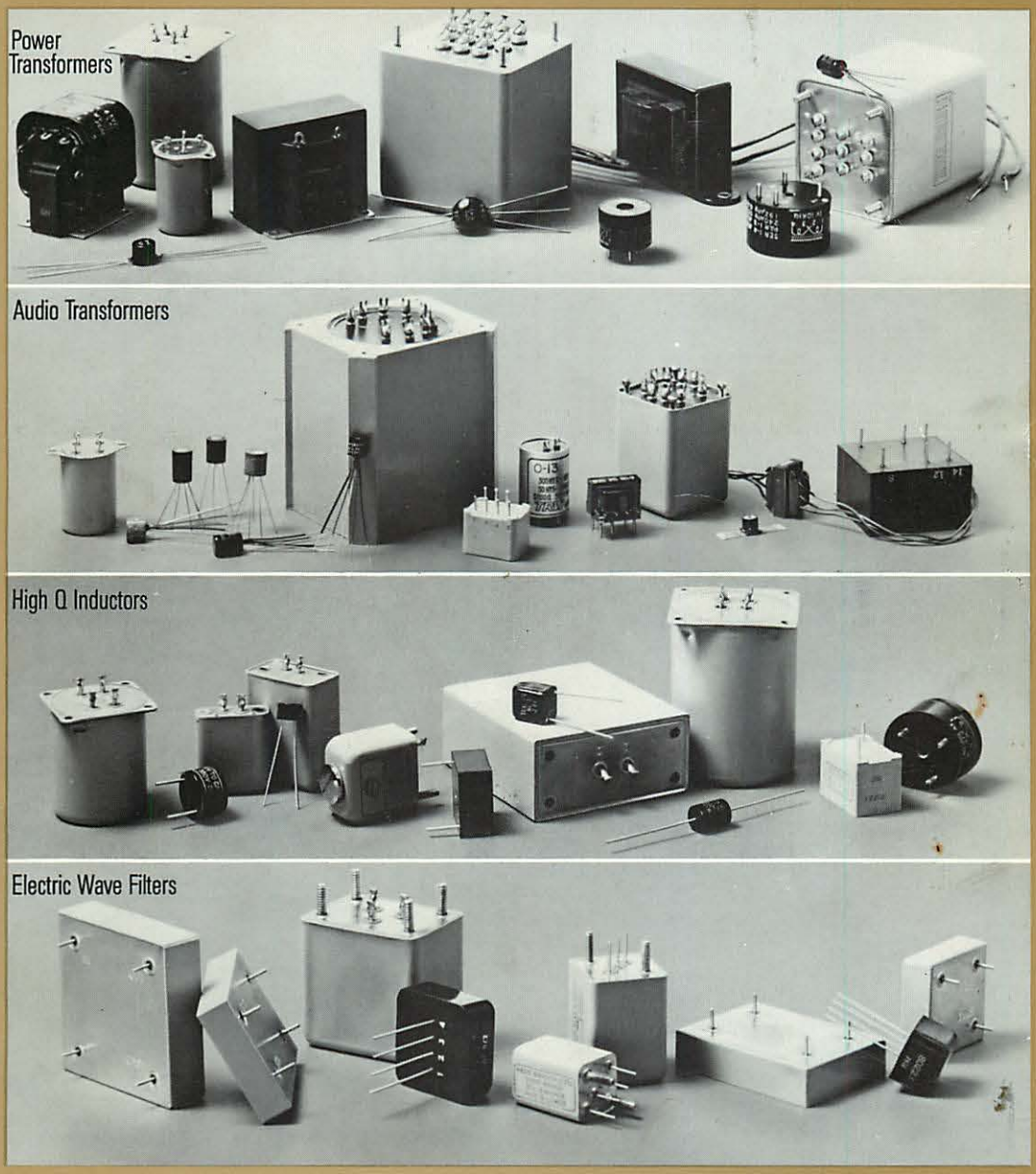
"UTC"

TRW

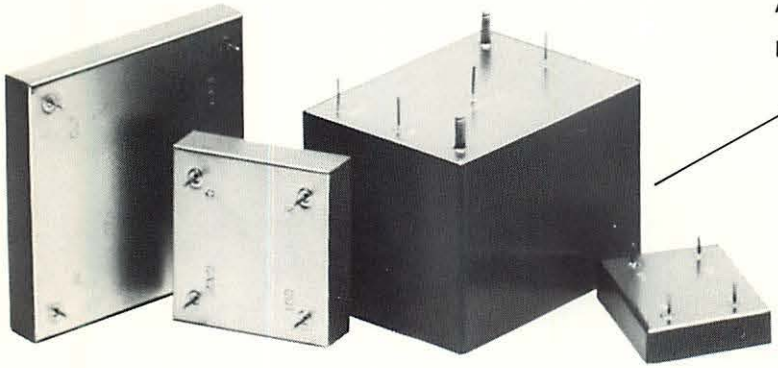
Master Catalog

Transformer and Coil Products
TRW Electronic Assemblies
Division

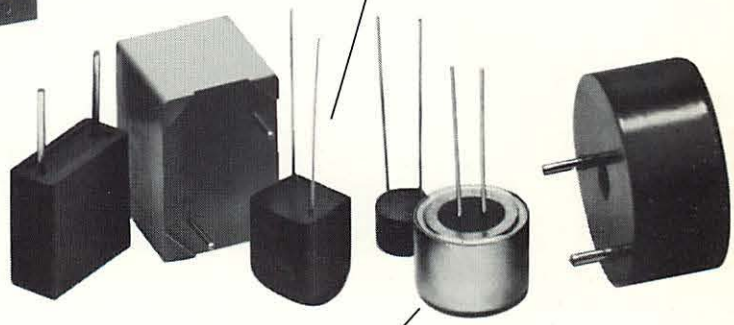


We're much more than a catalog house...

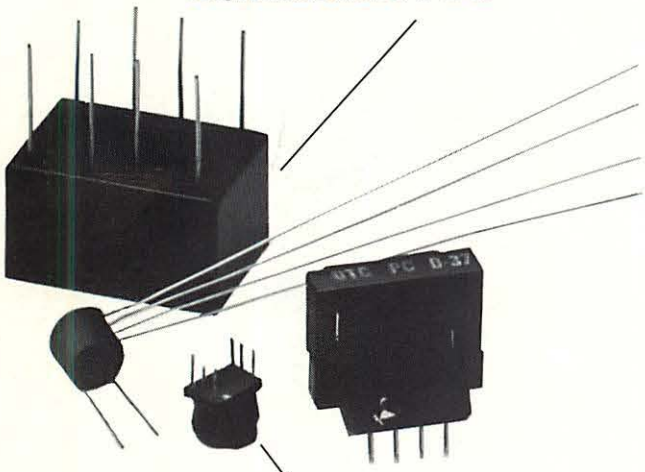
5.5-kHz band pass filter with linear phase characteristic.
Band width: ±300 Hz within 0.5 db
Attenuation: 85 db below 2.5 kHz,
50 db above 7 kHz
MIL type: FR4RX22YY1, MIL-F-18327D



Temperature stable, shielded inductor in ML configuration.
L=50 H; Q=approx. 16 at 400 Hz
Size: 7/16 in. x 1/2 in. x 5/16 in.
MIL type: TF5R20ZZ, MIL-T-27D



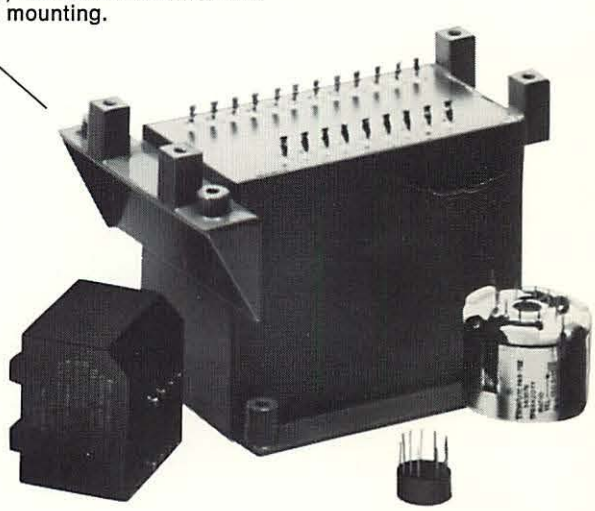
Electrostatically shielded transformer for modern coupling to telephone line.
Return loss: >26 db
Frequency response: ½ db, 300 Hz to 340 kHz
Longitudinal balance: >45 db

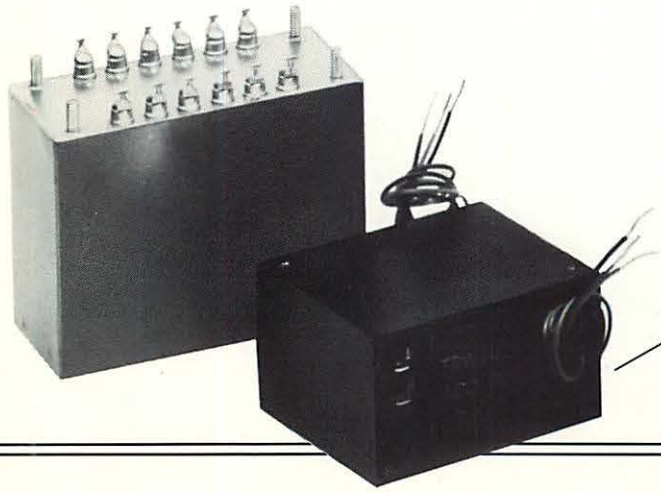


High-frequency, high-Q, temperature stable inductor in shielded case.
L=39 μH; Q=approx. 150 at 1.5 MHz
Size: .69 in. dia. x .5 in. h
MIL type: TF4R20YY, MIL-T-27D

Line-matching ultraminiature type.
will carry 3 mA DC unbalanced current.
Size: .43 in. x .4 in. x .3 in. h
Frequency range: .200 Hz to 100 kHz

Hermetically sealed metal-clad 3-phase, 400-Hz transformer with special mounting.





Molded, electrostatically shielded high-voltage transformer for a 4-kV corona-free application.

The one-stop total resource for hi-rel magnetics

(left) Frequency analysis on Spectrum Wave Analyzer for product development.

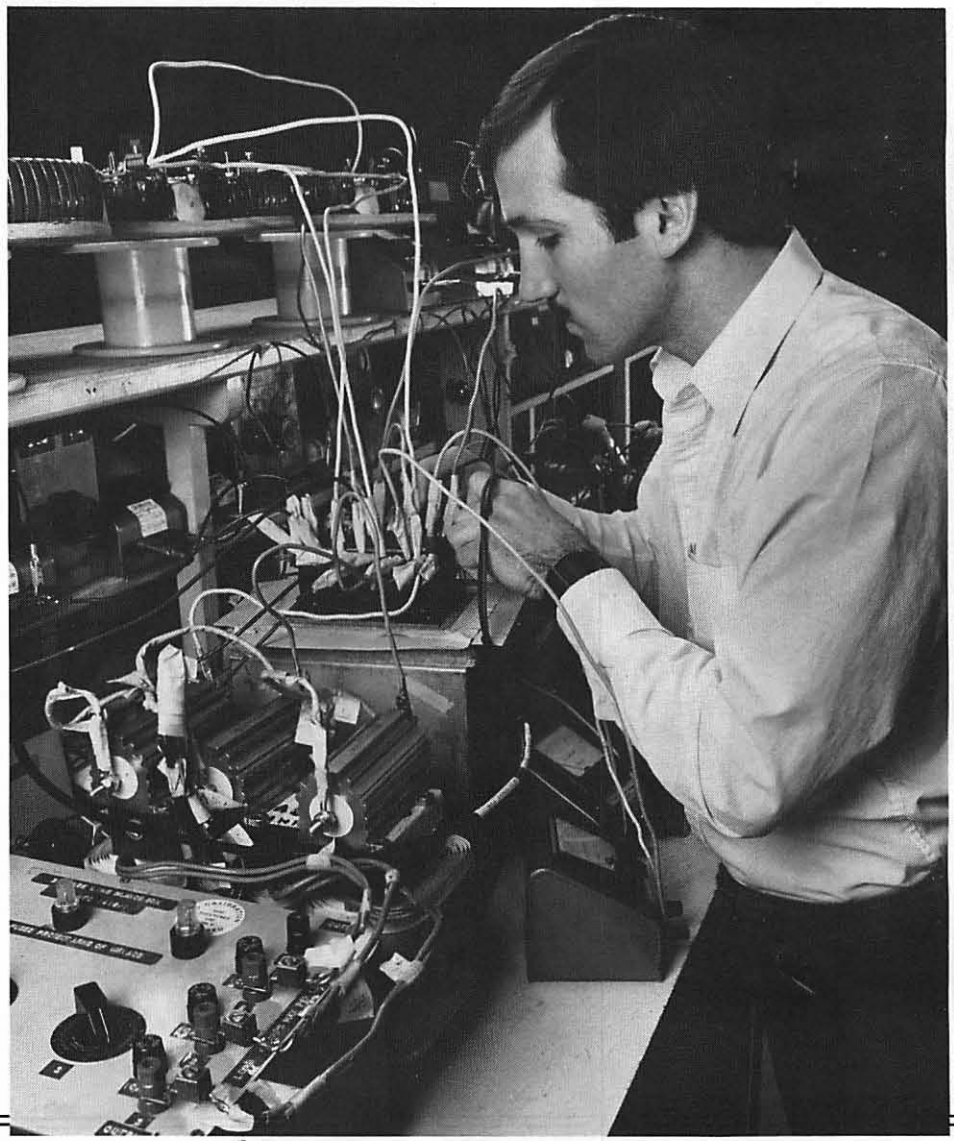
(below) Post Production Product Performance Testing. Three phase full load voltage measurement for documentation requirements.

The recognized leader in Hi-Rel magnetic components, TRW's Transformer and Coil Products operation provides you with the broadest line of quality transformers, inductors, filters, high-Q coils, and "next-step" inductive assemblies. More than 30,000 catalog and custom-designed part numbers range from ultra-miniature, hermetically sealed components weighing several grams to high efficiency transformers weighing several hundred pounds.

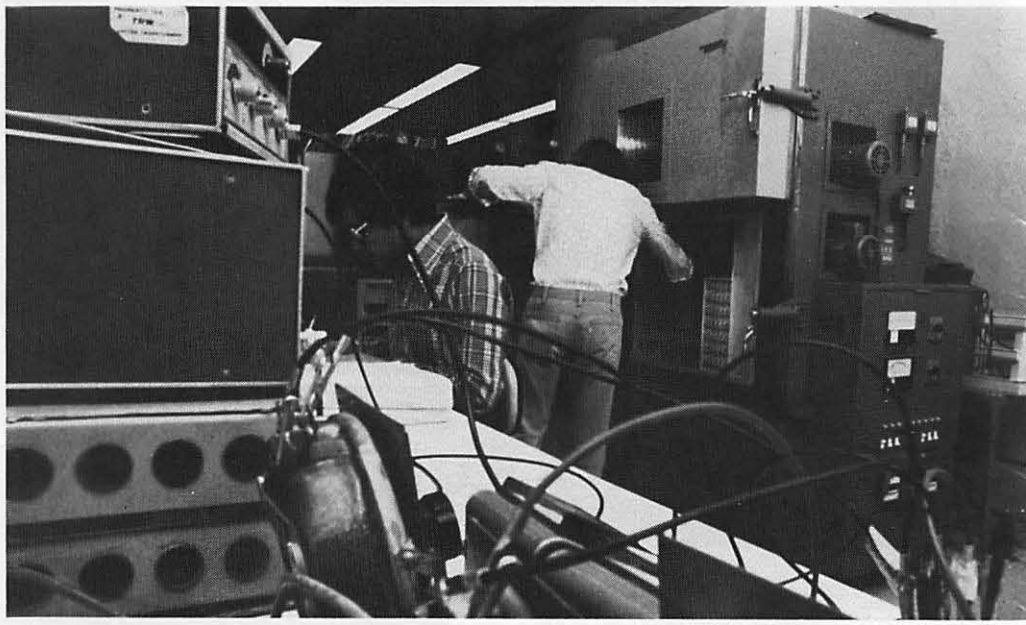
If our stock line doesn't contain your part, then our engineers will draw on their experience to custom design a component to meet your special design requirements. State-of-the-art technology and dedicated, experienced personnel ensure quick and economical design of your custom part. And now the Transformer & Coil Products operation can go the next step with you by handling the manufacture of your entire sub-assembly.

Extensive quality control, advanced testing facilities and on-going post-production inspection yield a product that will exceed the most stringent specifications.

In short, Transformer and Coil Products is the only stop you need to make your Hi-Rel magnetics needs. Experience, flexibility and dependability all under one roof.



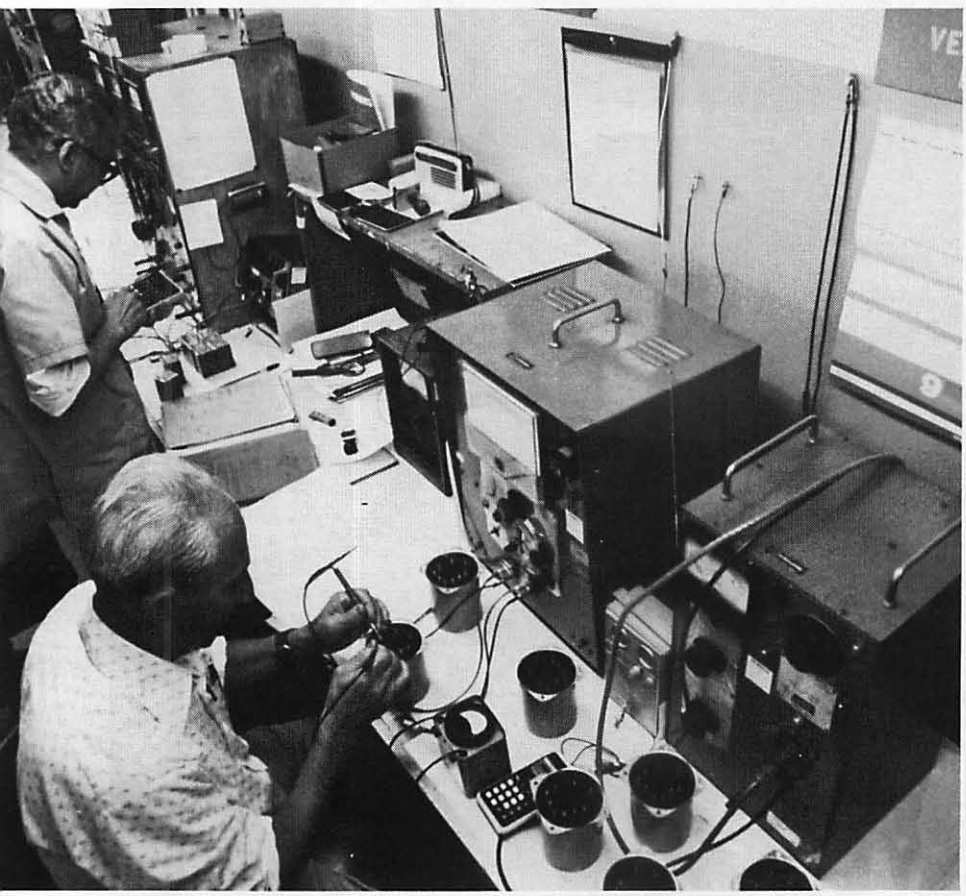
The quality leader . . .



(above) Inspection under 30X magnification for approved solder connections and general workmanship.

(below) Production electrical testing.

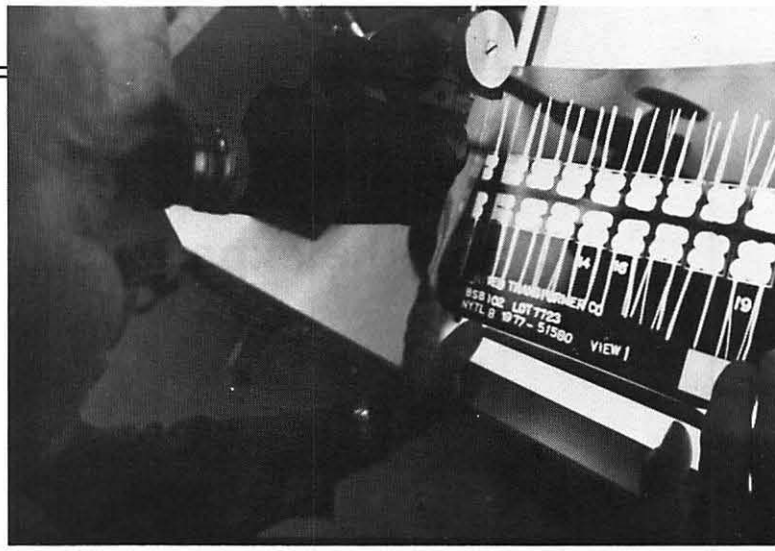
(right) Automatic Thermal Shock Testing to military specifications.

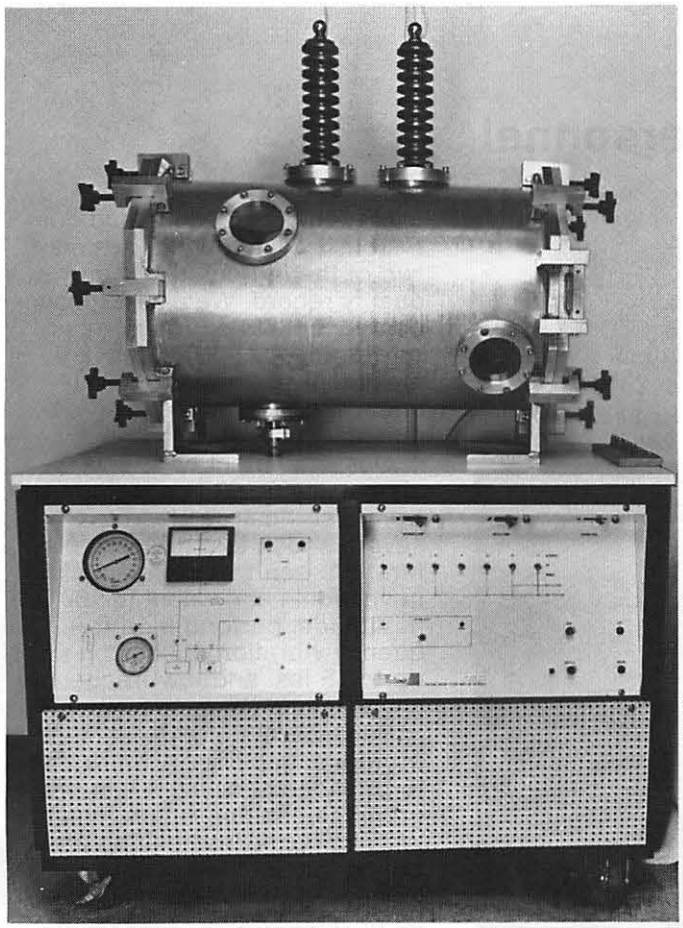


For over 50 years, TRW Transformer and Coil Products has produced components for the most demanding customers in the world. Our experience makes us the quality leader in the industry, with less than 1% of our total production parts returned to the factory. For the Hi-Rel engineer, whose critical circuits must be smaller, more accurate and highly reliable, this experience means rigorous quality control throughout production and MIL quality in all our parts:

- All in-house manufactured items, such as laminations and drawn cans, are subjected to the same strict inspection as materials furnished by outside vendors.
- Transformers and filter products are performance tested three separate times during successive stages of manufacture.
- Extensive environmental testing, including shock, moisture, altitude, high/low frequency vibration and electrical overload further ensure quality and reliability.

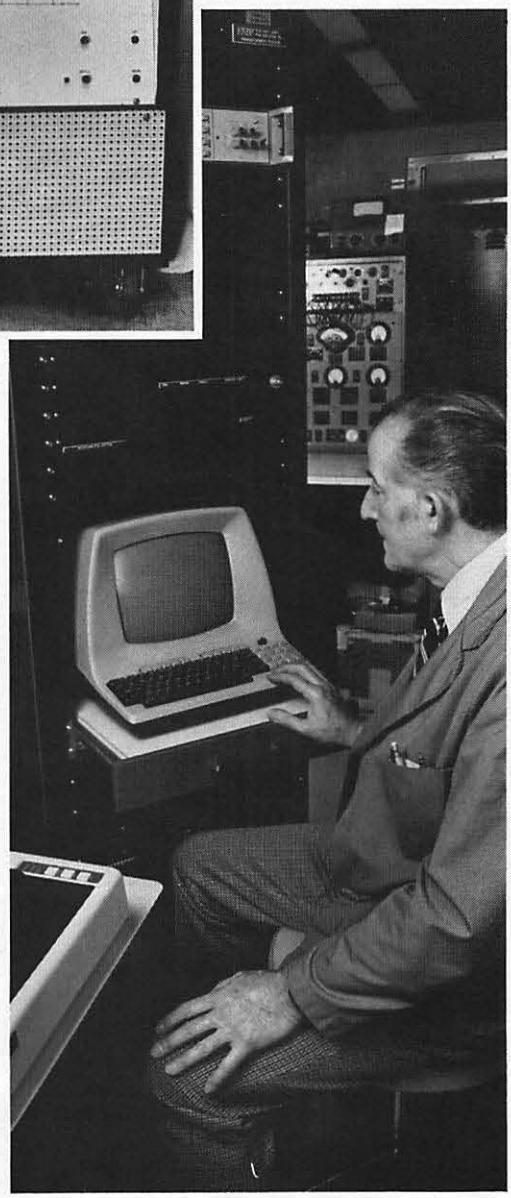
In this way, the performance and life of each component and sub-assembly are monitored—usually far beyond customer requirements.





(left) Vacuum chamber to simulate high altitude.

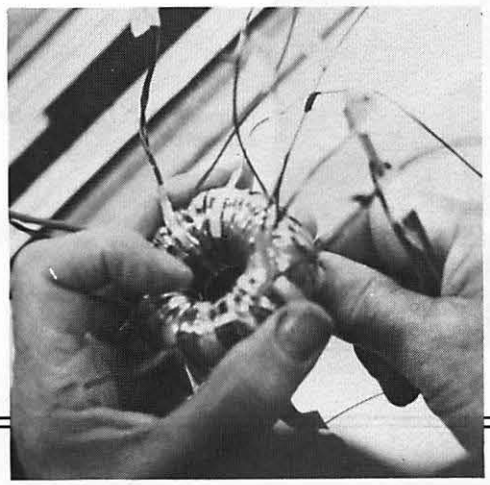
(above) Radiograph inspection.



State-of-the-art test and production facilities . . .

(right) Computer controlled ATE with print capability.

(below) Prototype development



We can provide QA software data services for Certificates of Compliance, certified summary, or special serialized test data, traceability and acceptance and qualification test plans.

In addition, we can arrange government source inspection or customer source inspection in our facilities for both in-process or end-item inspection.

QPL prototype similarity data for qualification extension approval is also available as a result of our extensive qualified product listings.

Tests comply with MIL-STD-202 and facilities comply with MIL-Q-9858A.

Our in-house test facilities are backed up by extensive manufacturing capabilities. For example, we do our own heliarc welding, machining, tool and die making and mold building. Computer aided design equipment allows our engineers to see the results of design changes immediately. Prototype samples made in the model shop aren't released to the customer until we're assured the product is produceable in volume.

By combining all these resources under one roof, we not only can offer and exceptionally broad array of production and testing capabilities, but also perform them quickly and economically.

...and the experienced personnel

Materials inspection and continuous quality control are only two of the ingredients in our quality record. We also expose components to a broad array of environmental tests to ensure maximum performance even under the most demanding circumstances.

Our equipment can simulate almost any adverse condition, from electrical overload to severe shock to extreme moisture. We can test components in vacuums equivalent to 150,000 ft. altitude, perform high-frequency vibration checks on units up to 15 lbs. and low-frequency checks on units up to 50 lbs.

Because of our extensive laboratory capabilities, we are able to provide specialized test programs to customer requirements. We can provide screening programs that include continuously monitored thermal shock, burn-in, or radiographic inspection.

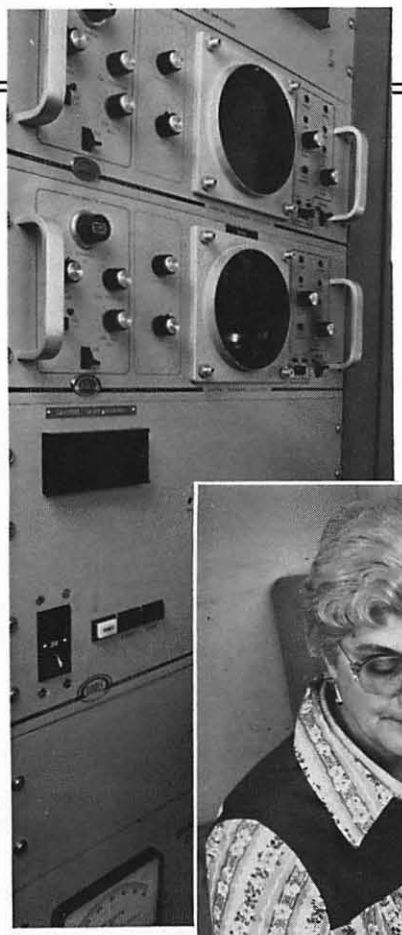
Qualification testing to MIL-T-27, MIL-F-18327, MIL-T-21038 and MIL-C-15305 are performed in-house, in our DESC-certified environmental test laboratories.

Other special test facilities include advanced corona detection, power component testing on computerized ATE and electric wave filter testing on Network and Spectrum analyzers.

(below) High speed bobbin winding with electronic counting.

(left) QA, QC Documentation specialists.

...to put it to work for you



(left) Ultra-sensitive corona detection system.

(right) Computer controlled network analyzer.

Our personnel are dedicated to uncompromising quality, putting technology and superior experience to work to make us your one-stop center for all your inductive needs. Materials inspection, environmental testing, advanced facilities—our staff is ready to make these capabilities work for you.

Drawing on their more than 25 years of experience, each of our design engineers will give practical answers to your design questions. Whether it a special miniature inductor or an entire custom-designed magnetics subassembly, they can find the best solution to your magnetics requirements.

Backing up our applications staff are dedicated marketing groups and a skilled manufacturing group that has long experience with advanced test and production equipment.

Experience and dedication to quality have made the Transformer and Coil Division the one-stop magnetics resource. Let us provide the solution to your Mil and industrial Hi-Rel magnetics needs by contacting us at: Transformer & Coil Products Operation, TRW Electronic Assemblies Division, 150 Varick Street, New York, NY 10013 or 212-255-3500, TWX: 710-581-2722.

(left) Hi-Rel customized sub-assembly production.

Product Index

AUDIO TRANSFORMERS

POWER TRANSFORMERS

SWITCH POWER MAGNETICS

PULSE TRANSFORMERS

HIGH Q COILS

ELECTRIC WAVE FILTERS

Selection Guide for TRW Transformers

STANDARD AUDIO TRANSFORMERS AND INDUCTORS

Product Series	Description	Frequency Range	Max. Power
Military Types: Grade 5, Metal Encased			
BIT-250	Ribbon style leads; compatible with transistor and IC flat pack styles. Transformers and inductors.	300 Hz to 250 kHz	80 mW @ 1 kHz
DO-T	Flexible 1½" Dumet leads. Ultraminiature transformers and inductors for transistor circuitry.	300 Hz to 20 kHz	500 mW @ 1 kHz
DO-T200	Plug-in — TO-5 pattern. Ultraminiature transformers and inductors for transistor style circuitry.	300 Hz to 20 kHz	100 mW @ 1 kHz
DI-T	Flexible 1½" Dumet leads. Ultraminiature transformers and inductors for transistor circuitry.	400 Hz to 100 kHz	500 mW @ 1 kHz
DI-T200	Plug-in — TO-5 pattern. Ultraminiature transformers and inductors for transistor circuitry.	400 Hz to 100 kHz	500 mW @ 1 kHz
TOP-1000	Plug-in, .50 D by .35 High Miniature transformers.	300 Hz to 75 kHz	.6 W @ 1 kHz
TOP-2000	Plug-in, .50D by .5 High Miniature transformers.	150 Hz to 75 kHz	1 W @ 1 kHz
TOP-3000	Plug-in, .750 D by .52 High Miniature transformers.	50 Hz to 30 kHz	2 W @ 1 kHz
Military Types: Grade 4, Metal Encased			
H	**Transformers** — Full line of input, interstage and output types for transistor and tube use. Chopper type transformers. **Inductors** — Range from .4 mHys to 450 Hys.	30 Hz to 20 kHz	1 mW to 10 mW
FHA	Low profile audio unit, straight 1" pin terminals for plug-in mounting.	300 Hz to 20 kHz	100 mW @ 300 Hz
W (Mil Std)	Qualified to Mil Stds. print No.'s M27/3-01A to M27/11-01A. Inputs, interstage and output types.	300 Hz to 10 kHz	2W @ 300 Hz
Military Types: Grade 5, Molded			
CMA, B, C	1 to 1 High frequency isolation transformer.	1.5 kHz to 5 MHz	35 mW to 230 mW
SSO-P	Transistor and tube type transformers. Input, interstage, output and inductors.	300 Hz to 20 kHz	100 mW @ 300 Hz
SO-P	Transistor and tube type transformers. Input, interstage, output and inductors.	200 Hz to 20 kHz	250 mW @ 200 Hz
MTC	Plug-in, MIL-T-27, transformers for telephone interconnect and hybrid action.	300 Hz to 4 kHz	10 mW
Industrial Types: Cased, Non-Hermetic			
0	Excellent quality compact audio transformers and inductors, full range of transistor and tube applications	300 Hz to 20 kHz	1 watt
A	Ultra compact wideband transistor and tube type transformers and inductors and hybrids.	10 kHz 50 kHz	5 Watt
LS	Linear standard transformers. Hi-fidelity, highest quality. Tube and transistor types. Includes low dist. high efficiency, shielded types, hybrid transformers. Broadcast quality.	7 Hz to 50 kHz	Low level to 50W
Industrial Types: Open Frame, Non-Hermetic			
SSO	Flexible lead type transformers and inductors for tube and transistor application. Channel frame available.	300 Hz to 20 kHz	100 mW
SO	Small, broadband type, flexible lead type. Transistor and tube types. Channel frame available.	200 Hz to 20 kHz	250 mW
PC	Plug-in types for mounting on PC boards. Same electrical characteristics as standard ouncer, sub-ouncer and sub-sub-ouncer lines.	100 Hz to 20 kHz 200 Hz to 20 kHz 300 Hz to 20 kHz	1W 250 mW 100 mW
TC	Plug-in and lead type transformers and inductors for telephone interconnect	100 Hz to 10 kHz	1 mW to 10 mW

IN ADDITION TO THE NEEDS met by TRW stock audio and power components listed on this page, there are many unique applications that can be met with special units.

Our catalog audio line, for example, represents close to 500 commercial and MIL grade components covering a frequency band from 5 Hz to 5 MHz, at levels of mWs to 250 W and ranging in weight from 1/20 oz. to 16 lb. Our custom designs — which often can be MIL qualified by similarity — cover an even broader range of frequencies and power ratings.

Custom power designs range from milliwatts to 100 kVA capacity. They comprise temperature ranges from Class R (105°C) to Class U (higher than 170°C.) All types of mechanical and electrical configurations are available, and special engineering emphasis is placed on individual requirements.

STANDARD POWER TRANSFORMERS AND INDUCTORS

Product Series	Description	Frequency	Power Range
Military Types			
CMA, B, C	Common mode inductors.	4.8A to 1.1A	1 mHys to 16 mHys
DO-T400	Flexible lead ultraminiature power transformer. Hermetically sealed to MIL-T-27D Grade 5, Metal Clad.	380 Hz to 2400 Hz	400 mW
FP	MIL-T-27, Grade 5, low profile power transformers. 115V pri; secs deliver 2 to 30V.	400 Hz	10W to 30W
LL	MIL-T-27 Inductors Grade 5. Axially leaded units. .365 D x .49 L.	.25 Amps to 3 Amps	30 μHys to 5000 μHys
H	Inductors. Hermetically sealed inductor to MIL-T-27D Grades 4 & 5.	.017A to 30A*	0.4 mHy to 450 Hyst
H	Hermetically sealed to MIL-T-27D. Grades 4 & 5. Transistor, filament, inverter and plate type. Metal clad & molded.	50 Hz to 2500 Hz	1.2 VA to 5.0 KVA
HIT	Ultra-shielded power line isolation transformers. Hermetically sealed to MIL-T-27D. Grade 4. 0.1 mfd or less, effective coupling.	50 Hz to 400 Hz	50W to 1200W
MET	Hermetically sealed metal clad to MIL-T-27D Grade 4. For 400 Hz application to give min. size. Transistor, filament, universal types.	380 Hz to 2400 Hz	1.4W to 240W
N	Mil. St'd. filament & plate transformers per MIL-T-27D. Grade 4 (ruggedized) construction.	50 Hz to 400 Hz	7.5W to 125W
PH/PV	MIL-T-27 3-phase transformers; Grades 4 & 5. Electrostatically shielded isolation and multi-output transformers.	50/60 Hz	25W-360W
PS	Plug-in inverter transformers.	50 kHz to 100 kHz	16W to 60W
SRA	Low inductance, high current miniature molded inductors.	up to 100 kHz up to 15A	8 μHys to 1250 μHyst
SRB	Low inductance, high current miniature molded inductors.	up to 100 kHz up to 15A	20 μHys to 3000 μHyst
SRC	Low inductance, high current miniature molded inductors.	up to 100 kHz up to 13.6A	60 μHys to 10,000 μHyst
SRD	High current, molded inductors.	Up to 100 kHz up to 13A	500 μHys to 5.6 Hys
TPC	Plug-in power transformers, MIL-T-27D Grade 5, Class S, low voltage, high current.	50/60 Hz	1.7 VA to 12 VA

STANDARD PULSE TRANSFORMERS

Type No.	Ratio	Pulse Width Micro-seconds	Rise Time Micro-seconds	Droop In %	Hi-Pot Voltage RMS	MIL Type Designation	Service
BIT-P	4:4:1	.05-100	.01-40	0-30	200	TP6RX4410CZ	Coupling and Blocking Oscillator
H-45 to H-57	1:1:1	.05-25	.01-2	0-30	1250	TP7SX1110	Coupling and Blocking Oscillator Higher Voltage, Tube, SCR, etc.
H-60 to H-68	4:4:1	.05-10	.012-.40	0-25	100	TP7SX4410AZ	Coupling and Blocking Oscillator
PIP	4:4:1 & 5:3:1	.05-10	.01-.40	0-15	100	TP6RX4410CZ TP6RX5310CZ	Coupling and Blocking Oscillator
PCH-45 to PCH-57	1:1:1	.05-25	.01-2	0-30	1250	TP7SX1110	Coupling and Blocking Oscillator Higher Voltage, Tube, SCR, etc.
PCH-60 to PCH-68	4:4:1	.05-10	.012-.40	0-25	100	TP7SX4410AZ	Coupling and Blocking Oscillator
MPX100 MPX200 MPX300	1CT:1CT 1.41CT: 1CT 1.25CT: 1CT	Manchester II (Bi-phase) 1 MHz Clock	0.1	20	100	TF7SX( )KZ	MIL-STD-1553B Command/Response Multiplex Data Bus

The BIT-250™ Line— A Surface Mount Device

TRW

AUDIO

PACKAGING

Size reduction without loss of performance is achieved by major reduction of air gaps in the magnetic circuit. Core permeability closely approaches the theoretical maximum for material and structure.

Materials, dimensions, and surface finish are identical with IC Flat Pack standards. Removable support protects terminal alignment prior to final assembly. This insulated support allows testing in conventional jigs.

