

Non-Catalog Model

Frequency Mixer

Level 7 (LO Power +7 dBm)

TSM-2+



Important Note

This is a non-catalog model and can be manufactured on specific request. Pricing and delivery information can be supplied upon request.

Please click "Back", and then click "Contact Us" for Applications support.

CASE STYLE : A11

ELECTRICAL SPECIFICATIONS 50Ω @ +25°C					
Parameter		Min.	Typ.	Max.	Units
Frequency	LO (fL to fU)	1		1000	MHz
	RF (fL to fU)	1		1000	MHz
	IF	0		1000	MHz
Conversion Loss	mid band		5.6	7.5	dB
	Total Range			10.0	dB
LO-RF Isolation	Low Range	45	55		dB
	Mid Range	20	40		dB
	Upper Range	18	35		dB
LO-IF Isolation	Low Range	40	50		dB
	Mid Range	20	40		dB
	Upper Range	18	25		dB
1 dB Comp. Input Power			+1		dBm

Notes: Low Range = [fL to 10fL]
mid band = [2fL to fU/2]

Mid Range = [10fL to fU/2]

Upper Range = [fU/2 to fU]

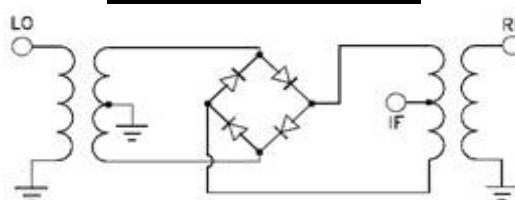
Hermetically sealed

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	8
RF	1
IF	3, 4 ^
GROUND	2, 5, 6, 7
CASE GROUND	2, 5, 6, 7

^ - pins must be connected together externally

Electrical Schematics



Frequency Mixer

TSM-2+

Typical Performance Data

RF (MHz)	LO (MHz)	CONVERSION LOSS (dB)			LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
		@LO (dBm)				@LO (dBm)			@LO (dBm)		
		+14	+17	+20		+14	+17	+20	+14	+17	+20
1.0	31.00	7.65	7.23	7.05	31.0	64.00	67.00	70.00	64.00	67.00	70.00
2.0	32.00	6.99	6.50	6.38	32.0	64.00	67.00	70.00	64.00	67.00	70.00
5.0	35.00	6.14	5.80	5.68	35.0	64.00	67.00	70.00	64.00	67.00	70.00
10.0	40.00	6.01	5.62	5.47	40.0	64.00	67.00	70.00	64.00	67.00	70.00
20.0	50.00	6.10	5.68	5.51	50.0	64.00	67.00	70.00	64.00	67.00	70.00
50.0	80.00	5.94	5.58	5.44	80.0	64.00	61.90	60.30	64.00	63.70	61.50
100.0	70.00	5.88	5.53	5.39	70.0	56.00	54.30	53.20	56.00	54.80	53.00
167.3	137.30	5.89	5.57	5.44	137.3	50.10	48.70	48.10	48.80	47.60	47.00
233.9	203.90	6.02	5.72	5.54	203.9	46.10	45.10	44.90	43.80	43.00	43.10
300.4	270.40	5.74	5.45	5.37	270.4	43.10	42.60	42.60	40.30	40.00	40.20
366.9	336.90	6.01	5.73	5.58	336.9	40.80	40.50	40.60	37.70	37.60	38.20
466.7	436.70	6.15	5.82	5.66	436.7	38.40	38.30	38.70	33.80	34.30	35.40
500.0	470.00	6.05	5.72	5.56	470.0	39.00	38.80	39.10	33.80	34.10	34.90
599.8	569.80	6.34	6.02	5.78	569.8	38.50	37.40	36.90	32.70	32.80	32.90
666.3	636.30	6.54	6.11	5.88	636.3	38.50	37.90	37.40	31.60	31.60	31.50
799.4	769.40	7.07	6.27	5.92	769.4	36.00	36.10	36.20	29.90	29.70	29.70
832.7	802.70	7.29	6.46	6.03	802.7	35.30	35.20	35.40	28.80	28.80	28.40
899.2	869.20	7.77	7.00	6.39	869.2	34.10	33.80	33.80	26.60	26.10	25.90
932.5	902.50	8.11	7.37	6.84	902.5	33.70	33.20	33.10	25.90	25.00	24.50
1000.0	969.00	8.20	7.63	7.18	969.0	33.30	32.50	32.10	24.80	23.60	22.60



