DEMO MANUAL DC2095A

LTC6655
0.25ppm Noise, Low Drift
Precision Reference

DESCRIPTION

Demonstration circuit 2095A features the LTC®6655, a precision low drift reference packaged in a hermetic LS8. The demonstration circuit is available with the 2.5V, 4.096V or 5V output voltage option parts.

The demo board circuit shows the optimal layout for overall reference performance. The LTC6655 has a maximum drift of 2ppm/°C and an initial accuracy of ±0.025%. The hermetic package further improves the Long Term Drift performance of the reference to 20ppm/√kHzr. Another benefit of the hermetic package is improved humidity performance. Testing has shown that humidity can cause the PCB to deform and stress the package. To reduce this effect the ground plane is removed directly under the reference. Doing this reduces output voltage shift as a result of humidity to less than 10ppm.

Design files for this circuit board are available at http://www.linear.com/demo/DC2095A

PERFORMANCE SUMMARY

Specifications are at \( T_A = 25°C \)

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>UNITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>V_IN</td>
<td>Input Supply Range</td>
<td>( V_{OUT} + 0.5 )</td>
<td>13</td>
<td></td>
<td></td>
<td>V</td>
</tr>
<tr>
<td>V_OUT</td>
<td>Output Voltage Accuracy</td>
<td>−0.025</td>
<td>+0.025</td>
<td></td>
<td></td>
<td>%</td>
</tr>
<tr>
<td>Long-Term Drift of Output Voltage</td>
<td></td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td>ppm/√kHzr</td>
</tr>
<tr>
<td>I_O</td>
<td>Supply Current</td>
<td></td>
<td>5</td>
<td></td>
<td></td>
<td>mA</td>
</tr>
</tbody>
</table>

Lin, LTC, LTM, Linear Technology and the Linear logo are registered trademarks of Linear Technology Corporation. All other trademarks are the property of their respective owners.
**QUICK START PROCEDURE**

With the demonstration circuit, it is easy to set up and evaluate the performance of the LTC6655. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. With the power off, connect the power supply positive to $V_{IN}$ and the common to GND. With default settings, the supply can range from $V_{OUT} +0.5V$ to 13V.

2. Connect a DVM to the $V_{OUT}$ turret with the common connection connected to ground.

3. Turn on power supply and confirm reference operation.

---

**Figure 1. Test Setup**

<table>
<thead>
<tr>
<th>ASSY</th>
<th>U1</th>
<th>$V_{OUT}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>-A</td>
<td>LTC6655BHL 8-2.5PB</td>
<td>2.5V</td>
</tr>
<tr>
<td>-B</td>
<td>LTC6655BHL 8-4.096PB</td>
<td>4.0V</td>
</tr>
<tr>
<td>-C</td>
<td>LTC6655BHL 8-5PB</td>
<td>5.0V</td>
</tr>
</tbody>
</table>
part. Embedded in the caption of the diagram, the text reads:

**CUSTOMER NOTICE**

LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.

**APPROVALS**

- Title: Schematic
- IC No.: LTC6655B HLS8 - *
- SIZE: N/A
- DATE: Thursday, October 09, 2014
- SHEET 1 OF 1

**REVISION HISTORY**

<table>
<thead>
<tr>
<th>ECO</th>
<th>REV</th>
<th>DESCRIPTION</th>
<th>APPROVED</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>PRODUCTION</td>
<td>CUYLER L</td>
<td>10-09-2014</td>
</tr>
</tbody>
</table>

**ASSEMBLY TYPE**

<table>
<thead>
<tr>
<th>ASSY TYPE</th>
<th>LTC Part #</th>
<th>VOUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>LTC6655B HLS8-2.5#PBF</td>
<td>2.5V</td>
</tr>
<tr>
<td>B</td>
<td>LTC6655B HLS8-4.09#PBF</td>
<td>4V</td>
</tr>
<tr>
<td>C</td>
<td>LTC6655B HLS8-5#PBF</td>
<td>5V</td>
</tr>
</tbody>
</table>

**Diagram Notes**

- VIN range: 0.5V<Vout]<Vin<13V
- GND connection
- Linear Technology DEMO MANUAL DC2095A

**Diagram Schematic**

Diagram includes a schematic with components labeled and connections made. The schematic shows a circuit with interconnected parts, including capacitors (C1: 0.1uF 0603, C2: 10uF 1206), resistors (R1: OPT 1206), and operational amplifiers (U1: SHDN). Connections are marked with asterisks (*) indicating assembly types.
DEMO MANUAL DC2095A

DEMONSTRATION BOARD IMPORTANT NOTICE

Linear Technology Corporation (LTC) provides the enclosed product(s) under the following AS IS conditions:

This demonstration board (DEMO BOARD) kit being sold or provided by Linear Technology is intended for use for ENGINEERING DEVELOPMENT OR EVALUATION PURPOSES ONLY and is not provided by LTC for commercial use. As such, the DEMO BOARD herein may not be complete in terms of required design-, marketing-, and/or manufacturing-related protective considerations, including but not limited to product safety measures typically found in finished commercial goods. As a prototype, this product does not fall within the scope of the European Union directive on electromagnetic compatibility and therefore may or may not meet the technical requirements of the directive, or other regulations.

If this evaluation kit does not meet the specifications recited in the DEMO BOARD manual the kit may be returned within 30 days from the date of delivery for a full refund. THE FOREGOING WARRANTY IS THE EXCLUSIVE WARRANTY MADE BY THE SELLER TO BUYER AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED, IMPLIED, OR STATUTORY, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. EXCEPT TO THE EXTENT OF THIS INDEMNITY, NEITHER PARTY SHALL BE LIABLE TO THE OTHER FOR ANY INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES.

The user assumes all responsibility and liability for proper and safe handling of the goods. Further, the user releases LTC from all claims arising from the handling or use of the goods. Due to the open construction of the product, it is the user’s responsibility to take any and all appropriate precautions with regard to electrostatic discharge. Also be aware that the products herein may not be regulatory compliant or agency certified (FCC, UL, CE, etc.).

No License is granted under any patent right or other intellectual property whatsoever. LTC assumes no liability for applications assistance, customer product design, software performance, or infringement of patents or any other intellectual property rights of any kind.

LTC currently services a variety of customers for products around the world, and therefore this transaction is not exclusive.

Please read the DEMO BOARD manual prior to handling the product. Persons handling this product must have electronics training and observe good laboratory practice standards. Common sense is encouraged.

This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

Mailing Address:

Linear Technology
1630 McCarthy Blvd.
Milpitas, CA 95035

Copyright © 2004, Linear Technology Corporation