



**IQ Mixer Operating From 30 GHz to 38 GHz With  
an IF Range From DC to 3.5 GHz And LO Power of  
+17 dBm, Field Replaceable 2.92mm**

## Mixers Technical Data Sheet

**PE86X9006**

### Features

- I/Q Double Balanced Mixer Module
- IRM or Single Sideband Upconverter Functionality
- RF/LO mm-wave frequency 30 GHz to 38 GHz
- Wide IF Bandwidth DC to 3.5 GHz
- GaAs MESFET MMIC Technology
- 15 dB image rejection
- High LO/RF Isolation 35 dB
- High input IP3 +19 dBm
- LO drive level +17 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 PE86X9006 is an I/Q double balanced millimeter-wave mixer module that operates across an RF and LO frequency range from 30 GHz to 38 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 15 dB image rejection, 35 dB LO to RF isolation, and +19 dBm input IP3. The LO drive level is +17 dBm with typical conversion loss of 10.5 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 = +17 dBm)

Description	Minimum	Typical	Maximum	Units
RF Frequency Range	30		38	GHz
LO Frequency Range	30		38	GHz
IF Frequency Range	DC		3.5	GHz
Impedance		50		Ohms
RF Input Power			+19	dBm
LO Input Power		+17	+27	dBm
IF Input Power			+24	dBm

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 30 GHz to 38 GHz With an IF Range From DC to 3.5 GHz And LO Power of +17 dBm, Field Replaceable 2.92mm PE86X9006](#)

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### Performance by Frequency

Description	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency Range, RF/LO		30 - 34			34 - 38		GHz
Frequency Range, IF		DC - 3.5			DC - 3.5		GHz
Conversion Loss (As IRM)		10.5	13.5		11	14	dB
Image Rejection	11	15		11	15		dB
1 dB Compression (Input)		17			17		dBm
LO to RF Isolation	30	35		23	34		dB
LO to IF Isolation	18	25		14	23		dB
IP3 (Input)		19			19		dBm
Amplitude Balance		0.5			1		dB
Phase Balance		13			12		Deg

### MxN Spurious Outputs

	nLO				
mRF	0	1	2	3	4
0	xx	-12	xx	xx	xx
1	47	0	53	xx	xx
2	xx	62	68	59	xx
3	xx	xx	101	70	90
4	xx	xx	xx	90	104

RF = 35.1 GHz @ -10 dBm  
 LO = 35 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.

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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	0.08 lbs [36.29 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  
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 10-8 atm cc  
ESD Sensitive Material, Transport material in Approved  
ESD bags. Handle only in ESD Workstation.

ESD Sensitive



**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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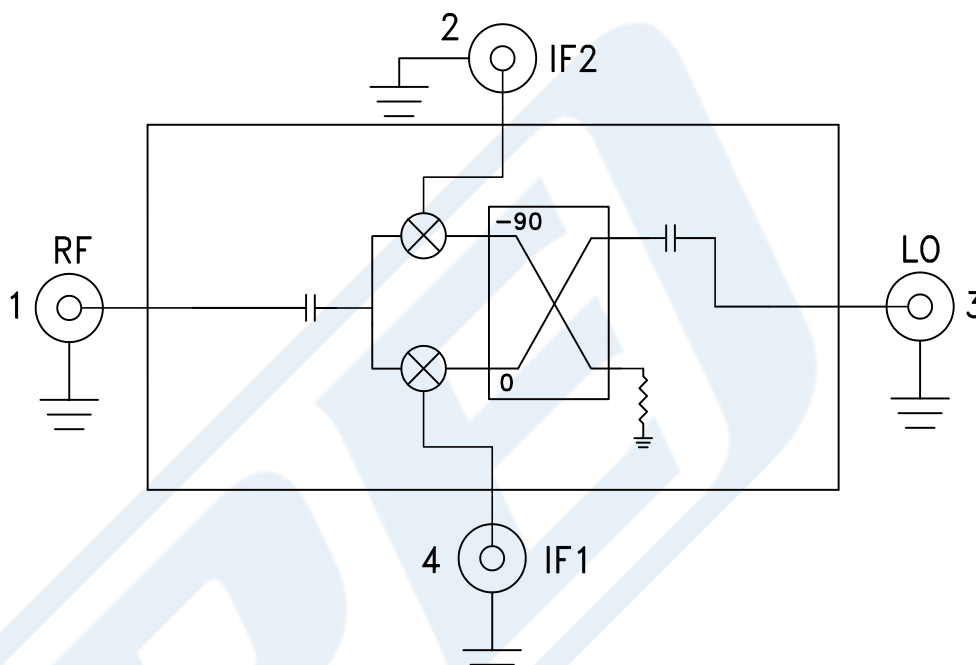


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**Functional Block Diagram**



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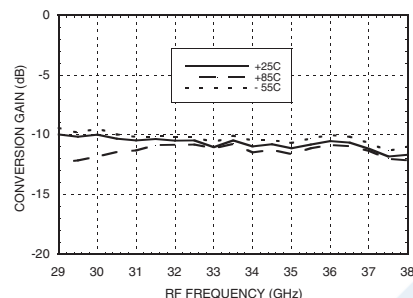
## Mixers Technical Data Sheet

