

# High Reliability Mixer

## SYM-R252HW+

Level 17 (LO Power +17 dBm) 10 to 2500 MHz

### The Big Deal

- High reliability with hermetically sealed ceramic quads
- Wideband, 10 to 2500 MHz
- Low conversion loss, 6.5 dB
- High IP3, +23 dBm
- High isolation, 40 dB L-R, 40 dB L-I typ.



CASE STYLE: TTT881

### Product Overview

Mini-Circuits SYM-R252HW+ is a surface mount, level 17 Schottky-diode-based triple balanced frequency mixer with an RF/LO frequency range from 10 to 2500 MHz and an IF bandwidth of 10 to 500 MHz. This model utilizes hermetically sealed ceramic quads to provide high reliability for use in harsh operating conditions. It provides an outstanding combination of low conversion loss, high IP3, and excellent L-R and L-I isolation. The mixer comes housed in a miniature shielded package (0.38 x 0.50 x 0.23"), saving space in tight PCB layouts.

### Key Features

Feature	Advantages
Hermetically sealed ceramic quads	Provides high reliability for applications in harsh operating conditions.
High IP3, +23 dBm typ.	Minimizes third order intermodulation products and improves dynamic range in demanding environments where multiple carriers may be present.
Low conversion loss, 6.5 dB	Preserves signal integrity from input to output by reducing undesirable signal loss that can degrade system performance and enables lower NF front ends, improving system sensitivity.
Good P1dB compression, +14 dBm at input	Results in excellent linearity and high dynamic range.
High L-R and L-I isolation, <ul style="list-style-type: none"><li>• L-R, 40 dB typ.</li><li>• L-I, 40 dB typ.</li></ul>	Reduces undesired signal crosstalk that can interfere with system performance.
Small size (0.38 x 0.50 x 0.23")	Saves PCB real estate and accommodates crowded layouts.

#### 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)



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### 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, 10 to 2500 MHz
- good L-R isolation, 40 dB typ.
- good L-I isolation, 40 dB typ.
- high IP3, 23 dBm typ.
- hermetically sealed ceramic quad

### Applications

- CDMA
- GSM
- DCS
- PCN
- Base station

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

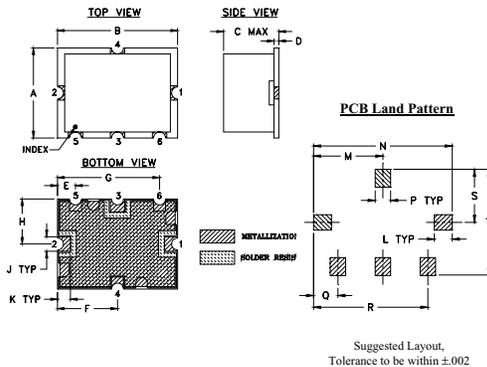
Available Tape and Reel at no extra cost

Reel Size	Devices/Reel
7"	10, 20, 50, 100, 200
13"	500

### Electrical Specifications at 25°C

Parameter	Min.	Typ.	Max.	Unit
Frequency Range, RF	10	—	2500	MHz
Frequency Range, LO	10	—	2500	MHz
Frequency Range, IF	10	—	500	MHz
Conversion Loss	—	6.5	9.1	dB
LO to RF Isolation	24	40	—	dB
LO to IF Isolation	28	40	—	dB
IP3	—	23	—	dBm
RF Input Power at 1 dB Compression	—	+14	—	dBm

