

50Ω 5500 to 13500 MHz

### The Big Deal

- Wideband, 5500 to 13500 MHz
- Low insertion loss, 0.8 dB to 11200 MHz
- Low unbalance, 1.0 dB, 8°
- Power handling up to +34 dBm



CASE STYLE: DQ1225

### Product Overview

Mini-Circuits MTX2-143+ is a wideband MMIC balun transformer with an impedance ratio of 2:1 covering a wide range of applications from 5500 to 13500 MHz. Fabricated using IPD process technology, this model provides outstanding repeatability with low insertion loss, low amplitude unbalance, low phase unbalance, and RF input power handling up to +34 dBm (2.5W). The unit comes housed in a tiny 3 x 3 x 0.89mm QFN package with low inductance, excellent thermal efficiency, and high ESD rating.

### Key Features

| Feature  | Advantages  |
|--|---|
| Wideband, 5500 to 13500 MHz  | MTX2-143+ supports a broad variety of applications including WiMAX, WiBRO, ISM, radar, SATCOM and more.     |
| Low insertion loss <ul style="list-style-type: none"> <li>• 0.8 dB, 5500 to 11200 MHz</li> <li>• 1.3 dB, 11200 to 13500 MHz</li> </ul> | Enables excellent signal power transmission from input to output.   |
| Low unbalance <ul style="list-style-type: none"> <li>• 1.0 dB amplitude unbalance</li> <li>• 8° phase unbalance</li> </ul>             | Low unbalance can improve a system's electromagnetic compatibility by rejecting unwanted common-mode noise. |
| Tiny size, 3 x 3 x 0.89mm  | Accommodates tight space requirements for dense PCB layouts.  |

# MMIC Balun RF Transformer

## MTX2-143+

50Ω 5500 to 13500 MHz

### Features

- wideband, 5500 to 13500 MHz
- low phase unbalance, 8 deg. and amplitude unbalance, 1.0 dB typ.
- miniature size, (3 x 3 x 0.89 mm)
- low cost
- aqueous washable



CASE STYLE: DQ1225

### +RoHS Compliant

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

### Applications

- WiMAX/WIBRO
- ISM
- RADAR
- SATCOM

### Electrical Specifications at 25°C

| Parameter                            | Frequency (MHz) | Min. | Typ. | Max.  | Unit   |
|--------------------------------------|-----------------|------|------|-------|--------|
| Impedance Ratio (secondary/ primary) |                 |      | 2    |       |        |
| Frequency Range                      |                 | 5500 | —    | 13500 | MHz    |
| Insertion Loss <sup>1</sup>          | 5500 - 11200    | —    | 0.8  | 1.2   | dB     |
|                                      | 11200 - 13500   | —    | 1.3  | 2.5   |        |
| Amplitude Unbalance                  | 5500 - 13500    | —    | 1.0  | —     | dB     |
| Phase Unbalance <sup>2</sup>         | 5500 - 13500    | —    | 8    | —     | Degree |

1. Insertion Loss is referenced to mid-band loss, 1.5 dB.

2. Relative to 180°

### Maximum Ratings

| Parameter             | Ratings        |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C  |
| Storage Temperature   | -65°C to 150°C |
| Input RF Power        | 34 dBm at 25°C |

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

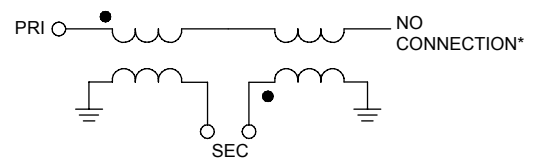
ESD rating

Human body model (HBM): Class 1B (500 to <1000V) in accordance with ANSI/ESD 5.1-2007

