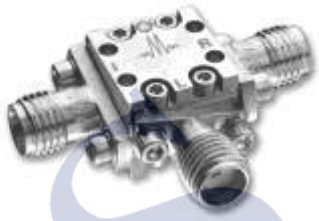
TRIPLE-BALANCED MIXERS M2-0250



Features

- LO/RF 2.0 to 50.0 GHz
- IF 0.4 to 50.0 GHz
- 10 dB Typical Conversion Loss
- Ultra-Broadband RF, LO, and IF
- 2.40 mm Connectors

Electrical Specifications - Specifications guaranteed from -55 to +100°C, measured in a 50-Ohm system.

Parameter	LO (GHz)	RF (GHz)	IF (GHz)	Min	Typ	Max	Diode Option LO drive level (dBm)
Conversion Loss (dB)	2.0-50.0	2.0-50.0	0.4-50.0		10		
Isolation (dB) LO-RF LO-IF RF-IF	 2.0-50.0 2.0-50.0 2.0-50.0	 2.0-50.0 2.0-50.0 2.0-50.0			 See Plots		
Input 1 dB Compression (dBm)	2.0-50.0	2.0-50.0			+5		L (+10 to +20)
Input Two-Tone Third Order Intercept Point (dBm)	2.0-50.0	2.0-50.0			See Plot		L (+10 to +20)

Part Number Options

Please specify diode level and package style by adding to model number.				
Package Styles		**Examples**		
		M2-0250LNVT		
Connectorized	NVT	M2-0250 (Model)	L (Diode Option)	NVT (Package)

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TRIPLE-BALANCED MIXERS

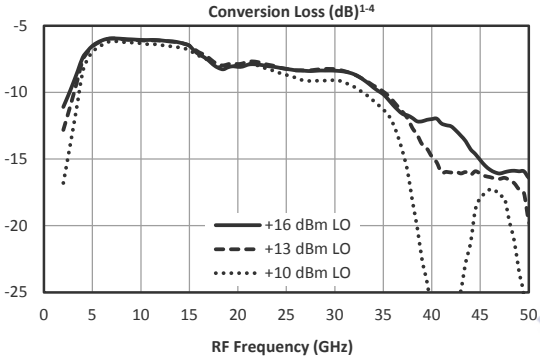
M2-0250

Page 2

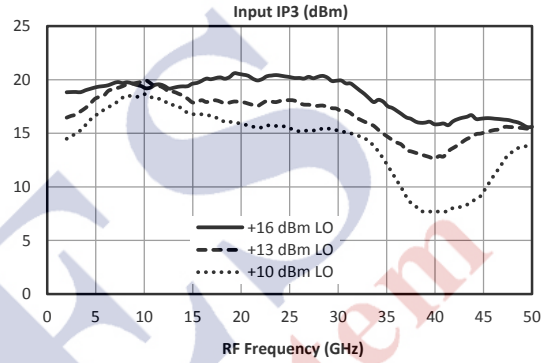
LO/RF 2.0 to 50.0 GHz
IF 0.4 to 50.0 GHz

Typical Performance

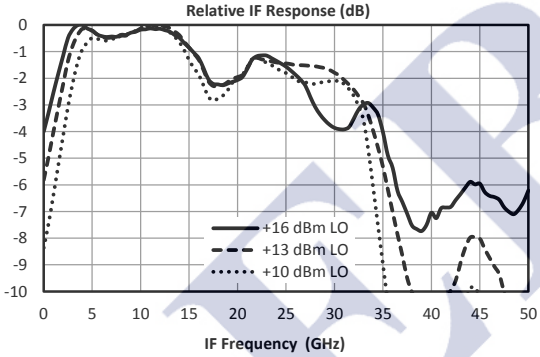
Conversion Loss (dB)[1-4]



