

Plug-In

# RF Transformer

50Ω

0.2 to 600 MHz

T4-2-X65+  
T4-2-X65



Generic photo used for illustration purposes only

CASE STYLE: X65

**+RoHS Compliant**

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

## Maximum Ratings

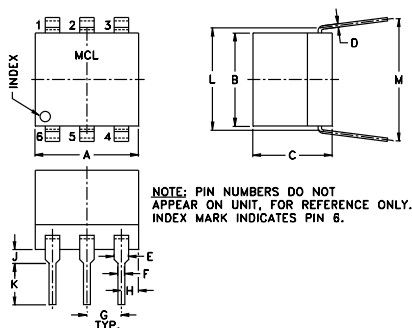
|                       |                |
|-----------------------|----------------|
| Operating Temperature | -20°C to 85°C  |
| Storage Temperature   | -55°C to 100°C |
| RF Power              | 250mW          |
| DC Current            | 30mA           |

Permanent damage may occur if any of these limits are exceeded.

## Pin Connections

|               |       |
|---------------|-------|
| PRIMARY DOT   | 6     |
| PRIMARY       | 3     |
| SECONDARY DOT | 1     |
| SECONDARY     | 3     |
| NOT USED      | 2,4,5 |

## Outline Drawing



## Outline Dimensions (inch/mm)

| A    | B    | C    | D    | E    | F    | G    |
|------|------|------|------|------|------|------|
| .30  | .27  | .23  | .010 | .042 | .020 | .100 |
| 7.62 | 6.86 | 5.84 | 0.25 | 1.07 | 0.51 | 2.54 |

| H    | J    | K    | L    | M    | wt    |
|------|------|------|------|------|-------|
| .05  | .04  | .11  | .300 | .35  | grams |
| 1.27 | 1.02 | 2.79 | 7.62 | 8.89 | 0.50  |

## Features

- wideband, 0.2 to 600 MHz
- good return loss
- also available with flat-pack (W38) & surface mount gull-wing (KK81) leads

## Applications

- impedance matching
- VHF/UHF

## Transformer Electrical Specifications

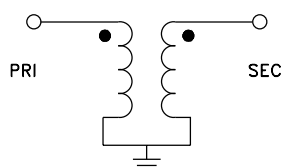
| Ω<br>RATIO<br>(Secondary/Primary) | FREQUENCY<br>(MHz) | INSERTION LOSS* |             |             |
|-----------------------------------|--------------------|-----------------|-------------|-------------|
|                                   |                    | 3 dB<br>MHz     | 2 dB<br>MHz | 1 dB<br>MHz |
| 4                                 | 0.2-600            | 0.2-600         | 0.5-500     | 2-250       |

\* Insertion Loss is referenced to mid-band loss, 0.6 dB typ.

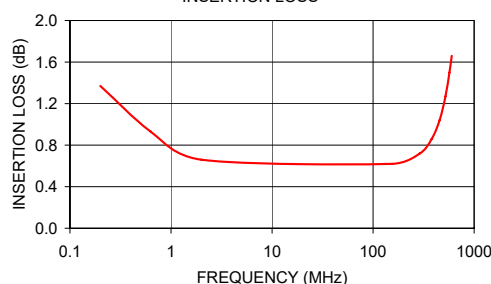
## Typical Performance Data

| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | INPUT<br>R. LOSS<br>(dB) |
|--------------------|---------------------------|--------------------------|
| 0.20               | 1.37                      | 11.78                    |
| 0.63               | 0.93                      | 16.67                    |
| 2.00               | 0.66                      | 21.14                    |
| 154.00             | 0.62                      | 16.06                    |
| 290.00             | 0.72                      | 8.60                     |
| 380.00             | 0.86                      | 5.52                     |
| 455.00             | 1.04                      | 3.83                     |
| 520.00             | 1.27                      | 2.95                     |
| 570.00             | 1.50                      | 2.41                     |
| 600.00             | 1.66                      | 2.16                     |

