BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

**Typical Applications**
The HMC877LC3 is ideal for:
- Synchronization of clock and data
- Transponder design
- Broadband Test & Measurement
- RF ATE Applications

**Features**
- Very Wide Bandwidth: 8 - 23 GHz
- Continuous Adjustable Delay Range: 500° (1.4 UI)
- Single-Ended or Differential Operation
- Adjustable Differential Output Voltage
  - Swing: 500 - 950 mVp-p @ 16 GHz
- Delay Control Modulation Bandwidth: 2.5 GHz
- Single Supply: +3.3V
- 16 Lead Ceramic 3x3mm SMT Package: 9mm²

**General Description**
The HMC877LC3 is a phase shifter/time delay with 0 to 500° (1.4 UI) continuously adjustable shift/delay range. The delay control is linearly monotonic with respect to the differential control voltage (VDCP, VDCN) and the control input has a modulation bandwidth of 2.5 GHz. The device provides a differential output voltage with constant amplitude for single-ended or differential input voltages above the input sensitivity level, while the output voltage swing may be adjusted using the VAC control pin. The HMC877LC3 features internal temperature compensation and bias circuitry to minimize delay variations with temperature. The device also features a delay control voltage range adjustment pin, LC. All RF input and outputs of the HMC877LC3 are internally terminated with 50 Ohms to Vcc, and may either be AC or DC coupled. Output pins can be connected directly to a 50 Ohm to Vcc terminated system, while DC blocking capacitors must be used if the terminated system input is 50 Ohms to a DC voltage other than Vcc. The HMC877LC3 is available in ROHS-compliant 3x3mm SMT package.

**Electrical Specifications, \( T_A = +25^\circ C \), Vcc = 3.3V, GND=ODWN = 0V**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Voltage</td>
<td>± 5% Tolerance</td>
<td>3.135</td>
<td>3.3</td>
<td>3.465</td>
<td>V</td>
</tr>
<tr>
<td>Power Supply Current</td>
<td>ODWN = 0V</td>
<td>175</td>
<td>190</td>
<td>215</td>
<td>mA</td>
</tr>
<tr>
<td>Phase Shift Range</td>
<td>@ 10 GHz</td>
<td>504</td>
<td></td>
<td></td>
<td>Deg</td>
</tr>
<tr>
<td></td>
<td>@ 16 GHz</td>
<td>498</td>
<td></td>
<td></td>
<td>Deg</td>
</tr>
<tr>
<td></td>
<td>@ 22 GHz</td>
<td>485</td>
<td></td>
<td></td>
<td>Deg</td>
</tr>
<tr>
<td>Time Delay Range</td>
<td>@ 10 GHz</td>
<td>1.4</td>
<td></td>
<td></td>
<td>UI</td>
</tr>
<tr>
<td></td>
<td>@ 16 GHz</td>
<td>1.38</td>
<td></td>
<td></td>
<td>UI</td>
</tr>
<tr>
<td></td>
<td>@ 22 GHz</td>
<td>1.35</td>
<td></td>
<td></td>
<td>UI</td>
</tr>
<tr>
<td>Delay Control Modulation Bandwidth</td>
<td></td>
<td>2.5</td>
<td></td>
<td></td>
<td>GHz</td>
</tr>
<tr>
<td>Delay Control Voltage (VDCP)</td>
<td>VCC-0.6</td>
<td>VCC+0.6</td>
<td></td>
<td></td>
<td>V</td>
</tr>
</tbody>
</table>

[1] The UI stands for unit interval

---

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D
HMC877* PRODUCT PAGE QUICK LINKS

Last Content Update: 02/23/2017

COMPARABLE PARTS
View a parametric search of comparable parts.

EVALUATION KITS
• HMC877LC3 Evaluation Board

DOCUMENTATION
Data Sheet
• HMC877 Data Sheet

DESIGN RESOURCES
• HMC877 Material Declaration
• PCN-PDN Information
• Quality And Reliability
• Symbols and Footprints

DISCUSSIONS
View all HMC877 EngineerZone Discussions.