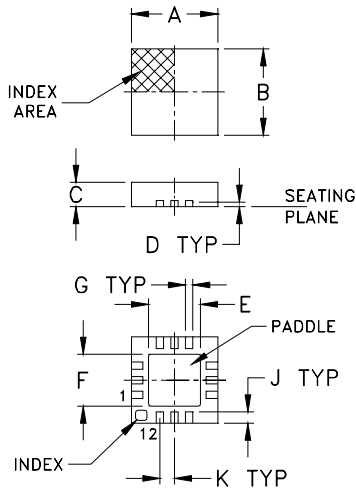
### Pad Connections

| Function                      | Pad Number        |
|-------------------------------|-------------------|
| PRIMARY DOT (Unbalanced Port) | 2                 |
| SECONDARY DOT (Balanced)      | 7                 |
| SECONDARY (Balanced)          | 9                 |
| EXTERNAL GND                  | 1,3,6,10 & paddle |
| NO CONNECTION                 | 4,5,8,11,12       |

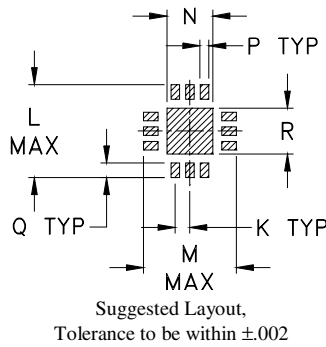
### Configuration J



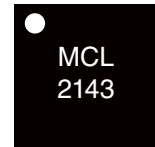
Outline Drawing



PCB Land Pattern



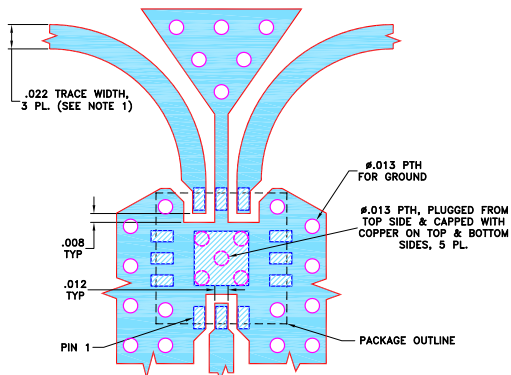
Product Marking



Outline Drawing Dimensions (inch mm)

|      |      |      |      |      |      |      |     |       |
|------|------|------|------|------|------|------|-----|-------|
| A    | B    | C    | D    | E    | F    | G    | H   | J     |
| .118 | .118 | .035 | .008 | .057 | .057 | .009 | --- | .016  |
| 3.00 | 3.00 | 0.89 | 0.20 | 1.45 | 1.45 | 0.23 | --- | 0.41  |
| K    | L    | M    | N    | P    | Q    | R    |     | wt    |
| .020 | .127 | .127 | .049 | .010 | .020 | .049 |     | grams |
| 0.51 | 3.23 | 3.23 | 1.24 | 0.25 | 0.51 | 1.24 |     | 0.02  |

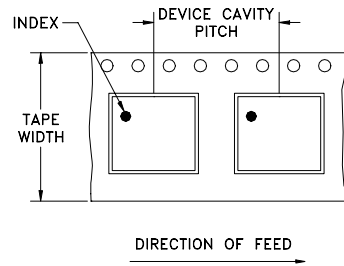
Demo Board MCL P/N: TB-900+  
Suggested PCB Layout (PL-497)



- NOTES:
- TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS R04350B 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.

Tape and Reel (F66)

