

LTC4425EDD: Linear Supercap Charger With Current-Limited Ideal Diode And V/I Monitor

DESCRIPTION

Demonstration Circuit DC1589A is a Linear Supercap Charger with Current-Limited Ideal Diode and V/I Monitor, featuring the LTC[®]4425.

PERFORMANCE SUMMARY Specifications are at T_a = 25°C

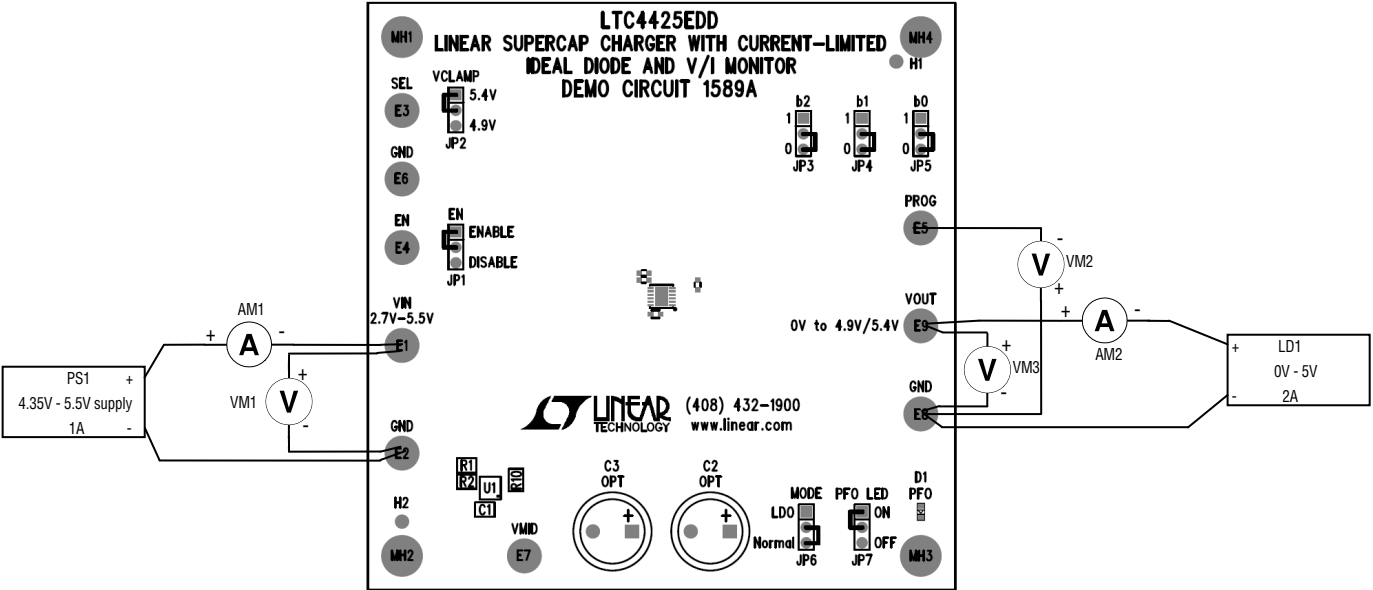
| SYMBOL | PARAMETER | CONDITIONS | MIN | TYP | MAX | UNITS |
|---------------------|-------------------------------|------------|-----|-----|-----|-------|
| V _{in} | Input Voltage Range | | 2.7 | | 5.5 | V |
| I _{charge} | Supercap Charge current | | | | 2 | A |
| V _{OUT} | Supercap Stack Output Voltage | | 1.2 | | 5.4 | V |
| V(MID) | Supercap Midpoint Voltage | | 0.6 | | 2.7 | V |

QUICK START PROCEDURE

Refer to Figure 1 for the proper measurement equipment setup and jumper settings and follow the procedure below.

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the VBUS or VOUT(x) and GND terminals. See Figure 2 for proper scope probe technique.

1. Set b[2-0] jumpers (JP3, JP4, JP5) to “1”. Set MODE (JP6) to “LDO”. Set LD1 to 0A, and PS1 to 5V. Observe VOUT (VM3) = 3.3V, I(VIN) (AM1) = 2A, and V(PROG) (VM2) = 1V. Note: The supercapacitor COUT1 will charge in approximately 0.5 seconds, so please observe these signals within a few seconds of setting PS1 to 5V.
2. Set PS1 to 0V. Observe D1 (PFO) should be lit due to input ‘power failure’
3. Set LD1 to 1A. Observe VOUT. VOUT should decrease to 0V, in about 1 second.



