

# Surface Mount Frequency Mixer

## SYM-11LH+ SYM-11LH

Level 10 (LO Power +10 dBm) 1 to 2000 MHz



Generic photo used for illustration purposes only

CASE STYLE: TTT167

### Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
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, 1 to 2000 MHz
- low conversion loss, 7.0 dB typ.
- good isolation, 45 dB typ. L-R, 33 dB typ. L-I

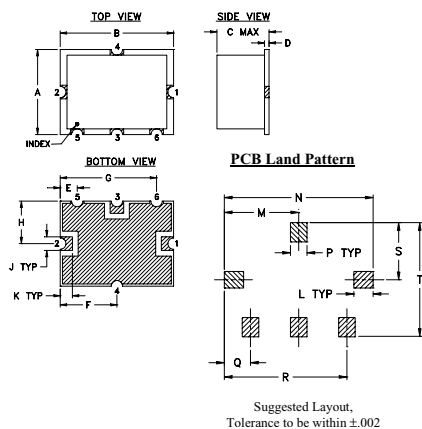
### Applications

- cellular
- ISM/GSM
- satellite distribution
- GPS

**+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

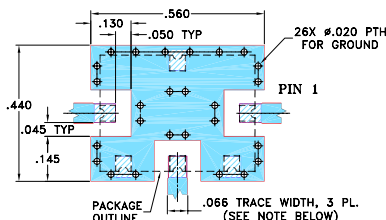
### Outline Drawing



### 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	L		M		U		L		M			U		
$f_L$ - $f_U$		$\bar{X}$	$\sigma$	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	
1-2000	10-600	7.0	.10	8.3	9.85	60	40	45	25	37	25	59	40	33	20	25	20	14

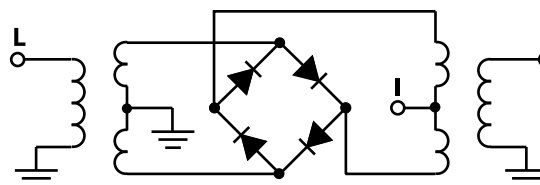
1 dB COMP.: +5 dBm typ.

L=low range( $f_L$  to  $10f_L$ )  
M=mid range( $10f_L$  to  $f_U/2$ )  
U=upper range ( $f_U/2$  to  $f_U$ )  
m=mid band ( $2f_L$  to  $f_U/2$ )

