Surface Mount

Frequency Mixer

TUF-3HSM+

Level 17 (LO Power +17 dBm) 0.15 to 400 MHz

Generic photo used for illustration purposes only

CASE STYLE: NNN150

+RoHS Compliant

The +Suffix identifies 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	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

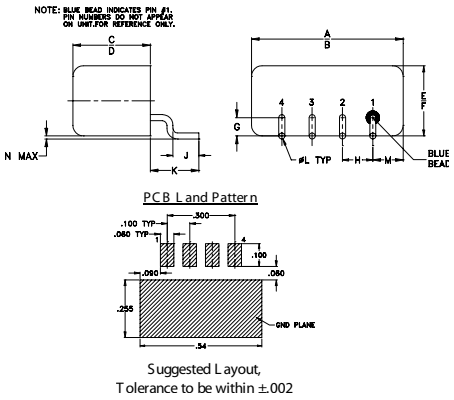
Features

- low conversion loss, 5.0 dB typ.
- good IP3, 22 dBm typ.
- excellent L-R isolation, 50 dB typ.; L-I, 45 dB typ.
- rugged welded construction

Applications

- HF/VHF
- defense & federal communications

Outline Drawing

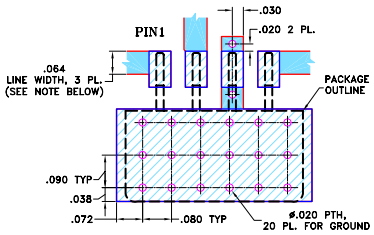


Outline Dimensions (inch / mm)

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 Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 @ CENTER BAND (dBm)
LO/RF	IF	Mid-Band m			Total Range	L		M		U		L		M		U		
f_L-f_U		$\overline{X}$	σ	Max.	Max.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
0.15-400	DC-400	5.00	0.33	7.0	8.0	60	50	50	35	40	30	60	40	45	25	35	20	22

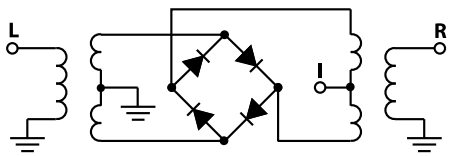
1 dB COMP.: +14 dBm typ.
E = [IP3 (dBm)-LO Power (dBm)]/10

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)
RF	LO	LO +17dBm	LO +17dBm	LO	LO +17dBm	LO +17dBm	LO +17dBm
0.15	30.15	5.73	1.50	10.00	82.56	73.10	1.50
0.30	30.30	5.50	1.42	20.00	77.94	72.84	1.49
0.50	30.50	5.40	1.41	40.00	73.33	71.28	1.46
0.75	30.75	5.32	1.41	50.00	71.91	69.09	1.49
1.00	31.00	5.29	1.41	68.00	70.74	64.21	1.48
2.80	32.80	5.15	1.42	86.00	70.55	58.19	1.45
10.00	40.00	5.07	1.36	104.00	68.91	54.46	1.47
20.00	50.00	5.01	1.35	122.00	69.27	51.05	1.48
38.00	68.00	4.98	1.35	140.00	65.14	48.62	1.50
56.00	86.00	4.96	1.29	176.00	69.38	45.57	1.52
110.00	140.00	5.08	1.26	212.00	58.50	42.60	1.55
128.00	158.00	5.07	1.25	230.00	54.52	41.38	1.56
164.00	194.00	5.10	1.19	255.00	55.28	41.47	1.61
200.00	230.00	5.24	1.16	280.00	56.41	41.92	1.60
250.00	280.00	5.41	1.11	305.00	51.98	40.69	1.64
300.00	330.00	5.43	1.00	330.00	48.01	38.86	1.66
325.00	355.00	5.40	1.05	355.00	49.07	36.77	1.65
350.00	380.00	5.46	1.08	380.00	53.89	34.86	1.74
375.00	405.00	5.63	1.15	405.00	51.11	33.11	1.90
400.00	430.00	6.10	1.28	430.00	47.28	33.20	1.89