RELIABILITY

Cylindrical bobbin-winding techniques eliminate corner stress normally found in fine-wire windings of conventional rectangular structures.

Lead arrangements and terminations have been designed to maximum reliability under thermal shock and temperature cycling.

FLEXIBILITY

The stock units shown on facing page are designed to afford maximum flexibility of application.

Transformers are 7-terminal types, with center-tapped primaries and split secondaries. When connected in parallel, split-winding secondaries provide ¼ the impedance and twice the DC current capability as series connections.

Inductors in the stock line include both single-winding and split-winding types.

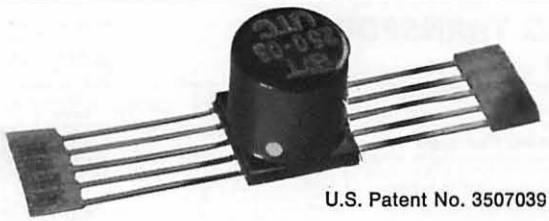
SPECIALS

BIT-250's not found in the stock line will be designed to customer's requirements.

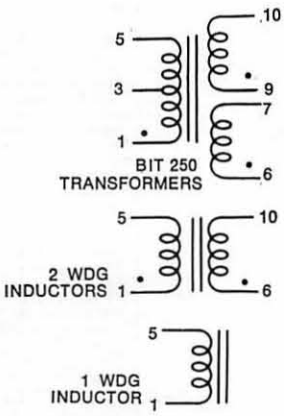
- Special electrical parameters
- 10 or more leads
- Operation to 130°C per MIL Class S.

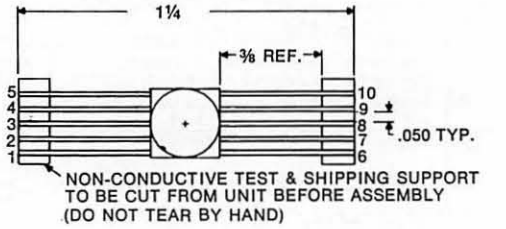
NOTES

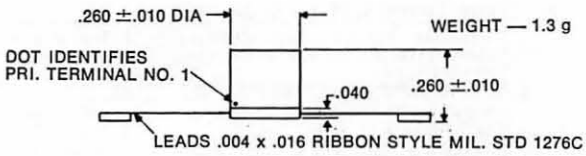
- **FREQUENCY RESPONSE** ±2 db, 300 Hz — 250,000 Hz, @ 1 MW Ref. level.
- **DIELECTRIC STRENGTH** tested @ 200 V RMS.
- **MIL SPECS** To complete MIL-T-27D Specs. Metal encased, ruggedized, Grade 5, Class R.
- **SHIELDING** All units electromagnetically self-shielded.
- **LEAD MATERIAL** Tinned ribbon-style, solderable and weldable — MIL-STD-1276C.



U.S. Patent No. 3507039







TRANSFORMERS

BIT-250 Type No.	MIL Part No.	Pri Imp Ω (CT)	Sec Imp Ω (Split Wdg) Series/Par	Power Level mW for 5% Max Dist @ 1 KHz	Pri DCR Ω	(Series Conn.) Sec DCRΩ	Turns Ratio Pri/ Sec/ Sec	Turns Ratio Pri./ Overall Sec	Typical Application
BIT-250-14	M27/173-03	150	12/3	80	16	1.85	7.1:1:1	3.54:1	Output
BIT-250-18	M27/173-04	300	600/150	80	30	65	1.4:1:1	1:1.4	Output or Matching
BIT-250-20	M27/173-05	400	400/100	80	45	45	2:1:1	1:1	Matching or Interstage
BIT-250-26	M27/173-06	500	50/12.5	80	58	5.5	6.32:1:1	3.16:1:1	Output
BIT-250-30	M27/173-07	600	600/150	80	65	65	2:1:1	1:1	Isolation or Matching
BIT-250-36	M27/173-08	1000	1000/250	80	110	100	2:1:1	1:1	Output or Matching
BIT-250-40	M27/173-02	1500	600/150	75	150	65	3.16:1:1	1.58:1	Output
BIT-250-48	M27/173-09	2000	8000/2000	75	177	745	1:1:1	1:2	Isolation or Interstage
BIT-250-56	M27/173-10	10K	500/125	75	900	45	8.92:1:1	4.46:1	Output or Driver
BIT-250-60	M27/173-11	10K	1200/300	75	900	100	5.78:1:1	2.89:1	Driver
BIT-250-64	M27/173-12	10K	2000/500	75	900	160	4.48:1:1	2.24:1	Interstage
BIT-250-70	M27/173-13	10K	10K/2500	75	900	750	2:1:1	1:1	Isolation or Interstage
BIT-250-90	M27/173-01	25K	1000/250	40	2400	78	10:1:1	5:1	Interstage

INDUCTORS

BIT-250 Type No.	MIL-Type	Connections	Inductance Hys Min @ 1 KHz 5 V	@ ma DC	DC Res Ω	Ratio of Wdgs.
BIT-250-03 (2 Wdgs)	TF5R20ZZ	Series	8.6 2.5	0 2	2260	1:1
		Parallel	2.4 .63	0 4	565	
BIT-250-05 (1 Wdg)	TF5R20ZZ		5.5 1.5	0 2	1000	
BIT-250-06 (1 Wdg)	TF5R20ZZ		.80 .25	1 6	250	
BIT-250-09 (2 Wdgs)	TF5R20ZZ	Series	.60 .15	0 5	146	1:1
		Parallel	.15 .038	0 10	37	

DO-T® Transistor Transformers and Inductors

AUDIO

PACKAGING

Hermetically sealed. A TRW pioneered structure. The bobbin is completely rigid eliminating stress and wire movement. The turns are circular in shape rather than square, eliminating turn corner stress and effecting uniform wire lay. No tapes are employed in connecting coil wire and external leads. They are rigidly anchored in secure terminal board fashion providing strain relief.

The leads used on the stock DO-T transformers are insulated solid .016 diameter Dumet leads. For plug-in type see page 12.

MIL SPECS To complete MIL-T-27D Specs. Units are fully ruggedized, hermetically sealed, **metal cased** to MIL Grade 5, Class R.

ALTITUDE 150,000 ft. max.

PERFORMANCE

The radically designed TRW DO-T Family (see pages 9-12) transistor transformers provide unprecedented power handling capacity and reliability, coupled with small size. Electrical parameters and areas of application exceed conventional transformer capabilities.

Curves on this page and on pages 11 & 12 indicate their performance compared to that of similar size units now on the market. These curves show representative performance of all DO-T's and DI-T's except 200,000 ohm units. Higher performance is obtained when used in push-pull with balanced DC. Other manufacturers' comparative performance is shown on these curves to put unjustified claims in perspective. For example, the TRW DO-T10 delivers 100 mW @ 5% distortion @ 300 Hz. **Identical measurements** were made on contemporary manufacturers' equivalent, rated at 50 mW @ 300 Hz. Actual delivered power was under **1 mW @ 7½% distortion @ 300 Hz.**

FREQUENCY RESPONSE ±3 db, 300 Hz to 20 kHz at 1 mw.

WORKING VOLTAGE 50 volts peak.

APPLICATION

Units can be used for different impedances from those shown, keeping in mind that impedance ratio is constant. Lower source impedance will improve low frequency response and level ratings . . . higher source will reduce them. Units may be used reversed, input to secondary. The frequency response curve on this page is shown to 20 kHz. This descriptive curve is not meant to be restrictive. Units can be used at frequencies well above 20 kHz. Satisfactory applications for frequencies up to and above 250 kHz have been developed.

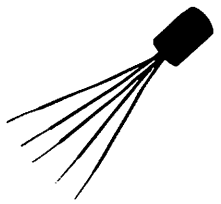
PULSE APPLICATION In pulse coupling impedance matching applications, (when measured with a 30 microsecond input pulse voltage wave), typical values for these transformers are: 5% or less droop, zero overshoot and less than 10% backswing.

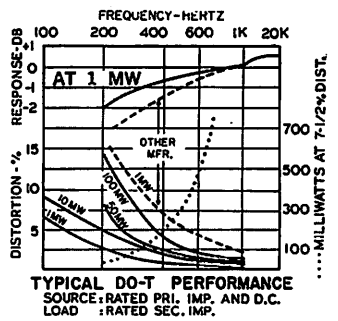
RELIABILITY The exceptional reliability of DO-T family units, inherent in their unique structure, has been dynamically proven in the field.

SHIELDING Hipermalloy electromagnetic shield available from stock for all DO-T family units. Order TRW P/N DOT-SH, or DIT-SH.

DILESIL HIGH TECHNOLOGY DO-T FAMILY TRANSFORMER

- A High Reliability version of the DO-T and DI-T line is available on special order. This alternate construction is designated DILESIL.
- DILESIL construction is intended for fine wire DO-T, DI-T transformers which are used in environments that produce prolonged thermal stress, far exceeding the thermal cycling specification requirements of MIL-T-27.
- DILESIL DO-T's have been approved and qualified by Defense Electronic Supply Command and appear on QPL-27 for MIL-T-27D.
- DILESIL construction is recommended for applications requiring extreme reliability under thermal stress. Thousands of these parts have been used in Hi-Rel Military and NASA applications for the past fifteen years.
- DILESIL DO-T and DI-T transformers are electrically identical to standard DO-T and DI-T parts. However, DILESIL parts are slightly larger than equivalent DO-T and DI-T parts.
- Contact the TRW engineering department for more detailed information.





TYPICAL DO-T PERFORMANCE
SOURCE: RATED PRI. IMP. AND D.C. LOAD : RATED SEC. IMP.

SPECIALS

For indication of possibilities of DO-T Family units custom built to your special requirements, contact the TRW Inductive Products engineering department.

The stock DO-T Family are Grade 5, Class R units, for a maximum operating temperature of 105°C in accordance with MIL-T-27D Specs. On special order they can be designed to Class S requirements of MIL-T-27D (130°C maximum operating temperature). No additional life expectancy is gained by ordering Class S insulation systems for applications in the vicinity of Class R temperatures. Where the operating temperatures are above 105°C, the use of Class S insulations will afford greater life expectancy.

Special units with electrical modifications of changed lead lengths, modified impedance ratios, and additions of electrostatic shields, etc., are available for all DO-T Family units.

Stock units cover general purpose applications. For specific applications cost reductions may be effected.

INDUCTOR DO-T™ LISTING

Type No.	MIL Type		
DO-T50 (2 Wdgs)	TF5R20ZZ	Series connection: .075 Hy @ 10 ma DC, .06 Hy @ 30 ma DC, DCR 10.5 ohms Parallel connection: .018 Hy @ 20 ma DC, .015 Hy @ 60 ma DC, DCR 2.6 ohms	
DO-T28	TF5R20ZZ	.3 Hy @ 4 ma DC, .15 Hy @ 20 ma DC	DCR 25 ohms
DO-T27	TF5R20ZZ	1.25 Hys @ 2 ma DC, .5 Hy @ 11 ma DC	DCR 100 ohms
DO-T8	TF5R20ZZ	3.5 Hys @ 2 ma DC, 1 Hy @ 5 ma DC	DCR 560 ohms
DO-T26	TF5R20ZZ	6 Hys @ 2 ma DC, 1.5 Hys @ 5 ma DC	DCR 2100 ohms
DO-T49 (2 Wdgs)	TF5R20ZZ	Series connection: 20 Hys @ 1 ma DC, 8 Hys @ 3 ma DC, DCR 5100 ohms Parallel connection: 5 Hys @ 2 ma DC, 2 Hys @ 6 ma DC, DCR 1275 ohms	

For Power DO-T Transformers (DO-T400 Series) See Catalog page 31

DO-T® Transistor Transformers and Inductors

TRW AUDIO

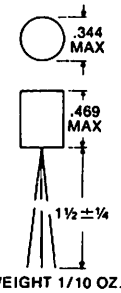
TRANSFORMER DO-T™ LISTING

Locating Line	Type No.	MIL Part No.	Pri. Imp. ‡‡	DC mat in Pri.	Sec. Imp. ‡‡	P. Max in mW @ 1 kHz 5% Dist.	DCR ±25% Pri.	DCR ±25% Sec. Ser. Conn.	Turns Ratio ±3% Pri.	Turns Ratio ±3% Sec. Ser. Conn.
1	DO-T44	M27/172-01	80 CT 100 CT	12 10	32 split 40 split	600	9.8	6	1.58	1
2	DO-T29	M27/172-02	120 CT 150 CT	10 10	3.2 4	600	10	.46	6.12	1
3	DO-T12	M27/172-03	150 CT 200 CT	10 10	12 16	600	11	1.5	3.54	1
4	DO-T13	M27/172-04	300 CT 400 CT	7 7	12 16	600	20	1.63	5	1
5	DO-T19	M27/172-05	300 CT	7	600	600	19	89	1	1.41
6	DO-T30	M27/172-06	320 CT 400 CT	7 7	3.2 4	600	20	.46	10	1
7	DO-T43	M27/172-07	400 CT 500 CT	8 6	40 split 50 split	600	46	8	3.16	1
8	DOT-42	M27/172-08	400 CT 500 CT	8 6	120 split 150 split	600	46	26	1.82	1
9	DO-T41	M27/172-09	400 CT 500 CT	8 6	400 split 500 split	600	46	74	1	1
10	DO-T53	M27/172-10	400 CT 500 CT	8 6	4000 CT 5000 CT	600	46	550	1	3.33
11	DO-T2	M27/172-11	500 600	3 3	50 60	600	60	8	3.16	1
12	DO-T20	M27/172-12	500 CT	5.5	600	600	31	90	1	1.1
13	DO-T4	M27/172-13	600	3	3.2	600	60	.58	13.7	1
14	DO-T55	TF5R21ZZ	600 CT	4	600 CT	600	47	47	1	1
15	DO-T14	M27/172-14	600 CT 800 CT	5 5	12 16	600	43	1.5	7.07	1
16	DO-T31	M27/172-15	640 CT 800 CT	5 5	3.2 4	600	43	.46	14.1	1
17	DO-T32	M27/172-16	800 CT 1000 CT	4 4	3.2 4	600	51	.46	15.8	1
18	DO-T15	M27/172-17	800 CT 1070 CT	4 4	12 16	600	51	1.5	8.15	1
19	DO-T21	M27/172-18	900 CT	4	600	600	53	89	1.22	1
20	DO-T3	M27/172-19	1000 1200	3 3	50 60	600	115	8	4.46	1
21	DO-T45	M27/172-20	1000 CT 1250 CT	3.5 3.5	16,000 split 20,000 split	100	120	940	1	4
22	DO-T16	M27/172-21	1000 CT 1330 CT	3.5 3.5	12 16	600	71	1.5	9.15	1
23	DO-T33	M27/172-22	1060 CT 1330 CT	3.5 3.5	3.2 4	600	71	.46	18.2	1
24	DO-T5	M27/172-23	1200	2	3.2	100	105	.58	19.35	1
25	DO-T17	M27/172-24	1500 CT 2000 CT	3 3	12 16	600	108	1.5	11.2	1
26	DO-T22	M27/172-25	1500 CT	3	600	600	86	89	1.58	1
27	DO-T34	M27/172-26	1600 CT 2000 CT	3 3	3.2 4	600	109	.46	22.4	1
28	DO-T51	M27/172-27	2000 CT 2500 CT	3 3	2000 split 2500 split	100	195	125	1	1
29	DO-T37	M27/172-28	2000 CT 2500 CT	3 3	8000 split 10,000 split	100	195	455	1	2
30	DO-T52*	TF5R21ZZ	4000 CT 5000 CT	2 2	8000 CT 10,000 CT	100	320	590	1	1.41
31	DO-T18	M27/172-29	7500 CT 10,000 CT	1 1	12 16	100	505	1.6	25	1
32	DO-T35	M27/172-30	8000 CT 10,000 CT	1 1	3.2 4	100	505	.46	50	1
33	DO-T48*	TF5R21ZZ	8000 CT 10,000 CT	1 1	1200 CT 1500 CT	100	640	110	2.58	1
34	DO-T47*	TF5R21ZZ	9000 CT 10,000 CT	1 1	9000 CT 10,000 CT	100	850	1080	1	1
35	DO-T6	M27/172-31	10,000	1	3.2	100	790	.68	55.7	1
36	DO-T9	M27/172-32	10,000 12,000	1 1	500 CT 600 CT	100	780	50	4.48	1
37	DO-T10	M27/172-33	10,000 12,500	1 1	1200 CT 1500 CT	100	780	115	2.89	1
38	DO-T25	M27/172-34	10,000 CT 12,000 CT	1 1	1500 CT 1800 CT	100	780	126	2.58	1
39	DO-T38	M27/172-35	10,000 CT 12,000 CT	1 1	2000 split 2400 split	100	560	230	2.24	1
40	DO-T11	M27/172-36	10,000 12,500	1 1	2000 CT 2500 CT	100	780	190	2.24	1
41	DO-T36	M27/172-37	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	100	975	1175	1	1
42	DO-T1	M27/172-38	20,000 30,000	.5 .5	800 1200	50	830	115	5	1
43	DO-T23	M27/172-39	20,000 CT 30,000 CT	.5 .5	800 CT 1200 CT	50	830	115	5	1
44	DO-T39	M27/172-40	20,000 CT 30,000 CT	.5 .5	1000 split 1500 split	50	800	113	4.47	1
45	DO-T40	M27/172-41	40,000 CT 50,000 CT	.25 .25	400 split 500 split	50	1700	60	10	1
46	DO-T54	M27/172-42	40,000 CT 50,000 CT	.25 .25	4000 CT 5000 CT	50	1700	450	3.33	1
47	DO-T46*	TF5R21ZZ	100,000 CT	0	500 CT	25	7900	85	14.14	1
48	DO-T7	M27/172-43	200,000	0	1000	25	9000	100	14.14	1
49	DO-T24	M27/172-44	200,000 CT	0	1000 CT	25	9000	100	14.14	1
	DO-TSH	Drawn Hipermalloy shield and cover for DO-T's provides 20 to 30 db shielding. .55" h x .36" dia. ⅛" hole in cover.								
	DO-TSH-2†	Drawn Hipermalloy shield and cover for DO-T's provides 20 to 30 db shielding. .64" h x .383" dia. ⅛" hole in cover.								

See Catalog page 31 for TRW's line of 400 cycle DO-T Transformers.
‡ maDC shown is for single ended usage. For push-pull, maDC can be any balanced value taken by .5W transistors.
Where windings are listed as split, ¼ of the listed impedance is available by paralleling the winding.
* Includes electrostatic shield.
† DO-TSH2 fits over DO-TSH.

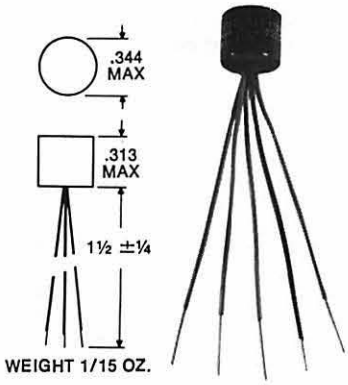
Unit Locating Key

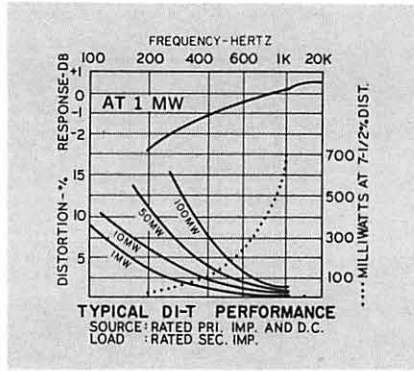
Type No.	Located on Line
DO-T1	42
DO-T2	11
DO-T3	20
DO-T4	13
DO-T5	24
DO-T6	35
DO-T7	48
DO-T8	Pg. 9
DO-T9	36
DO-T10	37
DO-T11	40
DO-T12	3
DO-T13	4
DO-T14	15
DO-T15	18
DO-T16	22
DO-T17	25
DO-T18	31
DO-T19	5
DO-T20	12
DO-T21	19
DO-T22	26
DO-T23	43
DO-T24	49
DO-T25	38
DO-T26	Pg. 9
DO-T27	Pg. 9
DO-T28	Pg. 9
DO-T29	2
DO-T30	6
DO-T31	16
DO-T32	17
DO-T33	23
DO-T34	27
DO-T35	32
DO-T36	41
DO-T37	29
DO-T38	39
DO-T39	44
DO-T40	45
DO-T41	9
DO-T42	8
DO-T43	7
DO-T44	1
DO-T45	21
DO-T46	47
DO-T47	34
DO-T48	33
DO-T49	Pg. 9
DO-T50	Pg. 9
DO-T51	28
DO-T52	30
DO-T53	10
DO-T54	46
DO-T55	14



WEIGHT 1/10 OZ.

DI-T® Transistor Transformers and Inductors





FREQUENCY RESPONSE ±3 db, 400 Hz to 100 kHz at 1 mW.

UNIT LOCATION KEY

Type No.	Located on Line	Type No.	Located on Line
DI-T1	23	DI-T26	28
DI-T2	7	DI-T27	26
DI-T3	11	DI-T28	25
DI-T5	12	DI-T36	22
DI-T8	27	DI-T37	15
DI-T9	17	DI-T38	20
DI-T10	18	DI-T41	5
DI-T11	21	DI-T43	4
DI-T19	3	DI-T44	1
DI-T20	8	DI-T51	14
DI-T21	10	DI-T52	16
DI-T22	13	DI-T53	6
DI-T23	24	DI-T55	9
DI-T25	19	DI-T56	2

PACKAGING DO-T family; see Cat. p. 9.

MIL SPECS To complete MIL-T-27D Specs. Grade 5. Class R.

Locating Line	Type No.	MIL Type	Pri. Imp. Ω	ma D.C.‡ In Pri.	Sec. Imp. Ω	Pri. DCR Ω	mw Level*	Application
1	DI-T44	TF5R21ZZ	80 CT 100 CT	12 10	32 split 40 split	11.5	500	Interstage
2	DI-T56	TF5R21ZZ	150 CT	10	150 CT	14	500	Coupling
3	DI-T19	TF5R21ZZ	300 CT	7	600	20	500	Output to line
4	DI-T43	TF5R21ZZ	400 CT 500 CT	8 6	40 split 50 split	50	500	Interstage
5	DI-T41	TF5R21ZZ	400 CT 500 CT	8 6	400 split 500 split	50	500	Interstage or output (Ratio 2:1:1) also wide pulse application
6	DI-T53	TF5R21ZZ	400 CT 500 CT	8 6	4000 CT 5000 CT	33	500	Input or driver to low noise transistor
7	DI-T2	TF5R21ZZ	500 600	3 3	50 60	65	100	Output
8	DI-T20	TF5R21ZZ	500 CT	5.5	600	32	500	Output or line to line or mixing
9	DI-T55	TF5R21ZZ	600 CT	4	600 CT	47	500	Isolation or Interstage (Ratio 1:1) also wide pulse application
10	DI-T21	TF5R21ZZ	900 CT	4	600	53	500	Output to line
11	DI-T3	TF5R21ZZ	1000 1200	3 3	50 60	110	100	Output
12	DI-T5	TF5R21ZZ	1200	2	3.2	110	100	Output
13	DI-T22	TF5R21ZZ	1500 CT	3	600	87	500	Output to line
14	DI-T51	TF5R21ZZ	2000 CT 2500 CT	3 3	2000 split 2500 split	180	100	Isolation or Interstage (Ratio 2:1:1) also wide pulse application
15	DI-T37	TF5R21ZZ	2000 CT 2500 CT	3 3	8000 split 10,000 split	180	100	Isolation or Interstage (Ratio 1:1:1) also wide pulse application
16	DI-T52	TF5R21ZZ	4000 CT 5000 CT	2 2	8000 CT 10,000 CT	300	100	Interstage Includes electrostatic shield
17	DI-T9	TF5R21ZZ	10,000 12,000	1 1	500 CT 600 CT	870	100	Output or driver
18	DI-T10	TF5R21ZZ	10,000 12,500	1 1	1200 CT 1500 CT	870	100	Driver
19	DI-T25	TF5R21ZZ	10,000 CT 12,000 CT	1 1	1500 CT 1800 CT	870	100	Interstage
20	DI-T38	TF5R21ZZ	10,000 CT 12,000 CT	1 1	2000 split 2400 split	620	100	Interstage
21	DI-T11	TF5R21ZZ	10,000 12,500	1 1	2000 CT 2500 CT	870	100	Driver
22	DI-T36	TF5R21ZZ	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	970	100	Isolation or Interstage (Ratio 1:1) also wide pulse application
23	DI-T1	TF5R21ZZ	20,000 30,000	.5 .5	800 1200	815	50	Interstage
24	DI-T23	TF5R21ZZ	20,000 CT 30,000 CT	.5 .5	800 CT 1200 CT	815	50	Interstage
25	DI-T28	TF5R20ZZ	.1 Hy @ 4 ma DC, .08 Hy @ 10 ma DC			25		Inductor
26	DI-T27	TF5R20ZZ	.9 Hy @ 2 ma DC, .5 Hy @ 6 ma DC			105		Inductor
27	DI-T8	TF5R20ZZ	2.5 Hys @ 2 ma DC, .9 Hy @ 4 ma DC			630		Inductor
28	DI-T26	TF5R20ZZ	4.5 Hys @ 2 ma DC, 1.2 Hys @ 4 ma DC			2300		Inductor
29	DI-TSH	Drawn Hipermalloy shield and cover for DI-T's provides 20 to 30 db shielding .390″ h x .359″ dia. ⅛″ hole in cover.						

* For 5% maximum distortion @ 1 kHz.

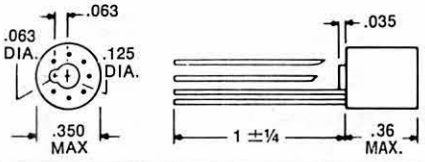
‡ ma DC shown is for single ended usage. For push-pull, ma DC can be any balanced value taken by .5W transistors. Where windings are listed as split, ¼ of the listed impedance is available by paralleling the winding.

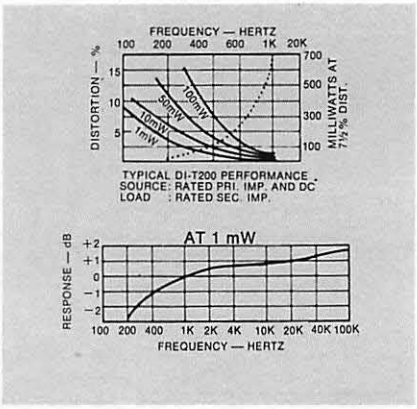
DO-T200 and DI-T200 Series Transformers and Inductors

TRW

AUDIO

HEIGHT .562 FOR DO-T
Weight: 1/15 OZ. DI-T
1/8 OZ. DO-T





PACKAGING Metal encased. DO-T family unit. See Catalog page 9.

MIL SPECS To complete MIL-T-27D Specs. Ruggedized, metal encased to MIL Grade 5, Class R.

FREQUENCY RESPONSE At 1 mW ±3 db, 300 Hz to 20 kHz, DO Type; ±3 db, 400 Hz to 100 kHz, DI Type.

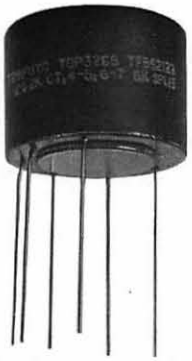
TERMINALS Leads are .016 Dumet wire, tinned, and may be either welded or soldered. They are uninsulated and are spaced on a .1″ radius circle, conforming to the termination pattern of the "TO-76" cased semiconductors and micrologic elements.

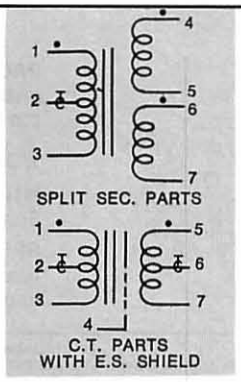
Type No.	MIL Part No.	Pri. Imp.Ω	ma D.C.‡ In Pri.	Sec. Imp. Ω	Pri. DCR Ω	mw Level*	Application
DO-T255	M27/76-07	1000 CT 1200 CT	3 3	50 60	115	100	Output or matching
DO-T275	M27/76-06	10,000 CT 12,000 CT	1 1	1500 CT 1800 CT	780	100	Interstage
DO-T277	M27/76-05	10,000 CT 12,000 CT	1 1	2000 split 2400 split	560	100	Interstage
DO-T278	M27/76-04	10,000 12,500	1 1	2000 CT 2500 CT	780	100	Driver
DO-T283	M27/76-03	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	975	100	Isolation or Interstage (Ratio 1:1) also pulse application
DO-T288	M27/76-02	20,000 CT 30,000 CT	.5 .5	800 CT 1200 CT	830	50	Interstage
DO-T297	M27/76-01	200,000 CT	0	1000 CT	8500	25	Input and Chopper
DO-T200SH	Drawn Hipermalloy shield provides 15 to 20 db shielding through side of case, .578″ h x .375″ dia. no cover.						
DI-T225	M27/103-15	80 CT 100 CT	12 10	32 split 40 split	11.5	500	Interstage
DI-T227	TF5R21ZZ	150 CT	10	150 CT	14	500	Coupling
DI-T230	M27/103-14	300 CT	7	600 CT	20	500	Output or line to line or matching
DI-T235	M27/103-13	400 CT 500 CT	8 6	40 split 50 split	50	500	Interstage
DI-T240	M27/103-12	400 CT 500 CT	8 6	400 split 500 split	50	500	Interstage or output (Ratio 2:1:1) also wide pulse application
DI-T245	M27/103-11	500 CT 600 CT	3 3	50 CT 60 CT	65	500	Output or matching
DI-T250	M27/103-10	500 CT	5.5	600 CT	32	500	Output or line to line or mixing or matching
DI-T228	TF5R21ZZ	600 CT	3	75 CT	56	500	Output or line to line matching
DI-T255	M27/103-09	1000 CT 1200 CT	3 3	50 CT 60 CT	110	500	Output or matching
DI-T260	M27/103-08	1500 CT	3	600 CT	87	500	Output to line or matching
DI-T265	M27/103-07	2000 CT 2500 CT	3 3	8000 split 10,000 split	180	100	Isolation or Interstage (Ratio 1:1:1) also wide pulse application
DI-T270	M27/103-06	10,000 CT 12,000 CT	1 1	500 CT 600 CT	870	100	Output or driver
DI-T273	M27/103-05	10,000 CT 12,500 CT	1 1	1200 CT 1500 CT	870	100	Output or driver
DI-T276	M27/103-04	10,000 CT 12,000 CT	1 1	2000 CT 2400 CT	870	100	Interstage or driver
DI-T278	M27/103-03	10,000 CT 12,500 CT	1 1	2000 split 2500 split	620	100	Interstage or driver
DI-T283	M27/103-01	10,000 CT 12,000 CT	1 1	10,000 CT 12,000 CT	970	100	Isolation or Interstage (Ratio 1:1) also wide pulse application
DI-T288	M27/103-02	20,000 CT 30,000 CT	.5 .5	800 CT 1200 CT	815	50	Interstage or driver
DI-T290	M27/103-16	600 CT	4	600 CT	47	500	Isolation or Interstage (Ratio 1:1) also wide pulse application
DI-T204	TF5R20ZZ	Split Inductor (2 wdgs) Series connected: .1 Hy @ 4 ma DC, .08 Hy @ 10 ma DC, DCR 25 ohms Parallel connected: .025 Hy @ 8 ma DC, .02 Hy @ 20 ma DC, DCR 6 ohms					
DI-T208	TF5R20ZZ	Split Inductor (2 wdgs) Series connected: .9 Hy @ 2 ma DC, .5 Hy @ 6 ma DC, DCR 105 ohms Parallel connected: .2 Hy @ 4 ma DC, .1 Hy @ 12 ma DC, DCR 26 ohms					
DI-T212	TF5R20ZZ	Split Inductor (2 wdgs) Series connected: 2.5 Hys @ 2 ma DC, .9 Hy @ 4 ma DC, DCR 630 ohms Parallel connected: .6 Hy @ 4 ma DC, .2 Hy @ 8 ma DC, DCR 157 ohms					
DI-T216	TF5R20ZZ	Split Inductor (2 wdgs) Series connected: 4.5 Hys @ 2 ma DC, 1.2 Hys @ 4 ma DC, DCR 2300 ohms Parallel connected: 1.1 Hys @ 4 ma DC, .3 Hy @ 8 ma DC, DCR 575 ohms					
DI-T200SH	Drawn Hipermalloy shield provides 15 to 20 db shielding through side of case. .421″ h x .375″ dia. no cover.						

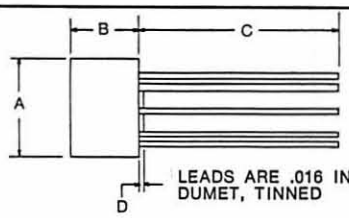
* For 5% maximum distortion @ 1 kHz ‡ ma DC shown is for single ended usage. For push-pull, ma DC can be any balanced value taken by .5W transistors.
Where windings are listed as split, ¼ of the listed impedance is available by paralleling the winding.

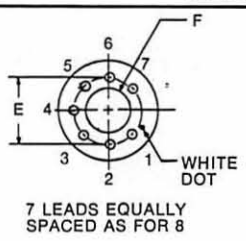
TRW TRANSFORMER & COIL PRODUCTS, 150 Varick Street, New York, NY 10013, Telephone: (212) 255-3500, TWX: 710-581-2722

TOP Transistor Transformers









DIMENSIONS

	A MAX.	B MAX.	C ±.25	D ±.010	E ±.010	F ±.010
TOP-1000 SERIES	.5	.35	1.0	.020	.35	.218
TOP-2000 SERIES	.5	.50	1.0	.020	.35	.218
TOP-3000 SERIES	.75	.52	1.0	.020	.60	.475

TOP-1000 Series (TF5S21ZZ) FREQUENCY RESPONSE ±3 DB 300 Hz-75 KHz at 1 mW

Type No.	Pri. Imp. (Ω)	ma DC in Pri.	Sec. Imp. (Ω)	Power (Watts) † at 1 kHz & Higher	at 400 Hz	at 300 Hz	DCR Pri./Sec. (±25%)	Turns Ratio Pri./Sec.
TOP-1265	150 CT	11	150 Split	.6	.3	.16	13/18.3	1/1
TOP-1270	150 CT	11	600 Split	.6	.3	.16	13/75	1/2
TOP-1380	600 CT	5.5	600 Split	.6	.3	.16	57/79	1/1
TOP 1385*	600 CT	5.5	600 CT	.6	.3	.16	53/75	1/1
TOP-1387	600 CT	5.5	1200 Split	.6	.3	.16	53/105	1/1.41
TOP-1490*	2000 CT	3	2000 CT	.6	.3	.16	198/218	1/1
TOP-1495	2000 CT	3	8000 Split	.6	.3	.16	198/850	1/2
TOP-1640	10,000 CT	1.4	10,000 Split	.6	.3	.16	865/1215	1/1
TOP-1645*	10,000 CT	1.4	10,000 CT	.6	.3	.16	1060/1215	1/1
TOP-1655	15,000 CT	1	600 Split	.6	.3	.16	1305/72.5	5/1

TOP-1000SH Drawn Hipermalloy Shield — .53 O.D. x .40 H

TOP-2000 Series (TF5S21ZZ) FREQUENCY RESPONSE ±3 DB 150 Hz-75 KHz at 1 mW

Type No.	Pri. Imp. (Ω)	ma DC in Pri.	Sec. Imp. (Ω)	Power (Watts)† at 1 kHz & Higher	at 400 Hz	at 150 Hz	DCR Pri./Sec. (±25%)	Turns Ratio Pri./Sec.
TOP-2265	150 CT	8	150 Split	1	.75	.075	12/20	1/1
TOP-2270	150 CT	8	600 Split	1	.75	.075	12/82	1/2
TOP-2380	600 CT	4	600 Split	1	.75	.075	60/66	1/1
TOP-2385*	600 CT	4	600 CT	1	.75	.075	60/68	1/1
TOP-2387	600 CT	4	1200 Split	1	.75	.075	60/116	1/1.41
TOP-2490*	2000 CT	2	2000 CT	1	.75	.075	175/240	1/1
TOP-2495	2000 CT	2	8000 Split	1	.75	.075	185/1015	1/2
TOP-2640	10,000 CT	1	10,000 Split	1	.75	.075	780/1075	1/1
TOP-2645*	10,000 CT	1	10,000 CT	1	.75	.075	715/985	1/1
TOP-2655	15,000 CT	.8	600 Split	.66	.66	.075	1165/80	5/1
TOP-2695	20,000 CT	.7	1000 Split	.5	.5	.075	1750/135	4.47/1
TOP-2814	100,000 CT	.3	2000 Split	.1	.1	.075	10,000/248	7.07/1

TOP-2000SH Drawn Hipermalloy Shield — .53 O.D. x .55 H

TOP-3000 Series (TF5S21ZZ) FREQUENCY RESPONSE ±3 DB 50 Hz-30 KHz at 1 mW

Type No.	Pri. Imp. (Ω)	ma DC in Pri.	Sec. Imp. (Ω)	Power (Watts) † at 1 kHz & Higher	at 400 Hz	at 50 Hz	DCR Pri./Sec. (±25%)	Turns Ratio Pri./Sec.
TOP-3065	150 CT	8	150 Split	2	1.5	.03	12/16.5	1/1
TOP-3070	150 CT	8	600 Split	2	1.5	.03	12/66	1/2
TOP-3180	600 CT	4	600 Split	2	1.5	.03	48/66	1/1
TOP-3185*	600 CT	4	600 CT	2	1.5	.03	48/66	1/1
TOP-3187	600 CT	4	1200 Split	2	1.5	.03	48/132	1/1.41
TOP-3290*	2000 CT	2.2	2000 CT	2	1.5	.03	160/220	1/1
TOP-3295	2000 CT	2.2	8000 Split	2	1.5	.03	160/880	1/2
TOP-3440	10,000 CT	1	10,000 Split	1	1	.03	800/1100	1/1
TOP-3445*	10,000 CT	1	10,000 CT	1	1	.03	800/1100	1/1
TOP-3455	15,000 CT	.8	600 Split	.66	.66	.03	1200/66	5/1
TOP-3495	20,000 CT	.7	1000 Split	.5	.5	.03	1600/110	4.47/1
TOP-3614	100,000 CT	.3	2000 Split	.1	.1	.03	8000/220	7.07/1

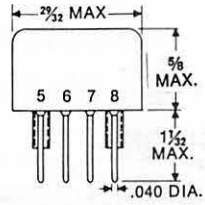
TOP-3000SH Drawn Hipermalloy Shield — .78 O.D. x .57 H

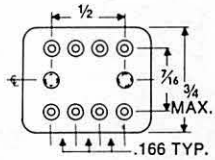
* Includes Electrostatic Shield.

† For 5% Dist at Rated Frequency.

Inductors and Audio Transformers

Subminiature/FH Case





PACKAGING Hermetically sealed. Metal encased. Low profile type with straight pin terminals.

WORKING VOLTAGE 175 pk.

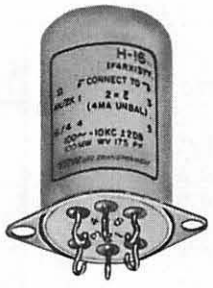
MIL SPECS To complete MIL-T-27D Specs. Grade 4, Class R.

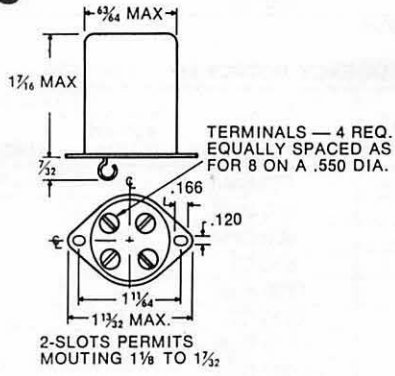
SPECIALS High permeability cases, different pins, higher temperature, different impedance ratios, etc., to your specs.