PE86X9006

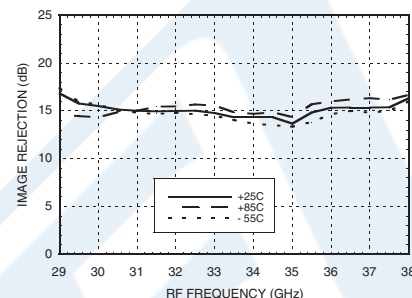
### Typical Performance Data

*Data taken As IRM With External IF 90° Hybrid*

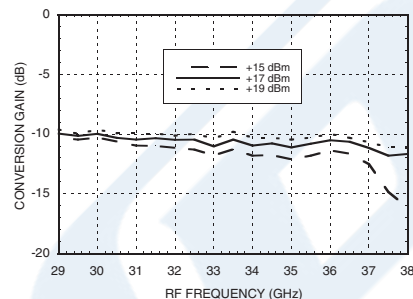
#### Conversion Gain vs. Temperature



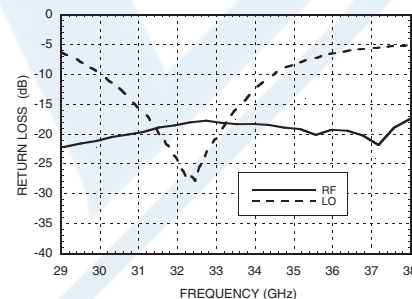
#### Image Rejection vs. Temperature



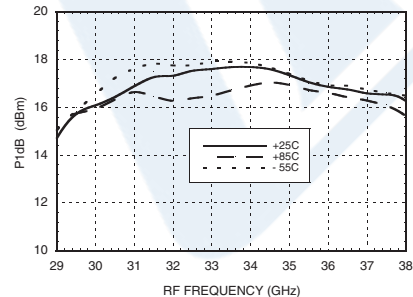
#### Conversion Gain vs. LO Drive



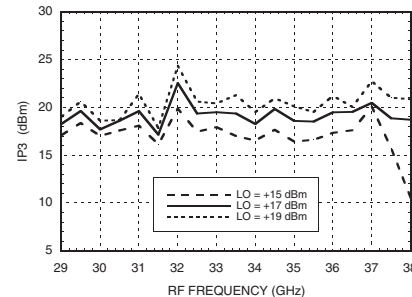
#### Return Loss



#### Input P1dB vs. Temperature



#### Input IP3 vs. LO Drive



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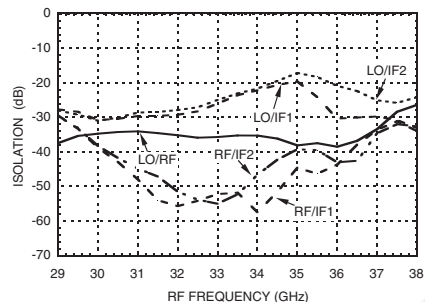
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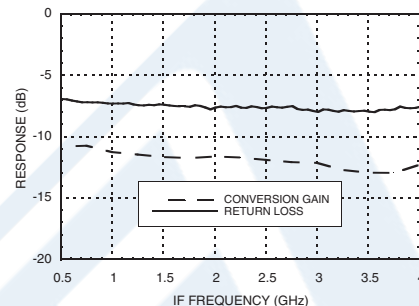
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### IF1 & IF2 Port Characteristics

