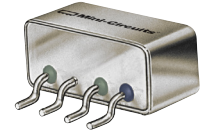


Surface Mount Frequency Mixer

TUF-3MHSM+

Level 13 (LO Power +13 dBm) 0.15 to 400 MHz



CASE STYLE: NNN150

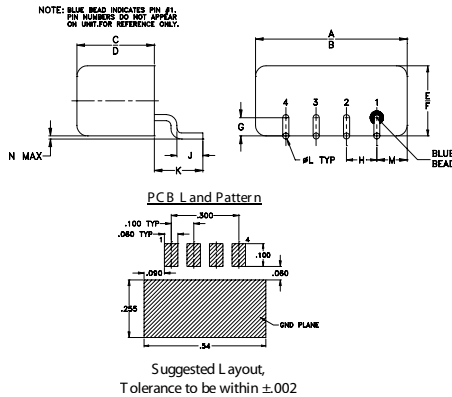
Maximum Ratings

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

Outline Drawing

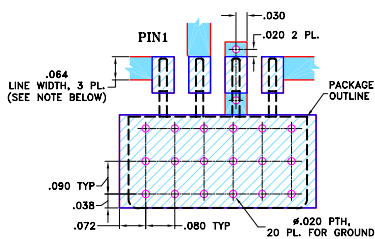


Outline Dimensions (inch/mm)

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

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

Features

- low conversion loss, 5.0 dB typ.
- good IP3, 18 dBm typ.
- excellent L-R isolation, 46 dB typ.; L-I, 42 dB typ.
- rugged welded construction

Applications

- HF/VHF
- defense & federal communications

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							
LO/RF f_L-f_U	Mid-Band m \bar{X} σ Max. Total Range Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.						
0.15-400	DC-400	60	50	46	30	35	25	60	40	42	25	35	20	18

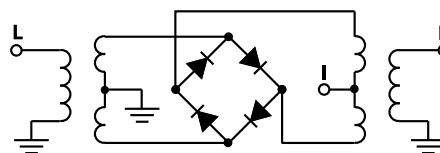
1 dB COMP.: +9 dBm typ.

