

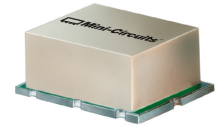
High IP3

# Frequency Mixer

NON-CATALOG

SYM-22H+

Level 17 (LO Power +17 dBm) 1500 to 2200 MHz



CASE STYLE: TTT167

## 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

- low conversion loss, 5.6 dB typ.
- high IP3, 30 dBm typ.
- useable over 1000-2400 MHz
- good L-R isolation, 33 dB typ.; & L-I isolation, 38 dB typ.
- IF response to DC

## Applications

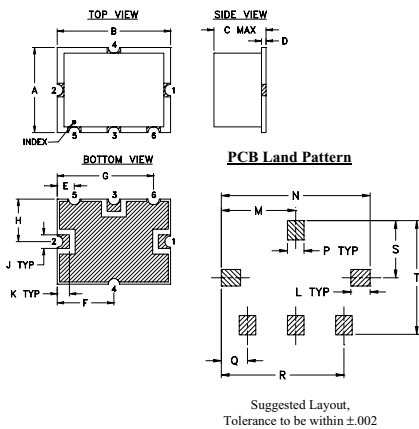
- PCS
- cellular

**+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                  |

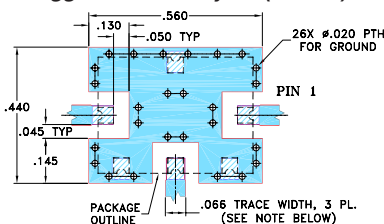
## Outline Drawing



## 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     | wt.   |      |
| .070 | .270  | .540  | .060 | .095 | .445  | .208  | .415  | grams |      |
| 1.78 | 6.86  | 13.72 | 1.52 | 2.41 | 11.30 | 5.28  | 10.54 | 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

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.  
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## Electrical Specifications

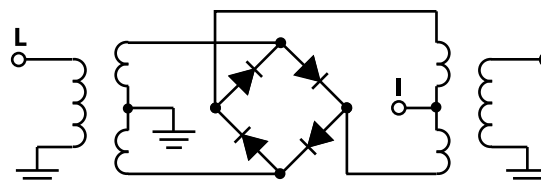
| FREQUENCY (MHz) |        | CONVERSION LOSS (dB) |             | LO-RF ISOLATION (dB) |      | LO-IF ISOLATION (dB) |      | IP3 at center band (dBm) |    |
|-----------------|--------|----------------------|-------------|----------------------|------|----------------------|------|--------------------------|----|
| LO/RF           | IF     | Mid-Band             | Total Range | Typ.                 | Min. | Typ.                 | Min. | Typ.                     |    |
| $f_L - f_U$     | DC-200 | $\bar{m}$            | Max.        |                      |      |                      |      |                          |    |
| 1500-2200       | DC-200 | 5.6                  | .30         | 8.8                  | 33   | 22                   | 38   | 22                       | 30 |

1 dB COMP.: +14 dBm typ.