Type No.	Application	MIL Type	Pri. Imp. Ohms	Sec. Imp. Ohms	Pri. Unbal. ma DC	Response ±2 db (Hz)	Max. Level dbm	Max. Level mw
FHA-33	Single plate to low imp.	M27/200-01	30,000	50	1	300-10,000	+15	30
FHA-38	Transistor Interstage	TF4R21YY	10,000 CT (DCR600)	1200 CT	2	300-10,000	+15	30
FHA-39	Transistor Interstage	TF4R21YY	10,000 CT (DCR600)	2000 CT	2	300-10,000	+15	30
FHA-40A	Transistor Output	TF4R21YY	500 CT (DCR26)	600 CT	10	300-10,000	+15	30
FHA-41A	Transistor Output	TF4R21YY	1500 CT (DCR71)	600 CT	7	300-10,000	+15	30
FHA-42A	Isolation or Transistor Interstage	TF4R21YY	10,000 CT	10,000 CT	1	300-10,000	+20	100
FHA-10	Isolation or Transistor Interstage	TF4R21YY	5000/1250 split	5000/1250 split	4	300-20,000	+17	50
FHA-15†	Transistor Interstage	TF4R21YY	10K CT/2.5K split	200 CT/50 split	2	300-20,000	+20	100
FHA-25†	Transistor Interstage	TF4R21YY	20K CT/5K split	800 CT/200 split	1	300-20,000	+20	100

† Electrostatic shield between primary and secondary.

Miniature/RC-25 Case





PACKAGING Hermetically sealed. Steel drawn case. Compressed glass bead headers with hooked pin terminals.

MIL SPECS To complete MIL-T-27D Specs, Grade 4, Class R.

WORKING VOLTAGE 175 peak.

NOTES For higher frequencies, considerably higher levels are permissible. For example, the H-3 will handle +21 dbm at 400 Hz.

SPECIALS Available on production order: High permeability steel case for high degree of magnetic shielding. MIL AG case. Straight pin terminals.

Type No.	Application	MIL Part No.	Pri. Imp. Ohms	Sec. Imp. Ohms	Pri. Unbal. ma DC	Response ±2 db (Hz)	Max. Level dbm	Max. Level mw
H-1	Mike, line to grid	M27/166-02	50, 200 CT, 500 CT*	50,000	0	50-10,000	+ 5	3
H-2	Mike to grid	M27/166-01	82	135,000	50	250-8,000	+18	63
H-3	Plate to single grid	M27/166-15	15,000	60,000	0	50-10,000	+ 6	4
H-4	Plate to single grid DC in Pri.	M27/166-16	15,000	60,000	4	200-10,000	+14	25
H-5	Plate to PP grids	M27/166-17	15,000	95,000 CT	0	50-10,000	+ 5	3
H-6	Plate to PP grids DC in Pri.	M27/166-18	15,000	95,000 split	4	200-10,000	+11	12
H-7	Plate or PP to line	M27/166-19	20,000 CT	600/150 split	4	200-10,000	+21	125
H-8	Mixing and matching	M27/166-06	600/150 split	600 CT	0	50-10,000	+ 8	6.3
H-9	82/41:1 input to grid	M27/166-08	600/150 split	1 MEG.	0	200-3,000 (4 db)	+10	10
H-10	10:1 plate to grid	M27/166-14	10,000	1 MEG.	0	200-3,000 (4 db)	+10	10
H-11	Inductor	TF4R20YY	300 Hys. — 0 DC, 50 Hys.-3 ma. DC, 6,000 Ohms					
H-12	Mike, line to PP grids	M27/166-03	50, 200 CT, 500 CT*	50,000 CT	0	50-10,000	+ 5	3
H-13	Transistor Interstage	M27/166-12	10K/2.5K split	2K/.5K split	4	100-10,000	+20	100
H-14	Transistor Interstage	M27/166-13	10K/2.5K split	4K/1K split	4	100-10,000	+20	100
H-15	Transistor to line	M27/166-09	1500 CT	500/125 split	8	100-10,000	+20	100
H-16	Transistor to V.C.	M27/166-10	2000 CT 4000 CT	8 16	4	100-10,000	+20	100
H-17	Transistor Input	M27/166-07	600/150 split	2000/500 split	0	50-20,000	+15	31
H-18	Transistor Interstage	M27/166-11	10,000 CT	500/125 split	4	100-10,000	+20	100
H-220	Transistor Interstage	M27/166-05	500/125 split	500/125 split	20	100-20,000	+24	250†
H-221	Transistor Interstage	M27/166-04	500/125 split	150/37.5 split	20	100-20,000	+24	250†
H-224 (2 wdgs)	Split Inductor	TF4R20YY	Series connection: 1 Hy @ 20 ma DC, 60 ohms Parallel connection: .25 Hy @ 40 ma DC, 15 ohms					

† 250 mw @ 100 Hz, 1 watt @ 200 Hz.

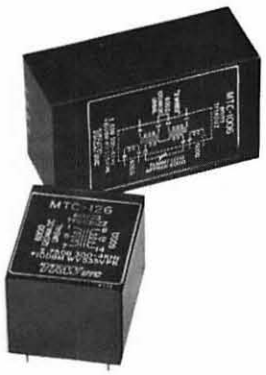
* 200 ohm termination can be used for 150 ohms or 250 ohms. 500 ohm termination for 600 ohms.

Telephone Interconnect Transformers

TRW

AUDIO

MTC Series



APPLICATIONS MTC (MIL-T-27D) transformers, designed for coupling applications feature unbalanced DC current ratings of up to 120 mA — higher than competitive units — while longitudinal balance per FCC 68.310 specification is greater than 60 dB.

The 2-wire to 4-wire hybrid transformer is noteworthy in that it can carry up to 100 mA unbalanced DC current through its primary, and has greater than 60 dB trans-hybrid loss over the 300-Hz to 4-kHz frequency band.

Dielectric strength exceeds 1500 volts AC.

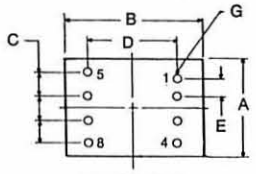


FIGURE 1

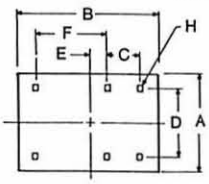


FIGURE 2

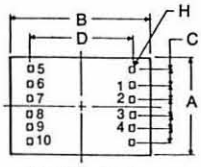
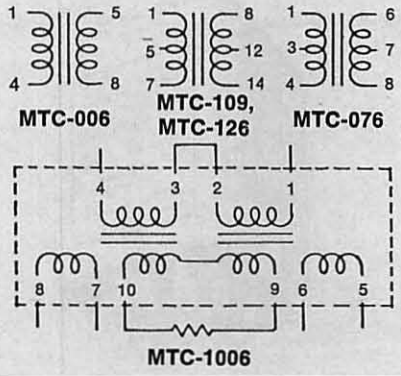


FIGURE 3

SCHEMATICS



Type	A	B	Unit Height	C ±.010	D ±.010	E ±.010	F ±.010	G, Dia. ±.005	H, Sq. ±.005	Pin Ht. ±.030
MTC-006	.875	1.093	.719	.20	.50	.15	—	.025	—	.125
MTC-076	1.562	1.875	.750	.25	1.00	.375	.75	—	.025	.156
MTC-109	1.562	1.875	1.156	.40	1.00	.20	.80	—	.025	.343
MTC-126	1.562	1.875	1.156	.40	1.00	.20	.80	—	.025	.343
MTC-1006	1.625	2.812	1.156	.20	2.30	—	—	—	.025	.125

Type No.	Application	Primary Impedance (Ohms)	DCR	Max Unbalanced DC Current (mA)	Secondary Impedance (Ohms)	DCR	Size
MTC-006	Coupling	600	33	0	600	35	Figure 1
MTC-076	Coupling	600 CT	44	70	600 CT	51	Figure 2
MTC-109	Coupling	900 CT	32	100	600 CT	21	Figure 2
MTC-126	Coupling	600 CT	22	120	600 CT	21	Figure 2
MTC-1006	Hybrid	600 Split		100‡	600/600		Figure 3

Series	Frequency Response	Max. Power Level	Longitudinal Balance	Maximum Distortion	Impedance Matching	Return Loss	Hybrid-trans-Hybrid Loss
MTC-006	±.50 dB, 300 Hz-4 kHz	+7 dBm	60 dB min.	0.5%	—	26 dB min.*	—
MTC-076	±.75 dB, 300 Hz-4 kHz	+10 dBm	60 dB min.	0.5%	—	10 dB min.*	—
MTC-109	±.75 dB, 300 Hz-4 kHz	+10 dBm	60 dB min.	0.5%	—	10 dB min.*	—
MTC-126	±.75 dB, 300 Hz-4 kHz	+10 dBm	60 dB min.	0.5%	—	10 dB min.*	—
MTC-1006	±.50 dB, 300 Hz-4 kHz	+10 dBm	60 dB min.	0.5%	—	11 dB min.*	60 dB min.

* Return loss figures are lowest readings over the frequency range as measured per MIL-STD-188C. For industrial use, return loss is greater than 22 dB. ‡ In 2-wire port.

TC Series

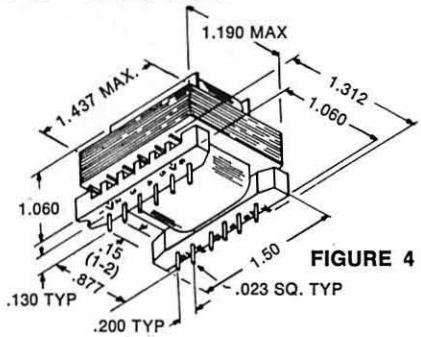


FIGURE 4

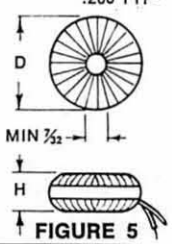


FIGURE 5

SIZE SERIES	D	H	WT. OZ.
TC-L-2	1·	13/32	¾
TC-L-3	1¼	⅝	2

HIGH-Q-TOROID MICROCRYSTALLINE WAX IMPREGNATED SUPPLIED WITH 4″ LEADS

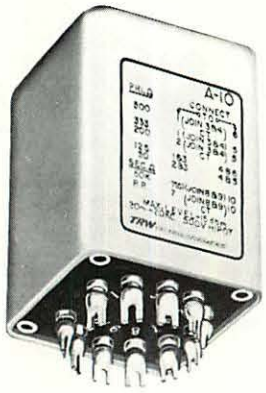
APPLICATIONS The TC Series of plug-in transformers is ideally suited for telephone interconnection applications. These low-profile units meet or exceed all modem and voice transmission impedance-matching requirements. They feature low distortion and wide frequency response, and are specially designed for wave soldering to printed circuit boards.

Type No.	Application	Primary Impedance (Ohms)	Max Unbalanced DC Current (mA)	Secondary Impedance (Ohms)	Size
TC-0-30	Coupling	600 Split	—	600 Split	Same as PC-0, Pg. 19
TC-0-20	Coupling	600 Split	—	1500 CT	Same as PC-0, Pg. 19
TC-SO-15	Coupling	600 Split	—	600 Split	Same as PC-SO, Pg. 21
TC-SO-22	Coupling	600 Split	—	1500 CT	Same as PC-SO, Pg. 21
TC-SSO-33	Coupling	600 Split	—	600 Split	Same as PC-SSO, Pg. 24
TC-SSO-20	Coupling	600 Split	—	1500 CT	Same as PC-SSO, Pg. 24
TC-F-1*	Coupling	900/600 Split	60/75	600 CT	Figure 4
TC-0-37	Bridging	4000 Split	—	600 Split	Same as PC-0, Pg. 19
TC-SO-23	Bridging	4000 Split	—	600 Split	Same as PC-SO, Pg. 21
TC-SSO-27	Bridging	4000 Split	—	600 Split	Same as PC-SSO, Pg. 24
TC-0-35†	Hybrid	600	—	600/600	Same as PC-0, Pg. 19
TC-SSO-32†	Hybrid	600	—	600/600	Same as PC-SSO, Pg. 24
TC-D-1†	Hybrid	600	—	600/600 0 dBm level	Same as DO-T, Pg. 10
TC-L-1	Holding Coil	2 Hy @ 60 mA DC; 1.3 Hy @ 100 mA DC; 180 ohm			Figure 4
TC-L-2	Holding Coil	1 Hy @ 0 mA DC; .8 Hy @ 25 mA DC; 225 ohm			Figure 5
TC-L-3	Holding Coil	1 Hy @ 0 mA DC; .8 Hy @ 40 mA DC; 113 ohm			Figure 5
PC-0-17	Hipermalloy shield, slip fit over TC-0 units				
PC-SO-SH	Hipermalloy shield, slip fit over TC-SO units				
PC-SSO-SH	Hipermalloy shield, slip fit over TC-SSO units				
DOT-SH	Hipermalloy shield, slip fit over TC-D-1 units				

Series	Frequency Response	Max. Power Level	Longitudinal Balance	Maximum Distortion	Impedance Matching	Return Loss	Hybrid-trans-Hybrid Loss
TC-0	±.50 dB, 100 Hz-10 kHz	+10 dBm	50 dB min.	0.5%	±10%	26 dB min.	50 dB min.
TC-SO	±.50 dB, 200 Hz-10 kHz	+10 dBm	50 dB min.	0.5%	±10%	26 dB min.	50 dB min.
TC-SSO	±.50 dB, 275 Hz-10 kHz	+10 dBm	50 dB min.	0.5%	±10%	26 dB min.	50 dB min.

* Frequency response ±2 dB, 300 Hz to 10 kHz, flat pack design. † Two units required for 2-wire to 4-wire hybrid.

Ultra-Compact™ Audio



PACKAGING High quality rugged metal case with both top and bottom mounting facilities. Asterisked items (see Type No.) have multiple alloy shield.

APPLICATIONS Compact commercial amplifiers and equipments.

APPLICATION NOTE Included in line are filament/transistor supply units.

FOR HERMETIC METAL CASED MIL TYPES See page 17.

NOTE All units except those carrying DC in primary employ a true humbucking coil structure, which provides electrical balance and effects good inductive shielding.

TYPE A CASE

1½" x 1½" x 2" h
Unit Weight: ½ lb.
Mounting Holes $1\frac{5}{32}$" sq.
Screws: 4-40
Cutout: 1⅜" dia.

INPUT AND MATCHING TRANSFORMERS

Type No.	Application	Primary Imp. Ohms	Unbal DC	Secondary Imp. Ohms	Response ±2 db (Hz)	Pri. Res. Ohms	Max. Level dbm	Max. Level mw
A-10	Low impedance to grid	50, 125/150, 200/250, 333, 500/600	0	50,000 split	20-20,000	59	+15	30
A-11*	Low impedance to 1 or 2 grids	50, 200, 500	0	50,000 CT	20-20,000	52	+ 5	3
A-12	Low impedance to PP grids	50, 125/150, 200/250, 333, 500/600	0	80,000 split	20-20,000	60	+15	30
A-20†	Mixing, matching	50, 125/150, 200/250, 333, 500/600	0	50, 125/150, 200/250, 333, 500/600	10-50,000	64	+15	30
A-21*†	Mixing, matching	50, 200/250, 500/600	0	50, 200/250, 500/600	30-30,000	28	+15	30
A-27	Xtal/hi. impedance to line	100,000 split	0	50, 125/150, 200/250, 333, 500/600	30-20,000 meas. with res. source	3700	+15	30
A-39*	Line to transistor	600/150 split	0	2000/500 split	20-20,000	70	+10	10
A-43†	Mixing, matching line or transistor to 2 simultaneously loaded lines or transistors	600/150 split	0	2 secondaries each 600/150 split	20-30,000	45	+15	30

* Multiple alloy shield for extremely low hum pickup † High electrostatic shielding

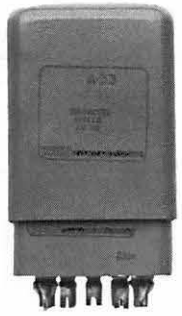
Interstage and Output Transformers

Type No.	Application	Primary Imp. Ohms	Unbal DC	Secondary Imp. Ohms	Response ±2 db (Hz)	Pri Res. Ohms	Max. Level dbm	Max. Level mw
A-15	Transistor Interstage	10,000/2500 split	8 ma	2000/500 split	40-20,000	600	—	1w
A-16	Plate to grid	15,000	0	60,000	20-20,000	800	+15	30
A-18	Single or PP plates to PP grids	15,000 split	0	80,000 split	20-20,000	1040	+15	30
A-19	Plate to PP grids	15,000	8 ma	80,000 split	40-20,000	2900	+15	30
A-22	Tr. Intstg. or output	500 CT	20 ma	500/125 split	40-20,000	36	—	1w
A-23	Tr. Intstg. or output	500 CT	20 ma	16/4 split	40-20,000	36	—	1w
A-24	Single or PP plates to line	15,000 split	0	50, 125/150, 200/250, 333, 500/600	20-40,000	1430	+15	30
A-25	Plate to line	15,000	8 ma	50, 125/150, 200/250, 333, 500/600	40-20,000	1580	+15	30
A-26	Single or PP plates to line	30,000 split	0	50, 125/150, 200/250, 333, 500/600	20-40,000	2520	+15	30
A-28	Transistor to V.C.	48 CT	750 ma Bal	16 split, 8, 4	40-20,000	5	—	5w
A-34	Transistor Interstage	25,000/6250 split	3 ma	500/125 split	30-20,000	1620	—	1w
A-35	Transistor Interstage	10,000/2500 split	8 ma	500/125 split	30-20,000	610	—	1w
A-36	Transistor Interstage	500/125 split	20 ma	150/37.5 split	40-20,000	36	—	1w
A-37	Transistor Interstage	500/125 split	20 ma	50/12.5 split	40-20,000	36	—	1w
A-38	Transistor Interstage	100/25 split	40 ma	40/10 split	40-20,000	6.2	—	1w
A-44	Tr. Intstg. or output	4K / 1K split	12 ma	600/150 split	30-20,000	310	—	1w

Ultra-Compact™ Audio

Hipermalloy Magnetic Shield

A-33 SHIELD



APPLICATION Ideal for ultra low level applications such as microphone input, instrumentation, low cross talk multi-channel mixing, and medical.

SHIELDING Provides approximately 20 db of shielding.

INSTALLATION Slips over standard "A"-line case.

SIZE $1\frac{19}{32}$" sq x $2\frac{1}{32}$" H

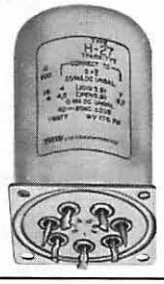
Hipermalloy Shield (A-33) shown slipping over "A"-line unit

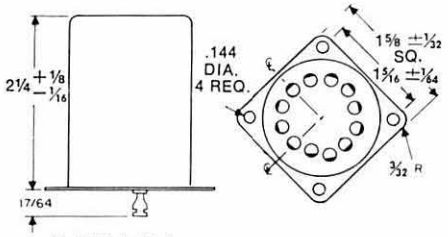
Special Application Transformers and Inductor

Type No.	Application	Inductance Characteristics
A-30	Audio inductor	450 Hys @ 0 ma DC; 250 Hys @ 5 ma DC, 6000 ohms; 65 Hys @ 10 ma DC, 1500 ohms

Type No.	Application	Pri. Imp. Ohms	Unbal DC	Sec. Imp. Ohms	±2 db from	Pri. Res. Ohms	Max. Level
A-45	Autotransformer, speaker matching	4, 8, 16	0	—	40 Hz - 20 kHz	1.2	1w @ 40 Hz; 4w @ 80 Hz
A-47	Hybrid transformer 3 balanced windings CT	500/600 CT Turns Ratio 1:1:1	0	500/600 CT 500/600 CT	40 Hz - 20 kHz	39	+10 dbm, 10 mw
A-48	"2 wire to 4 wire" hybrid circuit. Two transformers in one case for hybrid circuit use. Includes electromagnetic shielding. Hybrid circuit will provide 60 db minimum circuit isolation. Turns Ratio 1:1:1.	500/600	0	500/600 } 2 Wdgs. 500/600 } plus winding for balance loading.	40 Hz - 20 kHz	—	+10 dbm, 10 mw
A-49	Similar to A-48 except Turns Ratio 1:1.41:1.41						

MIL Grade Compact Audio





Unit Weight 8 oz.

PACKAGING Hermetically sealed. Metal encased.

TERMINALS Solder lug, glass to metal sealed type.

MIL SPECS To complete MIL-T-27D Specs. Grade 4, Class R.

SPECIALS Available in MIL AJ case. H-282, available in MIL EG case.

H-282 CASE: $1\frac{13}{16}$ Sq. x $2\frac{1}{2}$ H.

Type No.	Application	MIL Part No.	Pri. Imp. Ohms	Sec. Imp. Ohms	Pri. Unbal. DC ma	Response ±2 db (Hz)	Max. Level dbm	Max. Level mw	Working Volts Pk.
H19A	Balanced line to grid 1:14, multiple (75 db) shielding	M27/197-03	250 CT 500 CT	50,000 CT 100,000 CT	0	30-20,000	+ 6	4	175
H-20	1 to 2 plates to PP grids	M27/197-02	15,000 split	80,000 split	0	30-20,000	+12	15	350
H-21	Plate to PP grids DC in pri.	M27/197-01	15,000	80,000 split	8	100-20,000	+23	200	350
H-22	Plate to line	M27/197-04	15,000	50/200, 125/500*	8	50-20,000	+23	200	268
H-23	PP plates to line	M27/197-05	30,000 split	50/200, 125/500*	0	30-20,000	+19	80	350
H-24	Inductor	TF4R20YY	450 Hys - 0 DC, 250 Hys - 5 ma DC, 6000 ohms 65 Hys - 10 ma DC, 1500 ohms						350
H-25	Mixing or trans. to line	M27/197-06	500 CT	500/125 split	20	40-20,000	—	1w	175
H-26	Transistor Interstage	M27/197-07	10,000/2500 split	2000/500 split	8	40-20,000	—	1w	350
H-27	Transistor to V.C.	M27/197-08	500 CT	16/4 split	20	40-20,000	—	1w	175
H-280	Transistor driver	M27/197-09	200 CT	400/100 split	20	40-20,000	—	1w	175
H-281	Transistor to V.C.	M27/197-10	48 CT	16, 8, 4	750 Bal	40-20,000	—	5w	175
H-282	Transistor to V.C. RC-62 case.	M27/197-11	20 CT	16, 8, 4	1000 Bal	75-20,000	—	10w	175
H-283†	Mixing or matching for line or transistor	TF4R21YY	50, 125/150, 200/ 250, 333, 500/600	50, 125/150, 200/ 250, 333, 500/600	0	20-50,000	+15	30	175

* 200 ohm termination can be used for 150 ohms or 250 ohms, 125/500 ohm termination for 150/600 ohms. † High electrostatic shielding.

O, PC-O
Performance Characteristics

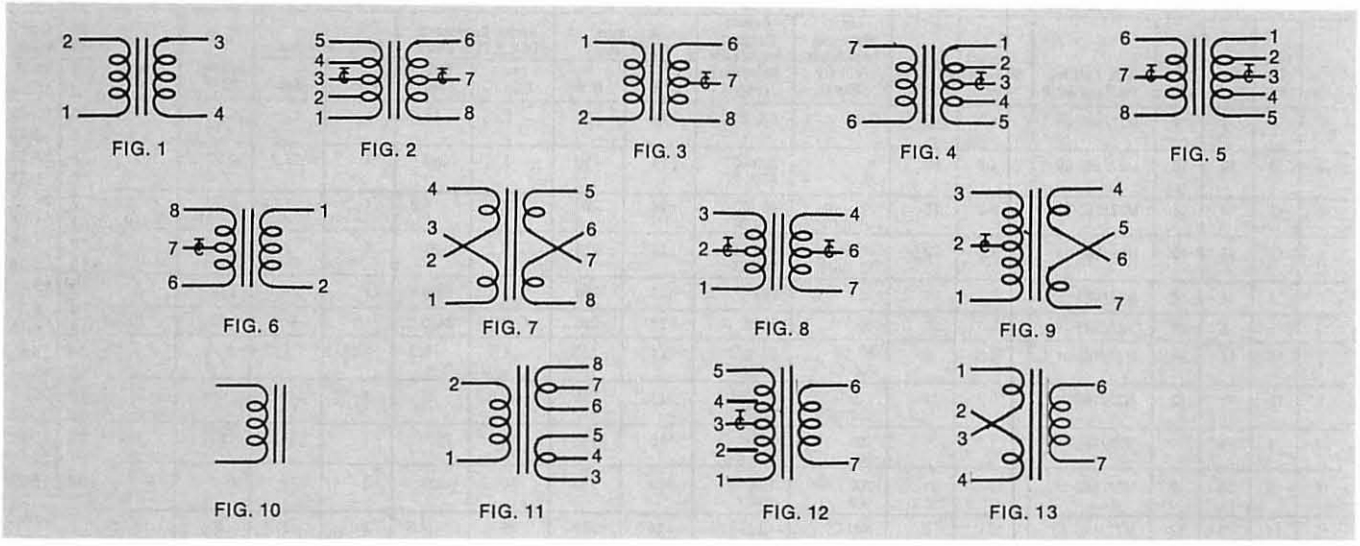
TRW

AUDIO

WORKING VOLTAGE: 175 V PEAK ALL UNITS

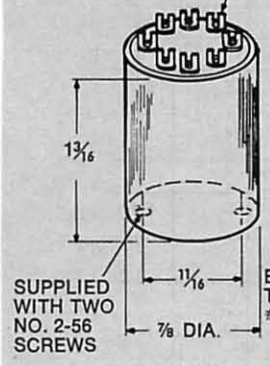
Type No. O-#	Type No. PC-O-#	Application	Pri. Imp. Ω	Unbal. ma DC/Pri.	Sec. Imp. Ω	DCR ±20%		Turns Ratio ±3%		Max. Level		Schem. Diag. Fig. No.	Freq. Resp. ±1 db (Hz)	Term. w/Same Polarity
						Pri.	Sec. Ser. Conn.	Total Pri.	Total Sec.	dbm	mw			
1	1	Low input imp. to grid	50, 200/250, 500/600		50K	52	3900	1	10	+8	6.3	12	30-20K	1,6
2	2	Low input imp. to PP grids	50, 200/250, 500/600		50K CT	52	3900	1	10	+8	6.3	2	30-20K	1,6
3	3	Low input imp. to grid	7.5/30		50K	4.5		1	40.9	+8	6.3	13	30-20K	
4	4	Plate to grid	15K		60K	710	3200	1	2	+8	6.3	1	30-20K	1,3
5	5	Plate to grid	15K	4	60K	710	3200	1	2	+8	6.3	1	200-10K	1,3
6	6	Plate to PP grids	15K		95K CT	690	3900	1	2.5	+8	6.3	3	30-20K	1,6
7	7	Plate to PP grids	15K	4	95K CT	690	3900	1	2.5	+8	6.3	3	200-10K	1,6
8	8	Plate to line	15K		50, 200/250, 500/600	950	48	5.49	1	+8	6.3	4	30-20K	1,6
9	9	Plate to line	15K	4	Same as 0-8	950	48	5.49	1	+8	6.3	4	200-10K	
10	10	PP to line	30K CT		Same as 0-8	1300	52	7.7	1	+8	6.3	5	30-20K	1,8
11	11	Crystal to line or transistor	50K		Same as 0-8	3900	53	10	1	+8	6.3	4	30-20K	1,6
12	12	Mixing matching	50, 200/250		Same as 0-8	12	45	1	1.58	+8	6.3	5	30-20K	1,6
13	13	Inductor	300 Hys @ 0 DC; 50 Hys @ 3 ma DC; 6000 ohms			—	—	—				10		
15	15	10:1 plate to grid	10K		1 Megohm	330	4875	1	10	+8	6.3	1	50-5K	1,3
16*		Low imp. to grid	250 CT		50K	40	1900	1	14	+8	6.3		30-20K	
17		Hipermalloy shield, slip fit over ouncer, 1" dia. provides 25 db shielding					—	—	—					
	17	Hipermalloy shield, slip fit over PC-O unit, 1 1/16" max. x 1 1/8" max. x 25/32" max. H												
18	18	Transistor interstage	10/2.5K split	4	2K/500 split	800	204	2.24	1	+20	100	7	100-20K	1,2,5,6
19	19	Transistor interstage	10/2.5K split	4	4K/1K split	800	353	1.58	1	+20	100	7	100-20K	1,2,5,6
20	20	Transistor to line	1500 CT	8	500/125 split	100	35	1.73	1	+20	100	9	100-20K	1,4
21	21	Transistor to voice coil	2000/4000 CT	4	8/16	200	.9	15.8	1	+20	100	6	100-20K	6,1
22	22	Transistor to voice coil	400/500 CT	20	3.2/4	35	.45	11	1		1W†	6	100-20K	6,1
24	24	Inductor	1.6 Hys @ 3 ma DC; .8 Hys @ 10 ma DC; 25 ohms				—	—	—			10		
25	25	Transistor input	600/150 split		2K/500 split	70	280	1	1.83	+15	30	7	50-15K	1,2,5,6
26	26	Transistor interstage	10K CT	4	10K CT	700	1000	1	1	+20	100	8	100-20K	1,4
27	27	Transistor interstage	10K CT	4	500/125 split	750	52	4.5	1	+20	100	9	100-20K	1,4,5
28	28	Transistor interstage	50K CT	2	500/125 split	3200	64	10	1	+20	100	9	100-20K	1,4,5
29	29	Transistor interstage or chopper	100K CT	1	500/125 split	3200	35	14	1	+20	100	9	100-20K	1,4,5
30	30	Transistor interstage	500/125 split	20	500/125 split	37	67	1	1		1W†	7	100-20K	1,2,5,6
31	31	Transistor interstage	500/125 split	20	150/37.5 split	35	16	1.8	1		1W†	7	100-20K	1,2,5,6
32	32	Transistor interstage	500/125 split	20	50/12.5 split	37	7	3.16	1		1W†	7	100-20K	1,2,5,6
33	33	Transistor interstage	100/25 split	40	40/10 split	9	5	1.58	1		1W†	7	100-20K	1,2,5,6
35	35	Hybrid	600		600/600 CT	95 ea.	1:1:1 3 equal windings				250	11	100-20K	1,3,6
36	36	Split inductor	Series connection: 1 Hy 20 ma DC; 60 ohms Parallel connection: 25 Hys 40 ma DC; 15 ohms			—	—	—						
37	37	Transistor to line	4K/1K split	4	600/150 split	395	57	2.58	1		1W†	7	100-20K	1,2,5,6

* Uses two heavy gauge hipermalloy shields for very low hum pickup plus orientable mounting.
Primary CT is balanced to 1% can be used for 150, 200, 250, 500 or 600 ohm source . . . 200:1 imped. ratio. 3 oz.
† At 200 Hz, ¼ watt at 100 Hz.



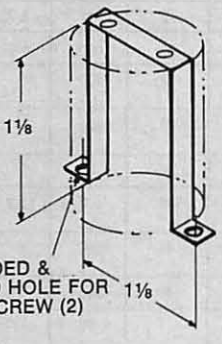
O-LINE UNIT

OUNCER TERMINALS (5/32 HIGH) 7/64 DIA. EQUALLY SPACED AS FOR 8 ON A 37/64 DIA.

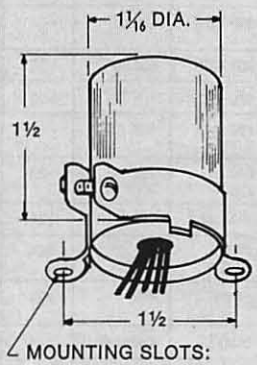


O-BR

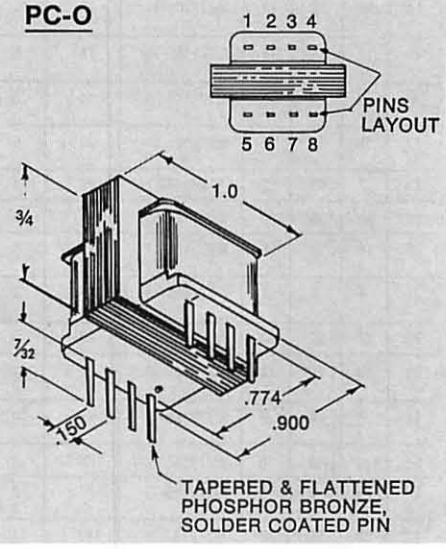
O-BR MOUNTING BRACKET NATIONAL-22 GA. (.030)CRS. FINISH: HOT TIN DIP



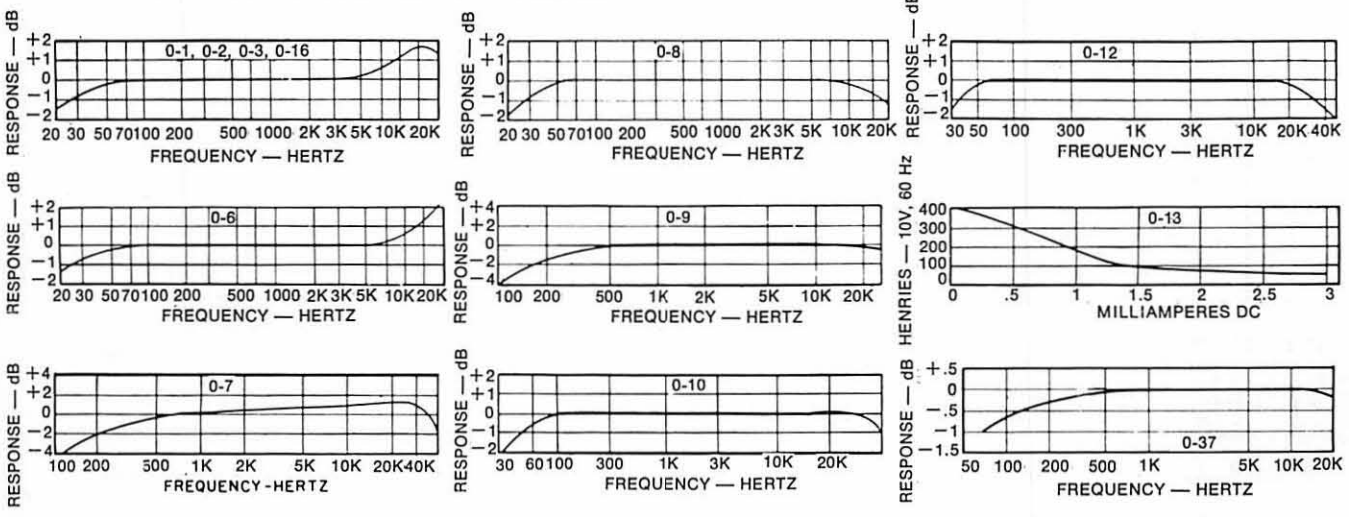
O-16 UNIT



PC-O



TYPICAL O-LINE RESPONSE CURVES



SO, PC-SO, SO-P
Performance Characteristics

Line	Type No. SO	Type No. PC-SO	Type No. SO-P	MIL Part No. for Type SO-P	E. T. Product Millivolt Sec.	Unbal. DC ma in Winding	Input-Matching Impedance Primary (Ohms)	Output-Matching Impedance Secondary (Ohms)	Maximum Level DBM	Maximum Level M.W	Series Connected DCR ±25% Ohms In Pri.	Series Connected DCR ±25% Ohms Out Sec.	Turns Ratio ±3% Pri.	Turns Ratio ±3% Sec.	Schem. PC/P	Pins Arrange PC/P
	Input Winding						Frequency Response 200 Hz - 20 kHz — Working Voltage: 175 Peak									
1	9	9	9	M27/165-06	1.5	0	3.2	500 CT	+24	250	0.35	15	1	12.5	20/9	E/C
3	10	10	10	M27/165-09	4.6	60	8 16	2000 CT 4000 CT	+24	250	2	290	1	15.9	20/9	E/C
4	14	14	14	M27/165-01	5.2	10	32 split 40 split	80 CT 100 CT	+24	250	3.2	4.9	1	1.58	5/11	E/D
5	13	13	13	M27/165-03	5.8	2.5	40 split 50 split	400 CT 500 CT	+24	250	4.5	20	1	3.16	5	E
6	4	4	4	M27/165-16	3.7	24	50	30K	+23	200	3.8	1850	1	24.5	10	E
7	6	6	6	M27/165-18	3.2	20	60	100K	+23	200	3.7	3400	1	40	10	E
8	14	14	14	M27/165-01	8.3	16	80 CT 100 CT	32 split 40 split	+24	250	4.9	3.2	1.58	1	5/11	E/D
9	12	12	12	M27/165-04	10	14	120 split 150 split	400 CT 500 CT	+24	250	12.6	20	1	1.82	5	E
10	1	1	1	M27/165-02	1.2	0	200 50	250K 62.5K	+10	10	16	2500	1	35	10	E
11	3	3	3	M27/165-11	10	21 10	200 500	10K 25K	+23	200	30	1225	1	7.1	10/1	E/A
13	13	13	13	M27/165-03	18	8	400 CT 500 CT	40 split 50 split	+24	250	20	4.5	3.16	1	5	E
14	12	12	12	M27/165-04	18	8	400 CT 500 CT	120 split 150 split	+24	250	20	12.5	1.82	1	5	E
15	11	11	11	M27/165-05	18	8	400 CT 500 CT	400 split 500 split	+24	250	20	45	1	1	5	E
16	9	9	9	M27/165-06	19	0	500 CT	3.2	+24	250	15	.35	12.5	1	20/9	E/C
17	15	15	15	M27/165-07	23	6	600 CT	600 split	+24	250	35	60	1	1	5/11	E/D
18	22	22	22	TF5R21ZZ	28	5	900 split	600 split	+24	250	72	44	1.22	1	7	E
19	20	20	20	M27/165-08	32	4	600 split†	10K CT	+23	200	80	1050	1	4.08	6	E
20	18	18	18	M27/165-17	23	9	600 split	50K CT	+24	250	63	2400	1	9.1	5/11	E/D
21	7	7	7	M27/165-15	9.2	2.5	800 1200	20K 30K	+23	200	32	450	1	5	10/1	E/A
22	22	22	22	TF5R21ZZ	23	6	600 split	900 split	+24	250	44	72	1	1.22	7	E
23	10	10	10	M27/165-09	7.4	4 2	2K CT 4K CT	8 16	+24	250	280	2	15.9	1	20/9	E/C
24	8	8	8	M27/165-12	15	2.2	2K CT	10K	+23	200	40	1000	1	2.23	2/3	E/B
25	16	16	16	M27/165-10	46	4	2500 CT	2500 split	+24	250	140	300	1	1	5	E
26	3	3	3	M27/165-11	74	3 1.5	10K 25K	200 500	+23	200	1225	30	7.1	1	10/1	E/A
27	20	20	20	M27/165-08	133	1	10K CT†	600 split	+23	200	1050	80	4.08	1	6	E
28	8	8	8	M27/165-12	34	1	10K	2000 CT	+23	200	1000	40	2.23	1	2/3	E/B
29	21	21	21	M27/165-13	111	1	10K CT† 12K CT†	10K split 12K split	+23	200	855	1080	1	1	6	E
30	2	2	2	M27/165-14	10	.25	10K	90K	+20	100	215	1850	1	3	10/1	E/A
31	7	7	7	M27/165-15	46	.5	20K 30K	800 1200	+23	200	450	32	5	1	10/1	E/A
32	4	4	4	M27/165-16	91	1	30K	50	+23	200	1850	3.8	24.5	1	10	E
33	18	18	18	M27/165-17	100	1	50K CT	600 split	+24	250	2400	63	9.1	1	5/11	E/D
34	2	2	2	M27/165-14	29	0	90K	10K	+20	100	1850	215	3	1	10/1	E/A
35	6	6	6	M27/165-18	130	.5	100K	60	+23	200	3400	3.7	40	1	10	E
36	1	1	1	M27/165-02	44	0	250K 62.5K	200 50	+10	10	2500	16	35	1	10	E

† Electrostatic Shield.

