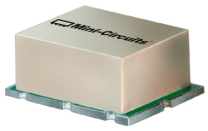
*Surface Mount*

# Frequency Mixer

## SYM-25DMHW+
## SYM-25DMHW

Level 13 (LO Power +13 dBm) 40 to 2500 MHz



CASE STYLE: TTT167

**+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" | 10, 20, 50, 100, 200 |
| 13" | 500 |

### Maximum Ratings

| | |
|---|---|
| Operating Temperature | -40°C to 85°C |
| Storage Temperature | -55°C to 100°C |
| RF Power | 200mW |
| IF Current | 40mA |

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

### Pin Connections

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

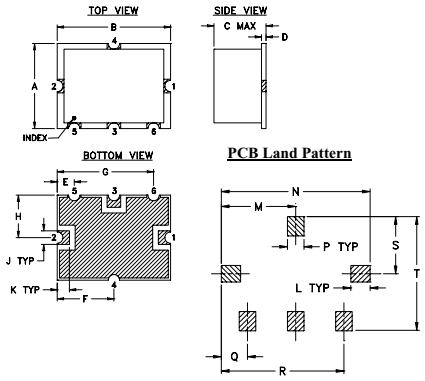
### Features

- wideband, 40 to 2500 MHz
- low conversion loss, 6.6 dB typ.
- high IP3, 26 dBm typ.
- IF response to DC

### Applications

- cellular
- PCS
- satellite distribution

### Outline Drawing



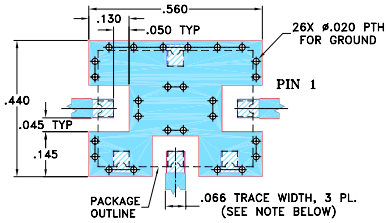

Suggested Layout,
Tolerance to be within ±.002

### Outline Dimensions ( inch / mm )

| A | B | C | D | E | F | G | H | J | K |
|---|---|---|---|---|---|---|---|---|---|
| .38 | .50 | .23 | .020 | .075 | .250 | .425 | .187 | .050 | .050 |
| 9.65 | 12.70 | 5.84 | 0.51 | 1.91 | 6.35 | 10.80 | 4.75 | 1.27 | 1.27 |

| L | M | N | P | Q | R | S | T | |
|---|---|---|---|---|---|---|---|---|
| .070 | .270 | .540 | .060 | .095 | .445 | .208 | .415 | wt. |
| 1.78 | 6.86 | 13.72 | 1.52 | 2.41 | 11.30 | 5.28 | 10.54 | grams |
| | | | | | | | | 0.8 |

### Demo Board MCL P/N: TB-12
### Suggested PCB Layout (PL-079)




NOTE:

1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. THE USE OF SOLDER MASK OVER THE GROUND AREA UNDER THE UNIT AS SHOWN IS RECOMMENDED TO PREVENT POTENTIAL SHORTING. IF USER CHOOSES TO EXPOSE METAL UNDER THE ENTIRE UNIT GROUND PAD FOR IMPROVED GROUNDING, IT IS RECOMMENDED A SOLDER MASK DAM BE APPLIED AROUND EACH GROUND PAD TO ENSURE FILLET AND CONNECTION AT GROUND PADS.
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER). SEE NOTE 2.

DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

### Electrical Specifications

| FREQUENCY (MHz) | | CONVERSION LOSS* (dB) | | | | LO-RF ISOLATION (dB) | | | | | | LO-IF ISOLATION (dB) | | | | | | IP3 at center band (dBm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Mid-Band m | | | Total Range | L | | M | | U | | L | | M | | U | | |
| LO/RF $f_L$-$f_U$ | IF | $\overline{X}$ | σ | Max. | Max. | Typ. | Min. | Typ. | Min. | Typ. | Min. | Typ. | Min. | Typ. | Min. | Typ. | Min. | Typ. |
| 40-2500 | DC-1000* | 6.6 | .10 | 8.0 | 9.0 | 47 | 32 | 37 | 27 | 35 | 22 | 38 | 28 | 35 | 25 | 38 | 20 | 26 |

