

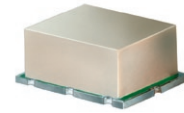
# Frequency Mixer

## SYM-63LH+

Level 10 (LO Power +10 dBm) 1 to 6000 MHz

### The Big Deal

- Ultra broadband, 1 to 6000 MHz
- High isolation and good conversion loss across the band
- Low profile compact package



CASE STYLE: TTT166

### Product Overview

Model SYM-63LH+ is an ultra broadband double balanced mixer utilizing core and wire transformers and a diode quad in a ring configuration. The transformers are designed to provide ultra wide bandwidth using simulation software together with Mini-Circuits proprietary transformer technology. These mixers provide an IF response from DC to 1000 MHz and are especially useful in wideband system applications such as IED.

### Key Features

Feature	Advantages
Low conversion loss, 8dB for wide bandwidth	Low loss enables lower NF front ends thereby improving system sensitivity.
High LO to RF isolation	Less susceptibility to the LO signal interfering with system performance. Reduced levels of unwanted responses especially in a wideband system.
Broadband matching	The IF port VSWR is less than 1.5 to 1 over the specified frequency range. This simplifies the cascading of an amplifier following the mixer.
Compact low profile package 0.38 x 0.50 x 0.15"	Enables high density packaging
Insensitive to LO power level variations	Enable the use of an LO amplifier with reduced specs for gain flatness, consequently improving the potential to lower LO amplifier costs.



ISO 9001 ISO 14001 AS 9100 CERTIFIED

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IF/RF MICROWAVE COMPONENTS

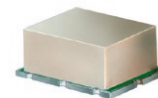
For detailed performance specs  
& shopping online see web site

**Notes:** 1. Performance and quality attributes and conditions not expressly stated in this specification sheet are intended to be excluded and do not form a part of this specification sheet. 2. Electrical specifications and performance data contained herein are based on Mini-Circuit's applicable established test performance criteria and measurement instructions. 3. The parts covered by this specification sheet 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).

# Surface Mount Frequency Mixer

## SYM-63LH+

Level 10 (LO Power +10 dBm) 1 to 6000 MHz



CASE STYLE: TTT166  
PRICE: \$12.95 ea. QTY (10-49)

### 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

- ultra wide bandwidth, 1-6000 MHz
- IF response to DC

### Applications

- test equipment
- cable TV
- cellular
- PCS
- satellite distribution
- ISM/GPS
- WCDMA
- defence communications

+ RoHS compliant in accordance with EU Directive (2002/95/EC)

The +Suffix has been added in order to identify RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications.

### Electrical Specifications @ 25°C

FREQUENCY (MHz)	CONVERSION LOSS* (dB)				LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			IP3 at center band (dBm)								
	LO/RF	IF	Mid-Band m	Total Range Max.	L	M	U	L	M	U									
1-6000	DC-1000		7.5	0.15	9.5	10	65	45	35	20	29	20	60	40	25	14	19	12	14

1 dB COMP.: +3 dBm typ.

\* Conversion Loss at 30 MHz IF.

σ is a measure of repeatability from unit to unit.

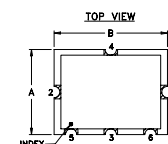
L = low range [f<sub>L</sub> to 10 f<sub>L</sub>]

U = upper range [f<sub>U</sub>/2 to f<sub>U</sub>]

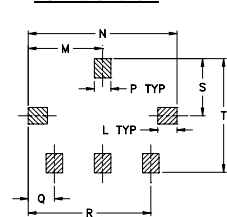
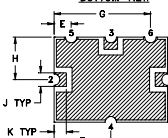
M = mid range [10 f<sub>L</sub> to f<sub>U</sub>/2]

m = mid band [2f<sub>L</sub> to f<sub>U</sub>/2]

### Outline Drawing



### PCB Land Pattern



Suggested Layout, Tolerance to be within ±.002

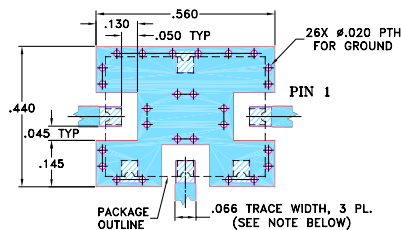
### Outline Dimensions (inch/mm)

A	B	C	D	E	F	G	H	J
.38	.50	.15	.020	.075	.250	.425	.187	.050
9.65	12.70	3.81	0.51	1.91	6.35	10.80	4.75	1.27

K	L	M	N	P	Q	R	S	T	wt.
.050	.070	.270	.540	.060	.095	.445	.208	.415	grams
1.27	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)

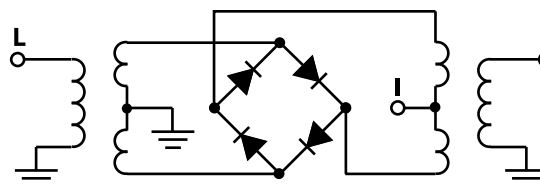


- NOTE: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS .030" ± .002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. GROUND PAD SHALL BE FREE OF SOLDER MASK IF REQUIRED FOR SOLDERING.  
3. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.
- DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER), SEE NOTE 2.
  - DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### Typical Performance Data

Frequency (MHz)	Conversion Loss (dB)		Isolation L-R (dB)		Isolation L-I (dB)		VSWR RF Port (:1)		VSWR LO Port (:1)	
	LO	RF	LO	RF	LO	RF	LO	RF	LO	RF
1.00	31.00	5.83	65.41	60.62	1.68	3.60				
10.00	40.00	6.07	63.21	58.28	1.09	3.54				
100.00	130.00	6.21	53.47	46.17	1.04	3.45				
145.00	175.00	6.21	51.34	43.08	1.04	3.46				
505.00	535.00	6.28	42.90	33.70	1.37	2.72				
1000.00	1030.00	6.65	41.76	34.89	2.07	1.72				
1500.00	1530.00	7.31	32.97	23.84	2.07	1.27				
2000.00	2030.00	6.87	30.92	24.37	2.01	1.70				
3000.00	3030.00	8.60	26.67	34.89	2.42	2.64				
4000.00	4030.00	7.94	28.22	18.49	1.76	2.75				
5000.00	5030.00	8.24	36.41	19.92	2.09	2.09				
5100.00	5130.00	8.18	38.17	20.34	2.05	2.18				
5200.00	5230.00	8.20	40.26	20.55	1.86	2.33				
5300.00	5330.00	8.25	42.62	20.82	1.65	2.57				
5400.00	5430.00	8.34	43.72	21.01	1.60	2.77				
5500.00	5530.00	8.43	42.20	21.03	1.76	2.76				
5600.00	5630.00	8.60	39.70	21.01	2.11	2.84				
5700.00	5730.00	8.76	37.69	21.00	2.61	2.88				
5800.00	5830.00	8.85	36.36	20.92	2.89	2.84				
6000.00	6030.00	9.28	34.92	20.45	2.77	2.19				

### Electrical Schematic



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