PASTERNACK® THE ENGINEER'S RF SOURCE

IQ Mixer Operating From 6 GHz to 10 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 dBm, Field Replaceable SMA

Mixers Technical Data Sheet PE86X9001

Features

- I/Q Double Balanced Mixer Module
- IRM or Single Sideband Upconverter Functionality
- RF/LO mm-wave frequency 6 GHz to 10 GHz
- Wide IF Bandwidth DC to 3.5 GHz
- GaAs MESFET MMIC Technology
- High image rejection 35 dB
- High LO/RF Isolation 45 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

Description

The PE86X9001 is an I/Q double balanced millimeter-wave mixer module that operates across an RF and LO frequency range from 6 GHz to 10 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, 45 dB LO to RF isolation, and +25 dBm input IP3. The LO drive level is +19 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.

Electrical Specifications (TA = +25° C, IF= 100 MHz, LO = +19 dBm)

Description	Minimum	Typical	Maximum	Units
RF Frequency Range	6		10	GHz
LO Frequency Range	6		10	GHz
IF Frequency Range	DC		3.5	GHz
Impedance		50		Ohms
Conversion Loss		7.5	10	dB
Image Rejection	20	35		dB
LO to RF Isolation	35	45		dB
LO to IF Isolation	20	25		dB
Input at 1dB Compression Point		+17		dBm
Input at 3rd Order Intercept Point		+25		dBm
Amplitude Balance		0.5		dB

Click the following link (or enter part number in "SEARCH" on website) to obtain additional part information including price, inventory and certifications: IQ Mixer Operating From 6 GHz to 10 GHz With an IF Range From DC to 3.5 GHz And LO Power of +19 dBm, Field Replaceable SMA PE86X9001

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Phase Balance	5		Degrees
RF Input Power		+20	dBm
LO Input Power	+19	+27	dBm
IF Input Power		+20	dBm

Performance by Frequency

Harmonics of LO

LO Freq. (GHz)	nLO Spur at RF Port			
	1	2	3	4
3.5	39	40	52	51
6.5	43	49	51	70
7.5	51	65	53	62
8.5	56	61	56	50
9.5	47	57	65	63
10.5	45	55	59	46

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

MxN Spurious Outputs

	nLO				
mRF	0	1	2	3	4
0	xx	-10	29	18	51
1	33	0	46	77	68
2	99	71	75	70	99
3	97	101	100	86	101
4	99	98	98	102	107

RF = 7.6 GHz @ -10 dBm
LO = 7.5 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 7.8 mW/°C above 85°C)	507 mW
Thermal Resistance (R_{TH}) (junction to die bottom)	128 °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.

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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	0.081 lbs [36.74 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	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.

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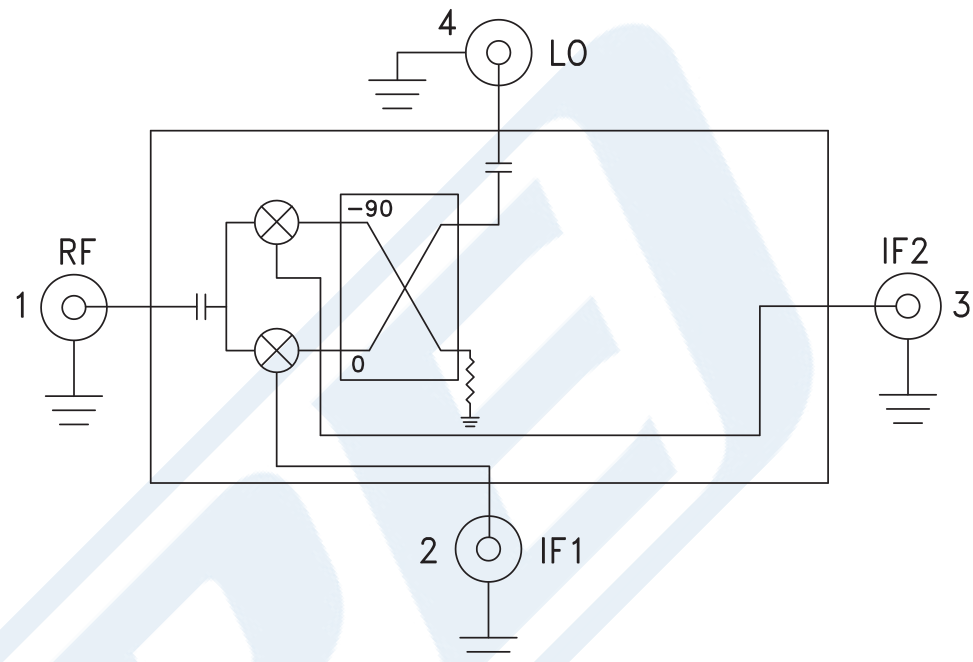
Functional Block Diagram



