*Non-Catalog Model*

# Frequency Mixer SCM-2LH

Level 10 (LO Power + 10 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 : YY109**

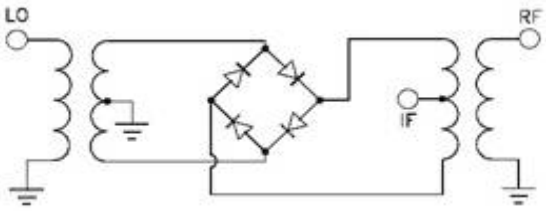
| ELECTRICAL SPECIFICATIONS 50Ω @ +25°C | | | | | |
|---|---|---|---|---|---|
| **Parameter** | | **Min.** | **Typ.** | **Max.** | **Units** |
| **Frequency** | **LO** ($f_L$ to $f_U$) | 5 | | 1000 | MHz |
| | **RF** ($f_L$ to $f_U$) | 5 | | 1000 | MHz |
| | **IF** | 0 | | 500 | MHz |
| **Conversion Loss** | **Mid band** | | 7.2 | 8.4 | dB |
| | **Total Range** | | | 9.7 | dB |
| **LO-RF Isolation** | **Low Range** | 40 | 65 | | dB |
| | **Mid Range** | 25 | 50 | | dB |
| | **Upper Range** | 20 | 44 | | dB |
| **LO-IF Isolation** | **Low Range** | 40 | 58 | | dB |
| | **Mid Range** | 25 | 50 | | dB |
| | **Upper Range** | 15 | 28 | | dB |
| **1 dB Compression** | | | +5 | | dBm |

**Note:** Low Range = [$f_L$ to $10f_L$] Mid Range = [$10f_L$ to $f_U/2$] Upper Range = [$f_U/2$ to $f_U$]
Mid band = [$2f_L$ to $f_U/2$]

Non-hermetic

| 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** | 8 |
| **RF** | 1 |
| **IF** | 3,4^ |
| **GROUND** | 2,5,6,7 |

^ - pins must be connected together externally

# Frequency Mixer SCM-2LH

## *Typical Performance Data*

| RF (MHz) | LO (MHz) | CONVERSION LOSS (dB) | | |
|---|---|---|---|---|
| | | @LO (dBm) | | |
| | | +7 | +10 | +13 |
| 5.0 | 35.0 | 7.20 | 6.68 | 6.43 |
| 10.1 | 40.1 | 7.10 | 6.56 | 6.32 |
| 20.4 | 50.4 | 7.12 | 6.56 | 6.31 |
| 35.0 | 65.0 | 7.02 | 6.51 | 6.27 |
| 54.0 | 84.0 | 7.05 | 6.48 | 6.26 |
| 60.1 | 90.1 | 7.02 | 6.46 | 6.24 |
| 83.2 | 113.2 | 7.01 | 6.46 | 6.25 |
| 115.0 | 85.0 | 6.96 | 6.41 | 6.18 |
| 159.1 | 129.1 | 6.83 | 6.45 | 6.17 |
| 220.1 | 190.1 | 6.66 | 6.42 | 6.18 |
| 273.2 | 243.2 | 6.68 | 6.47 | 6.23 |
| 339.2 | 309.2 | 6.78 | 6.57 | 6.31 |
| 421.0 | 391.0 | 6.98 | 6.78 | 6.48 |
| 500.0 | 470.0 | 7.21 | 6.83 | 6.40 |
| 600.0 | 570.0 | 7.52 | 7.28 | 7.05 |
| 700.0 | 670.0 | 8.08 | 7.19 | 6.76 |
| 760.0 | 730.0 | 9.09 | 7.62 | 6.79 |
| 850.0 | 820.0 | 9.50 | 8.58 | 7.48 |
| 897.5 | 867.5 | 9.32 | 8.64 | 7.98 |
| 1000.0 | 970.0 | 9.21 | 8.57 | 8.03 |

