

## Filter Data Sheets

### Solder Mounted Feedthrough Capacitors

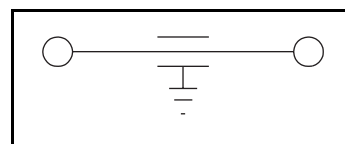
TF, DF

#### Ordering Information

As Part Number

|                                       |                             |
|---------------------------------------|-----------------------------|
| Tangent of loss angle (Tan $\delta$ ) | 0.035 max.                  |
| Insulation Resistance                 | 7.5 GW Min at Rated Voltage |
| Proof Test Voltage                    | 3 × Rated Voltage           |
| Finish                                | Tin                         |

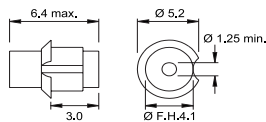
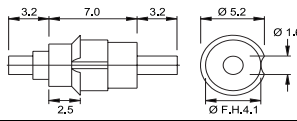
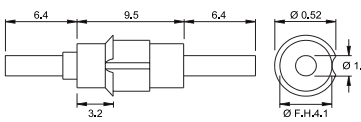
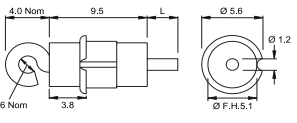
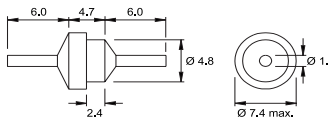
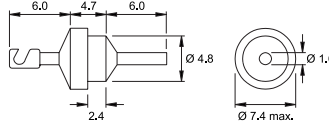
#### Circuit Diagram



#### Case Dimensions

All dimensions in mm. Limits  $\pm 0.2$  unless otherwise stated.

#### Characteristics

| Case Type                                                                                                                                       | Part Number | Cap.<br>(pF) | Tolerance  | Current<br>Rating<br>(A) | Rated Voltage<br>V d.c.<br>-55°C to +85°C | Typical Insertion Loss (dB) |         |       |        |
|-------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------------|------------|--------------------------|-------------------------------------------|-----------------------------|---------|-------|--------|
|                                                                                                                                                 |             |              |            |                          |                                           | 10 MHz                      | 100 MHz | 1 GHz | 10 GHz |
|                                                               | TF500PP2420 | 500          | - 0 + 100% | —                        | 300                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 | TF01N0Z2420 | 1000         | - 20 + 80% | —                        | 300                                       | 6                           | 23      | 43    | 60     |
|                                                              | TF01N0Z2415 | 1000         | - 20 + 80% | 15                       | 300                                       | 6                           | 23      | 43    | 60     |
|                                                                                                                                                 |             |              |            |                          |                                           |                             |         |       |        |
|                                                              | TF01N0P2404 | 1000         | - 0 + 100% | 10                       | 500                                       | 6                           | 23      | 43    | 60     |
|                                                                                                                                                 | TF01N0Z2404 | 1000         | - 20 + 80% | 10                       | 500                                       | 6                           | 23      | 43    | 60     |
|                                                                                                                                                 | TF500PE2404 | 500          | $\pm 25\%$ | 10                       | 500                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 | TF04N2M2404 | 4200         | $\pm 20\%$ | 10                       | 500                                       | 12                          | 35      | 50    | 60     |
|  <p><b>Note:</b> Type 2500 L = 3.2<br/>Type 2501 L = 6.4</p> | TF01N0Z2500 | 1000         | - 20 + 80% | 10                       | 500                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 | TF01N5Z2500 | 1500         | - 20 + 80% | 10                       | 500                                       | 9                           | 28      | 48    | 60     |
|                                                                                                                                                 | TF03N0Z2500 | 3000         | - 20 + 80% | 10                       | 500                                       | 12                          | 32      | 53    | 60     |
|                                                                                                                                                 | TF01N0Z2501 | 1000         | - 20 + 80% | 10                       | 500                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 | TF01N5Z2501 | 1500         | - 20 + 80% | 10                       | 500                                       | 9                           | 28      | 48    | 60     |
|                                                                                                                                                 | TF03N0Z2501 | 3000         | - 20 + 80% | 10                       | 500                                       | 12                          | 32      | 53    | 60     |
|                                                              | DF01N0Z0100 | 1000         | - 20 + 80% | 15                       | 500                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 |             |              |            |                          |                                           |                             |         |       |        |
|                                                              | DF01N0Z0101 | 1000         | - 20 + 80% | 15                       | 500                                       | 3                           | 16      | 36    | 55     |
|                                                                                                                                                 |             |              |            |                          |                                           |                             |         |       |        |

Other values of capacitance are available on request.

# Solder Mounted C and Pi Circuit Filters

SLT

## Ordering Information

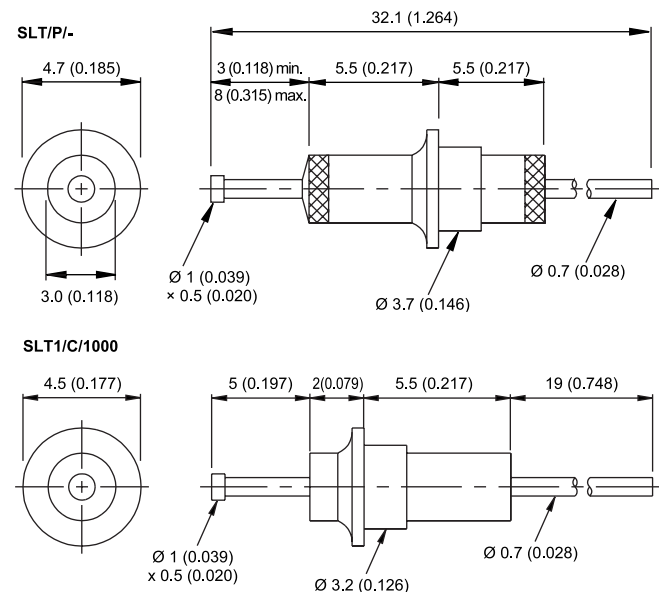
Please state Part Number.

## Materials

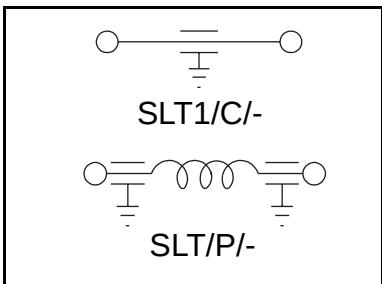
Mounting eyelet: Brass, silver finish  
Feedthrough terminations: Copper alloy, tin lead or silver finish.

