

Non-Catalog Model

Frequency Mixer

LRMS-5R

Level 7 (LO Power +7 dBm)

Important Note

This is a non-catalog model and can be manufactured on specific request. Pricing and delivery information can be supplied upon request.



Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : QQQ130

| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C | | | | | |
|---------------------------------------|---------------|------|------|------|-------|
| Parameter | | Min. | Typ. | Max. | Units |
| Frequency | LO (fL to fU) | 10 | | 1500 | MHz |
| | RF (fL to fU) | 10 | | 1500 | MHz |
| | IF | 0 | | 1000 | MHz |
| Conversion Loss | mid band | | 5.6 | 8.0 | dB |
| | Total Range | | | 9.9 | dB |
| LO-RF Isolation | Low Range | 40 | 50 | | dB |
| | Mid Range | 20 | 34 | | dB |
| | Upper Range | 18 | 22 | | dB |
| LO-IF Isolation | Low Range | 27 | 50 | | dB |
| | Mid Range | 15 | 30 | | dB |
| | Upper Range | 7 | 14 | | dB |
| 1 dB Comp. Input Power | | | +1 | | dBm |

Notes: Low Range = [fL to 10fL]
mid band = [2fL to fU/2]

Mid Range = [10fL to fU/2]

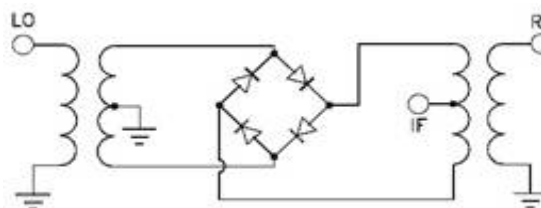
Upper Range = [fU/2 to fU]

Phase detection, positive polarity

Hermetic sealed diodes

| MAXIMUM RATINGS | |
|-----------------------|----------------|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power | 50mW |
| IF Current | 40mA |

