

Field Replaceable 2.92mm IQ Mixer From 20 GHz to 31 GHz With an IF Range From DC to 4.5 GHz And LO Power of +17 dBm

FMMX9005 is an I/Q double balanced millimeter-wave mixer module that operates across an RF and LO frequency range from 20 GHz to 31 GHz with an IF frequency range of DC to 4.5 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 24 dB image rejection, 42 dB LO to RF isolation, and +22.5 dBm input IP3. The LO drive level is +17 dBm with typical conversion loss of 10 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.

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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 = +17 dBm

| Description | Min | Typ | Max | Units |
|--------------------|-----|-------|-----|---------|
| RF Frequency Range | 20 | | 31 | GHz |
| LO Frequency Range | 20 | | 31 | GHz |
| IF Frequency Range | DC | | 4.5 | GHz |
| Impedance | | 50 | | Ohms |
| Conversion Loss | | 10 | 15 | dB |
| Image Rejection | 17 | 24 | | dB |
| LO to RF Isolation | 29 | 42 | | dB |
| LO to IF Isolation | 15 | 30 | | dB |
| Input at P1dB | | +17 | | dBm |
| Input at IP3 | | +22.5 | | dBm |
| Amplitude Balance | | 0.3 | | dB |
| Phase Balance | | 4 | | Degrees |
| RF Input Power | | | +13 | dBm |
| LO Input Power | | +17 | +27 | dBm |
| IF Input Power | | | +13 | dBm |



Features:

- I/Q Double Balanced Mixer Module
- IRM or Single Sideband Upconverter Functionality
- RF/LO mm-wave frequency 20 GHz to 31 GHz
- IF Bandwidth DC to 4.5 GHz
- GaAs MESFET MMIC Technology
- High image rejection 28 dB
- High LO/RF Isolation 38 dB
- High input IP3 +25 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
sales@fairviewmicrowave.com

Performance by Frequency

MxN Spurious Outputs

| mRF | nLO | | | | |
|-----|-----|-----|----|----|----|
| | 0 | 1 | 2 | 3 | 4 |
| 0 | xx | -13 | 27 | xx | xx |
| 1 | 18 | 0 | 35 | 52 | xx |
| 2 | 76 | 74 | 87 | 74 | 82 |
| 3 | xx | 83 | 87 | 77 | 87 |
| 4 | xx | xx | 82 | 87 | 87 |

RF = 24.5 GHz @ -10 dBm
 LO = 24.4 GHz @ +17 dBm
 Data taken without IF 90° hybrid
 All values in dBc with reference to output power at IF= 100 MHz

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 0.0856 lbs [38.83 g]

Configuration

Design IQ
 Connector Option Field Replaceable
 RF Connector 2.92mm Female
 LO Connector 2.92mm Female
 IF Connector 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.



