

Field Replaceable SMA IQ Mixer From 4 GHz to 8.5 GHz With an IF Range From DC to 3.5 GHz And LO Power of +15 dBm

FMMX9000 is an I/Q double balanced millimeter-wave mixer module that operates across an RF and LO frequency range from 4 GHz to 8.5 GHz with an IF frequency range of DC to 3.5 GHz. The design utilizes GaAs MESFET MMIC technology that offers high linearity with reliable and consistent performance. This I/Q mixer design incorporates 2 double balanced mixer cells and a 90° hybrid and can operate as a single sideband upconverter, or an image reject mixer (IRM). For downconversion applications, an external quadrature IF hybrid can be used to select the desired sideband while rejecting image signals. Typical performance is impressive with 35 dB image rejection, 40 dB LO to RF isolation, and +23 dBm input IP3. The LO drive level is +15 dBm with typical conversion loss of 7.5 dB.

The drop-in package is hermetically sealed with field replaceable SMA connectors. Operating temperature range is -55°C to +85°C. And for added confidence, this rugged package assembly is designed to meet MIL-STD-883 test conditions for Hermeticity and Temperature Cycle.

This I/Q double balanced Mixer module is part of Fairview Microwave's expanding line of Mixers. These Mixers are high performance modules that offer excellent performance. The family of mixers has a variety of mixer types including Double Balanced Mixers, I/Q Double Balanced Mixer Modules, and others that cover up to Millimeter-Wave Frequencies.

Electrical Specifications TA = +25° C, IF= 100 MHz, LO = +15 dBm

Description	Min	Typ	Max	Units
RF Frequency Range	4		8.5	GHz
LO Frequency Range	4		8.5	GHz
IF Frequency Range	DC		3.5	GHz
Impedance		50		Ohms
RF Input Power			+20	dBm
LO Input Power		+15	+27	dBm
IF Input Power			+20	dBm



Features:

- I/Q Double Balanced Mixer Module
- IRM or Single Sideband Upconverter Functionality
- RF/LO mm-wave frequency 4 GHz to 8.5 GHz
- IF Bandwidth DC to 3.5 GHz
- GaAs MESFET MMIC Technology
- High image rejection 35 dB
- High LO/RF Isolation 40 dB
- High input IP3 +23 dBm
- LO drive level +15 dBm
- Hermetically Sealed Module
- Mil Spec Compliant
- Field Replaceable Connectors
- -55°C to +85°C Operating Temperature

Applications:

- Electronic Warfare
- Point-to-Point Radios
- Point-to-Multipoint Radios
- VSAT
- Radar
- Space Systems
- Test Instrumentation
- Sensors
- Telecom Infrastructure
- Military End-Use

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Performance by Frequency

Description	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, RF/LO		4.0 - 8.5		5.5 - 7.5			GHz
Frequency Range, IF		DC - 3.5		DC - 3.5			GHz
Conversion Loss		7.5	10.5		7.5	9.5	dB
Image Rejection	22	35		28	34		dB
1 dB Compression (Input)		14			15		dBm
LO to RF Isolation	32	40		35	40		dB
LO to IF Isolation	14	20		15	20		dB
IP3 (Input)		23			23		dBm
Amplitude Balance		0.3			0.2		dB
Phase Balance		8			6		Deg

Harmonics of LO

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
3.5	41	54	59	57
4.5	43	43	59	58
5.5	46	57	52	71
6.5	44	60	71	60
7.5	43	66	69	62
8.5	44	65	69	70

LO = +15 dBm
 Values in dBc below input LO level measured at RF Port.
 Data taken with IF ports terminated in 50 Ohms.

MxN Spurious Outputs

mRF	nLO				
	0	1	2	3	4
0	xx	-10	35	25	51
1	35	0	45	54	74
2	94	64	72	67	95
3	95	97	99	84	97
4	90	93	95	97	106

RF = 5.6 GHz @ -10 dBm
 LO = 5.5 GHz @ +15 dBm
 Data taken without IF hybrid
 All values in dBc below IF power level

Absolute Maximum Ratings

RF / IF Input	+20 dBm
LO Drive	+27 dBm
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

Electrical Specification Notes:

All measurements performed as downconverter unless otherwise noted.
 Conversion loss measure as IRM.

Mechanical Specifications

Size

Length 0.89 in [22.61 mm]
 Width 0.68 in [17.27 mm]
 Height 0.36 in [9.14 mm]
 Weight 0.08 lbs [36.29 g]

Configuration

Design IQ

Connector Option
 RF Connector
 LO Connector
 IF Connector

Field Replaceable
 SMA Female
 SMA Female
 SMA Female

Environmental Specifications

Temperature

Operating Range -55 to +85 deg C
 Storage Range -65 to +150 deg C

Temperature Cycle

MIL-STD-883, Method 101C, Cond B

Hermetic Seal

Gross Leak MIL-STD-883 Method 1014C1/Fine Leak MIL-STD-883, Method 1014A2, 5 x 10⁻⁸ atm cc

ESD Sensitive

ESD Sensitive Material, Transport material in Approved ESD bags. Handle only in ESD Workstation.