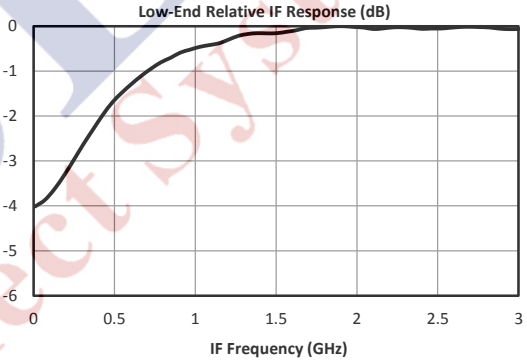
Input IP3 (dBm)



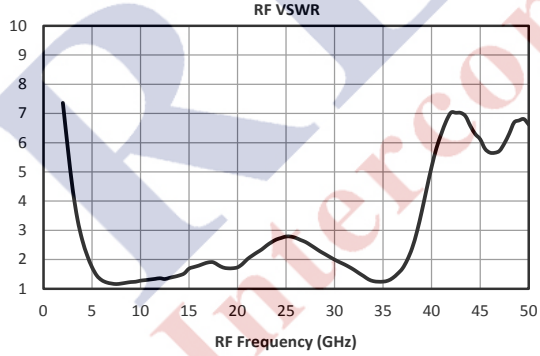
Relative IF Response (dB)



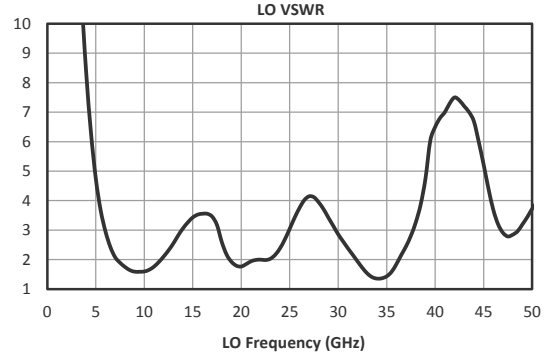
Low-End Relative IF Response (dB)



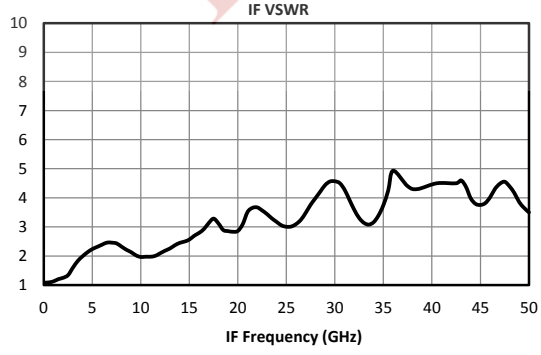
RF VSWR



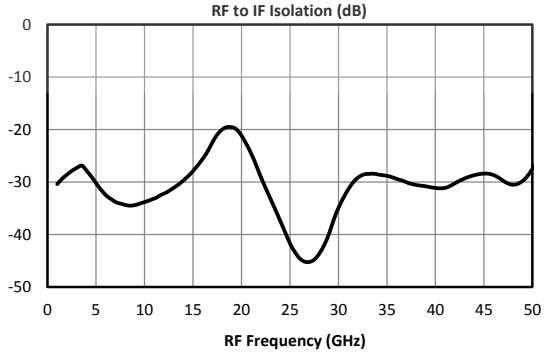
LO VSWR



IF VSWR



RF to IF Isolation (dB)