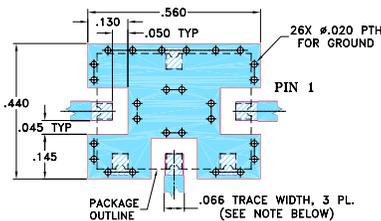
### Outline Drawing



### 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

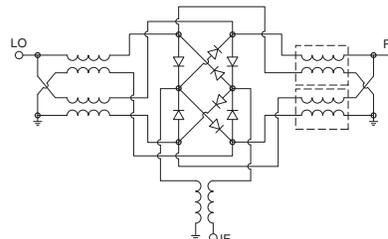
### Notes

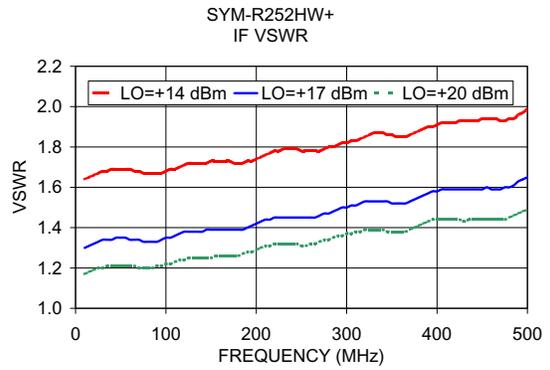
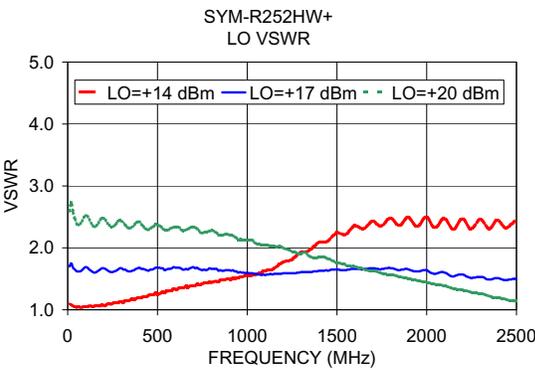
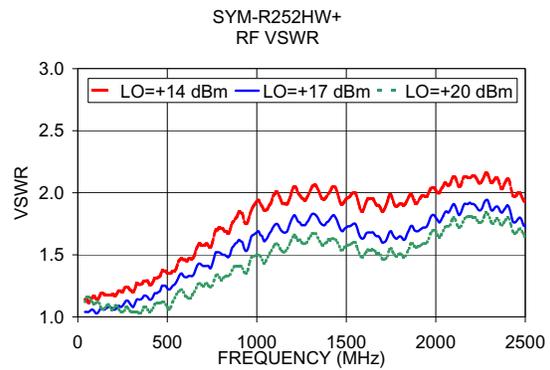
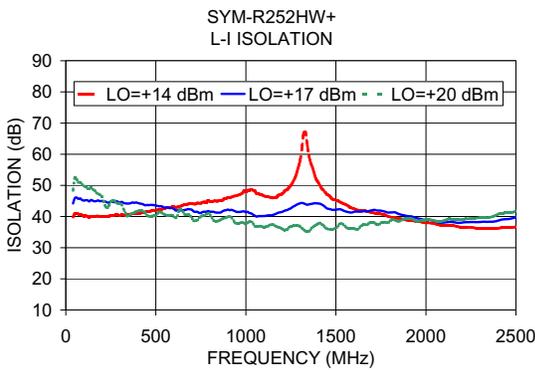
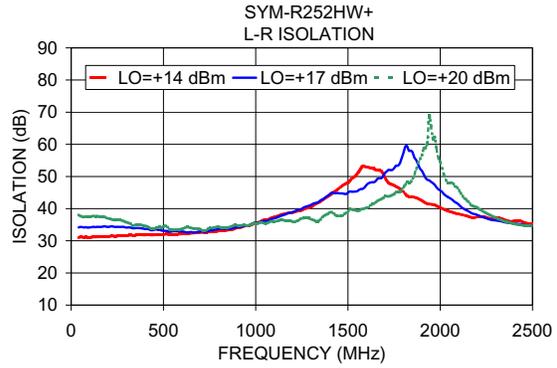
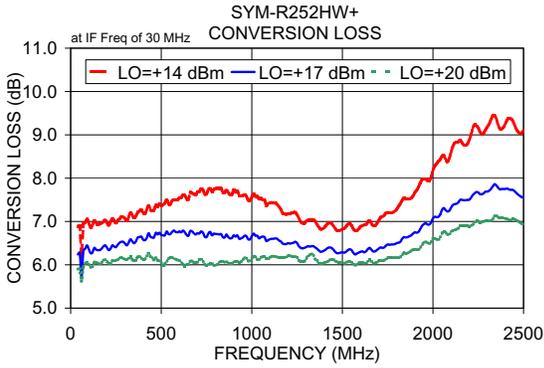
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### Typical Performance Data

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
40.10	10.00	6.24	34.15	44.21	1.04	1.70
100.10	70.00	6.36	34.16	45.12	1.03	1.62
500.10	470.00	6.69	33.15	43.54	1.23	1.65
800.10	770.00	6.71	33.73	41.53	1.51	1.64
900.10	870.00	6.68	34.17	42.23	1.62	1.63
1000.10	970.00	6.66	35.58	41.39	1.68	1.60
1200.10	1170.00	6.50	38.88	41.48	1.80	1.58
1300.10	1270.00	6.41	41.19	44.24	1.81	1.59
1400.10	1370.00	6.33	44.46	44.18	1.77	1.62
1500.10	1470.00	6.29	44.97	42.19	1.72	1.65
1600.10	1570.00	6.30	47.33	41.51	1.64	1.65
1700.10	1670.00	6.37	51.03	42.00	1.60	1.66
1800.10	1770.00	6.50	57.24	41.32	1.65	1.67
1900.10	1870.00	6.75	51.76	40.12	1.69	1.65
2000.10	1970.00	7.07	45.66	38.89	1.80	1.63
2100.10	2070.00	7.32	41.25	38.08	1.91	1.60
2200.10	2170.00	7.50	38.05	38.05	1.91	1.56
2300.10	2270.00	7.69	36.33	38.24	1.90	1.52
2400.10	2370.00	7.75	35.35	38.66	1.90	1.50
2530.10	2500.00	7.52	34.20	40.40	1.72	1.50

### Electrical Schematic





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