Double Balanced Mixer Operating From 24 GHz to 38 GHz With an IF Range From DC to 8 GHz And LO Power of +13 dBm, Field Replaceable 2.92mm

**Mixers Technical Data Sheet**

**Features**

- Double Balanced Mixer Module
- RF/LO Frequency 24 to 38 GHz
- Wide IF Bandwidth DC to 8 GHz
- GaAs MESFET MMIC Technology
- No external components or matching circuitry
- LO Drive level +13 dBm
- Low Conversion loss 9 dB
- High LO/RF Isolation 35 dB
- 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 PE86X1001 is a double balanced mixer module that operates across an RF and LO frequency range from 24 GHz to 38 GHz with a wide IF frequency range of DC to 8 GHz. The design utilizes GaAs MESFET MMIC technology and requires no external components or matching circuitry. Excellent LO to RF and LO to IF isolation levels that range from 35 to 40 dB are the result of using optimized balun structures. The LO drive level is +13 dBm with typical conversion loss of 9 dB and an input IP3 level up to +20 dBm. The drop-in package is hermetically sealed with field replaceable 2.92mm connectors for the RF and LO ports, and an SMA connector for the IF port. 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, and the design exhibits a robust 1000V ESD, Class IC rating.

**Electrical Specifications** (TA = +25°C, IF= 1 GHz, LO = +13 dBm)

<table>
<thead>
<tr>
<th>Description</th>
<th>Minimum</th>
<th>Typical</th>
<th>Maximum</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>RF Frequency Range</td>
<td>24</td>
<td>38</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>LO Frequency Range</td>
<td>24</td>
<td>38</td>
<td>GHz</td>
<td></td>
</tr>
<tr>
<td>IF Frequency Range</td>
<td>DC</td>
<td>8</td>
<td>GHz</td>
<td></td>
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<tr>
<td>Impedance</td>
<td>50</td>
<td></td>
<td>Ohms</td>
<td></td>
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<tr>
<td>Conversion Loss</td>
<td>9</td>
<td>12</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>Noise Figure</td>
<td>9</td>
<td>12</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>LO to RF Isolation</td>
<td>27</td>
<td>35</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>LO to IF Isolation</td>
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<td>40</td>
<td>dB</td>
<td></td>
</tr>
<tr>
<td>RF to IF Isolation</td>
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<td>30</td>
<td>dB</td>
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<tr>
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<td>+11</td>
<td></td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td>Input at 2nd Order Intercept Point</td>
<td>+55</td>
<td></td>
<td>dBm</td>
<td></td>
</tr>
<tr>
<td>Input at 3rd Order Intercept Point</td>
<td>+20</td>
<td></td>
<td>dBm</td>
<td></td>
</tr>
</tbody>
</table>

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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. Pasternack reserves the right to make such changes as required. Unless otherwise stated, all specifications are nominal. Pasternack does not make any representation or warranty regarding the suitability of the part described herein for any particular purpose, and Pasternack does not assume any liability arising out of the use of any part or documentation.

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PE86X1001 REV 1.0

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### Mixers Technical Data Sheet

<table>
<thead>
<tr>
<th></th>
<th>RF Input Power</th>
<th>LO Input Power</th>
<th>IF Input Power</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>+27 dBm</td>
<td>+11 dBm</td>
<td>+27 dBm</td>
</tr>
</tbody>
</table>

#### Electrical Specification Notes:
All measurements performed as downconverter unless otherwise noted.
Conversion loss measured 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: 0.081 lbs [36.74 g]

**Configuration**
- Design: Double Balanced
- 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

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Functional Block Diagram

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Mixers Technical Data Sheet

Typical Performance Data

Conversion Gain vs. Temperature

Conversion Gain vs. LO Drive

Isolation

Return Loss

IF Bandwidth

Upconverter Performance

Conversion Gain vs. LO Drive

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### MxN Spurious Outputs

<table>
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<td>xx</td>
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<td>xx</td>
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<td></td>
<td>2</td>
<td>xx</td>
<td>72</td>
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<tr>
<td></td>
<td>3</td>
<td>xx</td>
<td>xx</td>
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<tr>
<td></td>
<td>4</td>
<td>xx</td>
<td>xx</td>
<td>xx</td>
<td>103</td>
</tr>
</tbody>
</table>

RF = 28 GHz @ -10 dBm  
LO = 27 GHz @ +13 dBm  
All values in dBc below the IF output power level.

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