Key to SO Line

SO-Type	Line Number
1	10-36
2	30-34
3	11-26
4	6-32
5	37-38
6	7-35
7	21-31
8	24-28
9	1-16
10	3-23
11	15
12	9-14
13	5-13
14	4-8
15	17
16	25
18	20-33
20	19-27
21	29
22	18-22

INDUCTORS

37	SO-5	Inductor, 50 Hys @ 1 maDC, 2675 ohms DC res.	
38	SO-5P PC-SO5	Split Inductor — Series: 40 Hys @ 1 maDC, 20 Hys @ 2 maDC, 2675 ohms Parallel: 10 Hys @ 2 maDC, 5 Hys @ 4 maDC, 670 ohms	13/12 E/A

SHIELDS Drawn Hipermalloy Shield provides 20 db Shielding

PC-SO-SH	31/32" Sq x 5/8" H
SO-P-SH	1 1/16" L x 13/16" W x 47/64" H

SO, PC-SO, SO-P
Performance Characteristics

TYPES

SO—Open frame type with flexible leads.

PC-SO — Printed circuit board mounting open frame (new item).

SO-P — Hermetically sealed type to complete MIL-T-27D Specs, Grade 5, Class R.

NOTES

ON PERFORMANCE CHARACTERISTICS

- To present the widest range of application, matching impedance values are listed in order of increasing impedance value without regard to the traditional designation of primary or secondary winding.
- The primary and secondary winding can be used arbitrarily as the input or output.
- Impedance values written one above the other indicate a range of matching impedances over which the parts will give satisfactory performance as long as the impedance ratio is maintained.
- Impedance values separated by a slash indicate the series and parallel connected impedance value of the windings.
- PC-SO Types have terminal arrangements that permit the connection of series or parallel windings by bridging adjacent terminals (see Fig. 14). This eliminates unwanted cross overs on the PC board when split is available.

(E.T. is the maximum voltage, time product for a single pulse applied to the winding.)

PIN ARRANGEMENT (Pins not used are removed. These are indicated by "x.")

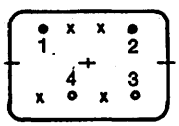


FIG. A

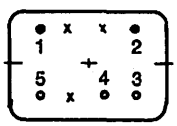


FIG. B

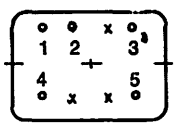


FIG. C

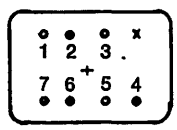


FIG. D

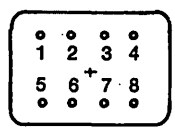


FIG. E†

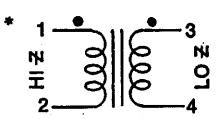


FIG. 1

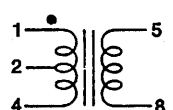


FIG. 2

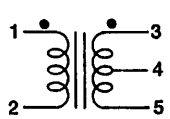


FIG. 3

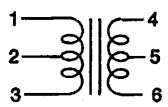


FIG. 4

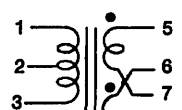


FIG. 5

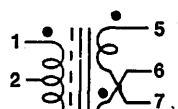


FIG. 6

FIG. 7

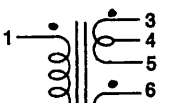


FIG. 8

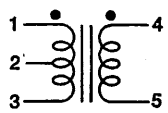


FIG. 9

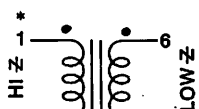


FIG. 10

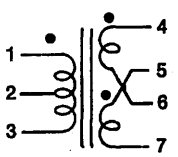


FIG. 11

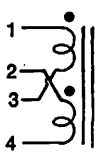


FIG. 12

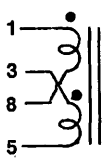


FIG. 13

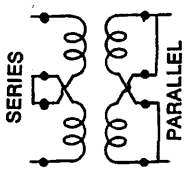


FIG. 14

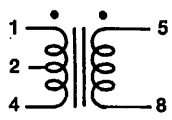
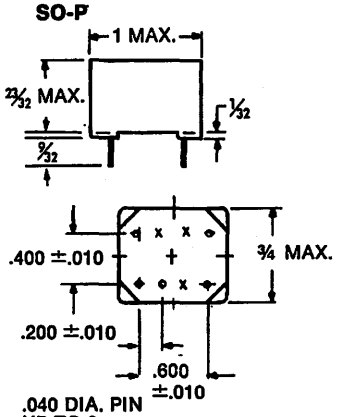


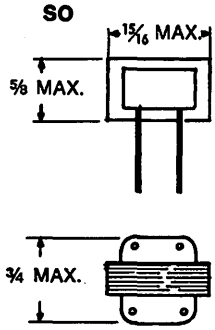
FIG. 20

SO-P



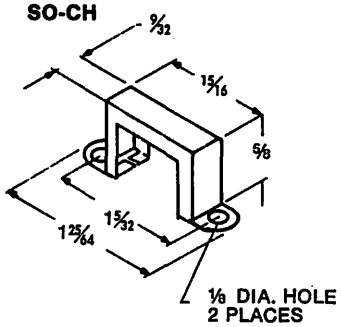
.040 DIA. PIN
UP TO 8
.200 APART

SO



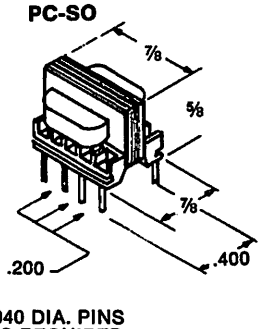
WEIGHT: .03 LBS.
LEADS: 4" LONG
FINISH: BLACK

SO-CH



1/8 DIA. HOLE
2 PLACES

PC-SO



.040 DIA. PINS
AS REQUIRED
UP TO 8

† Pin numbers not shown in schematic will be missing.

* On PC-SO-2 and SO-2P, Hi Z and Lo Z are reversed.

SSO, PC-SSO, SSO-P
Performance Characteristics

TRW

AUDIO

Line	Type No. SSO	Type No. PC-SSO	Type No. SSO-P	E.T. Product Millivolt Sec.	Unbal. DC ma in Winding	Input-Matching Impedance Primary (Ohms)	Output-Matching Impedance Secondary(Ohms)	Maximum Level DBM	Maximum Level M.W.	Series Connected DCR ±25% Ohms In Pri.	Series Connected DCR ±25% Ohms Out Sec.	Turns Ratio ±3% Pri.	Turns Ratio ±3% Sec.	Schematic Catalog Pg. 24 PC/P	Pins Arrangement Catalog Pg. 24 PC/P
	Input Winding					300 Hz - 20 kHz — Working Volts: 175 Peak									
1	16	16	16	1.2	54	3.2 4.0	1200 1500	+20	100	.45	70	1	18.1	10	F
2	10	10	10	1.5	54	3.2	10K	+20	100	.65	800	1	55.5	10	F
3	29	29	29	2.5	26	12.8/3.2 split* 16.0/4 split*	500/125 split* 600/150 split*	+20	100	1.5	36.2	1	6.11	7	F
4	35	35	36	2.5	26	12.8/3.2 split* 16.0/4 split*	4K/1K split 5K/1.25K split	+20	100	1.5	327	1	17.6	7	F
5	38	38	38	2.5	26	12.8/3.2 split* 16.0/4 split*	8K/2K split 10K/2.5K split	+20	100	1.5	600	1	25	7	F
6	9	9	9	3.3	26	16	10K	+20	100	2.7	800	1	25	10	F
7	11	11	11	2.5	11	50 60	500 600	+20	100	5	50	1	3.16	10	F
8	30	30	30	2.5	11	50/12 split* 60/15 split*	500/125 split* 600/150 split*	+20	100	6.5	36	1	3.16	7	F
9	12	12	12	2.5	11	50 60	1000 1200	+20	100	5.0	90	1	4.45	10	F
10	4	4	4	2.6	11	50	30K	+20	100	4.6	2875	1	24.5	10	F
11	6	6	6	2.0	15	60	100K	+20	100	3.3	3500	1	40	10	F
12	28	28	28	5.5	10	48/12 split* 100/25 split*	48/12 split* 100/25 split*	+20	100	5.9	6.9	1	1	7	F
13	44	44	44	1.2	0	100/25 split*† 200/50 split*†	100K CT 200K CT	+7	5	4.1	3290	1	31.6	6	F
14	34	34	34	10	0	200/50 split* 240/60 split*	1K/250 split* 1200/300 split*	+20	100	19	102	1	2.23	7	F
15	3	3	3	7.7	10 5	200 500	10K 25K	+20	100	34	2500	1	7.1	10/1	F/A
16	14	14	14	4.7	14 7	200 CT 500 CT	10K CT 25K CT	+20	100	22	560	1	7.07	14/4	F/C
17	39	39	39	7.7	10 5	200/50 split 500/125 split	10K/2.5K split 25K/6.25K split	+20	100	34	2500	1	7.1	7	F
18	26	26	26	5.7	12	400/100 split 500/125 split	40K CT 50K CT	+20	100	43	1900	1	10	5	F
19	43	43	43	5.7	12	400/100 split 500/125 split	40K/10K split 50K/12.5K split	+20	100	43	1900	1	10	7	F
20	29	29	29	5.3	8	500/125 split* 600/150 split*	12.8/3.2 split* 16/4 split*	+20	100	36.2	1.5	6.11	1	7	F
21	11	11	11	2.6	3.5	500 600	50 60	+20	100	50	5	3.16	1	10	F
22	30	30	30	2.6	3.5	500/125 split* 600/150 split*	50/12.5 split* 60/15 split*	+20	100	36	6.5	3.16	1	7	F
23	19	19	19	13	10	500 CT	600 CT	+20	100	26	70	1	1.1	14/4	F/C
24	31	31	31	13	10	500/125 split*	600/150 split*	+20	100	30	42	1	1.1	7	F
25	32	32	32	Hybrid, 3 equal windings Center Tapped-Trifilar		500 600	500 CT 500 CT 600 CT 600 CT	+14	25	50	50 50	1:1:1		8	F
26	17	17	17	18	8	500 CT 600 CT	10K 12K	+20	100	95	800	1	4.48	13	F
27	40	40	40	18	8	500/125 split* 600/150 split*	10K/2.5K split 12K/3.0K split	+20	100	98	1200	1	4.48	7	F
28	19	19	19	15	10	600 CT	500 CT	+20	100	70	26	1.1	1	14/4	F/C
29	31	31	31	15	10	600/150 split*	500/125 split*	+20	100	40.3	32.9	1.1	1	7	F
30	33	33	33	13	10	600/150 split*†	600 CT	+20	100	29	42	1	1	6	F
31	46	46	46	15	10	600/150 split*	900/225 split*	+20	100	43	50	1	1.22	7	F
32	20	20	20	15	11	600 CT	1500 CT	+20	100	65	70	1	1.58	14/4	F/C
33	35	35	35	13	5	600/150 split*	2K/500 split*	+20	100	40	113	1.82	1	7	F
34	27	27	27	6.8	11	600/150 split	4K CT	+20	100	47	155	1	2.68	5/11	F/E
35	37	37	37	8.5	3.2	600/150 split*†	8K CT	+10	50	55	484	1	3.65	6	F
36	7	7	7	8.5	2.5	800 1200	20K 30K	+20	100	110	800	1	5	10	F
37	15	15	15	8.5	5	800 CT 1200 CT	20K CT 30K CT	+20	100	110	800	1	5	12/4	F/D
38	42	42	42	8.5	5	800/200 split 1200/300 split	20K/5K split 30K/7.5K split	+17	50	110	800	1	5	7	F
39	46	46	46	18	8	900/225 split*	600/150 split*	+20	100	50	43	1.22	1	7	F
40	12	12	12	11	3	1000 1200	50 60	+20	100	5	90	4.45	1	10	F
41	34	34	34		6	1K/25 split* 1200/300 split*	200/50 split* 240/60 split*	+20	100	102	19	2.23	1	7	F

† Electrostatic Shield * Bifilar

Key SSO	Key Line
2	64, 71
3	15, 55
4	10, 68
5	Pg. 24
6	11, 72
7	36, 65
8	49, 60
9	6, 54
10	2
11	7, 21
12	9, 40
13	42, 74
14	16, 57
15	37, 66
16	1, 45
17	26, 58
19	23, 28
20	32, 46
21	43, 75
22	47, 61
23	Pg. 24
24	Pg. 24
25	62
26	18, 69
27	34, 50
28	12
29	3, 20
30	8, 22
31	24, 29
32	25
33	30
34	14, 41
35	33, 48
36	4, 51
37	35, 53
38	5, 52
39	17, 56
40	27, 59
41	63
42	38, 67
43	19, 70
44	13, 73
45	44, 76
46	31, 39

SHIELDS-DRAWN HIPERMALLOY SHIELD PROVIDES 20 db SHIELDING

PC-SSO-SH	2 7/32" Sq x 1/2" H
SSO-P-SH	1" L x 13/16" W x 15/32" H

SSO, PC-SSO, SSO-P
Performance Characteristics

TRW AUDIO

Line	Type No. SSO	Type No. PC-SSO	Type No. SSO-P	E.T. Product Millivolt Sec.	Unbal. DC ma In Winding	Input-Matching Impedance Primary (Ohms)	Output-Matching Impedance Secondary (Ohms)	Maximum Level DBM	Maximum Level M.W.	Series Connected DCR ±25% Ohms In Pri.	Series Connected DCR ±25% Ohms Out Sec.	Turns Ratio ±3% Pri.	Turns Ratio ±3% Sec.	Schematic Catalog Pg. 24 PC/P	Pins Arrangement Catalog Pg. 24 PC/P
	Input Winding					300 Hz - 20 kHz — Working Volts: 175 Peak									
42	13	13	13	3.2	0	1000	200K	+7	5	190	4000	1	14.4	10	F
43	21	21	21	3.2	0	1000 CT	200K CT	+7	5	200	4000	1	14.4	14/4	F/C
44	45	45	45	3.25	0	1000/250 split†	200K CT	+7	5	200	4000	1	14.4	6	F
45	16	16	16	22	3	1200 1500	3.2 40	+20	100	70	.45	18.1	1	10	F
46	20	20	20	23	7	1.5K CT	600 CT	+20	100	70	65	1.58	1	14/4	F/C
47	22	22	22	32	7	1500 CT 1800 CT	10K CT 12K CT	+20	100	300	800	1	2.58	12/4	F/D
48	35	35	35	25	2.5	2K/500 split*	600/150 split*	+20	100	113	40	1.82	1	7	F
49	8	8	8	10	2.2	2K CT	10K	+20	100	45	1200	1	2.23	13/3	F/B
50	27	27	27	16	2.5	4K CT	600 split	+20	100	155	47	2.58	1	5/11	F/E
51	36	36	36	44	2.6	4K/1K split 5K/125 split	12.8/3.2 split* 16/4 split*	+20	100	327	1.5	17.6	1	7	F
52	38	38	38	63	2	8K/2K split 10/2.5K split	12.8/3.2 split* 16/4 split*	+20	100	600	1.5	25	1	7	F
53	37	37	37	30	.6	8K CT†	600/150 split*	+7	50	484	55	3.65	1	6	F
54	9	9	9	82	2	10K	16	+20	100	800	2.7	25	1	10	F
55	3	3	3	55	3 1.5	10K 25K	200 500	+20	100	2500	34	7.1	1	10/1	F/A
56	39	39	39	55	3 1.5	10K/2.5K split 25K/6.25K split	200/50 split 500/125 split	+20	100	2500	34	7.1	1	7	F
57	14	14	14	33	2 1	10K CT 25K CT	200 CT 500 CT	+20	100	560	22	7.07	1	14/4	F/C
58	17	17	17	82	2	10K 12K	500 CT 600 CT	+20	100	800	95	4.48	1	13	F
59	40	40	40	82	4	10K/2.5 split 12K/3.0K split	500/125 split 600/150 split	+20	100	1200	98	4.48	1	7	F
60	8	8	8	23	1	10K	2K CT	+20	100	1200	45	2.23	1	13/3	F/B
61	22	22	22	82	4	10K CT 12K CT	1500 CT 1800 CT	+20	100	800	300	2.58	1	12/4	F/D
62	25	25	25	60	1	10K CT 12K CT	10K split‡ 12K split‡	+20	100	560	650	1	1	5/11	F/E
63	41	41	41	60	1	10K/2.5K split 12K/3.0K split	10K/2.5K split 12K/3.0K split	+20	100	560	650	1	1	7	F
64	2	2	2	13	.25	10K	90K	+15	30	710	3150	1	3	10	F
65	7	7	7	42	.5	20K 30K	800 1200	+20	100	800	110	5	1	10	F
66	15	15	15	42	1	20K CT 30K CT	800 CT 1200 CT	+20	100	800	110	5	1	12/4	F/D
67	42	42	42	42	1	20K/5K split 30K/7.5K split	800/200 split 1200/300 split	+17	50	800	110	5	1	7	F
68	4	4	4	64	1	30K	50	+20	100	2875	4.6	24.5	1	10	F
69	26	26	26	57	.5	40K CT 50K CT	400/100 split 500/125 split	+20	100	1900	43	10	1	5	F
70	43	43	43	57	.5	40K/10K split 50K/12.5K split	400/100 split 500/125 split	+20	100	1900	43	10	1	7	F
71	2	2	2	38		90K	10K	+15	30	3150	710	3	1	10	F
72	6	6	6	79	.5	100K	60	+20	100	3500	3.3	40	1	10	F
73	44	44	44	40	0	100K CT† 200K CT†	100/25 split 200/50 split	+7	5	3290	4.1	31.6	1	6	F
74	13	13	13	48	0	200K	1000	+7	5	4000	190	1	14.4	10	F
75	21	21	21	48	0	200K CT	1K CT	+7	5	4000	200	14.1	1	14/4	F/C
76	45	45	45	48	0	200K CT†	1K/250 split	+7	5	4000	200	14.4	1	6	F

† Electrostatic Shield * Bifilar ‡ Secondary is not split for SSO-25
Magnetic Shields on Catalog page 22

Key

SSO	Line
2	64, 71
3	15, 55
4	10, 68
5	Pg. 24
6	11, 72
7	36, 65
8	49, 60
9	6, 54
10	2
11	7, 21
12	9, 40
13	42, 74
14	16, 57
15	37, 66
16	1, 45
17	26, 58
19	23, 28
20	32, 46
21	43, 75
22	47, 61
23	Pg. 24
24	Pg. 24
25	62
26	18, 69
27	34, 50
28	12
29	3, 20
30	8, 22
31	24, 29
32	25
33	30
34	14, 41
35	33, 48
36	4, 51
37	35, 53
38	5, 52
39	17, 56
40	27, 59
41	63
42	38, 67
43	19, 70
44	13, 73
45	44, 76
46	31, 39

SSO, PC-SSO, SSO-P
Performance Characteristics

INDUCTORS

		Pri.	Sch.	Pin Diag.
SSO-5	50 Hys at 1 ma DC, 4400 ohms DC res.	Blk Blk		
SSO-23	8 Hys at 2 ma DC, 4 Hys at 5 ma DC, 650 ohms	Rd Gn		
SSO-24	3.5 Hys at 2 ma DC, 1.5 Hys at 5 ma DC, 160 ohms	Rd Blue		
PC-SSO-5 SSO-5P	Split Series: 100 Hys @ 0 ma DC, 50 Hys @ 1 ma DC, 4400 ohms Parallel: 25 Hys @ 0 ma DC, 12 Hys @ 2 ma DC, 1100 ohms		16/ /15	F/ /A
PC-SSO-23 SSO-23P	Split Series: 8 Hys @ 2 ma DC, 4 Hys @ 5 ma DC, 600 ohms Parallel: 2 Hys @ 4 ma DC, 1 Hy @ 10 ma DC, 150 ohms		16/ /15	F/ /A
PC-SSO-24 SSO-24P	Split Series: 3.5 Hys @ 2 ma DC, 1.5 Hys @ 5 ma DC, 160 ohms Parallel: 0.9 Hy @ 4 ma DC, 0.4 Hy @ 10 ma DC, 40 ohms		16/ /15	F/ /A

MIL-PART NUMBER DESIGNATIONS

Type No.	Designation	Type No.	Designation	Type No.	Designation	Type No.	Designation	Type No.	Designation
SSO-1P	M27/167-02	SSO-10P	M27/167-20	SSO-19P	M27/167-07	SSO-28P	M27/167-03	SSO-37P	M27/167-12
SSO-2P	M27/167-32	SSO-11P	M27/167-05	SSO-20P	M27/167-17	SSO-29P	M27/167-04	SSO-38P	M27/167-21
SSO-3P	M27/167-01	SSO-12P	M27/167-14	SSO-21P	M27/167-41	SSO-30P	M27/167-06	SSO-39P	M27/167-24
SSO-4P	M27/167-35	SSO-13P	M27/167-40	SSO-22P	M27/167-29	SSO-31P	M27/167-08	SSO-40P	M27/167-27
SSO-5P	TF5R20ZZ	SSO-14P	M27/167-25	SSO-23P	TF5R20ZZ	SSO-32P	M27/167-11	SSO-41P	M27/167-31
SSO-6P	M27/167-38	SSO-15P	M27/167-34	SSO-24P	TF5R20ZZ	SSO-33P	M27/167-09	SSO-42P	M27/167-13
SSO-7P	M27/167-33	SSO-16P	M27/167-16	SSO-25P	M27/167-30	SSO-34P	M27/167-15	SSO-43P	M27/167-37
SSO-8P	M27/167-28	SSO-17P	M27/167-26	SSO-26P	M27/167-36	SSO-35P	M27/167-10	SSO-44P	M27/167-39
SSO-9P	M27/167-22	SSO-18P	M27/167-23	SSO-27P	M27/167-18	SSO-36P	M27/167-19	SSO-45P	M27/167-42

PIN ARRANGEMENT (Pins not used are removed. These are indicated by "x.")

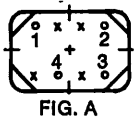


FIG. A

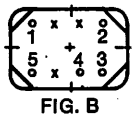


FIG. B

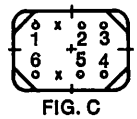


FIG. C

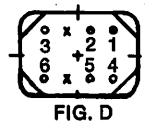


FIG. D

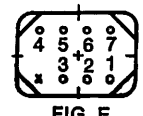


FIG. E

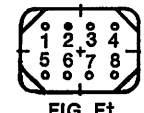


FIG. F†

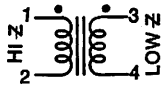


FIG. 1

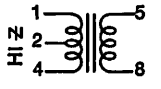


FIG. 2

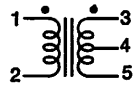


FIG. 3

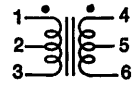


FIG. 4

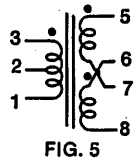


FIG. 5

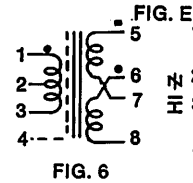


FIG. 6

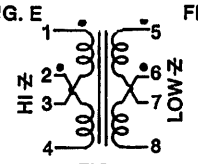


FIG. 7

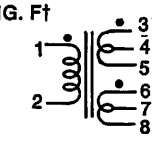


FIG. 8

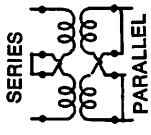


FIG 9

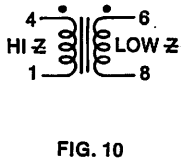


FIG. 10

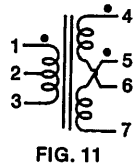


FIG. 11

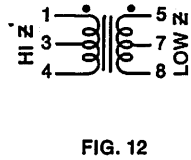


FIG. 12

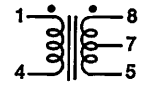


FIG. 13

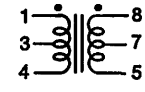


FIG. 14

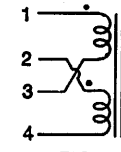


FIG. 15

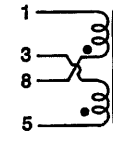
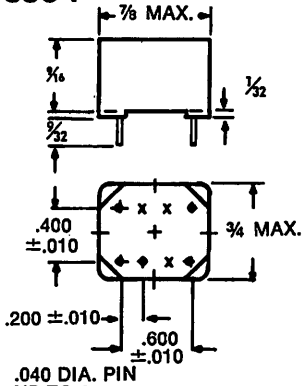


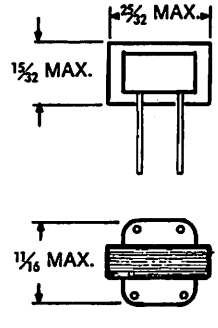
FIG. 16

SSO-P



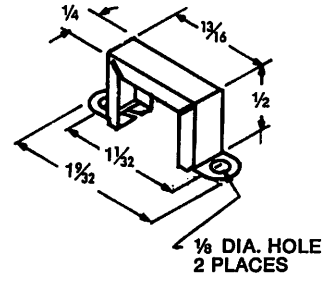
.040 DIA. PIN
UP TO 8
.200 APART (TYP.)

SSO



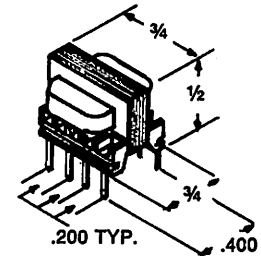
WEIGHT: .02 LBS.
LEADS: 4" LONG
FINISH: BLACK

SSO-CH



⅛ DIA. HOLE
2 PLACES

PC-SSO



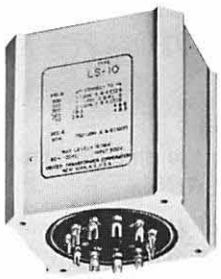
.040 DIA. PINS
AS REQUIRED
UP TO 8

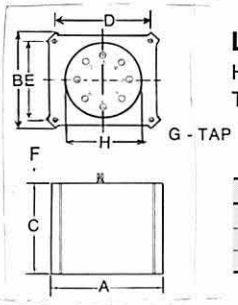
†Pin numbers not shown in schematic will be missing

Linear Standard™ Audio Transformers

TRW

AUDIO





LINEAR STANDARD

High shielding die cast cases
Top and bottom mounting

APPLICATIONS

High fidelity, broadcast requirements, low distortion, high efficiency.

Case No.	A	B	C	D	E	F	G	H	Weight
LS-1	3⅛	2⅝	3¼	2 7/16	1 15/16	11/32	6-32	1⅞	3 lbs.
LS-2	4 7/16	3½	4 3/16	3 11/16	2 11/16	½	8-32	2¾	7.5 lbs.
LS-3	5 13/16	5	4 11/16	5 1/32	4 3/16	11/16	10-24	3¾	15 lbs.

LOW IMPEDANCE TO GRID AND MIXING AND MATCHING TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	±1 db from	Max. Level dbm	Relative* Hum	Unbal. DC in Primary	Case No.
LS-10	Low impedance mike, pickup or multiple line to push pull grids	50, 125/150, 200/250, 333, 500/600 ohms	60,000 ohms in two sections	20-20,000	+19	−74 db	.5 ma	LS-1
LS-10X	As above	As above	50,000 ohms	20-20,000	+17	−92 db-Q	.5 ma	LS-1
LS-12X	Low impedance mike, pickup or multiple line to push pull grids	50, 125/150, 200/250, 333, 500/600 ohms	80,000 ohms overall, split	20-20,000	+17	−92 db-Q	.5 ma	LS-1
LS-14X	Low impedance mike, pickup or parallel mixer to grid	2.5, 5.5, 10, 15, 22, 30, 38, 60 ohms	50,000 ohms	20-20,000	+17	−92 db-Q	.5 ma	LS-1
LS-26	Bridging line to single or push pull grids	5,000 ohms	60,000 ohms in two sections	15-20,000	+23	−74 db	0 ma	LS-1
LS-30†	Mixing, low impedance mike, pickup or multiple line to multiple line	50, 125/150, 200/250, 333, 500/600 ohms	50, 125/150, 200/250, 333, 500/600 ohms	7-50,000	+23	−74 db	.5 ma	LS-1
LS-30X†	As above	As above	As above	20-20,000	+20	−92 db-Q	.3 ma	LS-1
LS-31	Three isolated lines or pads to multiple line	30/50, 200/250 ohms each primary	50, 125/150, 200/250, 333, 500/600 ohms	20-20,000	+23	−74 db	.5 ma	LS-1
LS-68†	Mixing, matching line or transistor to 2 simultaneously loaded lines or transistors	600/150 split	2 secondaries each 600/150 split	20-40,000	+15	−92 db-Q	0 ma	LS-1

HYBRID AND REPEAT COILS

Type No.	Application	Primary and Secondary Impedances	±1 db from	Max. Level dbm	Relative* Hum	Max. Unbal. DC in Primary	Case No.
LS-140†	Line to line for isol. balanced and unbal. cir.; bal. for max. cross talk 70 db	500/600 ohms split 500/600 ohms split	30-20,000	+18	−92 db-Q	0 ma	LS-1
LS-141	Three sets of bal. wind. for hybrid service, center tapped	500/600 ohms 500/600 ohms Turns Ratio 1:1:1	30-15,000	+18	−74 db	0 ma	LS-1

PLATE, CRYSTAL, PHOTOCELL, AND BRIDGING TO LINE TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	±1 db from	Max. Level	Relative* Hum	Unbal. DC in Primary	Case No.
LS-27	Single pl. to multiple line	15,000 ohms	50, 125/150, 200/250, 333, 500/600	30-15,000	200 mw	−74 db	8 ma	LS-1
LS-50	Single pl. to multiple line	15,000 ohms	50, 125/150, 200/250, 333, 500/600	10-40,000	200 mw	−74 db	0 ma	LS-1
LS-51	Push pull low level pl. to multiple line	30,000 ohms plate to plate	50, 125/150, 200/250, 333, 500/600	10-40,000	250 mw	−74 db	1 ma	LS-1
LS-150	Bridging from 50 to 500 ohm line to line	4,000 ohms, bridging	50, 125/150, 200/250, 333, 500/600	7-50,000	200 mw	−74 db	1 ma	LS-1
LS-151	Bridging from 50 to 500 ohm line to line	16,000 ohms, bridging	50, 125/150, 200/250, 333, 500/600	7-50,000	400 mw	−74 db	1 ma	LS-1

HIGH LEVEL MATCHING TRANSFORMERS

Type No.	Application	Primary Impedance	Secondary Impedance	±1 db from	Max. Level	Relative* Hum	Unbal. DC in Primary	Case No.
LS-33	High level line matching	50, 125/150, 200/250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5, 10, 15, 20, 30, 50, 125/150, 200/250, 333, 500/600	10-40,000	20 watts	—	—	LS-2
LS-34	High level line matching	50, 125/150, 200/250, 333, 500/600 ohms	1.2, 2.5, 5, 7.5, 10, 15, 20, 30, 50, 125/150, 200/250, 333, 500/600	10-40,000	40 watts	—	—	LS-3

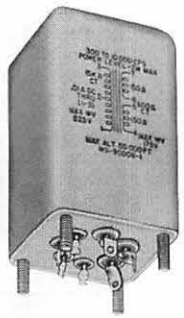
OUTPUT TRANSFORMERS TO LINE AND VOICE COIL

Type No.	Primary will match typical tubes	Primary Impedance	Secondary Impedance	±1 db from	Max. Level	Relative* Hum	Unbal. DC in Primary	Case No.
LS-54	Push pull 6AQ5, 6V6, 6L6, 5881	8,000 ohms	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	—	—	LS-2
LS-55	Push pull 300B, 6L6's, 6AS7G, 6080, 7027, 7581, 7355, 7868	5,000 ohms plate to plate and 3,000 ohms plate to plate	500, 333, 250/200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	—	—	LS-2
LS-61	Push pull triode; 6AS7G, 6080, 6L6, 5881, KT-66, 807, 1614	10,000 ohms plate to plate and 6,000 ohms plate to plate	500, 333, 250/200, 125, 50, 30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	—	—	LS-2
LS-63	Same as above	10,000 ohms plate to plate and 6,000 ohms plate to plate	30, 20, 15, 10, 7.5, 5, 2.5, 1.2	7-50,000	20 watts	—	—	LS-2
LS-35	EL-34 in AB-feedback	5,000 ohms CT 43% screen taps	4, 8, 16	7-50,000	35 watts	—	—	LS-3
LS-667	Push pull transistors class B (2N277 or equivalent)	8 ohms split	4, 8, 16	7-50,000	50 watts	—	—	LS-3

The values of unbalanced DC shown will effect approximately 1.5 db loss at 30 Hz.
* Comparison of hum balanced unit with shielding to normal uncased type. Q = Multiple alloy magnetic shields.
† High electrostatic shielding.

Military Style Audio Transformers

AUDIO



PACKAGING Hermetically sealed. Metal encased.

MIL SPECS To complete MIL-T-27D Specs. Grade 4, Class R.

FREQUENCY RESPONSE 300 Hz to 10 kHz, ±2 db.

SHIELDING Electrostatic shielding provided on W-785 and W-786.

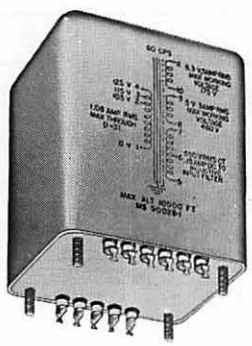
NOTE Secondaries of W-783 are center tapped, providing 90K CT to 22.5K CT MIL AJ CASE 1⅝" x 1⅝" x 2⅜" H. Weight 0.6 lbs.

MS AUDIO TRANSFORMERS

Type No.	MS No.	MIL Part No.	Application	Pri. Ohms	Pri. ma DC	Sec. Ohms	Level
W-783	90000-A	M27/3-01A	PP Plates to PP Grids	10K CT	10 Unbal	90K/22.5K split	15 dbm
W-784	90001-A	M27/4-01A	Line to V C	600/150 split		4/8/16	2 W
W-785	90002-A	M27/5-01A	Line to PP Grids	600/150 split		135K CT	15 dbm
W-786	90003-A	M27/6-01A	Line to Line	600/150 split		600/150 split	15 dbm
W-787	90004-A	M27/7-01A	Plate to Line	7600/4800	40 Unbal	600/150 split	2 W
W-788	90005-A	M27/8-01A	Plate to V C	7600/4800	40 Unbal	4/8/16	2 W
W-789	90006-A	M27/9-01A	PP Plates to Line	15K CT	10 Unbal	600/150 split	2 W
W-790	90007-A	M27/10-01A	PP Plates to Line	24K CT	20 Bal	600/150 split	1 W
W-791	90008-A	M27/11-01A	PP Plates to Line	60K CT	20 Bal	600/150 split	.5 W

Military Style Power Transformers

POWER



PACKAGING Hermetically sealed. Metal cased.

MIL SPECS To complete MIL-T-27D Specs.

FILAMENT, POWER AND PLATE Transformer primaries are 105/115/125 V. 54/66 Hz. Current ratings for high voltage secondaries are DC, choke input filter. For condenser input, reduce current to 70% of rated values. The -2 after MS No. indicates Grade 4 (ruggedized). All units are electrostatically shielded.

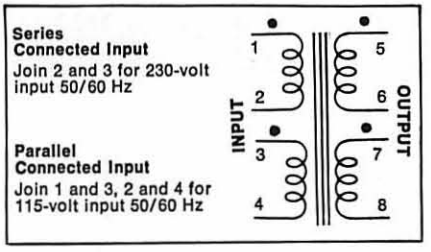
Type No.	MS No.	MIL Part No.	Secondary Ratings		MIL Case	Wt. Lbs.
N-583A	MS90016-2	M27/300-01	2.5 V-3 A	1000 WV	EB	1 5/16
N-584A	MS90017-2	M27/300-02	2.5 V-10 A	1000 WV	GB	2 3/8
N-585A	MS90018-2	M27/300-04	5 V-3 A	1000 WV	FB	1 3/4
N-586A	MS90019-2	M27/300-05	5 V-10 A	1000 WV	HB	3 1/2
N-587A	MS90020-2	M27/300-07	6.3 V-2 A	1000 WV	FB	1 1/2
N-588A	MS90021-2	M27/300-08	6.3 V-5 A	1000 WV	GB	2 3/4
N-589A	MS90022-2	M27/300-09	6.3 V-10A	1000 WV	JB	5
N-590A	MS90023-2	M27/300-10	6.3 V-20 A	1000 WV	KB	7 1/2
N-591A	MS90024-2	M27/300-03	2.5 V-10 A	6300 WV	JB	4 1/2
N-592A	MS90025-2	M27/300-06	5 V-10 A	6300 WV	KB	6 1/4
N-593A	MS90026-2	M27/36-01	200-100-0-100-200, 70 ma 6.3/5 V-2 A 6.3 V-3 A		HA	3 3/4

115/230 V., 50/60 Hz
Plug-In IC Power Transformers

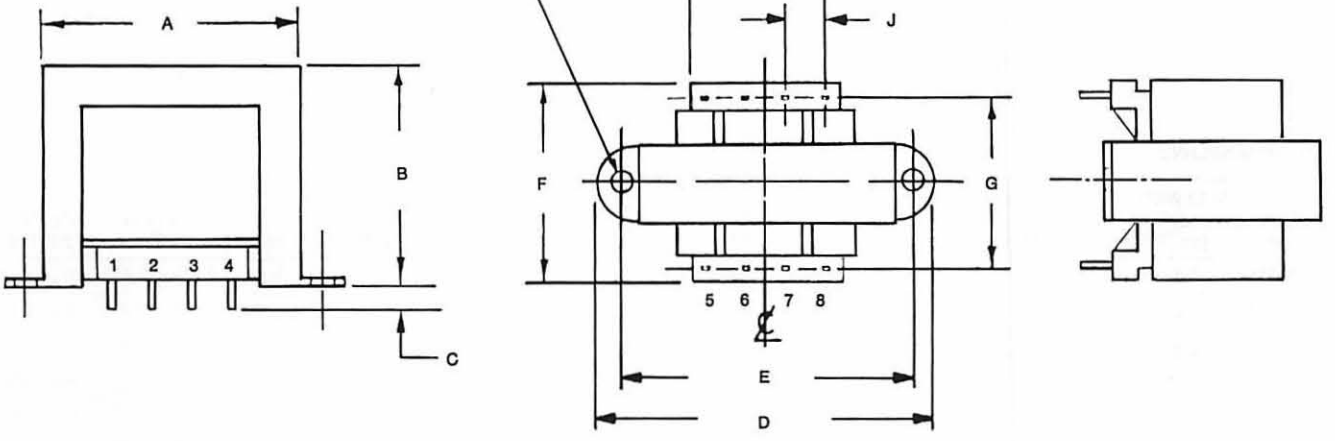
APPLICATIONS The TPC Series of plug-in power transformers is ideally suited for low-voltage, high-current IC feed applications. These units are also recommended for use in full-wave centertap and full-wave bridge rectifier circuits.

MIL SPECS To complete MIL-T-27D Specs, Grade 5, Class S. MIL Type No. TF5S03ZZ.

RATINGS Based on approximately 20% regulation from no-load to full-load RMS conditions.