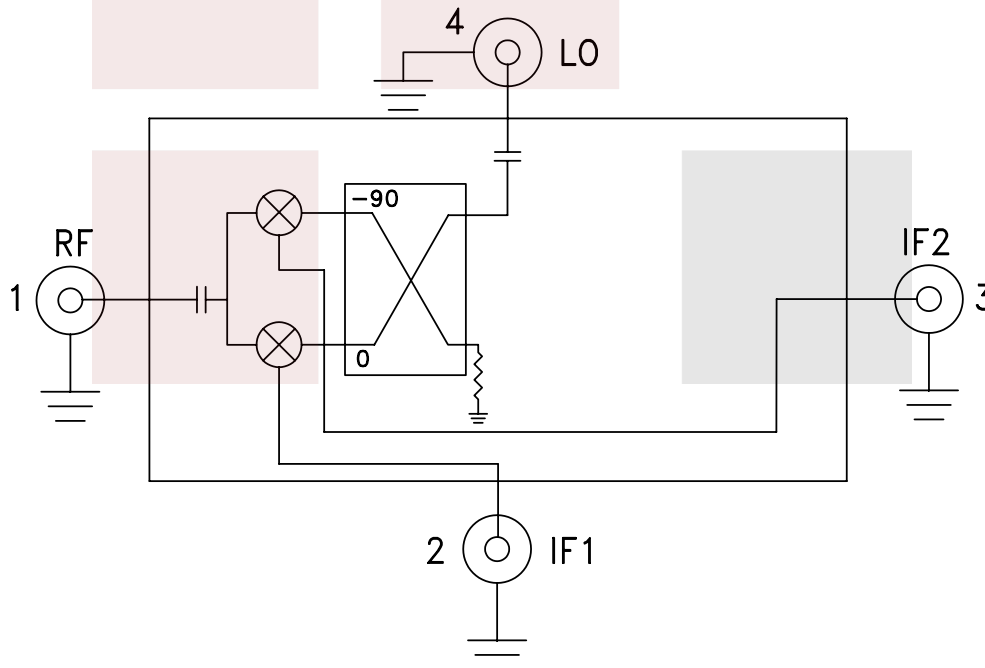
Compliance Certifications (see [product page](#) for current document)

Plotted and Other Data

Notes:

- *Conversion gain data taken with external IF 90° hybrid.

Functional Block Diagram



Typical Performance Data

Data taken As IRM With External IF Hybrid
Conversion Gain vs. Temperature

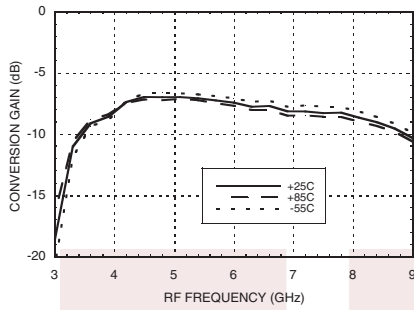
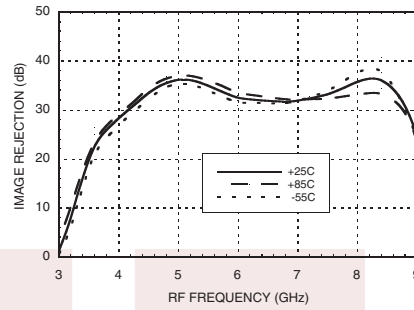
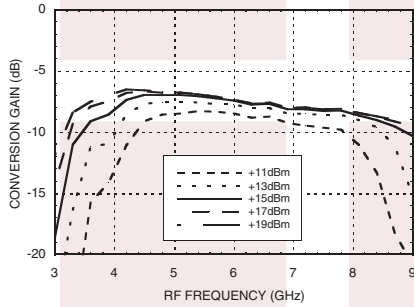