## Case Dimensions

All dimensions in mm (inches)



## Circuit Diagram



## Voltage Rating

| Type C      |        | Type Pi     |            |
|-------------|--------|-------------|------------|
| -55 to 85°C | +125°C | -55 to 85°C | +125°C     |
| 400 V d.c.  | —      | 200 V d.c.  | 100 V d.c. |

For Test Conditions see page 59

| Type        | Mounting Hole   | Minimum Pitch   |
|-------------|-----------------|-----------------|
| SLT1/C/1000 | 3.4 mm (0.134") | 4.8 mm (0.189") |
| SLT/P/680   | 4 mm (0.157")   | 5 mm (0.197")   |
| SLT/P/1500  | 4 mm (0.157")   | 5 mm (0.197")   |
| SLT/P/5000  | 4 mm (0.157")   | 5 mm (0.197")   |

## Characteristics

| Part Number | Cap. (pF)<br>(min.) | Current Rating<br>(A d.c. & 400<br>Hz a.c.) | Typical Insertion Loss (dB) (50 Ω system) |        |         |       |        | Color Code |
|-------------|---------------------|---------------------------------------------|-------------------------------------------|--------|---------|-------|--------|------------|
|             |                     |                                             | 1 MHz                                     | 10 MHz | 100 MHz | 1 GHz | 10 GHz |            |
| SLT1/C/1000 | 1000                | 10                                          | -                                         | 5      | 24      | 40    | 65     | -          |
| SLT/P/680   | 680                 | 10                                          | -                                         | 4      | 35      | 60    | 70     | GREEN      |
| SLT/P/1500  | 1500                | 10                                          | 1                                         | 12     | 50      | 75    | 75     | BLUE       |
| SLT/P/5000  | 5000                | 10                                          | 4                                         | 25     | 70      | 75    | 75     | RED        |

## Solder Mounted Pi Circuit Filters

## TPS

## Ordering Information

e.g TPS014A



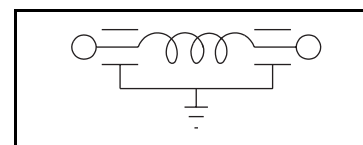
Blank - No special conditioning  
Bu - Standard burn in  
Bx - Burn in to Cust. req.

## Insulation Resistance

| Rated Voltage at 85°C | Test Voltage    | I.R.  |
|-----------------------|-----------------|-------|
| < 100 V d.c.          | 10 ± 1 V d.c.   | > 5GΩ |
| ≥ 100 to < 500 V d.c. | 100 ± 15 V d.c. |       |
| ≥ 500                 | 500 ± 50 V d.c. |       |

| Tangent of loss angle (Tan δ) | 0.04 max. |
|-------------------------------|-----------|
| Finish                        | Tin       |

## Circuit Diagram



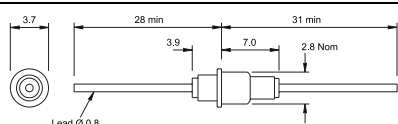
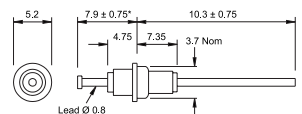
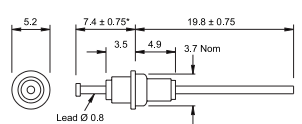
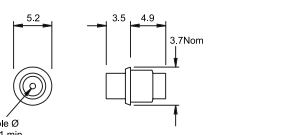
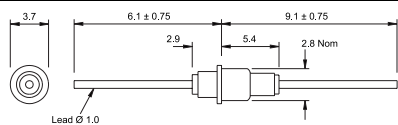
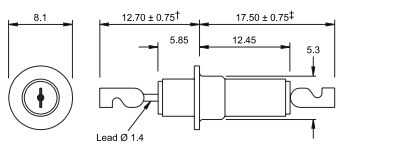
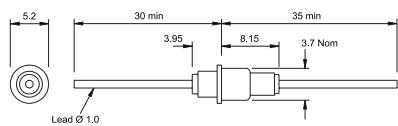
Environmental Classification 55/125/56

## Case Dimensions

For Test Conditions see page 59

All dimensions in mm. Maximum unless otherwise stated.

## Characteristics

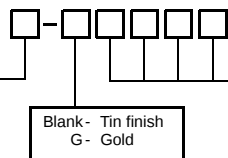
| Case Type                                                                                                                                                        | Part Number | Min Cap. (pF) | Rated Voltage V d.c. |       | Current d.c. (A) | Minimum No Load Insertion Loss (dB) at 25°C |         |       |        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------------|----------------------|-------|------------------|---------------------------------------------|---------|-------|--------|
|                                                                                                                                                                  |             |               | 85°C                 | 125°C |                  | 10 MHz                                      | 100 MHz | 1 GHz | 10 GHz |
|                                                                                | TPS051A     | 1500          | 350                  | 210   | 10               | 6                                           | 45      | 60    | 60     |
|                                                                                                                                                                  | TPS051B     | 5000          | 200                  | 120   | 10               | 15                                          | 65      | 70    | 70     |
| * TPS103 - No Pin Head<br>                                                    | TPS003A     | 1500          | 600                  | 360   | 10               | 5                                           | 45      | 70    | 70     |
|                                                                                                                                                                  | TPS103A     | 1500          | 600                  | 360   | 10               | 5                                           | 45      | 70    | 70     |
|                                                                                                                                                                  | TPS003B     | 4000          | 350                  | 210   | 10               | 15                                          | 65      | 70    | 70     |
|                                                                                                                                                                  | TPS103B     | 4000          | 350                  | 210   | 10               | 15                                          | 65      | 70    | 70     |
|                                                                                                                                                                  | TPS203E     | 5000          | 350                  | 210   | 10               | 20                                          | 70      | 70    | 70     |
| * TPS114 - No Pin Head<br>                                                    | TPS014A     | 1750          | 350                  | 210   | 10               | 5                                           | 50      | 60    | 60     |
|                                                                                                                                                                  | TPS114A     | 1750          | 350                  | 210   | 10               | 5                                           | 50      | 60    | 60     |
|                                                                                                                                                                  | TPS014B     | 800           | 600                  | 360   | 10               | 3                                           | 30      | 60    | 60     |
|                                                                                                                                                                  | TPS114B     | 800           | 600                  | 360   | 10               | 3                                           | 30      | 60    | 60     |
|                                                                                                                                                                  |             |               |                      |       |                  |                                             |         |       |        |
|                                                                               | TPS014C     | 1750          | 350                  | 210   | 10               | 5                                           | 35      | 50    | 50     |
|                                                                                                                                                                  | TPS014D     | 800           | 600                  | 360   | 10               | 3                                           | 23      | 50    | 50     |
|                                                                               | TPS023A     | 3000          | 200                  | 120   | 15               | 7                                           | 50      | 65    | 60     |
|                                                                                                                                                                  | TPS023B     | 1500          | 350                  | 210   | 15               | 5                                           | 25      | 60    | 60     |
| <br>* TPS104 - No Lead Forming<br>TPS204 - Lead Lengths †30 Min and ‡36.5 Min | TPS004A     | 3000          | 830                  | 500   | 25               | 8                                           | 50      | 70    | 70     |
|                                                                                                                                                                  | TPS104A     | 3000          | 830                  | 500   | 25               | 8                                           | 50      | 70    | 70     |
|                                                                                                                                                                  | TPS204A     | 3000          | 830                  | 500   | 25               | 8                                           | 50      | 70    | 70     |
|                                                                                                                                                                  | TPS004B     | 2000          | 1000                 | 600   | 25               | 5                                           | 50      | 65    | 65     |
|                                                                                                                                                                  | TPS104B     | 2000          | 1000                 | 600   | 25               | 5                                           | 50      | 65    | 65     |
|                                                                                                                                                                  | TPS204B     | 2000          | 1000                 | 600   | 25               | 5                                           | 50      | 65    | 65     |
|                                                                               | TPS017A     | 3000          | 350                  | 210   | 10               | 8                                           | 55      | 65    | 65     |