## Typical Performance Data

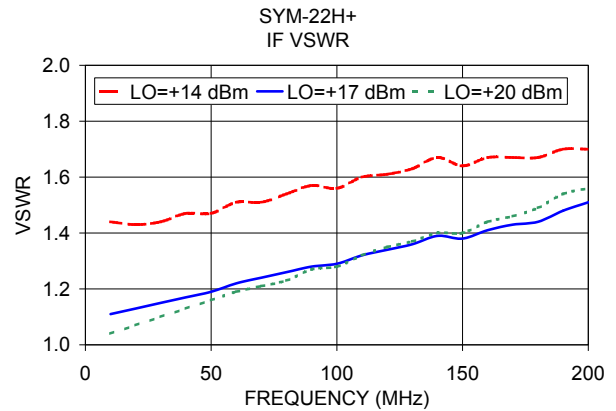
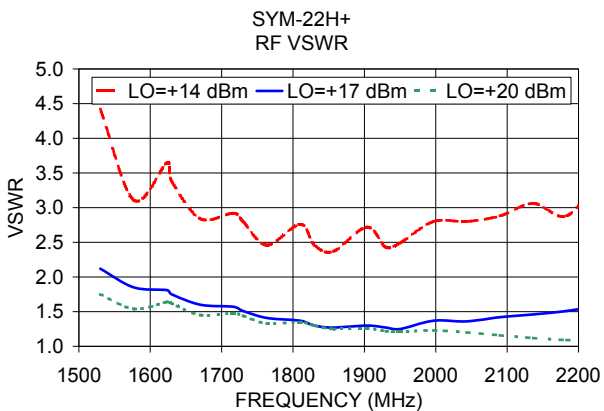
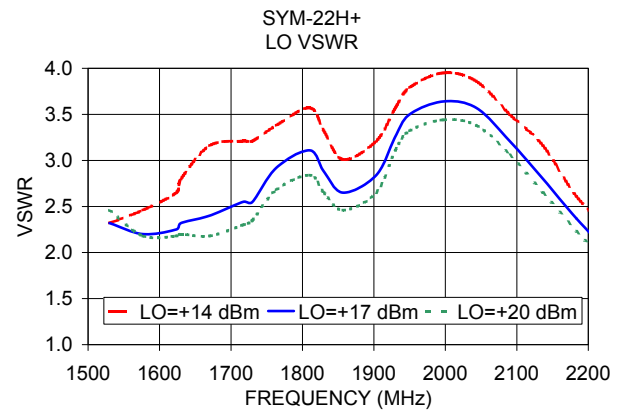
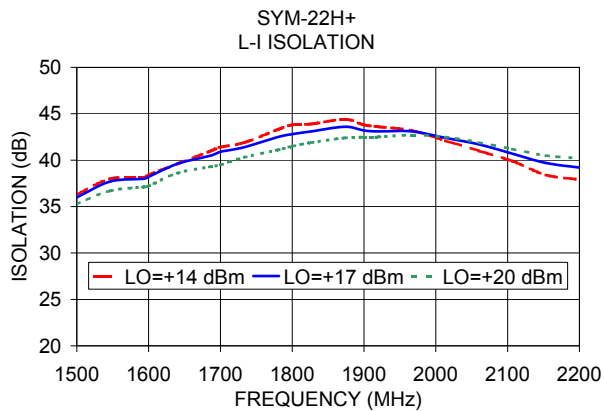
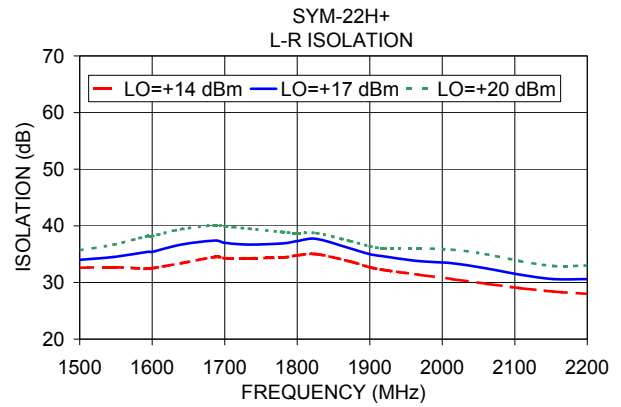
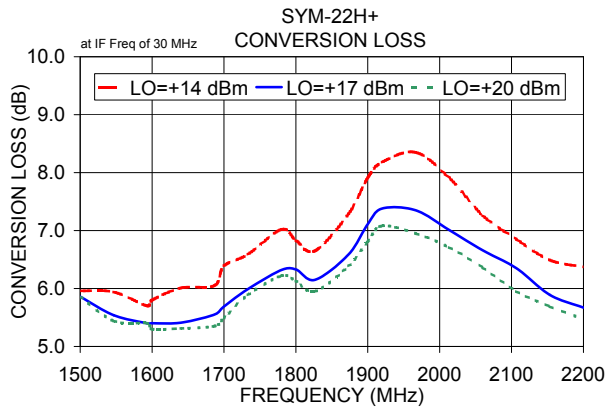
| Frequency (MHz) |         | Conversion Loss (dB) | Isolation L-R (dB) | Isolation L-I (dB) | VSWR RF Port (:1) | VSWR LO Port (:1) |
|-----------------|---------|----------------------|--------------------|--------------------|-------------------|-------------------|
| RF              | LO      | LO +17dBm            | LO +17dBm          | LO +17dBm          | LO +17dBm         | LO +17dBm         |
| 1500.00         | 1530.00 | 5.86                 | 34.00              | 36.00              | 2.12              | 2.32              |
| 1546.67         | 1576.67 | 5.54                 | 34.50              | 37.70              | 1.85              | 2.20              |
| 1593.33         | 1623.33 | 5.40                 | 35.40              | 38.00              | 1.81              | 2.25              |
| 1600.00         | 1630.00 | 5.40                 | 35.40              | 38.20              | 1.75              | 2.32              |
| 1640.00         | 1670.00 | 5.41                 | 36.70              | 39.60              | 1.60              | 2.40              |
| 1686.67         | 1716.67 | 5.55                 | 37.40              | 40.50              | 1.57              | 2.55              |
| 1700.00         | 1730.00 | 5.69                 | 37.00              | 40.90              | 1.51              | 2.55              |
| 1733.33         | 1763.33 | 5.99                 | 36.70              | 41.40              | 1.41              | 2.92              |
| 1780.00         | 1810.00 | 6.32                 | 36.90              | 42.50              | 1.37              | 3.11              |
| 1800.00         | 1830.00 | 6.33                 | 37.30              | 42.80              | 1.30              | 2.88              |
| 1826.67         | 1856.67 | 6.15                 | 37.70              | 43.10              | 1.27              | 2.65              |
| 1873.33         | 1903.33 | 6.59                 | 36.00              | 43.60              | 1.30              | 2.84              |
| 1900.00         | 1930.00 | 7.11                 | 35.00              | 43.20              | 1.27              | 3.26              |
| 1920.00         | 1950.00 | 7.38                 | 34.60              | 43.10              | 1.25              | 3.50              |
| 1966.67         | 1996.67 | 7.35                 | 33.80              | 43.10              | 1.37              | 3.64              |
| 2013.33         | 2043.33 | 7.01                 | 33.40              | 42.40              | 1.36              | 3.57              |
| 2060.00         | 2090.00 | 6.66                 | 32.50              | 41.70              | 1.42              | 3.21              |
| 2106.67         | 2136.67 | 6.35                 | 31.40              | 40.70              | 1.46              | 2.80              |
| 2153.33         | 2183.33 | 5.89                 | 30.60              | 39.70              | 1.51              | 2.37              |
| 2200.00         | 2230.00 | 5.67                 | 30.60              | 39.20              | 1.59              | 1.99              |

## Electrical Schematic



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REV. H  
M160892  
SYM-22H+  
ED-6438/1  
DJ/TD/AM  
180123  
Page 1 of 2



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