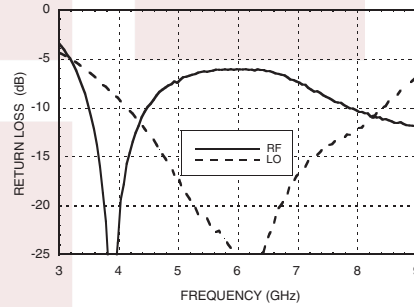
Image Rejection vs. Temperature



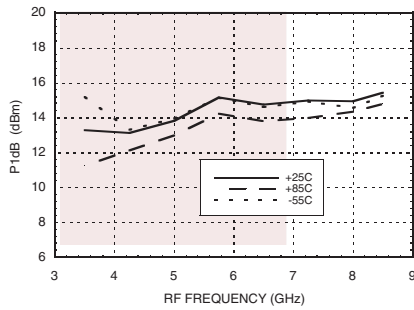
Conversion Gain vs. LO Drive



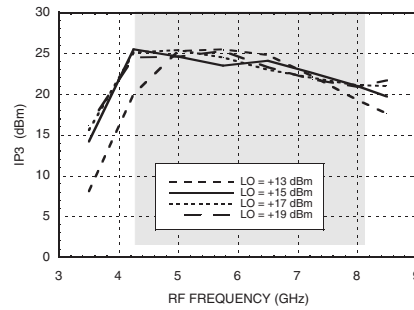
Return Loss



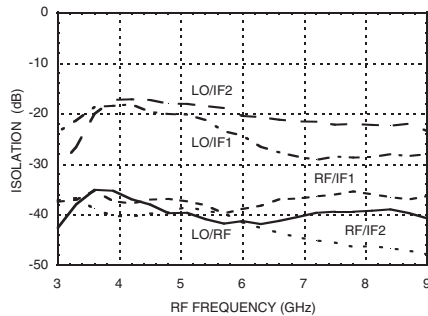
Input P1dB vs. Temperature



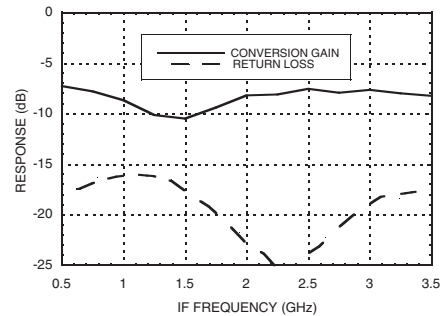
Input IP3 vs. LO Drive



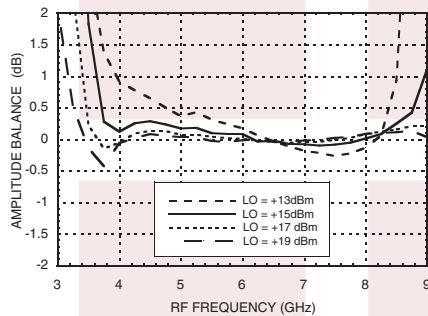
Isolations



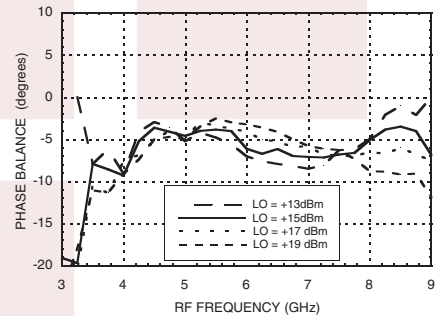
IF Bandwidth*



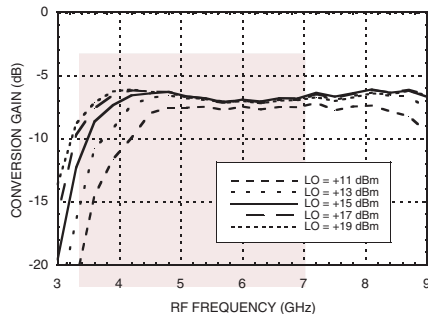
Amplitude Balance vs. LO Drive



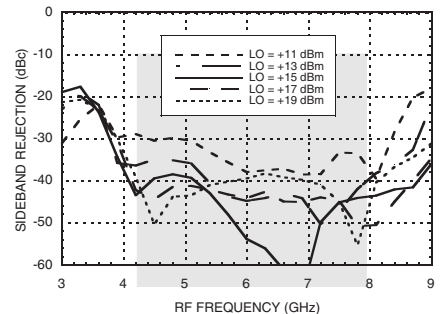
Phase Balance vs. LO Drive



Upconverter Performance Conversion Gain vs. LO Drive*



Upconverter Performance Sideband Rejection vs. LO Drive*

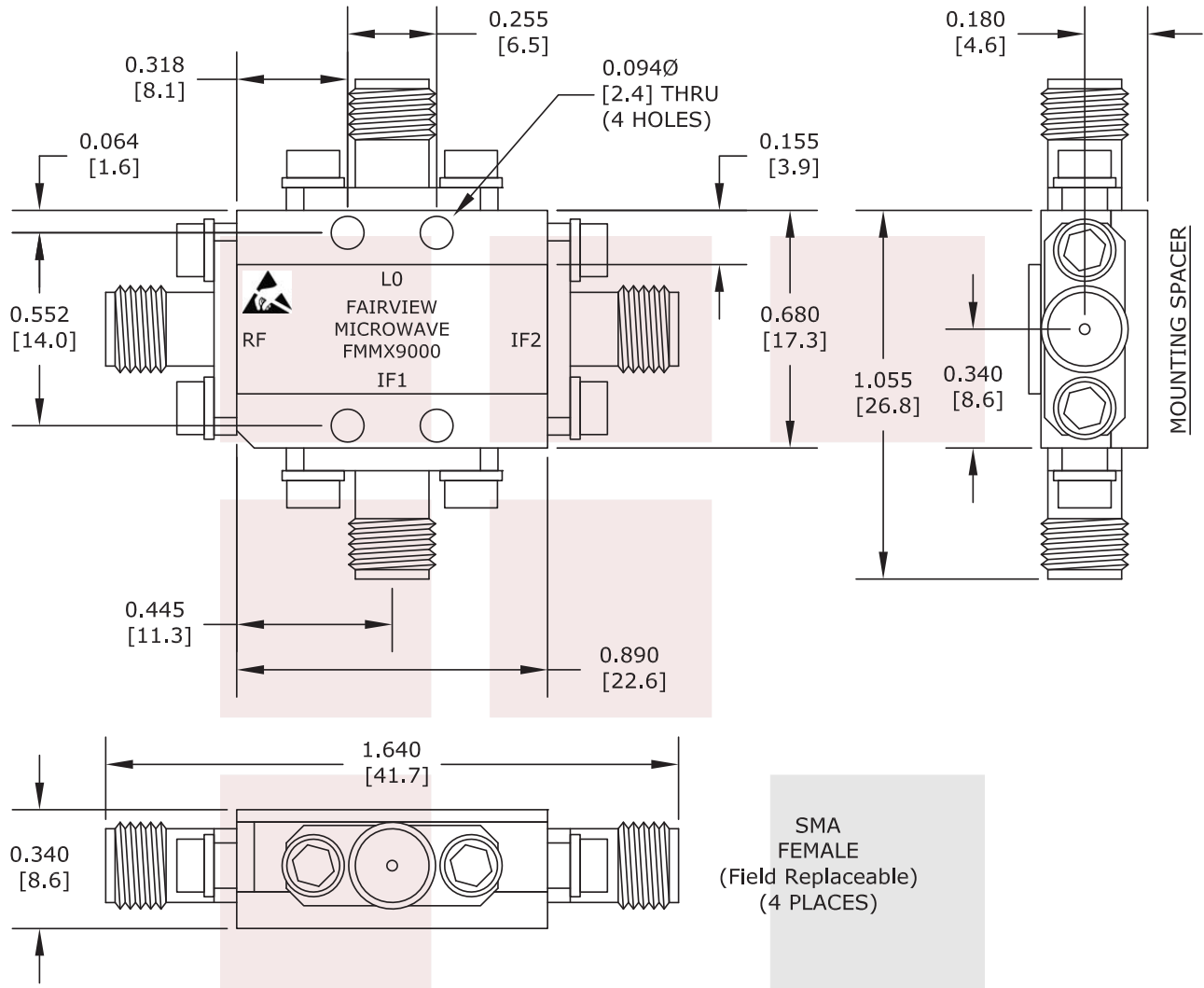