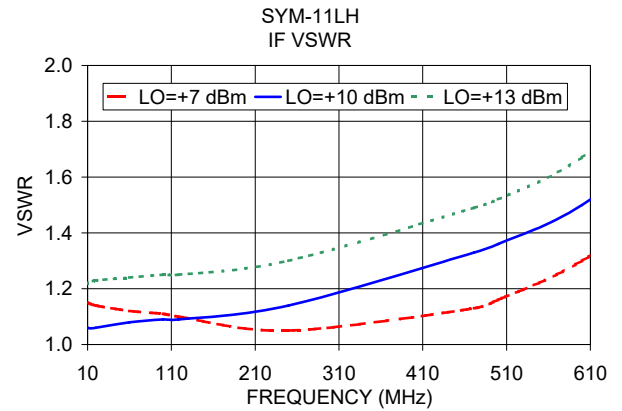
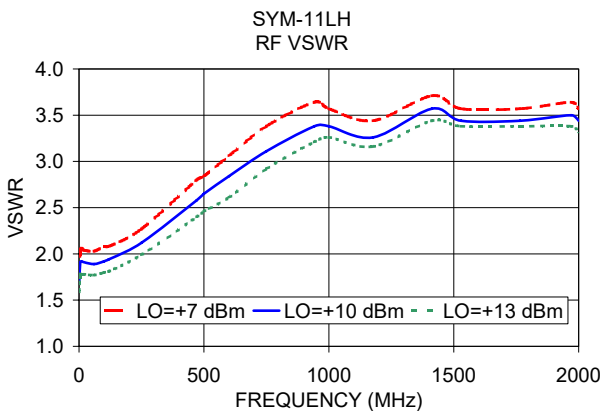
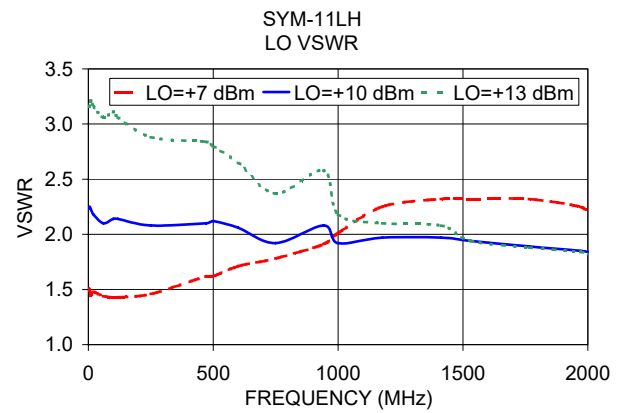
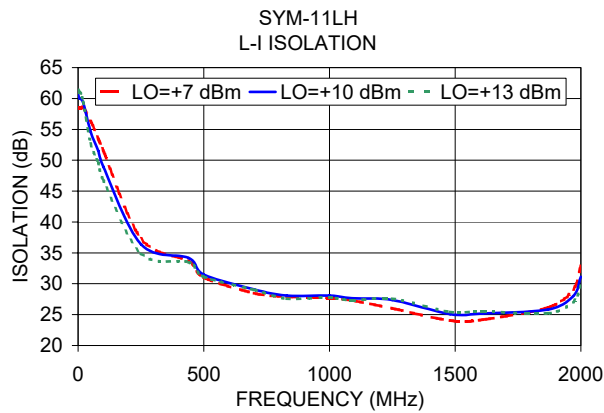
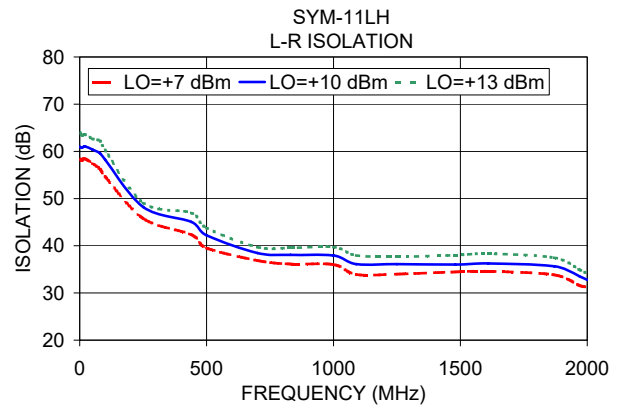
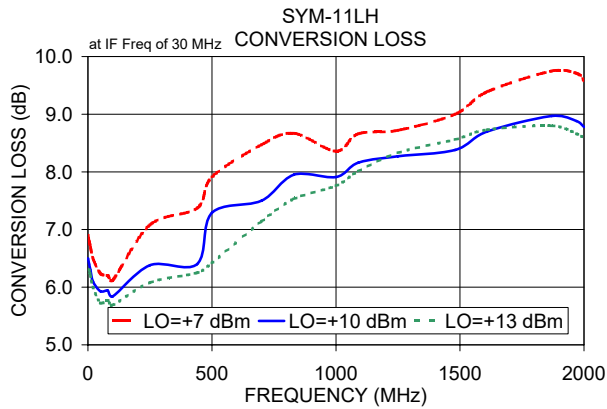
### Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm	LO +10dBm
1.00	31.00	6.50	61.00	60.60	1.69	2.23
5.00	35.00	6.40	60.80	60.00	1.91	2.25
10.00	40.00	6.30	60.77	59.99	1.92	2.23
20.00	50.00	6.10	61.07	59.34	1.91	2.18
50.00	80.00	5.93	60.38	54.58	1.89	2.10
80.00	110.00	5.94	59.60	51.54	1.92	2.14
100.00	130.00	5.84	58.27	48.96	1.94	2.14
250.00	280.00	6.38	48.22	36.40	2.12	2.08
440.00	470.00	6.40	45.06	34.17	2.58	2.10
500.00	530.00	7.29	42.23	31.50	2.65	2.12
700.00	730.00	7.50	38.46	29.07	2.84	2.06
830.00	860.00	7.95	38.08	28.07	3.11	1.92
1000.00	1030.00	7.91	37.94	28.08	3.38	2.08
1090.00	1120.00	8.16	36.12	27.65	3.38	1.92
1250.00	1280.00	8.27	36.11	27.37	3.26	1.97
1480.00	1510.00	8.38	36.02	25.08	3.57	1.97
1610.00	1640.00	8.70	36.26	25.19	3.44	1.94
1870.00	1900.00	8.97	35.66	25.82	3.44	1.89
1970.00	2000.00	8.88	33.51	28.03	3.50	1.85
2000.00	1970.00	8.78	32.77	31.12	3.44	1.84

### Electrical Schematic



## Performance Charts



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