| LO (MHz) | LO-RF ISOLATION (dB) | | | LO-IF ISOLATION (dB) | | |
|---|---|---|---|---|---|---|
| | @LO (dBm) | | | @LO (dBm) | | |
| | +7 | +10 | +13 | +7 | +10 | +13 |
| 5.0 | 57.1 | 59.0 | 60.2 | 53.7 | 53.8 | 53.8 |
| 10.1 | 57.0 | 58.8 | 60.0 | 53.4 | 53.6 | 53.6 |
| 20.4 | 57.2 | 59.0 | 60.2 | 53.9 | 54.1 | 54.2 |
| 35.0 | 56.6 | 58.5 | 59.7 | 53.9 | 54.1 | 54.3 |
| 54.0 | 55.7 | 57.4 | 58.7 | 53.9 | 54.1 | 54.1 |
| 60.1 | 55.4 | 57.0 | 58.3 | 54.0 | 54.1 | 54.1 |
| 83.2 | 54.3 | 55.9 | 57.2 | 54.4 | 54.6 | 54.6 |
| 115.0 | 52.6 | 54.3 | 55.7 | 55.3 | 56.1 | 55.8 |
| 159.1 | 50.5 | 52.2 | 53.4 | 58.4 | 57.7 | 56.3 |
| 220.1 | 48.0 | 49.6 | 51.2 | 65.8 | 61.1 | 58.5 |
| 273.2 | 46.1 | 48.0 | 49.5 | 77.5 | 63.6 | 59.7 |
| 339.2 | 44.3 | 46.1 | 47.7 | 57.6 | 57.8 | 58.5 |
| 421.0 | 42.8 | 44.7 | 46.5 | 55.6 | 61.4 | 58.6 |
| 500.0 | 40.9 | 42.9 | 44.8 | 50.2 | 49.6 | 50.1 |
| 600.0 | 39.7 | 41.9 | 44.0 | 48.5 | 46.9 | 45.3 |
| 700.0 | 40.3 | 42.5 | 44.1 | 44.7 | 45.0 | 41.3 |
| 760.0 | 38.6 | 41.2 | 43.2 | 41.3 | 41.5 | 40.2 |
| 850.0 | 36.3 | 38.4 | 40.5 | 35.5 | 35.8 | 35.6 |
| 897.5 | 35.6 | 37.7 | 39.8 | 33.3 | 33.7 | 34.0 |
| 1000.0 | 33.7 | 36.3 | 39.3 | 29.1 | 30.1 | 30.7 |

