

**Field Replaceable SMA IQ Mixer From 11 GHz to 16 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 dBm**

FMMX9003 is an I/Q double balanced millimeter-wave mixer module that operates across an RF and LO frequency range from 11 GHz to 16 GHz with an IF frequency range of DC to 3.5 GHz. The design utilizes leading edge 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 30 dB image rejection, 35 dB LO to RF isolation, and +28 dBm input IP3. The LO drive level is +19 dBm with typical conversion loss of 9 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 = +19 dBm

Description	Min	Typ	Max	Units
RF Frequency Range	11		16	GHz
LO Frequency Range	11		16	GHz
IF Frequency Range	DC		3.5	GHz
Impedance		50		Ohms
Conversion Loss		9	12	dB
Image Rejection	15	30		dB
LO to RF Isolation	30	35		dB
LO to IF Isolation	18	25		dB
Input at IP3		+28		dBm
Amplitude Balance		0.5		dB
Phase Balance		5		Degrees
RF Input Power			+20	dBm
LO Input Power		+19	+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 11 GHz to 16 GHz
- Wide IF Bandwidth DC to 3.5 GHz
- GaAs MESFET MMIC Technology
- High image rejection 30 dB
- High LO/RF Isolation 35 dB
- High input IP3 +28 dBm
- LO drive level +19 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

Fairview Microwave  
 1130 Junction Dr. #100  
 Allen, TX 75013  
 Tel: 1-800-715-4396 / (972) 649-6678  
 Fax: (972) 649-6689  
[www.fairviewmicrowave.com](http://www.fairviewmicrowave.com)  
[sales@fairviewmicrowave.com](mailto:sales@fairviewmicrowave.com)

**Performance by Frequency**

**Harmonics of LO**

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
10.5	32	49	58	79
11.5	32	47	61	61
12.5	32	51	63	53
13.5	34	52	67	xx
14.5	35	48	69	xx
15.5	34	54	71	xx

LO = +19 dBm  
 Values in dBc below input LO level measured at RF Port.

**MxN Spurious Outputs**

mRF	nLO				
	0	1	2	3	4
0	xx	-12	7	14	xx
1	24	0	51	59	70
2	79	73	74	79	91
3	87	102	99	86	97
4	xx	84	102	97	105

RF = 13.6 GHz @ -10 dBm  
 LO = 13.5 GHz @ +19 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
Channel Temperature	150 °C
Continuous Pdiss (T=85°C) (derate 6.9 mW/°C above 85°C)	448 mW
Thermal Resistance (R <sub>TH</sub> ) (junction to die bottom)	145 °C/W
Storage Temperature	-65 to +150 °C
Operating Temperature	-55 to +85 °C

**Electrical Specification Notes:**

All measurements performed as downconverter unless otherwise noted.

**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	0.083 lbs [37.65 g]

**Configuration**

Design	IQ
Connector Option	Field Replaceable
RF Connector	SMA Female
LO Connector	SMA Female
IF Connector	SMA Female

**Environmental Specifications**

**Temperature**

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

Temperature Cycle  
 Hermetic Seal

MIL-STD-883, Method 101C, Cond B  
 Gross Leak MIL-STD-883 Method 1014C1/Fine Leak MIL-STD-883, Method 1014A2, 5 x 10<sup>-8</sup> atm cc