Electrical Schematics



| PIN CONNECTIONS | |
|-----------------|---------|
| LO | 1 |
| RF | 4 |
| IF | 5 |
| GROUND | 2, 3, 6 |

Frequency Mixer

LRMS-5R

Typical Performance Data

| RF (MHz) | LO (MHz) | CONVERSION LOSS (dB) | | | LO (MHz) | LO-RF ISOLATION (dB) | | | LO-IF ISOLATION (dB) | | |
|-------------|-------------|-------------------------|------|------|-------------|-------------------------|------|------|-------------------------|------|------|
| | | @LO (dBm) | | | | @LO (dBm) | | | @LO (dBm) | | |
| | | +10 | +13 | +16 | | +10 | +13 | +16 | +10 | +13 | +16 |
| 5.0 | 35.0 | 6.56 | 6.17 | 5.95 | 5.0 | 77.6 | 78.3 | 78.5 | 69.0 | 82.1 | 77.0 |
| 10.0 | 40.0 | 6.45 | 6.03 | 5.79 | 10.0 | 71.7 | 73.1 | 73.9 | 63.3 | 75.4 | 72.8 |
| 20.0 | 50.0 | 6.30 | 5.86 | 5.58 | 20.0 | 65.8 | 67.4 | 68.7 | 56.9 | 67.3 | 69.1 |
| 50.0 | 80.0 | 5.86 | 5.46 | 5.27 | 50.0 | 58.2 | 60.2 | 62.0 | 49.8 | 61.2 | 60.2 |
| 100.0 | 70.0 | 5.65 | 5.31 | 5.14 | 100.0 | 51.8 | 53.7 | 55.7 | 43.7 | 53.9 | 54.9 |
| 149.7 | 119.7 | 5.65 | 5.33 | 5.15 | 149.7 | 48.1 | 50.1 | 51.9 | 40.1 | 50.8 | 51.0 |
| 200.0 | 170.0 | 5.67 | 5.37 | 5.22 | 200.0 | 45.7 | 47.5 | 49.4 | 37.7 | 48.2 | 48.9 |
| 246.1 | 216.1 | 5.89 | 5.54 | 5.34 | 246.1 | 44.0 | 45.9 | 47.8 | 36.2 | 48.7 | 44.3 |
| 342.6 | 312.6 | 6.12 | 5.71 | 5.44 | 342.6 | 41.2 | 43.1 | 45.0 | 34.6 | 48.7 | 38.4 |
| 439.0 | 409.0 | 6.17 | 5.77 | 5.51 | 439.0 | 38.9 | 40.8 | 42.4 | 34.2 | 43.8 | 33.7 |
| 500.0 | 470.0 | 6.52 | 5.97 | 5.64 | 500.0 | 37.8 | 39.7 | 41.6 | 35.2 | 38.4 | 30.8 |
| 583.7 | 553.7 | 6.87 | 6.25 | 5.90 | 583.7 | 36.9 | 39.2 | 41.5 | 35.7 | 33.2 | 27.5 |
| 680.2 | 650.2 | 7.26 | 6.55 | 6.09 | 680.2 | 35.9 | 38.3 | 40.2 | 33.8 | 29.3 | 24.5 |
| 750.0 | 720.0 | 7.71 | 6.89 | 6.36 | 750.0 | 35.6 | 37.6 | 38.9 | 30.6 | 26.8 | 23.2 |
| 873.1 | 843.1 | 8.22 | 7.45 | 6.96 | 873.1 | 34.7 | 36.9 | 37.9 | 25.2 | 21.6 | 19.4 |
| 1000.0 | 970.0 | 8.19 | 7.70 | 7.38 | 1000.0 | 33.2 | 35.5 | 37.0 | 20.9 | 18.1 | 16.1 |
| 1114.2 | 1084.2 | 8.20 | 7.76 | 7.48 | 1114.2 | 31.8 | 33.7 | 35.3 | 18.4 | 16.3 | 14.7 |
| 1210.6 | 1180.6 | 8.39 | 8.02 | 7.78 | 1210.6 | 30.7 | 32.5 | 33.8 | 16.5 | 15.0 | 13.4 |
| 1355.3 | 1325.3 | 8.78 | 8.41 | 8.25 | 1355.3 | 29.0 | 30.9 | 32.3 | 14.1 | 13.3 | 12.2 |
| 1500.0 | 1470.0 | 9.59 | 8.83 | 8.49 | 1500.0 | 26.9 | 28.6 | 29.9 | 12.8 | 12.3 | 11.5 |