Note: All connections from equipment should be Kelvin connected directly to the board pins which they are connected on this diagram and any input or output leads should be twisted pair.

Figure 1. Proper Measurement Equipment Setup for DC1550A

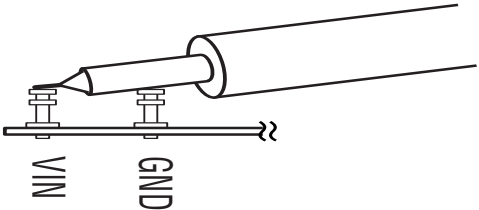


Figure 2. Measuring Input or Output Ripple

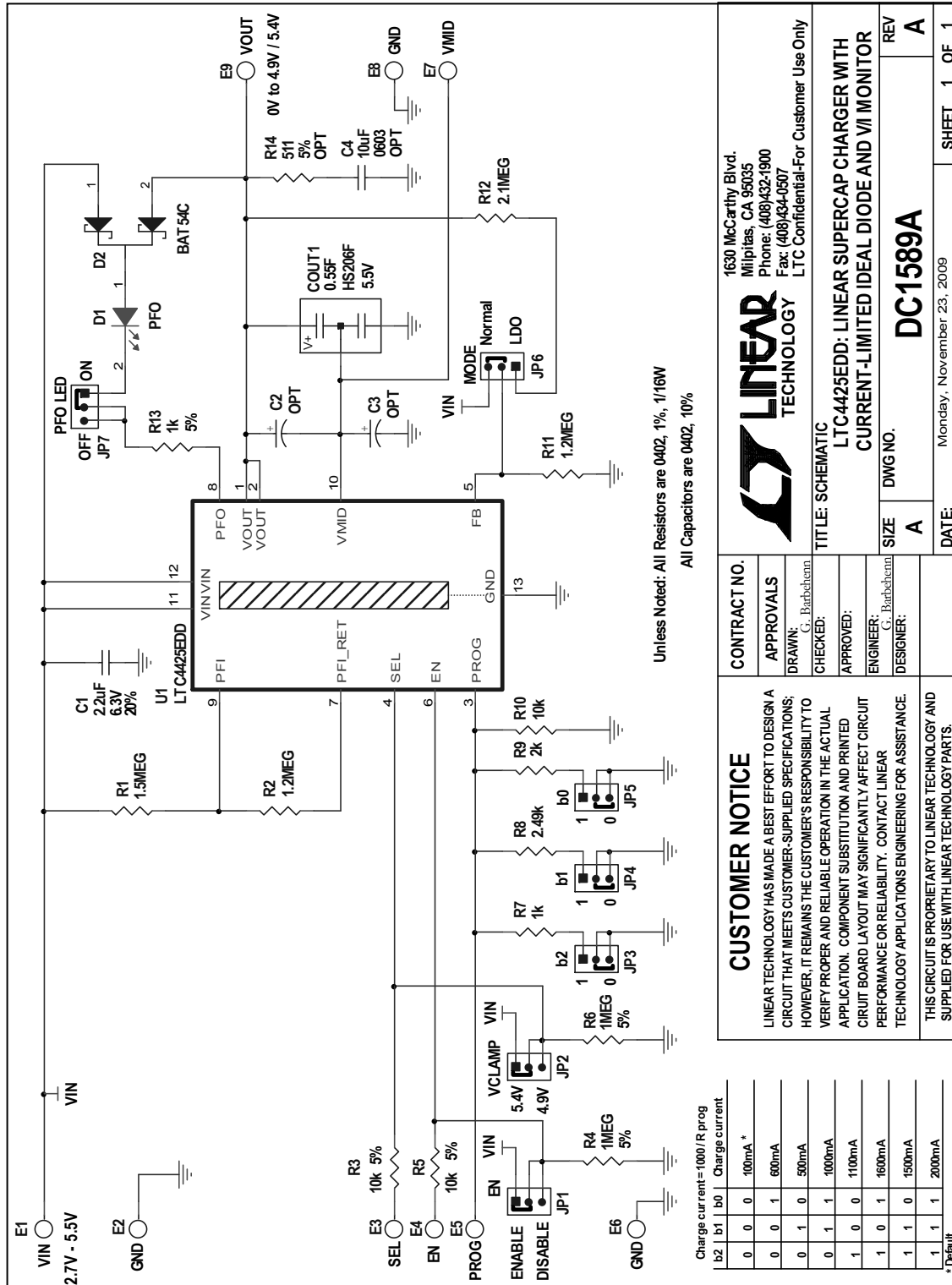


Figure 3. Circuit Schematic

CONTRACT NO.