# Frequency Mixer SCM-2LH

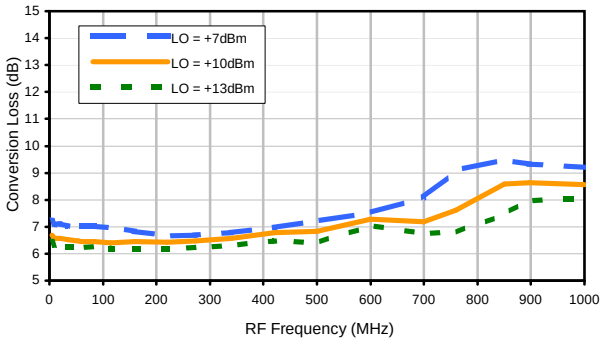
## *Typical Performance Data*

| RF/LO (MHz) | RF VSWR (:1) @LO (dBm) | | | LO VSWR (:1) @LO (dBm) | | | IF (MHz) | IF VSWR (:1) @LO (dBm) | | | LO/RF (MHz) @LO (dBm) | max. DC output (mV) | DC Offset (mV) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | +7 | +10 | +13 | +7 | +10 | +13 | | +7 | +10 | +13 | +10 | | |
| 5.0 | 1.75 | 1.66 | 1.57 | 1.71 | 2.41 | 3.39 | 0.3 | 2.83 | 2.44 | 2.08 | 5.0 | -342.1 | 1.24 |
| 10.1 | 1.77 | 1.68 | 1.58 | 1.52 | 2.23 | 3.21 | 0.7 | 2.84 | 2.45 | 2.09 | 10.1 | -346.8 | 1.25 |
| 20.4 | 1.79 | 1.70 | 1.60 | 1.51 | 2.24 | 3.22 | 1.2 | 2.85 | 2.45 | 2.09 | 20.0 | -345.5 | 1.24 |
| 35.0 | 1.81 | 1.72 | 1.62 | 1.50 | 2.23 | 3.18 | 1.6 | 2.85 | 2.45 | 2.09 | 50.0 | -335.2 | 1.18 |
| 54.0 | 1.82 | 1.73 | 1.64 | 1.48 | 2.17 | 3.12 | 2.0 | 2.85 | 2.45 | 2.09 | 100.0 | -345.5 | 1.15 |
| 60.1 | 1.82 | 1.73 | 1.64 | 1.47 | 2.16 | 3.11 | 3.0 | 2.86 | 2.45 | 2.09 | 150.0 | -355.0 | 1.04 |
| 83.2 | 1.81 | 1.72 | 1.62 | 1.46 | 2.12 | 3.10 | 4.8 | 2.86 | 2.46 | 2.09 | 200.0 | -351.4 | 0.95 |
| 115.0 | 1.85 | 1.76 | 1.66 | 1.47 | 2.13 | 3.08 | 6.5 | 2.87 | 2.45 | 2.09 | 250.0 | -370.1 | 0.91 |
| 159.1 | 1.89 | 1.80 | 1.71 | 1.45 | 2.06 | 3.03 | 8.3 | 2.90 | 2.47 | 2.10 | 300.0 | -369.3 | 0.53 |
| 220.1 | 1.93 | 1.85 | 1.76 | 1.51 | 2.09 | 3.04 | 10.0 | 2.89 | 2.47 | 2.10 | 350.0 | -306.7 | 0.48 |
| 273.2 | 1.94 | 1.86 | 1.76 | 1.61 | 2.18 | 3.14 | 30.0 | 2.80 | 2.39 | 2.03 | 400.0 | -321.7 | 0.69 |
| 339.2 | 2.00 | 1.91 | 1.82 | 1.71 | 2.21 | 3.14 | 60.0 | 2.78 | 2.37 | 2.00 | 450.0 | -318.0 | 0.70 |
| 421.0 | 1.96 | 1.89 | 1.79 | 1.88 | 2.29 | 3.16 | 90.0 | 2.91 | 2.49 | 2.10 | 500.0 | -308.6 | 0.33 |
| 500.0 | 1.89 | 1.81 | 1.71 | 2.02 | 2.40 | 3.29 | 120.0 | 2.90 | 2.48 | 2.10 | 550.0 | -312.7 | -0.04 |
| 600.0 | 1.76 | 1.68 | 1.58 | 2.21 | 2.45 | 3.17 | 150.0 | 2.80 | 2.38 | 2.01 | 600.0 | -310.4 | -0.30 |
| 700.0 | 1.59 | 1.51 | 1.41 | 2.53 | 2.78 | 3.44 | 200.0 | 2.98 | 2.55 | 2.15 | 650.0 | -307.9 | 0.54 |
| 760.0 | 1.47 | 1.38 | 1.29 | 2.63 | 2.88 | 3.62 | 275.0 | 2.92 | 2.49 | 2.10 | 700.0 | -268.8 | 1.09 |
| 850.0 | 1.34 | 1.26 | 1.18 | 2.75 | 2.94 | 3.69 | 350.0 | 2.88 | 2.47 | 2.08 | 800.0 | -263.7 | -0.37 |
| 897.5 | 1.34 | 1.27 | 1.22 | 2.80 | 2.94 | 3.64 | 425.0 | 2.88 | 2.47 | 2.09 | 900.0 | -257.9 | -1.44 |
| 1000.0 | 1.46 | 1.43 | 1.36 | 2.82 | 2.89 | 3.48 | 500.0 | 2.82 | 2.40 | 2.06 | 1000.0 | -254.3 | -0.93 |