SAMPLE AND BUY
Visit the product page to see pricing options.

TECHNICAL SUPPORT
Submit a technical question or find your regional support number.

DOCUMENT FEEDBACK
Submit feedback for this data sheet.

This page is dynamically generated by Analog Devices, Inc., and inserted into this data sheet. A dynamic change to the content on this page will not trigger a change to either the revision number or the content of the product data sheet. This dynamic page may be frequently modified.
BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

Electrical Specifications, $T_A = +25^\circ C, Vcc = 3.3V, GND=ODWN = 0V$ (Continued)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Conditions</th>
<th>Min.</th>
<th>Typ.</th>
<th>Max.</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output Amplitude Control Voltage (VAC)</td>
<td>Single-Ended, peak-to-peak @ 10 GHz</td>
<td>0.65</td>
<td>1.5</td>
<td>1.8</td>
<td>V</td>
</tr>
<tr>
<td></td>
<td>Single-Ended, peak-to-peak @ 16 GHz</td>
<td>490</td>
<td>648</td>
<td>mVp-p</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Ended, peak-to-peak @ 22 GHz</td>
<td>420</td>
<td>520</td>
<td>mVp-p</td>
<td></td>
</tr>
<tr>
<td>Input Amplitude Range</td>
<td>Differential</td>
<td>200</td>
<td>1200</td>
<td>mVp-p</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Single-Ended</td>
<td>100</td>
<td>600</td>
<td>mVp-p</td>
<td></td>
</tr>
<tr>
<td>Harmonic Suppression*</td>
<td>VDCP=VDCN=3.3 V @ 22 GHz ($f_{in}/2$)</td>
<td>26</td>
<td>48</td>
<td>dBc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VDCP=VDCN=3.3 V @ 8 GHz ($f_{in}/8$)</td>
<td>28</td>
<td>62</td>
<td>dBc</td>
<td></td>
</tr>
<tr>
<td></td>
<td>VDCP=VDCN=3.3 V @ 16 GHz ($f_{in}/16$)</td>
<td>30</td>
<td>32</td>
<td>36</td>
<td>dBc</td>
</tr>
<tr>
<td>Input Return Loss</td>
<td>frequency &lt; 23 GHz</td>
<td>12</td>
<td>dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Output Return Loss</td>
<td>frequency &lt; 23 GHz</td>
<td>6</td>
<td>dB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RMS Jitter</td>
<td>@ 16 GHz</td>
<td>0.45</td>
<td>ps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rise Time, $t_r$</td>
<td>@ 16 GHz</td>
<td>10</td>
<td>ps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fall Time, $t_f$</td>
<td>@ 16 GHz</td>
<td>11</td>
<td>ps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Delay Temperature Sensitivity</td>
<td>@ 16 GHz</td>
<td>0.05</td>
<td>deg/°C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Propagation Delay, $t_d$</td>
<td>VDCP=2.7V, VDCN=3.3V @ 16GHz (Relative to zero phase shift)</td>
<td>140</td>
<td>ps</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Harmonic suppression measurements are taken for single-ended inputs and outputs.

Time Delay vs. Frequency $^[1][2][3]$

Time Delay vs. Bias Voltage $^[2][3][4]$

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.
HMC877LC3

**BROADBAND TIME DELAY & PHASE SHIFTER**  
SMT, 8 - 23 GHz

### Time Delay vs. Temperature

![Time Delay vs. Temperature graph]

- **Time Delay vs. Temperature @ VDCP=3.3V (Relative to VDCP=VCC-0.6V)**

### Time Delay vs. Control Voltage

![Time Delay vs. Control Voltage graph]

- **Time Delay vs. Control Voltage @ VDCP=2.7V to 3.9V with 0.1V step**

### Phase Shift vs. Frequency

![Phase Shift vs. Frequency graph]

### Phase Shift vs. Bias Voltage

![Phase Shift vs. Bias Voltage graph]

### Phase Shift vs. Temperature

![Phase Shift vs. Temperature graph]

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices.

