



**THE DATASHEET OF
TTC1-33W+**



RF Transformer

TTC1-33W+

50Ω 4.5 to 3000 MHz

The Big Deal

- Wideband, 4.5 to 3000 MHz
- Low insertion loss, 1.5 dB typ. up to 2 GHz
- Good amplitude unbalance, ± 0.4 dB typ.
- Low phase unbalance, 4° typ.
- Excellent common mode rejection, 26 dB typ.



CASE STYLE: GU2939

Product Overview

Mini-Circuits' TTC1-33W+ is a tiny surface-mount transmission line core and wire transformer covering a very wide frequency range from 4.5 to 3000 MHz. The transformer provides low insertion loss. It achieves low phase and amplitude unbalance and excellent common mode rejection performance. Featuring core and wire construction on 5 terminal carrier, the unit measures 0.10 x 0.06 x 0.07", accommodating dense circuit board layouts.

Key Features

| Feature | Advantages |
|---|--|
| Wideband, 4.5 to 3000 MHz | Very wide frequency range covers bandwidth requirements for many broadband applications. |
| Low insertion loss, 1.5 dB typ. | TTC1-33W+ provides excellent signal transmission from input to output with consistent performance across its entire frequency range. |
| Excellent common mode rejection, 26 dB typ. | Provides good IP2, IP3. |
| Small footprint (0.10 x 0.06 x 0.07") | Accommodates tight space requirements for dense PCB layouts. |

Surface Mount RF Transformer

50Ω 4.5 to 3000 MHz

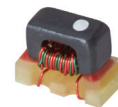
TTC1-33W+

Features

- wide bandwidth 4.5 to 3000 MHz
- balanced transmission line
- excellent CMRR
- aqueous washable

Applications

- balanced to unbalanced transformation
- wideband push-pull amplifiers
- PCS/DCS
- MMDS



Generic photo used for illustration purposes only

CASE STYLE: GU2939

+RoHS Compliant

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



Available Tape and Reel
at no extra cost

| Reel Size | Devices/Reel |
|-----------|-----------------------------------|
| 7" | 20, 50, 100, 200, 500, 1000, 2000 |

Electrical Specifications at 25°C

| Parameter | Frequency (MHz) | Min. | Typ. | Max. | Unit |
|--|-----------------|------|------|------|--------|
| Impedance Ratio | | | 1 | | |
| Frequency Range | | 4.5 | | 3000 | MHz |
| Average Insertion Loss (above 0.3 dB midband loss) | 50-1000 | — | 0.7 | 1.0 | dB |
| | 10-2000 | — | 1.5 | 2.0 | |
| | 4.5-3000 | — | 2.6 | 3.3 | |
| Phase Unbalance (±) | 50-1000 | — | 2 | 6 | Degree |
| | 10-2000 | — | 4 | 8 | |
| Amplitude Unbalance | 50-1000 | — | 0.4 | 0.9 | dB |
| | 10-2000 | — | 0.8 | 1.2 | |
| | 4.5-3000 | — | 1.0 | 1.6 | |
| Common Mode Rejection | 10-2000 | 20 | 26 | — | dB |
| | 4.5-3000 | 17 | 23 | — | |

Maximum Ratings

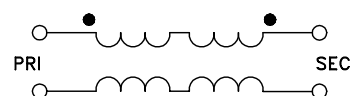
| Parameter | Ratings |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power | 0.5W |

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

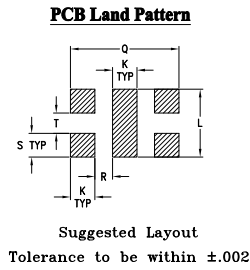
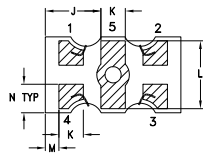
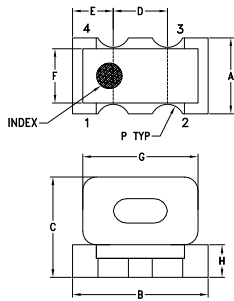
Pin Connections

| Function | Pin Number |
|---------------|------------|
| PRIMARY DOT | 1 |
| PRIMARY | 4 |
| SECONDARY DOT | 2 |
| SECONDARY | 3 |
| NOT USED | 5 |