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Typical Performance Data

Data taken As IRM With External IF Hybrid

Conversion Gain vs. Temperature

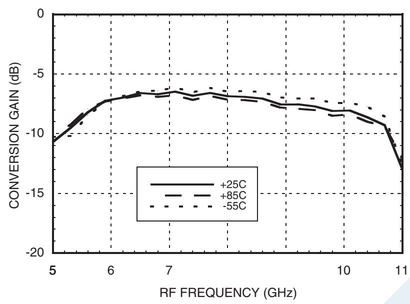
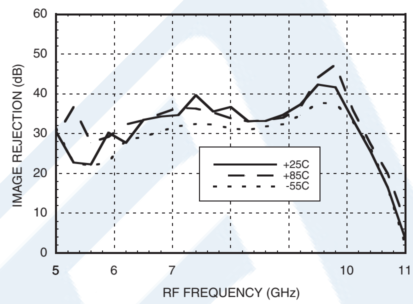
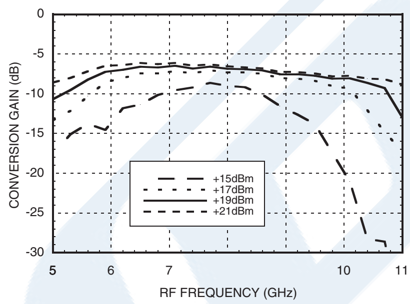


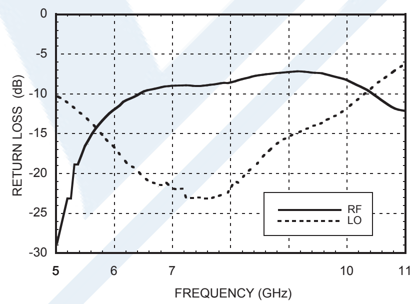
Image Rejection vs. Temperature



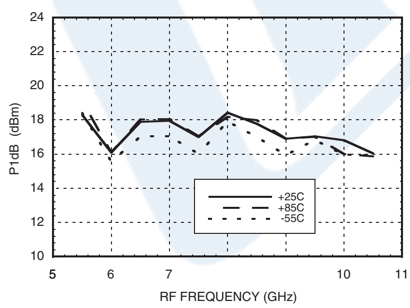
Conversion Gain vs. LO Drive



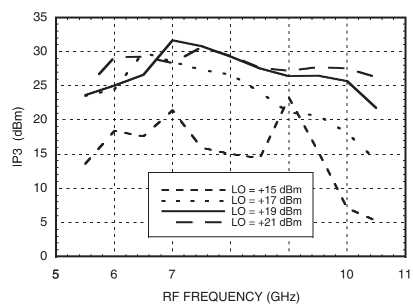
Return Loss



Input P1dB vs. Temperature



Input IP3 vs. LO Drive



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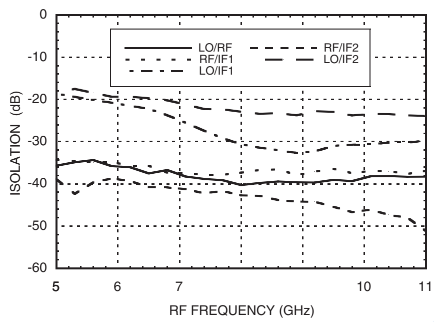
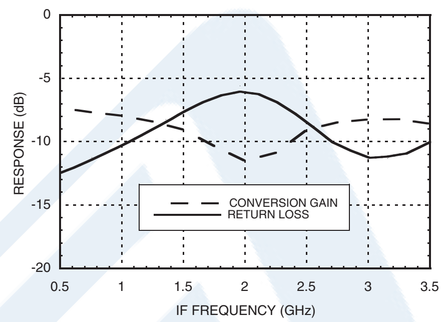
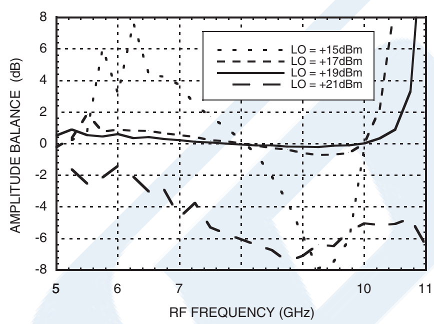
Isolations



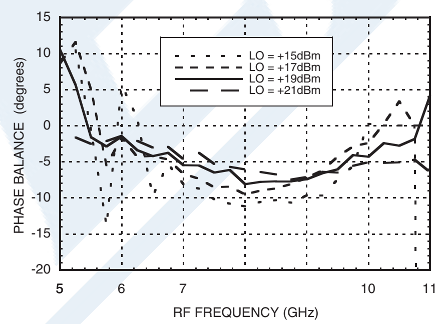
*IF Bandwidth**



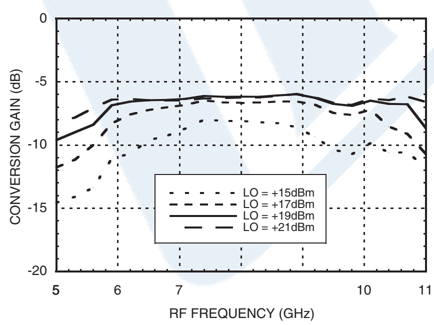
Amplitude Balance vs. LO Drive



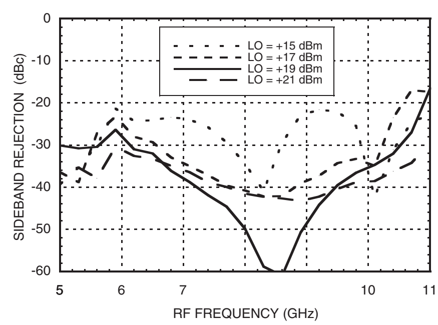
Phase Balance vs. LO Drive



*Upconverter Performance Conversion Gain vs. LO Drive**



*Upconverter Performance Sideband Rejection vs. LO Drive**



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URL: https://www.pasternack.com/50-ohm-sma-mixer-6-10-ghz-if-dc-3.5-ghz-pe86x9001-p.aspx

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PE86X9001 CAD Drawing

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