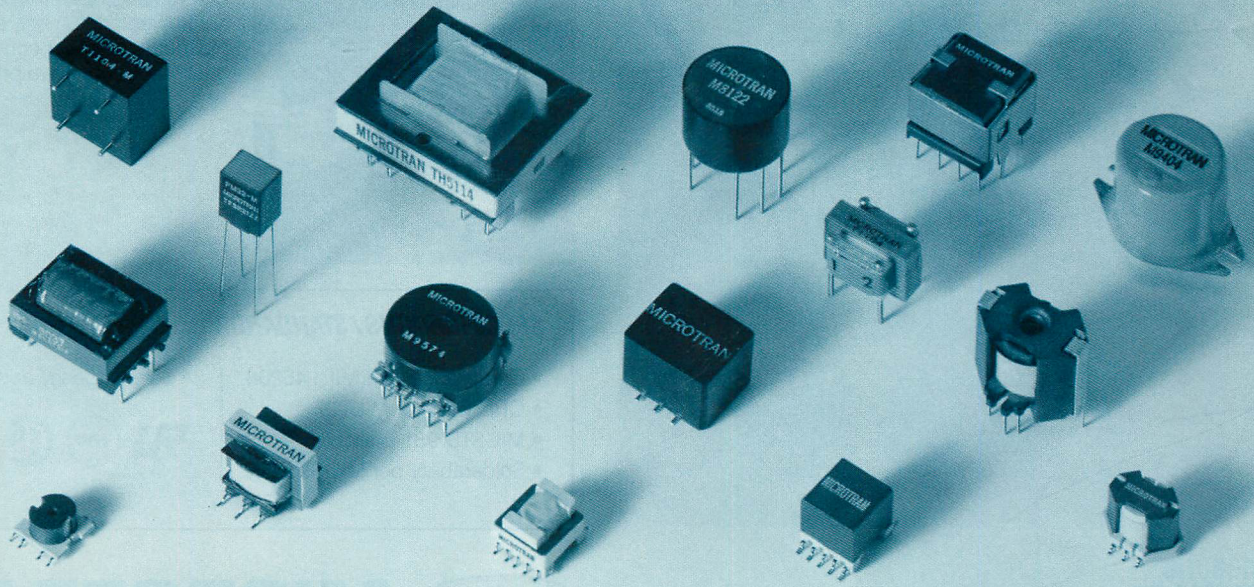


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- Proven engineering and quality
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As a result of our 100% quality control and use of automated state-of-the-art testing equipment, many of our customers have eliminated incoming inspection.



## MAGNETICS FOR:

- TELECOMMUNICATIONS
- MILITARY / AEROSPACE
- INSTRUMENTATION, CONTROL AND AUTOMATION
- SWITCH MODE POWER SUPPLIES



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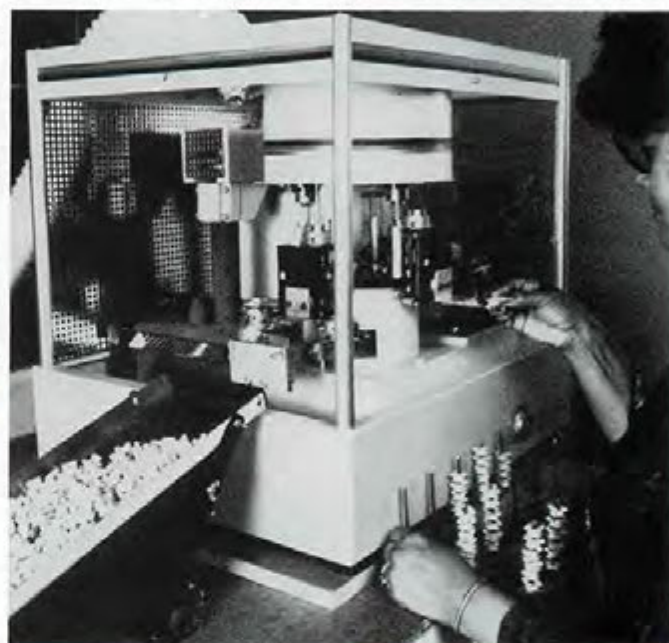
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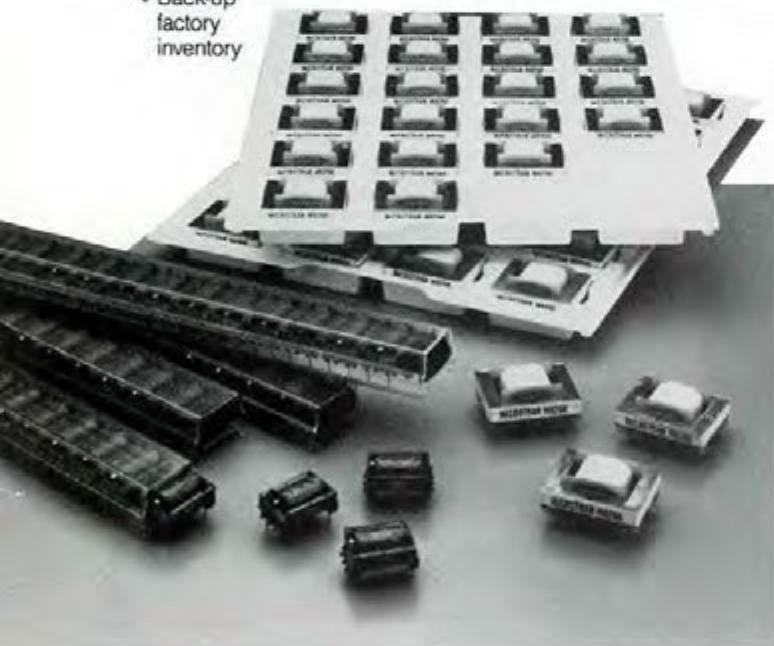
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Coil winding, soldering and other automated equipment, enable Microtran to deliver consistent quality at competitive pricing.



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## OTHER OPTIONS

- Just-In-Time delivery
- Certification for ship-to-stock

## SPECIFICATIONS / STANDARDS

- Compliance with MIL-I-45208
- QPL listed for MIL-T-27
- MIL-STD-981 available
- Solderability per MIL-STD-202
- Safety agency approvals:



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### CUSTOM DESIGNS

Modified catalog items and custom designs are available on special order to meet your exact requirements. See Action Request Form on page 26. Fax your specs. or telephone Microtran for engineering assistance and quotation.

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| * OKL100-H   | 24   | QPL5000-F    | 24   | SC1-00490   | 7    | * SL1-15-M   | 9    | SL3-100-F    | 9    | T4415    | 17   | * UM33-M   | 21   |
| * OKL100-M   | 24   | * QPL5000-H  | 24   | SC1-00840   | 7    | SL1-30-B     | 9    | * SL3-100-M  | 9    | T5114    | 16   | * UM34-F   | 21   |
| * OKL150-F   | 24   | * QPL5000-M  | 24   | SC1-01280   | 7    | SL1-30-F     | 9    | * SL3-220-B  | 9    | T5115    | 16   | UM34-M     | 21   |
| * OKL150-H   | 24   | * QPL7500-F  | 24   | SC1-01960   | 7    | SL1-30-M     | 9    | SL3-220-F    | 9    | T5117    | 16   | UM35-F     | 21   |
| * OKL150-M   | 24   | * QPL7500-H  | 24   | SC1-03770   | 7    | SL1-60-B     | 9    | * SL3-220-M  | 9    | T5119    | 16   | UM35-M     | 21   |
| * OKL250-F   | 24   | * QPL7500-M  | 24   | SC1-04900   | 7    | SL1-60-F     | 9    | SL3-470-B    | 9    | T5220    | 17   | * UM36-F   | 21   |
| * OKL250-H   | 24   | * QPL10000-F | 24   | SC1-07900   | 7    | SL1-60-M     | 9    | SL3-470-F    | 9    | T5415    | 17   | * UM36-M   | 21   |
| * OKL250-M   | 24   | * QPL10000-H | 24   | SC1-16800   | 7    | SL1-120-B    | 9    | * SL3-470-M  | 9    | T6112    | 16   | * UM37-F   | 21   |
| * OKL500-F   | 24   | * QPL10000-M | 24   | SC2-00120   | 7    | SL1-120-F    | 9    | * SL3-1000-B | 9    | T7410    | 17   | UM37-M     | 21   |
| * OKL500-H   | 24   | * QPL15000-F | 24   | SC2-00330   | 7    | SL1-120-M    | 9    | SL3-1000-F   | 9    | T8410    | 17   | * UM39-F   | 21   |
| * OKL500-M   | 24   | * QPL15000-H | 24   | SC2-00750   | 7    | SL1-220-B    | 9    | * SL3-1000-M | 9    | T9116    | 16   | UM39-M     | 21   |
| OKL1000-F    | 24   | * QPL15000-M | 24   | SC2-01450   | 7    | SL1-220-F    | 9    | SL3-2200-B   | 9    | T9117    | 16   | UM90       | 21   |
| * OKL1000-H  | 24   | * QPL25000-F | 24   | SC2-03250   | 7    | SL1-220-M    | 9    | * SL3-2200-F | 9    | T9220    | 17   | * VM1-FPB  | 21   |
| * OKL1000-M  | 24   | * QPL25000-H | 24   | SC2-05250   | 7    | SL1-450-B    | 9    | * SL3-2200-M | 9    | T9311    | 17   | VM1-M      | 21   |
| * OKL1500-F  | 24   | * QPL25000-M | 24   | SC2-14000   | 7    | SL1-450-F    | 9    | SL3-4000-B   | 9    | T9312    | 17   | VM1-PC     | 22   |
| * OKL1500-H  | 24   | * QTL25-F    | 24   | SL05-15-B   | 7    | SL1-450-M    | 9    | SL3-4000-F   | 9    | T9317    | 17   | * VM2-FPB  | 21   |
| * OKL1500-M  | 24   | * QTL25-H    | 24   | SL05-15-F   | 7    | SL1-900-B    | 9    | * SL3-4000-M | 9    | T9320    | 17   | * VM2-M    | 21   |
| * OKL2500-F  | 24   | * QTL25-M    | 24   | SL05-15-M   | 7    | SL1-900-F    | 9    | * SL4-2.2-B  | 9    | TH2104   | 16   | VM2-PC     | 22   |
| * OKL2500-H  | 24   | * QTL50-F    | 24   | SL05-24-B   | 7    | SL1-900-M    | 9    | * SL4-2.2-F  | 9    | TH2106   | 16   | * VM3-FPB  | 21   |
| * OKL2500-M  | 24   | * QTL50-H    | 24   | SL05-24-F   | 7    | SL1-1500-B   | 9    | * SL4-2.2-M  | 9    | TH2220   | 17   | VM3-M      | 21   |
| * OKL5000-F  | 24   | * QTL50-M    | 24   | SL05-24-M   | 7    | SL1-1500-F   | 9    | * SL4-5-B    | 9    | TH5114   | 16   | VM3-PC     | 22   |
| * OKL5000-H  | 24   | * QTL100-F   | 24   | SL05-35-B   | 7    | SL1-1500-M   | 9    | * SL4-5-F    | 9    | TH5116   | 16   | * VM4-FPB  | 21   |
| * OKL5000-M  | 24   | * QTL100-H   | 24   | SL05-35-F   | 7    | * SL2-1.4-B  | 9    | * SL4-5-M    | 9    | TH5117   | 16   | * VM4-M    | 21   |
| * OKL10000-F | 24   | * QTL100-M   | 24   | SL05-35-M   | 7    | SL2-1.4-F    | 9    | * SL4-11-B   | 9    | TH5118   | 16   | VM4-PC     | 22   |
| * OKL10000-H | 24   | * QTL150-F   | 24   | SL05-55-B   | 7    | * SL2-1.4-M  | 9    | * SL4-11-F   | 9    | TH5220   | 17   | VM5-FPB    | 21   |
| * OKL10000-M | 24   | * QTL150-H   | 24   | SL05-55-F   | 7    | * SL2-2.5-B  | 9    | * SL4-11-M   | 9    | TH9306   | 16   | VM5-M      | 21   |
| * QKM2-F     | 24   | * QTL150-M   | 24   | SL05-55-M   | 7    | * SL2-2.5-F  | 9    | * SL4-23-B   | 9    | THP104-M | 16   | VM5-PC     | 22   |
| * QKM2-H     | 24   | * QTL250-F   | 24   | SL05-85-B   | 7    | * SL2-2.5-M  | 9    | SL4-23-F     | 9    | THP220-M | 17   | * VM6-FPB  | 21   |
| QKM2-M       | 24   | * QTL250-H   | 24   | SL05-85-F   | 7    | * SL2-5.5-B  | 9    | * SL4-23-M   | 9    | TL1104   | 16   | * VM6-M    | 21   |
| * QKM5-F     | 24   | * QTL250-M   | 24   | SL05-85-M   | 7    | * SL2-5.5-F  | 9    | * SL4-50-B   | 9    | TL1106   | 16   | VM6-PC     | 22   |
| * QKM5-H     | 24   | * QTL500-F   | 24   | SL05-158-B  | 7    | * SL2-5.5-M  | 9    | * SL4-50-F   | 9    | TL1111   | 17   | * VM7-FPB  | 21   |
| * QKM5-M     | 24   | * QTL500-H   | 24   | SL05-158-F  | 7    | * SL2-13-B   | 9    | SL4-50-M     | 9    | TL1114   | 16   | VM7-M      | 21   |
| * QKM10-F    | 24   | * QTL500-M   | 24   | SL05-158-M  | 7    | SL2-13-F     | 9    | SL4-100-B    | 9    | TL1115   | 17   | VM7-PC     | 22   |
| * QKM10-H    | 24   | * QTL1000-F  | 24   | SL05-192-B  | 7    | * SL2-13-M   | 9    | * SL4-100-F  | 9    | TL1220   | 17   | * VM8-FPB  | 21   |
| * QKM10-M    | 24   | * QTL1000-H  | 24   | SL05-192-F  | 7    | * SL2-26-B   | 9    | * SL4-100-M  | 9    | TL1320   | 17   | VM8-M      | 21   |
| * QKM25-F    | 24   | * QTL1000-M  | 24   | SL05-192-M  | 7    | * SL2-26-F   | 9    | * SL4-230-B  | 9    | TM104    | 16   | VM8-PC     | 22   |
| * QKM25-H    | 24   | * QTL1500-F  | 24   | SL05-305-B  | 7    | SL2-26-M     | 9    | * SL4-230-F  | 9    | TM105    | 17   | * VM9-FPB  | 21   |
| * QKM25-M    | 24   | * QTL1500-H  | 24   | SL05-305-F  | 7    | SL2-50-B     | 9    | SL4-230-M    | 9    | TM106    | 17   | VM9-M      | 21   |
| * QKM50-F    | 24   | * QTL1500-M  | 24   | SL05-305-M  | 7    | SL2-50-F     | 9    | * SL4-470-B  | 9    | TP3106   | 16   | VM9-PC     | 22   |
| * QKM50-H    | 24   | * QTL2500-F  | 24   | SL06-26-B   | 7    | * SL2-50-M   | 9    | SL4-470-F    | 9    | TP3111   | 17   | VM10-FPB   | 21   |
| * QKM50-M    | 24   | * QTL2500-H  | 24   | SL06-26-F   | 7    | SL2-100-B    | 9    | * SL4-470-M  | 9    | TP3220   | 17   | VM10-M     | 21   |
| * QKM100-F   | 24   | * QTL2500-M  | 24   | SL06-26-M   | 7    | SL2-100-F    | 9    | SL4-1000-B   | 9    | TS1104   | 16   | VM10-PC    | 22   |
| * QKM100-H   | 24   | * QTL5000-F  | 24   | SL06-36-B   | 7    | * SL2-100-M  | 9    | * SL4-1000-F | 9    | TS1104-M | 16   | * VM11-FPB | 21   |
| * QKM100-M   | 24   | * QTL5000-H  | 24   | SL06-36-F   | 7    | * SL2-225-B  | 9    | * SL4-1000-M | 9    | TS1106   | 16   | * VM11-M   | 21   |
| * QKM250-F   | 24   | * QTL5000-M  | 24   | SL06-36-M   | 7    | SL2-225-F    | 9    | * SL4-2200-B | 9    | TS1106-M | 16   | VM11-PC    | 22   |
| * QKM250-H   | 24   | * QTL10000-F | 24   | SL06-51-B   | 7    | SL2-225-M    | 9    | * SL4-2200-F | 9    | TS1115   | 17   | * VM12-FPB | 21   |
| * QKM250-M   | 24   | * QTL10000-H | 24   | SL06-51-F   | 7    | SL2-475-B    | 9    | * SL4-2200-M | 9    | TS1220   | 17   | VM12-M     | 21   |
| * QKM500-F   | 24   | * QTL10000-M | 24   | SL06-51-M   | 7    | SL2-475-F    | 9    | SL4-4000-B   | 9    | TS1220-M | 17   | VM12-PC    | 22   |
| * QKM500-H   | 24   | * QTL15000-F | 24   | SL06-80-B   | 7    | SL2-475-M    | 9    | * SL4-4000-F | 9    | TS3106   | 16   | * VM13-FPB | 21   |
| * QKM500-M   | 24   | * QTL15000-H | 24   | SL06-80-F   | 7    | SL2-1000-B   | 9    | * SL4-4000-M | 9    | TS3220   | 17   | * VM13-M   | 21   |
| * QKM1000-F  | 24   | * QTL15000-M | 24   | SL06-80-M   | 7    | SL2-1000-F   | 9    | SL4-5600-B   | 9    | TSL103   | 16   | VM13-PC    | 22   |
| * QKM1000-H  | 24   | * QTL25000-F | 24   | SL06-122-B  | 7    | SL2-1000-M   | 9    | SL4-5600-F   | 9    | TV104    | 16   | VM14-FPB   | 21   |
| * QKM1000-M  | 24   | * QTL25000-H | 24   | SL06-122-F  | 7    | SL2-1800-B   | 9    | SL4-5600-M   | 9    | * UM21-F | 21   | VM14-M     | 21   |
| QPL25-F      | 24   | * QTL25000-M | 24   | SL06-122-M  | 7    | * SL2-1800-F | 9    | SP2016       | 8    | * UM21-M | 21   | VM14-PC    | 22   |
| * QPL25-H    | 24   | * QTL50000-F | 24   | SL06-188-B  | 7    | SL2-1800-M   | 9    | SP2020       | 8    | * UM22-F | 21   | VM15-FPB   | 21   |
| * QPL25-M    | 24   | * QTL50000-H | 24   | SL06-188-F  | 7    | SL2-2700-B   | 9    | SP2620       | 8    | * UM22-M | 21   | VM15-M     | 21   |
| * QPL50-F    | 24   | * QTL50000-M | 24   | SL06-188-M  | 7    | SL2-2700-F   | 9    | SP2625       | 8    | * UM23-F | 21   | VM15-PC    | 22   |
| * QPL50-H    | 24   | S100-FB      | 22   | SL06-300-B  | 7    | SL2-2700-M   | 9    | SP3220       | 8    | * UM23-M | 21   | * VM16-FPB | 21   |
| * QPL50-M    | 24   | S101-S       | 22   | SL06-300-F  | 7    | * SL3-1.3-B  | 9    | SP3230       | 8    | UM24-F   | 21   | * VM16-M   | 21   |
| * QPL100-F   | 24   | S101-SP      | 22   | SL06-300-M  | 7    | SL3-1.3-F    | 9    | SP3535       | 8    | * UM24-M | 21   | VM16-PC    | 22   |
| * QPL100-H   | 24   | S105-S       | 22   | SL06-460-B  | 7    | * SL3-1.3-M  | 9    | SP4040       | 8    | * UM25-F | 21   | VM17-FPB   | 22   |
| * QPL100-M   | 24   | * S105-SP    | 22   | SL06-460-F  | 7    | * SL3-3.0-B  | 9    | SP5050       | 8    | * UM25-M | 21   | VM17-M     | 22   |
| QPL250-F     | 24   | S107-S       | 22   | SL06-460-M  | 7    | * SL3-3.0-F  | 9    | T1104        | 16   | UM26-F   | 21   | VM17-PC    | 22   |
| * QPL250-H   | 24   | * S107-SP    | 22   | * SL1-1.1-B | 9    | * SL3-3.0-M  | 9    | T1104-M      | 16   | UM26-M   | 21   | VM90       | 21   |
| * QPL250-M   | 24   | S108-S       | 22   | SL1-1.1-F   | 9    | * SL3-6.5-B  | 9    | T2104        | 16   | * UM27-F | 21   |            |      |
| * QPL500-F   | 24   | * S108-SP    | 22   | * SL1-1.1-M | 9    | * SL3-6.5-F  | 9    | T2106        | 16   | * UM27-M | 21   |            |      |
| * QPL500-H   | 24   | S111-S       | 22   | * SL1-2.5-B | 9    | * SL3-6.5-M  | 9    | T2108        | 16   | UM28-F   | 21   |            |      |
| * QPL500-M   | 24   | * S111-SP    | 22   | * SL1-2.5-F | 9    | * SL3-14-B   | 9    | T2110        | 16   | * UM28-M | 21   |            |      |
| QPL1000-F    | 24   | S116-S       | 22   | * SL1-2.5-M | 9    | * SL3-14-F   | 9    | T2111        | 17   | UM29-F   | 21   |            |      |



## toroidal power inductors

OUTLINE DRAWINGS FOR SL SERIES

New Swinging Chokes for Switch Mode Power Supplies, Regulators, and EMI/RFI Filter Applications

- Specially designed for controlled saturation — repeatable specific inductance at a specific current.
- Designed to handle high current spikes typically encountered in high current SMPS applications.
- Application frequencies up to 1 MHz.
- Toroidal construction — closed magnetic field — low EMI.

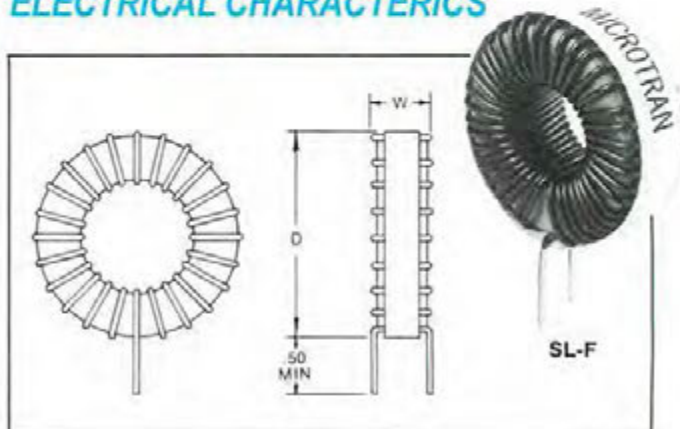
### OPEN FRAME -F

Tinned leads to  $\frac{1}{16}$ " of body for PCB mounting. Additional mechanical mounting recommended for larger units with finer wire. To order add -F to Part No., i.e. SL2-50-F.