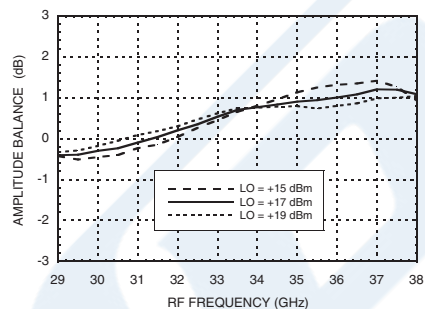
Isolations, LO = +19 dBm



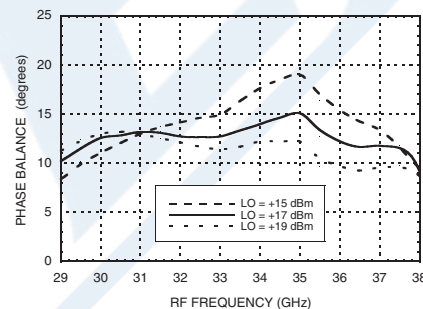
### IF Bandwidth\*



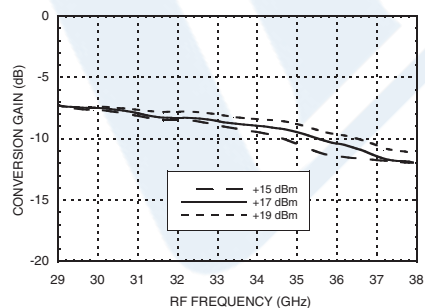
### Amplitude Balance vs. LO Drive



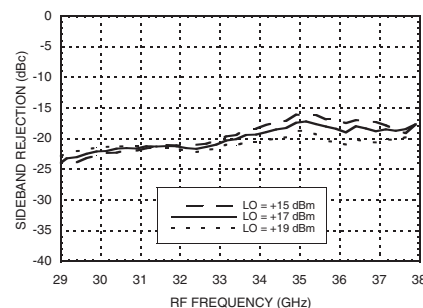
### Phase Balance vs. LO Drive



### Upconverter Performance Conversion Gain vs. LO Drive



### Upconverter Performance Sideband Rejection vs. LO Drive



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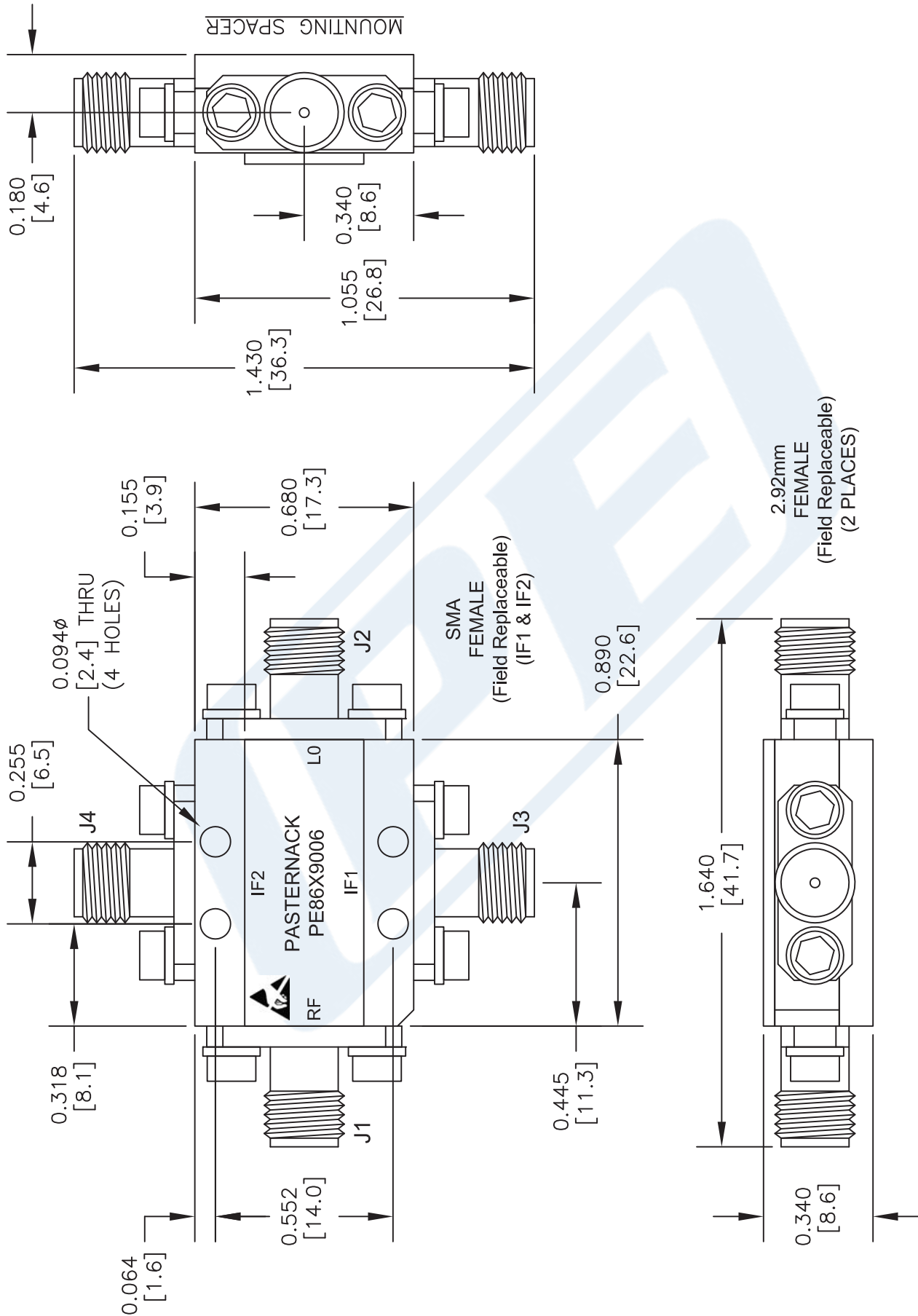
URL: <https://www.pasternack.com/50-ohm-2.92mm-mixer-30-38-ghz-if-dc-3.5-ghz-pe86x9006-p.aspx>

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# PE86X9006 CAD Drawing

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DWG TITLE

**PE86X9006**

NOTES:  
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].

**Pasternack Enterprises, Inc.**  
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FSCM NO. 53919

CAD FILE 042716

SCALE N/A

SIZE A

2233