## Solder Mounted Feedthrough Capacitors

## DCS

## Ordering Information

e.g. DCS204N

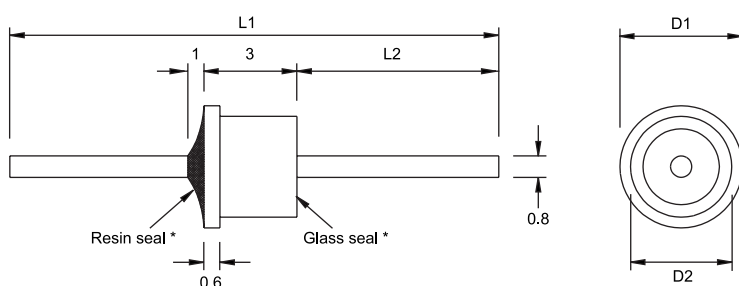
Blank - Seal positioning  
per outline drawing  
Z - Seal positions revCapacitance, e.g.  
100 pf = 100P  
2700 pf = 02N7

Environmental Classification 55/125/56

For Test Conditions see page 59

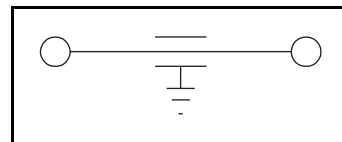
## Case Dimensions

All dimensions maximum unless otherwise stated, in mm.



\* Available with Glass/Resin Seal Positions Reversed – See Ordering Information

## Circuit Diagram



## Voltage Rating

| DCS# _ _ _ _ |                          |                           |                                  |
|--------------|--------------------------|---------------------------|----------------------------------|
| #            | -55°C to +85°C<br>V d.c. | -55°C to +125°C<br>V d.c. | -55°C to +125°C<br>V a.c. 400 Hz |
| 2            | 70                       | 60                        | —                                |
| 4            | 100                      | 87                        | 62                               |
| 5            | 150                      | 130                       | 90                               |
| 7            | 300                      | 260                       | 185                              |

## Case Diameter

| DCS _ # # _ _ |     |      |        |           |
|---------------|-----|------|--------|-----------|
| # #           | D1  | D2   | L1     | L2        |
| 04            | 4.2 | 3.35 | 16 ± 1 | 6.6 ± 0.5 |
| 21            | 6.5 | 5.6  | 11 ± 1 | 4.0 ± 0.5 |

## Characteristics

| Part Number  | Rated Current<br>(Amps) | Min. Cap.<br>(pF) | Min IR<br>(GΩ) | Typical Insertion Loss (db) at Full Load Current<br>-55°C to +125°C |         |       |        |
|--------------|-------------------------|-------------------|----------------|---------------------------------------------------------------------|---------|-------|--------|
|              |                         |                   |                | 10 MHz                                                              | 100 MHz | 1 GHz | 10 GHz |
| DCS204N-100P | 10                      | 100               | 5              | -                                                                   | 3       | 20    | 28     |
| DCS204N-500P | 10                      | 500               | 5              | -                                                                   | 13      | 30    | 40     |
| DCS204N-01N2 | 10                      | 1200              | 5              | 3                                                                   | 20      | 37    | 45     |
| DCS204N-02N7 | 10                      | 2700              | 5              | 9                                                                   | 25      | 40    | 50     |
| DCS204N-05N0 | 10                      | 5000              | 5              | 14                                                                  | 30      | 45    | 55     |
| DCS421N-22P0 | 10                      | 22                | 5              | -                                                                   | -       | 6     | 23     |
| DCS421N-47P0 | 10                      | 47                | 5              | -                                                                   | -       | 11    | 28     |
| DCS421N-100P | 10                      | 100               | 5              | -                                                                   | 3       | 20    | 28     |
| DCS421N-330P | 10                      | 330               | 5              | -                                                                   | 12      | 30    | 48     |
| DCS421N-470P | 10                      | 470               | 5              | -                                                                   | 13      | 32    | 50     |
| DCS421N-680P | 10                      | 680               | 5              | -                                                                   | 16      | 34    | 50     |
| DCS421N-01N0 | 10                      | 1000              | 5              | 2                                                                   | 19      | 36    | 53     |
| DCS421N-02N2 | 10                      | 2200              | 5              | 8                                                                   | 26      | 42    | 58     |
| DCS421N-03N3 | 10                      | 3300              | 5              | 11                                                                  | 29      | 44    | 60     |
| DCS421N-04N7 | 10                      | 4700              | 5              | 13                                                                  | 32      | 44    | 60     |
| DCS421N-06N8 | 10                      | 6800              | 5              | 17                                                                  | 35      | 45    | 60     |
| DCS421N-10N0 | 10                      | 10000             | 5              | 20                                                                  | 39      | 46    | 60     |
| DCS504N-100P | 10                      | 100               | 5              | -                                                                   | 3       | 20    | 28     |
| DCS504N-500P | 10                      | 500               | 5              | -                                                                   | 13      | 35    | 50     |
| DCS504N-01N2 | 10                      | 1200              | 5              | 3                                                                   | 20      | 37    | 45     |
| DCS504N-02N7 | 10                      | 2700              | 5              | 9                                                                   | 25      | 40    | 50     |
| DCS704N-100P | 10                      | 100               | 5              | -                                                                   | 3       | 20    | 28     |
| DCS704N-500P | 10                      | 500               | 5              | -                                                                   | 13      | 30    | 40     |
| DCS704N-01N2 | 10                      | 1200              | 5              | 3                                                                   | 20      | 35    | 45     |

## Solder Mounted C Circuit Filters

dBZ, D

## Ordering Information

Please state Part Number.

## Materials

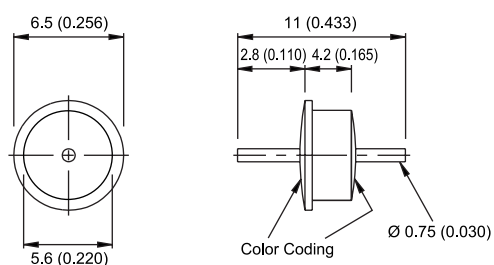
Cases: Brass, silver finish

Feedthrough terminations: Copper alloy, tin lead or silver finish.