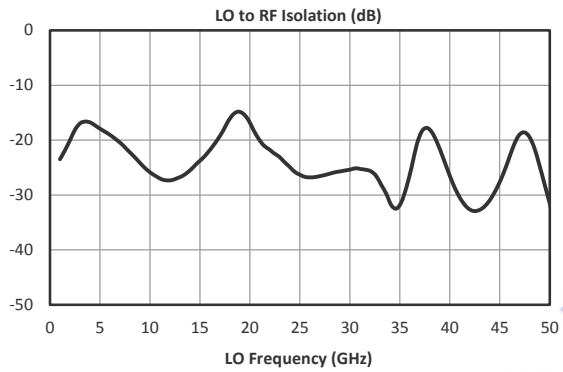


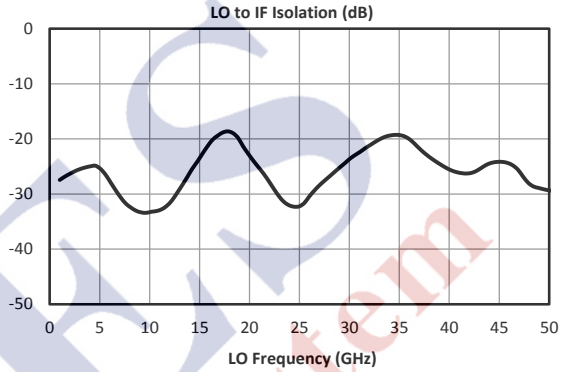
TRIPLE-BALANCED MIXERS

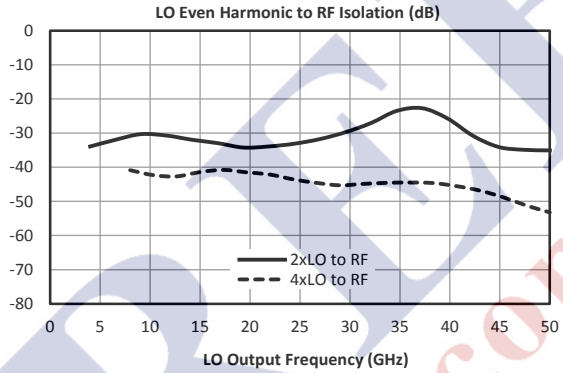
M2-0250

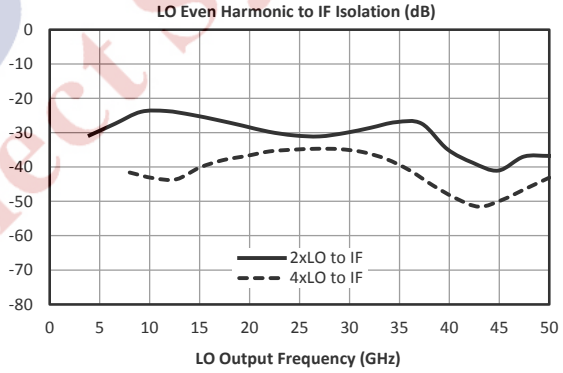
LO/RF 2.0 to 50.0 GHz
IF 0.4 to 50.0 GHz