Field Replaceable SMA IQ Mixer From 4 GHz to 8.5 GHz With an IF Range From DC to 3.5 GHz And LO Power of +15 dBm from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [Field Replaceable SMA IQ Mixer From 4 GHz to 8.5 GHz With an IF Range From DC to 3.5 GHz And LO Power of +15 dBm FMMX9000](https://www.fairviewmicrowave.com/field-replaceable-sma-mixer-15-dbm-fmmx9000-p.asp)

URL: <https://www.fairviewmicrowave.com/field-replaceable-sma-mixer-15-dbm-fmmx9000-p.asp>

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FAIRVIEW MICROWAVE INC.		NOTES:			
ALLEN, TX 75013 WWW.FAIRVIEWMICROWAVE.COM		1. UNLESS OTHERWISE SPECIFIED ALL DIMENSIONS ARE NOMINAL.			
		2. ALL SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE AT ANY TIME.			
		3. DIMENSIONS ARE IN INCHES [mm].			
TITLE		DWG NO		CAGE CODE	
Field Replaceable SMA IQ Mixer From 4 GHz to 8.5 GHz With an IF Range From DC to 3.5 GHz And LO Power of +15 dBm		FMMX9000		3FKR5	
		CAD FILE	SHEET	SCALE	SIZE
		042716		N/A	A
					2233