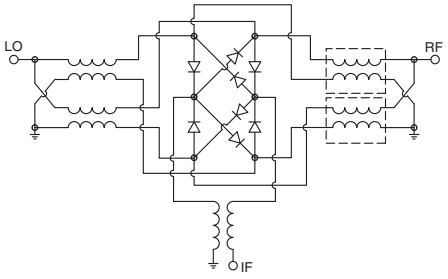
1 dB COMP.: +9 dBm typ.
*Conversion loss increases up to 6 dB higher as IF frequency decreases from 5MHz to DC.

L = low range [$f_L$ to 10 $f_L$]
m= mid band [$2\sqrt{f_L}$ to $f_U/2$]
M = mid range [10 $f_L$ to $f_U/2$]
U = upper range [$f_U/2$ to $f_U$]

### Typical Performance Data

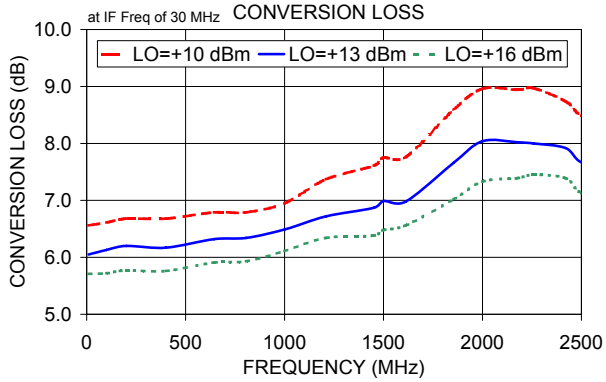
| Frequency (MHz) | | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|---|---|---|---|---|---|---|
| RF | LO | LO +13dBm | LO +13dBm | LO +13dBm | LO +13dBm | LO +13dBm |
| 10.10 | 80.10 | 6.05 | 53.30 | 37.85 | 1.14 | 1.50 |
| 100.10 | 170.10 | 6.13 | 61.96 | 37.66 | 1.14 | 1.48 |
| 200.10 | 270.10 | 6.20 | 57.62 | 37.58 | 1.17 | 1.45 |
| 400.10 | 470.10 | 6.17 | 51.91 | 37.25 | 1.28 | 1.42 |
| 644.24 | 714.24 | 6.32 | 48.85 | 36.97 | 1.49 | 1.26 |
| 805.62 | 875.62 | 6.34 | 44.29 | 34.60 | 1.70 | 1.20 |
| 1000.10 | 1070.10 | 6.49 | 40.91 | 34.12 | 2.01 | 1.11 |
| 1209.07 | 1279.07 | 6.72 | 36.71 | 32.67 | 2.27 | 1.04 |
| 1451.13 | 1521.13 | 6.87 | 35.32 | 33.07 | 2.79 | 1.08 |
| 1500.10 | 1570.10 | 6.99 | 35.51 | 33.59 | 2.90 | 1.11 |
| 1612.51 | 1682.51 | 6.98 | 36.55 | 34.68 | 2.94 | 1.18 |
| 1854.58 | 1924.58 | 7.66 | 35.12 | 37.81 | 2.52 | 1.35 |
| 2000.10 | 2070.10 | 8.04 | 33.74 | 39.74 | 2.41 | 1.47 |
| 2177.34 | 2247.34 | 8.02 | 32.04 | 37.96 | 2.21 | 1.59 |
| 2258.03 | 2328.03 | 8.00 | 31.23 | 35.83 | 2.14 | 1.65 |
| 2419.41 | 2489.41 | 7.92 | 30.39 | 32.11 | 2.09 | 1.85 |
| 2500.10 | 2430.10 | 7.67 | 29.98 | 30.34 | 1.82 | 2.00 |