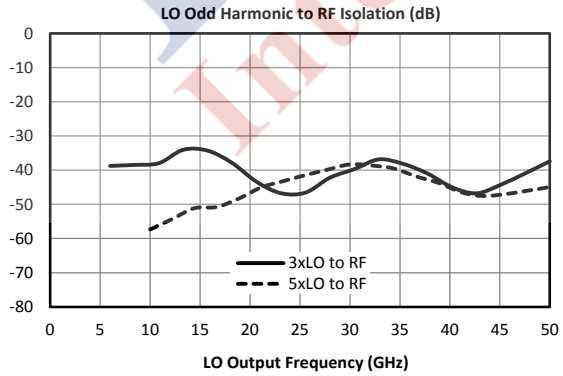
Typical Performance

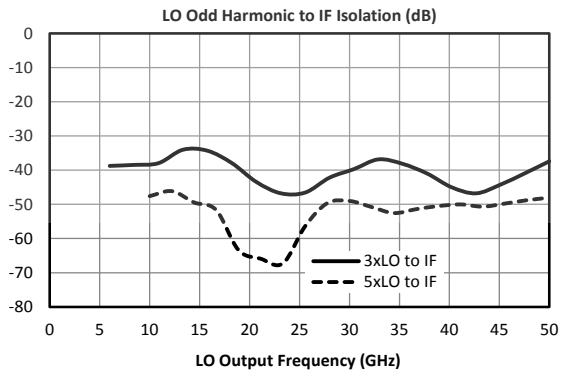












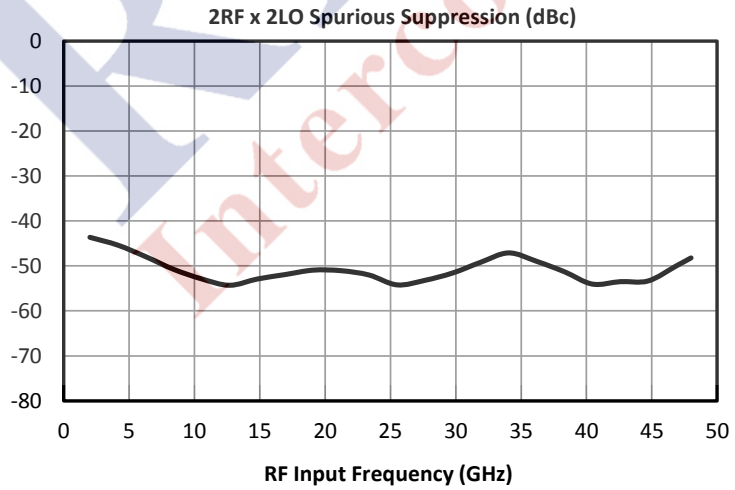
Downconversion Spurious Suppression

Spurious data is taken by selecting RF and LO frequencies (±mLO±nRF) within the 2 to 50 GHz RF/LO bands, which create a 2.0 GHz IF spurious output. The mixer is swept across the spurious band and the mean is calculated. The numbers shown in the table below are for a -10 dBm RF input. Spurious suppression is scaled for different RF power levels by (n-1), where "n" is the RF spur order. For example, the 2RFx2LO spur is 52 dBc for a -10 dBm input, so a -20 dBm RF input creates a spur that is (2-1) x (-10 dB) dB lower, or 62 dBc.

Typical Downconversion Spurious Suppression (dBc): L-Diode[5]

-10 dBm RF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
0xRF	----------	See LO to IF Isolation and LO Harmonic to IF Isolation Plots (Page 3)				
1xRF	22	Reference	29	13	36	24
2xRF	61	48	52	52	51	50
3xRF	89	62	73	70	78	72
4xRF	110	95	94	95	96	98
5xRF	127	108	112	110	114	118

A sample downconversion spurious sweep is shown below. An LO which is 2.0 GHz higher than the RF is used to create a 2.0 GHz reference IF. A second LO is used to create a 2x2 spurious IF, also at 2.0 GHz (1.0 GHz fundamental IF). The difference between these two output levels is the spurious suppression in dBc. The mean value across the 2 to 48 GHz RF input band is the number shown in the table above.



Downconversion 2RFx2LO Spurious Data Example:

RF Input: 2 to 48 GHz @ -10 dBm
LO for Reference: 4 to 50 GHz
LO for Spurious: 3 to 49 GHz
IF Output: 2.0 GHz