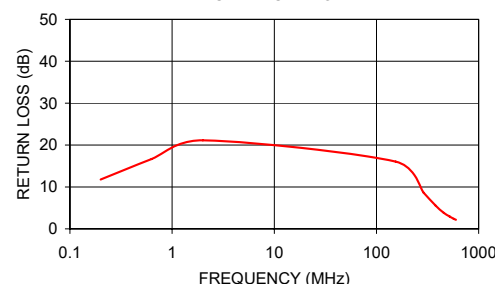
## Config. D



T4-2-X65  
INSERTION LOSS



T4-2-X65  
INPUT RETURN LOSS



## Notes

- Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
- Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
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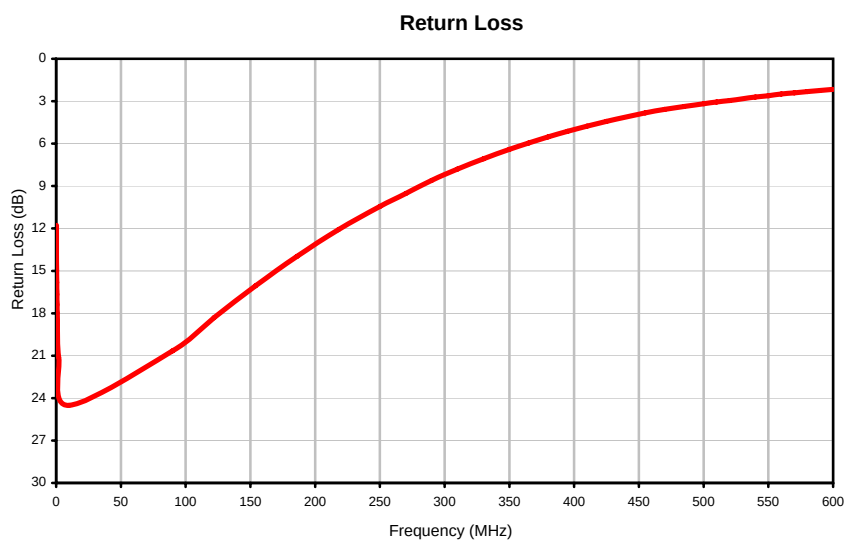
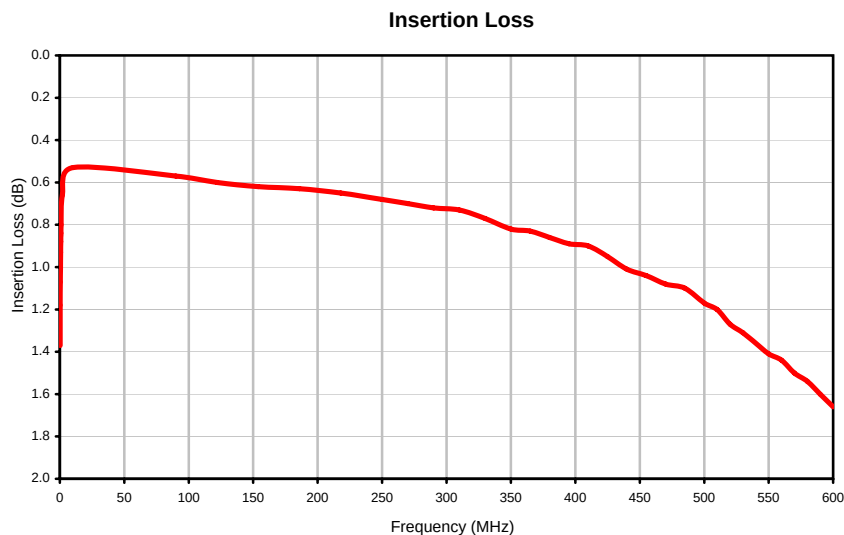
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*Typical Performance Data*