REV. X1
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Frequency Mixer

LRMS-5R

Typical Performance Data

| RF/LO (MHz) | RF VSWR (:1) | | | LO VSWR (:1) | | | IF (MHz) | IF VSWR (:1) | | | LO/RF (MHz) | max. DC output (mV) | DC Offset (mV) |
|----------------|-----------------|------|------|-----------------|------|------|-------------|-----------------|------|------|----------------|------------------------------|----------------------|
| | @LO (dBm) | | | @LO (dBm) | | | | @LO (dBm) | | | @LO (dBm) | | |
| | +10 | +13 | +16 | +10 | +13 | +16 | | +10 | +13 | +16 | +13 | | |
| 5.0 | 2.73 | 2.64 | 2.55 | 1.68 | 2.43 | 3.47 | 5.0 | 1.51 | 1.21 | 1.03 | 5.0 | 221.9 | -0.01 |
| 10.0 | 1.68 | 1.62 | 1.58 | 1.67 | 2.43 | 3.47 | 10.0 | 1.52 | 1.22 | 1.03 | 10.0 | 231.0 | -0.01 |
| 20.0 | 1.45 | 1.37 | 1.32 | 1.62 | 2.37 | 3.38 | 20.0 | 1.52 | 1.22 | 1.03 | 20.0 | 233.7 | -0.01 |
| 50.0 | 1.38 | 1.27 | 1.19 | 1.71 | 2.46 | 3.47 | 50.0 | 1.52 | 1.21 | 1.03 | 50.0 | 231.2 | 0.00 |
| 100.0 | 1.41 | 1.29 | 1.20 | 1.63 | 2.38 | 3.29 | 100.0 | 1.53 | 1.22 | 1.04 | 100.0 | 236.2 | 0.06 |
| 149.7 | 1.47 | 1.34 | 1.24 | 1.60 | 2.33 | 3.27 | 149.7 | 1.53 | 1.22 | 1.05 | 149.7 | 244.2 | 0.17 |
| 200.0 | 1.53 | 1.40 | 1.30 | 1.63 | 2.28 | 3.20 | 200.0 | 1.53 | 1.22 | 1.06 | 200.0 | 238.7 | 0.31 |
| 246.1 | 1.61 | 1.48 | 1.37 | 1.62 | 2.29 | 3.15 | 246.1 | 1.52 | 1.22 | 1.06 | 246.1 | 241.3 | 0.63 |
| 342.6 | 1.82 | 1.68 | 1.57 | 1.70 | 2.29 | 3.12 | 342.6 | 1.51 | 1.21 | 1.07 | 342.6 | 239.7 | 1.04 |
| 439.0 | 2.09 | 1.93 | 1.80 | 1.79 | 2.33 | 3.12 | 439.0 | 1.46 | 1.19 | 1.07 | 439.0 | 206.1 | 1.79 |
| 500.0 | 2.27 | 2.10 | 1.96 | 1.86 | 2.41 | 3.19 | 500.0 | 1.43 | 1.17 | 1.07 | 500.0 | 203.6 | 2.00 |
| 583.7 | 2.56 | 2.36 | 2.22 | 1.96 | 2.48 | 3.27 | 583.7 | 1.35 | 1.13 | 1.09 | 583.7 | 208.7 | 3.07 |
| 680.2 | 2.96 | 2.71 | 2.52 | 2.12 | 2.69 | 3.40 | 680.2 | 1.25 | 1.08 | 1.15 | 680.2 | 199.2 | 4.09 |
| 750.0 | 3.17 | 2.92 | 2.74 | 2.25 | 2.80 | 3.59 | 750.0 | 1.10 | 1.14 | 1.30 | 750.0 | 193.3 | 5.44 |
| 873.1 | 3.56 | 3.32 | 3.14 | 2.54 | 3.09 | 3.90 | 873.1 | 1.07 | 1.23 | 1.40 | 873.1 | 192.0 | 6.35 |
| 1000.0 | 3.73 | 3.56 | 3.40 | 2.73 | 3.20 | 3.82 | 1000.0 | 1.36 | 1.57 | 1.75 | 1000.0 | 200.9 | 5.97 |
| 1114.2 | 3.76 | 3.69 | 3.53 | 2.81 | 3.18 | 3.93 | 1114.2 | 1.81 | 2.02 | 2.23 | 1114.2 | 188.0 | 5.59 |
| 1210.6 | 3.79 | 3.73 | 3.66 | 2.95 | 3.19 | 3.94 | 1210.6 | 2.36 | 2.60 | 2.82 | 1210.6 | 183.6 | 5.78 |
| 1355.3 | 3.78 | 3.75 | 3.73 | 3.15 | 3.12 | 4.13 | 1355.3 | 3.52 | 3.78 | 4.03 | 1355.3 | 192.0 | 6.69 |
| 1500.0 | 3.86 | 3.83 | 3.80 | 3.29 | 2.98 | 4.30 | 1500.0 | 4.99 | 5.07 | 5.22 | 1500.0 | 185.9 | 8.33 |

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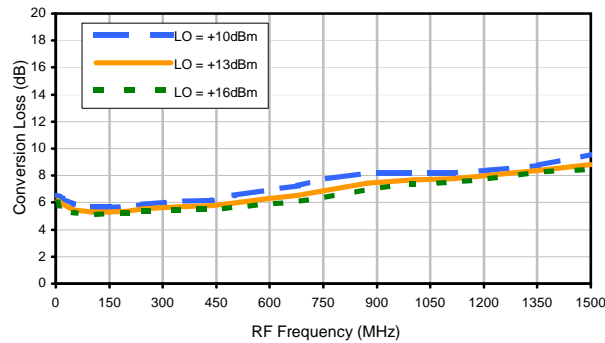