[1] VCC = 3.3V  
[2] ODWN= 0 V, VDCN=VCC  
[3] On the x-axis differential control voltage represents VDCP-VDCN voltage  
[4] Input Frequency: 20 GHz

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106  
Phone: 781-329-4700 • Order online at www.analog.com  
Application Support: Phone: 1-800-ANALOG-D
HMC877LC3

BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

Phase Shift vs. Control Voltage
@ VDCP=2.7V to 3.9V with 0.1V step \(^1\)[2][3]

Phase Shift vs. Temperature @VDCP=3.3V
(Relative to VDCP=VCC-0.6V) \(^1\)[2]

Phase Error vs. Control Voltage
@ Fmean=16 GHz \(^1\)[2][3][4]

Phase Shift vs. Control Voltage
@ 10 GHz \(^1\)[2][3][4]

Phase Shift vs. Control Voltage
@ 22 GHz \(^1\)[2][3][4]

DC Current vs. Temperature \(^2\)[5]

[1] VCC = 3.3V
[2] ODWN= 0 V, VDCN=VCC
[4] VDCP-VDCN=-0.6V is taken as reference level
[5] VDCP=3.3V and input frequency is 20 GHz

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D
HMC877LC3

BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

Single-Ended Output Swing vs. Supply Voltage [1][2][3]

![Graph showing Single-Ended Output Swing vs. Supply Voltage]

Single-Ended Output Swing vs. Frequency [1][3][4]

![Graph showing Single-Ended Output Swing vs. Frequency]

Single-Ended Output Swing vs. Control Voltage [1][4][5]

![Graph showing Single-Ended Output Swing vs. Control Voltage]

Duty Cycle Distortion @ 16 GHz [1][4][5]

![Graph showing Duty Cycle Distortion @ 16 GHz]

Single-Ended Output Swing vs. Amplitude Control Voltage [1][3][4][6]

![Graph showing Single-Ended Output Swing vs. Amplitude Control Voltage]

[1] ODWN= 0V, VDCN=VCC
[2] Input Frequency: 20 GHz
[3] VDCP=3.3V
[4] VCC=3.3V
[5] On the x-axis differential control voltage represents VDCP-VDCN voltage
[6] The input frequency is 10 GHz

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.
BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

Rise Time vs. Temperature @ 16 GHz

Fall Time vs. Temperature @ 16 GHz

RMS Jitter vs. Temperature @ 16 GHz

RMS Jitter vs. Bias Voltage @ 16 GHz

P_{fin}-P_{fin/2} Output Power Difference vs. Control Voltage

P_{fin}-P_{3fin/2} Output Power Difference vs. Control Voltage

[1] ODWN= 0V, VDCN=VCC
[2] VCC=3.3V
[3] On the x-axis differential control voltage represents VDCP-VDCN voltage
[4] Source jitter was not deembedded
[5] fin is the fundamental frequency

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices.

Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc.,
One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D
HMC877LC3

BROADBAND TIME DELAY & PHASE SHIFTER
SMT, 8 - 23 GHz

Second Harmonic vs. Control Voltage [1][2]

Input Return Loss vs. Frequency [1][4]

Output Return Loss vs. Frequency [1][4]

Modulation Signal Bandwidth vs. Temperature [1][3]

[1] VCC= 3.3 V, ODWN=0V
[2] fin is the fundamental frequency
[3] -6.8 dBm input power was applied to VDCP, VDCN is 50 Ohms terminated and fin=15 GHz
[4] VDCP=VDCN=VCC

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106 Phone: 781-329-4700 • Order online at www.analog.com Application Support: Phone: 1-800-ANALOG-D
**Output Eye Diagram Snapshot for 15 GHz Input Signal**

- Time Scale: 10 ps/div
- Amplitude Scale: 81.8 mV/div
- Test Conditions:
  - VCC=3.3 V, ODWN=0 V
  - VDCP = 300 mVpp @ 1 MHz
  - VDCN is 50 Ohms terminated
- Measurement Results:
  - RMS Jitter: 0.3 ps
  - Peak to peak Jitter: 1.78 ps
  - Rise Time: 11.78 ps
  - Fall Time: 11.78 ps

