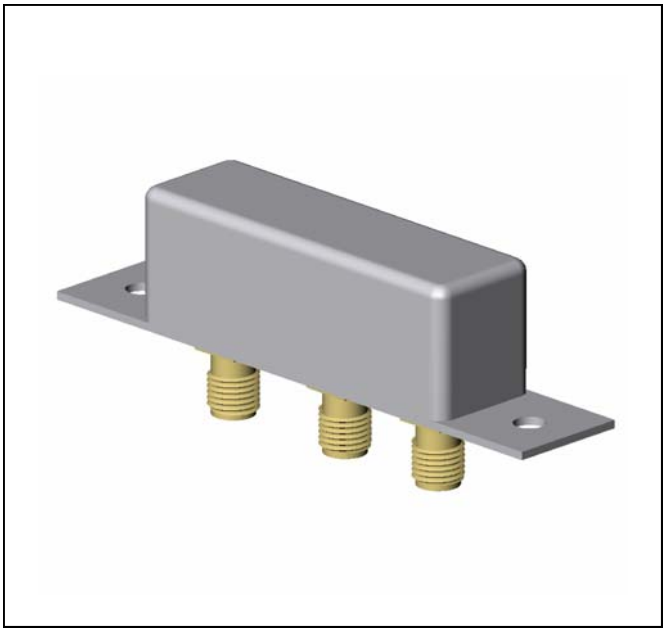
M1J

Double-Balanced Mixer

Rev. V2

Features

- LO and RF: 300 to 2000 MHz
- IF: DC to 1000 MHZ
- LO Drive +7 dBm (nominal)
- High Isolation 50 dB (Typ.)



Guaranteed Specifications[1]

Characteristics	Min	Typ.	Max.	Test Conditions
SSB Conversion Loss And SSB Noise Figure		6.0 dB 6.5 dB 8.0 dB 8.0 dB 9.5 dB	7.5 dB 8.0 dB 9.0 dB 9.0 dB 10.0 dB	fL & fR = 1000 to 1700 MHz fI = 10 to 500 MHz fI = 500 to 1000 MHz fL & fR = 600 to 2000 MHz fI = 10 to 1000 MHz fL & fR = 300 to 2000 MHz fI =10 to 450 MHz fI = 450 to 1000 MHz
Isolation L at R L at I L at R L at I	 40 dB 25 dB 30 dB 20 dB	 45 dB 35 dB 40 dB 30 dB		 fL 300 to 1000 MHz fL 1000 to 2000 MHz
Conversion Compression		1.0 dB		fR level = 0 dBm
Desensitization		1.0 dB		fR2 level = -2 dBm

Notes:
1. Measure in a 50-Ohm system with nominal LO drive and downconverter application only, unless otherwise specified. The I-Port frequency range extends to DC for phase detection, pulse modulation, or attenuator applications, I-Port VSWR degrades from a 50-Ohm system at low IF frequencies.

Absolute Maximum Ratings

Storage Temperature	-65°C to +100°C
Operating Temperature	-54°C to +100°C
Peak RF Input Power	+26 dBm at +25°C, derate to +17 dB, at +100°C
Peak Input Current at 25°C	50 mA DC

Weight 31 gram (1.1 oz) max.

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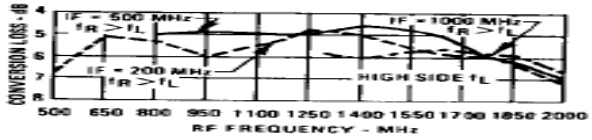
Typical Performance Curves at 25°C

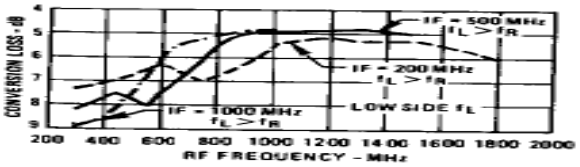
Conversion Loss



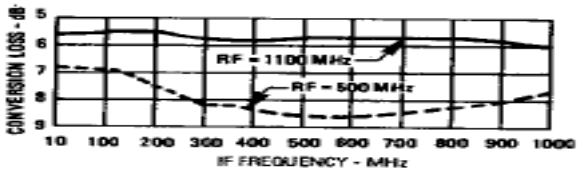
Conversion Loss vs. LO Drive Level: The minimum recommended drive level is +5 dBm. A lower drive level will degrade the conversion loss and noise figure over the full temperature and frequency range. Operation at +5 dBm is recommended to reduce the level of the intermodulation products in the last two rows of the intermodulation chart. It will also minimize the output noise below 2 kHz.