ESD Sensitive

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



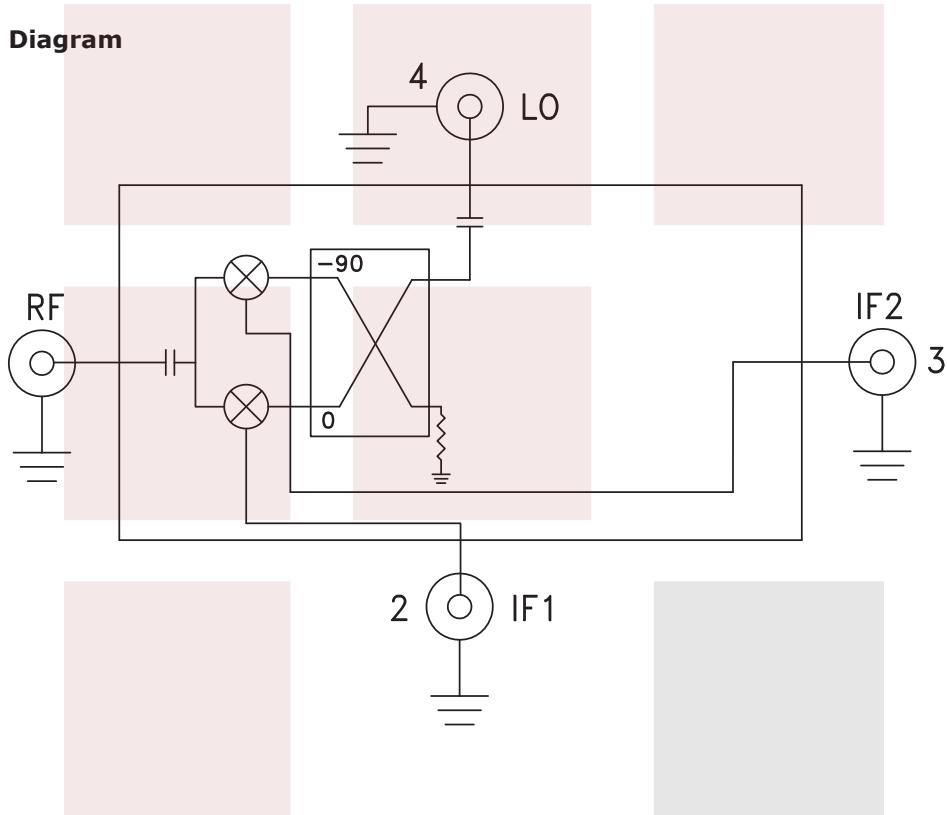
**Compliance Certifications** (see [product page](#) for current document)

**Plotted and Other Data**

Notes:

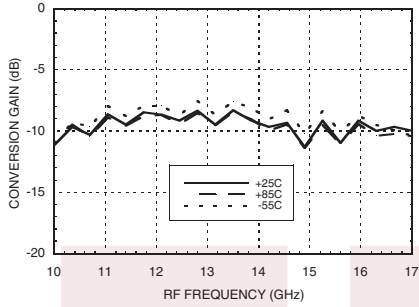
- \*Conversion gain data taken with external IF 90° hybrid.

**Functional Block Diagram**

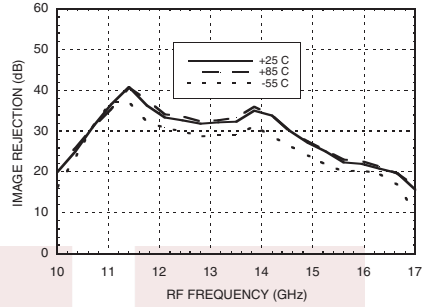


**Typical Performance Data**

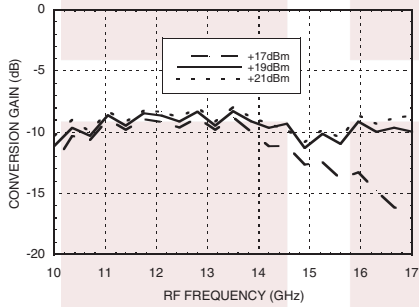
*Data taken As IRM With External IF Hybrid*  
**Conversion Gain vs. Temperature**