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IF/RF MICROWAVE COMPONENTS



REV. X1

TSM-2+

1/8/2009

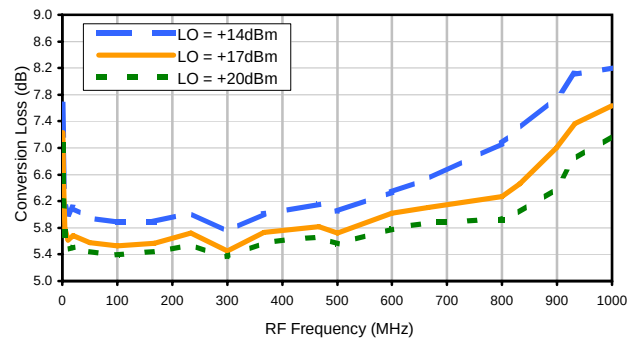
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Typical Performance Data

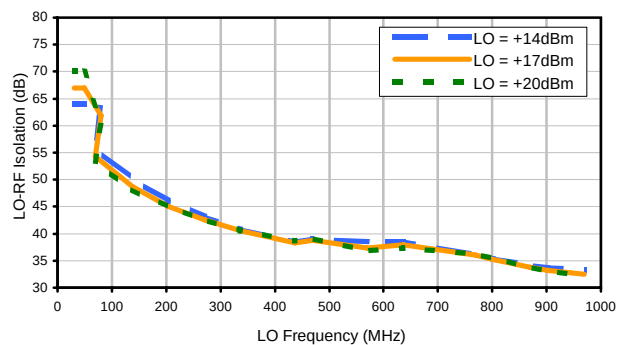
RF/LO (MHz)	RF VSWR (:1)			LO VSWR (:1)			IF (MHz)	IF VSWR (:1)			LO/RF (MHz)	max. DC output (mV)	DC Offset (mV)
	@ LO (dBm)			@ LO (dBm)				@ LO (dBm)			@ LO (dBm)		
	+14	+17	+20	+14	+17	+20		+14	+17	+20	+17		
5.0	1.26	1.30	1.34	1.77	2.70	4.33	5.0	1.43	1.24	1.09	1.0	-230.10	0.09
10.0	1.12	1.15	1.20	1.71	2.63	3.91	10.0	1.44	1.25	1.10	2.0	-234.90	0.09
20.0	1.04	1.07	1.15	1.76	2.77	3.95	20.0	1.43	1.25	1.10	5.0	-240.20	0.08
50.0	1.02	1.06	1.15	1.69	2.55	3.74	50.0	1.44	1.25	1.11	20.0	-240.20	0.09
100.0	1.06	1.07	1.14	1.63	2.41	3.37	100.0	1.45	1.27	1.13	50.0	-236.50	0.09
155.8	1.09	1.09	1.14	1.61	2.37	3.24	155.8	1.49	1.31	1.18	100.0	-238.60	0.08
200.0	1.12	1.11	1.14	1.54	2.29	3.18	200.0	1.54	1.36	1.23	162.0	-242.90	0.06
306.5	1.18	1.16	1.16	1.53	2.20	2.95	306.5	1.66	1.48	1.35	200.0	-243.40	0.02
366.8	1.21	1.18	1.17	1.52	2.16	2.89	366.8	1.75	1.57	1.44	290.8	-246.80	0.11
427.1	1.23	1.20	1.18	1.52	2.13	2.83	427.1	1.84	1.66	1.53	322.9	-237.60	0.11
500.0	1.26	1.22	1.21	1.55	2.06	2.74	500.0	1.97	1.77	1.66	387.3	-224.00	0.01
547.7	1.28	1.23	1.22	1.53	2.13	2.70	547.7	2.04	1.88	1.78	451.7	-223.30	0.22
608.0	1.30	1.26	1.24	1.50	2.09	2.65	608.0	2.02	1.87	1.77	500.0	-229.60	0.23
668.3	1.34	1.29	1.27	1.51	2.09	2.65	668.3	2.07	1.90	1.81	580.5	-229.00	0.37
728.7	1.38	1.34	1.32	1.56	2.04	2.69	728.7	2.08	1.91	1.83	644.9	-207.40	0.48
789.0	1.44	1.40	1.38	1.61	2.13	2.69	789.0	2.07	1.91	1.82	709.3	-196.50	1.06
849.3	1.51	1.47	1.46	1.63	2.19	2.70	849.3	2.02	1.86	1.77	773.7	-138.50	0.83
909.6	1.58	1.55	1.54	1.67	2.24	2.78	909.6	1.93	1.77	1.68	838.0	-187.30	0.49
969.9	1.60	1.66	1.66	1.74	2.28	2.85	969.9	1.81	1.66	1.57	902.4	-173.90	0.72
1000.0	1.75	1.72	1.72	1.77	2.30	2.89	1000.0	1.74	1.60	1.51	1000.0	-178.50	0.64