Type No.	Power Rating (VA)	Series Connected Output: Join 6 and 7 (CT)		Parallel Connected Output: Join 5 and 7, 6 and 8	
		Secondary Voltage (volts)	Max. Secondary Current (mA)	Secondary Voltage (volts)	Max. Secondary Current (mA)
TPC-10-170	1.7	10 CT	170	5	340
TPC-12-135	1.7	12 CT	135	6.3	270
TPC-16-110	1.7	16 CT	110	8	220
TPC-24-70	1.7	24 CT	70	12	140
TPC-28-60	1.7	28 CT	60	14	120
TPC-34-50	1.7	34 CT	50	17	100
TPC-40-40	1.7	40 CT	40	20	80
TPC-120-14	1.7	120 CT	14	60	28
TPC-10-530	5.3	10 CT	530	5	1060
TPC-12-420	5.3	12 CT	420	6.3	840
TPC-16-330	5.3	16 CT	330	8	660
TPC-24-220	5.3	24 CT	220	12	440
TPC-28-190	5.3	28 CT	190	14	380
TPC-34-155	5.3	34 CT	155	17	310
TPC-40-130	5.3	40 CT	130	20	260
TPC-120-45	5.3	120 CT	45	60	90
TPC-10-1200	12.0	10 CT	1200	5	2400
TPC-12-950	12.0	12 CT	950	6.3	1900
TPC-16-750	12.0	16 CT	750	8	1500
TPC-24-500	12.0	24 CT	500	12	1000
TPC-28-430	12.0	28 CT	430	14	860
TPC-34-350	12.0	34 CT	350	17	700
TPC-40-300	12.0	40 CT	300	20	600
TPC-120-100	12.0	120 CT	100	60	200



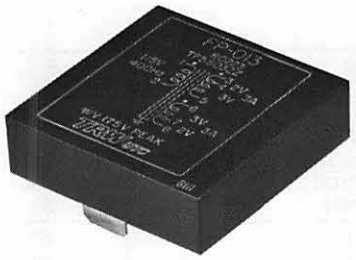
Power Rating	A Max.	B Max.	C ±.020	D Max.	E	F Max.	G ±.032	H ±.010	J Typ.	Weight, lb.
1.7 VA	1.50	1.25	.15	2.125	1.750	1.344	1.00	.60	.20	.20
5.3 VA	1.75	1.50	.15	2.375	2.000	1.469	1.10	.75	.25	.32
12.0 VA	2.00	1.75	.15	2.875	2.375	1.625	1.30	.75	.25	.58

400 Hz Power Transformers
Low Profile MIL-T-27 Grade 5 Class S

TRW

POWER

FP Series



APPLICATION Offering significant cost and size advantages over competitive low-voltage, high-current toroids, FP Series 400 Hz power transformers are wide applicability types which will fit many modern circuit needs.

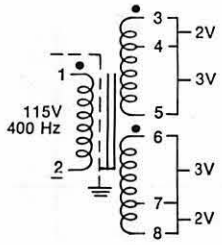
RATINGS Three power levels are available: 10, 20 and 30 watts. Within each power rating, three different winding and secondary tap arrangements are provided to cover a total voltage range from 2 to 30 volts. Since performance specifications are based on maximum-voltage, full-winding use, slight power derating is required when employing lower voltage taps, to keep current density normal.

CONSTRUCTION FP transformers feature a semi-toroidal, hum-bucking, self-shielding construction. Integral electrostatic shields are terminated in two unique mounting tabs. The units are of a low-profile design — .62 inches high — to fit "sandwich board" shallow drawer requirements. "PC" terminal types on all units.

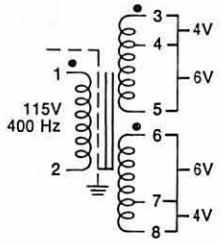
MIL SPECS To complete MIL-T-27D specifications. MIL Type No. TF5SO3ZZ.

SCHEMATICS

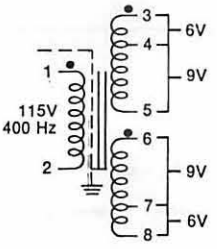
FP-011
FP-012
FP-013



FP-021
FP-022
FP-023

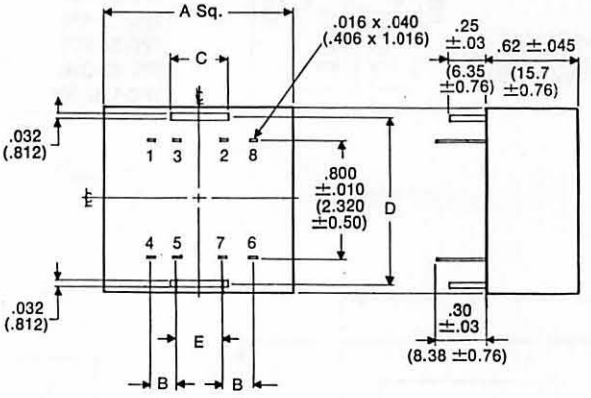


FP-031
FP-032
FP-033



SPECIFICATIONS

Type No.	MIL Part No.	Power Rating (Watts)	Primary Voltage (Volts)	Secondary Voltages (Volts)	Weight Lb. (Gms.)
FP-011	M27/325-01	10	115	2, 3, 4, 5, 6, 7, 8, 10	.125 (56.7)
FP-021	M27/325-02	10	115	4, 6, 8, 10, 12, 14, 16, 20	.125 (56.7)
FP-031	M27/325-03	10	115	6, 9, 12, 15, 18, 21, 24, 30	.125 (56.7)
FP-012	M27/325-04	20	115	2, 3, 4, 5, 6, 7, 8, 10	.25 (114)
FP-022	M27/325-05	20	115	4, 6, 8, 10, 12, 14, 16, 20	.25 (114)
FP-032	M27/325-06	20	115	6, 9, 12, 15, 18, 21, 24, 30	.25 (114)
FP-013	M27/325-07	30	115	2, 3, 4, 5, 6, 7, 8, 10	.38 (172)
FP-023	M27/325-08	30	115	4, 6, 8, 10, 12, 14, 16, 20	.38 (172)
FP-033	M27/325-09	30	115	6, 9, 12, 15, 18, 21, 24, 30	.38 (172)



DIMENSIONS

Type No.	Case Width "A" ±.03 in. (±.76mm)	Case Height ±.045 in. (±1.14mm)	Terminal Spacing "B" ±.005 in. (±.12mm)	Tab Width "C" ±.02 in. (±.50mm)	Tab Spacing "D" ±.01 in. (±.25mm)	A ±.03 in. (±0.76mm)	B ±.005 in. (±0.12mm)	C ±.02 in. (±0.50mm)	D ±.010 in. (±0.25mm)	E ±.005 in. (±0.12mm)
FP-011	1.24 sq. (31.49)	.62 (15.7)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	1.24 (31.49)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	.300 (7.62)
FP-021	1.24 sq. (31.49)	.62 (15.7)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	1.24 (31.49)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	.300 (7.62)
FP-031	1.24 sq. (31.49)	.62 (15.7)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	1.24 (31.49)	.200 (5.08)	.38 (9.65)	1.128 (28.65)	.300 (7.62)
FP-012	1.75 sq. (44.45)	.62 (15.7)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	1.75 (44.45)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	.350 (8.89)
FP-022	1.75 sq. (44.45)	.62 (15.7)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	1.75 (44.45)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	.350 (8.89)
FP-032	1.75 sq. (44.45)	.62 (15.7)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	1.75 (44.45)	.400 (10.16)	.38 (9.65)	1.625 (41.27)	.350 (8.89)
FP-013	2.25 sq. (57.15)	.62 (15.7)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	2.25 (57.15)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	.400 (10.16)
FP-023	2.25 sq. (57.15)	.62 (15.7)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	2.25 (57.15)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	.400 (10.16)
FP-033	2.25 sq. (57.15)	.62 (15.7)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	2.25 (57.15)	.600 (15.24)	.50 (12.7)	2.132 (54.15)	.400 (10.16)

Universal Transistor Supply Transformers

TRW

POWER

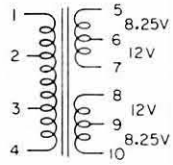
PACKAGING Hermetically sealed. Drawn metal case to MIL Grade 4.

MIL SPECS To complete MIL-T-27D Specs. MIL Type TF4S03 plus two letter case code. H-915 is qualified as M27/184-01. H-935 is qualified as M27/157-01. H-925 is qualified as M27/156-01.

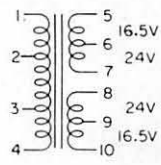
NOTES: Chart below shows the secondary AC voltages available, and the approximate DC voltages resulting, in typical capacitive filter silicon rectifier circuits (at the indicated currents). Since the capacitor following the rectifier affects the DC, voltage values used (in 1000 mfd) are shown in parenthesis ( ) after each current rating.

Primary taps can modify nominal AC voltages by −6%, +6%, and +12%.

UTC TYPE NO.
H-915 MET-465
H-925 MET-475
H-935 MET-445
H- 94 MET-455
H- 95
H- 96



UTC TYPE NO.
H-965 MET-495



PRI 2-4 115V NOM OUTPUT
1-4 115V -6% OUTPUT
1-3 115V +6% OUTPUT
2-3 115V +12% OUTPUT

INCLUDING MET™ SERIES

Primary 115 Volts, 50/60 Hz Nominal Secondary Volts, 8.25 to 40.5

Type No.	MIL DC Range	Industrial DC Range	MIL Case
H-915	6V-.065A to 53V-.02A	6V-.085A to 53V-.025A	AH
H-925	6V-.22A to 53V-.07A	6V-.28A to 53V-.085A	AJ
H-935	6V-1.2A to 53V-.4A	6V-1.52A to 53V-.48A	FA
H-94	6V-3A to 53V-1A	6V-3.8A to 53V-1.2A	HA
H-95	6V-7.5A to 53V-2.5A	6V-9A to 53V-3A	KA
H-96	6V-18A to 53V-6A	6V-23A to 53V-7.5A	OA

Primary 115 Volts, 50/60 Hz Nominal Secondary Volts, 16.5 to 81

H-965	12V-1.5A to 106V-.5A	12V-1.9A to 106V-.6A	HA

Primary 115 Volts, 400 Hz Nominal Secondary Volts, 8.25 to 40.5

Type No.	MIL DC Range	Industrial DC Range	MIL Case
MET-445	6V-.6A to 53V-.2A	6V-.75A to 53V-.25A	AH
MET-455	6V-1.2A to 53V-.4A	6V-1.25A to 53V-.48A	AJ
MET-465	6V-3A to 53V-1A	6V-3.8A to 53V-1.2A	FA
MET-475	6V-7.5A to 53V-2.5A	6V-9A to 53V-3A	HA

Primary 115 Volts, 400 Hz Nominal Secondary Volts, 16.5 to 81

MET-495	12V-.6A to 106V-.2A	12V-.76A to 106V-.24A	AJ

DC Output for 16.5- to 81-Volt Secondaries

Nominal AC Voltage	Approx. DC Voltage	DC Current in Amperes (Capacitance in 1000 mfd in Parentheses) 60-Hz Type H-965	400-Hz Type MET-495
Full Wave Bridge Silicon Rectifier			
16.5	12	1.5 (.5)	0.6 (.06)
24	24	1.25 (.5)	0.5 (.06)
33	36	0.75 (.25)	0.3 (.06)
40.5	48	1.0 (.25)	0.4 (.06)
48	50	0.65 (.125)	0.26 (.04)
57	68	0.60 (.125)	0.24 (.04)
64.5	82	0.55 (.125)	0.22 (0.4)
81	106	0.50 (.125)	0.20 (.04)
Full Wave CT			
33 CT	13	1.15 (.5)	0.46 (.06)
48 CT	24	0.90 (.25)	0.36 (.06)
81 CT	48	0.75 (.25)	0.30 (.06)

DC OUTPUT FOR 8.25- TO 40.5-VOLT SECONDARIES

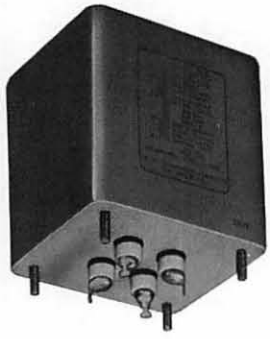
Nominal AC Voltage	Approx. DC Voltage	DC Current in Amperes (Capacitance in 1000 mfd in Parentheses) 60-Hz Types H-915	H-925	H-935	H-94	H-95	H-96	400-Hz Types MET-445	MET-455	MET-465	MET-475
Full Wave Bridge Silicon Rectifier											
8.25	6	.065 (.2)	.22 (.2)	1.2 (2)	3.0 (2)	7.5 (4)	18 (12)	.6 (.5)	1.2 (.5)	3.0 (.5)	7.5 (1)
12	12	.055 (.2)	.18 (.2)	1.0 (2)	2.5 (2)	6.0 (4)	15 (12)	.5 (.5)	1.0 (.5)	2.5 (.5)	6.0 (1)
16.5	18	.035 (.2)	.11 (.2)	.6 (1)	1.5 (1)	3.7 (2)	9 (6)	.3 (.25)	.6 (.25)	1.5 (.25)	3.7 (.5)
20.25	24	.042 (.2)	.14 (.2)	.8 (1)	2.0 (1)	5.0 (2)	12 (6)	.4 (.25)	.8 (.25)	2.0 (.25)	5.0 (.5)
24	25	.027 (.2)	.09 (.1)	.52 (.5)	1.3 (.5)	3.5 (1)	8 (4)	.26 (.15)	.52 (.15)	1.3 (.15)	3.5 (.25)
28.5	34	.025 (.1)	.085 (.1)	.48 (.5)	1.2 (.5)	3.0 (1)	7.5 (4)	.25 (.15)	.48 (.15)	1.2 (.15)	3.0 (.25)
32.25	41	.023 (.1)	.08 (.1)	.44 (.5)	1.1 (.5)	3.0 (1)	7 (4)	.22 (.15)	.44 (.15)	1.1 (.15)	3.0 (.25)
40.5	53	.020 (.1)	.07 (.1)	.40 (.5)	1.0 (.5)	2.5 (1)	6 (4)	.20 (.15)	.40 (.15)	1.0 (.15)	2.5 (.25)
Full Wave CT											
16.5 CT	6.6	.055 (.2)	.17 (.2)	.92 (2)	2.3 (2)	5.5 (4)	13.5 (12)	.46 (.5)	.92 (.5)	2.3 (.5)	5.5 (1)
24 CT	12	.040 (.2)	.13 (.2)	.72 (1)	1.8 (1)	4.5 (2)	11 (6)	.36 (.25)	.72 (.25)	1.8 (.25)	4.5 (.5)
40.5 CT	24	.035 (.2)	.11 (.2)	.60 (1)	1.5 (1)	3.7 (2)	9 (6)	.30 (.25)	.60 (.25)	1.5 (.25)	3.7 (.5)

Industrial Rating — Multiply D.C. Current By Approx. 1.25

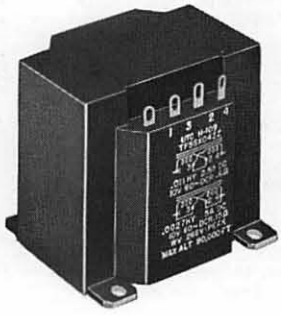
Filter Inductors

TRW POWER

METAL CASED



MOLDED



PACKAGING Hermetically sealed. H-70 group — Metal encased. H-105 group — molded.

APPLICATIONS Transistor supply units have two windings for wide flexibility. All are swinging types to enhance power supply regulation.

CONSTRUCTION Grain-oriented core materials impart highest permeabilities, producing exceptionally high inductance for size.

MIL SPECS To complete MIL-T-27D Specs. H-70 group (metal cased) Grade 4, Class S. H-105 group (molded) Grade 5, Class S.

METAL CASED MIL-T-27D RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE**

Type No.	MIL Type	Ind. @ ma Hys.	Ind. @ ma DC	Ind. @ ma Hys.	Ind. @ ma DC	Ind. @ ma Hys.	Ind. @ ma DC	Ind. @ ma Hys.	Ind. @ ma DC	Res. Ohms	Max. DCV Ch. Input	Test V RMS	MIL Case
H-70	TF4S04AH	20	20	18	25	14.5	30	10	35	925	350	1000	AH
H-71	TF4S04FB	20	40	18.5	50	15.5	60	10	70	350	500	2500	FB
H-72	TF4S04GB	13	70	11.5	85	9.5	105	7	125	215	500	2500	GB
H-73	TF4S04HB	11	100	9.5	125	7.5	150	5.5	175	150	700	2500	HB
H-74	TF4S04JB	11	150	10	170	8.5	195	**6.5**	**215**	135	700	2500	JB
H-75	TF4S04KB	11	200	10	230	8.5	250	**6.5**	**300**	90	700	2500	KB
H-76	M27/174-01	11	200	10	230	8.5	250	**6.5**	**300**	85	1500	4500	LB
H-77	TF4S04MB	10	300	9	350	**8**	**390**	**6.5**	**435**	60	2000	5500	MB
H-78	TF4S040A	7	400	**6.5**	**430**	**6**	**465**	**5.5**	**500**	48	2500	7000	OA
H-164†	M27/171-01	45‡	35	40‡	75	18‡	350	9‡	750	1.2		500	AG
*	(2 Wdgs.)	11.25‡	70	10‡	150	4.5‡	700	2.25‡	1.5A	.295			
H-166†	TF4S04AH	125‡	50	80‡	100	20‡	500	12‡	1 A	1.2		500	AH
*	(2 Wdgs.)	31‡	100	20‡	200	5‡	1 A	3‡	2 A	.3			
H-168†	TF4S04AJ	68‡	100	52‡	200	20‡	1 A	14‡	2 A	.8		750	AJ
*	(2 Wdgs.)	17‡	200	13‡	400	5‡	2 A	3.5‡	4 A	.2			
H-170†	TF4S04GB	180‡	125	140‡	250	25‡	1.25A	11‡	2.5A	.6		1000	GB
*	(2 Wdgs.)	45‡	250	35‡	500	6.2‡	2.5 A	2.7‡	5 A	.15			
H-171†	TF4S04JA	9‡	.75A	5‡	1.5A	2.2‡	7.5 A	1.6‡	15 A	.03		1000	JA
*	(2 Wdgs.)	2.25‡	1.25A	1.25‡	3 A	.55‡	15 A	.4‡	30 A	.0075			
H-172†	TF4S04HA	70‡	.25A	65‡	.4A	20‡	2 A	9‡	4 A	.22		1000	HA
*	(2 Wdgs.)	17.5‡	.5 A	16‡	.8A	5‡	4 A	2.25‡	8 A	.055			
H-173†	TF4S04KA	80‡	.5 A	72‡	.8A	16.5‡	4 A	8.2‡	8 A	.15		1000	KA
*	(2 Wdgs.)	20‡	1 A	18‡	1.6A	4.1‡	8 A	2.1‡	16 A	.038			
H-174†	TF4S04MB	50‡	.65A	45‡	1.3A	10‡	6.5 A	6.5‡	13 A	.08		1000	MB
*	(2 Wdgs.)	12.5‡	1.3 A	11‡	2.6A	2.5‡	13 A	1.6‡	26 A	.02			

MOLDED

Type No.	MIL Part No.	Inductance - Henries @ ma DC	DCR Ohms	Test Volts	L	W	H	Mtg. Dim. and Studs		Wgt. Lbs.
H-105	M27/149-01	2.5 @ 25 ma, 2 @ 35 ma, 1.5 @ 45 ma	225	1000	1 1/4	15/16	15/16	9/16 x 7/8 two #4-40 Taps, Diag.		.1
H-106	M27/159-01	2.25 @ 60 ma, 1.75 @ 80 ma, 125 @ 100 ma	110	1000	1 5/8	1 5/16	1 3/8	1 5/16 x 1 5/16	1/8 Dia. 4 holes	.28
H-107	M27/160-01	2 @ 120 ma, 1.5 @ 160 ma, 1 @ 200 ma	55	2500	2 1/8	1 3/4	1 55/64	1 3/4 x 1 11/32	5/32 Dia. 4 holes	.9
H-108	M27/179-01	2 @ 220 ma, 1.5 @ 270 ma, 1 @ 325 ma	35	2500	2 7/8	2 1/2	2 17/32	2 3/16 x 2 1/16	5/32 x 7/32 4 slots	1.7
H-109† (2 wdgs)*	TF5S04ZZ	.2 @ 125 ma, .025 @ 1.25A, .011 @ 2.5A .055 @ 250 ma, .00625 @ 2.5A, .0027 @ 5A	.6 .15	750	2 7/8	2 1/2	2 17/32	2 3/16 x 2 1/16	5/32 x 7/32 4 slots	1.7

† Split winding in series. * Split winding in parallel. ‡ Rated in millihenries. ¶ Terminals opposite mounting.

400 Hz Transformers

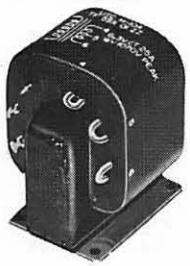
POWER

PACKAGING Hermetically sealed. DO-T's and MET's metal encased. H-101 group — molded.

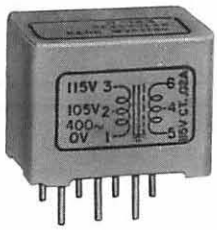
APPLICATION Transistor/filament and isolation.
SHIELDING All isolation transformers electrostatically shielded.

MIL SPECS To complete MIL-T-27D Specs. DO-T's: Grade 5, Class R. MET's: Grade 4, Class S. Molded units: Grade 5, Class S.

Molded Types, Grade 5



H-101 thru H-104



H-118
H-148
H-149

Primary: 105/115 Volts 380-1000 Hz
Secondary: 6.3 VCT 2500V RMS Test

Type No.	MIL-Type	Sec. Amp.	L In.	W In.	H In.	Mtg. Dim.	Wt. Lbs.
H-101	TF5S03ZZ	3.5	1 25/32	1 21/32	2	1 1/8 x 1 5/32	.3
H-102	M27/202-01	5.5	1 3/4	2	2 1/4	1 1/8 x 1 9/32	.44
H-103	M27/158-01	10	2 5/16	2 1/8	2 1/2	1 11/16 x 1 13/32	.8
H-104	M27/201-01	25	2 7/8	2 1/2	3 1/32	2 3/16 x 1 17/32	1.5

H-101 thru H-104 mounted by 4 holes .157D

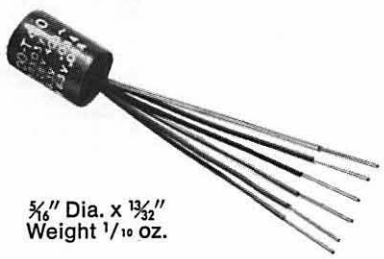
500V RMS TEST

Type No.	H-118	H-148‡	H-149
Application	Supply	Isolation	Supply
Primary	105/115V 380-1000 Hz	105/115V 400 Hz	28V 380-1000 Hz
Secondary	6.3V CT — .3A	115V CT-.02A	1) 6.3V-.08A 2) 6.3V-.08A 12.6V-.08A* 6.3V-.16A†
MIL-Type	TF5S03ZZ	TF5S03ZZ	TF5S03ZZ
Case Type (See pgs. 21 & 24)	SO-#P	SO-#P	SSO-#P

* Series Connected. † Parallel Connected. ‡ **ELECTROSTATICALLY SHIELDED.**

Metal Encased Types, Grade 5 DO-T400™ Series

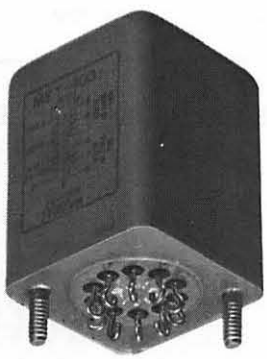
MIL TYPE TF5R03ZZ



5/16" Dia. x 13/32"
Weight 1/10 oz.

Type No.	Application	Primary	Secondary	Rated Heat Rise
DO-T400	Isolation transformer	28V, 400 Hz	6.3V @ 60 mA	40°C
DO-T410	Isolation transformer	28V, 400 Hz	(2 secs.) 6.3V @ 30 mA, 6.3V @ 30 mA	40°C
DO-T415	Isolation transformer	28V, 400 Hz	(2 secs.) 12.6V @ 15 mA, 12.6V @ 15 mA	40°C
DO-T420	Electrostatically shielded isolation transformer	28V, 400 Hz	28V @ 10 mA	40°C
DO-T430	3-watt autotransformer	28V, 400 Hz	12.6V - 0 - 12.6V @ 120 mA	40°C
DO-T440	3/4-watt autotransformer	28V, 400 Hz	6.3V - 0 - 6.3V @ 60 mA	40°C
DO-TSH DO-TSH2	Drawn Hipermalloy shields provide 20 to 40 dB shielding, each. See Catalog page 10 for dimensions.			

MET™ Series



Type No.	MIL Type	Pri. Volt	Sec. Volts	Amps. (MIL)	Amps (Industrial)	Sec. Test Volts RMS	MIL Case
MET-400‡	TF4S03AH 380-1000 Hz 105/115/125V		115 CT 115 CT 230* 115†	.06 .06 .06 .12	**.072** **.072** **.072** **.144**	1000	AH
MET-405‡	TF4S03EA 380-1000 Hz 105/115/125V		115 CT 115 CT 230* 115†	0.2 0.2 0.2 0.4	**.24** **.24** **.24** **.48**	1000	EA
MET-410	TF4S03YY 115V, 400 Hz		6.3	0.6	**.75**	500	RC-25 (Pg. 14)
MET-420	TF4S03AH 380-1000 Hz 105/115/125V		6.3 CT	2	**2.5**	1500	AH
MET-430¶	M27/180-01 400 Hz 57.5, 99.6, 115V		12.6 CT 12.6	2 2	**2.5** **2.5**	1500	FA

* Series Connected. † Parallel Connected. ‡ **ELECTROSTATICALLY SHIELDED.**
¶ Two MET-430's Scott connected provide 26 volt two phase from 115 V. three phase 400 Hz input.

Supply and Ultrashielded Transformers

ALL HERMETICALLY SEALED, all to complete MIL-T-27D Specs.

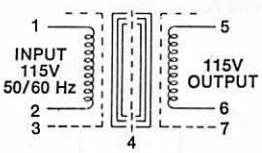
Transistor/Filament Supply Transformers

Primary: 105/115/210/220 volts, 50/60 Hz, except H-119, H-130, H-137, H-138, (115 V) and H-131 (115/220 V). All units designed for 50/60 Hz also suited for 400/1000 Hz service.

MIL-T-27D RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

Type No.	MIL Type	Sec. Volts	Amps (MIL)	Amps (Indust.)	Sec. Test Volts RMS	MIL Case
H-124	TF4S03FB	5	3	**3.8**	2000	FB
H-125	M27/151-01	5	10	**12**	10000	KB
H-119	TF4S03AH	6.3 CT	.3	**.38**	1500	AH
H-130	TF4S03AJ	6.3 CT	.6	**.75**	1500	AJ
H-131	M27/153-01	6.3 CT	2	**2.5**	2500	FB
H-132	TF4S03JA	6.3 CT 6.3 CT	6 6	**7** **7**	2500	JA
H-133	TF4S03HB	6.3 CT	7	**8**	2500	HB
H-134	TF4S03HA	6.3 CT	10	**12**	2500	HA
H-135	TF4S03JB	10 CT	10	**13**	2500	JB
H-137	TF4S03EB	6.3 6.3	.6 .6	**.75** **.75**	1500	EB
H-138	TF4S03GA	12.6 12.6	2 2	**2.5** **2.5**	1500	GA

HIT™ Series Ultrashielded Power-Line Isolation Transformers



SIMULATES BATTERY OPERATION FOR CRITICAL CIRCUITS REQUIRING EXTREME ISOLATION FOR POWER LINE.

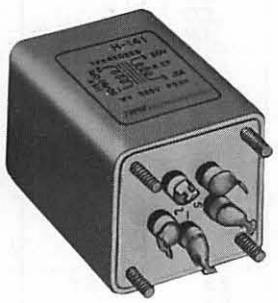
The effective capacity coupling between primary and secondary windings is less than 0.1 pf. Individually terminated shields allow maximum circuit design flexibility to further reduce this minute capacitance. Input and output terminals are on opposite sides of housing for excellent line/load isolation.

MIL-T-27D RATINGS IN REGULAR TYPE, **INDUSTRIAL RATINGS IN BOLD TYPE.**

Primary 115 V 50/60 Hz, Secondary 115 V.

Type No.	Power Watts	Power Watts	Max. Case Size	Mounting Dim. and Studs	Wt. Lbs.	MIL Part No.
HIT-1	50	**60**	4 1/32 x 4 1/32 x 3 1/32 h	3 3/8 x 3 3/8 10-32 x 1/2 long	5 1/2	M27/235-02
HIT-15	120	**150**	5 11/32 x 5 x 3 1/2 h	4 5/8 x 4 5/16 10-32 x 1/2 long	13	M27/235-03
HIT-2	160	**200**	5 17/32 x 5 17/32 x 4 17/32 h	4 13/16 x 4 13/16 10-32 x 1/2 long	15 1/2	M27/235-04
HIT-3	400	**480**	8 x 6 17/32 x 5 17/32 h	7 1/16 x 5 5/8 5/16-18 x 13/16 long	35	M27/235-01
HIT-4	1000	**1200**	9 x 7 1/2 x 7 1/2 h	8 x 6 1/2 5/16-18 x 13/16 long	60	M27/235-05

Transistor Supply Transformers



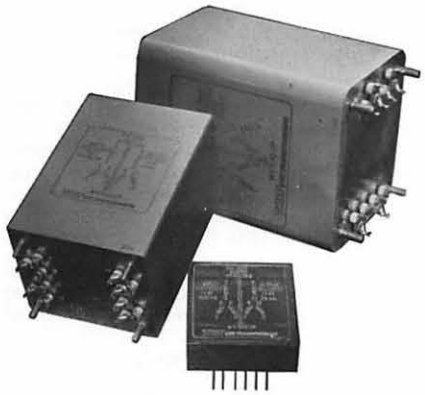
Primary 115 V 50/60 Hz (tapped on H-143 thru H-146 for dual secondary voltages). DC ratings are approximate, based on silicon bridge rectifier (except H-141, H-142 also shown F.W.C.T.). Choke input DCV is based on 10% voltage drop in choke. Condenser value, C, is in 1000 mfd. H-141, H-142, H-147 listing under "Secs in parallel" is single winding.

Type No.	MIL Part No.	Sec. V RMS	Sec. A RMS	Sec. in Parallel					Sec. in Series					MIL Case
				Choke DCV	Input DCA	Cond. DCV	Input DCA	C	Choke DCV	Input DCA	Cond. DCV	Input DCA	C	
H-141	M27/154-01 Full wave CT	20 CT	.3	16.5 8	.3 .43	26 12	.2 .3	.2 .5						EB
H-142	M27/155-01 Full wave CT	20 CT	.6	16.5 9	.6 .85	26 13	.4 .6	.4 1						EA
H-143	TF4S03HA	17/21.5 17/21.5	1.5 1.5	14/17.5	3	18.5/25	2	1	28/35	1.5	43/56	1	.5	HA
H-144	TF4S03LA	17/21.5 17/21.5	4 4	14/17.5	8	18.5/25	5	2	28/35	4	43/56	2.5	1	LA
H-145	TF4S03YY	17/21.5 17/21.5	9 9	14/17.5	18	18.5/25	12	6	28/35	9	43/56	6	4	RC-175*
H-146	TF4S03YY	34/43 34/43	4.5 4.5	28/35	9	43/56	6	4	56/70	4.5	85/110	3	1	RC-175*
H-147	TF4S03KA	10	20	8.2	20	10	13	12						KA

* RC-175 Dimensions: 5¾" Sq. x 7" H.

PH and PV Universal Three-Phase Transformers

TRW POWER



PH Series three-phase transformers are electrostatically shielded isolation transformers constructed to MIL-T-27 specifications.

Two Grade 4 metal-cased PH units are intended for 50/60-Hz, 120/208-volt Wye or 120-volt Delta inputs. One is rated at 65 watts, the other at 360 watts.

A 25-watt, molded Grade 5 PH unit is designed for 400-Hz, 115/200-volt Wye or 115-volt Delta inputs. All PH Series primaries and secondaries can be connected in either Wye or Delta.

PV Series three-phase transformers are identically packaged and suggested for similar inputs, but feature windings arranged and tapped to provide low-voltage, high-current inputs for full-wave bridge circuits.

Two Grade 4 metal-cased PV units for 50/60-Hz inputs provide 3.1 to 48 volts DC in 27 different voltage combinations, at currents ranging from 1.25 to 12.5 amps DC.

A Grade 5 molded PV transformer for 400-Hz use has the same voltage capabilities, but yields bridge circuit currents from 0.5 to 0.87 amp DC.

PV SPECIFICATIONS

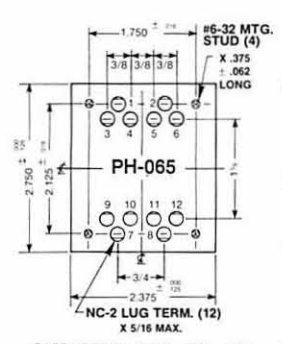
Type No.	Max. DC Rectified Current	
	Delta	Wye
PV-100	2.15 A	1.25 A
PV-105	12.5 A	7.2 A
PV-400	0.87 A	0.5 A

PH SPECIFICATIONS

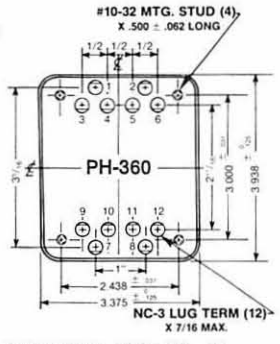
Type No.	Application	AC Input	Nominal AC Output
PH-065	Isolation	120 V, 50/60 Hz Delta	120 V @ 0.31 A/line
		208 V, 50/60 Hz Wye	208 V @ 0.18 A/line
PH-360	Isolation	120 V, 50/60 Hz Delta	120 V @ 1.73 A/line
		208 V, 50/60 Hz Wye	208 V @ 1.00 A/line
PH-425	Isolation	115 V, 400 Hz Delta	115 V @ 0.13 A/line
		200 V, 400 Hz Wye	200 V @ 0.07 A/line

Type No.	Application	AC Input	Nominal DC Output in 3-Phase Full-Wave Bridge Rectifier Circuit*					
			Secondary					
			Full Delta	⅓ Delta	⅔ Delta	Full Wye	⅓ Wye	⅔ Wye
PV-100 and PV-105	Full-Wave Bridge Circuit	208 V, 50/60 Hz Delta	28 V	9.3 V	18.7 V	48 V or ±24 V	16 V or ±8 V	32 V or ±16 V
		120 V, 50/60 Hz L-N Wye 208 V, 50/60 Hz L-L Wye 120 V, 50/60 Hz Delta	16.2 V	5.4 V	10.8 V	28 V or ±14 V	9.3 V or ±4.65 V	18.6 V or ±9.3 V
		120 V, 50/60 Hz L-L Wye	9.36 V	3.1 V	6.2 V	16.2 V or ±8.1 V	5.4 V or ±2.7 V	10.8 V or ±5.4 V
PV-400	Full-Wave Bridge Circuit	200 V, 400 Hz Delta	28 V	9.3 V	18.7 V	48 V or ±24 V	16 V or ±8 V	32 V or ±16 V
		115 V, 400 Hz L-N Wye 200 V, 400 Hz L-L Wye 115 V, 400 Hz Delta	16.2 V	5.4 V	10.8 V	28 V or ±14 V	9.3 V or ±4.65 V	18.6 V or ±9.3 V
		115 V, 400 Hz L-L Wye	9.36 V	3.1 V	6.2 V	16.2 V or ±8.1 V	5.4 V or ±2.7 V	10.8 V or ±5.4 V

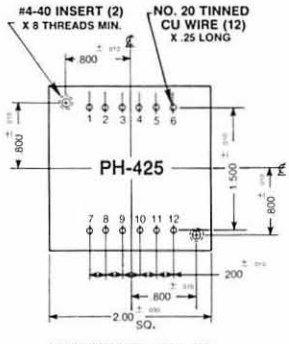
* Diode drops neglected.



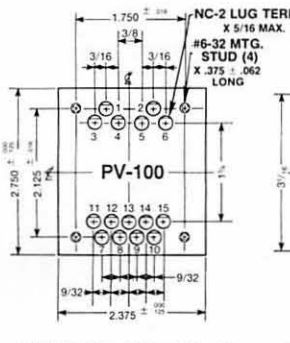
CASE HEIGHT = 3.812 + .000, - .188



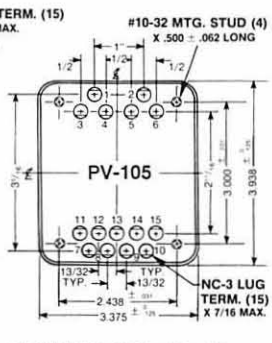
CASE HEIGHT = 5.250 + .000, - .188



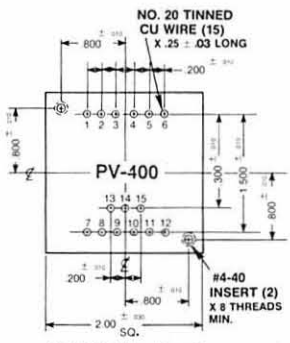
CASE HEIGHT = .75 ± .03



CASE HEIGHT = 3.812 + .000, - .188

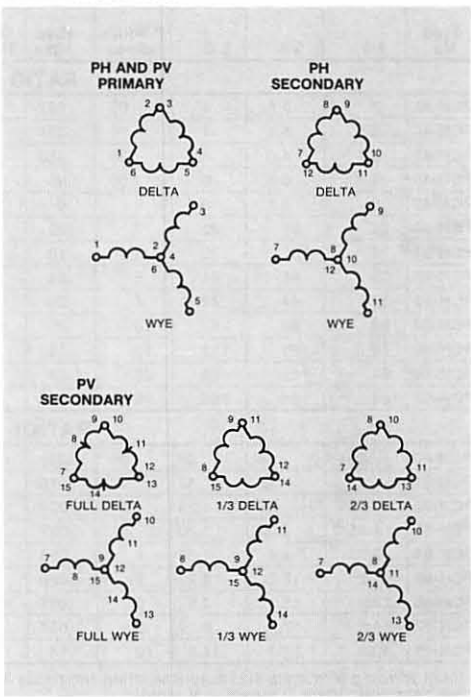


CASE HEIGHT = 5.250 + .000, - .188



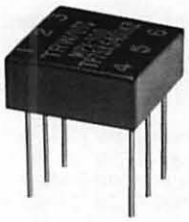
CASE HEIGHT = .75 ± .03

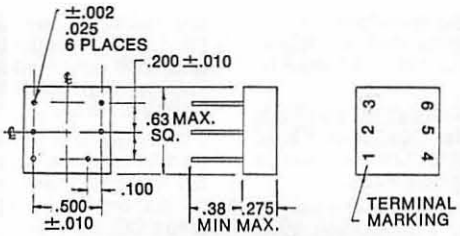
SCHEMATICS



Multiplex Data Bus MIL Std. 1553B Pulse Transformers

PULSE





Type No.	Application	Ratio*
MPX-100	Isolation Transformer	1 CT: 1 CT
MPX-200	Coupling Transformer	1.41 CT: 1 CT
MPX-300	Coupling Transformer	1.25 CT: 1 CT

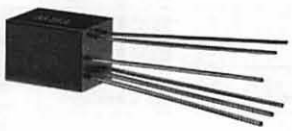
* Other ratios available on special order.