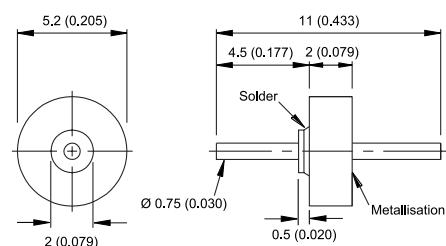
## Case Dimensions

All dimensions in mm (inches)

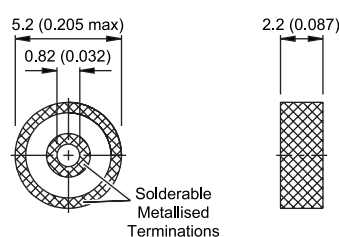
## dBZ/-/Ref 1



## dBZ/-



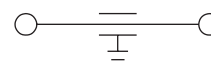
## D/-



## Circuit Diagram

Terminations

dBZ/-/Ref 1, dBZ/- and D/-



## Voltage Rating

|                  | -40 to 85°C | +100°C    |
|------------------|-------------|-----------|
| dBZ/100000/Ref 1 | 50 V d.c.   | 25 V d.c. |
| All others       | 100 V d.c.  | 50 V d.c. |

Linearly derate between 85°C and 100°C

|                        | D/-, dBZ/-      | dBZ/-/Ref 1                  |
|------------------------|-----------------|------------------------------|
| Mounting Hole Diameter | 5.3 mm (0.209") | 5.7-5.8 mm (0.224" - 0.228") |
| Minimum Pitch          | 5.4 mm (0.213") | 6.7 mm (0.264")              |

For Test Conditions see page 59

## Characteristics

| Part Number      | Cap. (pF)<br>(-20% +80%) | Current Rating<br>(A d.c.) | Typical Insertion Loss (dB) (50 Ω system) |       |        |         |       | Color Code<br>(hex end/thread end) |
|------------------|--------------------------|----------------------------|-------------------------------------------|-------|--------|---------|-------|------------------------------------|
|                  |                          |                            | 0.1 MHz                                   | 1 MHz | 10 MHz | 100 MHz | 1 GHz |                                    |
| dBZ/22/Ref 1     | 22                       | 10                         | -                                         | -     | -      | 3       | 15    | BLACK                              |
| dBZ/47/Ref 1     | 47                       | 10                         | -                                         | -     | -      | 5       | 20    | YELLOW                             |
| dBZ/100/Ref 1    | 100                      | 10                         | -                                         | -     | -      | 8       | 28    | WHITE                              |
| dBZ/330/Ref 1    | 330                      | 10                         | -                                         | -     | 2      | 18      | 34    | GREEN                              |
| dBZ/470/Ref 1    | 470                      | 10                         | -                                         | -     | 3      | 20      | 40    | ORANGE                             |
| dBZ/680/Ref 1    | 680                      | 10                         | -                                         | -     | 4      | 22      | 40    | GREY                               |
| dBZ/1000/Ref 1   | 1000                     | 10                         | -                                         | -     | 9      | 27      | 40    | BROWN                              |
| dBZ/4700/Ref 1   | 4700                     | 10                         | -                                         | 3     | 20     | 38      | 53    | RED                                |
| dBZ/10000/Ref 1  | 10000                    | 10                         | 1                                         | 8     | 27     | 44      | 63    | BLUE                               |
| dBZ/47000/Ref 1  | 47000                    | 10                         | 2                                         | 20    | 41     | 45      | 74    | LIGHT BLUE                         |
| dBZ/100000/Ref 1 | 100000                   | 10                         | 4                                         | 25    | 45     | 57      | 75    | LIGHT BROWN                        |

The insertion loss and electrical details above also apply to types D/- and dBZ/-

Solder Mounted C Circuit Filters

dBZ2

Ordering Information

Please state Part Number.

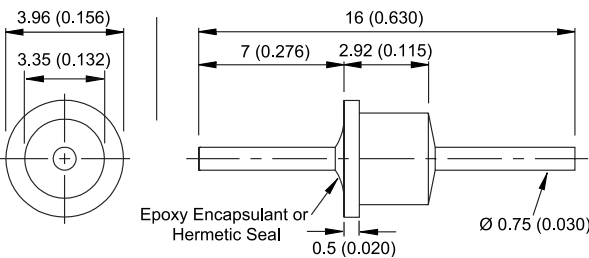
Materials

Body: Mild steel, gold finish (dBZ2/C/-/H)  
Brass, gold finish (dBZ2/C/-)

Feedthrough terminations: Iron/cobalt/nickel alloy gold finish (dBZ2/C/-/H)  
Copper, gold finish (dBZ2/C/-)

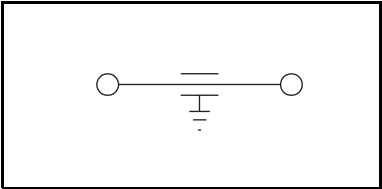
Case Dimensions

All dimensions in mm (inches)



|                        |                 |
|------------------------|-----------------|
| Mounting Hole Diameter | 3.5 mm (0.138") |
|------------------------|-----------------|

Circuit Diagram



Voltage Rating

| -55 to 85°C | +125°C    |
|-------------|-----------|
| 200 V d.c.  | 100 Vd.c. |

Linearly derate between 85°C and 125°C

Current Rating

|            |           |
|------------|-----------|
| dBZ2/C/-/H | 5 A d.c.  |
| dBZ2/C/-   | 10 A d.c. |

For Test Conditions see page 59

Characteristics

| Part Number   |             | Cap. (pF)<br>(min.) | Typical Insertion Loss (dB) (50 Ω system) |         |       |        | Color Code<br>(top end) |
|---------------|-------------|---------------------|-------------------------------------------|---------|-------|--------|-------------------------|
| Hermetic Seal | Epoxy Seal  |                     | 10 MHz                                    | 100 Mhz | 1 GHz | 10 GHz |                         |
| dBZ2/C/10/H   | dBZ2/C/10   | 10                  | -                                         | -       | 7     | 25     | PINK                    |
| dBZ2/C/500/H  | dBZ2/C/500  | 500                 | 3                                         | 20      | 40    | 55     | ORANGE                  |
| dBZ2/C/1000/H | dBZ2/C/1000 | 1000                | 9                                         | 26      | 40    | 60     | BROWN                   |
| dBZ2/C/2700/H | dBZ2/C/2700 | 2700                | 17                                        | 35      | 50    | 65     | LIGHT GREEN             |
| dBZ2/C/5000/H | dBZ2/C/5000 | 5000                | 20                                        | 38      | 53    | 65     | RED                     |

Solder Mounted Pi Circuit Filters

dBZ4

Ordering Information

Please state Part Number.

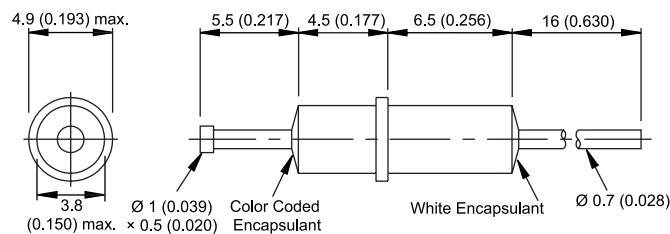
Materials

Body: Brass, silver finish  
Feedthrough terminations: Copper alloy, tin lead or silver finish.