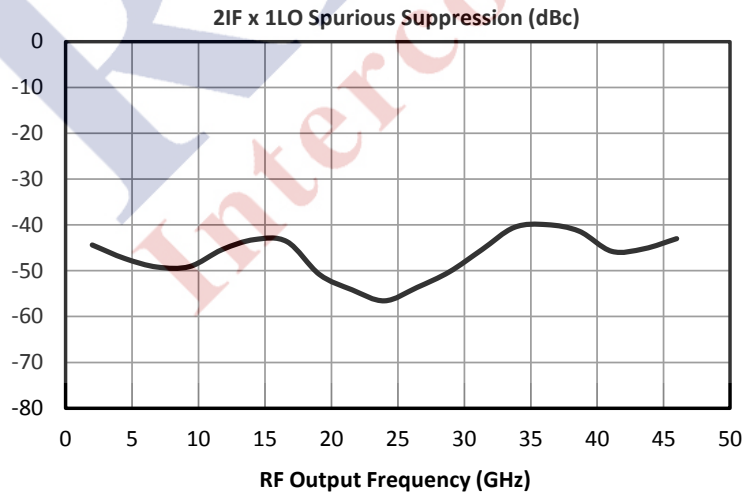
Upconversion Spurious Suppression

Spurious data is taken by mixing a 2.0 GHz IF with LO frequencies (±mLO±nIF) which create an RF within the 2 to 50 GHz RF band. The mixer is swept across the spurious output band and the mean is calculated. The numbers shown in the table below are for a -10 dBm IF input. Spurious suppression is scaled for different IF input power levels by (n-1), where "n" is the IF spur order. For example, the 2IFx1LO spur is typically 47 dBc for a -10 dBm input, so a -20 dBm IF input creates a spur that is (2-1) x (-10 dB) dB lower, or 57 dBc.

Typical Upconversion Spurious Suppression (dBc): L-Diode[5]

-10 dBm IF Input	0xLO	1xLO	2xLO	3xLO	4xLO	5xLO
0xIF	----------	See LO to RF Isolation and LO Harmonic to RF Isolation Plots (Page 3)				
1xIF	17	Reference	27	12	31	23
2xIF	47	47	52	47	51	48
3xIF	72	63	71	66	70	66
4xIF	98	91	95	91	93	90
5xIF	118	109	113	109	109	107

A sample upconversion spurious sweep is shown below. A 2.0 GHz reference IF input is used to create an RF output that is 2.0 GHz below the LO input (LO-IF=RF). A second LO (2.0 GHz higher) is combined with the same 2.0 GHz IF input (LO-2xIF=RF) to create the same 2 to 46 GHz RF output band. The difference between these two output levels is the spurious suppression in dBc. The mean value across the RF output band is the number shown in the table above.



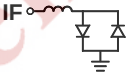
Upconversion 2IF x 1LO Spurious Data Example:

IF Input: 2.0 GHz @ -10 dBm
LO for Reference:4 to 48 GHz
LO for Spurious: 6 to 50 GHz
RF Output: 2 to 46 GHz

TRIPLE-BALANCED MIXERS

M2-0250

LO/RF 2.0 to 50.0 GHz
IF 0.4 to 50.0 GHz

Port	Description	DC Interface Schematic
LO	The LO port is DC coupled to ground and AC matched to 50 Ohms from 2 to 50 GHz. Blocking capacitor is optional.	
RF	The RF port is DC coupled to ground and AC matched to 50 Ohms from 2 to 50 GHz. Blocking capacitor is optional.	
IF	The IF port is DC coupled to the diodes and AC matched to 50 Ohms from 0.4 to 50 GHz. Blocking capacitor is optional.	

Absolute Maximum Ratings	
Parameter	**Maximum Rating**
RF DC Current	1 Amp
LO DC Current	1 Amp
IF DC Current	50 mA
RF Power Handling (RF+LO)	+23 dBm at +25°C, derated linearly to +20 dBm at +100°C
Operating Temperature	-55ºC to +100ºC
Storage Temperature	-65ºC to +125ºC
ESD Sensitivity (HBM)	Class 0

DATA SHEET NOTES:
1. Mixer Conversion Loss Plot IF frequency is 2.0 GHz.
2. Mixer Noise Figure typically measures within 0.5 dB of conversion loss.
3. Conversion Loss typically degrades less than 0.5 dB for LO drives 2 dB below the lowest and 3 dB above highest nominal LO drive levels.
4. Conversion Loss typically degrades less than 0.5 dB at +100°C and improves less than 0.5 dB at -55°C.
5. Unless otherwise specified, L-diode data is taken with +16 dBm LO drive.
6. Specifications are subject to change without notice. Contact Marki Microwave for the most recent specifications and data sheets.
7. Catalog mixer circuits are continually improved. Configuration control requires custom mixer model numbers and specifications.

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