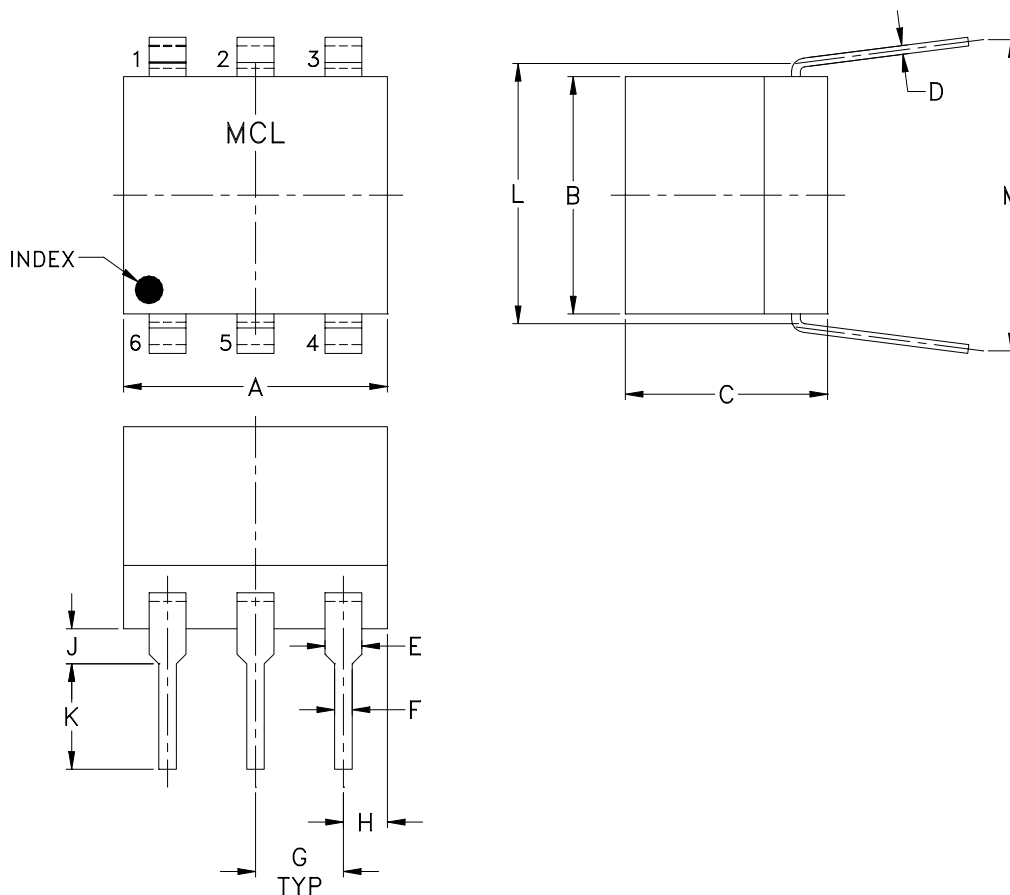
| FREQUENCY<br>(MHz) | INSERTION<br>LOSS<br>(dB) | RETURN<br>LOSS<br>(dB) |
|--------------------|---------------------------|------------------------|
| 0.20               | 1.37                      | 11.78                  |
| 0.30               | 1.18                      | 13.75                  |
| 0.40               | 1.07                      | 14.96                  |
| 0.50               | 1.01                      | 15.82                  |
| 0.63               | 0.93                      | 16.67                  |
| 0.75               | 0.88                      | 17.39                  |
| 0.88               | 0.84                      | 17.98                  |
| 1.00               | 0.80                      | 18.51                  |
| 2.00               | 0.66                      | 21.14                  |
| 10.00              | 0.53                      | 24.51                  |
| 90.00              | 0.57                      | 20.65                  |
| 122.00             | 0.60                      | 18.31                  |
| 154.00             | 0.62                      | 16.06                  |
| 186.00             | 0.63                      | 13.98                  |
| 218.00             | 0.65                      | 12.09                  |
| 250.00             | 0.68                      | 10.45                  |
| 270.00             | 0.70                      | 9.53                   |
| 290.00             | 0.72                      | 8.60                   |
| 310.00             | 0.73                      | 7.80                   |
| 330.00             | 0.77                      | 7.07                   |
| 350.00             | 0.82                      | 6.41                   |
| 365.00             | 0.83                      | 5.95                   |
| 380.00             | 0.86                      | 5.52                   |
| 395.00             | 0.89                      | 5.13                   |
| 410.00             | 0.90                      | 4.76                   |
| 425.00             | 0.95                      | 4.42                   |
| 440.00             | 1.01                      | 4.12                   |
| 455.00             | 1.04                      | 3.83                   |
| 470.00             | 1.08                      | 3.58                   |
| 485.00             | 1.10                      | 3.37                   |
| 500.00             | 1.17                      | 3.18                   |
| 510.00             | 1.20                      | 3.06                   |
| 520.00             | 1.27                      | 2.95                   |
| 530.00             | 1.31                      | 2.83                   |
| 540.00             | 1.36                      | 2.71                   |
| 550.00             | 1.41                      | 2.61                   |
| 560.00             | 1.44                      | 2.49                   |
| 570.00             | 1.50                      | 2.41                   |
| 580.00             | 1.54                      | 2.32                   |
| 590.00             | 1.60                      | 2.24                   |
| 600.00             | 1.66                      | 2.16                   |