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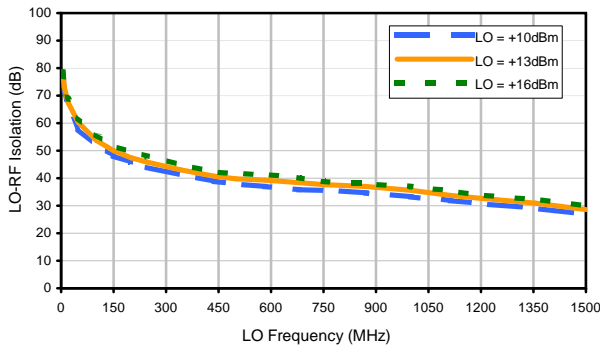


Typical Performance Curves

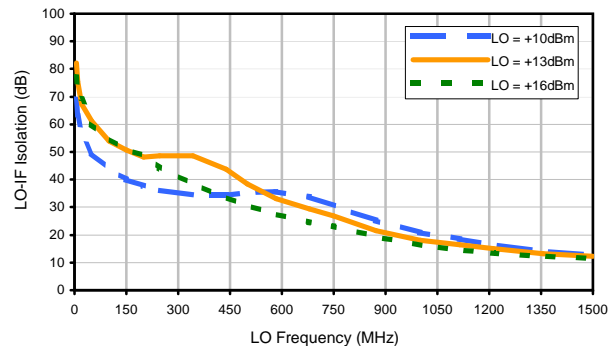
Conversion Loss



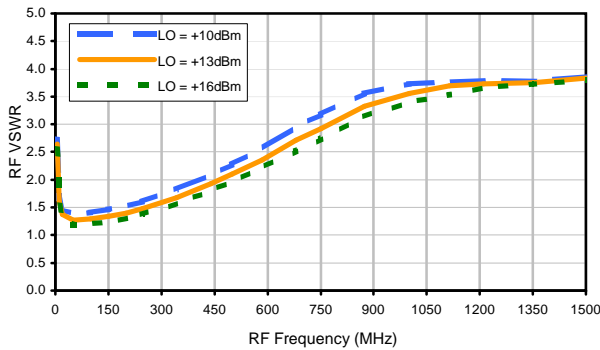
LO-RF Isolation



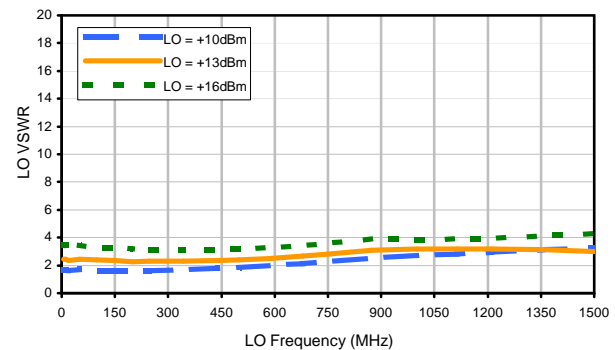
LO-IF Isolation



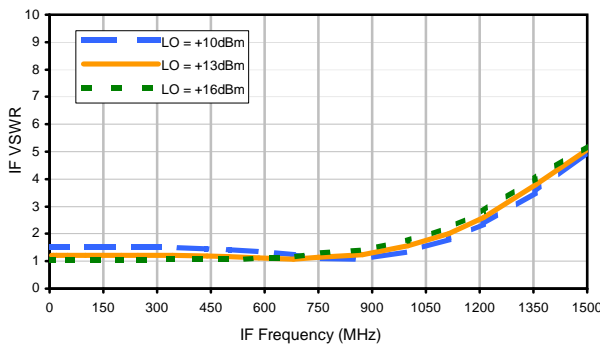
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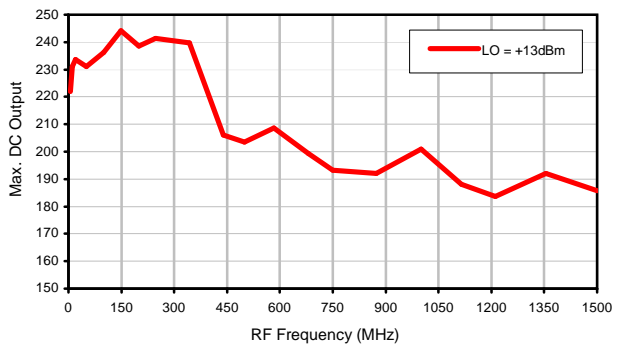
LO VSWR