Config. G



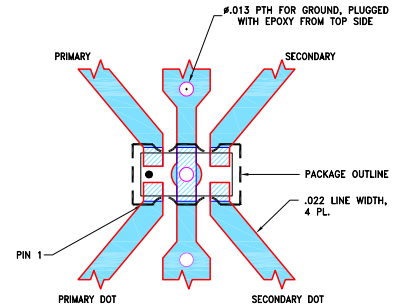
Outline Drawing



Outline Dimensions (inch/mm)

| A | B | C | D | E | F | G | H | J | K |
|------|------|------|------|------|-------|------|-------|-------|------|
| .056 | .100 | .074 | .040 | .030 | .040 | .085 | .024 | .041 | .018 |
| 1.42 | 2.54 | 1.88 | 1.02 | 0.76 | 1.02 | 2.16 | 0.61 | 1.04 | 0.46 |
| L | M | N | P | Q | R | S | T | wt | |
| .050 | .010 | .021 | .013 | .080 | 0.013 | .018 | 0.014 | grams | |
| 1.27 | 0.25 | 0.53 | 0.33 | 2.03 | 0.33 | 0.46 | 0.36 | grams | 0.04 |

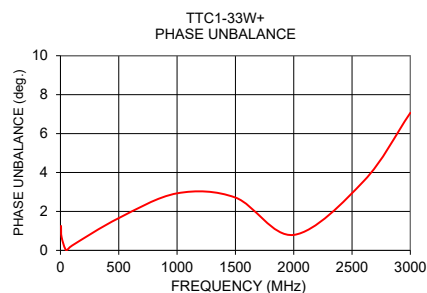
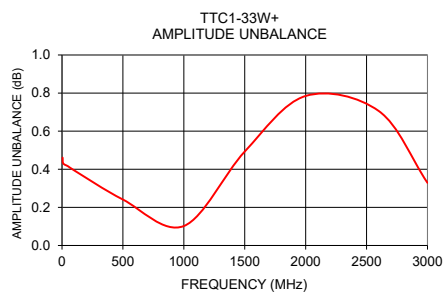
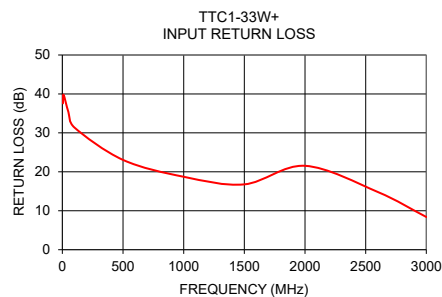
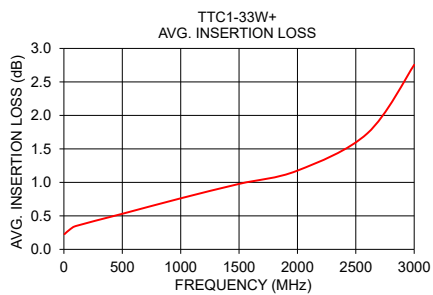
Demo Board MCL P/N: TB-1111+ Suggested PCB Layout (PL-657)



- NOTES:**
- TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .010"±.001". COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 - BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).
 DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

Typical Performance Data

| Frequency (MHz) | Insertion Loss (dB) | Input R. Loss (dB) | Amplitude Unbalance (dB) | Phase Unbalance (Deg.) | CMRR (dB) |
|-----------------|---------------------|--------------------|--------------------------|------------------------|-----------|
| 5 | 0.23 | 37.58 | 0.46 | 1.26 | 30.84 |
| 10 | 0.24 | 39.79 | 0.43 | 0.68 | 31.87 |
| 50 | 0.29 | 35.34 | 0.42 | 0.00 | 32.43 |
| 100 | 0.35 | 31.36 | 0.39 | 0.25 | 32.84 |
| 500 | 0.53 | 23.06 | 0.24 | 1.66 | 33.96 |
| 1000 | 0.76 | 18.73 | 0.10 | 2.93 | 31.62 |
| 1500 | 0.98 | 16.78 | 0.49 | 2.71 | 28.65 |
| 2000 | 1.18 | 21.54 | 0.78 | 0.79 | 26.81 |
| 2600 | 1.73 | 14.82 | 0.71 | 3.56 | 25.83 |
| 3000 | 2.75 | 8.40 | 0.33 | 7.07 | 23.80 |



Additional 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-Circuits' applicable established test performance criteria and measurement instructions.
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