DEMO MANUAL
DC2784B-B

LTM4700
High Current, PolyPhase® Step-Down
Power μModule Supply with Digital Power
System Management 3 × LTM4700, 300A

DESCRIPTION

Demonstration circuit 2784B-B is a high efficiency, high
density, μModule® regulator with 4.5V to 16V input range. The output voltage is adjustable from 0.5V to 1.8V and it
can supply 300A maximum load current. The demo board
has three LTM®4700 μModule regulators, which is a dual
50A or single 100A step-down regulator with digital power
system management. Please see LTM4700 data sheet for
more detailed information.

DC2784B-B powers up to default settings and produces
power based on configuration resistors without the need
for any serial bus communication. This allows easy evalua-
tion of the DC/DC converter. To fully explore the extensive
power system management features of the part, download
the GUI software LTpowerPlay® onto your PC and use
ADI’s I2C/SMBus/PMBus dongle DC1613A to connect to
the board. LTpowerPlay allows the user to reconfigure the
part on-the-fly and store the configuration in EEPROM,
view telemetry of voltage, current, temperature and
fault status.

GUI Download

The software can be downloaded from LTpowerPlay.
For more details and instructions of LTpowerPlay, please
refer to LTpowerPlay GUI for LTM4700 Quick Start Guide.

Design files for this circuit board are available.

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BOARD PHOTO

Part marking is either ink mark or laser mark

Figure 1. 3 × LTM4700; 300A DC2784B-B Demo Circuit
DEMO MANUAL
DC2784B-B

**QUICK START PROCEDURE**

Demonstration circuit 2784B-B is easy to set up to evaluate the performance of the LT4700EY. Refer to Figure 2 for the proper measurement equipment setup and follow the procedure below.

1. With power off, connect the input power supply to VIN (4.5V to 16V) and GND (input return).
2. Connect the 1.0V output load between VOUT and GND (initial load: no load).
4. Turn on the input power supply and check for the proper output voltages. VOUT should be 1.0V ±0.5%.
5. Once the proper output voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage and other parameters.
6. Connect the dongle and control the output voltages from the GUI. See “LTpowerPlay GUI for the LTM4700 Quick Start Guide” for details.

**NOTE:** Internal bias circuit is enabled when VIN >7V and JP3 is ON.

**NOTE:** When measuring the output or input voltage ripple, do not use the long ground lead on the oscilloscope probe. See Figure 3 for the proper scope probe technique. Short, stiff leads need to be soldered to the (+) and (−) terminals of an output capacitor. The probe’s ground ring needs to touch the (−) lead and the probe tip needs to touch the (+) lead.

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### PERFORMANCE SUMMARY
Specifications are at $T_A = 25^\circ C$

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>CONDITIONS</th>
<th>MIN</th>
<th>TYP</th>
<th>MAX</th>
<th>VALUE</th>
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<tr>
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<td>16</td>
<td></td>
<td>V</td>
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<td>Output Voltage, $V_{OUT}$</td>
<td>$V_{IN} = 4.5V$ to $16V$, $I_{OUT} = 0A$ to $300A$</td>
<td>0.5</td>
<td>1.0</td>
<td>1.8</td>
<td>V</td>
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<td>Maximum Output Current, $I_{OUT}$</td>
<td>$V_{IN} = 4.5V$ to $16V$, $V_{OUT} = 0.5V$ to $1.8V$</td>
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<td></td>
<td>A</td>
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<td>Typical Efficiency</td>
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<td>%</td>
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<td>kHz</td>
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**Table 1.** LTM4700 Demo Boards for Up to 400A Point-of-Load Regulation

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<th>MAXIMUM OUTPUT CURRENT</th>
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<th>NUMBER OF LTM4700 µModule REGULATORS ON THE BOARD</th>
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<td>1</td>
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<td>DC2702B-B</td>
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<td>400A</td>
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<td>4</td>
<td>DC2784B-C</td>
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</table>
QUICK START PROCEDURE

Figure 2. Proper Measurement Equipment Setup

Figure 3. Measuring Output Voltage Ripple
QUICK START PROCEDURE

Connecting a PC to DC2784B-B

You can use a PC to reconfigure the power management features of the LTM4700 such as: nominal $V_{OUT}$, margin set points, OV/UV limits, temperature fault limits, sequencing parameters, the fault log, fault responses, GPIOs and other functionalities. The DC1613A dongle may be plugged when $V_{IN}$ is present.

Figure 4. Demo Setup with PC
QUICK START PROCEDURE

Figure 5. Efficiency vs Load Current at $V_{IN} = 12V$ (RUNP is ON)

Figure 6. Output Voltage vs Load Current at $V_{IN} = 12V$, $V_{OUT} = 1.0V$

Figure 7. Output Voltage Ripple at $V_{IN} = 12V$, $V_{OUT} = 1.0V$, $I_{OUT} = 300A$
QUICK START PROCEDURE

Figure 8. Thermal at $V_{IN} = 12V$, $V_{OUT} = 1.0V$, $I_{OUT} = 195A$, $T_A = 25^\circ C$, No Airflow