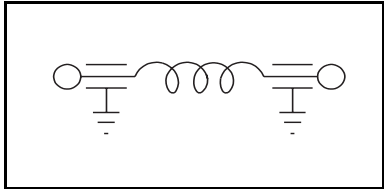
For Test Conditions see page 59

Case Dimensions

All dimensions in mm (inches)



Circuit Diagram



Voltage Rating

| -55 to 85°C | +125°C    |
|-------------|-----------|
| 200 V d.c.  | 100 Vd.c. |

Linearly derate between 85°C and 125°C

| All Types     |               |
|---------------|---------------|
| Mounting Hole | 4 mm (0.157") |
| Minimum Pitch | 5 mm (0.197") |

Characteristics

| Part Number  | Cap. (pF)<br>(-20% +80%) | Current Rating<br>(A d.c.) | Typical Insertion Loss (dB) (50 Ω system) |       |        |         |       |        | Color Code       | Marking* |
|--------------|--------------------------|----------------------------|-------------------------------------------|-------|--------|---------|-------|--------|------------------|----------|
|              |                          |                            | 0.1 MHz                                   | 1 Mhz | 10 MHz | 100 MHz | 1 GHz | 10 Ghz |                  |          |
| dBZ4/P/5000  | 5000                     | 10                         | -                                         | 4     | 25     | 70      | 75    | 75     | GREEN/WHITE      | OXp 5n0  |
| dBZ4/P/22000 | 22000                    | 10                         | 1                                         | 14    | 40     | 70      | 75    | 75     | DARK BLUE/WHITE  | OXp 22n  |
| dBZ4/P/44000 | 4400                     | 10                         | 3                                         | 17    | 50     | 70      | 75    | 75     | LIGHT BLUE/WHITE | OXp 44n  |

\*Color Coding may be replaced by a marker.

Printed Circuit Mounted Pi Filters

SLT/-/PC2

Ordering Information

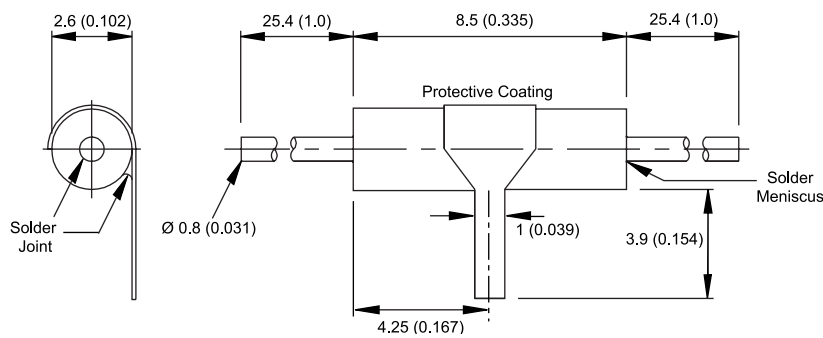
Please state Part Number.

Materials

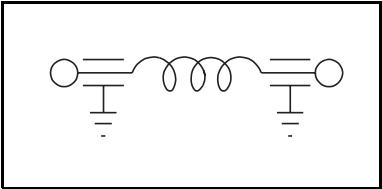
Feedthrough terminations: Copper alloy, tin lead finish.  
Earth tag: Brass, tin lead on area for user soldering, silver finish on remainder.

Case Dimensions

All dimensions in mm (inches)



Circuit Diagram



For Test Conditions see page 59

| Part Number                                                                                        | Mounting Hole                                                 |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| SLT/P/1500/PC2                                                                                     | 0.9 mm (0.035") [terminations]<br>1.2 mm (0.047") [earth tag] |
| Bends in the terminations must be at a distance not less than 2 mm (0.079") from the ceramic body. |                                                               |

Voltage Rating

| -55 to 85°C | +125°C    |
|-------------|-----------|
| 200 V d.c.  | 100 Vd.c. |

Linearly derate between 85°C and 125°C

Characteristics

| Part Number    | Min. Cap. (pF) | Current Rating (A d.c.) | Typical Insertion Loss (dB) 50 Ω system |        |        |         |         |
|----------------|----------------|-------------------------|-----------------------------------------|--------|--------|---------|---------|
|                |                |                         | 2 MHz                                   | 10 MHz | 50 MHz | 100 MHz | 500 MHz |
| SLT/P/1500/PC2 | 1500           | 10                      | 3                                       | 22     | 40     | 60      | 60      |

## Surface Mounted Pi Filters

## SLT/-/SM3

## Ordering Information

Please state Part Number.

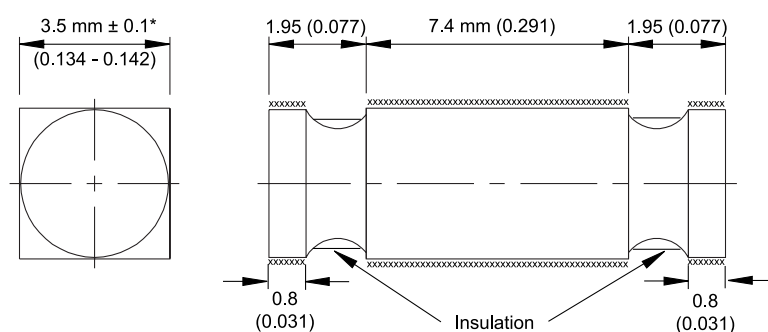
## Materials

Terminations: Tin lead or silver.

For Test Conditions see page 59

## Case Dimensions

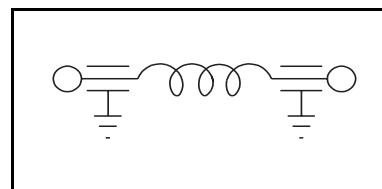
All dimensions in mm (inches)



xxx indicates solderable surface

\* Tin/lead finish 3.7 mm ± 0.2 (Dipped Finish)

## Circuit Diagram



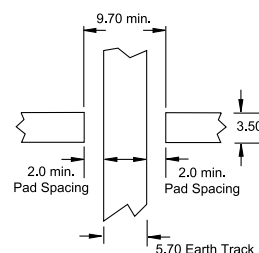
## Voltage Rating

| -55 to 85°C | +125°C    |
|-------------|-----------|
| 200 V d.c.  | 100 Vd.c. |

Linearly derate between 85°C and 125°C

## Recommended PCB Track Sizes

Dimensions in mm



## Characteristics

| Part Number     | Cap. (pF)<br>(-20% +80%) | Current Rating<br>(A d.c.) | Typical Insertion Loss (dB) (50 Ω system shielded housing) |        |         |       |        |
|-----------------|--------------------------|----------------------------|------------------------------------------------------------|--------|---------|-------|--------|
|                 |                          |                            | 1 MHz                                                      | 10 MHz | 100 MHz | 1 GHz | 10 GHz |
| SLT/P/1500/SM3  | 1500                     | 10                         | 2                                                          | 16     | 53      | 65    | 65     |
| SLT/P/22000/SM3 | 22000                    | 10                         | 12                                                         | 48     | 65      | 65    | 65     |

Miniature Threaded Feedthrough Capacitors

TCT

Ordering Information

e.g. TCT150A

Blank - Unified thread  
M - Metric thread

Blank - No special conditioning  
Bu - Standard burn in  
Bx - Burn in to Cust. req.