#### DIMENSIONS (Inches)

| Series | D<br>Max. | W<br>Max. | Wt.<br>Oz. |
|--------|-----------|-----------|------------|
| SL05-F | .56       | .30       | .13        |
| SL06-F | .87       | .40       | .45        |
| SL1-F  | 1.00      | .50       | .64        |
| SL2-F  | 1.30      | .65       | 1.59       |
| SL3-F  | 1.90      | .90       | 4.10       |
| SL4-F  | 2.20      | 1.10      | 8.00       |

### REFER TO PAGE 7 FOR ELECTRICAL CHARACTERISTICS



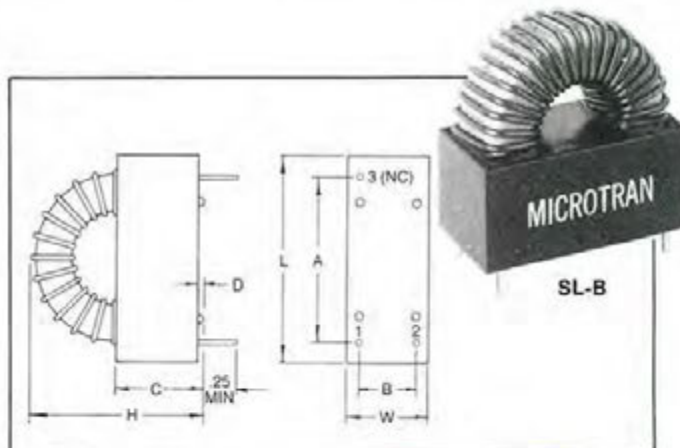
### BASE MOUNTED -B

Rugged, epoxy base mounted for PCB applications. To order add -B to Part No., i.e. SL2-50-B.

#### DIMENSIONS (Inches)

| Series | L<br>Max. | W<br>Max. | H<br>Max. | A    | B   | C<br>Max. | D    | Wt.<br>Oz. |
|--------|-----------|-----------|-----------|------|-----|-----------|------|------------|
| SL05-B | .66       | .34       | .62       | .50  | .20 | .22       | .025 | .15        |
| SL06-B | .87       | .43       | .94       | .60  | .20 | .22       | .025 | .49        |
| SL1-B  | 1.01      | .52       | 1.08      | .90  | .40 | .26       | .025 | .70        |
| SL2-B  | 1.31      | .66       | 1.33      | 1.10 | .50 | .36       | .030 | 1.7        |
| SL3-B  | 1.90      | .90       | 1.98      | 1.60 | .60 | .41       | .030 | 4.4        |
| SL4-B  | 2.12      | 1.08      | 2.30      | 1.75 | .90 | 1.00      | —    | 8.8        |

Tolerances dimensions A and B  $\pm .015$ .



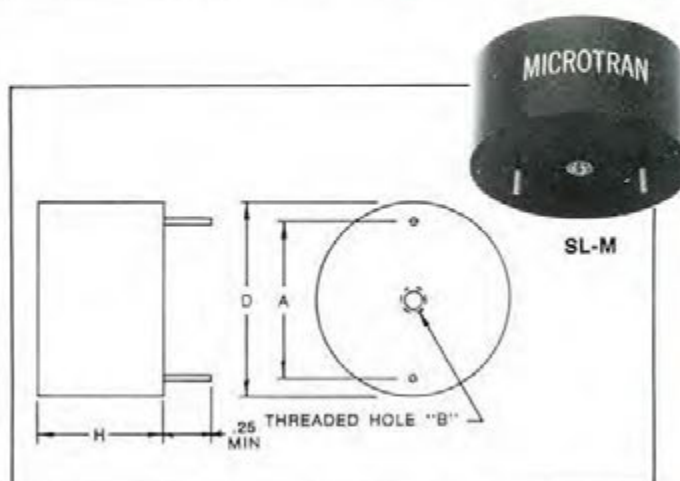
### MOLDED -M

Epoxy molded with threaded insert for MIL and industrial PCB applications. MIL designation TF5S04ZZ. To order add -M to Part No., i.e. SL2-50-M.

#### DIMENSIONS (Inches)

| Series | D     | H    | A    | B        | Wt.<br>Oz. |
|--------|-------|------|------|----------|------------|
| SL05-M | .625  | .34  | .52  | —        | .18        |
| SL06-M | .937  | .46  | .75  | —        | .60        |
| SL1-M  | 1.08  | .52  | .90  | 4-40x8   | .86        |
| SL2-M  | 1.375 | .70  | 1.20 | 6-32x8   | 2.3        |
| SL3-M  | 2.00  | 1.00 | 1.70 | 8-32x10  | 6.0        |
| SL4-M  | 2.50  | 1.25 | 1.25 | 10-32x12 | 10.8       |

Tolerance  $\pm .015$ .





## toroidal power inductors

REFER TO PG 6  
FOR STYLES & DIMENSIONS

| PART NO.                     | INDUCTANCE<br>@ 0 DC $\mu$ H | MAX.<br>DCR<br>(OHMS) | RATED<br>CURRENT<br>(AMPS) | 5% L<br>DROP<br>(DC AMPS) | 10% L<br>DROP<br>(DC AMPS) | 20% L<br>DROP<br>(DC AMPS) | 30% L<br>DROP<br>(DC AMPS) | 40% L<br>DROP<br>(DC AMPS) | 50% L<br>DROP<br>(DC AMPS) |
|------------------------------|------------------------------|-----------------------|----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| <b>NEW! SL05 SIZE SERIES</b> |                              |                       |                            |                           |                            |                            |                            |                            |                            |
| SL05-15 (*)                  | 15                           | .010                  | 4.0                        | 2.5                       | 3.6                        | 5.2                        | 6.6                        | 8.2                        | 9.8                        |
| SL05-24 (*)                  | 24                           | .018                  | 2.5                        | 2.2                       | 3.0                        | 4.2                        | 5.5                        | 6.7                        | 7.9                        |
| SL05-35 (*)                  | 35                           | .037                  | 1.8                        | 1.4                       | 2.0                        | 3.3                        | 4.5                        | 5.5                        | 6.6                        |
| SL05-55 (*)                  | 55                           | .072                  | 1.0                        | 1.4                       | 1.9                        | 2.7                        | 3.5                        | 4.2                        | 5.0                        |
| SL05-85 (*)                  | 85                           | .142                  | .65                        | .80                       | 1.2                        | 2.0                        | 2.7                        | 3.3                        | 3.9                        |
| SL05-158 (*)                 | 158                          | .271                  | .40                        | .60                       | .90                        | 1.4                        | 1.9                        | 2.3                        | 2.8                        |
| SL05-192 (*)                 | 192                          | .530                  | .25                        | .53                       | .80                        | 1.3                        | 1.7                        | 2.1                        | 2.5                        |
| SL05-305 (*)                 | 305                          | 1.050                 | .16                        | .50                       | .74                        | 1.1                        | 1.4                        | 1.7                        | 2.0                        |

|                              |     |      |     |     |     |     |      |      |      |
|------------------------------|-----|------|-----|-----|-----|-----|------|------|------|
| <b>NEW! SL06 SIZE SERIES</b> |     |      |     |     |     |     |      |      |      |
| SL06-26 (*)                  | 26  | .011 | 6.5 | 5.2 | 6.8 | 9.2 | 11.2 | 13.4 | 15.9 |
| SL06-36 (*)                  | 36  | .013 | 6.5 | 4.5 | 5.8 | 7.8 | 9.6  | 11.5 | 13.5 |
| SL06-51 (*)                  | 51  | .015 | 6.5 | 3.5 | 4.6 | 6.2 | 7.9  | 9.5  | 11.2 |
| SL06-80 (*)                  | 80  | .027 | 4.5 | 2.6 | 3.5 | 4.7 | 6.0  | 7.3  | 8.7  |
| SL06-122 (*)                 | 122 | .056 | 3.0 | 2.3 | 3.0 | 4.0 | 5.0  | 6.0  | 7.0  |
| SL06-188 (*)                 | 188 | .104 | 2.0 | 1.9 | 2.5 | 3.4 | 4.1  | 4.9  | 5.7  |
| SL06-300 (*)                 | 300 | .215 | 1.0 | 1.5 | 1.9 | 2.6 | 3.1  | 3.8  | 4.5  |
| SL06-460 (*)                 | 460 | .430 | .65 | 1.1 | 1.5 | 2.1 | 2.6  | 3.2  | 3.7  |

|                        |      |      |     |      |      |      |      |      |      |
|------------------------|------|------|-----|------|------|------|------|------|------|
| <b>SL1 SIZE SERIES</b> |      |      |     |      |      |      |      |      |      |
| SL1-1.1 (*)            | 1.1  | .002 | 5.0 | 26.3 | 34.1 | 50.0 | 59.8 | 71.8 | 83.3 |
| SL1-2.5 (*)            | 2.5  | .003 | 5.0 | 17.0 | 22.1 | 32.4 | 38.8 | 46.6 | 54.1 |
| SL1-4.5 (*)            | 4.5  | .004 | 5.0 | 10.7 | 14.3 | 21.0 | 25.2 | 30.2 | 35.1 |
| SL1-8.0 (*)            | 8.0  | .005 | 5.0 | 8.8  | 11.6 | 16.0 | 20.0 | 24.0 | 27.8 |
| SL1-15 (*)             | 15   | .007 | 5.0 | 5.1  | 7.5  | 11.0 | 14.0 | 16.9 | 20.0 |
| SL1-30 (*)             | 30   | .009 | 5.0 | 4.2  | 5.5  | 8.0  | 10.2 | 12.4 | 14.9 |
| SL1-60 (*)             | 60   | .017 | 5.0 | 2.1  | 3.6  | 5.4  | 6.9  | 8.5  | 10.2 |
| SL1-120 (*)            | 120  | .027 | 5.0 | 1.7  | 2.6  | 3.9  | 5.0  | 6.1  | 7.4  |
| SL1-220 (*)            | 220  | .037 | 5.0 | 1.5  | 2.0  | 3.0  | 3.8  | 4.6  | 5.5  |
| SL1-450 (*)            | 450  | .090 | 3.2 | 1.3  | 1.6  | 2.2  | 2.8  | 3.4  | 4.0  |
| SL1-900 (*)            | 900  | .230 | 1.5 | .9   | 1.2  | 1.6  | 1.9  | 2.4  | 2.8  |
| SL1-1500 (*)           | 1500 | .470 | 1.1 | .6   | .8   | 1.2  | 1.5  | 1.8  | 2.1  |

|                        |      |      |     |      |      |      |      |       |       |
|------------------------|------|------|-----|------|------|------|------|-------|-------|
| <b>SL2 SIZE SERIES</b> |      |      |     |      |      |      |      |       |       |
| SL2-1.4 (*)            | 1.4  | .003 | 5.0 | 28.3 | 43.8 | 62.2 | 82.1 | 102.5 | 123.0 |
| SL2-2.5 (*)            | 2.5  | .003 | 5.0 | 23.8 | 36.8 | 52.5 | 69.7 | 87.0  | 104.3 |
| SL2-5.5 (*)            | 5.5  | .005 | 5.0 | 16.0 | 24.8 | 35.4 | 47.0 | 58.7  | 70.4  |
| SL2-13 (*)             | 13   | .007 | 5.0 | 9.5  | 14.7 | 21.0 | 31.5 | 39.3  | 47.1  |
| SL2-26 (*)             | 26   | .010 | 5.0 | 6.3  | 10.0 | 15.0 | 20.0 | 25.0  | 30.0  |
| SL2-50 (*)             | 50   | .013 | 5.0 | 4.2  | 6.9  | 10.3 | 13.9 | 17.4  | 21.0  |
| SL2-100 (*)            | 100  | .018 | 5.0 | 3.3  | 4.9  | 7.5  | 9.8  | 12.2  | 14.9  |
| SL2-225 (*)            | 225  | .034 | 5.0 | 2.9  | 3.7  | 5.1  | 6.9  | 8.3   | 9.9   |
| SL2-475 (*)            | 475  | .055 | 4.5 | 1.5  | 2.0  | 3.4  | 4.4  | 5.5   | 6.8   |
| SL2-1000 (*)           | 1000 | .130 | 4.5 | 1.2  | 1.6  | 2.3  | 3.1  | 3.9   | 4.7   |
| SL2-1800 (*)           | 1800 | .340 | 2.0 | 1.0  | 1.3  | 1.9  | 2.4  | 2.9   | 3.5   |
| SL2-2700 (*)           | 2700 | .520 | 2.0 | .6   | .9   | 1.4  | 1.8  | 2.3   | 2.8   |

|                        |      |      |     |      |      |       |       |       |       |
|------------------------|------|------|-----|------|------|-------|-------|-------|-------|
| <b>SL3 SIZE SERIES</b> |      |      |     |      |      |       |       |       |       |
| SL3-1.3 (*)            | 1.3  | .003 | 9.0 | 51.6 | 72.2 | 101.0 | 128.3 | 160.3 | 192.3 |
| SL3-3.0 (*)            | 3.0  | .004 | 9.0 | 40.0 | 56.0 | 78.4  | 99.5  | 124.3 | 149.0 |
| SL3-6.5 (*)            | 6.5  | .005 | 9.0 | 31.2 | 43.6 | 61.0  | 77.5  | 96.8  | 116.1 |
| SL3-14 (*)             | 14   | .008 | 9.0 | 24.4 | 34.3 | 48.6  | 62.1  | 77.5  | 92.9  |
| SL3-30 (*)             | 30   | .011 | 9.0 | 17.6 | 24.8 | 35.2  | 45.0  | 56.2  | 67.4  |
| SL3-55 (*)             | 55   | .015 | 9.0 | 12.2 | 18.5 | 26.3  | 33.6  | 42.0  | 50.4  |
| SL3-100 (*)            | 100  | .020 | 9.0 | 9.4  | 13.3 | 19.7  | 25.2  | 31.6  | 37.9  |
| SL3-220 (*)            | 220  | .020 | 9.0 | 4.9  | 6.6  | 9.4   | 11.9  | 14.4  | 17.1  |
| SL3-470 (*)            | 470  | .034 | 7.0 | 2.7  | 4.1  | 6.3   | 8.1   | 10.0  | 12.0  |
| SL3-1000 (*)           | 1000 | .120 | 3.5 | 2.0  | 2.7  | 4.2   | 5.4   | 6.8   | 8.2   |
| SL3-2200 (*)           | 2200 | .220 | 2.8 | 1.6  | 2.1  | 3.0   | 3.8   | 4.6   | 5.5   |
| SL3-4000 (*)           | 4000 | .300 | 2.0 | 1.1  | 1.5  | 2.1   | 2.8   | 3.3   | 4.0   |

|                        |      |      |      |      |      |       |       |       |       |
|------------------------|------|------|------|------|------|-------|-------|-------|-------|
| <b>SL4 SIZE SERIES</b> |      |      |      |      |      |       |       |       |       |
| SL4-2.2 (*)            | 2.2  | .003 | 14.0 | 49.8 | 67.2 | 100.2 | 130.2 | 158.8 | 190.6 |
| SL4-5 (*)              | 5.0  | .004 | 14.0 | 40.0 | 54.0 | 80.5  | 104.6 | 127.6 | 153.1 |
| SL4-11 (*)             | 11   | .005 | 14.0 | 32.1 | 43.3 | 64.5  | 83.8  | 102.2 | 122.6 |
| SL4-23 (*)             | 23   | .007 | 14.0 | 24.6 | 33.2 | 49.5  | 64.3  | 78.4  | 94.1  |
| SL4-50 (*)             | 50   | .011 | 14.0 | 18.3 | 24.7 | 36.9  | 47.8  | 58.3  | 70.0  |
| SL4-100 (*)            | 100  | .016 | 14.0 | 12.8 | 17.3 | 25.9  | 33.6  | 41.0  | 49.2  |
| SL4-230 (*)            | 230  | .023 | 14.0 | 7.1  | 10.4 | 15.8  | 20.5  | 25.0  | 30.0  |
| SL4-470 (*)            | 470  | .023 | 14.0 | 3.5  | 5.4  | 8.0   | 10.4  | 12.7  | 15.4  |
| SL4-1000 (*)           | 1000 | .065 | 9.0  | 2.4  | 3.5  | 5.5   | 7.2   | 8.8   | 10.7  |
| SL4-2200 (*)           | 2200 | .120 | 7.0  | 2.0  | 3.0  | 4.0   | 5.0   | 6.1   | 7.3   |
| SL4-4000 (*)           | 4000 | .260 | 4.5  | 1.1  | 1.8  | 2.8   | 3.5   | 4.5   | 5.4   |
| SL4-5600 (*)           | 5600 | .310 | 4.5  | .9   | 1.4  | 2.2   | 3.0   | 3.8   | 4.5   |

\* Add either -F, -B, or -M to Part No. to designate construction.  
See photos and outline drawings on adjacent page.

### NOTES:

- Non-standard inductance values available on special order, i.e., specify P/N SL2-75-F for 75  $\mu$ H
- Inductance  $\pm 15\%$  measured at 1 kHz. See drive level test condition chart.
- DCR measured at 20°C. 130°C insulation system.
- Current values for percentage inductance drop are typical.
- Recommended PC board clearance hole .065 dia. min.

### DRIVE LEVEL TEST CONDITIONS

| Inductance         | Drive Level<br>@ 1 kHz |
|--------------------|------------------------|
| 0-200 $\mu$ H      | 100 mA AC              |
| 200 $\mu$ H — 2 mH | 10 mA AC               |
| 2 mH — 20 mH       | 1 mA AC                |



## common mode suppression inductors

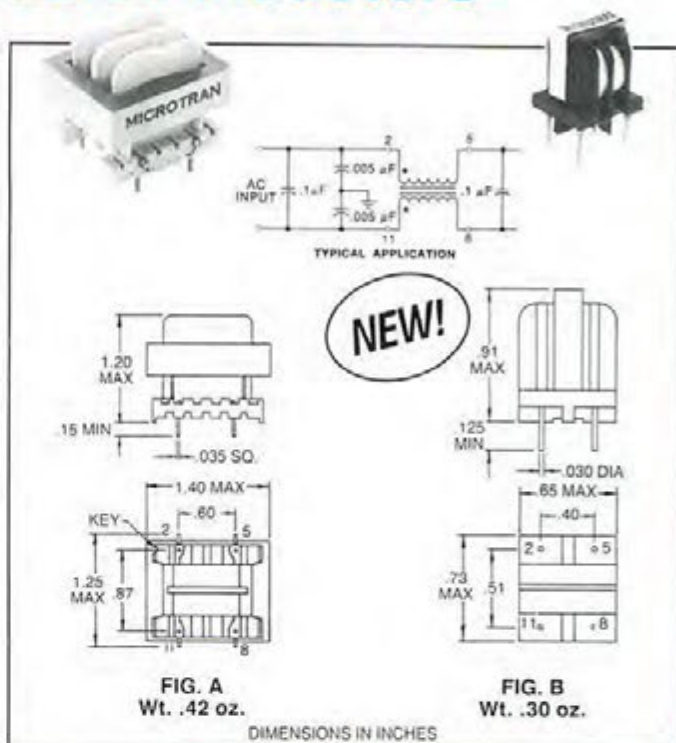
### For Elimination of Line Transmitted EMI/RFI Interference from SMPS Equipment

- 3750V RMS hipot.
- 130°C insulation system.
- VDE, IEC, UL, CSA compatible.
- Cost effective design.

Minimizes AC line-conducted interference from switching power supplies and regulators. Balun winding to within 1% produces opposing magnetic fluxes in the core to effectively cancel differential-mode noise signals. Substantially reduces component count as well as inductor size, as compared to differential filtering. Constructed with spacing between windings to meet international safety requirements.

| Part No.  | Inductance<br>mH Min. | RMS Max.<br>Amps | DCR Max.<br>Ohms | Fig. |
|-----------|-----------------------|------------------|------------------|------|
| SC1-16800 | 12.6                  | .50              | 1.0              | A    |
| SC1-07900 | 5.93                  | .75              | .43              | A    |
| SC1-04900 | 3.67                  | 1.00             | .22              | A    |
| SC1-03770 | 2.77                  | 1.25             | .156             | A    |
| SC1-01960 | 1.47                  | 1.5              | .11              | A    |
| SC1-01280 | .96                   | 2.0              | .071             | A    |
| SC1-00840 | .63                   | 2.5              | .046             | A    |
| SC1-00490 | .37                   | 3.0              | .027             | A    |
| SC1-00290 | .21                   | 4.0              | .0175            | A    |
| SC2-14000 | 14.0                  | .25              | 2.1              | B    |
| SC2-05250 | 5.25                  | .37              | .83              | B    |
| SC2-03250 | 3.25                  | .50              | .52              | B    |
| SC2-01450 | 1.45                  | .75              | .22              | B    |
| SC2-00750 | .75                   | 1.00             | .12              | B    |
| SC2-00330 | .33                   | 1.50             | .052             | B    |
| SC2-00120 | .12                   | 2.0              | .024             | B    |

NOTES: Inductance shown is for each winding measured @ 10 kHz, 1V RMS. Inductance with each winding connected series opposing under 100  $\mu$ H typical @ 10 kHz, 1V RMS. Inter-winding capacitance: 5 pF typical @ 10 kHz, 1V RMS.

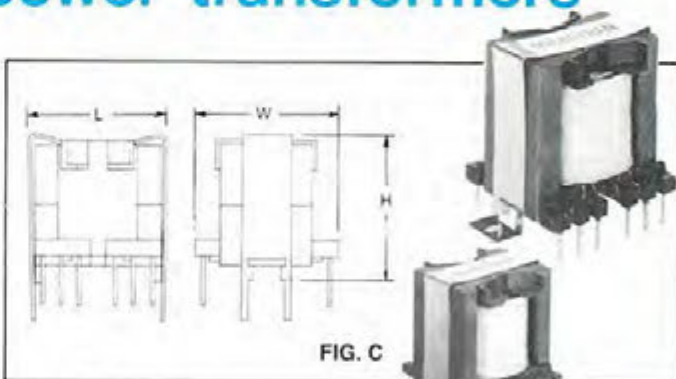


## custom switch mode power transformers

### For Switching Power Supplies

Utilizes latest core materials and shape factor to provide smallest possible volume and minimum PC board footprint for effective manufacturing cost reduction. These transformers are available in standard size/power ratings from 25 to 880 watts output for use over a wide frequency range. Standard configurations allow short turn-around time on custom-design samples. Other packaging and styles are available, such as horizontally mounted units. For application assistance, contact our Engineering Department.

- Standardized components speeds delivery.
- VDE, IEC, UL, CSA compatible.
- Frequency range 20 kHz — 300 kHz and higher.
- Core material for newest generation of higher frequency SMPS.