### Electrical Schematic

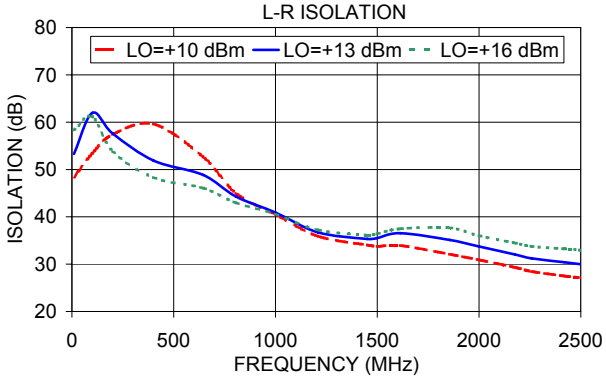


# Performance Charts

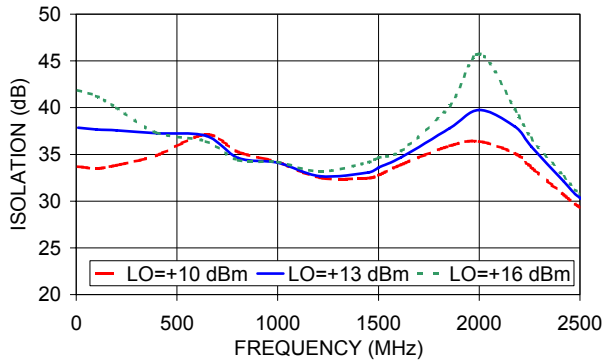
SYM-25DMHW
at IF Freq of 30 MHz CONVERSION LOSS



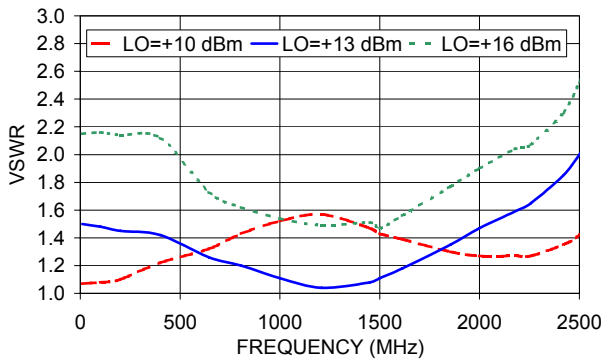

SYM-25DMHW
L-R ISOLATION



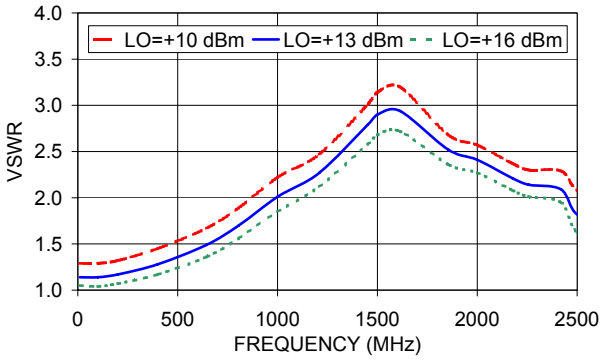

SYM-25DMHW
L-I ISOLATION



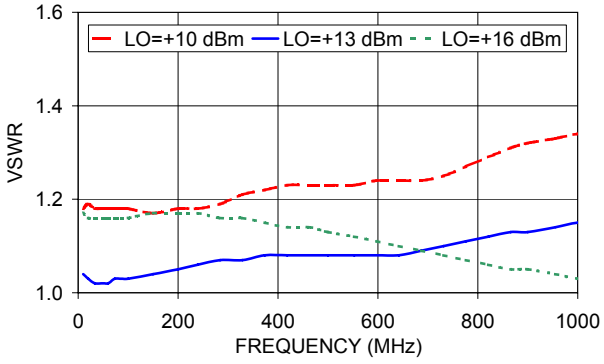

SYM-25DMHW
LO VSWR




SYM-25DMHW
RF VSWR




SYM-25DMHW
IF VSWR




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