IF VSWR



Max. DC Output

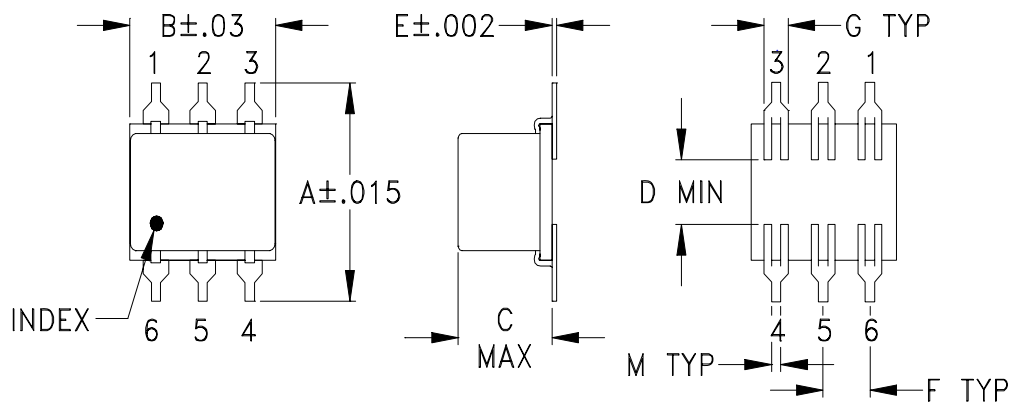


Case Style

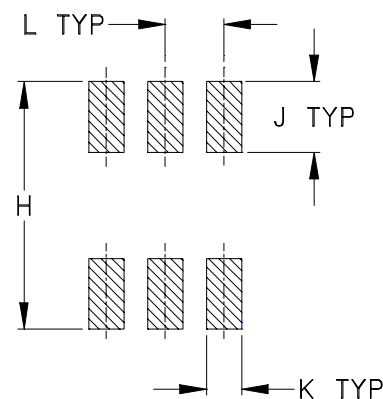
QQQ

QQQ130 (non-waterproof)
QQQ828 (washable)

Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

| CASE# | A | B | C | D | E | F | G | H | J | K | L | M | WT, GRAM |
|--------|-----------------|---------------|----------------|---------------|---------------|----------------|----------------|-----------------|----------------|----------------|----------------|---------------|----------|
| QQQ130 | .400 (10.16) | .31 (7.87) | .200 (5.08) | .10 (2.54) | .010 (.25) | .100 (2.54) | .050 (1.27) | .420 (10.67) | .120 (3.05) | .060 (1.52) | .100 (2.54) | .020 (.51) | .55 |
| QQQ828 | | | .050 (1.27) | | | | | | | | | | .20 |

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: Tin plate over Nickel plate.
 - For RoHS-5 Case Styles: Tin-Lead plate.