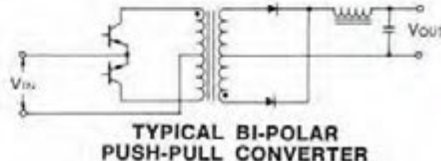
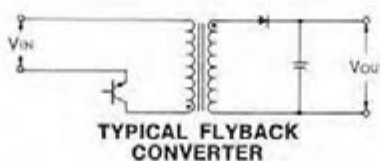
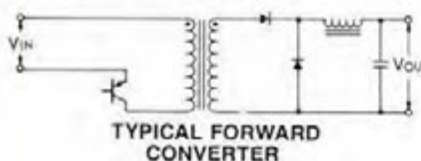


### TRANSFORMER OUTPUT POWER VS. FREQUENCY AND TEMPERATURE RISE

| Size Series | Power (W) 50 kHz |      |      | Power (W) 100 kHz |      |      | Max. Dimensions (Inches) |      |      | Wt. Oz. | Fig. |
|-------------|------------------|------|------|-------------------|------|------|--------------------------|------|------|---------|------|
|             | 20°C             | 30°C | 40°C | 20°C              | 30°C | 40°C | L                        | W    | H    |         |      |
| SP2016-(*)  | 25               | 35   | 40   | 40                | 55   | 63   | .92                      | .92  | .83  | .8      | C    |
| SP2020-(*)  | 35               | 45   | 55   | 55                | 70   | 80   | .92                      | .92  | 1.0  | .9      | C    |
| SP2620-(*)  | 60               | 80   | 95   | 90                | 115  | 135  | 1.15                     | 1.17 | 1.0  | 1.5     | C    |
| SP2625-(*)  | 70               | 90   | 110  | 105               | 130  | 160  | 1.15                     | 1.17 | 1.17 | 1.8     | C    |
| SP3220-(*)  | 80               | 110  | 130  | 120               | 155  | 190  | 1.36                     | 1.34 | 1.0  | 2.2     | C    |
| SP3230-(*)  | 115              | 150  | 185  | 155               | 210  | 260  | 1.36                     | 1.34 | 1.4  | 3.2     | C    |
| SP3535-(*)  | 170              | 220  | 268  | 230               | 315  | 355  | 1.48                     | 1.55 | 1.6  | 4.4     | C    |
| SP4040-(*)  | 225              | 325  | 385  | 350               | 460  | 525  | 1.67                     | 1.67 | 1.76 | 6.9     | C    |
| SP5050-(*)  | 310              | 445  | 525  | 580               | 740  | 880  | 2.10                     | 2.10 | 2.10 | 12.9    | C    |

\* Custom P/N assigned by factory.

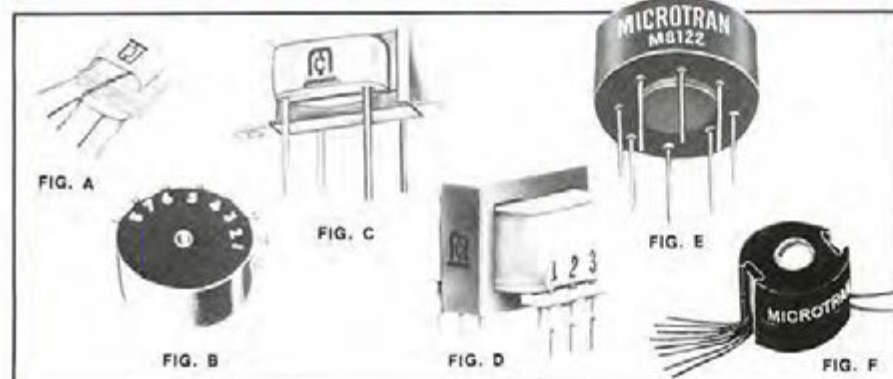
NOTES: The power ratings are based on forward converter circuitry with 40% duty cycle. Flyback circuits provide less power; bi-polar circuits will provide more. If the design is to meet VDE or IEC requirements, derate output power by 20%.





# Converter Transformers

## d.c. to d.c. converter transformers



### APPLICATIONS:

- Portable Radiation Monitors
- Infra-Red Detectors
- Op-Amp Power Supplies
- DC Isolation
- Geodetic-Oceanographic-Medical Equipment
- Mobile Equipment
- High Intensity Flashers
- DC Supply for Modular Equipment

| Select Unit to meet your Power and Size Requirements                | Part No. | Total VA Output | DC Input Volts | DC Output        |             |              |      | Switch Freq. Hz Approx. | Typical Transistor | Dimensions (Inches)         |      |       |                  |                    | Type of Construction | Fig. | Schematic | Approx. Wt. Oz. |
|---------------------------------------------------------------------|----------|-----------------|----------------|------------------|-------------|--------------|------|-------------------------|--------------------|-----------------------------|------|-------|------------------|--------------------|----------------------|------|-----------|-----------------|
|                                                                     |          |                 |                | Bridge           |             | CT Full Wave |      |                         |                    | L                           | W    | H     | Mounting Centers |                    |                      |      |           |                 |
|                                                                     |          |                 |                | Volts            | mA          | Volts        | mA   |                         |                    |                             |      |       | MD               | MW                 |                      |      |           |                 |
| 25 mW to 190 mW<br>HIGH VOLTAGE<br>LOW POWER<br>MINIATURE<br>DESIGN | M8149    | 25 mW           | 3              | 1000*            | 25 $\mu$ A  | —            | —    | 400                     | 2N670              | 1.016                       | .953 | .844  | —                | —                  | Printed Circuit      | D    | 2         | 1.25            |
|                                                                     | M8050    | 25 mW           | 3              | 1000*            | 25 $\mu$ A  | —            | —    | 400                     | 2N670              | 1.69                        | .812 | .844  | 1.375            | —                  | Open Frame           | C    | 2         | 1.25            |
|                                                                     | M8073    | 25 mW           | 4              | 425-500*         | 50 $\mu$ A  | —            | —    | 50-3k†                  | 2N1305             | .375                        | .375 | .375  | —                | —                  | Open Frame           | A    | 3         | 0.1             |
|                                                                     | M8074    | 50 mW           | 3              | 835*             | 90 $\mu$ A  | —            | —    | 400                     | 2N414              | 1.69                        | .812 | .844  | 1.375            | —                  | Open Frame           | C    | 4         | 1.25            |
|                                                                     | M8072    | 190 mW          | 2.7            | 480*             | 400 $\mu$ A | —            | —    | 800                     | 2N1307             | 1.69                        | .812 | .844  | 1.375            | —                  | Open Frame           | C    | 1         | 1.25            |
|                                                                     | M8092    | 190 mW          | 2.7            | 480*             | 400 $\mu$ A | —            | —    | 800                     | 2N1307             | 1.03                        | .875 | .80   | —                | —                  | Open Frame           | D    | 1         | 1.25            |
| M8120                                                               | 190 mW   | 28              | 480*           | 400 $\mu$ A      | —           | —            | 3.5k | 2N4355                  | 1.69               | .812                        | .844 | 1.375 | —                | Open Frame         | C                    | 7    | 1.25      |                 |
| 3 VA                                                                | M8121    | 3               | 5              | 190*             | 15          | —            | —    | 20k                     | 2N6121             | .563 D x .344H—#            |      |       |                  | Pot Core           |                      | F    | 8         | 0.3             |
| 5 VA<br>LOW PROFILE<br>ENCAPSULATED                                 | M8115    | 5               | 13.8           | $\pm 250$ or 500 | 10          | 250          | 20   | 6k                      | 2N3054             | 1.25D x .75H—0.140 Cl. Hole |      |       |                  | Molded Toroid      |                      | B    | 6         | 1.1             |
|                                                                     | M8117    | 5               | 28             | $\pm 250$ or 500 | 10          | 250          | 20   | 6k                      | 2N3054             | 1.25D x .75H—0.140 Cl. Hole |      |       |                  | Molded Toroid      |                      | B    | 5         | 1.1             |
|                                                                     | M8122    | 5               | 5              | $\pm 15$ or 30   | 175         | 15           | 350  | 20k                     | 2N3055             | .875D x .531H               |      |       |                  | P.C. Molded Toroid |                      | E    | 5         | 1.1             |
| 30 VA<br>LOW PROFILE<br>ENCAPSULATED                                | M8132    | 30              | 13.8           | $\pm 15$ or 30   | 1000        | 15           | 2000 | 20k                     | 2N3055             | 1.25D x .75H—0.140 Cl. Hole |      |       |                  | Molded Toroid      |                      | B    | 5         | 1.1             |
|                                                                     | M8133    | 30              | 28             | $\pm 15$ or 30   | 1000        | 15           | 2000 | 20k                     | 2N3055             | 1.25D x .75H—0.140 Cl. Hole |      |       |                  | Molded Toroid      |                      | B    | 5         | 1.1             |

\* Supplied with 4-40 nylon mtg. screw and nut in center hole.

\* Output when used with schematic indicated.

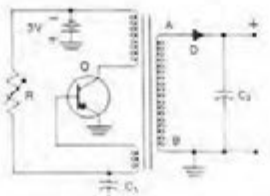
† Frequency depends on load and bias conditions.

ALL CONVERTER TRANSFORMERS ARE SUPPLIED WITH ENGINEERING BULLETIN LISTING COMPONENT VALUES

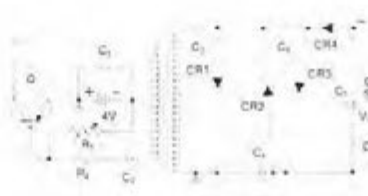
### TYPICAL DC-DC CONVERTER TRANSFORMER CIRCUITS



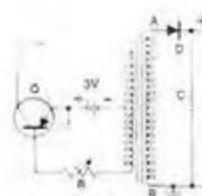
SCHEMATIC 1



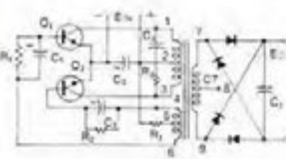
SCHEMATIC 2



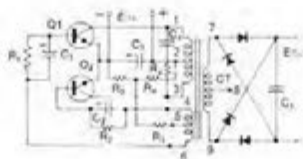
SCHEMATIC 3



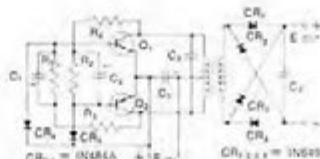
SCHEMATIC 4



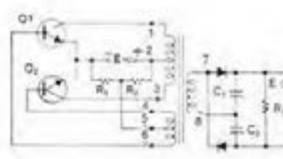
SCHEMATIC 5



SCHEMATIC 6



SCHEMATIC 7



SCHEMATIC 8



# Power Transformers

## low profile international series power transformers

For PC Board Solid-State Power, Control, and Instrumentation Applications  
115/230V 50/60 Hz Primary

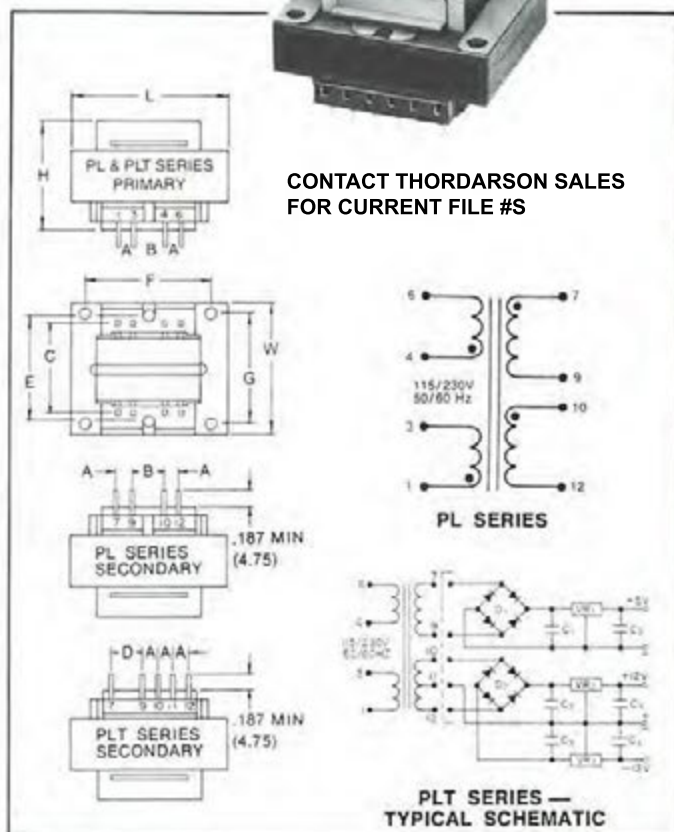
- Meets US and International Safety Standards—UL, VDE, IEC, CSA
- 4,000 Volt RMS Hipot Test — Dual Non-concentric Bobbins and Insulating Shroud Provide High Isolation and Reduced Capacitance
- 130°C Insulation System — Insulating Materials Meet UL 94V-0 Flammability Requirements
- Cost Effective Design

### PL SERIES—FOR CONTROL AND POWER SUPPLY APPLICATIONS

| Part No. | VA (Size) | Secondary          |          |                  |          |
|----------|-----------|--------------------|----------|------------------|----------|
|          |           | Parallel Connected |          | Series Connected |          |
|          |           | AC Volts           | RMS Amps | AC Volts         | RMS Amps |
| PL2.5-10 | 2.5       | 5.0                | 0.5      | 10.0 CT          | 0.25     |
| PL5.0-10 | 5.0       | 5.0                | 1.0      | 10.0 CT          | 0.5      |
| PL10-10  | 10.0      | 5.0                | 2.0      | 10.0 CT          | 1.0      |
| PL20-10  | 20.0      | 5.0                | 4.0      | 10.0 CT          | 2.0      |
| PL30-10  | 30.0      | 5.0                | 6.0      | 10.0 CT          | 3.0      |
| PL56-10  | 56.0      | 5.0                | 11.2     | 10.0 CT          | 5.6      |
| PL2.5-12 | 2.5       | 6.3                | 0.4      | 12.6 CT          | 0.2      |
| PL5.0-12 | 5.0       | 6.3                | 0.8      | 12.6 CT          | 0.4      |
| PL10-12  | 10.0      | 6.3                | 1.6      | 12.6 CT          | 0.8      |
| PL20-12  | 20.0      | 6.3                | 3.2      | 12.6 CT          | 1.6      |
| PL30-12  | 30.0      | 6.3                | 4.8      | 12.6 CT          | 2.4      |
| PL56-12  | 56.0      | 6.3                | 8.8      | 12.6 CT          | 4.4      |
| PL2.5-16 | 2.5       | 8.0                | 0.3      | 16.0 CT          | 0.15     |
| PL5.0-16 | 5.0       | 8.0                | 0.62     | 16.0 CT          | 0.31     |
| PL10-16  | 10.0      | 8.0                | 1.25     | 16.0 CT          | 0.62     |
| PL20-16  | 20.0      | 8.0                | 2.5      | 16.0 CT          | 1.25     |
| PL30-16  | 30.0      | 8.0                | 3.8      | 16.0 CT          | 1.9      |
| PL56-16  | 56.0      | 8.0                | 7.0      | 16.0 CT          | 3.5      |
| PL2.5-20 | 2.5       | 10.0               | 0.24     | 20.0 CT          | 0.12     |
| PL5.0-20 | 5.0       | 10.0               | 0.5      | 20.0 CT          | 0.25     |
| PL10-20  | 10.0      | 10.0               | 1.0      | 20.0 CT          | 0.5      |
| PL20-20  | 20.0      | 10.0               | 2.0      | 20.0 CT          | 1.0      |
| PL30-20  | 30.0      | 10.0               | 3.0      | 20.0 CT          | 1.5      |
| PL56-20  | 56.0      | 10.0               | 5.6      | 20.0 CT          | 2.8      |
| PL2.5-24 | 2.5       | 12.0               | 0.2      | 24.0 CT          | 0.1      |
| PL5.0-24 | 5.0       | 12.0               | 0.42     | 24.0 CT          | 0.21     |
| PL10-24  | 10.0      | 12.0               | 0.84     | 24.0 CT          | 0.42     |
| PL20-24  | 20.0      | 12.0               | 1.66     | 24.0 CT          | 0.83     |
| PL30-24  | 30.0      | 12.0               | 2.5      | 24.0 CT          | 1.25     |
| PL56-24  | 56.0      | 12.0               | 4.66     | 24.0 CT          | 2.33     |
| PL2.5-28 | 2.5       | 14.0               | 0.18     | 28.0 CT          | 0.09     |
| PL5.0-28 | 5.0       | 14.0               | 0.36     | 28.0 CT          | 0.18     |
| PL10-28  | 10.0      | 14.0               | 0.72     | 28.0 CT          | 0.36     |
| PL20-28  | 20.0      | 14.0               | 1.44     | 28.0 CT          | 0.72     |
| PL30-28  | 30.0      | 14.0               | 2.12     | 28.0 CT          | 1.06     |
| PL56-28  | 56.0      | 14.0               | 4.0      | 28.0 CT          | 2.0      |
| PL2.5-36 | 2.5       | 18.0               | 0.14     | 36.0 CT          | 0.07     |
| PL5.0-36 | 5.0       | 18.0               | 0.28     | 36.0 CT          | 0.14     |
| PL10-36  | 10.0      | 18.0               | 0.56     | 36.0 CT          | 0.28     |
| PL20-36  | 20.0      | 18.0               | 1.12     | 36.0 CT          | 0.56     |
| PL30-36  | 30.0      | 18.0               | 1.64     | 36.0 CT          | 0.82     |
| PL56-36  | 56.0      | 18.0               | 3.12     | 36.0 CT          | 1.56     |



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FOR CURRENT FILE #S



### DIMENSIONS Inches (mm)

| VA (Size) | L            | W            | H            | A†          | B           | C            | D          | Mounting     |             |   | Mfg. Screws   | Pin Square  | Lbs. (Kg.) |
|-----------|--------------|--------------|--------------|-------------|-------------|--------------|------------|--------------|-------------|---|---------------|-------------|------------|
|           |              |              |              |             |             |              |            | E            | F           | G |               |             |            |
| 2.5       | 1.625 (41.3) | 1.313 (33.3) | 1.125 (28.6) | .200 (5.1)  | .250 (6.4)  | 1.000 (25.4) | —          | 1.063 (27.0) | —           | — | 2X #4 (2X M3) | .025 (6.35) | .25 (1.1)  |
| 5.0       | 1.625 (41.3) | 1.313 (33.3) | 1.375 (34.9) | .200 (5.1)  | .400 (10.2) | 1.000 (25.4) | —          | 1.063 (27.0) | —           | — | 2X #4 (2X M3) | .025 (6.35) | .37 (1.7)  |
| 10.0      | 1.875 (47.6) | 1.563 (39.7) | 1.375 (34.9) | .200 (5.1)  | .400 (10.2) | 1.140 (29.0) | —          | 1.250 (31.8) | —           | — | 2X #4 (2X M3) | .036 (9.14) | .53 (2.4)  |
| 20.0      | 2.250 (57.1) | 1.875 (47.6) | 1.625 (41.3) | .400 (10.2) | .400 (10.2) | 1.460 (37.1) | .40 (10.2) | 1.500 (38.1) | —           | — | 2X #4 (2X M3) | .036 (9.14) | .90 (4.1)  |
| 30.0      | 2.625 (66.7) | 2.188 (55.6) | 1.563 (39.7) | .550 (14.0) | .275 (7.0)  | 1.880 (47.7) | .55 (14.0) | 2.19 (55.6)  | 1.75 (44.5) | — | 4X #6 (4X M3) | .045 (1.14) | 1.15 (5.2) |
| 56.0      | 3.000 (76.2) | 2.500 (63.5) | 1.813 (46.0) | .800 (20.3) | .300 (7.6)  | 1.900 (48.3) | .60 (15.2) | 2.50 (63.5)  | 2.00 (50.8) | — | 4X #6 (4X M3) | .045 (1.14) | 1.70 (7.7) |

† For PLT series secondary only, dimension A is 1/2 of value shown.

### PLT SERIES—FOR TRIPLE OUTPUT REGULATED POWER SUPPLIES

For Microprocessor, Logic, and Op Amp Applications

| Part No. | VA AC (Size) | DC Output #1 |         | DC Output #2 |       | C <sub>1</sub>        | C <sub>2</sub>       | VR <sub>1</sub> | VR <sub>2</sub> | VR <sub>3</sub> | D <sub>1</sub> | D <sub>2</sub> |
|----------|--------------|--------------|---------|--------------|-------|-----------------------|----------------------|-----------------|-----------------|-----------------|----------------|----------------|
|          |              | DC Volts     | Amps DC | DC Volts     | mA DC |                       |                      |                 |                 |                 |                |                |
| PLT20-32 | 20.0         | 5.0          | 1.25    | ±12          | 150   | 7,500 $\mu$ F 20V DC  | 1,500 $\mu$ F 50V DC | LM-323K-5       | LM-340K-12      | LM-320K-12      | 3N253          | 3N247          |
| PLT30-32 | 30.0         | 5.0          | 1.75    | ±12          | 210   | 10,000 $\mu$ F 20V DC | 1,500 $\mu$ F 50V DC | LM-323K-5       | LM-340K-12      | LM-320K-12      | 3N253          | 3N247          |
| PLT56-32 | 56.0         | 5.0          | 2.8     | ±12          | 350   | 15,000 $\mu$ F 20V DC | 2,000 $\mu$ F 50V DC | LM-323K-5       | LM-340K-12      | LM-320K-12      | MDA-400        | 3N247          |

C<sub>2</sub> and C<sub>4</sub> 10,000  $\mu$ F @ 20V. All VR's are National Semiconductor P/N's. All diodes are Motorola P/N's.



# Power Transformers

## international series power transformers

For PC Board Solid-State Power, Control, and Instrumentation Applications

- UL Recognized — Meets IEC-65 Safety Requirements for Worldwide Usage. UL 1411—File #E82992.
- Physical Barriers Between Primary and Secondary — Double Protection System — 4,000 Volt Hipot

### PW SERIES—FOR CONTROL AND POWER SUPPLY APPLICATIONS

115/230V 50/60 Hz Primary

| Part No. | Secondary |          | DC Output #1 | DC Output #2 | Schematic | Fig. |
|----------|-----------|----------|--------------|--------------|-----------|------|
|          | AC Volts  | RMS Amps | CT           | FW           |           |      |

#### PW28 SERIES • 0.5 VA

|         |         |      |                    |   |   |  |
|---------|---------|------|--------------------|---|---|--|
| PW28-10 | 10.0 CT | .050 | (Single Secondary) | 1 | A |  |
| PW28-12 | 12.6 CT | .040 | (Single Secondary) | 1 | A |  |
| PW28-16 | 16.0 CT | .031 | (Single Secondary) | 1 | A |  |

\* PW28 Series has 115V only primary. For 230V only primary, order as PW28-10-230V.