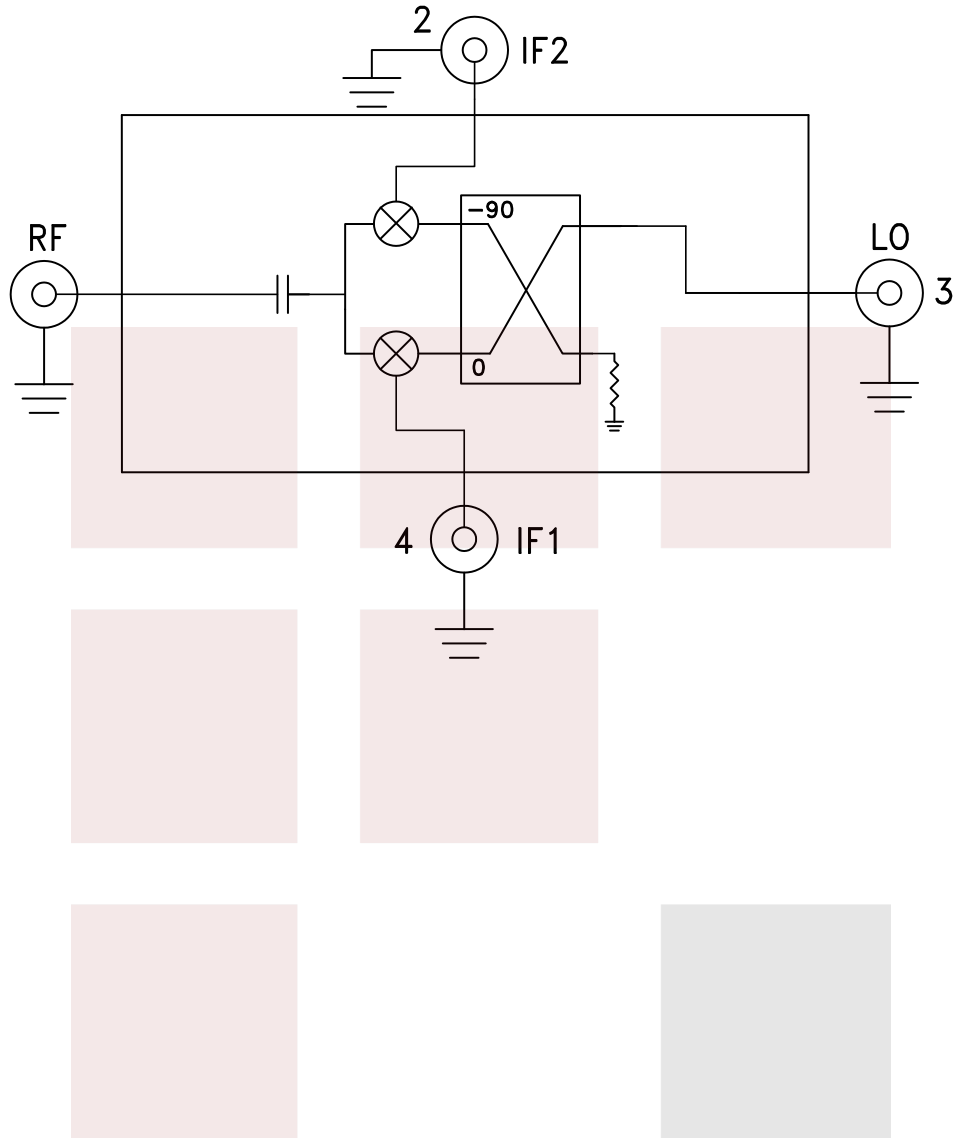
Compliance Certifications (see [product page](#) for current document)

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 90° Hybrid
Conversion Gain vs. Temperature

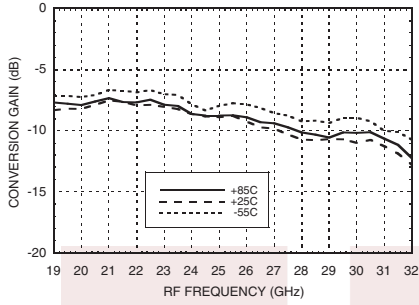
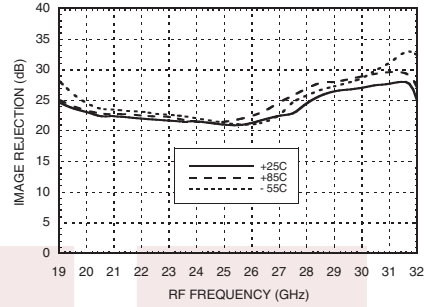
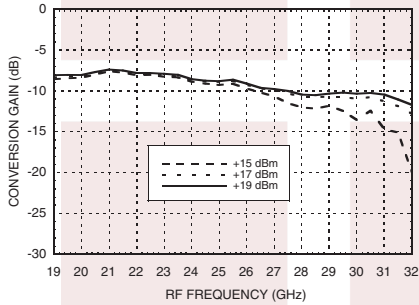


