

# Frequency Mixer

Level 10 (LO Power +10dBm) 20 to 1500 MHz

## TUF-5LHSM+



CASE STYLE: NNN150  
PRICE: \$14.70 ea. QTY (1-9)

**+ 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.

### Maximum Ratings

Operating Temperature	-55°C to 100°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	4
RF	1
IF	2
GROUND	3
CASE GROUND	3

### Features

- low conversion loss, 6.9 dB typ.
- high L-R isolation, 42 dB typ.
- rugged welded construction

### Applications

- cellular
- satellite distribution
- GSM/ISM

### Electrical Specifications

FREQUENCY (MHz)	CONVERSION LOSS (dB)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			IP3 @ CENTER BAND (dBm)						
		L	M	U	L	M	U							
20-1500	DC-1000	53	40	42	30	38	25	40	25	30	18	22	8	14

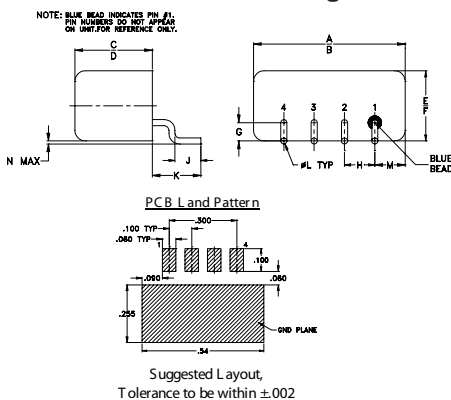
1 dB COMP.: +5 dBm typ.

L = low range [ $f_L$  to  $10 f_L$ ] M = mid range [ $10 f_L$  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)
20.00	5.60	62.84	53.91	1.43	2.57
50.00	5.38	57.81	46.30	1.32	2.51
100.00	5.25	52.60	40.86	1.31	2.50
158.75	5.20	49.11	38.29	1.34	2.38
200.00	5.25	47.45	36.98	1.48	2.28
297.50	5.37	44.43	34.13	1.59	2.36
436.25	5.54	42.14	31.89	1.91	2.34
500.00	5.74	41.47	30.68	2.36	2.36
575.00	5.89	40.90	30.02	2.49	2.36
713.75	6.61	40.16	28.61	2.97	2.45
750.00	6.80	39.71	28.48	3.40	2.46
760.00	6.83	39.62	28.42	3.53	2.48
852.50	7.07	39.30	28.00	3.80	2.56
991.25	6.99	38.97	26.26	3.86	2.67
1000.00	7.07	38.98	26.16	3.95	2.70
1130.00	7.19	35.93	24.11	3.91	2.73
1222.50	7.02	38.98	22.14	3.77	2.73
1361.25	6.88	39.21	19.23	3.65	2.77
1453.75	6.78	38.09	16.51	3.54	2.78
1500.00	6.66	37.95	16.08	3.47	2.77

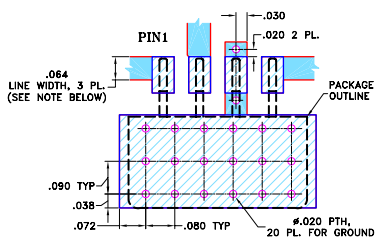
### Outline Drawing



### Outline Dimensions (inch/mm)

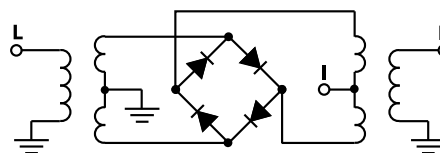
A	B	C	D	E	F	G
.50	.48	.255	.240	.23	.21	.06
12.70	12.19	6.48	6.10	5.84	5.33	1.52
H	J	K	L	M	N	wt
.100	.09	.16	.020	.09	.005	grams
2.54	2.29	4.06	0.51	2.29	0.13	1.9

### Demo Board MCL PIN: TB-201 Suggested PCB Layout (PL-081)



- NOTES: 1. TRACE WIDTH IS SHOWN FOR ROGERS RO4350B WITH DIELECTRIC THICKNESS 0.030" ± 0.002"; COPPER: 1/2 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.  
2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.  
■ DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER)  
■ DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

### Electrical Schematic



**Mini-Circuits**  
ISO 9001 ISO 14001 AS 9100 CERTIFIED

For detailed performance specs & shopping online see web site

P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 The Design Engineers Search Engine Provides ACTUAL Data Instantly at [minicircuits.com](http://minicircuits.com)

IF/RF MICROWAVE COMPONENTS

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