#### PW35 SERIES • 1.0 VA

|         |         |      |                    |   |   |  |
|---------|---------|------|--------------------|---|---|--|
| PW35-10 | 10.0 CT | .110 | (Single Secondary) | 1 | A |  |
| PW35-12 | 12.6 CT | .090 | (Single Secondary) | 1 | A |  |
| PW35-16 | 16.0 CT | .070 | (Single Secondary) | 1 | A |  |
| PW35-24 | 24.0 CT | .046 | (Single Secondary) | 1 | A |  |
| PW35-36 | 36.0 CT | .031 | (Single Secondary) | 1 | A |  |

#### PW41 SERIES • 3.5 VA

|         |         |      |                    |   |   |  |
|---------|---------|------|--------------------|---|---|--|
| PW41-10 | 10.0 CT | .350 | (Single Secondary) | 1 | B |  |
| PW41-12 | 12.6 CT | .280 | (Single Secondary) | 1 | B |  |
| PW41-16 | 16.0 CT | .220 | (Single Secondary) | 1 | B |  |
| PW41-24 | 24.0 CT | .150 | (Single Secondary) | 1 | B |  |
| PW41-36 | 36.0 CT | .100 | (Single Secondary) | 1 | B |  |

#### PW48 SERIES • 9.5 VA

|         |      |       |         |      |   |   |
|---------|------|-------|---------|------|---|---|
| PW48-10 | 5.0  | 1.900 | 10.0 CT | .950 | 2 | B |
| PW48-12 | 6.3  | 1.500 | 12.6 CT | .750 | 2 | B |
| PW48-16 | 8.0  | 1.200 | 16.0 CT | .600 | 2 | B |
| PW48-24 | 12.0 | .800  | 24.0 CT | .400 | 2 | B |
| PW48-36 | 18.0 | .520  | 36.0 CT | .260 | 2 | B |
| PW48-56 | 28.0 | .340  | 56.0 CT | .170 | 2 | B |

#### PW54 SERIES • 12.5 VA

|         |      |       |         |       |   |   |
|---------|------|-------|---------|-------|---|---|
| PW54-10 | 5.0  | 2.500 | 10.0 CT | 1.250 | 2 | C |
| PW54-12 | 6.3  | 2.000 | 12.6 CT | 1.000 | 2 | C |
| PW54-16 | 8.0  | 1.560 | 16.0 CT | .780  | 2 | C |
| PW54-24 | 12.0 | 1.040 | 24.0 CT | .520  | 2 | C |
| PW54-36 | 18.0 | .700  | 36.0 CT | .350  | 2 | C |
| PW54-56 | 28.0 | .446  | 56.0 CT | .223  | 2 | C |

### PWT SERIES—FOR TRIPLE OUTPUT REGULATED AND UNREGULATED POWER SUPPLIES

115/230V 50/60 Hz Primary

| Part No.   | Secondary #1 |          | Secondary #2 |          | DC Output #1 |     | DC Output #2 |     | Schematic | Fig. |
|------------|--------------|----------|--------------|----------|--------------|-----|--------------|-----|-----------|------|
|            | AC Volts     | RMS Amps | AC Volts     | RMS Amps | CT           | FW  | CT           | FW  |           |      |
| PWT54-1024 | 9.0 CT       | .800     | 24.0 CT      | .300     | +5           | 670 | ±15          | 170 | 3         | C    |
| PWT54-1633 | 16.0 CT      | .550     | 33.0 CT      | .180     | +9.0*        | 470 | ±21*         | 120 | 4         | C    |

\* +9.0 and ±21 DC output volts are for inputs to +5V and ±15V IC Voltage Regulator; see Schematic #4.

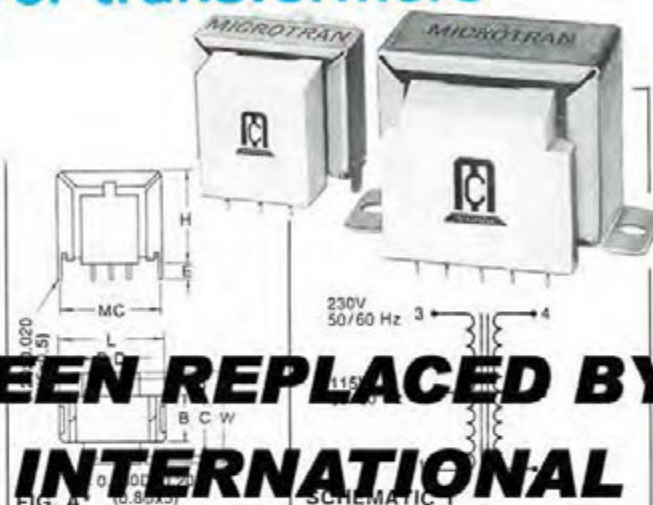


FIG. A

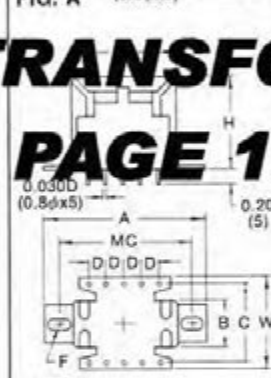


FIG. B\*

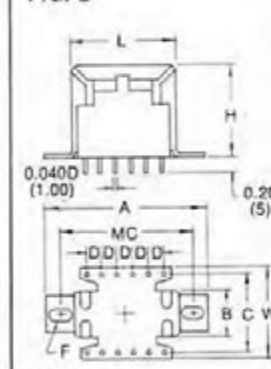


FIG. C\*

#### DIMENSIONS Inches (mm)

| Series | Max VA | L           | W           | H         | MC          | A         | B           | C          | D           | E        | F                     | Gz (6m)    |
|--------|--------|-------------|-------------|-----------|-------------|-----------|-------------|------------|-------------|----------|-----------------------|------------|
| PW28   | 0.7    | 1.16 (29.5) | 1.32 (33.5) | 1.10 (28) | 1.12 (28.5) | —         | 0.50 (12.5) | 0.984 (25) | 0.197 (5)   | 0.20 (5) | —                     | 2.5 (70)   |
| PW35   | 2      | 1.44 (36.5) | 1.69 (43)   | 1.26 (32) | 1.40 (35.5) | —         | 0.61 (15.5) | 1.380 (35) | 0.295 (7.5) | 0.24 (6) | —                     | 4.2 (130)  |
| PW41   | 5      | 1.67 (42.5) | 1.91 (48.5) | 1.42 (36) | 2.05 (52)   | 2.36 (60) | 0.85 (21.5) | 1.575 (40) | 0.394 (10)  | —        | 0.138x0.177 (3.5x4.5) | 8.0 (230)  |
| PW48   | 9.5    | 1.99 (50.5) | 2.05 (52)   | 1.69 (43) | 2.32 (59)   | 2.72 (69) | 1.08 (27.5) | 1.772 (45) | 0.295 (7.5) | —        | 0.177x0.256 (4.5x6.5) | 14.0 (400) |
| PW54   | 15     | 2.22 (56.5) | 2.09 (53)   | 1.93 (49) | 2.72 (69)   | 3.15 (80) | 1.08 (27.5) | 1.772 (45) | 0.295 (7.5) | —        | 0.177x0.256 (4.5x6.5) | 16.0 (510) |

PWT54 and PW54 have same dimensions

\* Request terminal layout sheet for pin locations.



# Power Transformers

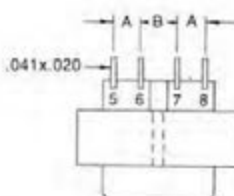
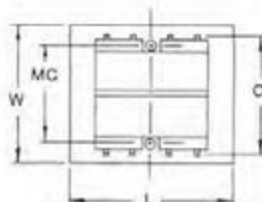
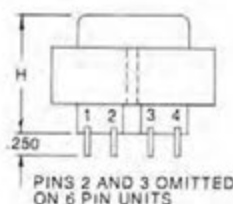
## **SPLITFORM<sup>®</sup>** split bobbin power transformers

### For PC Board

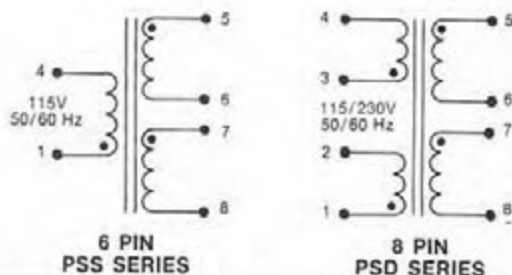
### Solid-State Power, Control, and Instrumentation Applications

- Split Bobbin Construction  
Center Flange Insulation Barrier  
High Isolation for Low Leakage Applications  
Low Capacitive Coupling Minimizes Line Noise and False Triggering
- 2,500V RMS Hipot
- 115V Single or 115/230V 50/60 Hz Dual Primary
- Dual Secondaries may be either Parallel or Series Connected
- Precision Spaced Terminals  
Terminal Numbers are Molded on Bobbin
- 130°C Insulation System
- Attractive Pricing — Superior Quality

| PART NO.                  |                             | SECONDARY RMS RATING |             |                  |             |
|---------------------------|-----------------------------|----------------------|-------------|------------------|-------------|
| Single 115V<br>PSS Series | Dual 115/230V<br>PSD Series | Parallel Connected   |             | Series Connected |             |
|                           |                             | AC<br>Volts          | RMS<br>Amps | AC<br>Volts      | RMS<br>Amps |
| PSS2-10                   | PSD2-10                     | 5.0                  | 0.22        | 10.0 CT          | 0.11        |
| PSS3-10                   | PSD3-10                     | 5.0                  | 0.5         | 10.0 CT          | 0.25        |
| PSS4-10                   | PSD4-10                     | 5.0                  | 1.2         | 10.0 CT          | 0.60        |
| PSS5-10                   | PSD5-10                     | 5.0                  | 2.4         | 10.0 CT          | 1.2         |
| PSS2-12                   | PSD2-12                     | 6.3                  | 0.18        | 12.6 CT          | 0.09        |
| PSS3-12                   | PSD3-12                     | 6.3                  | 0.4         | 12.6 CT          | 0.2         |
| PSS4-12                   | PSD4-12                     | 6.3                  | 1.0         | 12.6 CT          | 0.5         |
| PSS5-12                   | PSD5-12                     | 6.3                  | 2.0         | 12.6 CT          | 1.0         |
| PSS2-16                   | PSD2-16                     | 8.0                  | 0.14        | 16.0 CT          | 0.07        |
| PSS3-16                   | PSD3-16                     | 8.0                  | 0.3         | 16.0 CT          | 0.15        |
| PSS4-16                   | PSD4-16                     | 8.0                  | 0.8         | 16.0 CT          | 0.4         |
| PSS5-16                   | PSD5-16                     | 8.0                  | 1.6         | 16.0 CT          | 0.8         |
| PSS2-20                   | PSD2-20                     | 10.0                 | 0.11        | 20.0 CT          | 0.055       |
| PSS3-20                   | PSD3-20                     | 10.0                 | 0.24        | 20.0 CT          | 0.12        |
| PSS4-20                   | PSD4-20                     | 10.0                 | 0.6         | 20.0 CT          | 0.3         |
| PSS5-20                   | PSD5-20                     | 10.0                 | 1.2         | 20.0 CT          | 0.6         |
| PSS2-24                   | PSD2-24                     | 12.0                 | 0.09        | 24.0 CT          | 0.045       |
| PSS3-24                   | PSD3-24                     | 12.0                 | 0.2         | 24.0 CT          | 0.1         |
| PSS4-24                   | PSD4-24                     | 12.0                 | 0.5         | 24.0 CT          | 0.25        |
| PSS5-24                   | PSD5-24                     | 12.0                 | 1.0         | 24.0 CT          | 0.5         |
| PSS2-28                   | PSD2-28                     | 14.0                 | 0.08        | 28.0 CT          | 0.04        |
| PSS3-28                   | PSD3-28                     | 14.0                 | 0.17        | 28.0 CT          | 0.085       |
| PSS4-28                   | PSD4-28                     | 14.0                 | 0.4         | 28.0 CT          | 0.2         |
| PSS5-28                   | PSD5-28                     | 14.0                 | 0.84        | 28.0 CT          | 0.42        |
| PSS2-36                   | PSD2-36                     | 18.0                 | 0.06        | 36.0 CT          | 0.03        |
| PSS3-36                   | PSD3-36                     | 18.0                 | 0.13        | 36.0 CT          | 0.065       |
| PSS4-36                   | PSD4-36                     | 18.0                 | 0.34        | 36.0 CT          | 0.17        |
| PSS5-36                   | PSD5-36                     | 18.0                 | 0.7         | 36.0 CT          | 0.35        |
| PSS2-48                   | PSD2-48                     | 24.0                 | 0.046       | 48.0 CT          | 0.023       |
| PSS3-48                   | PSD3-48                     | 24.0                 | 0.1         | 48.0 CT          | 0.05        |
| PSS4-48                   | PSD4-48                     | 24.0                 | 0.25        | 48.0 CT          | 0.125       |
| PSS5-48                   | PSD5-48                     | 24.0                 | 0.5         | 48.0 CT          | 0.25        |
| PSS2-56                   | PSD2-56                     | 28.0                 | 0.04        | 56.0 CT          | 0.02        |
| PSS3-56                   | PSD3-56                     | 28.0                 | 0.09        | 56.0 CT          | 0.045       |
| PSS4-56                   | PSD4-56                     | 28.0                 | 0.22        | 56.0 CT          | 0.11        |
| PSS5-56                   | PSD5-56                     | 28.0                 | 0.44        | 56.0 CT          | 0.22        |
| PSS2-120                  | PSD2-120                    | 60.0                 | 0.02        | 120.0 CT         | 0.01        |
| PSS3-120                  | PSD3-120                    | 60.0                 | 0.04        | 120.0 CT         | 0.02        |
| PSS4-120                  | PSD4-120                    | 60.0                 | 0.1         | 120.0 CT         | 0.05        |
| PSS5-120                  | PSD5-120                    | 60.0                 | 0.2         | 120.0 CT         | 0.1         |



### SCHEMATICS



### DIMENSIONS Inches (mm)

| PSS, PSD Series | VA  | L           | W           | H           | MC              | A           | B            | C            | Lb. (Gm.)   |
|-----------------|-----|-------------|-------------|-------------|-----------------|-------------|--------------|--------------|-------------|
| 2               | 1.1 | 1.44 (36.6) | 1.23 (31.2) | 1.00 (25.4) | —               | .250 (6.35) | .250 (6.35)  | 1.200 (30.5) | 0.17 (77.4) |
| 3               | 2.4 | 1.44 (36.6) | 1.23 (31.2) | 1.26 (32)   | —               | .250 (6.35) | .250 (6.35)  | 1.200 (30.5) | 0.25 (114)  |
| 4               | 6   | 1.69 (43)   | 1.39 (35.3) | 1.36 (34.5) | 1.0625* (27.0)* | .250 (6.35) | .350 (8.9)   | 1.280 (32.5) | 0.44 (200)  |
| 5               | 12  | 1.97 (50)   | 1.63 (41.4) | 1.5 (38.1)  | 1.250* (31.8)*  | .300 (7.62) | .400 (10.16) | 1.410 (35.8) | 0.70 (319)  |

\* Clearance hole for 4-40 x 1 1/2" nylon mtg. screws. Order screw as P/N PS-S and nut as P/N PS-N; Sold only in pkgs. of 100 each.



# Power Transformers

## FLATSTACK® low profile power transformers—50/60 Hz

For Low Height PC Board Solid-State Power, Control, and Instrumentation Applications

### • FOUR SIZES

**NEW!** 2.5 VA Size 0.650 inches high for 13/16" Card Spacing

6 VA Size 0.85" high for 1" Card Spacing

12 VA Size 1.065" high for 1 1/4" Card Spacing

24 VA Size 1.250" high for 1 9/16" Card Spacing

### • SPLIT BOBBIN—Primaries and Secondaries Wound Side by Side.

High isolation for Low Leakage Applications. 1500V Hipot. Low Capacity Coupling Minimizes Line Noise and False Triggering

### • HUM-BUCKING SEMI-TOROIDAL CONSTRUCTION

### • PRECISION SPACED MOLDED-IN TERMINALS

### • DUAL PRIMARIES: 115/230V, 50/60 Hz.

## PF SERIES—FOR POWER SUPPLIES, INSTRUMENTS, CONTROL EQUIPMENT

| Part No. | VA (Size) | Secondary          |          |                  |          |
|----------|-----------|--------------------|----------|------------------|----------|
|          |           | Parallel Connected |          | Series Connected |          |
|          |           | AC Volts           | RMS Amps | AC Volts         | RMS Amps |
| PF2-5-10 | 2.5       | 5.0                | .50      | 10.0 CT          | .250     |
| PF6-10   | 6         | 5.0                | 1.20     | 10.0 CT          | .60      |
| PF12-10  | 12        | 5.0                | 2.40     | 10.0 CT          | 1.20     |
| PF24-10  | 24        | 5.0                | 4.80     | 10.0 CT          | 2.40     |
| PF2-5-12 | 2.5       | 6.3                | .40      | 12.6 CT          | .20      |
| PF6-12   | 6         | 6.3                | .90      | 12.6 CT          | .45      |
| PF12-12  | 12        | 6.3                | 1.90     | 12.6 CT          | .95      |
| PF24-12  | 24        | 6.3                | 3.80     | 12.6 CT          | 1.90     |
| PF2-5-16 | 2.5       | 8.0                | .30      | 16.0 CT          | .15      |
| PF6-16   | 6         | 8.0                | .70      | 16.0 CT          | .35      |
| PF12-16  | 12        | 8.0                | 1.50     | 16.0 CT          | .75      |
| PF24-16  | 24        | 8.0                | 3.00     | 16.0 CT          | 1.50     |
| PF2-5-20 | 2.5       | 10.0               | .25      | 20.0 CT          | .125     |
| PF6-20   | 6         | 10.0               | .60      | 20.0 CT          | .30      |
| PF12-20  | 12        | 10.0               | 1.20     | 20.0 CT          | .60      |
| PF24-20  | 24        | 10.0               | 2.40     | 20.0 CT          | 1.20     |
| PF2-5-24 | 2.5       | 12.0               | .20      | 24.0 CT          | .10      |
| PF6-24   | 6         | 12.0               | .50      | 24.0 CT          | .25      |
| PF12-24  | 12        | 12.0               | 1.00     | 24.0 CT          | .50      |
| PF24-24  | 24        | 12.0               | 2.00     | 24.0 CT          | 1.00     |
| PF2-5-30 | 2.5       | 15.0               | .17      | 30.0 CT          | .085     |
| PF6-30   | 6         | 15.0               | .40      | 30.0 CT          | .20      |
| PF12-30  | 12        | 15.0               | .80      | 30.0 CT          | .40      |
| PF24-30  | 24        | 15.0               | 1.60     | 30.0 CT          | .80      |
| PF2-5-34 | 2.5       | 17.0               | .15      | 34.0 CT          | .075     |
| PF6-34   | 6         | 17.0               | .34      | 34.0 CT          | .17      |
| PF12-34  | 12        | 17.0               | .70      | 34.0 CT          | .35      |
| PF24-34  | 24        | 17.0               | 1.40     | 34.0 CT          | .70      |
| PF2-5-56 | 2.5       | 28.0               | .09      | 56.0 CT          | .045     |
| PF6-56   | 6         | 28.0               | .20      | 56.0 CT          | .10      |
| PF12-56  | 12        | 28.0               | .42      | 56.0 CT          | .21      |
| PF24-56  | 24        | 28.0               | .85      | 56.0 CT          | .43      |

## PFT SERIES—FOR TRIPLE OUTPUT REGULATED POWER SUPPLIES

| Part No. | VA (Size) | Secondary #1 |          | Secondary #2 |          | DC Output #1   |     | DC Output #2   |     |
|----------|-----------|--------------|----------|--------------|----------|----------------|-----|----------------|-----|
|          |           | AC Volts     | RMS Amps | AC Volts     | RMS Amps | CT FW DC Volts | mA  | CT FW DC Volts | mA  |
| PFT12-35 | 12        | 16.0 CT      | 0.36     | 35.0 CT      | .15      | +8.75*         | 300 | +22*           | 85  |
| PFT12-38 | 12        | 16.0 CT      | 0.36     | 28.0 CT      | .187     | +6.75*         | 300 | +17.6          | 106 |
| PFT24-35 | 24        | 16.0 CT      | 0.72     | 35.0 CT      | .30      | +8.75*         | 600 | +22*           | 170 |
| PFT24-38 | 24        | 16.0 CT      | 0.72     | 28.0 CT      | .375     | +6.75*         | 600 | +17.6          | 212 |

\*8.75, ±17.6 or ±22 DC output volts are for inputs to +5V and ±12 or ±15V

IC Voltage Regulators. See PFT schematic. Line input 115/230V ±10%.

## 400 Hz PRINTED CIRCUIT POWER

Compact design for miniature solid state circuitry. Precision spaced molded-in terminals for power supplies, control equipment, instrument and similar applications. — Dual secondaries may be connected in series or parallel for varied voltage and current requirements. 115V Primary. See chart to right.

| Part No. | Secondary Parallel |              | Secondary Series |       |
|----------|--------------------|--------------|------------------|-------|
|          | Volts              | Amps         | Volts            | Amps  |
| PC4304   | 3.15V              | 1A           | 6.3V CT          | 0.5A  |
| PC4312   | 12.6V              | .026A        | 25.2V CT         | 0.13A |
| PC4316   | 28V                | .012A        | 56V CT           | .006A |
| PC4320   | 38V                | .01A         | 70V CT           | .005A |
| PC4408   | 6.3V               | .60A         | 12.6V CT         | .30A  |
| PC4412   | 12.6V              | .30A         | 25.2V CT         | .15A  |
| PC4416   | 28V                | .14A         | 56V CT           | .07A  |
| PC4424   | 40V                | .10A         | 80V CT           | .05A  |
| PC4428   | 58V                | .066A        | 116V CT          | .033A |
| PC4432   | 115V               | .010A, 12.6V |                  | 150A  |

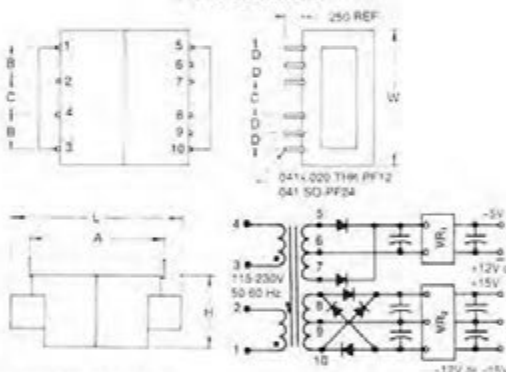


UL 506 File #E79781

### PF SERIES



### PFT SERIES



### DIMENSIONS (Inches)

| VA (Size) | L     | W     | H     | A     | B     | C     | D†    | Wt. Oz. |
|-----------|-------|-------|-------|-------|-------|-------|-------|---------|
| 2.5       | 1.870 | 1.560 | 0.650 | 1.600 | 0.375 | 0.375 | —     | 5       |
| 6         | 1.875 | 1.563 | 0.850 | 1.600 | 0.375 | 0.375 | —     | 7       |
| 12        | 2.500 | 2.000 | 1.065 | 2.000 | 0.500 | 0.500 | 0.250 | 11      |
| 24        | 2.870 | 2.250 | 1.250 | 1.900 | 0.600 | 0.530 | 0.300 | 15      |



### PC4300 PC4400 SERIES



### DIMENSIONS (Inches)

| Series | A     | B    | D     | E     | F    | Wt. Oz. |
|--------|-------|------|-------|-------|------|---------|
| PC4300 | .766  | .719 | .420  | .187  | .608 | 0.5     |
| PC4400 | 1.016 | .844 | 0.781 | 0.200 | .953 | 1.2     |



# Power Transformers & Inductors

FIG. A:



HERMETICALLY SEALED PER MIL-T-27.  
MIL Designation: TF4S03XX  
See MIL Case Dimension Chart

FIG. B



FIG. C



## 400 Hz ISOLATION/POWER

Center Tap Permits Use in Either FW Bridge or FW CT Circuitry. Electrostatic Shielding. Primary 115 Volts.

| Part No. | Secondary |          |     | Fig. A<br>MIL Case<br>XX |
|----------|-----------|----------|-----|--------------------------|
|          | AC Volts  | RMS Amps | VA  |                          |
| M8059    | 115 CT    | 0.35     | 40  | EB                       |
| M8060    | 115 CT    | 1.3      | 150 | GA                       |
| M8061*   | 115 CT    | 2.6      | 300 | JA                       |
| M8062*   | 115 CT    | 4.4      | 500 | KA                       |

\*Primary 105/115/125V.