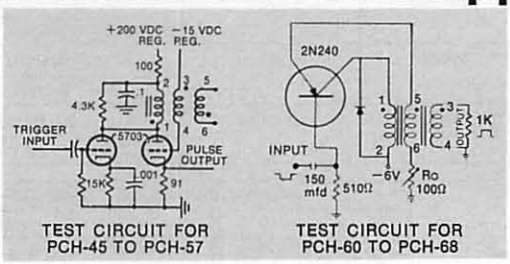
MIL SPECS MPX pulse transformers fully meet MIL STD 1553B Command/Response Multiplex Data Bus requirements. They also meet MIL-T-21038D Pulse Transformer Specs. MIL Type No. TP7SX( ) KZ.

PERFORMANCE MPX pulse transformers feature a high efficiency design for minimum losses. Common mode rejection ratio is greater than 45 db at 1 MHz. Input impedance is greater than 3000 ohms over the band from 75 KHz to 1 MHz at 1V rms. This series possesses exceptional waveform integrity: Rise time and fall time is less than 100 nanoseconds. Overshoot and ringing is less than ±1V peak. Droop is less than 20%.

CONSTRUCTION All windings are centertapped for greater circuit application flexibility. The series is packaged in a printed circuit style configuration, with a low profile configuration of 0.275 inches maximum height.
Dielectric withstanding voltage is tested at 100 Vrms.

Plug-in Precision Miniature Wide Application Pulse Transformers





PCH pulse transformers are plug-in versions of our MIL-T-21038 line of pulse transformers H45 to H57 and H60 to H68.

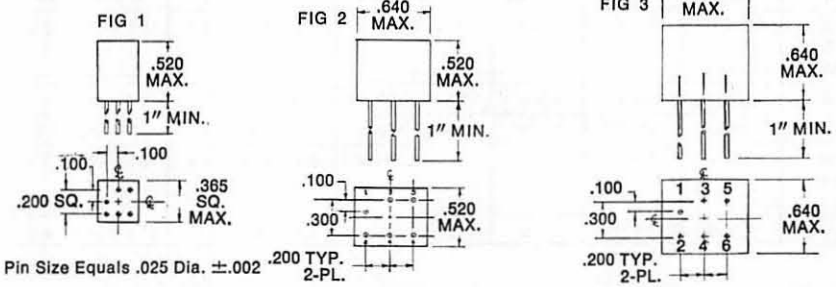
PACKAGING Hermetically sealed. Epoxy cased.

CONSTRUCTION Designed to be used on PC boards with 0.1″ pin spacings. The pins are in a non-symmetrical pattern to provide foolproof insertion.

MIL SPECS Meet MIL-T-21038D Specs. All units are Grade 7, Class S, Life X.

APPLICATIONS Transistor blocking oscillators, SCR drivers, coupling and isolation. The PCH-45 through PCH-57 also can be used in transistor circuits.

NOTE The units are individually adjusted in the circuit shown for each group. Parameters are checked to give the required pulse widths.



Pin Size Equals .025 Dia. ±.002

Type No.	Approx. DCR, Ohms 1-2	3-4	5-6	Blocking Oscillator Pulse P Width μSec.	Rise Time	% Over Shoot	Droop %	% Back Swing	Coupling Circuit Characteristics P Width μ Sec.	Volt Out	Rise Time	% Over Shoot	Droop %	% Back Swing	Imp. in/out,* ohms	Frequency Response within 2 db†	Size
RATIO 1:1:1 MIL TYPE DESIGNATION TP7SX1110KZ																	
PCH-45	3	3.5	4	.05	.022	0	20	10	.05	17	.01	20	0	35	250	260 kHz-34 MHz	Fig. 1
PCH-46	5.5	6.5	7	.10	.024	0	25	10	.10	19	.01	30	10	50	250	220 kHz-34 MHz	Fig. 1
PCH-47	3.7	4.0	4	.20	.026	0	25	8	.20	18	.01	30	15	65	500	260 kHz-93 MHz	Fig. 2
PCH-48	5.5	5.8	6	.50	.03	0	20	5	.50	20	.01	30	20	65	500	85 kHz-73 MHz	Fig. 2
PCH-49	8	8.5	9	1	.04	0	20	10	1	24	.02	15	15	65	500	50 kHz-62.5 MHz	Fig. 2
PCH-50	20	21	22	2	.05	0	20	10	2	27	.05	10	15	35	500	24.5 kHz-49 MHz	Fig. 2
PCH-51	28	31	33	3	.10	1	20	8	3	26	.07	10	10	35	500	12.6 kHz-5.65 MHz	Fig. 2
PCH-52	36	41	44	5	.13	1	25	8	5	23	.15	10	10	45	1000	13 kHz-3.465 MHz	Fig. 2
PCH-53	37	44	49	7	.28	0	25	8	7	24	.20	10	10	50	1000	9.5 kHz-6.3 MHz	Fig. 3
PCH-54	50	58	67	10	.30	0	20	8	10	24	.25	10	10	50	1000	7.1 kHz-1.35 MHz	Fig. 3
PCH-55	78	96	112	16	.75	0	20	10	16	23	.40	5	15	20	1000	1.65 kHz-3.05 MHz	Fig. 3
PCH-56	93	116	138	20	1.25	0	25	10	20	23	.6	5	10	10	1000	2.15 kHz-285 kHz	Fig. 3
PCH-57	104	135	165	25	2.0	0	30	10	25	24	1.5	5	10	10	1000	1.7 kHz-315 kHz	Fig. 3
RATIO: 4:4:1 MIL TYPE DESIGNATION TP7SX4410KZ																	
PCH-60	.124	.14	.05	.05	.016	0	0	30	.05	9.3	.012	0	0	20	50	550 kHz-43 MHz	Fig. 1
PCH-61	.41	.48	.19	.1	.016	0	0	30	.1	8.2	.021	0	0	15	50	95 kHz-17 MHz	Fig. 1
PCH-62	.78	.94	.33	.2	.022	0	0	18	.2	7.4	.034	0	5	12	100	60 kHz-14.5 MHz	Fig. 1
PCH-63	1.86	2.26	.70	.5	.027	2	10	20	.5	7.5	.045	0	20	25	100	22 kHz-3.7 MHz	Fig. 1
PCH-64	3.73	4.4	1.33	1	.033	0	12	25	1	7	.078	0	15	23	100	12 kHz-2.3 MHz	Fig. 1
PCH-65	6.2	7.3	2.22	2	.066	0	15	25	2	6.6	.14	0	10	20	100	8.5 kHz-1.675 MHz	Fig. 1
PCH-66	10.2	12	3.6	3	.087	0	18	30	3	6.8	.17	0	10	20	100	3.9 kHz-950 kHz	Fig. 1
PCH-67	14.5	17.5	5.14	5	.097	0	23	28	5	7.9	.2	0	18	28	200	3.6 kHz-840 kHz	Fig. 1
PCH-68	42.3	52.1	14.8	10	.14	0	15	28	10	6.5	.4	0	15	30	200	1.1 kHz-400 kHz	Fig. 1

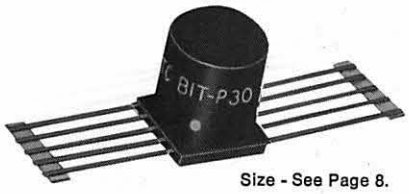
* Input winding terminals 1-2; output winding terminals 3-4; terminals 5-6 open.
† Per coupling circuit Z in/out, 1 V input.

TRW TRANSFORMER & COIL PRODUCTS, 150 Varick Street, New York, NY 10013, Telephone: (212) 255-3500, TWX: 710-581-2722

BIT-P™
Surface Mount Pulse Transformers

TRW

PULSE



Size - See Page 8.

PACKAGING

Size reduction without loss of performance is achieved by major reduction of air gaps in the magnetic circuit. Core permeability closely approaches the theoretical maximum for material and structure.

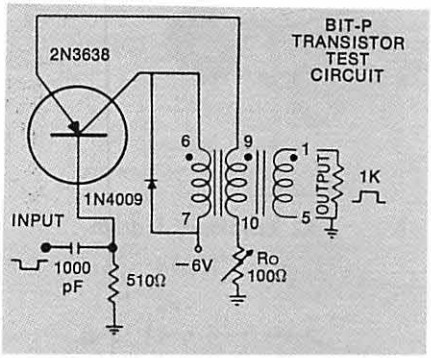
Materials, dimensions, and surface finish are identical with IC Flat Pack standards. Removable support protects terminal alignment prior to final assembly. This insulated support allows testing in conventional jigs.

FLEXIBILITY

Stock units are designed for the standard blocking oscillator circuit shown as well as for coupling application. By interconnecting windings, a variety of primary to secondary ratios may be obtained.

NOTES

- **PULSE WIDTH** .05 μsec-100 μsec
- **DIELECTRIC STRENGTH** tested @ 200 VRMS
- **MIL SPECS** To complete MIL-T-21038D Metal encased, ruggedized Grade 6, Class R, Life X.
- **SHIELDED** All units electromagnetically self-shielded
- **LEAD MATERIAL** Ribbon-style, solderable to MIL-STD 1276C.

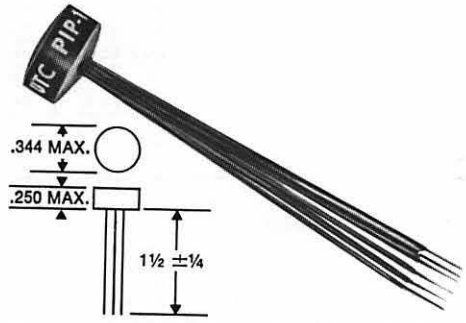


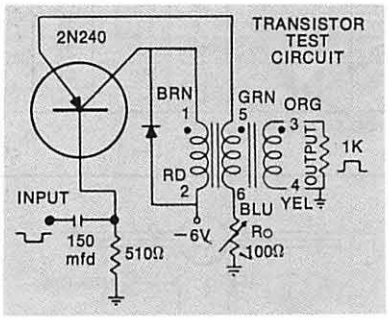
RATIO 4:4:1 MIL TYPE DESIGNATION TP6RX4410CZ

	Approx. DCR, Ohms			Block Oscillator Pulse					Coupling Circuit Characteristics						
Type No.	1 & 5	6 & 7	9 & 10	P Width μSec.	Rise Time	% Over Shoot	Droop %	% Back Swing	P Width μSec.	Volt Out	Rise Time	% Over Shoot	Droop %	% Back Swing	Imp.* in/out
BIT-P21	.32	.29	.28	.05	.01	0	0	35	.05	0.2	.01	0	0	20	50
BIT-P22	.33	.32	.29	.1	.012	0	0	25	.1	0.5	.015	0	0	20	50
BIT-P23	.38	.37	.3	.2	.02	0	0	15	.2	1.2	.02	0	0	20	100
BIT-P24	.5	.48	.32	.5	.023	0	5	15	.5	1.5	.022	0	5	25	100
BIT-P25	.62	.57	.35	1	.03	0	10	14	1	1.5	.025	0	20	28	100
BIT-P26	.7	.64	.4	2	.035	0	12	15	2	1.5	.028	0	15	23	100
BIT-P27	.85	.76	.48	3	.04	0	13	15	3	1.5	.032	0	18	28	100
BIT-P28	.96	.86	.52	5	.045	0	15	14	5	2	.035	0	20	20	200
BIT-P29	1.4	1.1	.57	10	.065	0	15	10	10	2	.05	0	25	25	200
BIT-P30	2.1	1.7	.8	15	.07	0	15	13	15	2	.06	0	27	18	200
BIT-P31	2.7	2.1	.97	25	.08	0	15	13	25	3	.1	0	30	30	500
BIT-P32	20	15	6	50	.2	0	10	5	50	3	.3	0	22	20	500
BIT-P33	42	32	12	100	.35	0	11	13	100	6	.4	0	15	18	500

* Input winding terminals 1 & 5, output winding terminals 6 & 7, terminals 9 & 10 open.

Precision Miniature Wide Application Pulse Transformers





PACKAGING

Hermetically sealed. DO-T family construction. See Catalog page 9

MIL SPECS

To complete MIL-T-21038D Specs. Grade 6, Class R, Life X.

APPLICATION

Transistor. D.W.V. Test = 100V.

NOTE

All individually adjusted to parameters shown and checked in test circuit to give required pulse width.

RATIO 4:4:1 MIL TYPE DESIGNATION TP6RX4410CZ

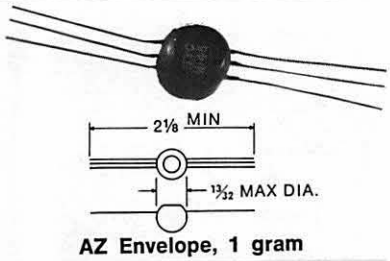
		Approx. DCR, Ohms			Blocking Oscillator Pulse					Coupling Circuit Characteristics							
Type No.	Military Part No.	1-Brn 2-Rd	3-Org 4-Yel	5-Grn 6-Blu	P Width μ Sec.	Rise Time	% Over Shoot	Droop %	% Back Swing	P Width μ Sec.	Volt Out	Rise Time	% Over Shoot	Droop %	% Back Swing	Imp. in/out,* Ohms	Frequency Response Within 2 db†
PIP-1	——	.21	.23	.13	.05	.02	0	0	37	.05	9	.018	0	0	12	50	150 kHz-29 MHz
PIP-2	——	.47	.56	.22	.1	.025	0	0	25	.1	8	.02	0	0	5	50	100 kHz-17 MHz
PIP-3	——	1.01	1.25	.37	.2	.030	2	0	15	.2	7	.035	0	0	5	100	16 kHz-9.5 MHz
PIP-4	——	1.5	1.85	.54	.5	.05	0	0	15	.5	7	.06	0	0	0	100	7 kHz-3.25 MHz
PIP-5	——	2.45	3.1	.9	1	.08	0	0	14	1	6.8	.15	0	0	5	100	7.5 kHz-2.25 MHz
PIP-6	——	3.0	3.7	1.1	2	.10	0	0	15	2	6.6	.18	0	2	10	100	2.2 kHz-1.32 MHz
PIP-7	——	4.9	6.05	1.8	3	.20	0	0	14	3	6.8	.20	0	2	10	100	1.7 kHz-1.5 MHz
PIP-8	——	8.0	9.7	2.9	5	.30	0	0	3	5	7.9	.22	0	13	25	200	1.8 kHz-1.45 MHz
PIP-9	M21038/6	13.1	15.9	4.7	10	.35	0	5	12	10	6.5	.4	0	15	20	200	1.5 kHz-1.14 MHz

RATIO 5:3:1 MIL TYPE DESIGNATION TP6RX5310CZ

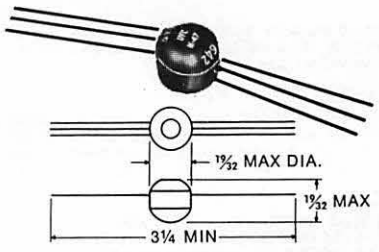
PIP-10	——	.55	.41	.15	.1	.01	0	0	20	.1	8	.01	0	0	5	140/50	170 kHz-32 MHz
PIP-11	——	2.9	2.2	8.2	1	.02	4	4	6	1	6.6	.05	0	6	12	280/100	12.5 kHz-3.25 MHz
PIP-12	M21038/7	9.4	7.1	2.6	5	.05	0	12	12	5	8	.09	2	12	25	560/200	15 kHz-4 MHz
PIP-SH	——	Drawn Hipermalloy shield and cover for PIP's provides 20 to 30 db shielding .281″ h x .359″ dia., ⅛″ hole in cover.															

* Input winding leads Brn-Rd (1-2); output winding leads Org-Yel (3-4); leads Grn-Blu (5-6) open.
† Per coupling circuit Z in/out, 1 V input.

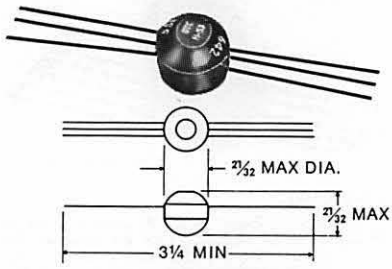
Precision Miniature Wide Application Pulse Transformers



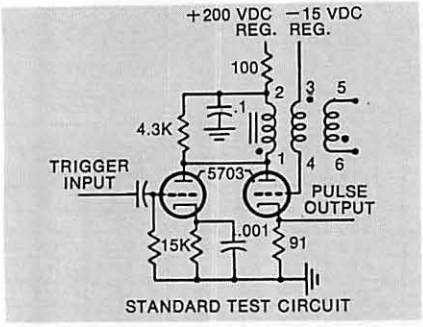
AZ Envelope, 1 gram



AC Envelope, 4 grams



AN Envelope, 6 grams



STANDARD TEST CIRCUIT

PACKAGING Hermetically sealed. Vacuum molded.

SERVICE −70°C to +130°C.

MIL SPECS To complete MIL-T-21038D Specs. Grade 7, Class S, Life X.

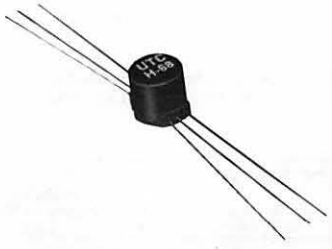
APPLICATION Tube, SCR and transistor Test Voltage 1250 V RMS.

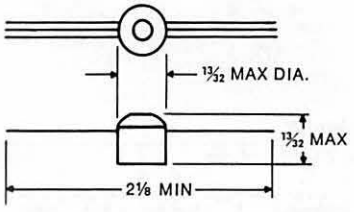
NOTE All individually adjusted to parameters shown and checked in test circuit to given required pulse width.

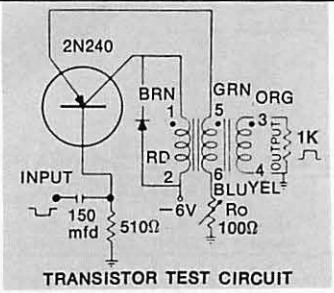
RATIO 1:1:1 MIL TYPE DESIGNATION TP7SX1110(††)

Type No.	Military Part No.	Approx. DCR, Ohms 1-2	3-4	5-6	Blocking Oscillator Pulse P Width μSec.	Rise Time	% Over Shoot	Droop %	% Back Swing	Coupling Circuit Characteristics P Width μSec.	Volt Out	Rise Time	% Over Shoot	Droop %	% Back Swing	Imp. in/out,* ohms	Frequency Response within 2 db†	†† Style & Env.
H-45	M21038/8-001	3	3.5	4	.05	.022	0	20	10	.05	17	.01	20	0	35	250	260 kHz-34 MHz	AZ
H-46	M21038/8-002	5.5	6.5	7	.10	.024	0	25	10	.10	19	.01	30	10	50	250	220 kHz-34 MHz	AZ
H-47	M21038/9-001	3.7	4.0	4	.20	.026	0	25	8	.20	18	.01	30	15	65	500	260 kHz-93 MHz	AC
H-48	M21038/9-002	5.5	5.8	6	.50	.03	0	20	5	.50	20	.01	30	20	65	500	85 kHz-73 MHz	AC
H-49	M21038/9-003	8	8.5	9	1	.04	0	20	10	1	24	.02	15	15	65	500	50 kHz-62.5 MHz	AC
H-50	M21038/9-004	20	21	22	2	.05	0	20	10	2	27	.05	10	15	35	500	24.5 kHz-49 MHz	AC
H-51	M21038/9-005	28	31	33	3	.10	1	20	8	3	26	.07	10	10	35	500	12.6 kHz-5.65 MHz	AC
H-52	M21038/9-006	36	41	44	5	.13	1	25	8	5	23	.15	10	10	45	1000	13 kHz-3.465 MHz	AC
H-53	——	37	44	49	7	.28	0	25	8	7	24	.20	10	10	50	1000	9.5 kHz-6.3 MHz	AN
H-54	M21038/10-001	50	58	67	10	.30	0	20	8	10	24	.25	10	10	50	1000	7.1 kHz-1.35 MHz	AN
H-55	M21038/10-002	78	96	112	16	.75	0	20	10	16	23	.40	5	15	20	1000	1.65 kHz-3.05 MHz	AN
H-56	——	93	116	138	20	1.25	0	25	10	20	23	.6	5	10	10	1000	2.15 kHz-285 kHz	AN
H-57	M21038/10-003	104	135	165	25	2.0	0	30	10	25	24	1.5	5	10	10	1000	1.7 kHz-315 kHz	AN

* Input winding terminals 1-2; output winding terminals 3-4; terminals 5-6 open.
† Per coupling circuit Z in/out, 1 V input.







TRANSISTOR TEST CIRCUIT

RATIO 4:4:1 MIL TYPE DESIGNATION TP7SX4410AZ DWV TEST = 100 VRMS

Type No.	Military Part No.	Approx. DCR, Ohms 1-2	3-4	5-6	Blocking Oscillator Pulse P Width μ Sec.	Rise Time	% Over Shoot	Droop %	% Back Swing	Coupling Circuit Characteristics P Width μ Sec.	Volt Out	Rise Time	% Over Shoot	Droop %	% Back Swing	Imp. in/out,* ohms	Frequency Response within 2 db†
H-60	——	.124	.14	.05	.05	.016	0	0	30	.05	9.3	.012	0	0	20	50	550 kHz-43 MHz
H-61	——	.41	.48	.19	.1	.016	0	0	30	.1	8.2	.021	0	0	15	50	95 kHz-17 MHz
H-62	——	.78	.94	.33	.2	.022	0	0	18	.2	7.4	.034	0	5	12	100	60 kH-14.5 MHz
H-63	——	1.86	2.26	.70	.5	.027	2	10	20	.5	7.5	.045	0	20	25	100	22 kHz-3.7 MHz
H-64	——	3.73	4.4	1.33	1	.033	0	12	25	1	7	.078	0	15	23	100	12 kHz-2.3 MHz
H-65	——	6.2	7.3	2.22	2	.066	0	15	25	2	6.6	.14	0	10	20	100	8.5 kHz-1.675 MHz
H-66	——	10.2	12	3.6	3	.087	0	18	30	3	6.8	.17	0	10	20	100	3.9 kHz-950 kHz
H-67	——	14.5	17.5	5.14	5	.097	0	23	28	5	7.9	.2	0	18	28	200	3.6 kHz-840 kHz
H-68	M21038/11	42.3	52.1	14.8	10	.14	0	15	28	10	6.5	.4	0	15	30	200	1.1 kHz-400 kHz

* Input winding terminals 1-2; output winding terminals 3-4; terminals 5-6 open.
† Per coupling circuit Z in/out, 1 V input.

Switch-Mode Components Selection Guide

TRW

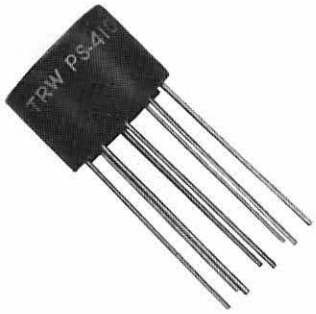
POWER

TRW answers your special inductive requirements by providing you with the most recent technology. With the addition of the CMA, B, C series common-mode inductors and PS series inverter transformers to our SR and LL lines, we now offer a complete line of components for use in SMPS equipment operating in the 50-100 KHz range. The creation of these lines is another part of TRW's commitment to serve as the one-stop center for all your inductive needs.

These components are suitable for all switch-mode applications—input filtering, output filtering, EMI suppression and interstage voltage transformation. Included are components for both common-mode (CMA, B, C) and differential mode (LL, SR) filtering. Some of the devices have multiple applications, such as the CMA, B, C inductors which can be used as high-frequency matching transformers.

Regardless of the application, each of our SMPS devices will meet or exceed your reliability requirements. All part numbers are MIL-type and some can operate in Class V environments. Many components are PC mounting style, the larger units featuring a stud for adding stability.

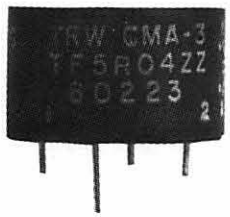
The SMPS line's performance is unmatched. These small, low profile packages disguise unusually high power-handling abilities, giving you exceptional "power density" along with high-frequency capability. Special winding techniques keep leakage inductances low and yield excellent voltage stability with frequency change.



PS INVERTER TRANSFORMERS

Page 42

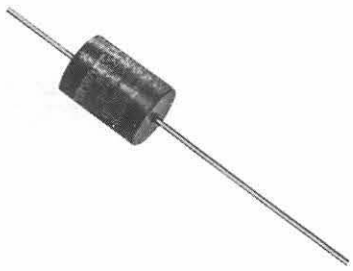
Type	Output/W	S_1 D.C. Out	S_2 D.C. Out	Size	Wt. (gms)	MIL Gr
PS-300	16	±12V @ .25A	+5V @ 2A	.750"D x .470"H	10	5
PS-310	16	±15V @ .20A	+5V @ 2A	.750"D x .470"H	10	5
PS-400	38	±12V @ .75A	+5V @ 4A	.900"D x .525"H	12	5
PS-410	38	±15V @ .60A	+5V @ 4A	.900"D x .525"H	12	5
PS-500	60	±12V @ 1.25A	+5V @ 6A	1.000"D x .650"H	24	5
PS-510	60	±15V @ 1.0 A	+5V @ 6A	1.000"D x .650"H	24	5



CMA, B, C COMMON MODE INDUCTORS

Page 39

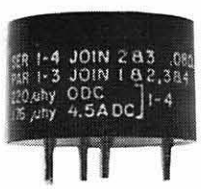
Type	LmHy	IRMSA	Leak μHys	DCR Ω	Wt. (gms)	MIL Gr
CMA-1	1	2.4	10	.096	12	5
CMA-3	3	1.5	20	.24	12	5
CMA-9	9	1.1	40	.50	12	5
CMB-1	1	4.4	15	.064	24	5
CMB-3	3	2.8	20	.16	24	5
CMB-9	9	2.0	40	.32	24	5
CMC-3	3	4.8	20	.07	42	5
CMC-9	9	3.0	40	.18	42	5
CMC-16	16	2.2	60	.32	42	5



LL INDUCTORS

Page 38

Type	Inductance at 1V, 20 kHz (μH)	Max. DCR (ohms)	Rated Current (amps)	MIL Part No.
LL-30	30	.035	3.0	M27/286-07
LL-50	50	.056	2.5	M27/286-08
LL-120	120	0.14	1.6	M27/286-01
LL-300	300	0.35	1.0	M27/286-02
LL-500	500	0.56	0.75	M27/286-03
LL-1200	1200	1.40	0.50	M27/286-04
LL-3000	3000	3.50	0.30	M27/286-05
LL-5000	5000	5.60	0.25	M27/286-06

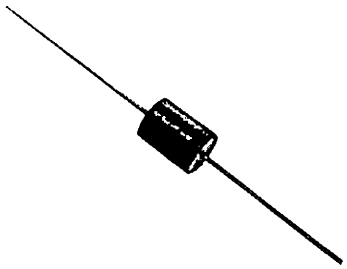


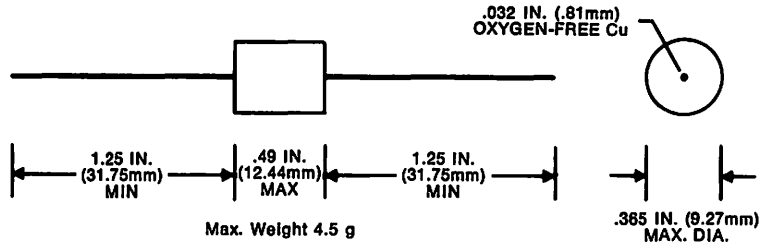
SR INDUCTORS

Page 40 & 41

Type No	Stock Line Inductance Range	DC Current Range	Approx. Ohm/Hy	Inductance Tolerance	MIL Gr
SRA	8 μHy-1250 μHy	up to 15A	510	+15%, −5% @ 1V, 10 kHz	5
SRB	20 μHy-3000 μHy	up to 15A	360	+15%, −5% @ 1V, 10 kHz	5
SRC	60 μHy-10,000 μHy	up to 13.6A	190	+15%, −5% @ 1V, 10 kHz	5
SRD	500 μHy-5.6 Hy	up to 13A	63	+15%, −5% @ 1V, 10 kHz	5

LL Series
Power Inductor





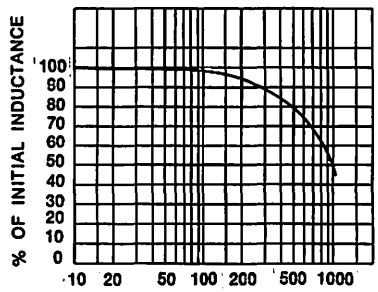
Max. Weight 4.5 g

- Mountable through PC board or to posts
- Inductance from 30 to 5000 μH
- Rated current range: 3.0 to 0.25 A
- Low inductance drop at rated current
- Less than ⅜ inch in diameter
- Suitable for reel-mounted assembly
- Manufactured to meet MIL-T-27
- MIL Type No. TF5R04ZZ

APPLICATIONS

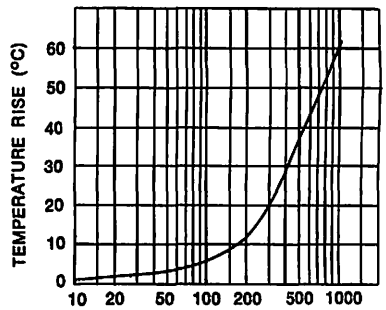
Intended primarily for switching regulator and power filtering applications, LL inductors can be installed either through PC boards or to wiring posts. Their small size — .365 in. diameter by .49 in. length — makes them ideal for use with multilayer boards. An axial lead configuration permits customer pre-mounting on reels, for machine insertion with other components. Other inductance values are available on special order.

Typical Inductance Change



LI² (L IN μH AT 0 DC, 1 IN AMPERES)

Typical Temperature Rise



LI² (L IN μH AT 0 DC, 1 IN AMPERES)

PERFORMANCE

LL inductors provide unprecedented power-handling capacity and reliability coupled with small size. For example, drop in rated inductance at rated DC current will not exceed 20%, while temperature rise at rated DC current is approximately 40°C. The units feature low DC resistance for a given inductance, having ohms/millihenry values of about 1.0.

PACKAGING

Hermetically sealed case to meet MIL-T-27. The .032-in. tinned, oxygen-free copper leads are rigidly anchored in secure fashion.

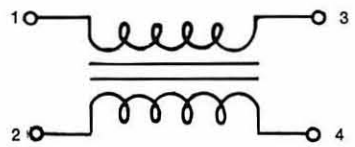
Type	Inductance at 1 V, 20 kHz (μH)	Max. DCR (ohms)	Rated Current (amps)	MIL Part No.
LL-30	30	.035	3.0	M27/286-07
LL-50	50	.056	2.5	M27/286-08
LL-120	120	0.14	1.6	M27/286-01
LL-300	300	0.35	1.0	M27/286-02
LL-500	500	0.56	0.75	M27/286-03
LL-1200	1200	1.40	0.50	M27/286-04
LL-3000	3000	3.50	0.30	M27/286-05
LL-5000	5000	5.60	0.25	M27/286-06

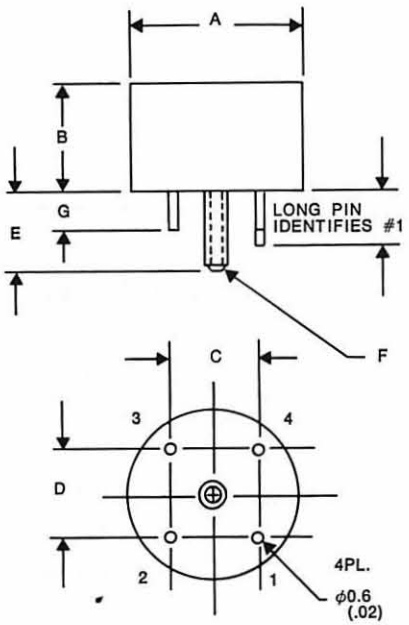
CMA, CMB, CMC Series
Common Mode Inductors for EMI Suppression

	Max. A Dia.	B Max.	C	D	±1.6 E (±.06)	UNC F −2A	G Min.
CMA	20.6	12.7	10.0	10.0	—	—	3.0
	(.811)	(.500)	(.394)	(.394)			(.118)
CMB	24.3	15.9	12.5	12.5	7.9	#4-40	4.0
	(.956)	(.625)	(.492)	(.492)	(.31)		(.157)
CMC	29.0	18.5	15.0	15.0	7.9	#4-40	5.0
	(1.142)	(.728)	(.590)	(.590)	(.31)		(.197)

All dimensions are in millimeters. Decimal equivalents in parenthesis.

- Windings are balanced to within 1%
- Dielectric strength between windings tested at 1,250 volts
- All units are magnetically shielded
- All units meet MIL-T-27D, Type TF5R04ZZ
- CMB's and CMC's have mounting stud for added sturdiness
- Current rating is for 40°C heat rise





CMA, CMB, CMC

PN	Ind.* MilliHys	I RMS Amps	Typ. Leakage uHys	DCR Ohms Max.**
CMA-1	1	2.4	10	.048
CMA-3	3	1.5	20	.12
CMA-9	9	1.1	40	.25
CMB-1	1	4.4	15	.032
CMB-3	3	2.8	20	.080
CMB-9	9	2.0	40	.16
CMC-3	3	4.8	20	.035
CMC-9	9	3.0	40	.090
CMC-16	16	2.2	60	.16

* Per winding; 1V, 10 kHz. ** Each winding.

ALTERNATE CAPABILITIES

These units can be used as high frequency matching transformers in the RF frequency range. Data pertaining to their performance in such a capability is given in the table below.

PN	Pri-Imp/Sec Imp (ohms)	Freq. Range	Power mW
CMA-1	16/16 64/64	1.5 KHz-1.5 MHz 6 KHz-5 MHz	35 70
CMA-3	50/50 200/200	1.5 KHz-1.5 MHz 6 KHz-5 MHz	35 70
CMA-9	150/150 600/600	1.5 KHz-1.5 MHz 6 KHz-5 MHz	35 70
CMB-1	16/16 64/64	1.5 KHz-1.5 MHz 6 KHz-5 MHz	70 150
CMB-3	50/50 200/200	1.5 KHz-1.5 MHz 6 KHz-5 MHz	70 150
CMB-9	150/150 600/600	1.5 KHz-1.5 MHz 6 KHz-5 MHz	70 150
CMC-3	50/50 200/200	1.5 KHz-1.5 MHz 6 KHz-5 MHz	115 230
CMC-9	150/150 600/600	1.5 KHz-1.5 MHz 6 KHz-5 MHz	115 230
CMC-16	250/250 1000/1000	1.5 KHz-1.5 MHz 6 KHz-5 MHz	115 230

Power Inductors
Switching Regulator Type

TRW POWER

SR Series

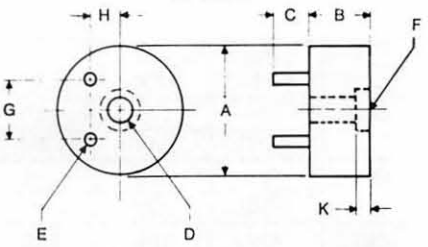
PACKAGING Hermetically sealed, molded case.

MIL SPECS To complete MIL-T-27D specs. Type number TF5S04ZZ.

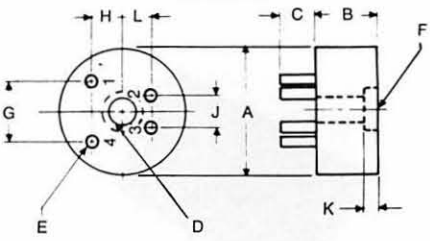
APPLICATION These inductors have low losses in the 3 to 100 kHz frequency range, making them ideal for switching regulator and AC filter choke applications.

INDUCTANCE Type numbers correspond to inductance values in microhenries, which are measured at 1 V, 10 kHz, 0 DC with an inductance tolerance of +15%, −5%. Values of inductance other than listed in an existing size are available. Part Number would be: SR(A, B or C) — (inductance in microhy at 0 DC).

SINGLE WINDING

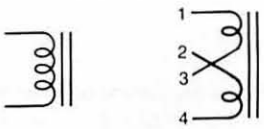


DOUBLE WINDING



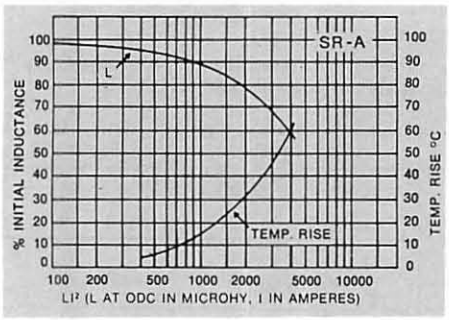
CURRENT RATINGS Listing I_1 is for approximately 10% drop in inductance with a typical 20°C temperature rise, and Listing I_2 is for approximately 20% drop in inductance with a typical 40°C temperature rise.

SCHEMS.



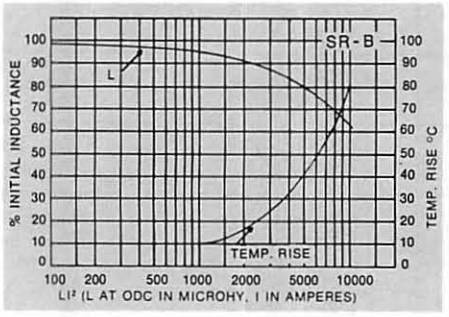
DIMENSIONS IN INCHES

Type	Winding	A dia. ±.030	B ±.063	C ±.030	D dia. ±.010	E dia. ±.005	F dia. ±.015	G ±.010	H ±.010	J ±.010	K C'bore ±.015	L ±.010	Wt. Oz.
SRA	Single	.875	.438	.250	.156	.073	.281	.400	.200	—	.082	—	.6
	Double		.563							.200		.200	
SRB	Single	1.188	.563	.250	.156	.073	.281	.600	.300	—	.082	—	1.5
	Double		.688							.400		.300	
SRC	Single	1.375	.750	.250	.156	.073	.281	.800	.300	—	.082	—	3
	Double		.813							.400		.500	



SRA

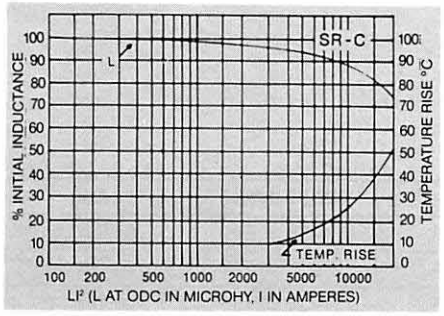
Type	No. of Windings	Inductance at 0 DC (μH)	I_1, at 10% drop in L (amps)	I_2, at 20% drop in L (amps)	Max. DCR (ohms)	MIL Part No.
SRA-1250	1	1250	.8	1.2	.7	M27/287-01
SRA-800	1	800	1	1.5	.45	M27/287-02
SRA-500	1	500	1.2	1.8	.3	M27/287-03
SRA-350	1	350	1.5	2.2	.2	M27/287-04
SRA-200*	2	200 (SER) 50 (PAR)	2 4	3 6	.12 .03	M27/287-05
SRA-88*	2	88 (SER) 22 (PAR)	3 6	4.5 9	.052 .013	M27/287-06
SRA-32*	2	32 (SER) 8 (PAR)	5 10	7.5 15	.02 .005	M27/287-07



SRB

Type	No. of Windings	Inductance at 0 DC (μH)	I_1, at 10% drop in L (amps)	I_2, at 20% drop in L (amps)	Max. DCR (ohms)	MIL Part No.
SRB-3000	1	3000	.8	1.2	1.2	M27/288-01
SRB-2000	1	2000	1	1.5	.8	M27/288-02
SRB-1200	1	1200	1.25	1.88	.5	M27/288-03
SRB-780	1	780	1.6	2.4	.3	M27/288-04
SRB-520	1	520	2	3	.2	M27/288-05
SRB-320	1	320	2.5	3.75	.13	M27/288-06
SRB-220*	2	220 (SER) 55 (PAR)	3 6	4.5 9	.08 .02	M27/288-07
SRB-120*	2	120 (SER) 30 (PAR)	4 8	6 12	.05 .013	M27/288-08
SRB-80*	2	80 (SER) 20 (PAR)	5 10	7.5 15	.032 .008	M27/288-09

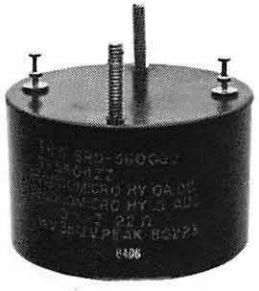
SR Series cont'd



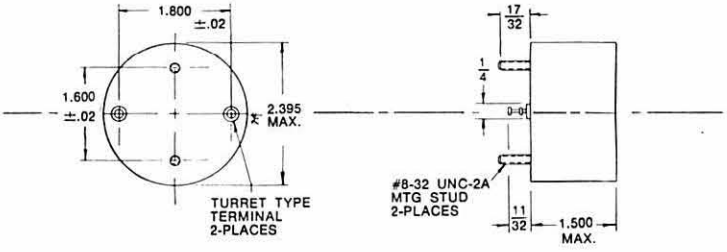
SRC

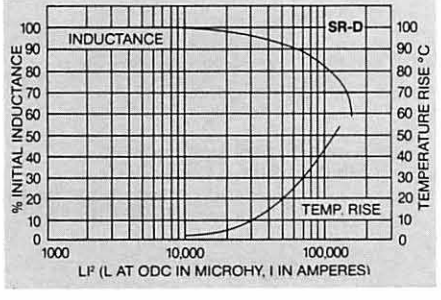
Type	No. of Windings	Inductance at 0 DC (μH)	I_1, at 10% drop in L (amps)	I_2, at 20% drop in L (amps)	Max. DCR (ohms)	MIL Part No.
SRC-10000	1	10,000	.84	1.1	2.1	M27/289-01
SRC-6400	1	6400	1	1.35	1.4	M27/289-02
SRC-2500	1	2500	1.6	2.2	.55	M27/289-03
SRC-1600	1	1600	2.1	2.8	.34	M27/289-04
SRC-1000	1	1000	2.6	3.5	.21	M27/289-05
SRC-640*	2	640 (SER) 160 (PAR)	3.3 6.6	4.5 9	.13 .033	M27/289-06
SRC-400*	2	400 (SER) 100 (PAR)	4 8	5.4 10.8	.088 .022	M27/289-07
SRC-240*	2	240 (SER) 60 (PAR)	5 10	6.8 13.6	.056 .014	M27/289-08

* Two identical windings brought out to four terminals permit series, parallel, center tapped or transformer connections.