Typical Performance Curves

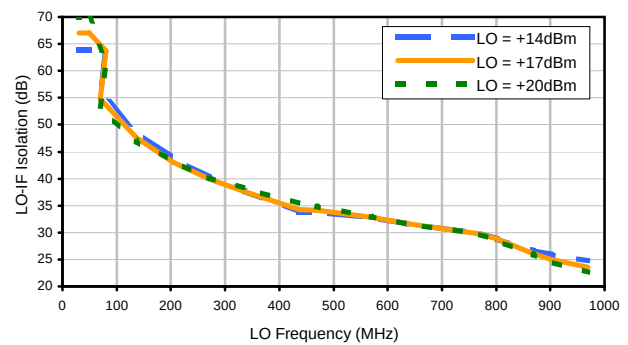
Conversion Loss



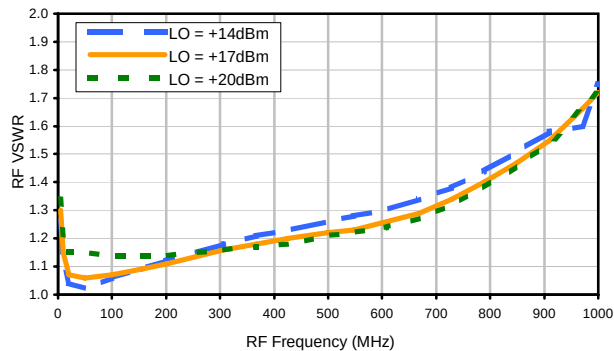
LO-RF Isolation



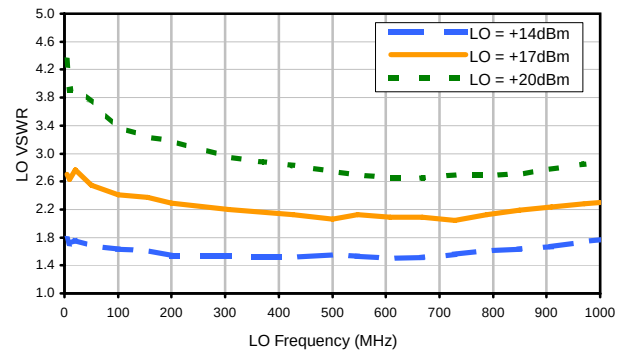
LO-IF Isolation



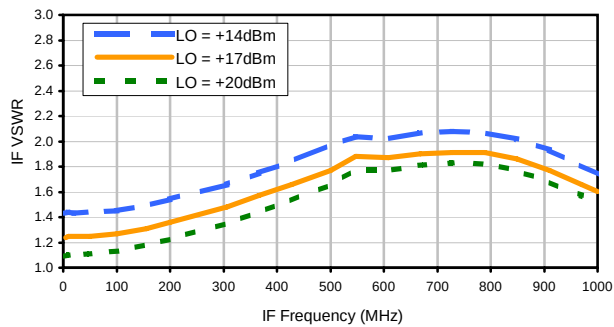
RF VSWR



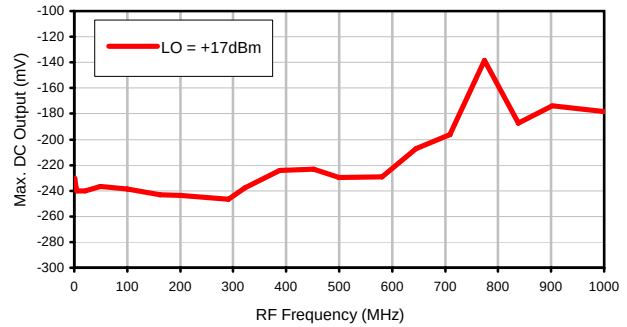
LO VSWR



IF VSWR



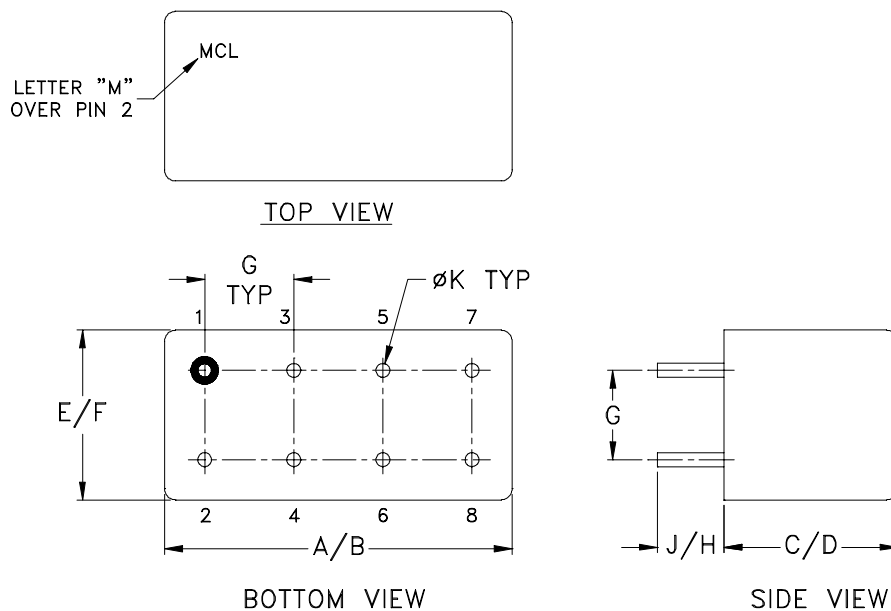
Max. DC Output



A03

A11

Outline Dimensions



CASE#	A	B	C	D	E	F	G	H	J	K	WT, GRAM
A03	.480	.500	.390 (9.91)	.405 (10.29)	.210	.230 (5.84)	.100 (2.54)	.20 (5.08)	.14 (3.56)	.020 (.51)	2.3
A11	(12.19)	(12.70)	.240 (6.10)	.255 (6.48)	(5.33)						1.9

Dimensions are in inches (mm). Tolerances: 2 Pl. $\pm .03$; 3 Pl. $\pm .015$

Notes:

- Header material: C.R.S.
Pin material: #52 alloy.
Cover material: Cupro-Nickel.
- Pin finish: Electro Tin-Silver.
- Insulated spacer available. Request P/N B14-047-01.
- Tolerance on pin diameter $\pm .005$ inch.
- Glass meniscus 0.015 inch max.
- Blue bead indicates Pin 1. Pin numbers do not appear on unit, for reference only.



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Mini-Circuits ISO 9001 & ISO 14001 Certified



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-20° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215