

# LTM8020

## 36V, 200mA DC/DC μModule Regulator

### DESCRIPTION

Demonstration circuit DC1194A features the LTM<sup>®</sup>8020, a 200mA DC/DC step-down μModule<sup>®</sup> regulator. The board is preset to deliver a 3.3V output at up to 200mA load current from an input voltage of up to 36V. The output voltage may be modified by simply changing one resistor. The LTM8020 data sheet must be read in conjunction

with this demo manual prior to working on or modifying demo circuit DC1194A.

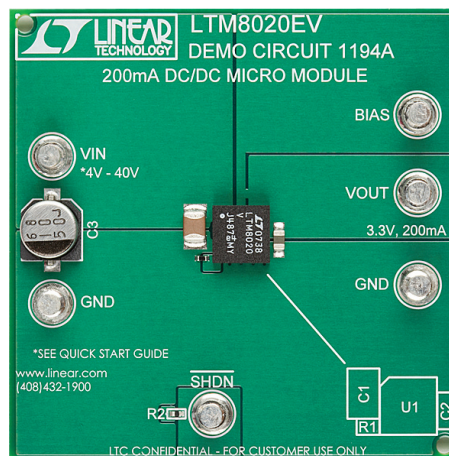
**Design files for this circuit board are available at <http://www.linear.com/demo>**

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### PERFORMANCE SUMMARY

| PARAMETER                 | CONDITIONS / NOTES                                       | VALUE              |
|---------------------------|--|--------------------|
| Input Voltage Range       | $V_{OUT} = 3.3V$ , Device Operating                      | 4.5V to 36V        |
| Output Voltage, $V_{OUT}$ | $R1 = 30.1k$   | 3.3V               |
| Maximum Output Current    |  | 200mA              |
| Efficiency                | $V_{IN} = 5V$ , $V_{OUT} = 3.3V$ , $I_{OUT} = 100mA$     | 85% (See Figure 2) |
| Light Load Power Loss     | $V_{IN} = 12V$ , $V_{OUT} = 3.3V$ , $I_{OUT} = 100\mu A$ | 400μW              |

### BOARD PHOTO



## DESCRIPTION

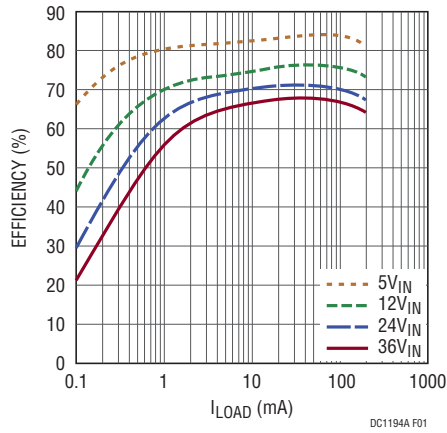


Figure 1. LTM8020EV Efficiency 3.3V<sub>OUT</sub>

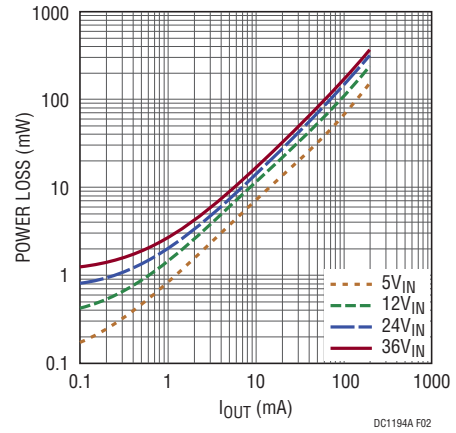


Figure 2. LTM8020EV Power Loss 3.3V<sub>OUT</sub>

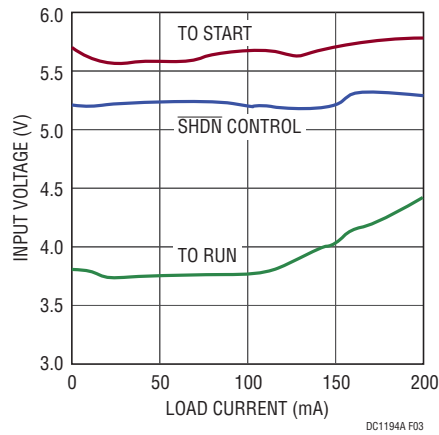


Figure 3. LTM8020EV Typical Minimum V<sub>IN</sub> 3.3V<sub>OUT</sub>

## QUICK START PROCEDURE

Demonstration circuit 1194A is easy to set up to evaluate the performance of the LTM8020. Refer to Figure 4 for proper measurement equipment setup and follow the procedure below:

**NOTE:** Do not hot-plug the  $V_{IN}$  terminal at high input voltage. The absolute maximum voltage on  $V_{IN}$  is 40V and hot-plugging a power supply through wire leads to the demonstration circuit can cause the voltage on the extremely low ESR ceramic input capacitor to ring to twice its DC value. In order to protect the IC, a higher ESR aluminum electrolytic capacitor is placed at the input terminals. This may protect against some, but not all, input transients due to hot-plugging with a power supply. See Application Note 88 for more details.

1. Connect the power supply (with power off), load, and meters as shown in Figure 4.
2. After all connections are made, turn on input power and verify that the output voltage is 3.3V.

**NOTE:** If the output voltage is too low, temporarily disconnect the load to make sure that the load is not set too high.

3. Once the proper output voltage is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

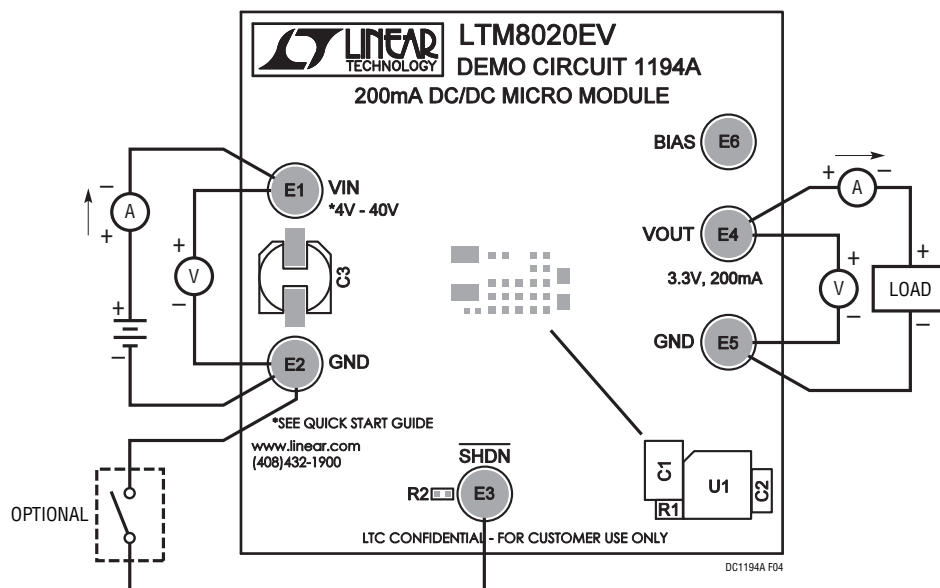


Figure 4. Proper Measurement Equipment Setup

# DEMO MANUAL DC1194A

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## PARTS LIST

| ITEM                                  | QTY | REFERENCE              | PART DESCRIPTION                  | MANUFACTURER'S PART NUMBER           |
|---------------------------------------|-----|------------------------|-----------------------------------|--------------------------------------|
| <b>Required Circuit Components</b>    |     |                        |                                   |                                      |
| 1                                     | 1   | C1                     | CAP, 1210 2.2 $\mu$ F 10% 50V X7R | TDK C3225X7R1H225K                   |
| 5                                     | 1   | R1                     | RES, 0402 301k 1% 1/16W           | VISHAY CRCW0402301KFKED              |
| 6                                     | 1   | R2                     | RES, 0402 100k 5% 1/16W           | VISHAY CRCW0402100KJNED              |
| 7                                     | 1   | U1                     | IC, MODULE                        | LINEAR TECH. LTM8020EV#PBF           |
| <b>Optional Electrical Components</b> |     |                        |                                   |                                      |
| 2                                     | 1   | C2                     | CAP, 0805 22 $\mu$ F 20% 6.3V X7R | TAIYO YUDEN JDK212BJ226MD-T          |
| 3                                     | 1   | C3                     | CAP, 10 $\mu$ F 20% 50V ALUM      | SANYO 50CE10BJ (Now SUNCON 50CE10BJ) |
| <b>Hardware</b>                       |     |                        |                                   |                                      |
| 4                                     | 6   | E1, E2, E3, E4, E5, E6 | TURRET                            | MILL-MAX 2501-2-00-80-00-00-07-0     |



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

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