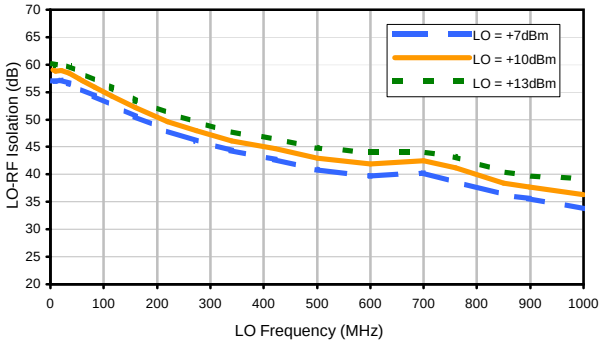
# Frequency Mixer SCM-2LH

## *Typical Performance Curves*

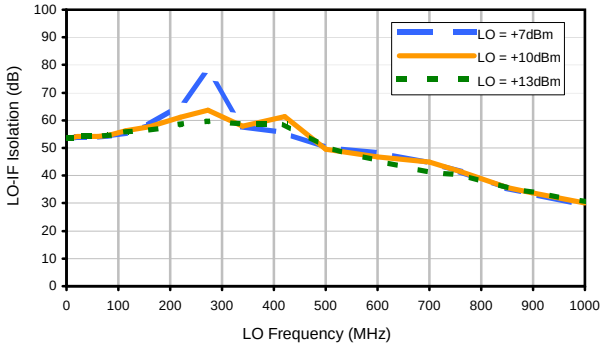
### Conversion Loss



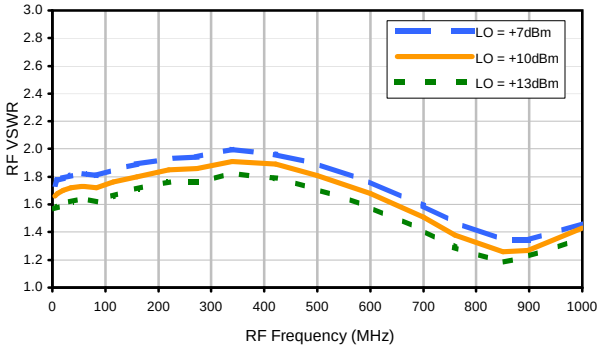

### LO-RF Isolation



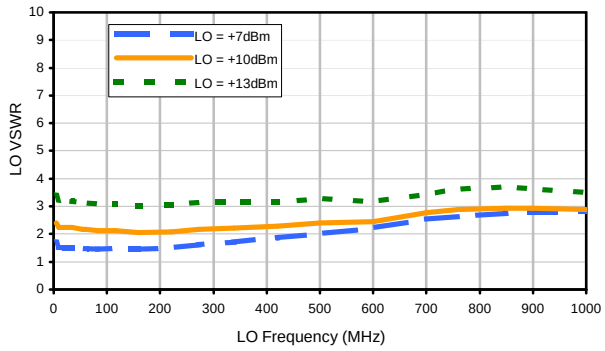

### LO-IF Isolation



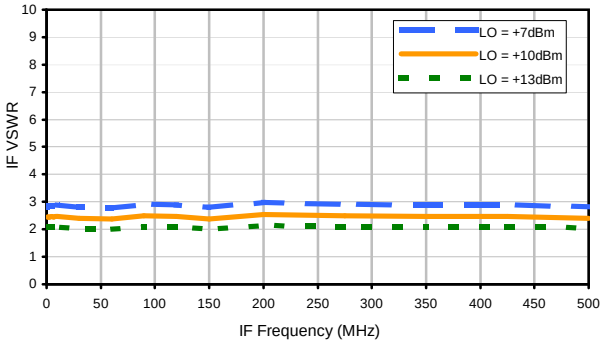

### RF VSWR



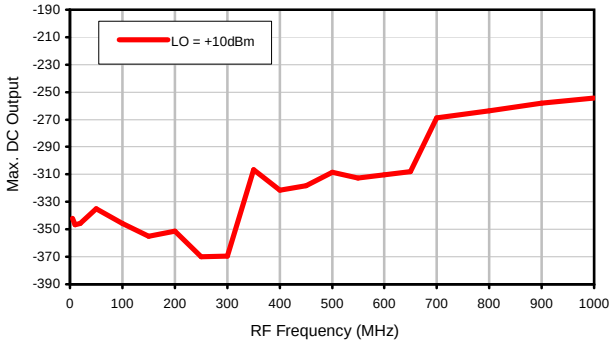

### LO VSWR




### IF VSWR



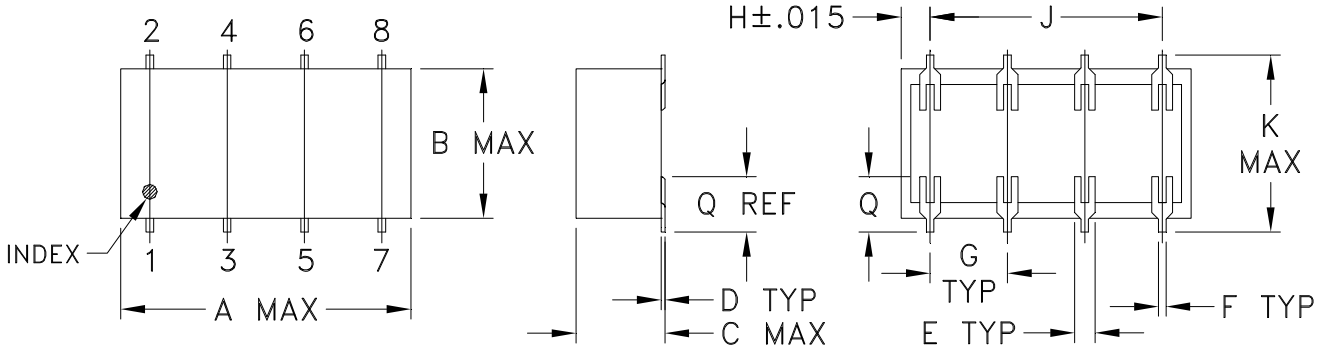

### Max. DC Output



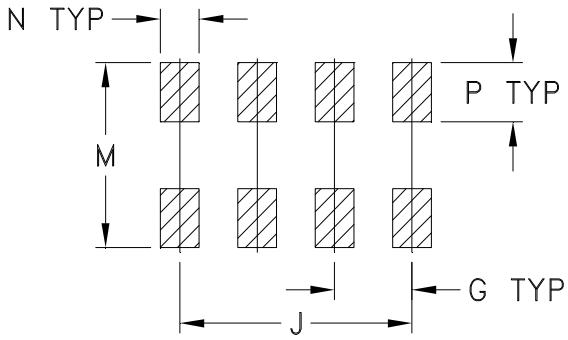
# Case Style YY

## Outline Dimensions

**YY101**
**YY109**
**YY161**




## PCB Land Pattern




Suggested Layout
Tolerance to be within ±.002

| CASE# | A | B | C | D | E | F | G | H | J | K | L | M | N | P | Q | WT. GRAMS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| YY101* | .75 (19.05) | .38 (9.65) | .20 (5.08) | .010 (0.25) | .050 (1.27) | .020 (0.51) | .200 (5.08) | .075 (1.91) | .600 (15.24) | .450 (11.43) | -- -- | .470 (11.94) | .100 (2.54) | .150 (3.81) | .148 (3.76) | 1.6 |
| YY109* | | | .20 (5.08) | | | | | | | .720 (18.29) | -- -- | .740 (18.80) | | | | 1.6 |
| YY161 | | | .28 (7.11) | | | | | | | .450 (11.43) | -- -- | .470 (11.94) | | | | 1.6 |