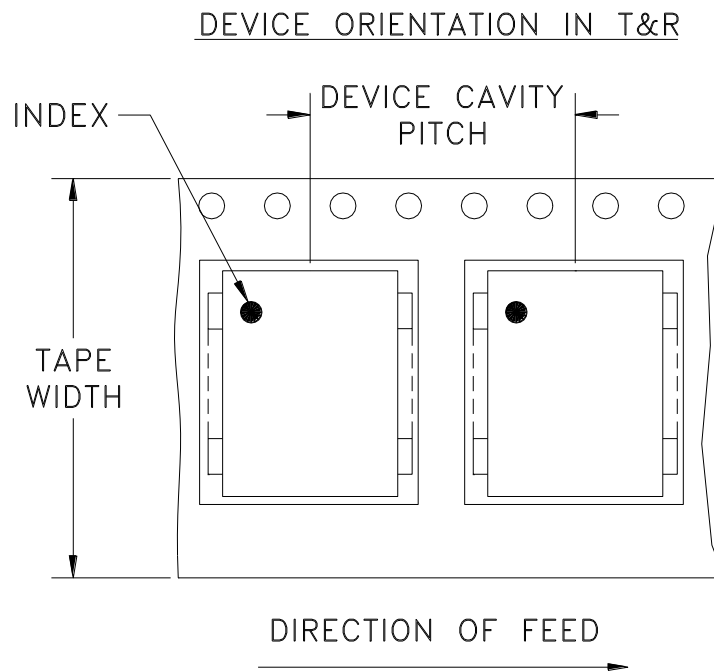
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Tape & Reel Packaging TR-F10



| Tape Width, mm | Device Cavity Pitch, mm | Reel Size, inches | Devices per Reel |
|----------------|-------------------------|-------------------|------------------|
| 24 | 16 | 7 | 10,20,50,100 |
| | | 13 | 200,500 |

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf

Note: Please consult individual model data sheet to determine device per reel availability.



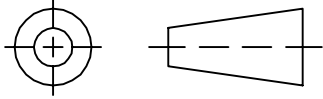
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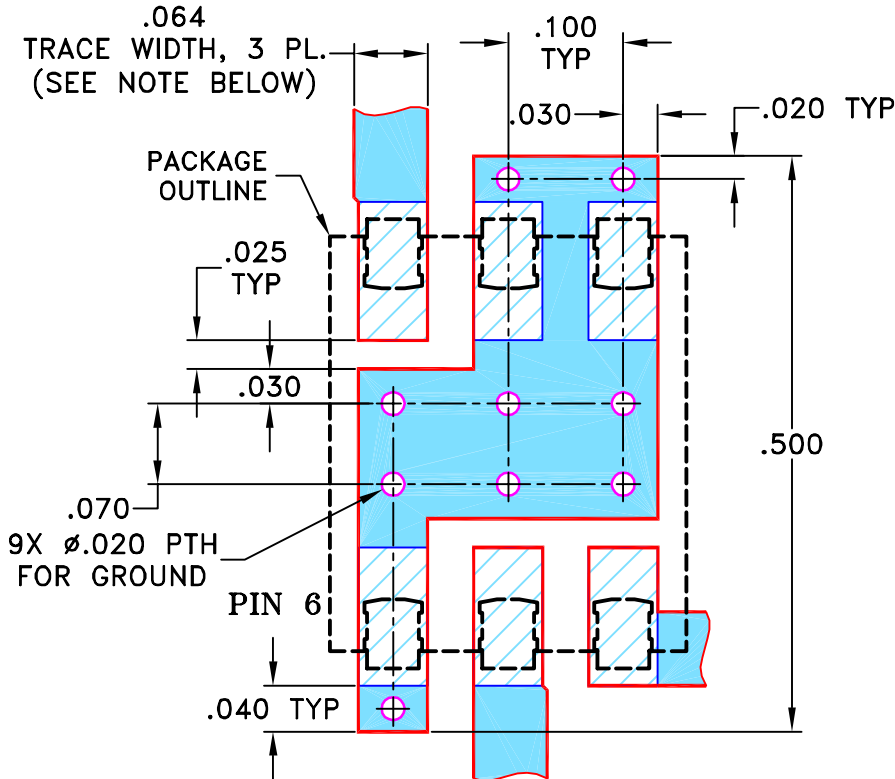
THIRD ANGLE PROJECTION



REVISIONS

| REV | ECN No. | DESCRIPTION | DATE | DR | AUTH |
|-----|---------|---------------|----------|----|------|
| OR | M82272 | NEW RELEASE | 08/02/02 | AV | DJ |
| A | M102713 | UPDATED NOTES | 01/14/06 | GF | IL |
| | | | | | |

SUGGESTED MOUNTING CONFIGURATION FOR QQQ569 CASE STYLE, "w" PIN CONNECTION



NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.