Figure 9. Thermal at $V_{IN} = 12V$, $V_{OUT} = 1.0V$, $I_{OUT} = 300A$, $T_A = 25^\circ C$, 400LFM Airflow
LTpowerPlay is a powerful Windows-based development environment that supports Analog Devices power system management ICs and µModules, including the LTM4675, LTM4676, LTM4677, LTM4678, LTC3880, LTC3882 and LTC3883. The software supports a variety of different tasks. You can use LTpowerPlay to evaluate Analog Devices ICs by connecting to a demo board system. LTpowerPlay can also be used in an offline mode (with no hardware present) in order to build a multichip configuration file that can be saved and reloaded at a later time. LTpowerPlay provides unprecedented diagnostic and debug features. It becomes a valuable diagnostic tool during board bring-up to program or tweak the power management scheme in a system, or to diagnose power issues when bringing up rails. LTpowerPlay utilizes the DC1613A USB-to-SMBus controller to communicate with one of many potential targets, including the LTM4675, LTM4676, LTM4677, LTM4678, LTC3880, LTC3882, LTC3883’s demo system, or a customer board. The software also provides an automatic update feature to keep the software current with the latest set of device drivers and documentation. The LTpowerPlay software can be downloaded from LTpowerPlay.

To access technical support documents for ADI Digital Power Products visit the LTpowerPlay Help menu. Online help also available through the LTpowerPlay.

Figure 10. LTpowerPlay Main Interface
**LTpowerPlay QUICK START PROCEDURE**

The following procedure describes how to use LTpowerPlay to monitor and change the settings of LTM4700.

1. Download and install the LTpowerPlay GUI: **LTpowerPlay**

2. Launch the LTpowerPlay GUI.
   
a. The GUI should automatically identify the DC2784B-B. The system tree on the left hand side should look like this:

![System Tree](image)

b. A green message box shows for a few seconds in the lower left hand corner, confirming that LTM4700 is communicating:

![Green Message Box](image)

c. In the Toolbar, click the “R” (RAM to PC) icon to read the RAM from the LTM4700. This reads the configuration from the RAM of LTM4700 and loads it into the GUI.

![Toolbar](image)

d. If you want to change the output voltage to a different value, like 0.8V. In the Config tab, type in 0.8 in the VOUT_COMMAND box, like this:

![Config Tab](image)

Then, click the “W” (PC to RAM) icon to write these register values to the LTM4700. After finishing this step, you will see the output voltage will change to 0.8V.

![Output Voltage Change](image)

If the write is successful, you will see the following message:

![Success Message](image)

e. You can save the changes into the NVM. In the toolbar, click “RAM to NVVM” button, as following

![RAM to NVVM](image)

f. Save the demo board configuration to a (*.proj) file. Click the Save icon and save the file. Name it whatever you want.
## PARTS LIST

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<thead>
<tr>
<th>ITEM</th>
<th>QTY</th>
<th>REFERENCE</th>
<th>PART DESCRIPTION</th>
<th>MANUFACTURER/PART NUMBER</th>
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**Required Circuit Components**
# Parts List

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<th>ITEM</th>
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Additional Demo Board Circuit Components

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<th>PART DESCRIPTION</th>
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# PARTS LIST

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<td>R8, R27-R31, R109, R117, R120, R121, R127, R130, R134, R138-R140, R144, R145, R150-R152, R155, R157, R160, R208, R216, R218, R219, R221, R226, R238-R245</td>
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<td>R9, R91, R92, R112, R114, R132, R135, R136, R146, R147, R149, R158, R202, R211, R215, R222, R227</td>
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<td>COUT74, COUT75, COUT78, COUT80, COUT81, COUT88, COUT95, COUT96</td>
<td>OPT, D3L</td>
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**Hardware: For Demo Board Only**

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<td>E1-E21, E23-E26</td>
<td>TEST POINT, TURRET, 0.064&quot;, MTG. HOLE</td>
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<td>PENNENGINEERING, KFH-032-10ET</td>
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<td>NUT, HEX, STEEL, ZINC PLATE, 10-32</td>
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<td>CONN., HDR, SHROUDED, 1×4, 2mm, R/A THT STR</td>
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<td>STANDOFF, NYLON, SNAP-ON, 0.50’</td>
<td>WURTH ELEKTRONIK, 702935000</td>
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ANALOG DEVICES HAS MADE A BEST EFFORT TO DESIGN A PCB DES.

DEVICES CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER’S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT TITLE: SCHEMATIC MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT ANALOG DEVICES APPLICATIONS ENGINEERING FOR ASSISTANCE.

THIS CIRCUIT IS PROPRIETARY TO ANALOG DEVICES AND THIS CIRCUIT IS PROPRIETARY TO ANALOG DEVICES AND THIS CIRCUIT IS PROPRIETARY TO ANALOG DEVICES AND

Monday, July 26, 2021

4 6

SIZE: N/A DATE: SHEET OF

DC2784B-B
SCHEMATIC DIAGRAM

ALL PARTS ON THIS PAGE ARE FOR DEMO ONLY, NOT NEEDED IN CUSTOMER DESIGN.

OPTIONAL CIRCUIT FOR PROGRAMMING WITHOUT VIN.

THIS CIRCUIT IS PROPRIETARY TO ANALOG DEVICES AND SUPPLIED FOR USE WITH ANALOG DEVICES PARTS.

ANALOG DEVICES 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 ANALOG DEVICES APPLICATIONS ENGINEERING FOR ASSISTANCE.
### REVISION HISTORY

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ESD Caution
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