**Dimensions are in inches (mm). Tolerances: 2 Pl. ± .01; 3 Pl. ± .005**

### Notes:

1. Case material: Plastic.
2. Termination finish:
   For RoHS Case Styles: Tin plate over Nickel plate.
   For RoHS-5 Case Styles: Tin-Lead plate.
3. Special Tolerances: Termination thickness ± .003 inch.
4. * Denotes: For SCM mixers, long termination version (case YY109) is available upon request, consult factory. To order short termination version (case YY101) add -NL suffix.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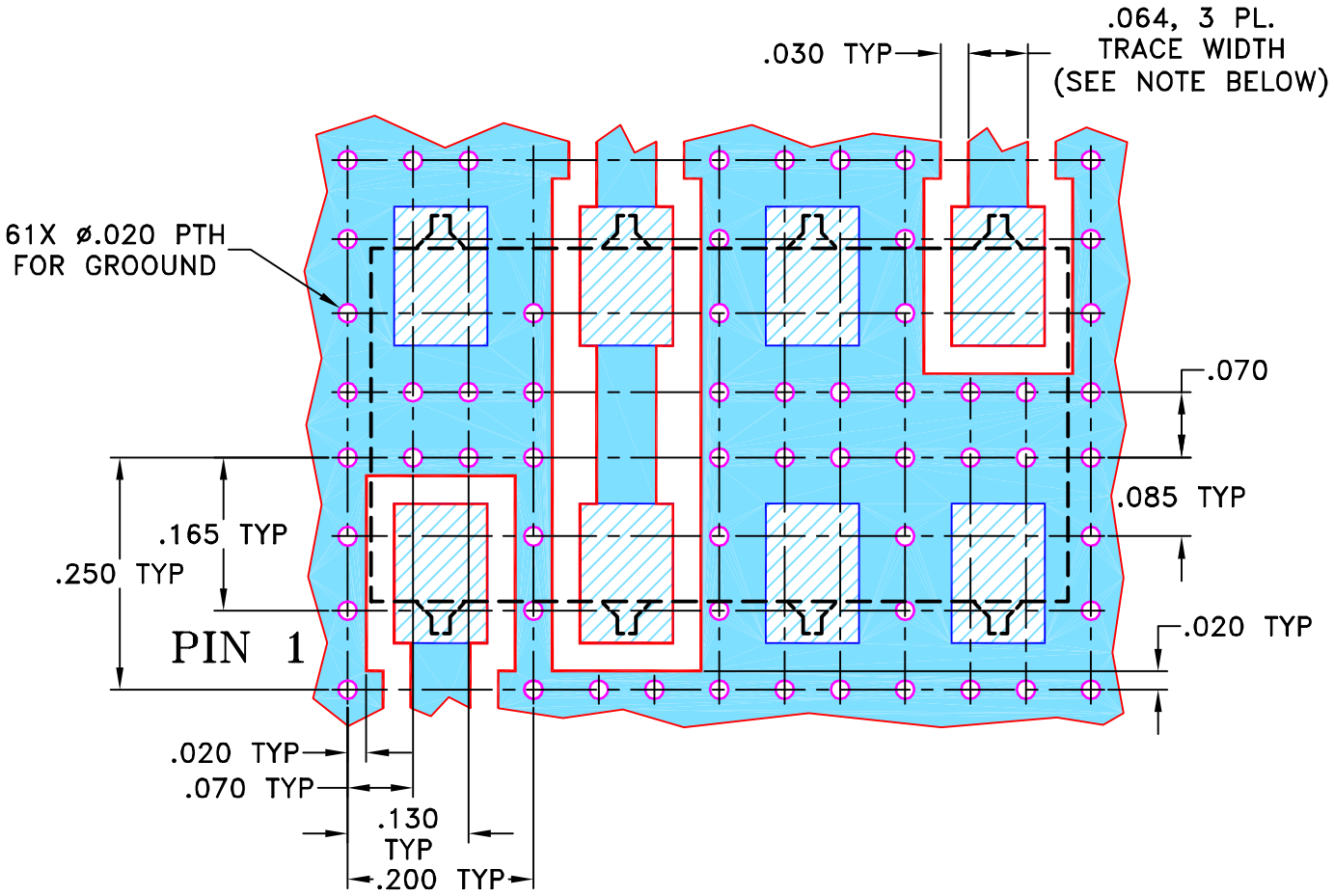
THIRD ANGLE PROJECTION

| 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 YY101 CASE STYLE, "d" 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 | 07/22/02 |
| TOLERANCES ON: | CHECKED | WL | 08/02/02 |
| 2 PL DECIMALS ± | APPROVED | DJ | 08/02/02 |
| 3 PL DECIMALS ± .005 | | | |
| ANGLES ± | | | |
| FRACTIONS ± | | | |