Blank - Tin finish  
G - Gold  
S - Silver

Blank - Wavy washer and nut  
T - Toothed washer and nut  
N - No hardware

Environmental Classification 55/125/56

|                               |                   |
|-------------------------------|-------------------|
| Tangent of loss angle (Tan δ) | 0.04 max.         |
| Proof Test Voltage            | 2 × Rated Voltage |

Case Dimensions

All dimensions in mm. Limits unless otherwise stated:  
One decimal place ± 0.2; two decimal places ± 0.05

Circuit Diagram

For Test Conditions see page 59

Insulation Resistance

| Rated Voltage at 85°C (V d.c.) | Test Voltage (V d.c.) | I.R.  |
|--------------------------------|-----------------------|-------|
| > 100 to < 500.                | 100 ± 15              | > 5GΩ |
| ≥ 500                          | 500 ± 50              |       |

Recommended mounting styles - A & B (see page 54).  
Maximum panel thickness 3.8 mm.

Characteristics

| Case Type                                                                 | Part Number | Cap. (pF)<br>- 20% + 80% | Rated Voltage V d.c. |       | Current d.c. (A) | Minimum No Load Insertion Loss (dB) |         |       |        |
|---------------------------------------------------------------------------|-------------|--------------------------|----------------------|-------|------------------|-------------------------------------|---------|-------|--------|
|                                                                           |             |                          | 85°C                 | 125°C |                  | 10 MHz                              | 100 MHz | 1 GHz | 10 GHz |
| <p>Lead Ø 1.40<br/>Thread 12-28 UNF 2A/M6 x 0.75</p>                      | TCT101A     | 1500                     | 500                  | 300   | 10               | 5                                   | 20      | 40    | 40     |
|                                                                           | TCT101B     | 1500                     | 500                  | 300   | —                | —                                   | —       | —     | —      |
| <p>Lead Ø: TCT150 0.80<br/>TCT152 1.3<br/>Thread 8-32 UNC 2A/M4 x 0.5</p> | TCT150A     | 1500                     | 200                  | 100   | 10               | 5                                   | 20      | 40    | 40     |
|                                                                           | TCT152G     | 100                      | 200                  | 100   | 10               | —                                   | 7       | 20    | 20     |
|                                                                           | TCT152E     | 500                      | 200                  | 100   | 10               | 2                                   | 15      | 28    | 28     |
|                                                                           | TCT152C     | 1000                     | 200                  | 100   | 10               | 4                                   | 18      | 35    | 35     |
|                                                                           | TCT152K     | 4000                     | 200                  | 100   | 10               | 10                                  | 30      | 40    | 40     |
|                                                                           | TCT152I     | 5000                     | 200                  | 100   | 10               | 12                                  | 30      | 40    | 40     |
| <p>Lead Ø: TCT150 0.80<br/>TCT152 1.3<br/>Thread 8-32 UNC 2A/M4 x 0.5</p> | TCT150B     | 1500                     | 200                  | 100   | —                | —                                   | —       | —     | —      |
|                                                                           | TCT152H     | 100                      | 200                  | 100   | —                | —                                   | —       | —     | —      |
|                                                                           | TCT152F     | 500                      | 200                  | 100   | —                | —                                   | —       | —     | —      |
|                                                                           | TCT152D     | 1000                     | 200                  | 100   | —                | —                                   | —       | —     | —      |
|                                                                           | TCT152L     | 4000                     | 200                  | 100   | —                | —                                   | —       | —     | —      |
|                                                                           | TCT152J     | 5000                     | 200                  | 100   | —                | —                                   | —       | —     | —      |

Other values of capacitance are available on request.

## Miniature Threaded Pi Circuit Filters

TPT

## Ordering Information

e.g. TPT270A

Blank - Unified thread  
M - Metric threadBlank - No special conditioning  
Bu - Standard burn in  
Bx - Burn in to Cust. req.Blank - Tin finish  
G - Gold  
S - SilverBlank - Wavy washer and nut  
T - Toothed washer and nut  
N - No hardware

Environmental Classification 55/125/56

For Test Conditions see page 59

Tangent of loss angle (Tan  $\delta$ ) 0.04 max.

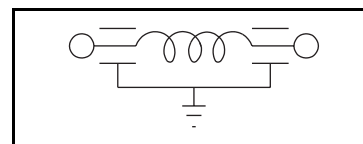
## Case Dimensions

All dimensions in mm. Limits unless otherwise stated:  
One decimal place  $\pm 0.2$ ; two decimal places  $\pm 0.05$ .

Plain wire only of minimum stated length on longer lead variants.

For plain wire (no head or forming) on short lead length style,  
replace first digit 0 by 5, e.g. TPT089A — TPT589A.

## Circuit Diagram

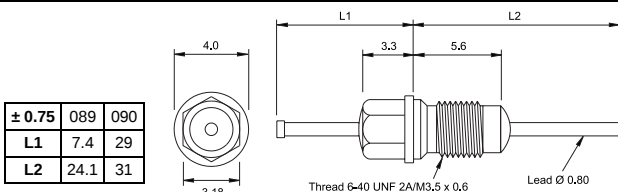
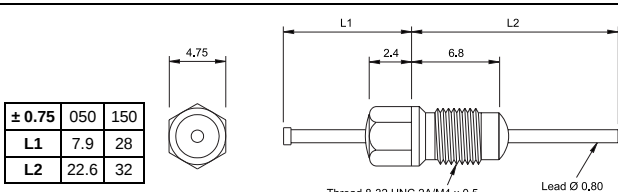
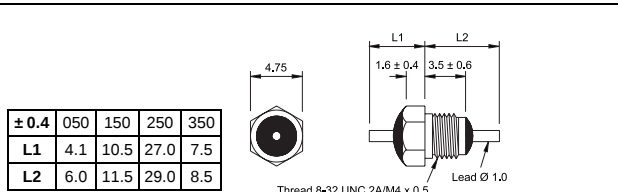


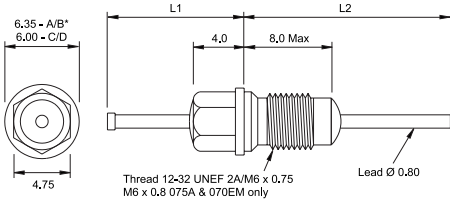
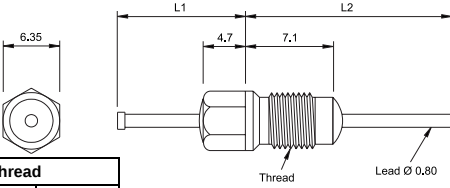
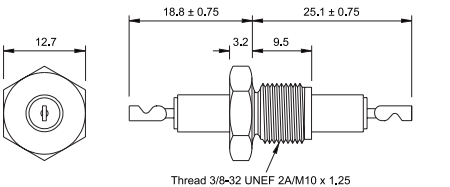
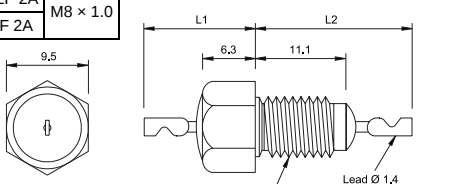
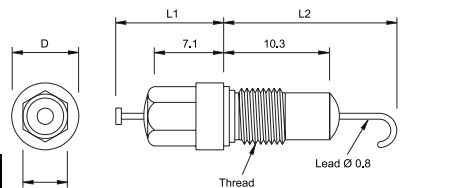
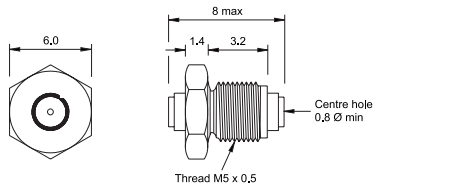
## Insulation Resistance