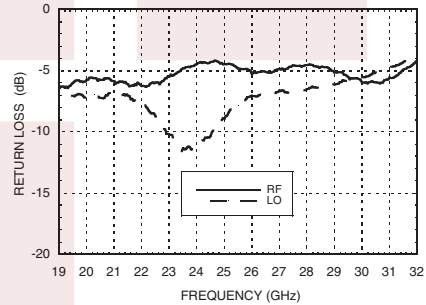
Image Rejection vs. Temperature



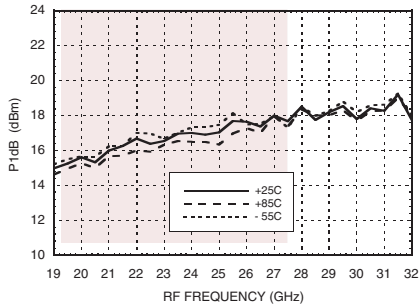
Conversion Gain vs. LO Drive



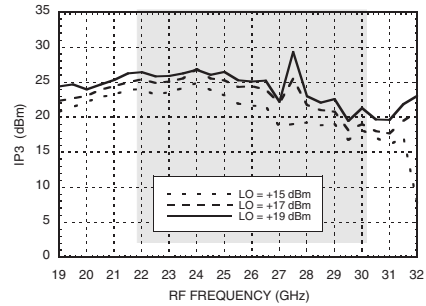
Return Loss



Input P1dB vs. Temperature

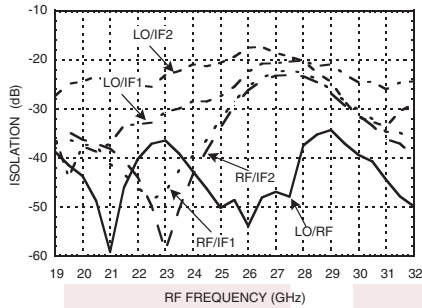


Input IP3 vs. LO Drive

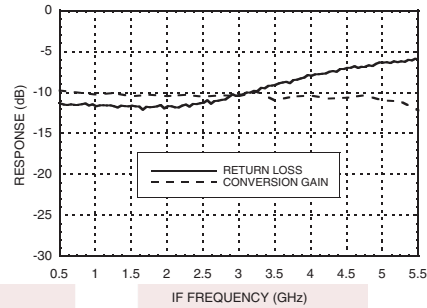


IF1 & IF2 Port Characteristics

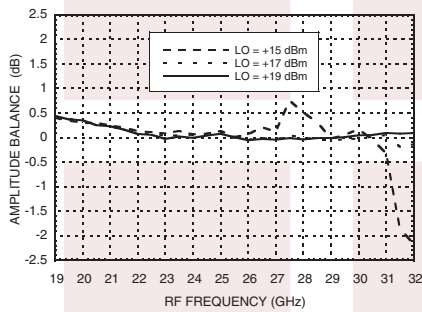
Isolation, LO=+10dBm



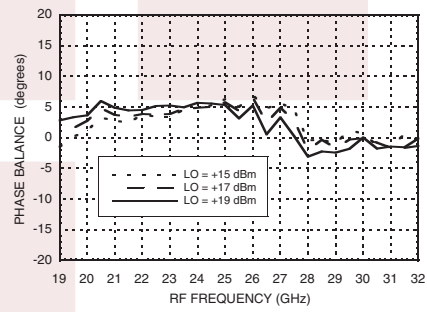
IF Bandwidth*



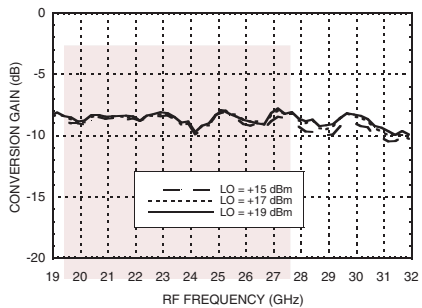
Amplitude Balance vs. LO Drive



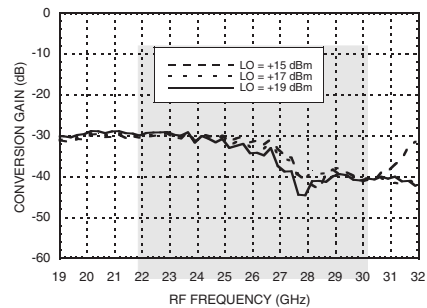
Phase Balance vs. LO Drive



Upconverter Performance Conversion Gain vs. LO Drive



Upconverter Performance Sideband Rejection vs. LO Drive

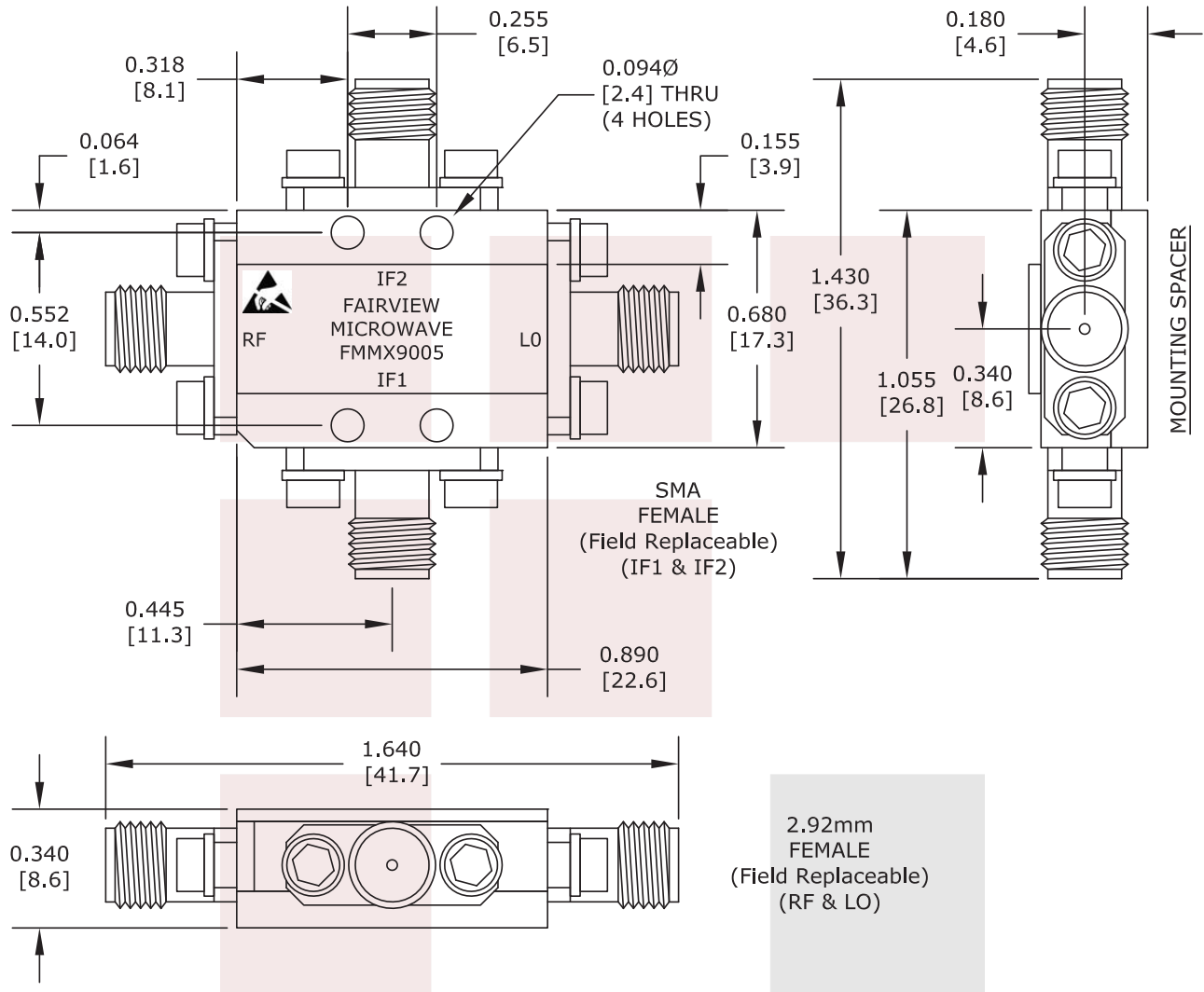


Field Replaceable 2.92mm IQ Mixer From 20 GHz to 31 GHz With an IF Range From DC to 4.5 GHz And LO Power of +17 dBm from Fairview Microwave is in-stock and available to ship same-day. All of our RF/microwave products are available off-the-shelf from our ISO 9001:2008 certified facilities in Allen, Texas. Fairview Microwave is RF on-demand.

For additional information on this product, please click the following link: [Field Replaceable 2.92mm IQ Mixer From 20 GHz to 31 GHz With an IF Range From DC to 4.5 GHz And LO Power of +17 dBm FMMX9005](https://www.fairviewmicrowave.com/field-replaceable-2.92mm-mixer-17-dbm-fmmx9005-p.aspx)

URL: <https://www.fairviewmicrowave.com/field-replaceable-2.92mm-mixer-17-dbm-fmmx9005-p.aspx>

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|--|--------|---|-------|--------------------|-------------|
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| TITLE Field Replaceable 2.92mm IQ Mixer From 20 GHz to 31 GHz With an IF Range From DC to 4.5 GHz And LO Power of +17 dBm | | DWG NO FMMX9005 | | CAGE CODE 3FKR5 | |
| CAD FILE | 092916 | SHEET | SCALE | N/A | SIZE A 2233 |