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

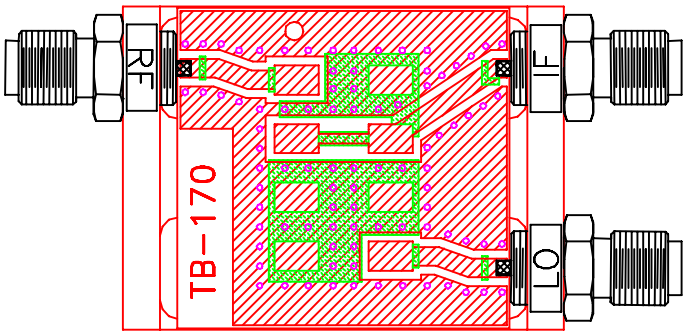
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

PL, d, YY101, SCM, TB-170

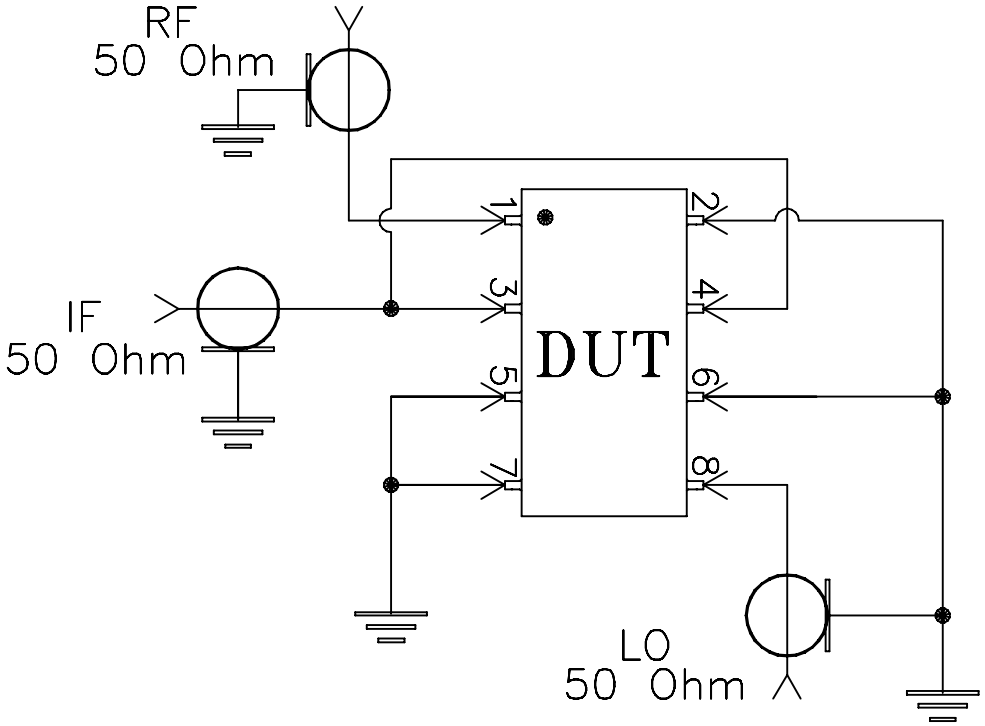
| SIZE | CODE IDENT | DRAWING NO: | REV: |
|---|---|---|---|
| A | 15542 | 98-PL-084 | A |

| FILE: | SCALE: | SHEET: |
|---|---|---|
| 98PL084 | 5:1 | 1 OF 1 |

# Evaluation Board and Circuit




TB-170




Schematic Diagram

## Notes:

1. SMA Female connectors.
2. PCB Material: Rogers RO4350 or equivalent, Dielectric Constant=3.5, Thickness=.030 inch.

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# Environmental Specifications ENV02T1

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 | -40° to 85°C<br>Ambient Environment | Individual Model Data Sheet |
| Storage Temperature | -55° to 100° C<br>Ambient Environment | Individual Model Data Sheet |
| Humidity | 90 to 95% RH, 240 hours, 50°C | MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours |
| 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, 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 |
| 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 |