2. 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

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

DRAWN

AV

07/19/02

TOLERANCES ON:

CHECKED

WL

08/02/02

2 PL DECIMALS ± .005

APPROVED

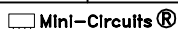
DJ

08/02/02

3 PL DECIMALS ±

ANGLES ±

FRACTIONS ±



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PL, w, QQQ569, LRMS-J, TB-44

SIZE

CODE IDENT

DRAWING NO:

REV:

A

15542

98-PL-083

A

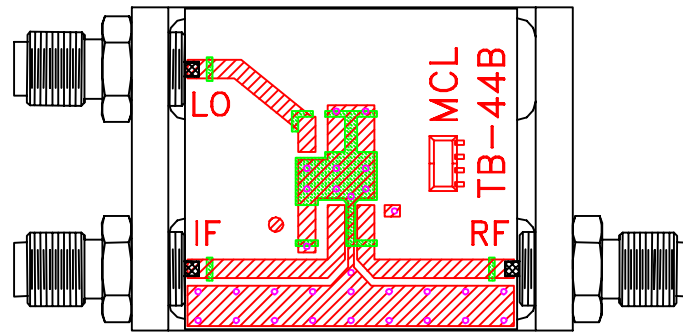
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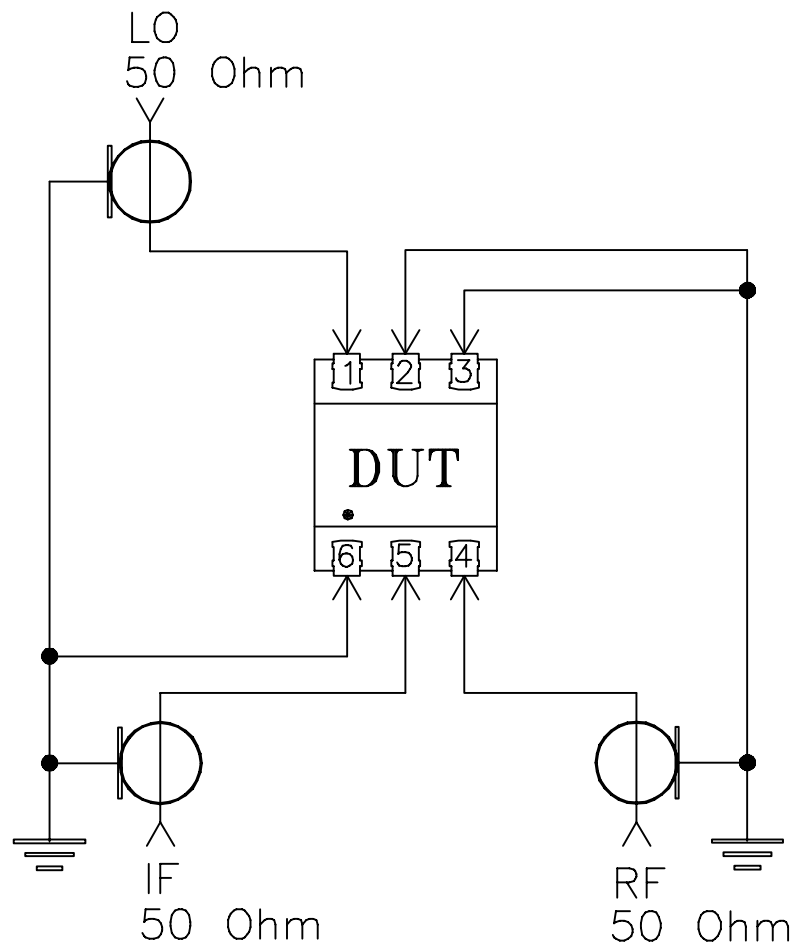
SHEET: 1 OF 1

ASHEETA1.DWG REV:A DATE:01/12/95

Evaluation Board and Circuit




TB-44+



Schematic Diagram

Notes:

1. SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

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