**Output Eye Diagram Continuous Snapshot for 15 GHz Input Signal**

- Time Scale: 10 ps/div
- Amplitude Scale: 81.8 mV/div
- Test Conditions:
  - VCC=3.3 V, ODWN=0 V
  - VDCP = 300 mVpp @ 1 MHz
  - VDCN is 50 Ohms terminated
- Measurement Result:
  - 26.8 ps (0.4 UI)
### Absolute Maximum Ratings

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Supply Voltage (Vcc)</td>
<td>-0.5V to +3.75V</td>
</tr>
<tr>
<td>Input Voltage (V&lt;sub&gt;IN&lt;/sub&gt;), Output Voltage (V&lt;sub&gt;OUT&lt;/sub&gt;)</td>
<td>Vcc -1.2V to Vcc+0.6V</td>
</tr>
<tr>
<td>Control Voltage (V&lt;sub&gt;DCP&lt;/sub&gt;), Delay Control Voltage Range Adjustment (L&lt;sub&gt;D&lt;/sub&gt;), Amplitude Control Voltage (V&lt;sub&gt;AC&lt;/sub&gt;)</td>
<td>0 to Vcc+0.6V</td>
</tr>
<tr>
<td>Channel Temperature (T&lt;sub&gt;C&lt;/sub&gt;)</td>
<td>125 °C</td>
</tr>
<tr>
<td>Continuous Pdiss (T = 85 °C)</td>
<td>1.43 W</td>
</tr>
<tr>
<td>(derate 35.8 mW/°C above 85 °C)</td>
<td></td>
</tr>
<tr>
<td>Thermal Resistance (junction to ground paddle)</td>
<td>27.9 °C/W</td>
</tr>
<tr>
<td>Storage Temperature</td>
<td>-65 to +125 °C</td>
</tr>
<tr>
<td>Operating Temperature</td>
<td>-40 to +85°C</td>
</tr>
<tr>
<td>ESD Sensitivity (HBM)</td>
<td>Class 1A</td>
</tr>
</tbody>
</table>

**ELECTROSTATIC SENSITIVE DEVICE**

**OBSERVE HANDLING PRECAUTIONS**
HMC877LC3

BROADBAND TIME DELAY & PHASE SHIFTER

SMT, 8 - 23 GHz

Outline Drawing

Outline Drawing

NOTES:
1. PACKAGE BODY MATERIAL: ALUMINA
2. LEAD AND GROUND PADDLE PLATING: 30-80 MICROINCHES GOLD OVER 50 MICRO-
INCHES MINIMUM NICKEL.
3. DIMENSIONS ARE IN INCHES [MILLIMETERS].
4. LEAD SPACING TOLERANCE IS NON-CUMULATIVE.
5. CHARACTERS TO BE BLACK INK MARKED WITH .018"MIN to .030"MAX HEIGHT
REQUIREMENTS. UTILIZE MAXIMUM CHARACTER HEIGHT BASED ON LID DIMENSIONS
AND BEST FIT, LOCATE APPROX. AS SHOWN.
6. PACKAGE WARP SHALL NOT EXCEED 0.05mm DATUM -C-
7. ALL GROUND LEADS AND GROUND PADDLE MUST BE SOLDERED TO PCB RF
GROUND.

Package Information

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Package Body Material</th>
<th>Lead Finish</th>
<th>MSL Rating</th>
<th>Package Marking (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMC877LC3</td>
<td>Alumina, White</td>
<td>Gold over Nickel</td>
<td>MSL3 [1]</td>
<td>H877 XXXX</td>
</tr>
</tbody>
</table>