Epoxy molded with .50" pins for printed circuit applications.  
MIL Designation: TF5S03XX

## 50/60 Hz CONTROL & POWER SUPPLY-MIL/COMMERCIAL

Designed for solid state and low voltage power supply applications. Primary 105/115/125 Volts. Part numbers listed on left are hermetically sealed per MIL Designation: TF4S03XX. Part numbers listed on right are open frame construction.

| MIL<br>Part No. | Fig. A<br>MIL Case<br>XX | COMMON ELECTRICAL RATINGS |          |                     |                         | COMMERCIAL                |      |                       |       |       |
|-----------------|--------------------------|---------------------------|----------|---------------------|-------------------------|---------------------------|------|-----------------------|-------|-------|
|                 |                          | Secondary                 |          | Rectifier Circuit   |                         | Open<br>Frame<br>Part No. | Fig. | Open Frame Dimensions |       |       |
|                 |                          | AC Volts                  | RMS Amps | CT FW<br>DC Volts** | FW Bridge<br>DC Volts** |                           |      | L                     | W     | H     |
| M8042           | AJ                       | 6.3 CT                    | 6        | 1.9                 | 3.8                     | M8242                     | B    | 2.375                 | 1.375 | 1.500 |
| M8043           | FB                       | 6.3 CT                    | 2.0      | 1.9                 | 3.8                     | M8243                     | B    | 3.250                 | 1.625 | 1.940 |
| M8086           | GA                       | 6.3 CT                    | 6.0      | 1.9                 | 3.8                     | M8286*                    | B    | 3.688                 | 2.125 | 2.250 |
| M8087           | GA                       | 12.6 CT                   | 3.0      | 4.7                 | 9.4                     | M8287                     | B    | 3.688                 | 2.125 | 2.250 |
|                 |                          | 12 CT                     | 4.0      | 9.9 (series)        | 19.8 (series)           | M8247†                    | C    | 4.125                 | 3.125 | 3.750 |
|                 |                          | 12                        | 4.0      | 9.9 (series)        | 19.8 (series)           |                           |      |                       |       |       |
| M8044           | JB                       | 12.6 CT                   | 2.0      | 10.5 (series)       | 21 (series)             | M8244                     | C    | 3.375                 | 2.875 | 3.094 |
|                 |                          | 12.6                      | 2.0      | 10.5 (series)       | 21 (series)             |                           |      |                       |       |       |
| M8022           | JB                       | 18.5 CT                   | 3.0      | 7.4                 | 14.8                    | M8222                     | C    | 3.375                 | 2.500 | 3.094 |
| M8088           | HA                       | 26 CT                     | 2.5      | 10.8                | 21.6                    | M8288                     | C    | 3.000                 | 2.750 | 2.750 |
| M8152           | AJ                       | 28 CT                     | 0.15     | 11.7                | 23.4                    |                           |      |                       |       |       |
| M8045           | FA                       | 28 CT                     | 6        | 11.7                | 23.4                    | M8245                     | B    | 3.250                 | 2.125 | 1.940 |
| M8055           | JA                       | 30 CT                     | 2.5      | 12.5                | 25                      | M8255                     | C    | 3.750                 | 2.750 | 3.469 |
| M8089           | AJ                       | 40 CT                     | 1        | 17                  | 34                      | M8289                     | B    | 2.375                 | 1.375 | 1.500 |
| M8090           | EA                       | 40 CT                     | 3        | 17                  | 34                      | M8290                     | B    | 2.812                 | 1.625 | 1.625 |
| M8091           | GB                       | 40 CT                     | 7.5      | 17                  | 34                      | M8291                     | B    | 3.688                 | 2.125 | 2.250 |
| M8046           | LA                       | 49 CT                     | 2.5      | 21                  | 42                      | M8246                     | C    | 4.500                 | 3.250 | 4.031 |
| M8056           | HA                       | 80 CT                     | 6        | 35                  | 70                      | M8256                     | C    | 3.000                 | 2.625 | 2.750 |

\*Secondary may be connected in series to provide 24V @ 4A or parallel for 12V @ 8A.

\*\*DC Output for resistive or inductive loads. Output volts based on approx. 1V drop per rectifier.

\*60 Hz only

## 50/60 Hz ISOLATION/POWER-MIL/COMMERCIAL

Center tap permits use in either F.W. Bridge or F.W. CT circuitry. Electrostatic shielding. Part numbers listed on left are hermetically sealed per MIL Designation: TF4S03XX. Part numbers listed on right are open frame construction.

| MIL<br>Part No. | Fig. A<br>MIL Case<br>XX | COMMON ELECTRICAL RATINGS |                   |                     |              | COMMERCIAL                |      |                       |       |       |
|-----------------|--------------------------|---------------------------|-------------------|---------------------|--------------|---------------------------|------|-----------------------|-------|-------|
|                 |                          | Input<br>Voltage          | Output<br>Voltage | Current<br>RMS Amps | VA<br>Rating | Open<br>Frame<br>Part No. | Fig. | Open Frame Dimensions |       |       |
|                 |                          |                           |                   |                     |              |                           |      | L                     | W     | H     |
| M8094           | AH                       | 115                       | 115 CT            | 0.0085              | 1            | M8294                     | B    | 2.125                 | 1.125 | 1.187 |
| M8151           | FA                       | 115                       | 115 CT            | 0.13                | 15           | M8251                     | B    | 3.250                 | 1.625 | 1.940 |
| M8095*          | GA                       | 115                       | 115 CT            | 0.35                | 40           | M8295*                    | B    | 4.000                 | 2.250 | 2.562 |
| M8078*          | KA                       | 115                       | 115 CT            | 0.9                 | 100          | M8278*                    | C    | 3.750                 | 3.125 | 3.469 |

\*Primary 105/115/125V.

## FILTER INDUCTORS-MIL/COMMERCIAL

For 50/60 and 400 Hz Power Supplies. 1500 Test Volt. May be connected in series or parallel for inductive requirements. Part numbers listed on left are hermetically sealed per MIL Designation: TF4S03XX. Part numbers listed on right are open frame construction. Inductance values shown are for 60 Hz, except M8102 120 Hz.

| MIL<br>Part No. | Fig. A<br>MIL Case<br>XX | COMMON ELECTRICAL RATINGS |            |             |                      |            |             | COMMERCIAL                |      |                       |       |       |
|-----------------|--------------------------|---------------------------|------------|-------------|----------------------|------------|-------------|---------------------------|------|-----------------------|-------|-------|
|                 |                          | Series Connected          |            |             | Parallel Connected   |            |             | Open<br>Frame<br>Part No. | Fig. | Open Frame Dimensions |       |       |
|                 |                          | Inductance<br>Henrys      | DC<br>Amps | DCR<br>Ohms | Inductance<br>Henrys | DC<br>Amps | DCR<br>Ohms |                           |      | L                     | W     | H     |
| M8098           | AH                       | 3.5                       | 0.050      | 200         | 0.875                | 0.10       | 50          | M8198                     | B    | 2.125                 | 1.125 | 1.189 |
| M8099           | AJ                       | 1.0                       | 0.15       | 65          | 0.25                 | 0.30       | 16          | M8199                     | B    | 2.375                 | 1.250 | 1.500 |
| M8100           | EB                       | 0.5                       | 0.3        | 30          | 0.125                | 0.6        | 7.5         | M8200                     | B    | 2.812                 | 1.375 | 1.625 |
| M8101           | FB                       | 0.32                      | 0.6        | 16          | 0.08                 | 1.2        | 4           | M8201                     | B    | 3.250                 | 1.625 | 1.940 |
| M8102           | JA                       | 0.2                       | 1.0        | 4           | 0.05                 | 2.0        | 1           | M8202                     | C    | 3.375                 | 2.375 | 3.094 |

## 400 Hz POWER SUPPLY

For Silicon Rectifier Circuitry, and Filament Applications. Primary 105/115/125 Volts.

| Part No. | Secondary |          | Rectifier Circuit   |                         | Fig. A<br>MIL Case<br>XX |
|----------|-----------|----------|---------------------|-------------------------|--------------------------|
|          | AC Volts  | RMS Amps | CT FW<br>DC Volts** | FW Bridge<br>DC Volts** |                          |
| M8064†   | 6.3 CT    | 0.6      | 1.9                 | 3.8                     | AH                       |
| M8039    | 12.6      | 0.8      | 10.5 (series)       | 21 (series)             | AJ                       |
|          | 12.6 CT   | 0.8      | 10.5 (series)       | 21 (series)             | AJ                       |
| M8065    | 26 CT     | 1.5      | 10.8                | 21.6                    | EA                       |
| M8066    | 26 CT     | 3        | 10.7                | 21.5                    | FA                       |
| M8067    | 30 CT     | 1.5      | 12.5                | 25                      | FB                       |
| M8070†   | 65 CT     | 0.170    | 28.4                | 56.8                    | AH                       |

\*\*DC Output for resistive or inductive loads. Output volts based on approx. 1V drop per rectifier.

†Primary 115V only

## 400 Hz TORODIAL POWER

Toroidal cores permit smaller height and package and greater efficiency. Size savings up to 30%. Printed circuit pins can be bent for chassis mounting. Low phase shift. Primary 115 Volts.

| Part No. | Secondary |        |    | Dimensions |        | Nominal<br>Wt. Oz. | Fig. |
|----------|-----------|--------|----|------------|--------|--------------------|------|
|          | AC Volts  | RMS mA | VA | OD         | Height |                    |      |
| M8106    | 28 CT     | 320    | 9  | 1.156      | 1.125  | 2                  | D    |
| M8107    | 28 CT     | 710    | 20 | 1.500      | 1.250  | 4                  | D    |
| M8108    | 56 CT     | 160    | 9  | 1.156      | 1.125  | 2                  | D    |
| M8109    | 56 CT     | 350    | 20 | 1.500      | 1.250  | 4                  | D    |
| M8111    | 115 CT    | 170    | 20 | 1.500      | 1.250  | 4                  | D    |

170 Clearance Hole for #8 Screw



# Toroidal Inductors



QE-M Molded



QG-F, QI-F, QK-F, QPL-F, QTL-F  
Open Frame



QG-M Molded



QI-M, QK-M, QPL-M, QTL-M Molded



QI-H, QK-H 2 studs, QPL-H, QTL-H  
4 studs Hermetic

## QE SERIES

Ultra miniaturized with low height design. Exceptionally high "Q" and wide frequency range. Frequency range of QE Series 1 to 300 kHz; QEM, 3 to 500 kHz. Accuracy,  $\pm 2\%$ . Molded in epoxy resin with .020"  $\times$  2" tinned copperweld leads. Size, .450" dia.  $\times$  .285".

| QEL-M SERIES |            |          |                     | QEM-M SERIES |            |          |                     |
|--------------|------------|----------|---------------------|--------------|------------|----------|---------------------|
| Part No.     | Inductance | Typ. DCR | Typ. Dist. Cap., pF | Part No.     | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QEL1-M       | 1 mH       | 2.1      | 25                  | QEM05-M      | 0.5 mH     | 2.1      | 20                  |
| QEL2-M       | 2          | 3.6      | 30                  | QEM1-M       | 1          | 3.8      | 30                  |
| QEL5-M       | 5          | 7.3      | 35                  | QEM2-M       | 2          | 6.2      | 35                  |
| QEL10-M      | 10         | 15.8     | 45                  | QEM5-M       | 5          | 15.9     | 45                  |
| QEL15-M      | 15         | 20       | 45                  | QEM10-M      | 10         | 19       | 50                  |
| QEL25-M      | 25         | 32       | 50                  | QEM15-M      | 15         | 42       | 55                  |
| QEL50-M      | 50         | 69       | 60                  | QEM25-M      | 25         | 98       | 60                  |
| QEL100-M     | 100        | 185      | 70                  | QEM50-M      | 50         | 193      | 70                  |

## QG SERIES

Frequency range of QGL Series, to 20 kHz; QGM Series, 2 to 100 kHz. Accuracy,  $\pm 2\%$ . QG-F: Open frame, microcrystalline wax dipped with 4" #28 AWG leads. Size, .625" dia.  $\times$  .291". QG-M: Molded in high temperature epoxy resin with .020"  $\times$  2" tinned copperweld leads. Leads may be bent downward for plug-in printed circuit use. Size, .875" dia.  $\times$  .375".

| QGL SERIES |            |          |                     | QGM SERIES |            |          |                     |
|------------|------------|----------|---------------------|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF | Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QGL5-      | 5 mH       | 2.5      | 30                  | QGM1-      | 1 mH       | 1.4      | 22                  |
| QGL10-     | 10         | 5        | 33                  | QGM2-      | 2          | 2.5      | 25                  |
| QGL15-     | 15         | 8        | 34                  | QGM5-      | 5          | 6        | 28                  |
| QGL30-     | 30         | 17       | 37                  | QGM10-     | 10         | 12       | 31                  |
| QGL50-     | 50         | 28       | 40                  | QGM15-     | 15         | 18       | 32                  |
| QGL100-    | 100        | 50       | 42                  | QGM25-     | 25         | 30       | 35                  |
| QGL250-    | 250        | 130      | 46                  | QGM50-     | 50         | 52       | 37                  |
| QGL500-    | 500        | 290      | 48                  | QGM100-    | 100        | 115      | 39                  |
| QGL1000-   | 1.0 H      | 530      | 51                  |            |            |          |                     |
| QGL1500-   | 1.5        | 825      | 53                  |            |            |          |                     |

## QI SERIES

Frequency range to 20 kHz; accuracy,  $\pm 2\%$ . QIL-M: Molded in high temperature epoxy with silver plated turret lugs. Size, 1.187" dia.  $\times$  .50". QIL-H: Hermetically sealed in metal case with Teflon terminals. Size, 1.062"  $\times$  .50"  $\times$  1.219". QIL-F: Open frame. Microcrystalline wax dipped with 4" #28 plastic leads. Size, 1" dia.  $\times$  .406".

| QIL SERIES |            |          |                     |
|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QIL3-      | 3 mH       | .73      | 36                  |
| QIL5-      | 5          | 1.1      | 38                  |
| QIL10-     | 10         | 2.1      | 40                  |
| QIL15-     | 15         | 3.3      | 42                  |
| QIL25-     | 25         | 5.3      | 45                  |
| QIL50-     | 50         | 11       | 47                  |
| QIL100-    | 100        | 22       | 49                  |
| QIL150-    | 150 mH     | 34       | 50                  |
| QIL250-    | 250        | 55       | 53                  |
| QIL500-    | 500        | 95       | 55                  |
| QIL1000-   | 1.0 H      | 210      | 57                  |
| QIL1500-   | 1.5        | 335      | 59                  |
| QIL2500-   | 2.5        | 650      | 61                  |

## QK SERIES

Frequency range of QKL Series to 10 kHz; QKM Series, 5 to 50 kHz. Accuracy,  $\pm 2\%$ . QK-F: Open frame, microcrystalline wax dipped, 4" #28 AWG leads. Size, 1.25" dia.  $\times$  .625". QK-H: Hermetically sealed with Teflon terminals. Size, 1.469"  $\times$  .781"  $\times$  1.734". QK-M: Molded in high temperature epoxy resin, silver plated turret lugs. Size, 1.375" dia.  $\times$  .75"; #8 clearance hole.

| QKL SERIES |            |          |                     |
|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QKL5-      | 5 mH       | .62      | 60                  |
| QKL10-     | 10         | 1.1      | 66                  |
| QKL15-     | 15         | 1.7      | 68                  |
| QKL25-     | 25         | 2.8      | 72                  |
| QKL50-     | 50         | 6        | 76                  |
| QKL100-    | 100        | 11       | 81                  |
| QKL150-    | 150        | 17       | 83                  |
| QKL250-    | 250 mH     | 28       | 87                  |
| QKL500-    | 500        | 63       | 91                  |
| QKL1000-   | 1.0 H      | 110      | 96                  |
| QKL1500-   | 1.5        | 175      | 98                  |
| QKL2500-   | 2.5        | 275      | 103                 |
| QKL5000-   | 5          | 645      | 106                 |
| QKL10,000- | 10         | 1175     | 112                 |

| QKM SERIES |            |          |                     |
|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QKM2-      | 2 mH       | .45      | 52                  |
| QKM5-      | 5          | 1.1      | 58                  |
| QKM10-     | 10         | 2.5      | 62                  |
| QKM25-     | 25         | 6.5      | 70                  |
| QKM50-     | 50         | 11       | 74                  |
| QKM100-    | 100 mH     | 25       | 79                  |
| QKM250-    | 250        | 65       | 87                  |
| QKM500-    | 500        | 115      | 92                  |
| QKM1000-   | 1.0 H      | 250      | 97                  |

## QP SERIES

Frequency range to 10 kHz; accuracy  $\pm 2\%$ . QPL-F: Open frame, microcrystalline wax dipped, 4" #24 leads. Size, 1.938"  $\times$  .875". QPL-H: Hermetically sealed with Teflon terminals. Size, 1.938"  $\times$  1.063"  $\times$  2.281". QPL-M: Molded in high temperature epoxy resin; silver plated turret lugs. Size, 2" dia.  $\times$  1".

| QPL SERIES |            |          |                     |
|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QPL25-     | 25 mH      | 1.5      | 100                 |
| QPL50-     | 50         | 2.5      | 105                 |
| QPL100-    | 100        | 6        | 110                 |
| QPL250-    | 250        | 15       | 115                 |
| QPL500-    | 500        | 25       | 120                 |
| QPL1000-   | 1.0 H      | 60       | 125                 |
| QPL1500-   | 1.5        | 90       | 130                 |
| QPL2500-   | 2.5 H      | 150      | 133                 |
| QPL5000-   | 5.0        | 350      | 138                 |
| QPL7500-   | 7.5        | 525      | 140                 |
| QPL10,000- | 10         | 600      | 142                 |
| QPL15,000- | 15         | 900      | 146                 |
| QPL25,000- | 25         | 1500     | 150                 |

## QT SERIES

Frequency range to 15 kHz; accuracy,  $\pm 2\%$ . QTL-F: Open frame, microcrystalline wax dipped, 4" #24 leads. Size, 2.438" dia.  $\times$  1". QTL-H: Hermetically sealed with Teflon terminals. Size, 2.563"  $\times$  1.313"  $\times$  2.813". QTL-M: Molded in epoxy resin. Size, 2.875"  $\times$  1.375".

| QTL SERIES |            |          |                     |
|------------|------------|----------|---------------------|
| Part No.   | Inductance | Typ. DCR | Typ. Dist. Cap., pF |
| QTL25-     | 25 mH      | 0.85     | 127                 |
| QTL50-     | 50         | 1.5      | 138                 |
| QTL100-    | 100        | 2.8      | 144                 |
| QTL150-    | 150        | 3.9      | 149                 |
| QTL250-    | 250        | 7        | 156                 |
| QTL500-    | 500        | 15       | 164                 |
| QTL1000-   | 1.0 H      | 27       | 173                 |
| QTL1500-   | 1.5 H      | 40       | 177                 |
| QTL2500-   | 2.5        | 70       | 184                 |
| QTL5000-   | 5          | 140      | 192                 |
| QTL10,000- | 10         | 270      | 200                 |
| QTL15,000- | 15         | 430      | 205                 |
| QTL25,000- | 25         | 850      | 212                 |
| QTL50,000- | 50         | 1500     | 221                 |



# Telephone Interconnect Transformers

## line coupling



CONTACT THORNDARSON SALES  
FOR CURRENT FILE #

See Application Notes

### FOR INTERCONNECT OF VOICE/DATA MODEM TERMINALS TO TELEPHONE LINES

Provides line isolation and matching—Prevents line imbalance—Wide dynamic signal capability—Low distortion  
Permits optimum use of Voice-Grade Telephone Lines for broadband data signals—Designed to meet FCC Part 68