Electrical Schematic



Notes

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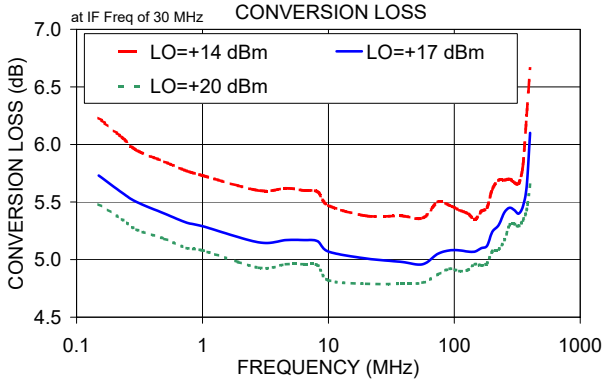
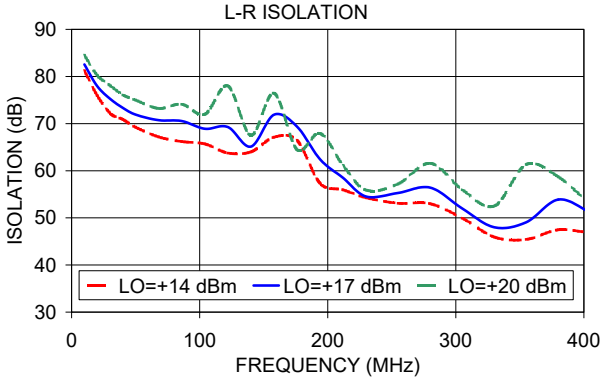
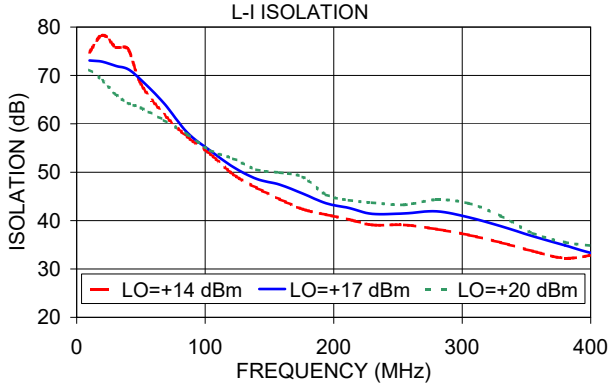
TUF-3HSM+
CONVERSION LOSS
at IF Freq of 30 MHz



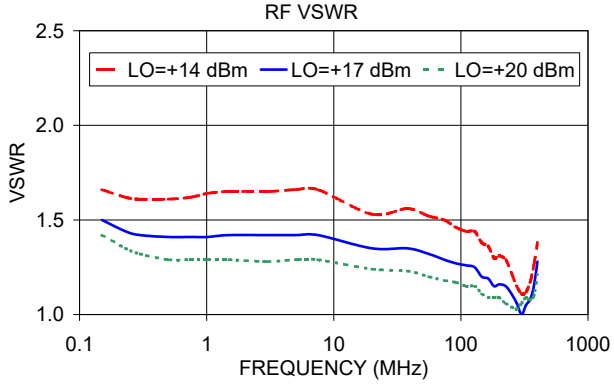
TUF-3HSM+
L-R ISOLATION



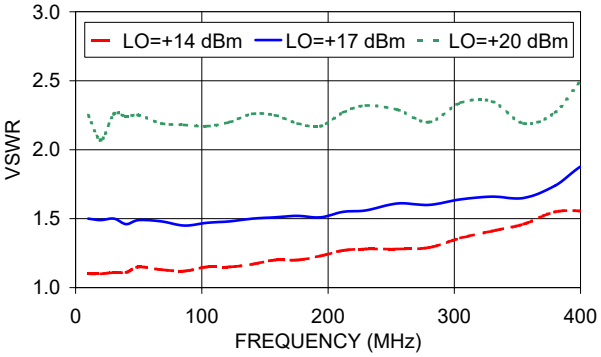
TUF-3HSM+
L-I ISOLATION



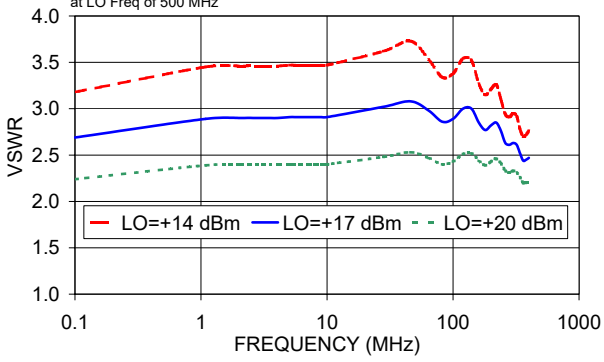
TUF-3HSM+
RF VSWR



TUF-3HSM+
LO VSWR



TUF-3HSM+
IF VSWR
at LO Freq of 500 MHz



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