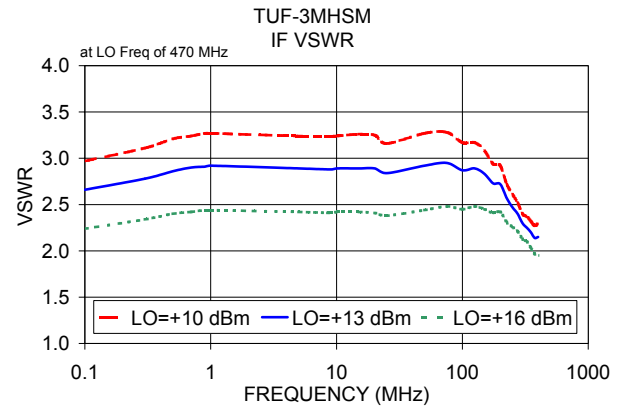
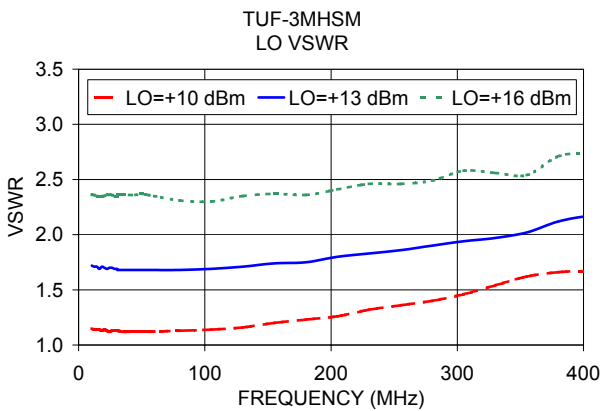
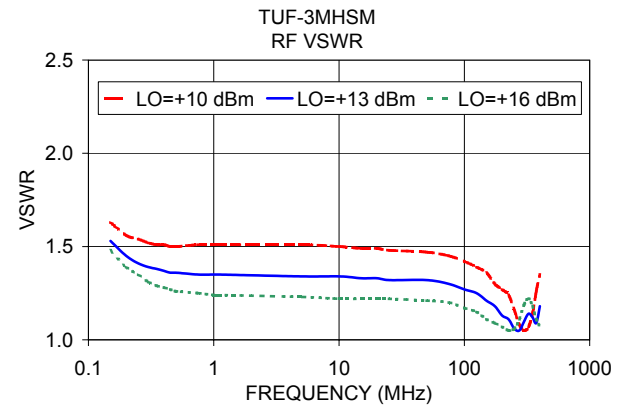
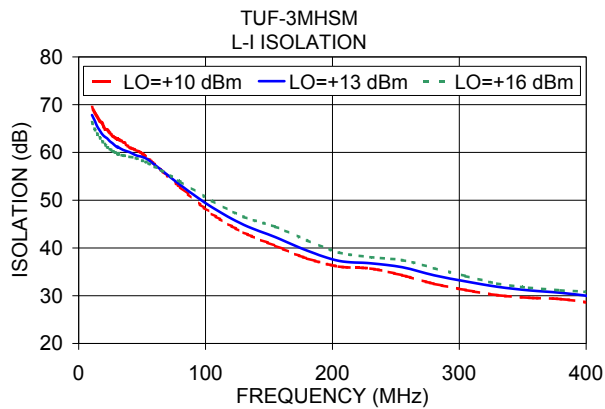
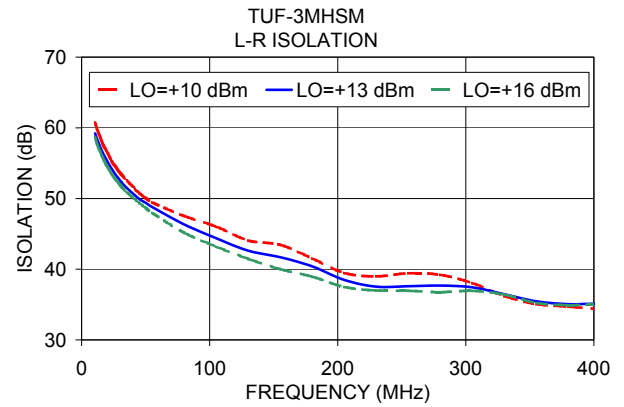
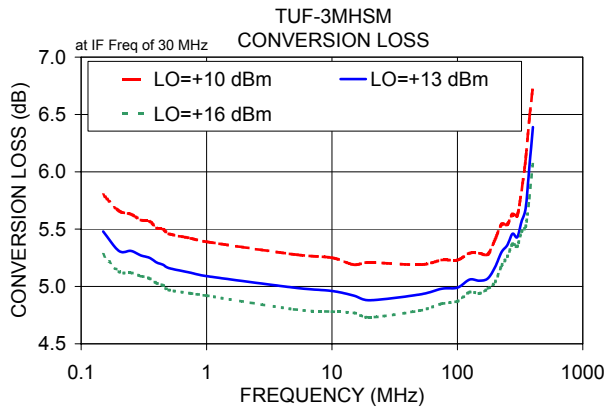
L = low range [f_L to $10 f_L$] M = mid range [$10 f_L$ to $f_U/2$] U = upper range [$f_U/2$ to f_U]
m = mid band [$2f_L$ to $f_U/2$]

Typical Performance Data

Frequency (MHz)	Conversion Loss (dB)	VSWR RF Port (:1)	Frequency (MHz)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR LO Port (:1)
0.15	30.15	5.48	10.50	59.22	67.83	1.72
0.20	30.20	5.31	14.50	57.31	65.51	1.71
0.30	30.30	5.27	18.50	55.80	63.82	1.71
0.40	30.40	5.21	22.50	54.49	62.93	1.69
0.50	30.50	5.16	26.50	53.38	61.95	1.70
1.00	31.00	5.09	30.50	52.42	61.07	1.69
5.00	35.00	4.99	31.00	52.30	61.12	1.68
10.00	40.00	4.96	35.10	51.52	60.51	1.68
20.00	50.00	4.88	40.10	50.70	60.05	1.68
50.10	80.10	4.93	50.10	49.38	59.05	1.68
75.10	105.10	4.98	55.10	48.79	58.41	1.68
100.10	130.10	4.99	105.10	44.38	48.52	1.69
150.10	180.10	5.05	130.10	42.61	44.85	1.71
200.10	230.10	5.17	180.10	40.40	39.44	1.75
250.10	280.10	5.36	205.10	38.48	37.29	1.80
300.10	330.10	5.43	255.10	37.59	35.97	1.86
325.10	355.10	5.57	305.10	37.44	32.99	1.94
350.10	380.10	5.68	330.10	36.46	31.87	1.97
375.10	405.10	6.04	380.10	35.06	30.61	2.12
400.10	430.10	6.39	405.10	35.05	29.79	2.17

Electrical Schematic





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