INCREASED POWER HANDLING CAPABILITY



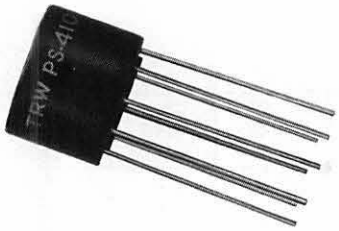


WT. 14 oz.
MIL Type TF5SO4ZZ

SRD

Type	No. of Windings	Inductance at 0 DC (μH)	I_1, at 10% drop in L (amps)	I_2, at 20% drop in L (amps)	Max. DCR (ohms)	MIL Type No.
SRD-500	1	500	9.5	13	.033	TF5S04ZZ
SRD-900	1	900	7.3	10	.057	TF5S04ZZ
SRD-2500	1	2500	4.4	6	.15	TF5S04ZZ
SRD-5000	1	5000	3.1	4.2	.33	TF5S04ZZ
SRD-10000	1	10,000	2.2	3	.60	TF5S04ZZ
SRD-22000	1	22,000	1.4	2	1.4	TF5S04ZZ
SRD-40000	1	40,000	1.1	1.5	2.4	TF5S04ZZ
SRD-90000	1	90,000	.73	1	5.4	TF5S04ZZ
SRD-360000	1	360,000	.36	.50	22	TF5S04ZZ
SRD-1.4	1	1.4 Hy	.18	.25	88	TF5S04ZZ
SRD-5.6	1	5.6 Hy	.09	.125	352	TF5S04ZZ

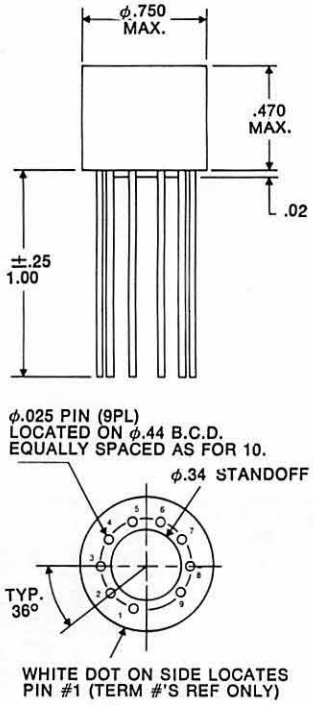
PS Series
Inverter Transformers

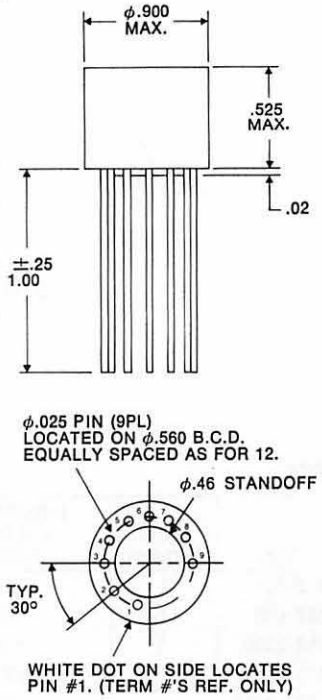


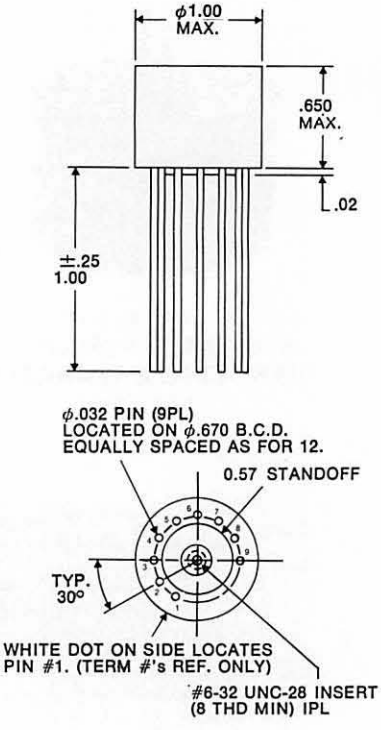
- Freq, Range: 50-100 kHz
- P.C. mounting style. Largest unit features insert for sturdiness
- MIL-type TF5V03YY, Class V environment
- Can be used for both MOSFET and bi-polar drives
- Magnetically shielded
- DC to DC efficiency of 75-80%, including all semiconductor and rectifier losses.
- Multiple benefits: hi-frequency, hi-power, hi-efficiency.

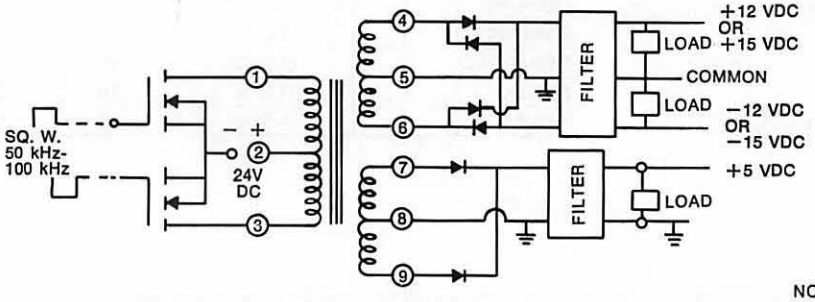
PS INVERTER TRANSFORMER

PN	Output/W	S1 DC Output	S2 DC Output	Size
PS-300	16	±12V @ 0.25A	+5V @ 2A	.750"D x .470"H
PS-310	16	±15V @ 0.20A	+5V @ 2A	.750"D x .470"H
PS-400	38	±12V @ 0.75A	+5V @ 4A	.900"D x .525"H
PS-410	38	±15V @ 0.60A	+5V @ 4A	.900"D x .525"H
PS-500	60	±12V @ 1.25A	+5V @ 6A	1.000"D x .650"H
PS-510	60	±15V @ 1.0A	+5V @ 6A	1.000"D x .650"H









NOTE: Dimensions are in inches.

Selection Guide for TRW High Q Coils and Chokes

Over 50 years of specialization in High Q Inductors are reflected in the superior Q and temperature stability of the molybdenum permalloy dust toroid, ferrites, and laminated structures produced by TRW today. Range of application is from DC to 30 MHz.

This catalog lists many different types of stock inductors, but special custom designs produced to customers' specifications are available on special order. Characteristics such as taps, additional windings, special adjustments such as in a resonant circuit, higher voltage capability, inductance adjusted with DC, special mechanical configurations, and even better temperature stability than our stock items are available to customers' requirements.

WHILE THE TOROIDAL COIL is superior for frequencies above 1 kHz, the laminated structure is superior for lower frequencies. The ML, MO, and MQM uses a hum-reducing lamination structure and, in addition, the ML, and MQM are in hipermalloy shield cases.

The toroidal coils MS, MP, MM, MH, MW, FE, MQE have extremely low hum pickup due to the symmetrical winding on the toroidal core.

ALL STOCK INDUCTORS are measured at 0 DC. The maximum DC listings are for approximately 5% drop in inductance, and negligible heat rise. The typical curves of inductance variation with AC or DC currents, illustrated on the following pages, best show the range of operation for a particular inductor. The excitation is plotted in milliamperes $\times \sqrt{\text{mHy}}$. For example, the 100 mHy MS toroid (MS-100) with 10 ma of DC flowing has an excitation factor of 10 ma $\times \sqrt{100\ \text{mHy}} = 100$, and the curve shows that approximately 90 mHy will be measured with 10 ma DC.

Since these high Q coils will saturate before any appreciable temperature rises occur, heating is usually not a problem. A general rule would be that four times the DC listings may be applied without any detrimental heating due to copper loss.

FOR VARIABLE INDUCTORS such as HVC, and TVC, the DC values listed apply at the mean to minimum inductance settings only. The maximum inductance cannot be obtained with that amount of DC current flowing.

Temperature stability of all TRW inductors is excellent. Guaranteed limits and typical curves of inductance variation with temperature are shown for most types.

Engineering, laboratory, and production facilities are available for full engineering discussion, sampling, and large quantity production to meet special requirements.

Intermediate inductance values in an existing stock toroidal series are available, priced as the next higher inductance unit.

HIGH Q INDUCTORS — FIXED

Type No.	Stock Line Inductance Range	Approx. DCR Ohm/Hy	Approximate Peak Q	Approximate @ Freq.	Inductance Tolerance Adjustment	Temp. Stability	MIL Gr.
CH-100 thru CH-200	100 μHy-200 μHy	51,000	85	1500 kHz	±5% @ 1V, 500 kHz	±2%	4
CH-300 thru CH-1000	300 μHy-1000 μHy	42,000	85	790 kHz	±5% @ 1V, 250 kHz	±2%	4
CM	0.25 MHy-50 MHy	3300	120	200 kHz	±5% @ 1V, 10 kHz	±3%	4
FE	.01 Hy-2 Hy	200	125	8 kHz	±1% @ 1V, 1 kHz	±1.5%	5
LL*	30 μHy-5000 μHy	1000	—	—	min.	—	5
MH	.6 MHy-40 MHy	2700	80	100 kHz	±2% @ .1V, 1 kHz	±1%	5
ML-0 thru ML-4	.15 Hy-1.4 Hy	150	22	1.5 kHz	±3% @ 1V, 1 kHz	within 2%	5
ML-5 thru ML-10	2.5 Hy-60 Hy	85	22	800 Hz	±3% @ 1V, 400 Hz	±2%	5
MM	3 MHy-120 MHy	1300	60	30 kHz	±2% @ .1V, 1 kHz	±2%	5
MO-.1 thru MO-1	.1 Hy-1 Hy	130	27	1.5 kHz	±2% @ 1V, 1 kHz	+1% −2%	5
MO-2 thru MO-100	2 Hy-100 Hy	65	25	600 Hz	±2% @ 1V, 400 Hz	+1% −3%	5
MP	100 MHy-750 MHy	600	45	10 kHz	±2% @ .1V, 1 kHz	±2%	5
MQE	4 MHy-2 Hy	170	140	8 kHz	±1% @ 1V, 1 kHz	±1%	4
MQM	.5 Hy-600 Hy	10	40	200 Hz	±2% series @ 1V, 60 Hz parallel @ .5V, 60 Hz	±2%	4
MS	1 MHy-100 MHy	1300	40	20 kHz	±2% @ .1V, 1 kHz	±2%	5
MW	.05 Hy-5 Hy	500	80	10 kHz	±1% @ 1V, 1 kHz	±1%	5

* See page 38

HIGH Q INDUCTORS — VARIABLE

Type No.	Mean Inductance Range	Variable Inductance Range	Temp. Stability	MIL Gr
HVC	.006 Hy-150 Hy	+200% −70% (10 to 1)	±1.5%	4
TVC*	.006 Hy-150 Hy	+200% −70% (10 to 1)	±1.5%	4

* Same as HVC but with taps @ 30, +50%

SR INDUCTORS* — FIXED

Type No	Stock Line Inductance Range	DC Current Range	Approx. Ohm/Hy	Inductance Tolerance	MIL Gr
SRA*	8 μHy-1250 μHy	up to 15A	510	+15%, −5% @ 1V, 10 kHz	5
SRB	20 μHy-3000 μHy	up to 15A	360	+15%, −5% @ 1V, 10 kHz	5
SRC	60 μHy-10,000 μHy	up to 13.6A	190	+15%, −5% @ 1V, 10 kHz	5
SRD	500 μHy-5.6 Hy	Up to 13A	63	+15%, −5% @ 1V, 10 kHz	5

* See pages 40 & 41

High-Frequency High-Q Inductors

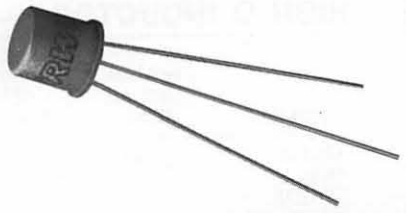
PACKAGING Temperature stable inductors in a TO-5 metal case.

MIL SPECS CM to complete MIL-T-27D Specs. Type number TF4S20YY. CH to complete MIL-C-15305E Specs. Type: LT10K.

APPLICATION CM Series shielded inductors have Qs over 120, and cover a frequency range from 10 to 800 kHz. Peak Q is centered at approximately 150 kHz.

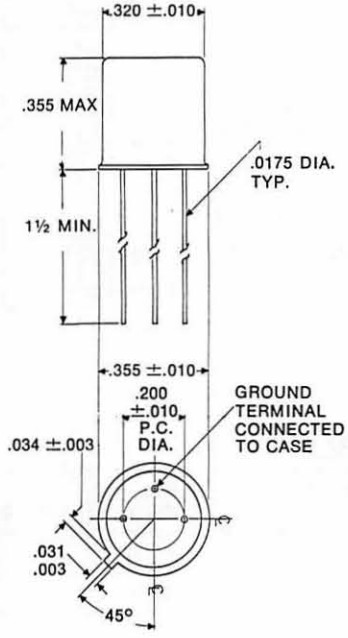
CH Series shielded inductors have Qs over 100, and cover a frequency range from 0.2 to 3.0 MHz. Peak Q is centered at approximately 1.5 MHz.

CURRENT RATINGS CM Series DC rating is for approximately 10% drop in inductance, with negligible heat rise. CH Series DC rating is for a 40°C maximum heat rise, with negligible drop in inductance.



Type No.	Inductance Tolerance at 25°C	Test Frequency, kHz	Test Level, RMS V	Max. L Variation, −55°C to +105°C
CM	±5%	10	1.0	±3%
CH-100 thru CH-200	±5%	500	1.0	±2%
CH-300 thru CH-1000	±5%	250	1.0	±2%

CM and CH Series

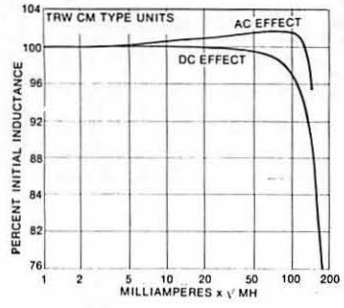


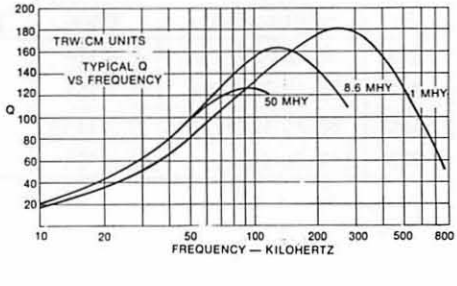
CM SERIES

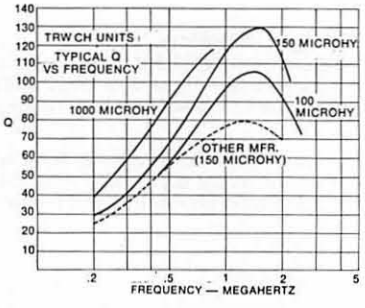
Type No.	Inductance at 0 DC, mHy	Max. DC Resistance, Ohms	Min. Q	Min. SRF, kHz	Max. DC Current, mA
CM-.25	0.25	0.9	120 @ 200 kHz	3000	260
CM-.50	0.50	1.8	120 @ 200 kHz	2100	180
CM-1.0	1.0	3.3	120 @ 200 kHz	1500	130
CM-1.5	1.5	4.8	120 @ 200 kHz	1160	105
CM-2.5	2.5	8.2	120 @ 150 kHz	900	83
CM-3.6	3.6	10	120 @ 150 kHz	730	70
CM-5.0	5.0	15	120 @ 150 kHz	600	59
CM-7.5	7.5	22	120 @ 100 kHz	470	48
CM-8.6	8.6	24	120 @ 100 kHz	430	45
CM-10	10	33	100 @ 100 kHz	400	41
CM-15	15	40	100 @ 100 kHz	320	34
CM-20	20	60	85 @ 70 kHz	280	29
CM-30	30	90	85 @ 70 kHz	220	24
CM-50	50	150	85 @ 70 kHz	165	18

CH SERIES

Type No.	MIL Part No.	Inductance at 0 DC, μHy	Max. DC Resistance, Ohms	Min. Q	Min. SRF, MHz	Max. DC Current, mA
CH-100	MS21358-44	100	5.1	85 @ 1500 kHz	7.5	191
CH-150	MS21358-45	150	6.6	85 @ 1500 kHz	5.5	168
CH-200	MS21358-46	200	9.5	85 @ 790 kHz	4.5	140
CH-300	MS21358-47	300	14	85 @ 790 kHz	3.4	115
CH-390	MS21358-48	390	16	85 @ 790 kHz	2.9	108
CH-500	MS21358-49	500	21	85 @ 790 kHz	2.6	94
CH-560	MS21358-50	560	23	85 @ 790 kHz	2.5	88
CH-680	MS21358-51	680	26	85 @ 790 kHz	2.1	85
CH-1000	MS21358-52	1000	43	60 @ 790 kHz	1.6	65







Miniductor™ Series

PULSE

PACKAGING Hermetically sealed, MS, MM, MH, MP, MW, epoxy molded symmetrical toroids. ML hipermalloy shield cased, hum reducing laminated inductor. MO, epoxy molded hum reducing laminated inductor. All have straight pin terminals for printed circuit applications.

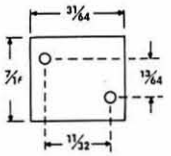
TERMINALS Per MIL-STD-1276.

MIL SPECS To complete MIL-T-27D Specs. MIL Type No. TF5R20ZZ.

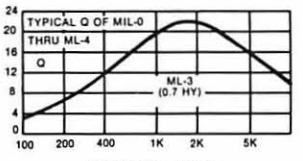
Type No.	Inductance Tolerance at 25°C	Test Frequency	Test Level RMS V	Max L Variation −55°C to +105°C
ML-0 thru 4	±3%	1 kHz	1.0	Within 2%
ML-5 thru 10	±3%	400 Hz	1.0	±2%
MO-.1 thru 1	±2%	1 kHz	1.0	+1% −2%
MO-2 thru 100	±2%	400 Hz	1.0	+1% −3%
MS	±2%	1 kHz	0.1	±2%
MP	±2%	1 kHz	0.1	±2%
MM	±2%	1 kHz	0.1	±2%
MH	±2%	1 kHz	0.1	±1%
MW	±1%	1 kHz	1.0	±1%

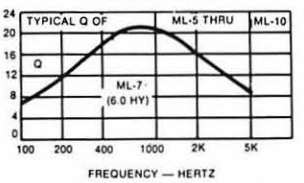
Laminated Types ML Series

TERMINAL LAYOUT

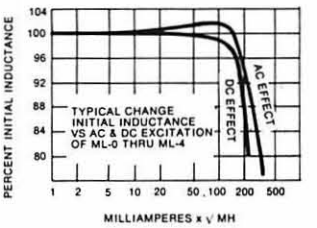


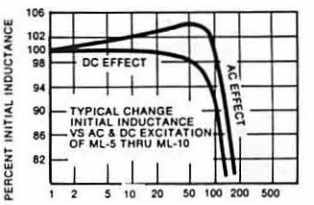
ML CASE
7/16" x 31/64" x 9/16" high
Weight: .2 oz.
TERMINALS: Type D — Tinned Dumet .025" Dia. x 1" long

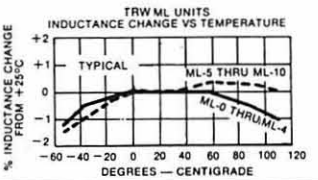




Type No.	MIL Part No.	Ind. Hy (0 DC)	ma DC Max.	DCRΩ ±20%
ML-0	M27/164-01	.15	12	33
ML-1	M27/164-02	.25	9	55
ML-2	M27/164-03	.4	7	90
ML-3	M27/164-04	.7	5	135
ML-4	M27/164-05	1.4	3	210
ML-5	M27/164-06	2.5	1	210
ML-6	M27/164-07	4.0	.7	340
ML-7	M27/164-08	6.0	.6	530
ML-8	M27/164-09	10	.5	850
ML-9	M27/164-10	25	.3	2300
ML-10	M27/164-11	60	.2	5160

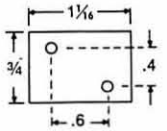




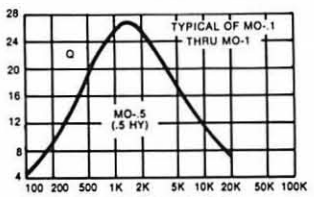


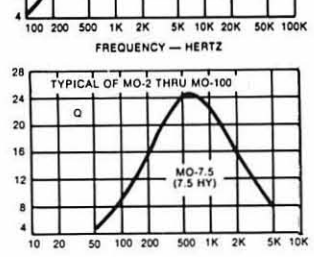
MO Series

TERMINAL LAYOUT

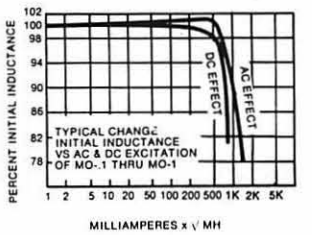


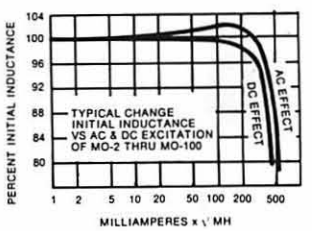
MO CASE
3/4" x 1 1/16" x 13/16" high
Weight: 1 oz.
TERMINALS: Tinned Dumet .040" Dia. x 9/32" long

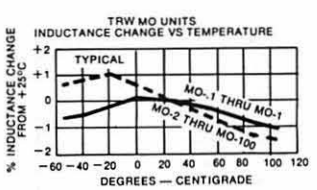




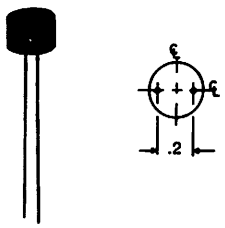
Type No.	MIL Part No.	Ind. Hy (0 DC)	ma DC Max.	DCRΩ ±20%
MO-.1	M27/168-01	.1	55	14
MO-.15	M27/168-02	.15	45	22
MO-.3	M27/168-03	.3	28	34
MO-.5	M27/168-04	.5	23	54
MO-1	M27/168-05	1	16	130
MO-2	M27/168-06	2	8	130
MO-5	M27/168-07	5	5	340
MO-7.5	M27/168-08	7.5	4.5	517
MO-20	M27/168-09	20	2.7	1310
MO-50	M27/168-10	50	1.4	3180
MO-100	M27/168-11	100	1.1	8550



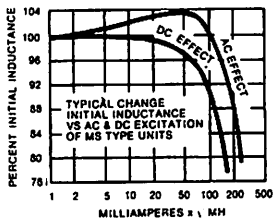


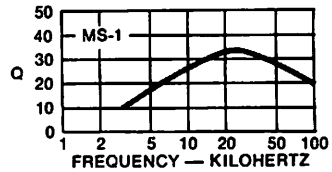


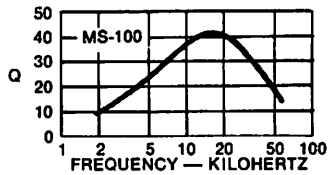
Toroidal Types
MS Series



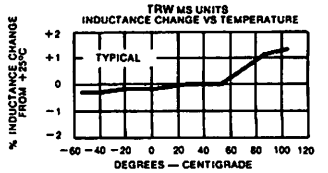
MS CASE
.35″ Dia. x .23″ high
Weight: 1.3 Gm.
TERMINALS: Type D — Tinned Dumet
.025″ Dia x 1¼″ long
MIL Type No. TF5R20ZZ



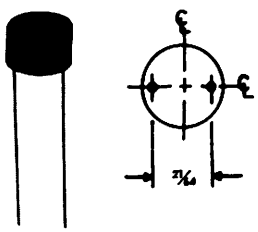




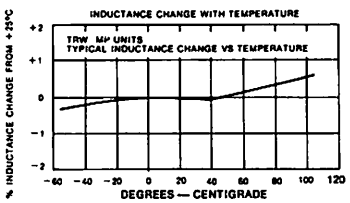
Type No.	MIL Part No.	Ind. mHy (0 DC)	ma DC Max.	DCRΩ Max.
MS-1	M27/146-01	1	60	1.4
MS-5	M27/146-02	5	28	7
MS-10	M27/146-03	10	20	11
MS-25	M27/146-04	25	13	38
MS-50	M27/146-05	50	9	75
MS-100	M27/146-06	100	6	132

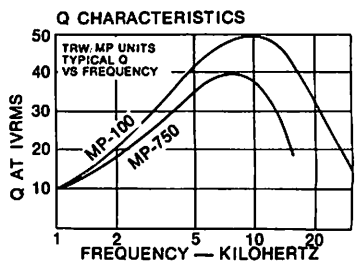


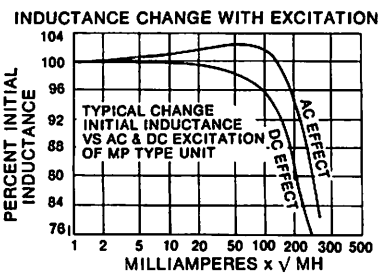
MP Series



MP CASE
7/16″ Dia. x ¼″ high
Weight: .07 oz.
TERMINALS: Type D — Tinned Dumet
.025″ Dia. x 1¼″ long
MIL Type No. TF5R20ZZ

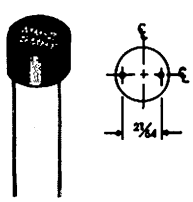




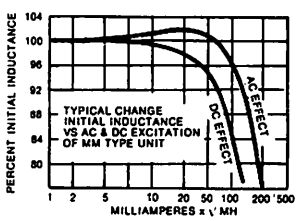


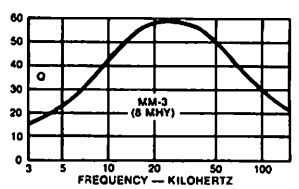
Type No.	MIL Part No.	Ind. mHy (0 DC)	ma DC Max.*	DCRΩ Max.
MP-100	M27/285-01	100	7.0	70
MP-150	M27/285-02	150	6.0	100
MP-250	M27/285-03	250	4.5	180
MP-350	M27/285-04	350	3.7	265
MP-500	M27/285-05	500	3.0	360
MP-750	M27/285-06	750	2.5	540

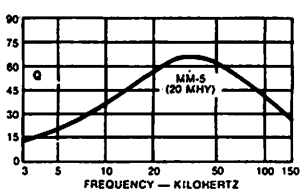
MM Series



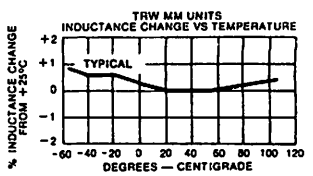
MM CASE
7/16″ Dia. x ¼″ high
Weight: .07 oz.
TERMINALS: Type D — Tinned Dumet
.025″ Dia. x 1¼″ long
MIL Type No. TF5R20ZZ



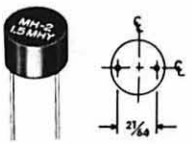




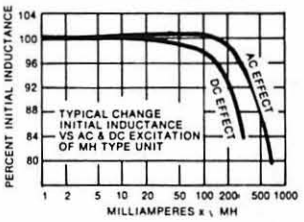
Type No.	MIL Part No.	Ind. mHy (0 DC)	ma DC Max.	DCRΩ Max.
MM-1	M27/240-01	3	50	4.8
MM-2	M27/240-02	5	40	8.0
MM-3	M27/240-03	8	30	13
MM-4	M27/240-04	12.5	25	19
MM-5	M27/240-05	20	20	31
MM-6	M27/240-06	30	16	47
MM-7	M27/240-07	60	11	94
MM-8	M27/240-08	120	8	186



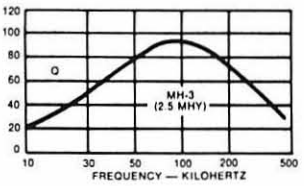
Toroidal Types
MH Series

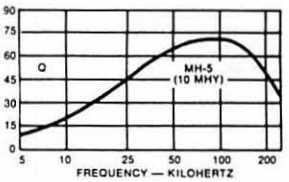


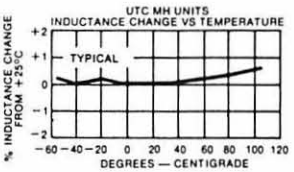
Type No.	MIL Part No.	Ind. mHy (0 DC)	ma DC Max.	DCRΩ Max.
MH-1	M27/241-01	.6	90	1.9
MH-2	M27/241-02	1.5	57	4.9
MH-3	M27/241-03	2.5	44	8.2
MH-4	M27/241-04	6	28	19
MH-5	M27/241-05	10	22	32
MH-6	M27/241-06	15	18	49
MH-7	M27/241-07	25	14	82
MH-8	M27/241-08	40	11	130



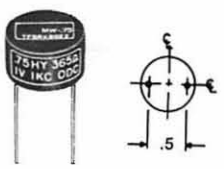
MH CASE
7/16" Dia. x 1/4" high
Weight: .07 oz.
TERMINALS: Type D — Tinned Dumet
.025" Dia. x 1 1/4" long



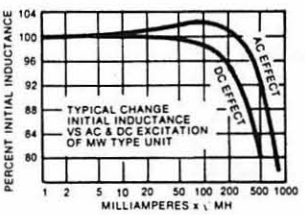




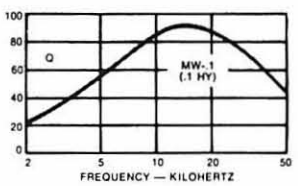
MW Series

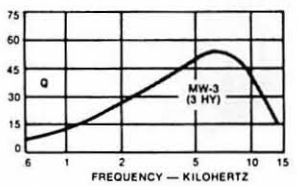


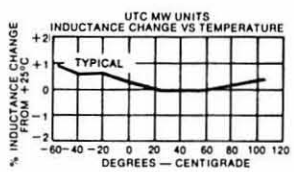
Type No.	MIL Part No.	Ind. Hy (0 DC)	ma DC Max.	DCRΩ ±20%
MW-.05	M27/161-01	.05	25	27
MW-.10	M27/161-02	.10	18	51
MW-.25	M27/161-03	.25	11	136
MW-.5	M27/161-04	.5	8	243
MW-.75	M27/161-05	.75	7	355
MW-1	M27/161-06	1.0	6	500
MW-1.2	M27/161-07	1.2	5	560
MW-2	M27/161-08	2	4	870
MW-3	M27/161-09	3	3.5	1340
MW-5	M27/161-10	5	3	2500



MW CASE
23/32" Dia. x 13/32" high
Weight: .25 oz.
TERMINALS: Type N-2 — Tinned Nickel
.040" Dia. x 3/8" long







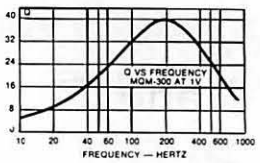
Hermetically Sealed High Q Coils

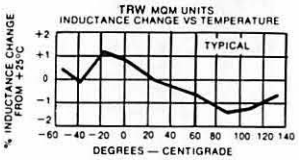
Low Frequency Laminated Inductors MQM Series

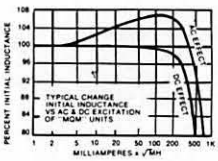
MQM CASE
1 5/16" Dia. x 1 5/8" high
Weight: 5 oz.
Mounting Holes: 1 1/8" x 1 1/8"
Screws: 4-40
Cutout: 1" Dia.
MIL Type No. TF4R20YY

CONNECTIONS Two identical windings brought out to four terminals permit series, parallel, center tapped, or transformer type connections.
TOLERANCE ±2% @ 60 Hz, 1 V series, 0.5 V parallel.
MIL SPECS To complete MIL-T-27D Specs.
TEMPERATURE STABILITY MQM, −55° to +130°C, ±2%.

Type No.	MIL Part No.	Series Henries (0 DC)	Parallel Henries (0 DC)	Series DCRΩ ±20%
MQM-2	M27/162-01	2	.5	21
MQM-16	M27/162-02	16	4	143
MQM-40	M27/162-03	40	10	368
MQM-300	M27/162-04	300	75	3700
MQM-600	M27/162-05	600	150	5720





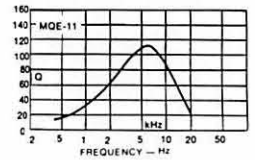


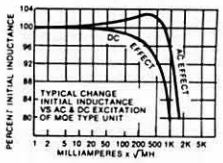
Toroidal Inductors MQE Series

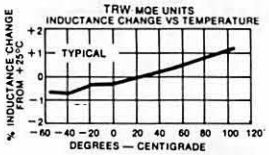
MQE CASE
1 1/16" long x 1/2" wide x 1 7/32" high
Unit Weight: 1.5 oz.
Mounting Holes: 3/4"
Screws: 4-40
Cutout: 5/16" x 1/2"

ADJUSTMENT MQE, ±1% @ 1 V, 1 kHz.
MIL SPECS To complete MIL-T-27D Specs.
TEMPERATURE STABILITY From −55°C to +105°C. MQE, ±1%.

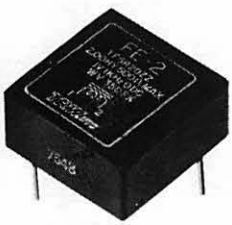
Type No.	MIL Type	Inductance (0 DC)	ma DC Max.	DCRΩ ±20%
MQE-0	TF4R20YY	4 mHy	160	.7
MQE-1	TF4R20YY	7 mHy	135	1.2
MQE-2	TF4R20YY	12 mHy	100	2.0
MQE-3	TF4R20YY	20 mHy	80	3.1
MQE-4	TF4R20YY	30 mHy	65	4.8
MQE-5	TF4R20YY	50 mHy	50	8.0
MQE-6	TF4R20YY	70 mHy	40	12
MQE-7	TF4R20YY	100 mHy	35	17
MQE-8	TF4R20YY	150 mHy	30	27
MQE-9	TF4R20YY	.25 Hy	22	43
MQE-10	TF4R20YY	.4 Hy	17	69
MQE-11	TF4R20YY	.6 Hy	14	102
MQE-12	TF4R20YY	.9 Hy	12	160
MQE-13	TF4R20YY	1.5 Hy	9	266
MQE-14	TF4R20YY	2 Hy	8	385

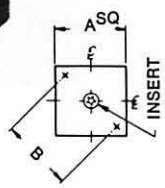






Toroidal Inductors FE Series





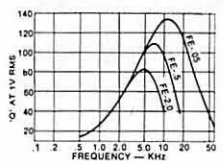
Type	A	B	HT	INSERT	WT
FE	15/16 MX	.968	1/2 MX	4-40	.7 oz

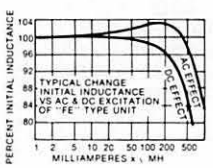
MIL TYPE NO. TF5R20ZZ

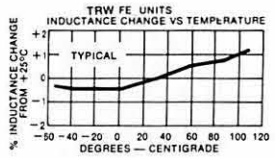
PACKAGING Hermetically sealed. Molded flat construction, symmetrical toroids.
TOLERANCE ±1% @ 1 V, 1 kHz.
TERMINALS Per MIL-STD-1276, tinned nickel, type N-2, .040" dia. x 3/8" long.
MIL SPECS To complete MIL-T-27D Specs.
TEMPERATURE STABILITY −55°C to +105°C, ±1.5%.

Type No.	MIL Part No.	Ind. Hy (0 DC)	ma DC Max.	DCRΩ Max.
FE-.01	M27/142-01	.0100	70	2.5
FE-.02	M27/142-02	.0200	50	5.1
FE-.05	M27/142-03	.0500	30	12
FE-.1	M27/142-04	.100	22	22
FE-.5	M27/142-05	.500	10	122
FE-1	M27/142-06	1.00	7	250
FE-2	M27/142-07	2.00	5	500

FE

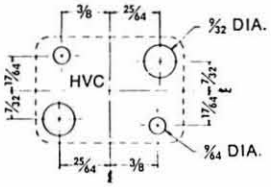




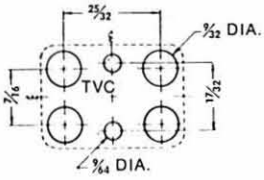


Wide Range HVC and TVC Variductor™

HVC



TVC



1⅛" long x 25/32" wide x 1⅜" high*
Weight: 2 oz.
Screws: 4-40
* Height includes adjustment screw

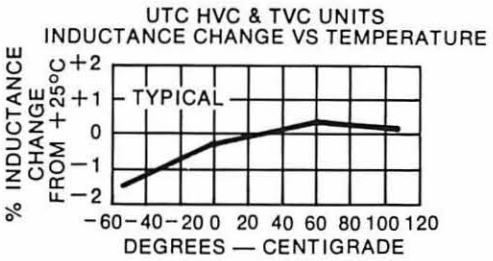
PACKAGING Hermetically sealed. Metal encased. Inductance variation controlled by adjustment screw on top of case. Range is covered in 900° rotation. Setting is positive. TVC is tapped version of HVC, with taps at 30% and 50% of total turns.

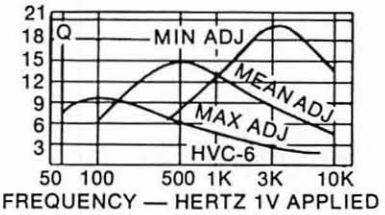
APPLICATION Oscillators, equalizers, filters, impedance matching, phase inversion, tuned circuits, etc.

