

# High Reliability Mixer

## TUF-R5MHSM+

Level 13 (LO Power +13 dBm) 20 to 1500 MHz



### Maximum Ratings

Operating Temperature	-55°C to 100°C
Storage Temperature	-55°C to 100°C
RF Power	50mW
IF Current	40mA

### Pin Connections

LO	4
RF	1
IF	2
GROUND	3
CASE GROUND	3

### Features

- hermetically sealed ceramic quad
- low conversion loss, 7.0 dB typ.
- high L-R isolation, 50 dB typ.
- rugged welded construction
- shielded metal case

### Applications

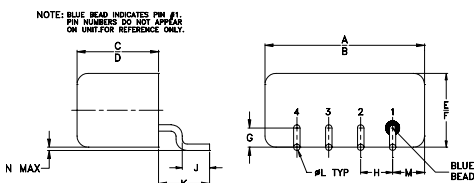
- cellular
- satellite distribution
- GSM/ISM

CASE STYLE: NNN150  
PRICE: \$16.10 ea. QTY. (1-9)

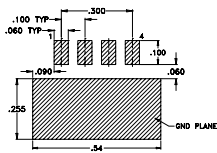
**+ RoHS compliant in accordance with EU Directive (2002/95/EC)**

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

### Outline Drawing



#### PCB Land Pattern

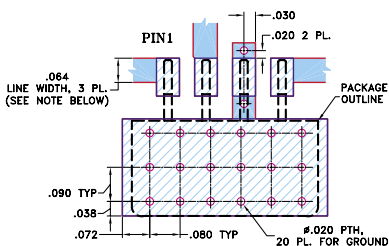


Suggested Layout,  
Tolerance to be within ±.002

### 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 R04350B 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 Specifications

FREQUENCY (MHz)	CONVERSION LOSS (dB)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)			IP3 at center band (dBm)										
		L	M	U	L	M	U											
20-1500	DC-650	7.0	0.1	8.5	9.0	60	45	50	35	46	28	40	27	32	20	22	9	17

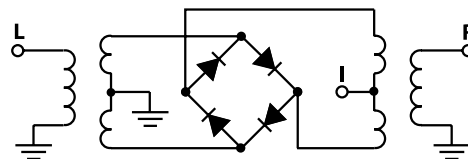
1 dB COMP.: +9 dBm typ.

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 [ $2 f_L$  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)
10.10	40.10	6.00	70.08	1.35	2.55
70.10	100.10	6.00	62.17	1.08	2.25
190.10	220.10	5.84	56.45	1.11	2.33
250.10	280.10	5.87	54.61	1.16	2.25
370.10	400.10	5.95	52.51	1.34	2.29
430.10	460.10	6.21	51.59	1.43	2.31
550.10	580.10	6.35	50.54	1.71	2.32
610.10	640.10	6.45	49.72	1.87	2.33
730.10	760.10	6.92	50.28	2.32	2.35
790.10	820.10	7.09	49.34	2.60	2.37
850.10	880.10	7.36	49.37	2.89	2.32
910.10	940.10	7.42	47.53	3.02	2.29
1090.10	1120.10	7.57	46.40	3.56	2.45
1150.10	1180.10	7.58	46.36	3.64	2.42
1210.10	1240.10	7.56	46.96	3.56	2.44
1270.10	1300.10	7.60	48.20	3.67	2.42
1330.10	1360.10	7.63	48.73	3.45	2.43
1390.10	1420.10	7.43	49.00	3.41	2.44
1450.10	1480.10	7.54	47.41	3.26	2.41
1510.10	1540.10	7.48	39.40	2.98	2.41

### Electrical Schematic



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