## Typical Performance Curves



## Outline Dimensions

**X65**



| CASE # | A             | B             | C             | D              | E              | F              | G              | H             | J             | K             | L              | M             | WT. GRAM |
|--------|---------------|---------------|---------------|----------------|----------------|----------------|----------------|---------------|---------------|---------------|----------------|---------------|----------|
| X65    | .30<br>(7.62) | .27<br>(6.86) | .23<br>(5.84) | .010<br>(0.25) | .042<br>(1.07) | .020<br>(0.51) | .100<br>(2.54) | .05<br>(1.27) | .04<br>(1.02) | .11<br>(2.79) | .300<br>(7.62) | .35<br>(8.89) | .50      |

**Dimensions are in inches (mm)**

### Notes:

- Case material: Plastic.  
Termination finish: For RoHS Case Styles: Tin Plate over Nickel Plate.  
For RoHS-5 Case Styles: Tin-Lead Plate.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

| Specification                  | Test/Inspection Condition                                                                                                                                       | Reference/Spec                                        |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|
| Operating Temperature          | -20° to 85°C<br>Ambient Environment                                                                                                                             | Individual Model Data Sheet                           |
| Storage Temperature            | -55° to 100° C<br>Ambient Environment                                                                                                                           | Individual Model Data Sheet                           |
| Thermal Shock                  | -55° to 100°C, 100 cycles                                                                                                                                       | MIL-STD-202, Method 107, Condition A-3, except +100°C |
| Solder Reflow Heat             | Sn-Pb Eutetic Process: 225°C peak<br>Pb-Free Process 245° - 250°C peak                                                                                          | J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1         |
| Solderability                  | 10X Magnification                                                                                                                                               | J-STD-002, Para 4.2.5, Test S, 95% Coverage           |
| Vibration (High Frequency)     | 20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)                                                                             | MIL-STD-202, Method 204, Condition D                  |
| Mechanical Shock               | 50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes                                                                                               | MIL-STD-202, Method 213, Condition A                  |
| Lead Integrity                 | 2 Pound Pull, perpendicular to edge of unit                                                                                                                     | MIL-STD-202, Method 211, Condition A                  |
| Marking Resistance to Solvents | Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C;<br>distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C | MIL-STD-202, Method 215                               |