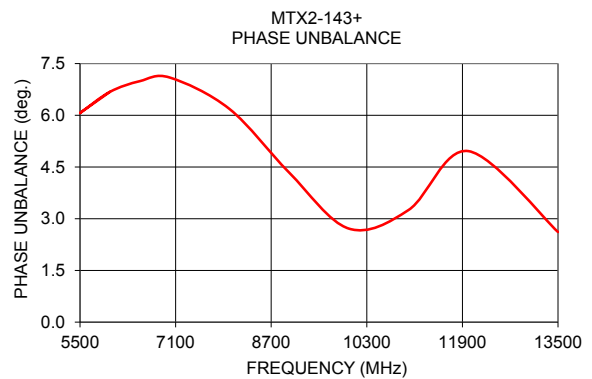
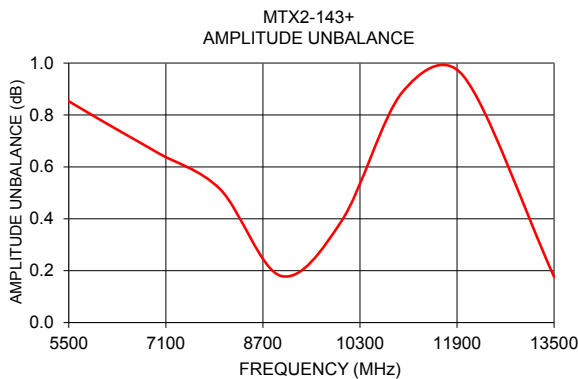
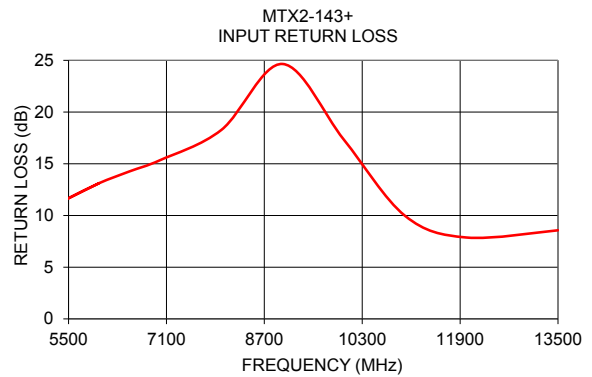
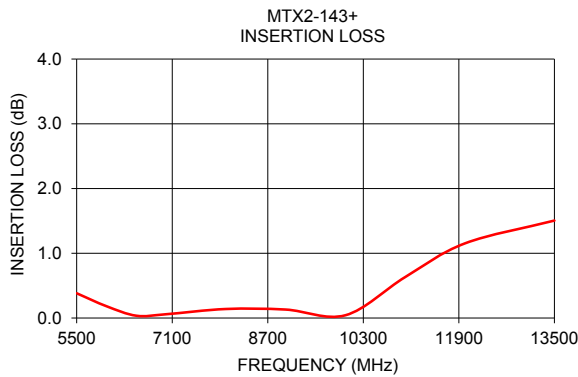
DEVICE ORIENTATION IN T&R



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel see note |            |
|----------------|-------------------------|-------------------|---------------------------|------------|
| 8              | 4                       | 7                 | Small quantity standard   | 20         |
|                |                         |                   |                           | 50         |
|                |                         |                   | Standard                  | 100        |
|                |                         |                   |                           | 200        |
|                |                         | 7                 |                           | 500        |
|                |                         |                   |                           | 1000, 2000 |

Typical Performance Data at 25°C

| FREQUENCY (MHz) | INSERTION LOSS (dB) | INPUT R. LOSS (dB) | AMPLITUDE UNBALANCE (dB) | PHASE UNBALANCE (Deg.) |
|-----------------|---------------------|--------------------|--------------------------|------------------------|
| 5500            | 0.38                | 11.66              | 0.85                     | 6.07                   |
| 6000            | 0.18                | 13.12              | 0.78                     | 6.68                   |
| 6500            | 0.04                | 14.27              | 0.72                     | 6.99                   |
| 7000            | 0.06                | 15.36              | 0.65                     | 7.10                   |
| 8000            | 0.14                | 18.28              | 0.51                     | 6.19                   |
| 9000            | 0.13                | 24.65              | 0.18                     | 4.34                   |
| 10000           | 0.04                | 17.33              | 0.39                     | 2.71                   |
| 11000           | 0.63                | 9.96               | 0.89                     | 3.25                   |
| 12000           | 1.15                | 7.87               | 0.95                     | 4.96                   |
| 13500           | 1.51                | 8.57               | 0.18                     | 2.61                   |



Additional Notes

- A. 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.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at [www.minicircuits.com/MCLStore/terms.jsp](http://www.minicircuits.com/MCLStore/terms.jsp)