- Frequency Response: 300-3500 Hz  $\pm$  0.5 dB
- Level: -45 dBm to +7 dBm
- Longitudinal Balance: Per FCC 68.310
- Distortion: 0.5% Max.
- Impedance Matching  $\pm$  10% over entire frequency range
- Dielectric Strength 1500V RMS

| Part No.                                 | Primary Impedance | Secondary Impedance | Pri. Unbal. mA DC | Ins. Loss dB | Pri. DCR | Sec. DCR | Schematic | Fig. | Application Notes                                                                                                           |
|------------------------------------------|-------------------|---------------------|-------------------|--------------|----------|----------|-----------|------|-----------------------------------------------------------------------------------------------------------------------------|
| <b>VOICE/DATA COUPLING</b>               |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| <b>SURFACE MOUNT</b>                     |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| TSL103                                   | 600               | 346                 | 0                 | 2.75         | 127      | 150      | 2         | A    | Ultra low profile. .164" high. For PCMCIA type II PC Card. Uses only .32" x .40" real estate. 1,000V hipot.                 |
| TS3104                                   | 600               | 600                 | 0                 | 1.4          | 76       | 135      | 2         | B    | Very low profile. 0.315" high.                                                                                              |
| TS3106                                   | 600CT             | 600CT               | 0                 | 1.4          | 76       | 135      | 7         | B    | Very low profile. 0.315" high.                                                                                              |
| TS1104                                   | 600               | 600                 | 0                 | 1.0          | 46       | 63       | 2         | C    | Very low profile.                                                                                                           |
| TS1104-M                                 | 600               | 600                 | 0                 | 1.0          | 46       | 63       | 1         | D    | Very low profile. Molded to meet MIL-T-27 Grade 5.                                                                          |
| TS1106                                   | 600CT             | 600CT               | 0                 | 1.5          | 46       | 63       | 7         | C    | Very low profile.                                                                                                           |
| TS1106-M                                 | 600CT             | 600CT               | 0                 | 1.5          | 46       | 63       | 7         | D    | Very low profile. Molded to meet MIL-T-27 Grade.                                                                            |
| <b>THROUGH HOLE MOUNT</b>                |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| PM32-F                                   | 600               | 600                 | 1.5               | 1.6          | 75       | 105      | 1         | PM-F | Frequency response 300 Hz-100kHz $\pm$ 2dB. 0.27" H. 1,000V hipot.                                                          |
| PM34-F                                   | 600CT             | 600CT               | 3                 | 1.6          | 75       | 105      | 15        | PM-F | Frequency response 300 Hz-100kHz $\pm$ 2dB. 0.27" H. 1,000V hipot.                                                          |
| PM32-M                                   | 600               | 600                 | 1.5               | 1.6          | 75       | 105      | 1         | E    | Frequency response 300 Hz-100kHz $\pm$ 2dB. 0.27" H. 1,000V hipot.                                                          |
| PM34-M                                   | 600CT             | 600CT               | 3                 | 1.6          | 75       | 105      | 15        | F    | Frequency response 300 Hz-100kHz $\pm$ 2dB. 0.27" H. 1,000V hipot.                                                          |
| TP3104                                   | 600               | 600                 | 0                 | 1.4          | 76       | 135      | 7         | G    | Very low profile. 0.315" high.                                                                                              |
| TP3106                                   | 600CT             | 600CT               | 0                 | 1.4          | 76       | 135      | 7         | G    | Very low profile. 0.315" high.                                                                                              |
| TV104                                    | 600               | 600                 | 2.5               | 2.2          | 50       | 65       | 2         | I    | Small footprint.                                                                                                            |
| T1104                                    | 600               | 600                 | 0                 | 1.0          | 46       | 63       | 1         | J    | Very low profile.                                                                                                           |
| T1104-M                                  | 600               | 600                 | 0                 | 1.0          | 46       | 63       | 1         | K    | Hipot 3750V.                                                                                                                |
| TL1104                                   | 600               | 600                 | 0                 | 1.5          | 66       | 102      | 2         | L    | For dry circuits.                                                                                                           |
| TL1106                                   | 600CT             | 600CT               | 0                 | 1.5          | 66       | 102      | 7         | L    | For dry circuits.                                                                                                           |
| TM104                                    | 600               | 374                 | 0                 | 2.0          | 108      | 120      | 1         | M    | 1,000V hipot.                                                                                                               |
| T2104                                    | 600               | 600                 | 0                 | 1.0          | 36       | 50       | 1         | N    |                                                                                                                             |
| T2106                                    | 600CT             | 600CT               | 0                 | 1.0          | 36       | 50       | 7         | P    |                                                                                                                             |
| T2108                                    | 600               | 900                 | 0                 | 1.0          | 36       | 77       | 1         | N    |                                                                                                                             |
| T2110                                    | 900               | 900                 | 0                 | 1.0          | 55       | 78       | 8         | O    | Electrostatic shield.                                                                                                       |
| T2316                                    | 4000              | 600                 | 0                 | 1.0          | 340      | 51       | 1         | N    | For bridging applications.                                                                                                  |
| T9116                                    | 600 Split         | 600 Split           | 80                | 2.0          | 95       | 180      | 17        | T    | Low crosstalk. 1500V Pri. to Sec. and core.                                                                                 |
| T9117                                    | 600 Split         | 600 Split           | 80                | 1.3          | 78       | 92       | 18        | T    | Low crosstalk. Return loss 23 dB @ 440 $\pm$ 0.035 $\mu$ F. Parallel load. 1500V Pri. to Sec. and core. 1000V Sec. to core. |
| TL1114                                   | 600CT             | 600 Split           | 90                | 1.8          | 73       | 134      | 20        | U    | Handles loop currents.                                                                                                      |
| T4113                                    | 900/600           | 600 Split           | 60/75Pri.         | 1.2          | 62       | 36/36    | 3         | S    | Level -15 to +7 dBm.                                                                                                        |
| T5114                                    | 600               | 600 Split           | 75                | 1.7          | 100      | 49/49    | 9         | V    |                                                                                                                             |
| T5119                                    | 600               | 600                 | 100               | 1.5          | 62       | 108      | 1         | V    |                                                                                                                             |
| T5117                                    | 600               | 600                 | 125               | 1.1          | 45       | 58       | 1         | V    |                                                                                                                             |
| T5115                                    | 600               | 600 Split           | 120               | 0.8          | 40       | 25/25    | 10        | W    |                                                                                                                             |
| T6112                                    | 600               | 900/600             | 100/120Sec.       | 0.5          | 25       | 26       | 6         | Y    | Electrostatic Shield.                                                                                                       |
| <b>LOW PROFILE - 8MM SERIES</b>          |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| TP3106                                   | 600CT             | 600CT               | 0                 | 1.4          | 76       | 135      | 7         | G    | Very low profile. 0.315" high.                                                                                              |
| TS3106                                   | 600CT             | 600CT               | 0                 | 1.4          | 76       | 135      | 7         | B    | Very low profile. 0.315" high.                                                                                              |
| <b>ULTRA LOW PROFILE - 4MM SERIES</b>    |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| TSL103                                   | 600               | 346                 | 0                 | 2.75         | 127      | 150      | 2         | A    | Ultra low profile. .164" high. For PCMCIA type II PC Card. Uses only .32" x .40" real estate. 1,000V hipot.                 |
| <b>INTERNATIONAL SERIES 3,750V HIPOT</b> |                   |                     |                   |              |          |          |           |      |                                                                                                                             |
| THP104-M                                 | 600               | 600                 | 0                 | 1.1          | 65       | 73       | 2         | Z    |                                                                                                                             |
| TH2104                                   | 600               | 600                 | 0                 | 1.0          | 38       | 52       | 1         | N    |                                                                                                                             |
| TH2106                                   | 600CT             | 600CT               | 0                 | 1.0          | 38       | 52       | 7         | P    |                                                                                                                             |
| TH9306                                   | 600CT             | 600CT               | 0                 | 1.5          | 44       | 56       | 7         | BB   | 3750V RMS hipot between windings, 1250V between winding and core                                                            |
| TH5114                                   | 600               | 600 Split           | 75                | 2.0          | 127      | 76/76    | 9         | V    |                                                                                                                             |
| TH5117                                   | 600               | 600                 | 125               | 1.1          | 56       | 74       | 1         | V    |                                                                                                                             |
| TH5116                                   | 600               | 600 Split           | 125               | 1.0          | 56       | 37/37    | 9         | V    | Longitudinal balance 40dB min.                                                                                              |
| TH5118                                   | 600 Split         | 600                 | 125               | 1.0          | 28/28    | 74       | 9         | V    |                                                                                                                             |

Available on special order with other ratings and constructions.

See outline dwgs. and schematic diagrams on following pages.



# Telephone Interconnect Transformers



CONTACT THORDARSON SALES  
FOR CURRENT FILE #  
See Application Notes

## line coupling—hybrid—holding coils

### FOR INTERCONNECT OF VOICE/DATA MODEM TERMINALS TO TELEPHONE LINES

Provides line isolation and matching—Prevents line imbalance—Wide dynamic signal capability—Low distortion  
Permits optimum use of Voice-Grade Telephone Lines for broadband data signals—Designed to meet FCC Part 68

- Frequency Response: 300-3500 Hz  $\pm 0.5$  dB
- Level: -45 dBm to +7 dBm
- Longitudinal Balance: Per FCC 68.310
- Distortion: 0.5% Max.
- Impedance Matching  $\pm 10\%$  over entire frequency range
- Dielectric Strength 1500V RMS

| Part No.                                                                                                                                                                                  | Primary Impedance | Secondary Impedance | Pri. Unbal. mA DC | Ins. Loss dB | Pri. DCR | Sec. DCR  | Schematic | Fig. | Application Notes                                                                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|---------------------|-------------------|--------------|----------|-----------|-----------|------|------------------------------------------------------------------------------------------------------------|
| <b>DATA MODEM COUPLING</b> — NON-VOICE APPLICATION FOR 300/1200/2400 BPS MODEM BOARD FOR MICROCOMPUTERS FOR FREQUENCY RESPONSE, IMPEDANCE MATCHING, RETURN LOSS, REQUEST OUTLINE DRAWING. |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| <b>SURFACE MOUNT</b>                                                                                                                                                                      |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TS1103                                                                                                                                                                                    | 600               | 346                 | 0                 | 2.75         | 127      | 150       | 2         | A    | Ultra low profile, .164" high. For PCMCIA type II PC Card. Uses only .32" x .40" real estate. 1000V hipot. |
| TS1115                                                                                                                                                                                    | 600               | 600                 | 65                | 1.5          | 42       | 59        | 2         | C    | Insertion loss measured at rated DC.                                                                       |
| <b>THROUGH HOLE MOUNT</b>                                                                                                                                                                 |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TP3111                                                                                                                                                                                    | 600               | 600                 | 50                | 1.8          | 49       | 76        | 2         | H    | Insertion loss measured at rated DC. Very low profile 0.35" high.                                          |
| TL1115                                                                                                                                                                                    | 600               | 600                 | 65                | 1.5          | 42       | 59        | 2         | L    | Insertion loss measured at rated DC.                                                                       |
| TM105                                                                                                                                                                                     | 600               | 470                 | 100               | 2.5          | 106      | 120       | 1         | M    | 100Ma rating, low profile.                                                                                 |
| TM106                                                                                                                                                                                     | 600               | 470                 | 100               | 2.0          | 108      | 120       | 1         | M    | 100Ma rating, low profile.                                                                                 |
| T9311                                                                                                                                                                                     | 600               | 600                 | 90                | 1.8          | 75       | 100       | 1         | AA   | 0.50" max ht.                                                                                              |
| T9312                                                                                                                                                                                     | 600               | 600 Split           | 90                | 1.8          | 75       | 100       | 9         | BB   | 0.50" max ht.                                                                                              |
| T9317                                                                                                                                                                                     | 600               | 600 Split           | 50                | 1.6          | 75       | 95        | 9         | BB   | 0.50" max ht.                                                                                              |
| TL1111                                                                                                                                                                                    | 600CT             | 600 Split           | 90                | 1.6          | 63       | 103       | 20        | U    |                                                                                                            |
| T2111*                                                                                                                                                                                    | 600               | 600                 | 90                | 2.0          | 71       | 117       | 13        | CC   | Low profile.                                                                                               |
| T2112*                                                                                                                                                                                    | 600               | 600CT               | 90                | 2.0          | 71       | 117       | 14        | CC   | Low profile.                                                                                               |
| T2113*                                                                                                                                                                                    | 600               | 600                 | 90                | 2.0          | 71       | 117       | 13        | N    |                                                                                                            |
| T2114*                                                                                                                                                                                    | 600               | 600CT               | 90                | 2.1          | 71       | 117       | 14        | P    |                                                                                                            |
| *Except sec. to core, highpot 1000V RMS.                                                                                                                                                  |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| <b>LOW PROFILE - 8MM SERIES</b>                                                                                                                                                           |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TP3111                                                                                                                                                                                    | 600               | 600                 | 50                | 1.8          | 49       | 76        | 2         | H    | Insertion loss measured at rated DC. Very low profile 0.35" high.                                          |
| <b>HOLDING COILS</b>                                                                                                                                                                      |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| T4415                                                                                                                                                                                     | 2.0 H/1.3 H       | 60/100              | N/A               | N/A          | 180      | N/A       | 4         | R    |                                                                                                            |
| T5415                                                                                                                                                                                     | 1.4 H $\pm 20\%$  | 120                 | N/A               | N/A          | 90/90    | N/A       | 5         | V    | Split winding, 1500V windings to core, 500V between windings.                                              |
| T7410                                                                                                                                                                                     | 1.0 H/0.8 H       | 0/25                | N/A               | N/A          | 225      | N/A       | 4         | DD   | Toroidal construction. Low crosstalk, 1000V hipot.                                                         |
| T8410                                                                                                                                                                                     | 1.0 H/0.8 H       | 0/40                | N/A               | N/A          | 113      | N/A       | 4         | DD   | Toroidal construction. Low crosstalk, 1000V hipot.                                                         |
| <b>HYBRID - TWO REQUIRED FOR CONVENTIONAL HYBRID OPERATION</b>                                                                                                                            |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| <b>SURFACE MOUNT</b>                                                                                                                                                                      |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TS3220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | 1.0*         | 49       | 70/70     | 11        | B    | Very low profile. 0.35" high.                                                                              |
| TS1220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | .7*          | 39       | 37/37     | 11        | C    | Surface mount. Very low profile.                                                                           |
| TS1220-M                                                                                                                                                                                  | 600 (4W)          | 600/600             | 0                 | .7*          | 39       | 37/37     | 11        | D    | Surface mount. Very low profile. Molded to meet MIL-T-27 grade 5.                                          |
| <b>THROUGH HOLE MOUNT</b>                                                                                                                                                                 |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TP3220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | 1.0*         | 49       | 70/70     | 11        | G    | Very low profile. 0.35" high.                                                                              |
| TL1220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | .7*          | 39       | 37/37     | 11        | L    | For dry circuits.                                                                                          |
| T2220                                                                                                                                                                                     | 600 (4W)          | 600/600             | 0                 | 1.0*         | 57       | 42/42     | 11        | P    | Trans-hybrid loss 45dB typical.                                                                            |
| T3220                                                                                                                                                                                     | 600 (4W)          | 600/600             | 0                 | .7*          | 34       | 25/25     | 11        | O    | Trans-hybrid loss 45dB typical.                                                                            |
| TL1320                                                                                                                                                                                    | 600 (4W)          | 600/600             | 80 (2W)           | 1.8*         | 98       | 78/78     | 21        | U    | Handles loop currents. Frequency response $\pm 0.7$ dB 300-3500 Hz.                                        |
| T4220                                                                                                                                                                                     | 600 (1W)          | 600/600             | 60 (2W)           | 1.0*         | 61       | 62/62     | 12        | S    | Electrostatic shield. @ 0 dBm. Impedance matching $\pm 15\%$ .                                             |
| T9320                                                                                                                                                                                     | 600 (4W)          | 600/600             | 50 (2W)           | 1.4*         | 75       | 85/85     | 11        | BB   | .50" max. ht. Frequency response $\pm 0.7$ dB 500-3500 Hz. $\pm 1.6$ dB. 300-3500 Hz @ 0 dBm.              |
| T9220                                                                                                                                                                                     | 600 (4W)          | 600/600             | 80 (2W)           | 1.6*         | 100      | 190       | 19        | T    | Low profile. Low crosstalk. DCR values are max.                                                            |
| <b>LOW PROFILE - 8MM SERIES</b>                                                                                                                                                           |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| TP3220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | 1.0*         | 49       | 70/70     | 11        | G    | Very low profile. 0.315" high.                                                                             |
| TS3220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | 1.0*         | 49       | 70/70     | 11        | G    | Very low profile. 0.35" high.                                                                              |
| <b>INTERNATIONAL SERIES 3.750V HIPOT</b>                                                                                                                                                  |                   |                     |                   |              |          |           |           |      |                                                                                                            |
| THP220-M                                                                                                                                                                                  | 600 (4W)          | 600/600             | 0                 | 1.0*         | 60       | 62.5/62.5 | 11        | Z    | 3750V hipot.                                                                                               |
| TH2220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 0                 | 1.2*         | 60       | 25/25     | 11        | EE   | 3750V RMS hipot except 200V between 2 wire and balance windings. Trans-hybrid loss 45 dB typical.          |
| TH5220                                                                                                                                                                                    | 600 (4W)          | 600/600             | 100 (2W)          | .7*          | 50       | 30/30     | 16        | X    | 3750V RMS hipot except 1500V between 2 wire and balance windings. Max level +20 dBm. E.S.S.                |

\*Insertion loss does not include 3dB in hybrid balance network.

Available on special order with other ratings and constructions.

See outline dwgs. and schematic diagrams on following pages.







# Telephone Interconnect Transformers

## OUTLINE DRAWINGS - TELEPHONE INTERCONNECT

**NEW!**



Very low profile.  
PC epoxy molded  
construction.  
MIL-T-27 TF5S21ZZ.  
Wt. 0.5 Oz.  
Flammability  
per UL 94V0

FIG. K

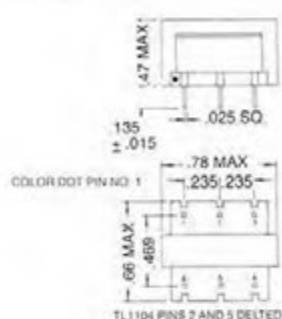


**NEW!**



Very low profile.  
PC construction.  
Vacuum varnish  
impregnated.  
Wt. 0.4 Oz.  
Available with  
.040" standoffs.  
On Special Order.

FIG. L

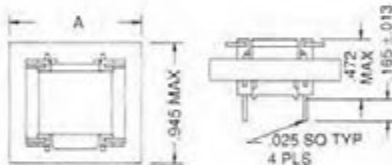


**NEW!**



Low Profile  
Plug-in Printed  
Circuit Construction  
Vacuum Varnish  
Impregnated.  
Wt. 0.55 oz.

FIG. M



| Part No.   | A          |
|------------|------------|
| TM104      | 1.024 Max. |
| TM105, 106 | .906 Max.  |



Plug-in printed circuit  
construction.  
Vacuum varnish  
impregnated.  
Wt. 0.5 Oz.

FIG. N

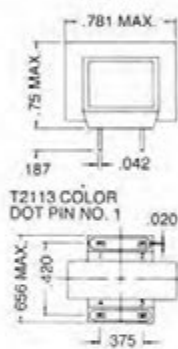
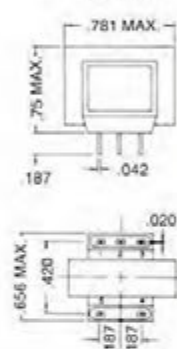


FIG. O

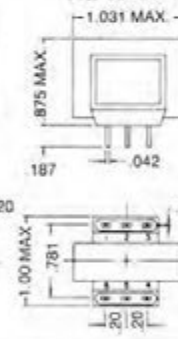


Plug-in printed circuit  
construction.  
Vacuum varnish  
impregnated.

FIG. P  
Wt. 0.5 Oz.



FIG. Q  
Wt. 1.2 Oz.



Plug-in printed  
circuit construction.  
Vacuum varnish  
impregnated. Wt. 3.5 Oz.  
Available with mounting  
flanges on Special Order.  
.187 Dia. holes, 1.75  
mounting centers.  
Add -FB to Part No.

FIG. R

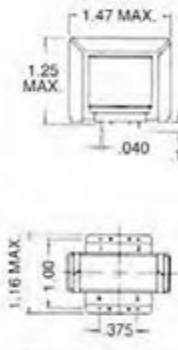
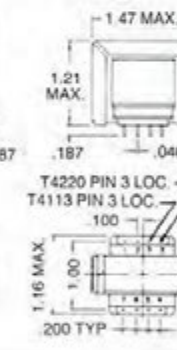


FIG. S



Low profile hum-bucking  
semi-toroidal construction.  
High crosstalk attenuation.  
Plug-in printed circuit  
construction. Vacuum  
varnish impregnated.  
Wt. 2.2 Oz.

FIG. T

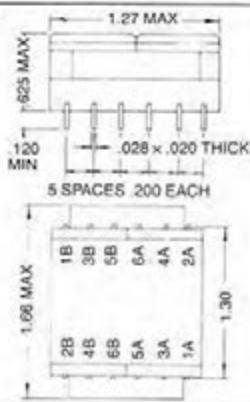
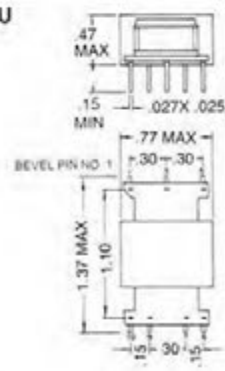


FIG. U



Plug-in printed  
circuit construction.  
Vacuum varnish  
impregnated.  
Wt. 0.76 oz.



DIMENSIONS IN INCHES



## Telephone Interconnect Transformers

## OUTLINE DRAWINGS –TELEPHONE INTERCONNECT



FIG. V

Flat Profile.  
Plug-in printed circuit  
construction.  
Vacuum varnish  
impregnated.  
Wt. 2.5 Oz.

| Part No.            | H   | W     |
|---------------------|-----|-------|
| T5114, T5415, T5119 | .69 | 1.344 |
| TH5114              | .69 | 1.453 |
| T5117, TH5116-18    | .83 | 1.453 |

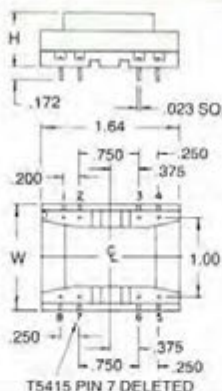


FIG. W

Plug-in printed circuit construction.  
Vacuum varnish impregnated.  
Wt. 5.5 Oz.



FIG. 5

Plug-in printed circuit construction with mounting channel. Vacuum varnish impregnated. Wt. 9.5 Oz.

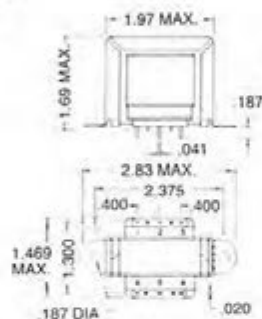


FIG. AA

Very low profile plug-in  
printed circuit  
construction.  
Vacuum varnish  
impregnated.  
Wt. 0.66 oz.

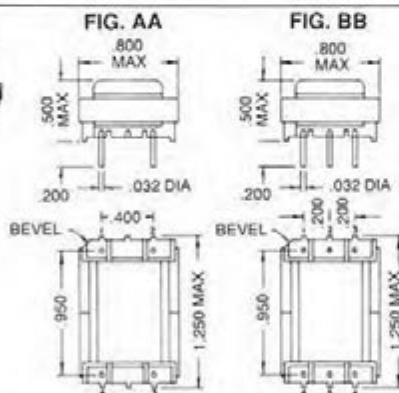


FIG. CC

Low-profile plug-in  
printed circuit  
construction.  
Vacuum varnish  
impregnated.  
Wt. 0.5 Oz.

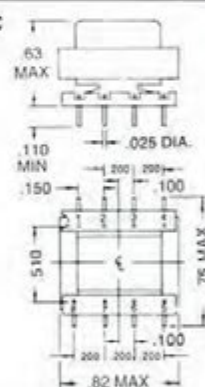


FIG. DD

High-Q Toroid.  
Microcrystalline wax  
impregnated.  
Supplied with 4"  
#28 leads.

| Size Series | D    | H    | Wt. Oz. |
|-------------|------|------|---------|
| T7400       | 1    | .406 | .75     |
| T8400       | 1.25 | .625 | 2       |

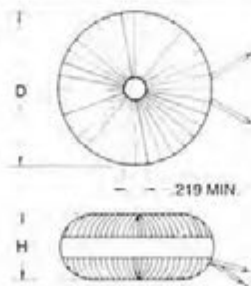


FIG. EE

PC construction.  
Vacuum varnish  
impregnated.  
Wt. 0.5 Oz.