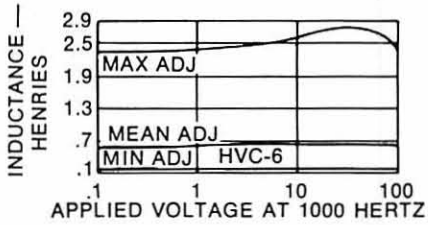
RANGE HVC, TVC +200% −70% of nominal value.

MIL SPECS To complete MIL-T-27D Specs. MIL Type No. TF4R20YY.

TEMPERATURE STABILITY At mean inductance, from −55°C to +105°C. HVC & TVC: ±1.5%.







Type No.	HVC MIL Part No.	Tapped Type No.	TVC MIL Type	Min. Hys	Mean Hys	Max. Hys	ma DC	DCRΩ ±20%
HVC-1	M27/145-01	TVC-1	TF4R20YY	.002	.006	.02	100	.5
HVC-2	M27/145-02	TVC-2	TF4R20YY	.005	.015	.05	60	1.4
HVC-3	M27/145-03	TVC-3	TF4R20YY	.011	.040	.11	40	3.6
HVC-4	M27/145-04	TVC-4	TF4R20YY	.03	.1	.3	30	8.6
HVC-5	M27/145-05	TVC-5	TF4R20YY	.07	.25	.7	20	22
HVC-6	M27/145-06	TVC-6	TF4R20YY	.2	.6	2	15	55
HVC-7	M27/145-07	TVC-7	TF4R20YY	.5	1.5	5	10	141
HVC-8	M27/145-08	TVC-8	TF4R20YY	1.1	4	11	7	360
HVC-9	M27/145-09	TVC-9	TF4R20YY	3	10	30	5	950
HVC-10	M27/145-10	TVC-10	TF4R20YY	7	25	70	3.5	2220
HVC-11	M27/145-11	TVC-11	TF4R20YY	20	60	200	2	5550
HVC-12	M27/145-12	TVC-12	TF4R20YY	50	150	500	1.5	15.6K

Choosing Type No.: If frequency is above 100 Hz, use type providing required inductance between mean and min. values.

Selection Guide for TRW Filters

Over 50 years of specialization in selective networks, from image parameter design to modern network synthesis are reflected in the superior performance, miniaturization, stability, and reliability of the electric wave filters produced by TRW today.

Because of the tremendous variation in requirements of frequency, band width, impedance, shape factor, size configuration, and other special characteristics such as envelope delay distortion, and return loss, TRW standard filters are only a portion of the filters made. Special "custom" designs to customers' specifications range from DC to 30 MHz, from a volume of less than 0.1 cubic inches to more than 250 cubic inches. They cover applications such as telephone, telegraph, telemetering, multiplexing, carrier elimination and restoration, etc.

FOR SPECIAL DESIGNS the following information must be known: source and load impedances, insertion loss, pass band, stop band, operating level, operating temperature range, and size restrictions, plus any other special requirements such as phase matching, insertion loss matching, or attenuation matching, between units, envelope delay distortion, return loss limits, etc.

Since filters usually contain many precisely adjusted elements and are used in critical applications where continued reliable performance is a necessity, all TRW filters, both standard designs and specials, are manufactured and guaran teed to MIL-F-18327.

Units with identical electrical and mechanical characteristics as stock items, except for center frequency on band pass filters, or cutoff frequency on low and high pass filters. are known as standard designs specials. For example, a band pass filter identical to the BPM series with a center frequency of 2700 Hz would be identified as BPM-2700, a 2700 Hz center frequency band pass filter identical to the MNF series would be identified as MNF-2.7, a low pass similar to LPM series with a 2700 Hz cutoff frequency would be identified as LPM-2700.

FOR BAND REJECT applications, the BPM band pass minifilters may be used by connecting as shown in our catalog. Generally, on standard filters, variations of ±20% in the source and load impedances will have negligible effect on the attenuation response. FLH, FLL, BPM, and BMI filters may be used with a much lower source impedance and still give satisfactory results.

The nominal test level, E_g is 2.0 Volts RMS for all stock filters except 0.5 Volt on the BPM and 1.0 Volt on the LPM.

BAND PASS

Type No.	Center Frequency Range	Band Width	Source (Ohms)	Load (Ohms)	MIL Grade
MNF	400 Hz to 165 kHz	±7.5%	10K	10K	7
MWF	22 kHz to 165 kHz	±15%	10K	10K	7
BPM	400 Hz to 20 kHz	±3%	10K	10K or Grid	6
BMI	30 Hz to 400 Hz	±3%	10K	Grid	6
TGT	425 Hz to 3315 Hz	±42.5 Hz	600	600	6
TGR	425 Hz to 3315 Hz	±42.5 Hz	600	600	6

BAND REJECT

Type No.	Frequency Range	Source & Load (Ohms)	MIL Grade
BPM	400 Hz to 20 kHz	10K	6

LOW PASS

Type No.	Cutoff Frequency Range	Source & Load (Ohms)	MIL Grade
LPM	200 Hz to 15 kHz	10K	6
FLH	600 Hz to 5 kHz	10K	6
FLL	3.5 kHz to 50 kHz	600	6
LMI	50 Hz to 150 Hz	10K	6
LML	500 Hz to 12 kHz	600	6

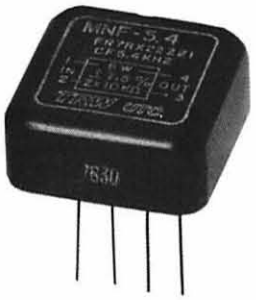
HIGH PASS

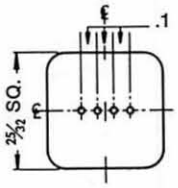
Type No.	Cutoff Frequency Range	Source & Load (Ohms)	MIL Grade
HPM	500 Hz to 4 kHz	10K	6
HMI	50 Hz to 400 Hz	10K	6
HML	40 Hz to 200 Hz	600	6

CALL FACTORY FOR DETAILS OR SPECIAL REQUIREMENTS ON FILTER APPLICATIONS

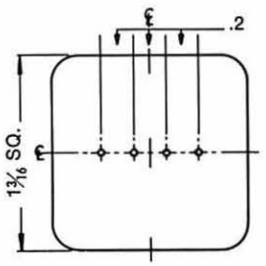
Telemetering Band Pass Filters

Tele-Minifilter™ MNF and MWF



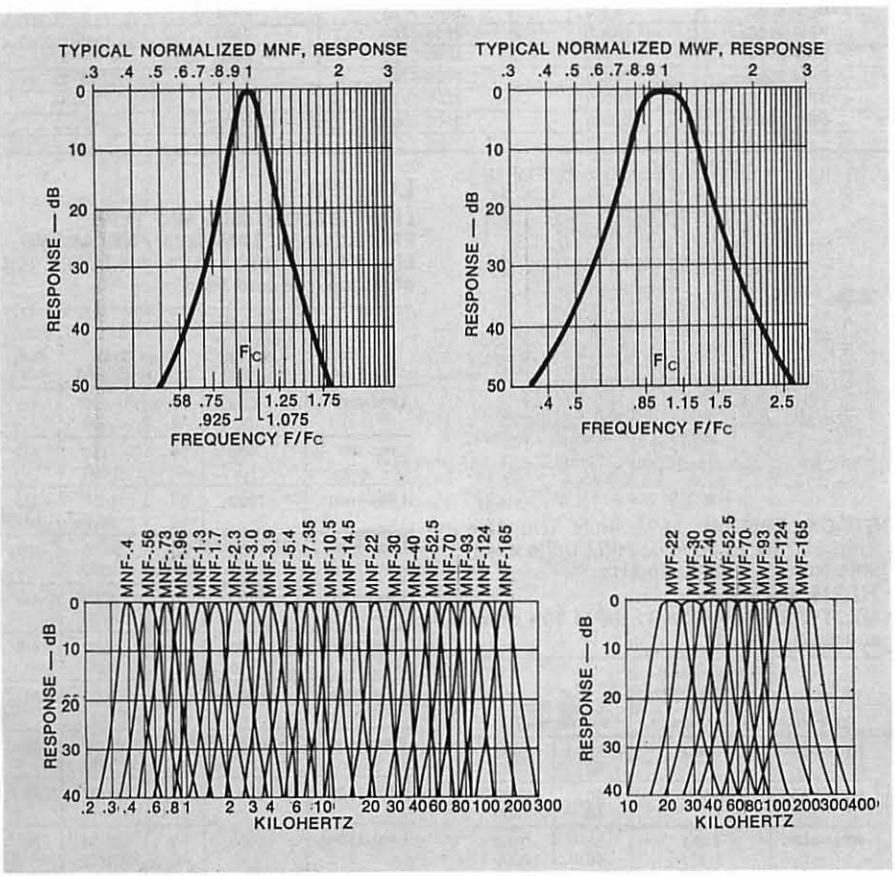


MNF-7.35 thru MNF-70, MWF-22 thru MWF-70
23/32" sq. x 1/2" high
Weight: 1/3 oz.



MNF-.4 thru MNF-5.4
1 3/16" sq. x 1/2" high
Weight: 1 oz.

MNF-93 thru MNF-165, MFW-93 thru MWF-165
23/32" sq. x .35" high Weight: 1/5 oz.
Leads: .025 Dia. x 1"; Type N-2, Tinned Nickel, MIL-STD-1276



PACKAGING

All hermetically sealed. MNF and MWF units metal cased, epoxy terminal board with pin terminals.

NOTES

The low potential connections (2 and 3 on MNF and MWF) are brought out to individual terminals so that input and output may be used at different DC potentials if desired.

MIL SPECS

All to complete MIL-F-18327D Specs. MNF and MWF: FR7RX22ZZ1.

IMPEDANCES

MNF and MWF 10K ohms source and load.

SPECIALS

MNF and MWF filters can be obtained with special center frequencies from 400 Hz to 200 kHz.

Leads: .025 Dia. x 1"; Type N-2, Tinned Nickel, MIL-STD-1276

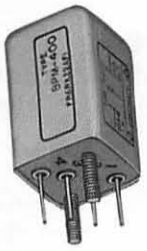
Type No.	Center Freq. (kHz)	Type No.	Center Freq. (kHz)
MNF-.4	.4	MNF-40	40
MNF-.56	.56	MNF-52.5	52.5
MNF-.73	.73	MNF-70	70
MNF-.96	.96	MNF-93	93
MNF-1.3	1.3	MNF-124	124
MNF-1.7	1.7	MNF-165	165
MNF-2.3	2.3		
MNF-3.0	3.0	MWF-22	22
MNF-3.9	3.9	MWF-30	30
MNF-5.4	5.4	MWF-40	40
MNF-7.35	7.35	MWF-52.5	52.5
MNF-10.5	10.5	MWF-70	70
MNF-14.5	14.5	MWF-93	93
MNF-22	22	MWF-124	124
MNF-30	30	MWF-165	165

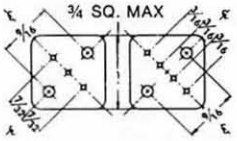
ATTENUATION CHART

Type No.	Pass Band Width (less than 3 db)	Stop Band
MNF	±7½%	15 db min @ ±25% 40 db min @ 1.75 Fc .58 Fc
MWF	±15%	15 db min @ ±50% 40 db min @ 2.5 Fc .4 Fc

Miniature Filters
Band Pass, High Pass, Low Pass

BPM Series





BPM case
¾" x ¾" x 1⅛"
Weight: 1 oz.

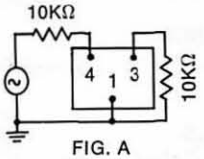
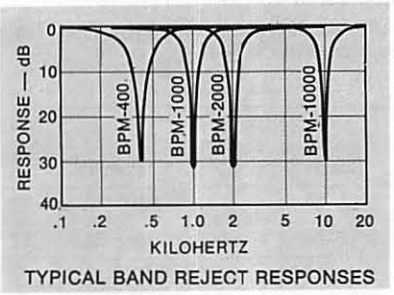


FIG. A

CONNECTIONS FOR
BAND REJECT APPLICATIONS



TYPICAL BAND REJECT RESPONSES

PACKAGING

Hermetically sealed. Standard MIL metal cases. Straight pin terminals. Shielded to reduce hum pick-up.

MIL SPECS

To complete MIL-F-18327D Specs. Grade 6, Class R, Life X.

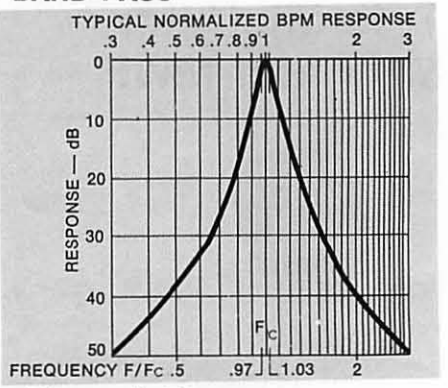
BAND REJECT

BPM units are designed for both band pass and band reject applications. For band reject connect as in Fig. A below.

WIDE BAND PASS APPLICATIONS

The HPM and LPM may be connected in tandem. For example, the HPM-500 in tandem with the LPM-5000 will be flat within 1 db from 625 Hz to 4000 Hz with an attenuation of 40 db at 300 Hz and 8250 Hz.

BAND PASS



Band Pass

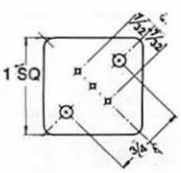
MIL TYPE FR6RX22AF1

BPM's source 10 K ohms; load 10 K ohms or grid. Grid output gives 2:1 gain.

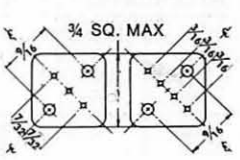
NOTE: Special BPM filters with center frequency of 30 kHz to 200 kHz are available with 10,000 ohms load only, these have three terminals.

Type No.	Center Frequency (Hz)	Pass Band (less than 2 db) (Hz)	Stop Band (more than 35 db)	
			Below (Hz)	Above (Hz)
BPM-400	400	388-412	200	800
BPM-500	500	485-515	250	1000
BPM-600	600	582-618	300	1200
BPM-800	800	776-824	400	1600
BPM-1000	1000	970-1030	500	2000
BPM-1200	1200	1164-1236	600	2400
BPM-1500	1500	1455-1545	750	3000
BPM-2000	2000	1940-2060	1000	4000
BPM-3000	3000	2910-3090	1500	6000
BPM-4000	4000	3880-4120	2000	8000
BPM-4800	4800	4656-4944	2400	9600
BPM-5000	5000	4850-5150	2500	10000
BPM-8000	8000	7760-8240	4000	16000
BPM-10000	10000	9700-10300	5000	16000
BPM-20000	20000	19400-20600	10000	40000

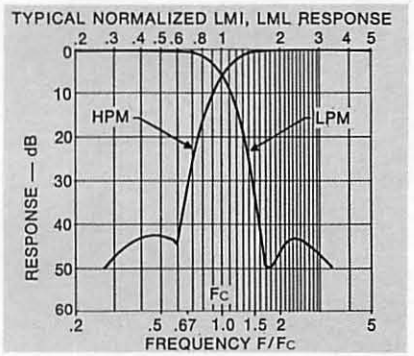
Minifilter™ LPM and HPM Series



HPM and LPM case (MIL AG)
1" x 1" x 1⅜"
Weight: 2¼ oz.



LPM-6000 or higher (MIL AF)
¾" x ¾" x 1⅛"
Weight: 1 oz.



STOCK SPECIAL LPM units available from 200 Hz to 25 kHz; HPM units available from 500 Hz to 25 kHz.

HIGH PASS

MIL TYPE FR6RX33AG1. HPM 10K ohms source and load.

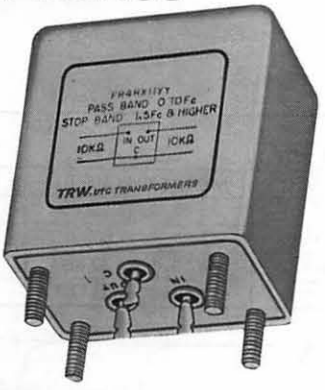
Type No.	Pass Band (less than 6 db) (Hz) & above	Stop Band min db @ (Hz)	
HPM-500	500	30 40	333 250
HPM-1000	1000	30 40	667 500
HPM-4000	4000	30 40	2680 2000

LOW PASS

LPM's BELOW 6000 MIL TYPE FR6RX11AG1, LPM-6000 AND ABOVE MIL TYPE FR6RX11AF1. All LPM's 10K ohms source and load.

Type No.	Pass Band (less than 6 db) DC to: (Hz)	Stop Band min db @ (Hz)		MIL Case
LPM-200	200	30 40	300 400	AG
LPM-500	500	30 40	750 1000	AG
LPM-1000	1000	30 40	1500 2000	AG
LPM-1500	1500	30 40	2250 3000	AG
LPM-2000	2000	30 40	3000 4000	AG
LPM-3000	3000	30 40	4500 6000	AG
LPM-5000	5000	30 40	7500 10000	AG
LPM-6000	6000	30 40	9000 12000	AF
LPM-10000	10000	30 40	15000 20000	AF
LPM-15000	15000	30 40	22500 30000	AF

Band Pass Filters BMI Series



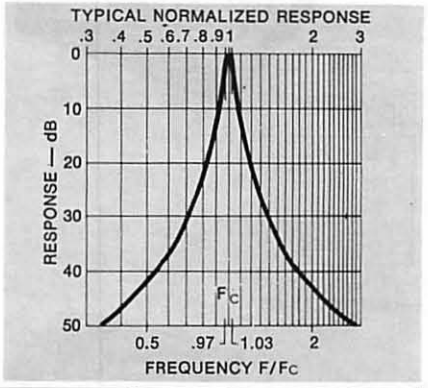
PACKAGING for BMI, LMI, LML, HMI and HML series.

MIL SPECS To Complete MIL-F-18327D Specs. MIL Type FR6RX22YY1.

SPECIALS BMI units available from 20 Hz to 50 kHz, above 400 Hz smaller size and weight can be obtained by selecting BPM units (see page 52).

NOTES BMI filters have a phase slope over the pass band that is essentially linear. For wide band pass filters, the HMI and LMI or HML and LML filters may be connected in tandem. For example, the HMI-200 in tandem with the LMI-4000 will result in a filter flat within 1 db from 250 Hz to 3200 Hz and with an attenuation of 35 db at 133 Hz and 6 kHz.

Type No.	Source Ω	Load Ω	Gain
BMI	10k	Grid	2:1



DIMENSIONS/MOUNTING

Base	Ht.	Mtg.	Mtg. Studs	Cut-out	Wt.
LMI, LML, HMI, BMI-30					
1 3/16" x 1 11/16"	2½"	¾" x 1¼"	6-32	⅞"	9 oz.
BMI, LMI-150					
1 3/16" x 1 11/16"	1⅝"	¾" x 1¼"	6-32	⅞"	6 oz.

MIL SPEC MIL-F-18327D

LMI, LML	FR6RX11YY1
BMI	FR6RX22YY1
HMI, HML	FR6RX33YY1

Type No.	Center Frequency (Hz)	Pass Band (less than 2 db) (Hz)	Stop Band Below (Hz)	Stop Band Above (Hz)
			(more than 35 db)	
BMI-30	30	29.1-30.9	15	60
BMI-50	50	48.5-51.5	25	100
			(more than 40 db)	
BMI-60	60	58.2-61.8	30	120
BMI-100	100	97.0-103	50	200
BMI-120	120	116.4-123.6	60	240
BMI-200	200	194-206	100	400
BMI-240	240	233-247	120	480
BMI-400	400	388-412	200	800

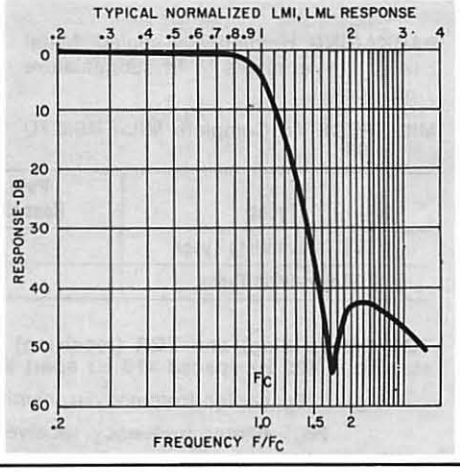
Low Pass Filters LMI and LML Series

SPECIALS LMI units available from 50 Hz to 25 kHz, for frequencies above 200 Hz, smaller size and weight can be obtained by selecting LPM units. LML units available from 500 Hz to 100 kHz.

NOTE LMI and LML filters have a phase slope that is essentially linear in the pass band up to .67 cutoff frequency.

MIL TYPE FR6RX11YY1

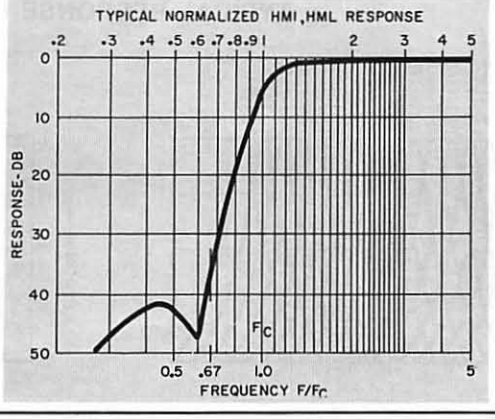
Type	Source Ω	Load Ω
LMI	10K	10K
LML	500/600	500/600



Type No.	Pass Band (less than 6 db) DC to : (Hz)	Stop Band Min. db @ (Hz)	
LMI-50	50	30 40	75 100
LMI-100	100	30 40	150 200
LMI-150	150	35 40	225 300
LML-500	500	35 40	750 1000
LML-1500	1500	35 40	2250 3000
LML-2500	2500	35 40	3750 5000
LML-3000	3000	35 40	4500 6000
LML-4000	4000	35 40	6000 8000
LML-10000	10000	35 40	15000 20000
LML-12000	12000	35 40	18000 24000

High Pass Filters HMI and HML Series

SPECIALS HMI units available from 30 Hz to 25 kHz, for frequency above 500 Hz, smaller size and weight can be obtained by selecting HPM units. HML units available from 30 Hz to 100 kHz.



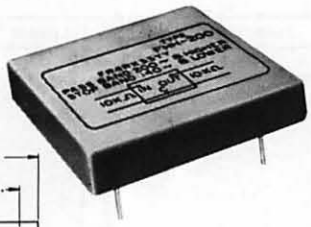
Type No.	Pass Band (less than 6 db) (Hz) & Above	Stop Band Min. db @ (Hz)	
HMI-50	50	30 40	33.4 25.0
HMI-100	100	35 40	66.7 50.0
HMI-200	200	35 40	133 100
HML-40	40	30 40	26.8 20.0
HML-200	200	35 40	133 100

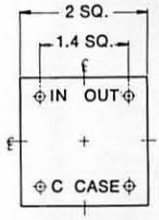
MIL TYPE FR6RX33YY1

Type	Source Ω	Load Ω
HMI	10K	10K
HML	500/600	500/600

Flats™ Low Pass Filters

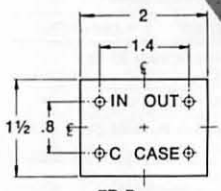
FP-A Case





FP-A
½ HIGH; WT. 2.5 OZ.

FP-B Case



FP-B
⅜ HIGH; WT. 2.0 OZ.

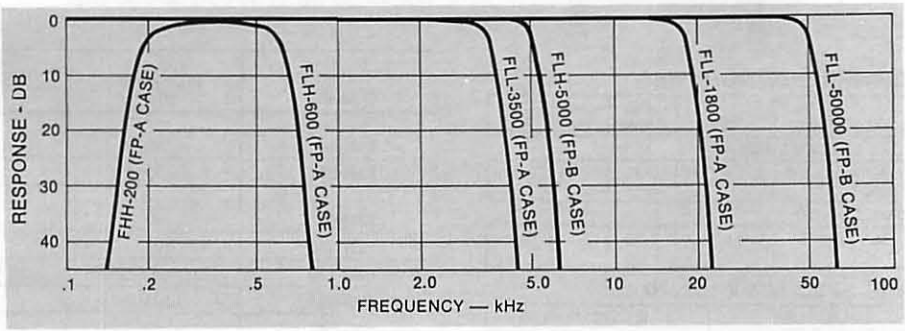
PACKAGING Flat metal case. Shielded to reduce hum pick-up. Hermetically sealed. Straight pin terminals.

MIL SPECS To complete MIL-F-18327D Specs. Grade 6, Class R, Life X.

NOTE Filters with other frequencies than shown can be supplied on special order.

LOW PASS
MIL TYPE FR6RX11YY1

Type No.	Source & Load Ω	Pass Band db (less than 1)	Pass Band db (3 ±1)	Stop Band	Case
FLH-600	10K	DC to 450 Hz	600 Hz	40 db above 800 Hz	FP-A
FLL-3500	600	DC to 3 kHz	3.5 kHz	40 db above 4.5 kHz	FP-A
FLH-5000	10K	DC to 4.2 kHz	5 kHz	43 db above 6.4 kHz	FP-B
FLL-18000	600	DC to 15 kHz	18 kHz	43 db above 23 kHz	FP-A
FLL-50000	600	DC to 42 kHz	50 kHz	43 db above 64 kHz	FP-B



Telegraph Tone Channel Filters

TGT CASE
1½" x 1½" x 2½"
Weight: 8 oz.
Mounting: 1 1/16" x 1 1/16"
Screws: 6-32

TGR CASE
1½" x 1½" x 4¼"
Weight: 15 oz.
Mounting: 1 1/16" x 1 1/16"
Screws: 6-32

PACKAGING Hermetically sealed. Metal cased. Pin terminals to fit subminiature 7-pin socket.

MIL SPECS To Complete MIL-F-18327D Specs. MIL Type FR6QX22YY1.

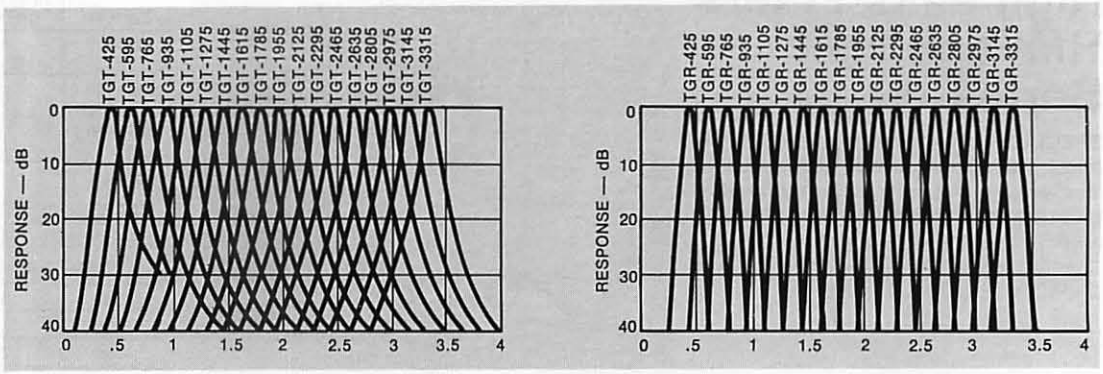
IMPEDANCE 600 ohms source and load.

Types	Pass Band Width (less than 3 db) (Hz)	Stop Band Width Min. db @ (Hz) from Fc
TGT Transmitting Types	±42.5	16 @ ±170
TGR Receiving Types	±42.5	30 @ ±170

TGT (transmitting) and TGR (receiving) standard designs have center frequencies starting at 425 Hz spaced 170 Hz apart through 3315 Hz.

e.g., 1105 center frequency transmit filter would be designated TGT-1105
2805 center frequency receive filter would be designated TGR-2805

TYPICAL RESPONSE CURVE



Mil Type Designations

MILITARY GENERAL SPECIFICATIONS, MILITARY TYPE DESIGNATIONS, MILITARY STANDARD DRAWINGS, MILITARY SLASH/SHEETS AND QUALIFIED PRODUCTS LISTS

Federal Supply Code for Manufacturers (FSCM) No. 80223 is assigned to TRW

TRW is in full compliance with the newly issued "Revision E" of MIL-T-27.

TRW Transformer & Coil Products military products are made to the requirements of either MIL-T-27 (transformers and inductors), MIL-F-18327 (electric wave filters), MIL-T-21038 (pulse transformers) or MIL-C-15305E (Radio Frequency Coils). The current revisions are MIL-T-27D, MIL-F-18327E, and MIL-T-21038D.

Each of these specifications make use of its own MIL Type Designation, which is essentially a shorthand description of the item. However, the MIL Type Designation will not fully describe an item without a statement of its electrical characteristics and, where necessary, a dimensional drawing. Therefore, for ordering purposes, you must specify the TRW Part Number in addition to the Type Designation. A condensed outline of MIL Designations is presented on page 56 for your reference.

The Department of Defense is phasing out the use of the previous standard part documents, e.g., M.S. sheets (Military Standards) and MIL Type Designations with the three-digit suffix to describe a discrete specific part.

The general component specifications MIL-T-27, MIL-F-18327 and MIL-T-21038 now have supplementary documents known as slash/sheets, which are drawings completely describing the standard parts. The slash/sheets are prefixed with the number of the related specification, such as M27/104-001, M18327/018-001 or M21038/8-001, MIL-C-15305E per MS21358 (Type LT10K).

However, OEMs are not restricted to the usage of slash/sheet standard parts. If a new or different application requires a new or different part it can be custom designed as previously, with all general visual, mechanical, environmental and electrical requirements governed by the applicable military general component specifications.

The slash/sheet itself does not list the qualified manufacturer. To determine this information, refer to the related QPL, look up the particular slash/sheet number and the qualified manufacturer will be listed.

The MIL Type Designation (less the three-digit suffix) does not describe a specific part — only a general family type. Refer to the charts on the following page for information obtained from the military type designations.

In the recent military transformer specification change from MIL-T-27C to MIL-T-27D, two changes occurred: the life expectancy symbol was discontinued and the family symbols were consolidated from 37 different code symbols to the 8 basic family code symbols listed.

If the part and the drawing have TF designations that appear in conflict, refer to the cross-index chart listed in paragraph 6.17 on page 50 of MIL-T-27D.

Each of these three specifications contains a requirement for qualification and a procedure for obtaining qualification by reason of similarity to a qualified part. All parts qualified to each specification appear on the appropriate Qualified Products List, e.g. QPL-27, QPL-18327, QPL-21038. If a desired item does not appear on the QPL, it still may be qualified by similarity, provided the manufacturer has an acceptable similar part qualified.

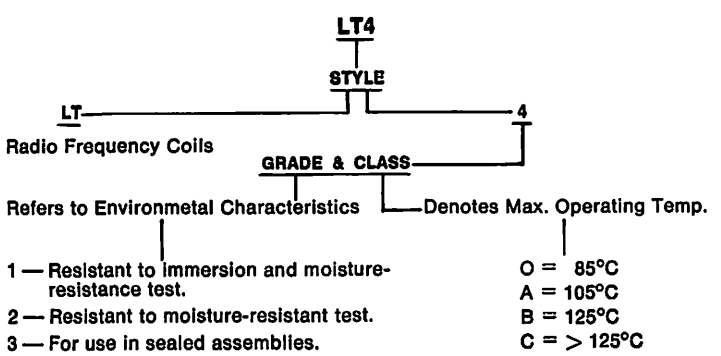
The determining factors considered in an extension of qualification are many and complex. Guidance by similarity appears in paragraph 20.2 and Figure 18 of MIL-T-27D, paragraph 20.3 and Figure 10 of MIL-F-18327E, and paragraph 20.3 and Figure 10 of MIL-T-21038D. This information can be obtained from the manufacturer. Obviously, a manufacturer with an extensive listing on the QPL is in a far better position to save the user time and high test costs than one with no listings, or with only a few parts listed.

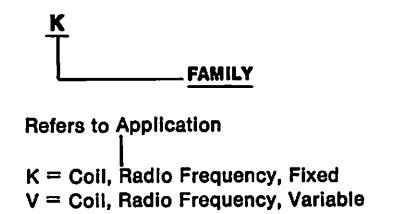
It's a FACT that TRW has more inductors, transformers and filters listed on the QPL than all other manufacturers combined.

Copies of the General Military Specifications, slash/sheets and Qualified Products Lists mentioned above may be obtained by manufacturers from:

U.S. Navy Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

MIL-C-15305E — MILITARY SPECIFICATION FOR COILS, FIXED AND VARIABLE (RADIO FREQUENCY)





NOTE: LT10K = Grade 1 Class A Family K

Mil Type Designations

Examples of Military Type Designations

MIL-T-27D—Military Specification for Transformers and Inductors (Audio and Power)

TF — COMPONENT
All MIL-T-27D transformers or inductors

4 — GRADE
Refers to case material and environmental capability e.g.,
Grade 4 = Metal cased. Max. reliability. Resistant to shock, vibration and thermal shock.
Grade 5 = Same as Grade 4 except encapsulated or molded.
Grade 6 = Open type for subsequent potting by OEM.

R — CLASS
Indicative of max. operating temp. (ambient plus temperature rise)
e.g., Q = 85°C
R = 105°C
S = 130°C
V = 155°C
T = 170°C
U = >170°C

03 — FAMILY
Two digit number code listed in spec. representing each application or category of transformers and inductors
03 = Power Transformer
04 = Power Inductor
20 = Audio Inductor
21 = Audio Transformer
36 = Pulse Transformer
37 = Charging Inductor
40 = Saturable Transformer
41 = Saturable Inductor

FA — CASE OR ENVELOPE SIZE AND MOUNTING
Two letter code listed in spec e.g.,
FA = 2 5/16 x 2 1/16 x 3 1/8". Stud threads, heights and tolerances must conform to spec.
YY = non-std. metal case.
ZZ = encapsulated or molded.

MIL-F-18327E—Military Specification for Filters (High Pass, Low Pass, Band Pass, Band Suppression and Dual Functioning)

FR — COMPONENT
Filter

6 — GRADE
4 — Metal Cased 10-55 Hz Vibration Frequency Range
5 — Encapsulated 10-55 Hz Vibration Frequency Range
6 — Metal Cased 10-2000 Hz Vibration Frequency Range
7 — Encapsulated 10-2000 Hz Frequency Range
8 — Metal Cased 10-500 Hz Vibration Frequency Range
9 — Encapsulated 10-500 Hz Vibration Frequency Range

R — CLASS
Indicative of max. operating temperature e.g.,
Q = 85°C
R = 105°C
S = 125°C
V = >125°C

X — LIFE EXPECTANCY
Designer's estimate of mean anticipated life e.g.,
X = 10,000 hours est.
Y = 2,500 hours min.

11 — FAMILY
Refers to application e.g.,
11 = Low Pass
22 = Band Pass
33 = High Pass

YY — CASE OR ENVELOPE SIZE AND MOUNTING
Two letter code listed in space e.g.,
FA = 2 5/16 x 2 1/16 x 3 1/8". Stud threads, heights and tolerances must conform to spec.
YY = non-std. metal case.
ZZ = encapsulated or molded.

1 — COMPOSITION
1 — LC
2 — Crystal
3 — Other electromechanical

MIL-T-21038D—Military Specification for Pulse Transformers

TP — COMPONENT
Transformer, Pulse

6 — GRADE
Refers to case material and environmental capability e.g.,
Grades 4 and 6 = Metal cased. Max. reliability. Resistant to shock, vibration and thermal shock. For use at high altitudes if required.
Grades 5 and 7 = Same as Grade 6 except encapsulated or molded.

R — CLASS
Indicative of max. operating temp. (ambient plus temperature rise)
e.g., Q = 85°C
R = 105°C
S = 130°C
T = 155°C
U = 170°C
V = >170°C

X — LIFE EXPECTANCY
Designer's estimate of mean anticipated life e.g.,
X = 10,000 hours est.
Y = 2,500 hours min.
Z = as specified

1100 — TURNS RATIO
Four digit code indicating the number of wdgs. and their ratios e.g.,
1110 = 1:1:1

C — ENVELOPE DIMENSIONS
One letter code representing fixed case styles in spec e.g.,
A = radial leads.
C = terminations at one end.

B — STYLE
One or two letter code representing fixed envelope dimensions.
Z = other sizes.
AA = Style J PC type

For QPL, TRW is the one.

With a greater variety of products qualified to MIL-T-27, MIL-F-18327 and MIL-T-21038 than anybody else in the business.

We're more likely to have the exact MIL-qualified part you need or be able to give you qualification by similarity. And this can save you the time and cost of running extensive qualifying tests against your discrete part number.

We have more inductive products . . . transformers, filters and pulse transformers . . . on the MIL-approved QPL list than any of our competitors. So next time you need parts, save yourself the trouble of shopping around. Start with the one name you can depend on to have just about everything . . . TRW Transformer & Coil Products.

For fast, off-the-shelf delivery, see your local TRW distributor. Or contact Transformer & Coil Products, Electronic Assemblies Division, TRW Electronic Components Group, 150 Varick Street, New York, NY 10013. 212.255.3500.

TRW

Transformer & Coil Products
Electronic Assemblies Division
TRW Electronic Components Group

TRW Supplies Transformers And Coils And More Than 300 Other Electronic Components Worldwide

A Company Called TRW

TRW is a diversified company that provides high technology products and services through 90,000 employees at 300 locations, worldwide. Nearly 15,000 of its people are scientists and engineers.

Accomplishments over the past twenty-five years include the building of more than 175 spacecraft, including Pioneer 10, the first to leave our solar system. Recent achievements in the area of electronic components include the first commercial usage of one-micron geometry for very large scale integrated circuitry, resistor networks made from non-noble hybrid materials, optoelectronic integrated circuitry, self-aligning fiber optic connectors and laser-scribed capacitors.

TRW Electronic Components Group

TRW Electronic Components Group offers more than 300 product lines, perhaps the most extensive selection of electronic components available from any one manufacturer. These include both standard and custom products to meet the needs of industrial, consumer and defense markets. TRW components find application in computer, telecommunications, aerospace, medical, instrumentation, home entertainment and automotive equipment.

Electronic Assemblies Division Transformer and Coil Operation

Electronic Assemblies Division, one of the 11 Product Divisions that comprise the TRW Electronic Components Group, provides a full line of transformers and coil products from its New York and Haiti operations. In addition, the division manufactures power supplies and Electronic Assemblies in 5 other locations in the U.S. and Taiwan.

IMMEDIATELY AVAILABLE
The Most Complete Line of
• Transformers • Inductors
• Pulse Units • Electric Wave Filters • High Q Coils in the Industry

Transformer and Coil Products
TRW Electronic Assemblies Division

150 VARICK STREET
NEW YORK, N.Y. 10013
(212) 255-3500
TELEX: 7105812722

Worldwide Sales/Distributor Organization

There are 55 Electronic Components Group sales and representatives offices, and 313 TRW Authorized Distributor locations in the United States, Canada and Puerto Rico. In addition, TRW has established an extensive network of sales representatives and distributors in 16 countries in Europe in order to provide the highest level of service in each country. This network functions under the direction of three regional offices located in Munich, Paris and Bedford. The entire European sales organization is supervised from a Sales Headquarters in Guildford, England.

TRW Electronic Components Group

A brochure listing the major products produced by these 11 Divisions is available from your local TRW Distributor or TRW Electronic Components Group sales office.

Capacitor Division
Connector Division
Cylindrical Connector Division
Daut + Rietz Connector Division
Electronic Assemblies Division
LSI Products Division
Motor Division
Optoelectronics Division
Resistive Products Division
RF Devices Division
TRW Connectors Ltd.

Tomorrow is Taking Shape at A Company Called TRW

Printed in USA