| Rated Voltage at 85°C (V d.c.) | Test Voltage (V d.c.) | I.R.          |
|--------------------------------|-----------------------|---------------|
| < 100                          | 10 $\pm$ 1            | > 5G $\Omega$ |
| $\geq 100$ to < 500            | 100 $\pm$ 15          |               |
| $\geq 500$                     | 500 $\pm$ 50          |               |

| Part No.    | Mounting Style | Max. panel thickness (mm) |
|-------------|----------------|---------------------------|
| TPT_89_     | A or B         | 2.2                       |
| TPT_50A & D | A or B         | 3.8                       |
| TPT_50B & C | A only         | N/A                       |
| TPT_70_     | A or B         | 3.8                       |
| TPT_01_     | A or B         | 3.8                       |
| TPT080_     | A or A         | 4.8                       |
| TPT_02_     | A or B         | 4.8                       |
| TPT_21_     | A or B         | 3.8                       |
| TPT114C     | A only         | N/A                       |

## Characteristics

| Case Type                                                                                                                                                                                                                          |      |      |      |     | Part Number | Min Cap. (pF) | Rated Voltage (V d.c.) |       | Current d.c. (A) | Minimum No Load Insertion Loss (dB) |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------|------|-----|-------------|---------------|------------------------|-------|------------------|-------------------------------------|---------|-------|--------|---------|------|-----|------|------|-----|---------|------|-----|-----|----|---|----|----|----|
|                                                                                                                                                                                                                                    |      |      |      |     |             |               | 85°C                   | 125°C |                  | 10 MHz                              | 100 MHz | 1 GHz | 10 GHz |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                 |      |      |      |     | TPT089A     | 1500          | 350                    | 210   | 10               | 5                                   | 40      | 60    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| <table><tr><td>± 0.75</td><td>089</td><td>090</td></tr><tr><td>L1</td><td>7.4</td><td>29</td></tr><tr><td>L2</td><td>24.1</td><td>31</td></tr></table>                                                                             |      |      |      |     | ± 0.75      | 089           | 090                    | L1    | 7.4              | 29                                  | L2      | 24.1  | 31     | TPT189A | 1500 | 350 | 210  | 10   | 5   | 40      | 60   | 60  |     |    |   |    |    |    |
| ± 0.75                                                                                                                                                                                                                             | 089  | 090  |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L1                                                                                                                                                                                                                                 | 7.4  | 29   |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L2                                                                                                                                                                                                                                 | 24.1 | 31   |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT089B     | 3000          | 200                    | 120   | 10               | 8                                   | 50      | 70    | 70     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT189B     | 3000          | 200                    | 120   | 10               | 8                                   | 50      | 70    | 70     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                 |      |      |      |     | TPT050A     | 1500          | 350                    | 210   | 10               | 5                                   | 45      | 65    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| <table><tr><td>± 0.75</td><td>050</td><td>150</td></tr><tr><td>L1</td><td>7.9</td><td>28</td></tr><tr><td>L2</td><td>22.6</td><td>32</td></tr></table>                                                                             |      |      |      |     | ± 0.75      | 050           | 150                    | L1    | 7.9              | 28                                  | L2      | 22.6  | 32     | TPT150A | 1500 | 350 | 210  | 10   | 5   | 45      | 65   | 60  |     |    |   |    |    |    |
| ± 0.75                                                                                                                                                                                                                             | 050  | 150  |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L1                                                                                                                                                                                                                                 | 7.9  | 28   |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L2                                                                                                                                                                                                                                 | 22.6 | 32   |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT050D     | 4000          | 200                    | 120   | 10               | 10                                  | 50      | 65    | 70     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT150D     | 4000          | 200                    | 120   | 10               | 10                                  | 50      | 65    | 70     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                 |      |      |      |     | TPT050B     | 1500          | 200                    | 120   | 15               | 5                                   | 40      | 60    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| <table><tr><td>± 0.4</td><td>050</td><td>150</td><td>250</td><td>350</td></tr><tr><td>L1</td><td>4.1</td><td>10.5</td><td>27.0</td><td>7.5</td></tr><tr><td>L2</td><td>6.0</td><td>11.5</td><td>29.0</td><td>8.5</td></tr></table> |      |      |      |     | ± 0.4       | 050           | 150                    | 250   | 350              | L1                                  | 4.1     | 10.5  | 27.0   | 7.5     | L2   | 6.0 | 11.5 | 29.0 | 8.5 | TPT150B | 1500 | 200 | 120 | 15 | 5 | 40 | 60 | 60 |
| ± 0.4                                                                                                                                                                                                                              | 050  | 150  | 250  | 350 |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L1                                                                                                                                                                                                                                 | 4.1  | 10.5 | 27.0 | 7.5 |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
| L2                                                                                                                                                                                                                                 | 6.0  | 11.5 | 29.0 | 8.5 |             |               |                        |       |                  |                                     |         |       |        |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT250B     | 1500          | 200                    | 120   | 15               | 5                                   | 40      | 60    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT350B     | 1500          | 200                    | 120   | 15               | 5                                   | 40      | 60    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT050C     | 500           | 350                    | 210   | 15               | —                                   | 15      | 55    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT150C     | 500           | 350                    | 210   | 15               | —                                   | 15      | 55    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT250C     | 500           | 350                    | 210   | 15               | —                                   | 15      | 55    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |
|                                                                                                                                                                                                                                    |      |      |      |     | TPT350C     | 500           | 350                    | 210   | 15               | —                                   | 15      | 55    | 60     |         |      |     |      |      |     |         |      |     |     |    |   |    |    |    |