[1] Max peak reflow temperature of 260 °C
[2] 4-Digit lot number XXXX

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D
## Pin Descriptions

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Function</th>
<th>Description</th>
<th>Interface Schematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 4-5, 8-9,12</td>
<td>GND</td>
<td>Signal grounds should be connected to 0V. Ground paddle must be connected to DC ground</td>
<td><img src="image1.png" alt="Interface Schematic 1" /></td>
</tr>
<tr>
<td>2, 3, 6, 7</td>
<td>INP, INN, VDCP, VDCN</td>
<td>Differential signal inputs.</td>
<td><img src="image2.png" alt="Interface Schematic 2" /></td>
</tr>
<tr>
<td>10, 11</td>
<td>QN, QP</td>
<td>Differential signal outputs.</td>
<td><img src="image3.png" alt="Interface Schematic 3" /></td>
</tr>
<tr>
<td>13</td>
<td>VAC</td>
<td>The output amplitude control pin.</td>
<td><img src="image4.png" alt="Interface Schematic 4" /></td>
</tr>
<tr>
<td>14</td>
<td>ODWN</td>
<td>Enable pin of the output. It should be connected to GND to enable the part. When it is connected to VCC or floated the output is set to VCC.</td>
<td><img src="image5.png" alt="Interface Schematic 5" /></td>
</tr>
<tr>
<td>15</td>
<td>VCC</td>
<td>The supply voltage of the part.</td>
<td><img src="image6.png" alt="Interface Schematic 6" /></td>
</tr>
</tbody>
</table>
Pin Descriptions (Continued)

<table>
<thead>
<tr>
<th>Pin Number</th>
<th>Function</th>
<th>Description</th>
<th>Interface Schematic</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>LC</td>
<td>This pin enables the control of the linearity level of Control Voltage vs. Phase Shift/Time Delay. Compromise is between linearity level and wideness of the Phase Shift/Time Delay tuning range. For optimum tuning range and linearity balance, R2=R3 are chosen as 4.7 kOhms.</td>
<td><img src="image" alt="Interface Schematic" /></td>
</tr>
</tbody>
</table>

Application Circuit

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.

For price, delivery, and to place orders: Analog Devices, Inc., One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106
Phone: 781-329-4700 • Order online at www.analog.com
Application Support: Phone: 1-800-ANALOG-D
**BROADBAND TIME DELAY & PHASE SHIFTER**
**SMT, 8 - 23 GHz**

**Evaluation PCB**

The circuit board used in the application should use RF circuit design techniques. Signal lines should have 50 Ohm impedance while the package ground leads and exposed paddle should be connected directly to the ground plane similar to that shown. A sufficient number of via holes should be used to connect the top and bottom ground planes. The evaluation board should be mounted to an appropriate heat sink. The evaluation circuit board shown is available from Hittite upon request.

**List of Materials for Evaluation PCB EVAL01-HMC877LC3**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>J1, J2, J5-J6</td>
<td>K Connector</td>
</tr>
<tr>
<td>J3-J4</td>
<td>SMA Connector</td>
</tr>
<tr>
<td>TP1-TP5</td>
<td>DC Pin</td>
</tr>
<tr>
<td>C1-C3</td>
<td>1000 pF Capacitor, 0402 Pkg.</td>
</tr>
<tr>
<td>C5-C7</td>
<td>0.1 µF Capacitor, 0402 Pkg.</td>
</tr>
<tr>
<td>C8-C9</td>
<td>4.7 µF Capacitor, Tantalum</td>
</tr>
<tr>
<td>R2-R3</td>
<td>4.7 kOhm Resistor, 0402 Pkg.</td>
</tr>
<tr>
<td>U1</td>
<td>HMC877LC3 Analog Phase Shifter/ Broadband Time Delay</td>
</tr>
<tr>
<td>PCB [2]</td>
<td>600-00064-00 Evaluation Board</td>
</tr>
</tbody>
</table>

[1] Reference this number when ordering complete evaluation PCB


---

Information furnished by Analog Devices is believed to be accurate and reliable. However, no responsibility is assumed by Analog Devices for its use, nor for any infringements of patents or other rights of third parties that may result from its use. Specifications subject to change without notice. No license is granted by implication or otherwise under any patent or patent rights of Analog Devices. Trademarks and registered trademarks are the property of their respective owners.