The maximum recommended drive level is +13 dBm. A higher drive level will significantly increase the noise figure and also degrade isolation. Operation at +13 dBm is recommended to achieve best two-tone performance and suppression of the intermodulation products in the rows above the second row in the intermodulation chart.



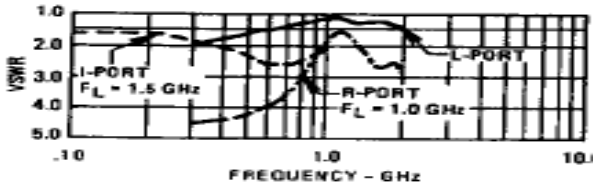


Conversion Loss vs. Input Frequency: Conversion loss of the mixer when used in SSB system. The frequency ordinate refers to the R-port (f_R) with f_I at 200, 500, and 1000 MHz. Data plotted with an f_L level of +7 dBm.



Conversion Loss vs. f_I Frequency: Conversion loss of the mixer when used in a SSB system. The frequency ordinate refers to the I-port when f_I is swept from 510 to 1500 MHz with f_R at 500 MHz and f_L swept from 1110 to 2100 MHz with f_R at 1100 MHz.

VSWR



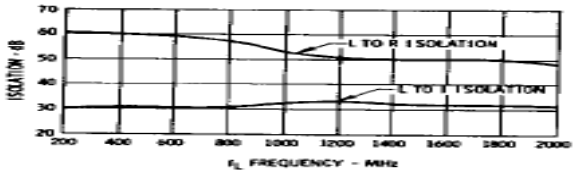
VSWR vs. Frequency: VSWR of the L-, I-, and R-ports in a 50-ohm system with f_L at +7 dBm. Some variation in the R-port VSWR will occur as a function of the L-port frequency.

Harmonic Intermodulation

	0	f_L	$2f_L$	$3f_L$	$4f_L$	$5f_L$
$5f_R$	>71	>71	>71	>71	>71	>71
$4f_R$	>71	>71	>71	>71	>71	>71
$3f_R$	>71	>71	>71	>71	>71	>71
$2f_R$	>71	53	68	56	71	51
f_R	>71	63	67	61	>71	69
	61	50	65	50	67	68
	63	55	64	64	70	66
	28	0	40	12	41	26
	29	0	41	10	42	19
	—	7	43	29	54	30
	—	3	36	27	54	29

Harmonic Intermodulation Products: Intermodulation signals which result from the mixing of mixer generated harmonics of the input signals are shown above. Mixing product suppression is indicated by the number of dB below the desired output level, $f_R - f_L$. Products are for the difference frequency $nf_L - mf_R$ and $mf_R - nf_L$. The performance was measured with f_R at 300 MHz, –10 dBm, and f_L = 299 MHz, +7 dBm for light area, +13 dBm for shaded area.

Isolation



Isolation vs. Frequency: Level of the f_L signal fed through to the R- and I-ports with respect to the level of the f_L signal at the L-port.

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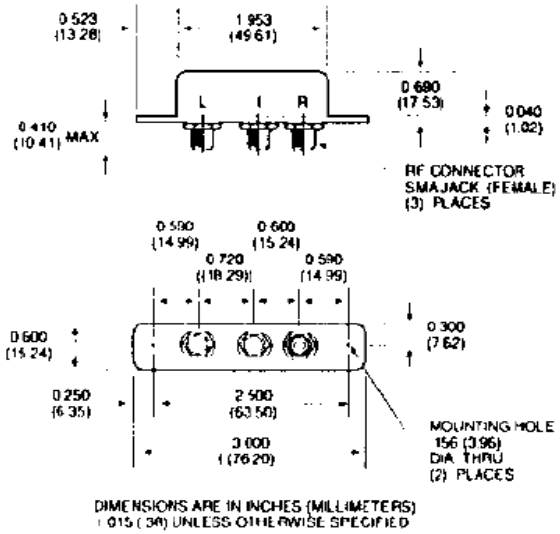
Outline Drawing: M1J



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