| Case Type                                                                                                                                                                                                                                                                                                                                                                                                                            |                 |      |  | Part Number | Min Cap. (pF) | Rated Voltage (V d.c.) |                 | Current d.c. (A) | Minimum No Load Insertion Loss (dB) |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------|--|-------------|---------------|------------------------|-----------------|------------------|-------------------------------------|---------|-------|--------|----------|--------|---------------|---------------|-----------|---------------|---------|------|-----|-----|----|----|----|----|----|
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               | 85°C                   | 125°C           |                  | 10 MHz                              | 100 MHz | 1 GHz | 10 GHz |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div>* INCREASED 0.7 FOR M6 THREADS</div> <div><table><tr><td>± 0.75</td><td>070</td><td>270</td></tr><tr><td>L1</td><td>8.7</td><td>30</td></tr><tr><td>L2</td><td>23.4</td><td>34</td></tr></table></div>                                                                                                                                         |                 |      |  | ± 0.75      | 070           | 270                    | L1              | 8.7              | 30                                  | L2      | 23.4  | 34     | TPT070A  | 1500   | 500           | 300           | 10        | 5             | 45      | 70   | 70  |     |    |    |    |    |    |
| ± 0.75                                                                                                                                                                                                                                                                                                                                                                                                                               | 070             | 270  |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L1                                                                                                                                                                                                                                                                                                                                                                                                                                   | 8.7             | 30   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L2                                                                                                                                                                                                                                                                                                                                                                                                                                   | 23.4            | 34   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT070C     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT270A     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT270C     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT075A     | 1500          | 350                    | 200             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT070B     | 5000          | 300                    | 180             | 10               | 20                                  | 65      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT070D     | 5000          | 300                    | 180             | 10               | 20                                  | 65      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT270B     | 5000          | 300                    | 180             | 10               | 20                                  | 65      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT270D     | 5000          | 300                    | 180             | 10               | 20                                  | 65      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT070EM    | 680           | 350                    | 200             | 10               | —                                   | —       | 45    | 45     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div><table><tr><td>± 0.75</td><td>001</td><td>101</td></tr><tr><td>L1</td><td>9.1</td><td>30</td></tr><tr><td>L2</td><td>11.5</td><td>33</td></tr></table></div> <div><table><tr><th>Part no.</th><th>Thread</th></tr><tr><td>A</td><td>12-28 UNEF 2A</td></tr><tr><td>B &amp; C</td><td>12-32 UNEF 2A</td></tr></table><div>M6 × 0.75</div></div> |                 |      |  | ± 0.75      | 001           | 101                    | L1              | 9.1              | 30                                  | L2      | 11.5  | 33     | Part no. | Thread | A             | 12-28 UNEF 2A | B & C     | 12-32 UNEF 2A | TPT001A | 1500 | 500 | 300 | 10 | 5  | 45 | 70 | 70 |
| ± 0.75                                                                                                                                                                                                                                                                                                                                                                                                                               | 001             | 101  |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L1                                                                                                                                                                                                                                                                                                                                                                                                                                   | 9.1             | 30   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L2                                                                                                                                                                                                                                                                                                                                                                                                                                   | 11.5            | 33   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| Part no.                                                                                                                                                                                                                                                                                                                                                                                                                             | Thread          |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                    | 12-28 UNEF 2A   |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| B & C                                                                                                                                                                                                                                                                                                                                                                                                                                | 12-32 UNEF 2A   |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT001B     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT101A     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT101B     | 1500          | 500                    | 300             | 10               | 5                                   | 45      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT001C     | 5500          | 300                    | 180             | 10               | 20                                  | 68      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT101C     | 5500          | 300                    | 180             | 10               | 20                                  | 68      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div></div> <div><table><tr><th>Part no.</th><th>Thread</th></tr><tr><td>A &amp; C</td><td>5/16-32 UNEF 2A</td></tr><tr><td>B &amp; D</td><td>5/16-24 UNF 2A</td></tr></table><div>M8 × 1.0</div></div>                                                                                                                                            |                 |      |  | Part no.    | Thread        | A & C                  | 5/16-32 UNEF 2A | B & D            | 5/16-24 UNF 2A                      | TPT080A | 1500  | 2500   | —        | 25     | 5             | 50            | 50        | 50            |         |      |     |     |    |    |    |    |    |
| Part no.                                                                                                                                                                                                                                                                                                                                                                                                                             | Thread          |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| A & C                                                                                                                                                                                                                                                                                                                                                                                                                                | 5/16-32 UNEF 2A |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| B & D                                                                                                                                                                                                                                                                                                                                                                                                                                | 5/16-24 UNF 2A  |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT080B     | 3000          | 1000                   | —               | 25               | 8                                   | 60      | 65    | 65     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div><table><tr><td>± 0.75</td><td>002</td><td>102*</td></tr><tr><td>L1</td><td>14.3</td><td>32</td></tr><tr><td>L2</td><td>19.0</td><td>37</td></tr></table></div> <div>* No lead forming</div>                                                                                                                                                  |                 |      |  | ± 0.75      | 002           | 102*                   | L1              | 14.3             | 32                                  | L2      | 19.0  | 37     | TPT002A  | 2000   | 1000          | 600           | 25        | 5             | 50      | 65   | 65  |     |    |    |    |    |    |
| ± 0.75                                                                                                                                                                                                                                                                                                                                                                                                                               | 002             | 102* |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L1                                                                                                                                                                                                                                                                                                                                                                                                                                   | 14.3            | 32   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L2                                                                                                                                                                                                                                                                                                                                                                                                                                   | 19.0            | 37   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT102A     | 2000          | 1000                   | 600             | 25               | 5                                   | 50      | 65    | 65     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT002B     | 3000          | 830                    | 500             | 25               | 8                                   | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT002C     | 3000          | 830                    | 500             | 25               | 8                                   | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT102B     | 3000          | 830                    | 500             | 25               | 8                                   | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT102C     | 3000          | 830                    | 500             | 25               | 8                                   | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT002D     | 4000          | 830                    | 500             | 25               | 15                                  | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT102D     | 4000          | 830                    | 500             | 25               | 15                                  | 55      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div><table><tr><td>± 0.75</td><td>021</td><td>121</td></tr><tr><td>L1</td><td>11.1</td><td>33</td></tr><tr><td>L2</td><td>17.5</td><td>36*</td></tr></table></div> <div>* Not formed</div> <div><table><tr><th>Thread</th><th>D</th></tr><tr><td>12-32 UNEF 2A</td><td>6.35</td></tr><tr><td>M6 × 0.75</td><td>7.00</td></tr></table></div>      |                 |      |  | ± 0.75      | 021           | 121                    | L1              | 11.1             | 33                                  | L2      | 17.5  | 36*    | Thread   | D      | 12-32 UNEF 2A | 6.35          | M6 × 0.75 | 7.00          | TPT021A | 4000 | 500 | 300 | 10 | 15 | 65 | 70 | 70 |
| ± 0.75                                                                                                                                                                                                                                                                                                                                                                                                                               | 021             | 121  |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L1                                                                                                                                                                                                                                                                                                                                                                                                                                   | 11.1            | 33   |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| L2                                                                                                                                                                                                                                                                                                                                                                                                                                   | 17.5            | 36*  |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| Thread                                                                                                                                                                                                                                                                                                                                                                                                                               | D               |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| 12-32 UNEF 2A                                                                                                                                                                                                                                                                                                                                                                                                                        | 6.35            |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| M6 × 0.75                                                                                                                                                                                                                                                                                                                                                                                                                            | 7.00            |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT121A     | 4000          | 500                    | 300             | 10               | 15                                  | 65      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT021B     | 6000          | 300                    | 180             | 10               | 20                                  | 68      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  | TPT121B     | 6000          | 300                    | 180             | 10               | 20                                  | 68      | 70    | 70     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
| <div></div>                                                                                                                                                                                                                                                                                                                                       |                 |      |  | TPT114C     | 1750          | 350                    | 210             | 10               | 5                                   | 35      | 50    | 50     |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                      |                 |      |  |             |               |                        |                 |                  |                                     |         |       |        |          |        |               |               |           |               |         |      |     |     |    |    |    |    |    |