DIMENSIONS IN INCHES



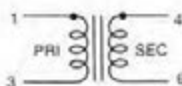
# Telephone Interconnect Transformers

## SCHEMATIC DIAGRAMS FOR TELEPHONE INTERCONNECT



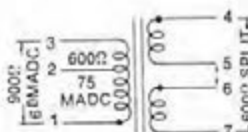
T5117, TH5117 PRI. 1-4 SEC. 6-7  
TM103-6, T9311 PRI. 1-2 SEC. 4-3  
T5119 PRI. 6-9 SEC. 3-2

#1



THP104-M PRI. 1-5 SEC. 6-10  
TP/TS3104 PRI. 1-4, SEC. 8-5

#2



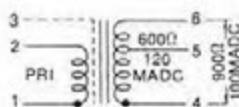
#3



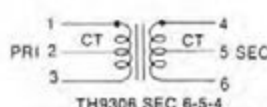
#4



#5

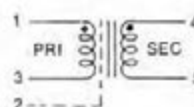


#6

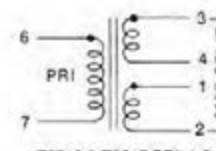


TH9306 SEC. 6-5-4  
TP/TS3106 PRI. 1-2-4, SEC. 5-6-7

#7

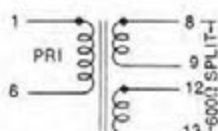


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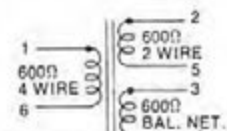


T9312 & T9317 PRI. 1-6,  
SEC. 2-5, 3-4  
TH5118 PRI. 1-2, 3-4 SEC. 6-7

#9

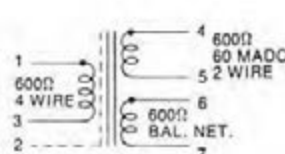


#10

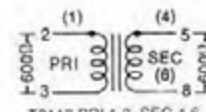


TP/TS3220 4 WIRE 1-4, 2 WIRE 5-6, BAL. 3-4  
THP220-M 4 WIRE 1-5, 2 WIRE 6-7, BAL. 9-10  
TH2220 4 WIRE 6-10, 2 WIRE 1-2, BAL. 4-5

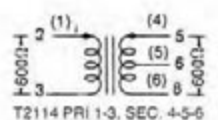
#11



#12

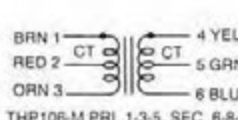


#13



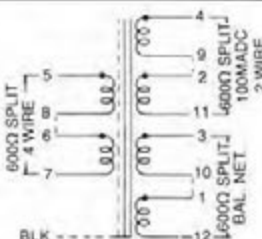
T2114 PRI. 1-3, SEC. 4-5-6

#14

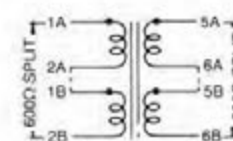


THP106-M PRI. 1-3-5, SEC. 6-8-10

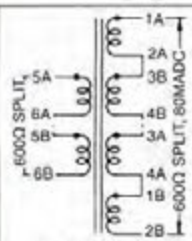
#15



#16

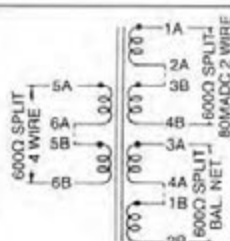


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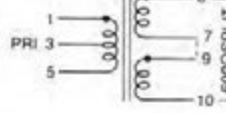


JOIN 2A-3B, 4A-1B

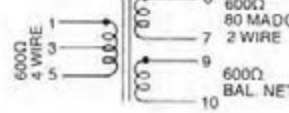
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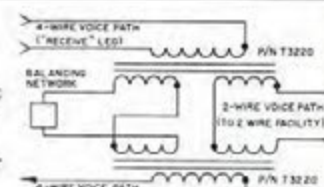
#19



#20



#21

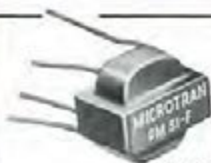


TYPICAL HYBRID APPLICATION



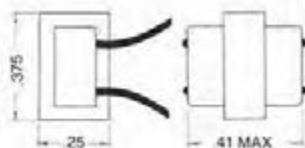
# Miniaturized Audio Transformers

## OPEN FRAME PM-F



4 inch #30  
color coded  
leads. Thorough resin  
impregnation and baking assures reliability. To order add -F to Part No., i.e. PM33-F.  
Wt. .05 oz.

MIL Designation: TF6S21ZZ



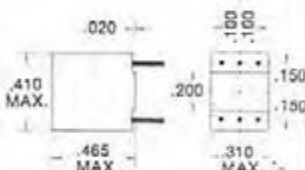
## MOLDED PM-M



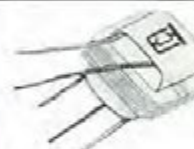
Epoxy molded.  
For printed  
circuit application.

Tinned copperweld leads .020 x .75" for reliable soldered joints and high-density welded lead packaging. Wt. .1 oz. To order add -M to Part No., i.e. PM12-M.

MIL Designation: TF6S21ZZ

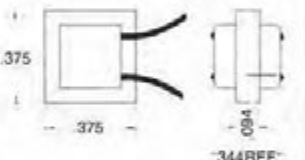


## OPEN FRAME UM-F



To order add -F to Part No., i.e. UM22-F.  
Wt. 0.08 oz. 4" #30 color coded leads.

MIL Designation: TF6S21ZZ

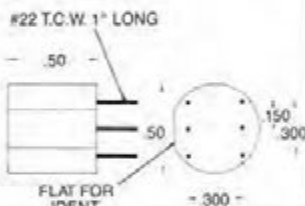


## MOLDED UM-M



To order add -M to Part No., i.e. UM22-M. Wt. 0.14 oz.

MIL Designation: TF6S21ZZ

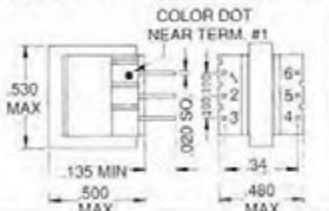


**NEW!**

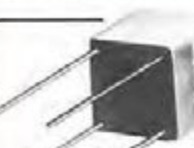
## OPEN FRAME PRINTED CIRCUIT VM-PC



Small Footprint Plug-in Printed  
Circuit Construction Vacuum Varnish  
Impregnated. Wt. 0.16 oz.



## MOLDED VM-M



Epoxy molded. Wt. 0.25 oz. To  
order add -M to Part No., i.e.  
VM2-M.

MIL Designation: TF6S21ZZ



DIMENSIONS IN INCHES.

## PICO-MINIATURE — PM SERIES

Frequency Response  $\pm 2$  dB 300 Hz to 100 kHz†

For maximum utilization of space in miniaturized printed circuit board applications. Manufactured per MIL-T-27.

| Part No. | Primary Impedance                                                                                       | Secondary Impedance | Pri. Unbal. mA DC | Pri. DCR | Sec. DCR | Level mW @ 300 Hz | Level mW @ 1 kHz |
|----------|---------------------------------------------------------------------------------------------------------|---------------------|-------------------|----------|----------|-------------------|------------------|
| PM37-(*) | 120 CT                                                                                                  | 3.2                 | 10                | 16       | 0.75     | 50                | 50               |
| PM38-(*) | 300 CT                                                                                                  | 600                 | 7                 | 41       | 98       | 50                | 50               |
| PM39-(*) | 500                                                                                                     | 50                  | 3                 | 60       | 8        | 50                | 50               |
| PM36-(*) | 500                                                                                                     | 500/125 split       | 3                 | 72       | 85       | 50                | 50               |
| PM32-(*) | 600                                                                                                     | 600                 | 1.5               | 75       | 105      | 50                | 50               |
| PM34-(*) | 600 CT                                                                                                  | 600 CT              | 3                 | 75       | 105      | 50                | 50               |
| PM33-(*) | 1500 CT                                                                                                 | 600                 | 3                 | 170      | 95       | 50                | 50               |
| PM31-(*) | 2500                                                                                                    | 2500 CT             | 1                 | 250      | 325      | 50                | 50               |
| PM29-(*) | 10,000 CT                                                                                               | 500 CT              | 1                 | 1050     | 80       | 50                | 50               |
| PM27-(*) | 10,000                                                                                                  | 1200                | 0.5               | 1050     | 280      | 50                | 50               |
| PM23-(*) | 10,000 CT                                                                                               | 1200 CT             | 1                 | 1050     | 280      | 50                | 50               |
| PM25-(*) | 10,000                                                                                                  | 1200/300 split      | 0.5               | 1050     | 290      | 50                | 50               |
| PM19-(*) | 10,000 CT                                                                                               | 2000 CT             | 1                 | 1000     | 300      | 50                | 50               |
| PM21-(*) | 10,000                                                                                                  | 2000/500 split      | 0.5               | 1000     | 300      | 50                | 50               |
| PM17-(*) | 10,000 CT                                                                                               | 10,000 CT           | 1                 | 1000     | 1300     | 50                | 50               |
| PM15-(*) | 25,000                                                                                                  | 1000                | 0.25              | 1700     | 110      | 40                | 40               |
| PM11-(*) | 25,000 CT                                                                                               | 1000 CT             | 0.5               | 1700     | 110      | 40                | 40               |
| PM13-(*) | 25,000                                                                                                  | 1000/250 split      | 0.25              | 1700     | 110      | 40                | 40               |
| PM7-(*)  | 50,000 CT                                                                                               | 1000 CT             | 0                 | 3300     | 75       | 10                | 10               |
| PM9-(*)  | 50,000                                                                                                  | 1000/250 split      | 0                 | 3300     | 75       | 10                | 10               |
| PM5-(*)  | 200,000                                                                                                 | 1000                | 0                 | 5300     | 110      | 10                | 10               |
| PM3-(*)  | 200,000 CT                                                                                              | 1000 CT             | 0                 | 5300     | 110      | 10                | 10               |
| PM41-(*) | Audio Choke                                                                                             | .3 H                | 4                 | 43       |          |                   |                  |
| PM40-(*) | Audio Choke                                                                                             | 3.5 H               | 2                 | 700      |          |                   |                  |
| PM39-(*) | Audio Choke                                                                                             | 6 H                 | 2                 | 1800     |          |                   |                  |
| PM90     | Magnetic Shield Mu-metal slip-on can for PM-M series.<br>20dB shielding. 0.365" x 0.465" x 0.500" high. |                     |                   |          |          |                   |                  |

\* These items not available in open frame construction.

† Add either -F, -M to Part No. See photos figures PM-M & PM-F.

Frequency response measured as stated power level above.

† PM3 and PM5 — 45 kHz.

## ULTRA-MINIATURE — UM SERIES

Frequency Response  $\pm 2$  dB 300 to 10,000 Hz

Measured at level stated for 300 Hz. Miniaturized design offers a relatively high power level and printed circuit packaging. Response measured at level stated for 300 Hz. Mfd. per MIL-T-27.

| Part No. | Primary Impedance                                                                                 | Secondary Impedance | Pri. Unbal. mA DC | Pri. DCR | Sec. DCR | Level mW @ 300 Hz | Level mW @ 1 kHz |
|----------|---------------------------------------------------------------------------------------------------|---------------------|-------------------|----------|----------|-------------------|------------------|
| UM26-(*) | 400                                                                                               | 11                  | 3                 | 35       | 1.5      | 15                | 500              |
| UM27-(*) | 400 CT                                                                                            | 11                  | 6                 | 35       | 1.5      | 15                | 500              |
| UM25-(*) | 400                                                                                               | 50                  | 3                 | 35       | 5        | 15                | 500              |
| UM29-(*) | 600 CT                                                                                            | 600 CT              | 7                 | 45       | 60       | 5                 | 400              |
| UM24-(*) | 1000                                                                                              | 50                  | 3                 | 65       | 10       | 5                 | 500              |
| UM33-(*) | 1000 CT                                                                                           | 600                 | 6                 | 80       | 65       | 5                 | 500              |
| UM32-(*) | 1500 CT                                                                                           | 600                 | 5                 | 135      | 65       | 5                 | 500              |
| UM39-(*) | 2500 CT                                                                                           | 600 CT              | 2                 | 250      | 50       | 5                 | 500              |
| UM34-(*) | 10,000 CT                                                                                         | 600 CT              | 2                 | 850      | 40       | 5                 | 500              |
| UM31-(*) | 10,000                                                                                            | 1200 CT             | 2                 | 850      | 120      | 5                 | 500              |
| UM37-(*) | 10,000                                                                                            | 2000 CT             | 1                 | 850      | 200      | 5                 | 500              |
| UM35-(*) | 15,000 CT                                                                                         | 15,000 CT           | 1                 | 930      | 1210     | 5                 | 300              |
| UM36-(*) | 20,000 CT                                                                                         | 800 CT              | 0.5               | 1100     | 80       | 5                 | 500              |
| UM22-(*) | 20,000                                                                                            | 1000                | 0.5               | 1100     | 100      | 5                 | 300              |
| UM23-(*) | 20,000                                                                                            | 1200 CT             | 0.5               | 1100     | 110      | 5                 | 300              |
| UM21-(*) | 100,000                                                                                           | 1000                | 0                 | 1900     | 135      | 5                 | 70               |
| UM30-(*) | Choke                                                                                             | 1.5 H (0 mA)        | 0.7 H (2 mA)      | 100 DCR  |          |                   |                  |
| UM28-(*) | Choke                                                                                             | 10 H (0 mA)         | 8 H (0.5 mA)      | 650 DCR  |          |                   |                  |
| UM90     | Magnetic Shield Mu-metal slip-on can for UM-M series.<br>20 dB shielding. 0.594" D x 0.562" high. |                     |                   |          |          |                   |                  |

\* Add either -F, -M to Part No. to designate construction. See Photos.

Power levels shown are for 7.5% maximum distortion.

## VERI-MINIATURE — VM SERIES

Frequency Response  $\pm 2$  dB 200 to 10,000 Hz

| Part No. | Primary Impedance                                                                                        | Secondary Impedance | Pri. Unbal. mA DC | Pri. DCR | Sec. DCR | Level mW |
|----------|----------------------------------------------------------------------------------------------------------|---------------------|-------------------|----------|----------|----------|
| VM1-(*)  | 50                                                                                                       | 600                 | 5.5               | 7        | 90       | 12       |
| VM7-(*)  | 500                                                                                                      | 3.4                 | 3.5               | 50       | 0.5      | 15       |
| VM16-(*) | 500 CT                                                                                                   | 250 CT              | 7.5               | 50       | 25       | 15       |
| VM14-(*) | 600 CT                                                                                                   | 600 CT              | 7.0               | 50       | 65       | 15       |
| VM8-(*)  | 1250                                                                                                     | 3.4                 | 2.0               | 135      | 0.5      | 15       |
| VM9-(*)  | 1250                                                                                                     | 50                  | 2.0               | 135      | 0.5      | 15       |
| VM10-(*) | 2500                                                                                                     | 2500 CT             | 1.5               | 225      | 215      | 2        |
| VM17-(*) | 10,000 CT                                                                                                | 5000 CT             | 0                 | 400      | 300      | 5        |
| VM12-(*) | 20,000                                                                                                   | 1000                | 0.16              | 625      | 85       | 5        |
| VM13-(*) | 20,000                                                                                                   | 1000 CT             | 0.16              | 625      | 85       | 5        |
| VM3-(*)  | 25,000                                                                                                   | 600                 | 0.15              | 720      | 45       | 5        |
| VM5-(*)  | 50,000                                                                                                   | 600                 | 0.1               | 830      | 55       | 5        |
| VM15-(*) | 50,000 CT                                                                                                | 50,000 CT           | 0                 | 2000     | 2600     | 5        |
| VM6-(*)  | 100,000                                                                                                  | 1200                | 0.07              | 2000     | 150      | 5        |
| VM2-(*)  | 200,000                                                                                                  | 600                 | 0.05              | 3000     | 110      | 2.5      |
| VM4-(*)  | 200,000                                                                                                  | 1200                | 0.035             | 3100     | 165      | 5        |
| VM11-(*) | Choke                                                                                                    | 20 H (0 mA)         | 12 H (0.5 mA)     | 1000     |          |          |
| VM90     | Magnetic Shield Mu-metal slip-on can for VM-M series.<br>20 dB shielding. 0.625" x 0.625" x 0.531" high. |                     |                   |          |          |          |

\* Add either -FPB, -M, or -PC to Part No. to designate construction. See Photos.

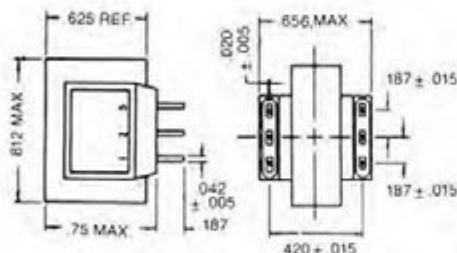


## Miniaturized Audio Transformers



PRINTED CIRCUIT —  
DCM SERIES

**INDUSTRIAL/COMMERCIAL GRADE**  
miniature printed circuit trans-  
formers. Rigid terminals provide  
fixed mounting centers usually  
found in expensive molded trans-  
formers. Wt. 5 oz.



**FIG. -S**  
**SINGLE THREADED**  
**STUD MOUNTING**

Double Mu-metal shielding, 3 inch  
#30 color coded leads, .312"D. Stud  
provided with nut. 625"D x .812"H.  
Wt. 0.55 oz.



**FIG. -SP**  
**PRINTED CIRCUIT**  
**MOUNTED**

Double Mu-metal shielded. .75"D x  
1.063"H. 7-.040 pins .125"H. Wt.  
0.62 oz.



FIG. -FB  
RIGHT ANGLE  
MOUNTING BRACKET

For mounting of -S series transformers, M.C. 0.375"



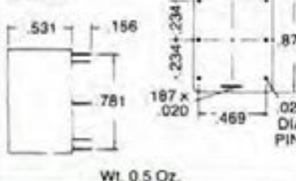
## MOLDED

Designed for plug-in printed circuit applications. Cast Epoxy resin provides highest resistance to extremes of ambient.

MIL Designation:  
TF552172

[illegible]

MM-M



Wt. 0.5 Oz



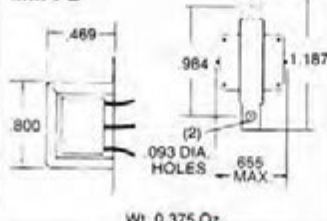
OPEN FRAME  
WITH CHANNEL

To order add -FB to Part No., i.e. MMT3-FB  
4 inch #28 color coded leads.

**MIL Designation:**

TF6S21ZZ

MM-FB



Wt. 0.375.0g.

### DECI-MINIATURE—DCM SERIES

FREQUENCY RESPONSE 200-15,000 Hz  $\pm 2$  dB

| Part No. | Primary Impedance | Secondary Impedance | Pri. Unbal. mA DC | Operating Level dBm |
|----------|-------------------|---------------------|-------------------|---------------------|
| DCM1-PC  | 25,000 CT         | 1200 CT             | 2                 | 18                  |
| DCM2-PC  | 15,000 CT         | 15,000 CT           | 3                 | 19                  |
| DCM3-PC  | 15,000 CT         | 600 CT              | 3                 | 19                  |
| DCM4-PC  | 10,000 CT         | 5000 CT             | 4                 | 20                  |
| DCM5-PC  | 10,000            | 2500/625 Split      | 2                 | 20                  |
| DCM6-PC  | 10,000 CT         | 1500 CT             | 4                 | 20                  |
| DCM7-PC  | 5000 CT           | 80,000 CT           | 6                 | 15                  |
| DCM8-PC  | 4000 CT           | 1200 CT             | 6                 | 20                  |
| DCM9-PC  | 4000 CT           | 800 CT              | 6                 | 20                  |
| DCM10-PC | 4000              | 800/150 Split       | 3                 | 20                  |
| DCM11-PC | 2500 CT           | 2500 CT             | 8                 | 20                  |
| DCM12-PC | 2500              | 2500/625 Split      | 4                 | 20                  |
| DCM13-PC | 2500 CT           | 625 CT              | 8                 | 20                  |
| DCM14-PC | 2500 CT           | 200 CT              | 8                 | 20                  |
| DCM18-PC | 800 CT            | 50,000 CT           | 16                | 20                  |
| DCM19-PC | 600               | 8000/2000 Split     | 8                 | 20                  |
| DCM20-PC | 800 CT            | 200 CT              | 16                | 20                  |
| DCM21-PC | 600 CT            | 600 CT              | 16                | 20                  |
| DCM22-PC | 250 CT            | 800 CT              | 25                | 20                  |
| DCM51-PC | Choke             | 10H @ 0 mA DC       | 5H @ 3 mA DC      | 300 DCR             |
| DCM52-PC | Choke             | 5H @ 0 mA DC        | 2H @ 5 mA DC      | 155 DCR             |
| DCM53-PC | Choke             | 2.5H @ 0 mA DC      | 1H @ 7 mA DC      | 75 DCR              |

**LOW LEVEL MICROPHONE/TRANSDUCER INPUT**  
FOR: PROFESSIONAL SOUND STUDIOS — BROADCAST MIXING  
CONSOLES — CONTROL AND INSTRUMENT AMPLIFIERS

**EQUIVALENT TO IMPORTED EUROPEAN STUDIO GRADE TRANSFORMERS**

- WIDE BANDWIDTH — BROAD FREQUENCY RESPONSE
- EXTREMELY LOW DISTORTION
- NEGLIGIBLE HUM PICK UP
- SUBMINIATURE SIZE
- EASE OF MOUNTING AND ORIENTATION
- POLARIZING VOLTAGE CONNECTION FOR CONDENSER MICROPHONES
- LOW MICROPHONICS
- ELECTROSTATIC SHIELDING

|                 | Nom.<br>Turns                                   | <b>Nominal<br/>Impedance Ratio</b> |                  | <b>Typ. Open<br/>Circuit<br/>Primary</b> |                                 |             |                                    |
|-----------------|-------------------------------------------------|------------------------------------|------------------|------------------------------------------|---------------------------------|-------------|------------------------------------|
| <b>Part No.</b> | <b>Ratio<br/>Pri./Sec.</b>                      | <b>Primary</b>                     | <b>Secondary</b> | <b>Impedance<br/>@ 50 Hz†</b>            | <b>Frequency<br/>Response ‡</b> | <b>Fig.</b> | <b>Replaces<br/>Beyer Part No.</b> |
| S101-S          | 1:20                                            | 12.5                               | 5000             | 100                                      | 30-15,000 Hz ± 1 dB             | -S          | 351.020.704                        |
| S101-SP         | 1:20                                            | 12.5                               | 5000             | 100                                      | 30-15,000 Hz ± 1 dB             | -SP         | 370.020.704                        |
| S105-S          | 1:15                                            | 200                                | 45,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -S          | 351.015.006                        |
| S105-SP         | 1:15                                            | 200                                | 45,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -SP         | 370.015.006                        |
| S107-S          | 1:15                                            | 200/50 split                       | 45,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -S          | 351.215.006                        |
| S107-SP         | 1:15                                            | 200/50 split                       | 45,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -SP         | 370.215.006                        |
| S108-S          | 1:10                                            | 200                                | 20,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -S          | 351.010.005                        |
| S108-SP         | 1:10                                            | 200                                | 20,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -SP         | 370.010.005                        |
| S111-S          | 1:7.1                                           | 200                                | 10,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -S          | 351.007.004                        |
| S111-SP         | 1:7.1                                           | 200                                | 10,000           | 2000                                     | 30-15,000 Hz ± 1 dB             | -SP         | 370.007.004                        |
| S116-S          | 1:5                                             | 200                                | 5000             | 2000                                     | 30-15,000 Hz ± 1 dB             | -S          | 351.005.003                        |
| S116-SP         | 1:5                                             | 200                                | 5000             | 2000                                     | 30-15,000 Hz ± 1 dB             | -SP         | 370.005.003                        |
| S126-S          |                                                 | 600 CT                             | 600              | 3750                                     | 30-20,000 Hz ± .5 dB            | -S          | 351.101-.031                       |
| S126-SP         | 1:1                                             | 600 CT                             | 600              | 3750                                     | 30-20,000 Hz ± .5 dB            | -SP         | 371.101-.031                       |
| S130-S          | 1:1                                             | 10,000                             | 10,000           | 100,000                                  | 30-15,000 Hz ± 1 dB             | -S          | 351.001.022                        |
| S130-SP         | 1:1                                             | 10,000                             | 10,000           | 100,000                                  | 30-15,000 Hz ± 1 dB             | -SP         | 372.001.081                        |
| S100-FB         | Right angle mounting bracket for S100-S series. |                                    |                  |                                          |                                 |             |                                    |
|                 |                                                 |                                    |                  |                                          |                                 | -FB         |                                    |

† Designed for optional bridging termination use to provide additional 6 dB output voltage gain.