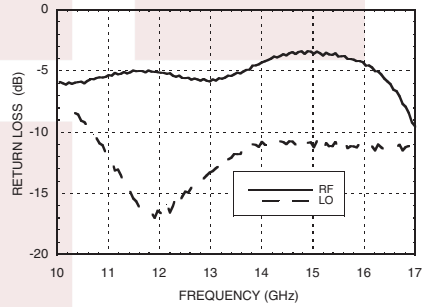
**Image Rejection vs. Temperature**



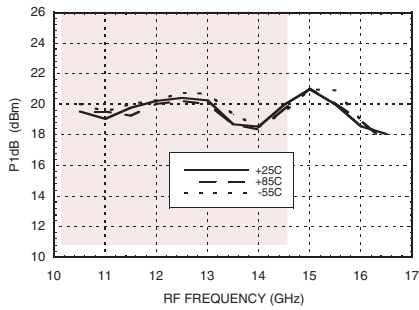
**Conversion Gain vs. LO Drive**



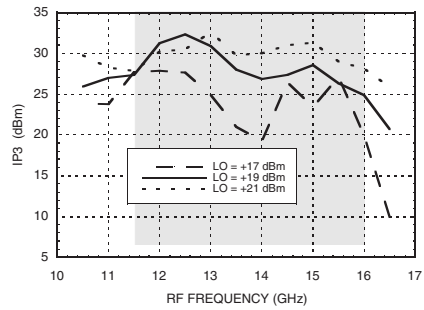
**Return Loss**



**Input P1dB vs. Temperature**

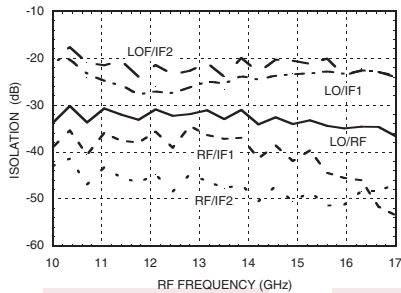


**Input IP3 vs. LO Drive**

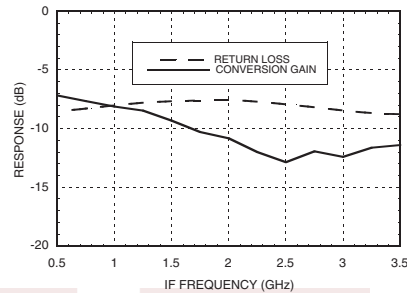


**Quadrature Channel Data Taken Without IF Hybrid**

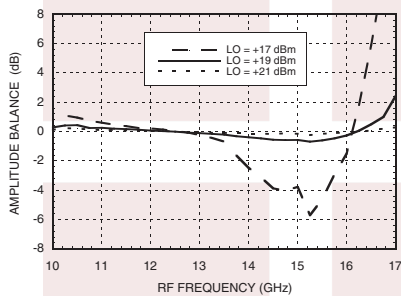
**Isolations**



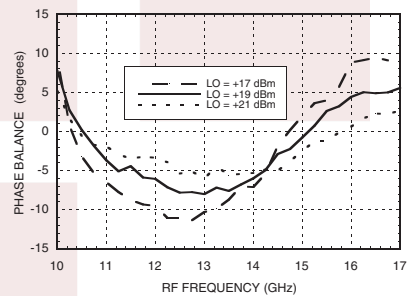
**IF Bandwidth\***



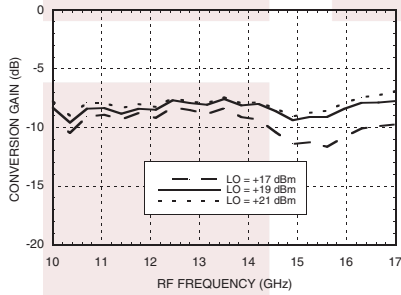
**Amplitude Balance vs. LO Drive**



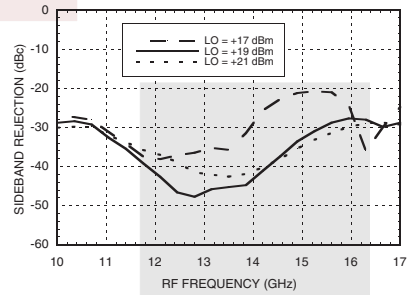
**Phase Balance vs. LO Drive**



**Upconverter Performance Conversion Gain vs. LO Drive\***



**Upconverter Performance Sideband Rejection vs. LO Drive\***



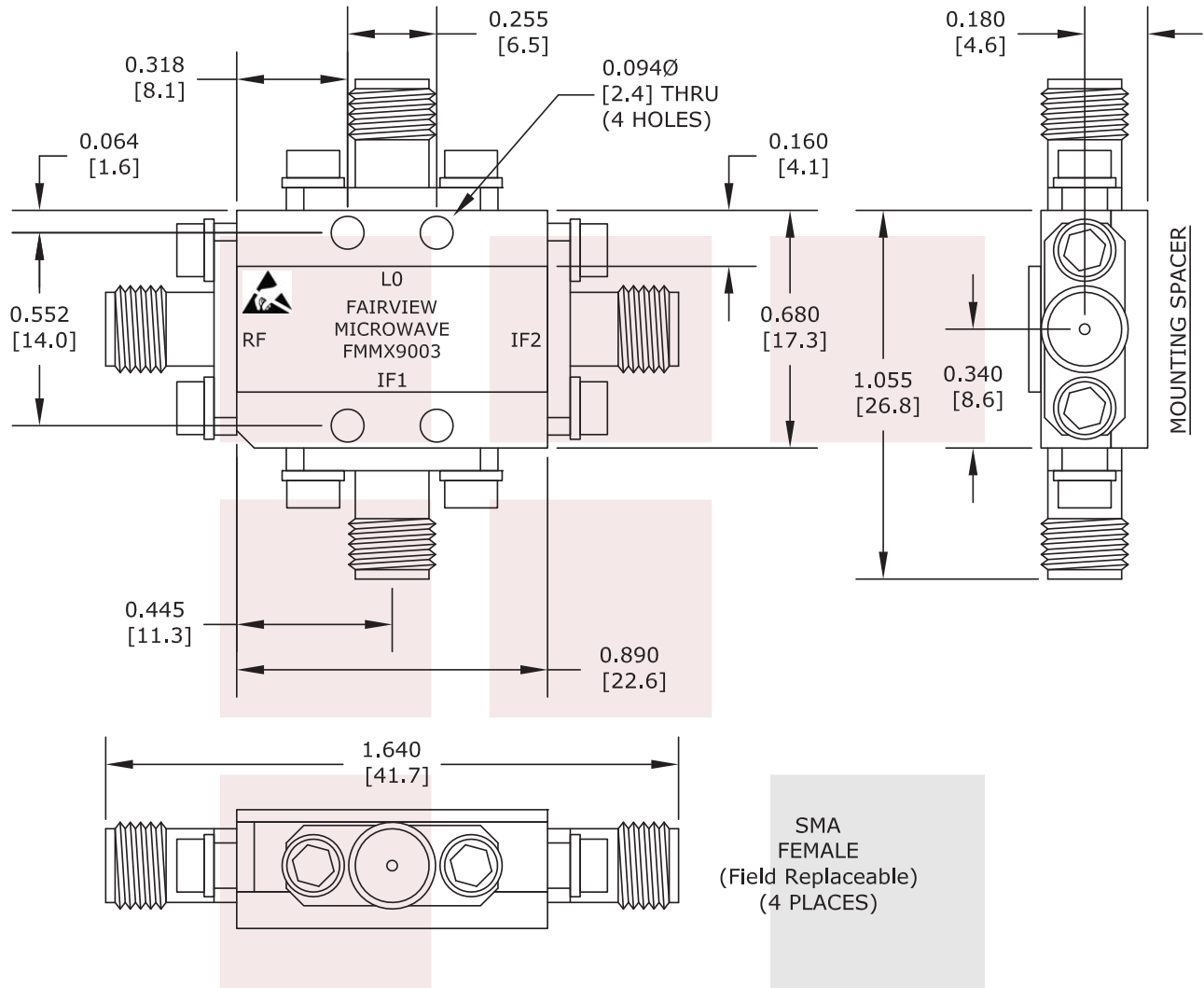
\* Conversion gain data taken with external IF hybrid

Field Replaceable SMA IQ Mixer From 11 GHz to 16 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 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 11 GHz to 16 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 dBm FMMX9003](https://www.fairviewmicrowave.com/field-replaceable-sma-mixer-19-dbm-fmmx9003-p.asp)

URL: <https://www.fairviewmicrowave.com/field-replaceable-sma-mixer-19-dbm-fmmx9003-p.asp>

The information contained in this document is accurate to the best of our knowledge and representative of the part described herein. It may be necessary to make modifications to the part and/or the documentation of the part, in order to implement improvements. Fairview Microwave reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Fairview Microwave does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Fairview Microwave does not assume any liability arising out of the use of any part or documentation.



<b>FAIRVIEW MICROWAVE INC.</b>		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 11 GHz to 16 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 dBm		FMMX9003	3FKR5		
CAD FILE	051916	SHEET	SCALE	N/A	SIZE A 2233