Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA

MIXERS TECHNICAL DATA SHEET

PE86X1003

FEATURES

- Double Balanced Mixer Module
- RF/LO Frequency 7 to 14 GHz
- Wide IF Bandwidth DC to 5 GHz
- GaAs MESFET MMIC Technology
- No external components or matching circuitry
- LO Drive level +13 dBm
- Low Conversion loss 7 dB
- High LO/RF Isolation 45 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 PE86X1003 is a double balanced mixer module that operates across an RF and LO frequency range from 7 GHz to 14 GHz with a wide IF frequency range of DC to 5 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 48 dB are the result of using optimized balun structures. The LO drive level is +13 dBm with typical conversion loss of 7 dB and an input IP3 level up to +20 dBm. The drop-in package is hermetically sealed with field replaceable SMA 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 = 100 MHz, 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>7</td>
<td>14</td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>LO Frequency Range</td>
<td>7</td>
<td>14</td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>IF Frequency Range</td>
<td>DC</td>
<td>5</td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Impedance</td>
<td>50</td>
<td></td>
<td></td>
<td>Ohms</td>
</tr>
<tr>
<td>RF Input Power</td>
<td></td>
<td>+25</td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>LO Input Power</td>
<td>+13</td>
<td></td>
<td>+25</td>
<td>dBm</td>
</tr>
<tr>
<td>IF Input Power</td>
<td></td>
<td>+25</td>
<td></td>
<td>dBm</td>
</tr>
</tbody>
</table>

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003

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.

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (866) 727-8376 or (949) 261-1920 • Fax: (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2016 Pasternack Enterprises All Rights Reserved

PE86X1003 REV 1.0 1
## Performance by Frequency

<table>
<thead>
<tr>
<th>Description</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency Range, RF &amp; LO</td>
<td>7 - 11</td>
<td></td>
<td>11 - 14</td>
<td></td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Frequency Range, IF</td>
<td>DC - 5</td>
<td></td>
<td>DC - 5</td>
<td></td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Conversion Loss</td>
<td>7</td>
<td>9.5</td>
<td>8</td>
<td>11</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>Noise Figure</td>
<td>7</td>
<td></td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>LO to RF Isolation</td>
<td>37</td>
<td>48</td>
<td>35</td>
<td>45</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>LO to IF Isolation</td>
<td>27</td>
<td>35</td>
<td>32</td>
<td>40</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>RF to IF Isolation</td>
<td>12</td>
<td>22</td>
<td>22</td>
<td>30</td>
<td></td>
<td></td>
<td>dB</td>
</tr>
<tr>
<td>IP3 (Input)</td>
<td>18</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>IP2 (Input)</td>
<td>48</td>
<td></td>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td>dBm</td>
</tr>
<tr>
<td>1 dB Compression (Input)</td>
<td>11</td>
<td></td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td>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**: 0.076 lbs [34.47 g]

#### Configuration

- **Design**: Double Balanced
- **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

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: **Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003**

*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.*
Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA

Mixers Technical Data Sheet

Temperature Cycle
MIL-STD-883, Method 101C, Cond B
Hermetic Seal
Gross Leak MIL-STD-883 Method 1014C/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 (visit www.Pasternack.com for current document)
RoHS Compliant

Plotted and Other Data
Notes:

Functional Block Diagram

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications:
Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003

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.
Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA

Mixers Technical Data Sheet

Typical Performance Data

Conversion Gain vs. Temperature
@ LO = +13 dBm

Return Loss @ LO = +13 dBm

Conversion Gain vs. LO Drive

Isolation @ LO = +13 dBm

IF Bandwidth @ LO = +13 dBm

Upconverter Performance
Conversion Gain vs. LO Drive

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003

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.
Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA

Mixers Technical Data Sheet

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003

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.
Mixers Technical Data Sheet

Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA from Pasternack Enterprises has same day shipment for domestic and International orders. Our RF, microwave and millimeter wave products maintain a 99% availability and are part of the broadest selection in the industry.

Click the following link (or enter part number in “SEARCH” on website) to obtain additional part information including price, inventory and certifications: Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA PE86X1003


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.

Pasternack Enterprises, Inc. • P.O. Box 16759, Irvine, CA 92623
Phone: (888) 727-8376 or (949) 261-1920 • Fax: (949) 261-7451
Sales@Pasternack.com • Techsupport@Pasternack.com

© 2016 Pasternack Enterprises All Rights Reserved
Double Balanced Mixer Operating From 7 GHz to 14 GHz With an IF Range From DC to 5 GHz And LO Power of +13 dBm, Field Replaceable SMA