APPROVALS

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LINEAR TECHNOLOGY

TITLE: SCHEMATIC

LTC4425EDD: LINEAR SUPERCAP CHARGER WITH CURRENT-LIMITED IDEAL DIODE AND VI MONITOR

SIZE DWG NO. REV

A A A

DATE: Monday, November 23, 2009

SHEET 1 OF 1

| | Qty | Reference | Part Description | Manufacture / Part # |
|--|-----|----------------|---|-----------------------------------|
| REQUIRED CIRCUIT COMPONENTS: | | | | |
| 1 | 1 | C1 | CAP, CHIP, X5R, 2.2 μ F, \pm 2%, 6.3V, 0402 | MURATA, GRM155R60J225ME15D |
| 2 | 1 | COUT1 | SUPERCAP, 0.55F, 80m Ω , 5.5V, 39mmX17mmX2.4mm | CAP-X, HS206F |
| 3 | 1 | R1 | RES, CHIP, 1.5MEG Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04021M50FKED |
| 4 | 2 | R2, R11 | RES, CHIP, 1.2MEG Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04021M20FKED |
| 5 | 2 | R3, R5 | RES, CHIP, 10k Ω , \pm 5%, 1/16W, 0402 | VISHAY, CRCW040210K0JNED |
| 6 | 2 | R4, R6 | RES, CHIP, 1MEG Ω , \pm 5%, 1/16W, 0402 | VISHAY, CRCW04021M00JNED |
| 7 | 1 | R7 | RES, CHIP, 1k Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04021K00FKED |
| 8 | 1 | R8 | RES, CHIP, 2.49k Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04022K49FKED |
| 9 | 1 | R9 | RES, CHIP, 2k Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04021K00JNED |
| 10 | 1 | R9 | RES, CHIP, 2k Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04022K00FKED |
| 11 | 1 | R10 | RES, CHIP, 10k Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW040210K0FKED |
| 12 | 1 | R12 | RES, CHIP, 2.1MEG Ω , \pm 1%, 1/16W, 0402 | VISHAY, CRCW04022M10FKED |
| 13 | 1 | R13 | RES, CHIP, 1k Ω , \pm 5%, 1/16W, 0402 | VISHAY, CRCW04021K00JNED |
| 14 | 1 | U1 | IC, SMT, Linear Supercap Charger with Current-limited Ideal Diode and V/I Monitor | LINEAR TECH., LTC4425EDD |
| ADDITIONAL DEMO BOARD CIRCUIT COMPONENTS: | | | | |
| 1 | 0 | C2-OPT, C3-OPT | SUPERCAP 2.5V or 2.7V | User supplied |
| 2 | 0 | C4-OPT | CAP, CHIP, X5R, 10 μ F, \pm 10%, 6.3V, 0603 | TDK, C1608X5R0J106K |
| 3 | 1 | D1 | DIODE, LED, RED, 0603 | PANASONIC, LNJ208R8ARA |
| 4 | 1 | D2 | DIODE, Dual SCHOTTKY, 30V, 200mA, SOT-23 | DIODE INC, BAT54C |
| 5 | 0 | R14-OPT | RES, CHIP, 511 Ω , \pm 5%, 1/16W, 0402 | VISHAY, CRCW0402511RJNED |
| HARDWARE FOR DEMO BOARD ONLY: | | | | |
| 1 | 9 | E1, E9 | TURRET, 0.09 DIA | MILL-MAX, 2501-2-00-80-00-00-07-0 |
| 2 | 7 | JP1-7 | 3 Pin Jumper, 2mm | SAMTEC, TMM-103-02-L-S |
| 3 | 7 | JP1-7 | SHUNT, 2mm | SAMTEC, 2SN-KB-G |
| 4 | 4 | | STAND-OFF, NYLON, 0.375" | KEYSTONE, 8832 |

Figure 4. Bill of Materials