† Frequency response measured with source equal to nominal primary impedance and with unloaded secondary except 100k load on S105 and S107 series.

### MICRO-MINIATURE—MM AND MMT SERIES

The low profile design of this series makes them ideal for use in plug-in printed circuit boards.

Available in open frame, hermetic, and molded constructions, all units are manufactured to MIL-I-27.

These units can be used as input, interstage, output, isolation and other impedance matching requirements.

| Part No. | Primary Impedance | Secondary Impedance | Pri. Unbal. mA DC | Oper Level dBm | Freq. Response $\pm 2$ dB |
|----------|-------------------|---------------------|-------------------|----------------|---------------------------|
| MM1(-)   | 200/50            | 250,000/62,500      | 0                 | 4              | 200-10,000                |
| MM1(-)   | 600               | 600                 | 8                 | 22             | 200-15,000                |
| MM126(-) | 600 CT            | 600 CT              | 16                | 22             | 200-15,000                |
| MM133(-) | 600 CT            | 600/150 split       | 16                | 22             | 200-15,000                |
| MM19(-)  | 600 CT            | 1200 CT             | 16                | 22             | 200-15,000                |
| MM132(-) | 600 CT            | 1200/300 split      | 16                | 22             | 200-15,000                |
| MM131(-) | 2000 CT           | 500 CT              | 10                | 28             | 200-15,000                |
| MM111(-) | 4000 CT           | 600 CT              | 5                 | 28             | 200-15,000                |
| MM121(-) | 4000 CT           | 600/150 split       | 5                 | 28             | 200-15,000                |
| MM117(-) | 10,000 CT         | 200 CT              | 6                 | 20             | 200-15,000                |
| MM128(-) | 10,000 CT         | 1500 CT             | 2                 | 20             | 200-15,000                |
| MM129(-) | 10,000 CT         | 10,000 CT           | 2                 | 20             | 200-15,000                |
| MM17(-)  | 25,000            | 1200 CT             | 1                 | 20             | 200-15,000                |
| MM118(-) | 25,000 CT         | 1200 CT             | 2                 | 20             | 200-15,000                |
| MM13(-)  | 50,000            | 600                 | 0.7               | 20             | 200-15,000                |
| MM14(-)  | 50,000 CT         | 600 CT              | 1.4               | 20             | 200-15,000                |

\* Add either -M or -FB to PIN to designate construction. See photos.

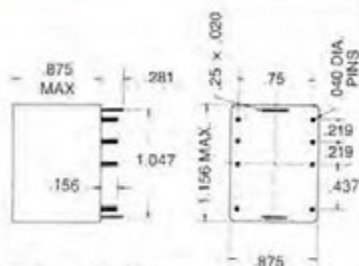


# Miniaturized Audio Transformers



## MOLDED M-M

To order add -M to Part No. For plug-in printed circuit applications. Epoxy resin provides resistance to extremes of ambient. Wt. 1.75 oz.

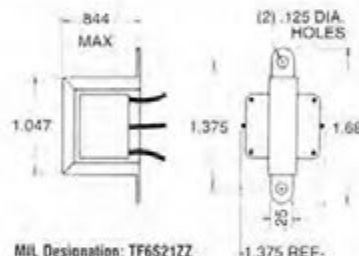


MIL Designation: TF5S21ZZ



## OPEN FRAME WITH CHANNEL M-FB

To order add -FB to Part No. Leads 4" long. #20 PVC Wt. 1.13 oz.

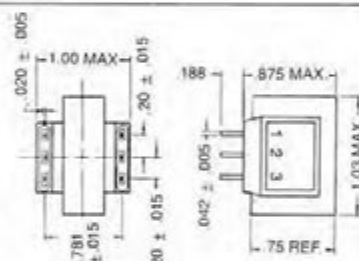


MIL Designation: TF6S21ZZ



## OPEN FRAME PRINTED CIRCUIT M-PC

To order add -PC to Part No. Units with more than 6 pins have 7 or 8 - .025 x .015 pins or .150 centers. Wt. 1.2 oz.

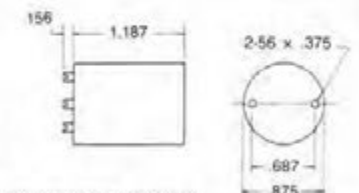


MIL Designation: TF6S21ZZ



## ALUMINUM CASED M-A

To order add -A to Part No. Supplied with 2-56 screws. Wt. 1.25 oz.



MIL Designation: TF6R21ZZ

**MODIFIED CATALOG ITEMS AND CUSTOM DESIGNS AVAILABLE ON SPECIAL ORDER. CALL US WITH YOUR SPECIFICATIONS.**



## MINIATURE AUDIO M & MT SERIES

This group of transformers is often referred to as "the designers' series."

In this series, Microtran offers the widest spectrum of electrical and mechanical specifications. All units are manufactured in accordance with the requirements of MIL-T-27. All dimensions shown in inches.

All items shown in charts below are available in any of the mechanical packages shown. Primary and secondary windings may be interchanged to obtain required impedance matching.

| Part No.* | Primary Impedance                                   | Secondary Impedance           | Primary Unbalance mA DC | Operating Level dBm | Frequency Response ±2 dB |
|-----------|-----------------------------------------------------|-------------------------------|-------------------------|---------------------|--------------------------|
| M3(-)*    | 7.5/30                                              | 50,000                        | 0                       | 5                   | 20-20,000                |
| M12(-)*   | 50/250 CT                                           | 50/250/600 CT                 | 0                       | 8                   | 20-20,000                |
| M1(-)*    | 50/250/600 CT                                       | 50,000                        | 0                       | 5                   | 20-20,000                |
| M1-S      | Same as M1 above                                    | with dual nickel alloy shield |                         |                     |                          |
| M2(-)*    | 50/250/600 CT                                       | 50,000 CT                     | 0                       | 5                   | 20-20,000                |
| M14(-)*   | 200                                                 | 1/2 Megohm                    | 0                       | 9                   | 80-3,000                 |
| M15(-)*   | 10,000                                              | 1 Megohm                      | 0                       | 11                  | 100-2,500                |
| M8(-)*    | 15,000                                              | 50/250/600 CT                 | 0                       | 8                   | 20-20,000                |
| M9(-)*    | 15,000                                              | 50/250/600 CT                 | 4                       | 21                  | 150-20,000               |
| M4(-)*    | 15,000                                              | 60,000                        | 0                       | 6                   | 20-15,000                |
| M5(-)*    | 15,000                                              | 60,000                        | 4                       | 14                  | 200-20,000               |
| M6(-)*    | 15,000                                              | 95,000 CT                     | 0                       | 5                   | 20-15,000                |
| M7(-)*    | 15,000                                              | 95,000 CT                     | 4                       | 11                  | 200-20,000               |
| M10(-)*   | 30,000 CT                                           | 50/250/600 CT                 | 0                       | 8                   | 30-50,000                |
| M11(-)*   | 50,000                                              | 50/250/600 CT                 | 0                       | 5                   | 20-20,000                |
| M13(-)*   | Reactor                                             | 300 hy. 0 DC                  | 50 hy. @ 3 mA           |                     | 6000Ω D.C.R.             |
| M90       | Magnetic Shield Mu-Metal slip on can for M-A Series | 25 dB shielding               |                         |                     |                          |
| MT2(-)*   | 100                                                 | 10 CT/40 CT                   | 100                     | 27                  | 200-20,000               |
| MT30(-)*  | 250 CT                                              | 500                           | 10                      | 30                  | 200-15,000               |
| MT23(-)*  | 250 CT                                              | 1000                          | 10                      | 30                  | 200-15,000               |
| MT14(-)*  | 400                                                 | 10                            | 50                      | 25                  | 200-20,000               |
| MT15(-)*  | 500 CT                                              | 210                           | 30                      | 27                  | 300-20,000               |
| MT1(-)*   | 600                                                 | 600                           | 10                      | 23                  | 200-15,000               |
| MT35(-)*  | 600                                                 | 600 CT & 600 CT               | 0                       | 5                   | 40-20,000                |
| MT36(-)*  | 600 CT                                              | 600 CT                        | 0                       | 15                  | 50-15,000                |
| MT26(-)*  | 600 CT                                              | 600 CT                        | 20                      | 23                  | 200-15,000               |
| MT19(-)*  | 600 CT                                              | 1,200 CT                      | 4                       | 23                  | 200-15,000               |
| MT33(-)*  | 600/150 Split                                       | 600/150 Split                 | 20                      | 23                  | 200-20,000               |
| MT22(-)*  | 600/150 Split                                       | 1,200 CT                      | 4                       | 23                  | 200-15,000               |
| MT29(-)*  | 1800 CT                                             | 450                           | 15                      | 30                  | 200-15,000               |
| MT12(-)*  | 2,000                                               | 3.4                           | 10                      | 32                  | 200-15,000               |
| MT24(-)*  | 2,500                                               | 600 CT                        | 10                      | 32                  | 200-15,000               |
| MT13(-)*  | 4,000 CT                                            | 3.4                           |                         | 32                  | 200-15,000               |
| MT11(-)*  | 4,000 CT                                            | 600 CT                        |                         | 32                  | 200-15,000               |
| MT21(-)*  | 4,000 CT                                            | 600/150 Split                 |                         | 32                  | 200-15,000               |
| MT25(-)*  | 7,500 CT                                            | 600 CT                        |                         | 32                  | 200-15,000               |
| MT34(-)*  | 10,000/2500 Split                                   | 2000/500 Split                |                         | 20                  | 200-20,000               |
| MT10(-)*  | 25,000                                              | 600                           |                         | 22                  | 200-15,000               |
| MT7(-)*   | 25,000                                              | 1,200 CT                      |                         | 22                  | 200-15,000               |
| MT18(-)*  | 25,000 CT                                           | 1,200 CT                      |                         | 22                  | 200-15,000               |
| MT5(-)*   | 50,000                                              | 6                             |                         | 20                  | 300-15,000               |
| MT3(-)*   | 50,000                                              | 600                           |                         | 20                  | 300-15,000               |
| MT8(-)*   | 50,000 CT                                           | 1,200 CT                      |                         | 20                  | 300-15,000               |
| MT20(-)*  | 50,000 CT                                           | 1200/300 Split                |                         | 20                  | 300-15,000               |
| MT6(-)*   | 100,000                                             | 1,200 CT                      | 1.4                     | 17                  | 200-15,000               |

\* Add -M, -PC, -A, or -FB to Part No. to designate construction.

† These items not available in -PC construction.

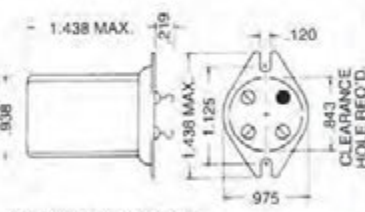
‡ For telephone line coupling or hybrid telephone line.

§ Broadcast fidelity line matching transformer. Frequency response ±0.5 dB.



## HERMETIC M-H

To order add -H to Part No. Grey Enamel Finish. High Compression Glass Terminals. Wt. 1.25 oz.



MIL Designation: TF4R21YY

**IMMEDIATE DELIVERY OF CATALOG ITEMS AT FACTORY PRICES FROM AUTHORIZED DISTRIBUTORS.**



# Technical Information

## METHOD OF APPROXIMATING SECONDARY AC CURRENT REQUIREMENTS

Since transformers may be used in many possible configurations, the current ratings shown above are AC-RMS secondary winding currents. When selecting the "Secondary Amp" rating, the conversion chart shown below may be helpful. For exact values of secondary current requirements; use curves prepared by O.H. SHADE "Proc of IRE 7/43 Analysis of Rectifier Operation."

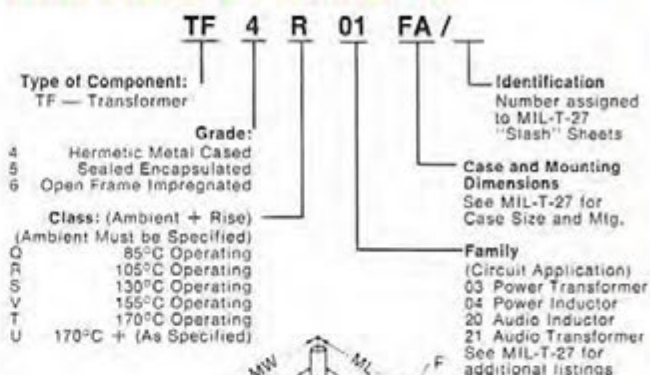
| Rectifier Type       | Filter Type     | Approximate Secondary RMS Current |
|----------------------|-----------------|-----------------------------------|
| Full Wave Center-Tap | Choke Input     | .7 times DC current               |
| Full Wave Center-Tap | Capacitor Input | 1.2 times DC current              |
| Full Wave Bridge     | Choke Input     | Equal to DC current               |
| Full Wave Bridge     | Capacitor Input | 1.8 times DC current              |

## EQUIVALENCY CHARTS

| Inches *             | mm      | Temperature  | Power     |
|----------------------|---------|--------------|-----------|
| 1/64—.0156 — 0.397   |         | °F °C        | dBm Power |
| 1/32—.0313 — 0.794   | 862 350 | -30          | 1.0 μW    |
| 1/16—.0625 — 1.588   | 392 200 | -20          | 10.0      |
| 3/32—.0938 — 2.381   | 374 190 | -10          | 100       |
| 1/8—.1250 — 3.175    | 356 180 | -6           | 250       |
| 5/32—.1563 — 3.969   | 338 170 | -5           | 320       |
| 3/16—.1875 — 4.763   | 320 160 | -4           | 400       |
| 7/32—.2188 — 5.556   | 311 155 | -3           | 500       |
| 1/4—.2500 — 6.350    | 302 150 | -2           | 630       |
| 9/32—.2813 — 7.144   | 284 140 | -1           | 794       |
| 5/16—.3125 — 7.938   | 266 130 | 0            | 1.0 mW    |
| 11/32—.3438 — 8.731  | 257 125 | 1            | 1.3       |
| 3/8—.3750 — 9.525    | 248 120 | 2            | 1.6       |
| 13/32—.4063 — 10.319 | 221 105 | 3            | 2.0       |
| 7/16—.4375 — 11.113  | 212 100 | 4            | 2.5       |
| 15/32—.4688 — 11.906 | 194 90  | 5            | 3.2       |
| 1/2—.5000 — 12.700   | 185 85  | 6            | 4.0       |
| 17/32—.5313 — 13.494 | 176 80  | 10           | 10.0      |
| 9/16—.5625 — 14.288  | 158 70  | 15           | 31.6      |
| 19/32—.5938 — 15.081 | 149 65  | 20           | 100       |
| 5/8—.6250 — 15.875   | 140 60  | 25           | 320       |
| 21/32—.6563 — 16.669 | 131 55  | 30           | 1.0 watt  |
| 11/16—.6875 — 17.463 | 122 50  | 35           | 3.2       |
| 23/32—.7188 — 18.256 | 104 40  | 40           | 10        |
| 3/4—.7500 — 19.050   | 95 35   | 45           | 32        |
| 25/32—.7813 — 19.844 | 86 30   | 50           | 100       |
| 13/16—.8125 — 20.638 | 77 25   | 60           | 1000      |
| 27/32—.8438 — 21.431 | 68 20   | 70           | 10 kW     |
| 7/8—.8750 — 22.225   | 50 10   | 80           | 100 kW    |
| 29/32—.9063 — 23.019 | 32 0    | 90           | 1000 kW   |
| 15/16—.9375 — 23.813 | 14 -10  | 100          | 10 Meg. W |
| 31/32—.9688 — 24.606 | -4 -20  |              |           |
| 1 —1.000 — 25.400    | -40 -40 |              |           |
|                      | -67 -55 |              |           |
|                      | -85 -65 |              |           |
|                      |         | dbm - 10 log | P<br>1 mW |

\* Unless otherwise specified, catalog dimensions are shown in inches.

## INTERPRETATION OF TYPE DESIGNATION PER MIL-T-27



## STANDARD MIL-T-27 CASES DIMENSIONS (INCHES)

| Case Symbol | — Case Dimensions — |         |         | — Mounting Dimensions — |         |              |
|-------------|---------------------|---------|---------|-------------------------|---------|--------------|
|             | L                   | W       | H       | ML                      | MW      | F            |
| AF          | 3/4                 | 3/4     | 1 1/8   | 1 1/8*                  | —       | 4-40 x 3/8   |
| AG          | 1                   | 1       | 1 3/8   | 1 1/8*                  | —       | 6-32 x 3/8   |
| AH          | 1 1/8               | 1 1/8   | 1 3/4   | S: 1 1/4                | —       | 6-32 x 3/8   |
| AJ          | 1 5/8               | 1 5/8   | 2 3/8   | 1 3/8                   | 1 1/8   | 6-32 x 3/8   |
| EA          | 1 13/16             | 1 13/16 | 2 3/4   | 1 3/8                   | 1 1/4   | 6-32 x 3/8   |
| EB          | 1 13/16             | 1 13/16 | 2 1/2   | 1 3/8                   | 1 1/4   | 6-32 x 3/8   |
| FA          | 2 1/8               | 2 1/8   | 3 1/8   | 1 13/16                 | 1 3/8   | 6-32 x 3/8   |
| FB          | 2 1/8               | 2 1/8   | 2 1/2   | 1 13/16                 | 1 3/8   | 6-32 x 3/8   |
| GA          | 2 3/4               | 2 3/8   | 3 13/16 | 2 1/8                   | 1 3/4   | 6-32 x 3/8   |
| GB          | 2 3/4               | 2 3/8   | 2 13/16 | 2 1/8                   | 1 3/4   | 6-32 x 3/8   |
| HA          | 3 1/8               | 2 5/8   | 4 1/4   | 2 13/16                 | 1 3/4   | 8-32 x 3/8   |
| HB          | 3 1/8               | 2 5/8   | 3 3/8   | 2 13/16                 | 1 3/4   | 8-32 x 3/8   |
| JA          | 3 1/8               | 3 1/8   | 4 1/2   | 2 5/8                   | 2 1/8   | 8-32 x 3/8   |
| JB          | 3 1/8               | 3 1/8   | 3 7/8   | 2 5/8                   | 2 1/8   | 8-32 x 3/8   |
| KA          | 3 13/16             | 3 3/8   | 5 1/4   | 3                       | 2 1/8   | 10-32 x 1/2  |
| KB          | 3 13/16             | 3 3/8   | 4 5/8   | 3                       | 2 1/8   | 10-32 x 1/2  |
| LA          | 4 3/8               | 3 11/16 | 5 1/4   | 3 3/8                   | 2 13/16 | 10-32 x 1/2  |
| LB          | 4 3/8               | 3 11/16 | 4 1/2   | 3 3/8                   | 2 13/16 | 10-32 x 1/2  |
| MA          | 4 13/16             | 4       | 6       | 3 13/16                 | 3       | 1/4-20 x 5/8 |
| MB          | 4 13/16             | 4       | 4 13/16 | 3 13/16                 | 3       | 1/4-20 x 5/8 |
| NA          | 5 1/8               | 4 3/8   | 6 13/16 | 4 3/8                   | 3 3/8   | 1/4-20 x 5/8 |
| NB          | 5 1/8               | 4 3/8   | 5 1/2   | 4 3/8                   | 3 3/8   | 1/4-20 x 5/8 |
| OA          | 5 1/2               | 4 1/2   | 6 3/4   | 3 3/4                   | 3       | 1/4-20 x 5/8 |

\* Not in conformance with MIL-T-27. S: Two studs in a diagonal.

YY — All metal cases not included above or with non-standard mounting centers. ZZ — Open type and encapsulated units.

1. Tolerances on dimensions L and W are  $\pm 0$  to  $-1/16$  for cases AF, AG, AH and AJ;  $\pm 0$  to  $-1/8$  for all other cases.

2. Tolerances on dimension H are  $\pm 0$  to  $-1/8$  for cases AF, AG, AH, and AJ;  $\pm 0$  to  $-3/16$  for all other cases.

3. Tolerances on dimensions ML and MW are  $\pm 1/16$  for cases AJ to JB inclusive;  $\pm 1/32$  for cases KA to LB, inclusive; and  $\pm 1/16$  for cases MA to OA, inclusive. When mounting studs or holes for inserts are used, they shall be symmetrically located.

4. Screw-stud lengths are from mounting surface and have a length tolerance of  $\pm 1/16$  on studs 1/2" long or less and  $\pm 1/8$  on studs over 1/2" long.



# Custom Transformer Specification Sheet

## action request form

For your special needs, we can modify catalog items at low cost; or for unique applications, we design magnetics from scratch...and fast.

Fill in your specs. below and Fax them to us.

Date .....

Name/Title .....

Company .....

Address .....

Phone ..... Fax .....

### POWER

TYPES: ☐ 50/60 / 400 Hz.  
☐ SMPS/Converter  
☐ Inductor

#### TRANSFORMERS

| Windings | Volts | RMS Amps | RMS Test V. |
|----------|-------|----------|-------------|
| Pri.     |       |          |             |
| Sec. #1  |       |          |             |
| Sec. #2  |       |          |             |
| Sec. #3  |       |          |             |

Frequency ..... Hz

Maximum Temperature Rise ..... °C

### AUDIO

TYPES: ☐ Input  
☐ Inductors

#### TRANSFORMERS

| Windings | Winding Impedance | Unbal DC | Source/Load Impedance | RMS Test V. |
|----------|-------------------|----------|-----------------------|-------------|
| Pri.     |                   |          |                       |             |
| Sec. #1  |                   |          |                       |             |
| Sec. #2  |                   |          |                       |             |

Frequency Response .....

Power Level ..... Distortion ..... %

### GENERAL REQUIREMENTS

Size restrictions? .....

Construction: ☐ Open  
☐ Cased

Mounting:

- ☐ Surface Mount  
☐ Through Hole  
☐ Chassis .....

Connection Type:  
☐ Solderable  
☐ Quick Connect  
☐ Lead Wire

Agency approvals required: ☐ U.L. ☐ CSA ☐ IEC ☐ VDE ☐ Other .....

Mil Specs: ☐ MIL-T-27 ☐ Grade ..... ☐ Other .....

Other requirements .....

Product application .....

Anticipated annual volume ..... Initial production date .....



#### INDUCTORS

| Inductance | Current RMS/DC | DCR |
|------------|----------------|-----|
|            |                |     |
|            |                |     |
|            |                |     |
|            |                |     |

Ambient Temperature ..... °C

Regulation ..... %

☐ Output  
☐ Telecommunication  
☐ Matching

#### INDUCTORS

| Inductance | mA DC | DCR | Freq. |
|------------|-------|-----|-------|
|            |       |     |       |
|            |       |     |       |
|            |       |     |       |
|            |       |     |       |

Insertion Loss ..... dB

Return Loss ..... dB

#### SCHEMATIC DIAGRAM/APPLICATION CIRCUIT



***THORDARSON MEISSNER, INC.***  
***537 EAST BROOKS AVE. #409***  
***NORTH LAS VEGAS, NV 89030-3973***  
***PHONE: 702-566-0800***  
***FAX: 702-566-2880***  
***EMAIL: INFO@THORDARSONMAGNETICS.COM***

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