

# LT3022

## 1A, Low Voltage, Very Low Dropout Linear Regulator

### DESCRIPTION

Demonstration circuit 932A is an adjustable 1A linear regulator featuring LT3022. The LT3022 is a very low dropout voltage (VLDO™) linear regulator that operates from input supplies down to 0.9V. The device supplies 1A output current with 145mV typical dropout voltage. The LT3022 is ideal for low input voltage to low output voltage applications, providing comparable electrical efficiency to a switching regulator. The regulator optimizes stability and transient response with low ESR ceramic output capacitors as small as 10µF. Other LT3022 features include 0.05% typical line regulation and 0.05% typical load regulation. In shutdown, the quiescent current typically drops to 7.5µA. Internal protection circuitry includes reverse-battery protection, current limiting, thermal limiting with hysteresis and reverse-current protection.

Minimum input voltage is the voltage required by the LT3022 to regulate the output voltage and supply the rated 1A output current. This specification is tested at

$V_{OUT} = 0.2V$ . For higher output voltages, the minimum input voltage required for regulation equals the regulated output voltage  $V_{OUT}$  plus the dropout voltage or 1.1V, whichever is greater.

The LT3022 is available as an adjustable device with an output voltage range down to the 200mV reference. The LT3022 regulator is available in the thermally enhanced low profile (0.75mm) 16-lead (5mm × 3mm) DFN and MSOP packages.

The LT3022 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 932A.

**Design files for this circuit board are available. Call the LTC factory.**

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#### Performance Summary ( $T_A = 25^{\circ}C$ )

PARAMETER	CONDITIONS	VALUE
Minimum Input Voltage	$V_{OUT} = 1.2V, I_{OUT} = 1A$	1.35V
Maximum Input Voltage		10V
Output Voltage $V_{OUT}$	Shunt at 1, 2 for JP2	$0.9V \pm 3\%$
	Shunt at 3, 4 for JP2	$1.0V \pm 3\%$
	Shunt at 5, 6 for JP2	$1.2V \pm 3\%$
	Shunt at 7, 8 for JP2	$1.5V \pm 3\%$
	Shunt at 9, 10 for JP2	$1.8V \pm 3\%$
	Shunt at 11, 12 for JP2	User Select

## QUICK START PROCEDURE

Demonstration circuit 932A is easy to set up to evaluate the performance of the LT3022. Refer to Figure 1 for proper measurement equipment setup 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 terminals of the input or output capacitors. See Figure 2 for proper scope probe technique.

1. Place JP1 on the ON position.
2. Use JP2 to set the desired output voltage.
3. With power off, connect the input power supply to VIN and GND.

4. Turn on the power at the input.

**NOTE.** Make sure that the input voltage does not exceed 10V.

5. Check for the proper output voltages.

**NOTE.** If there is no output, temporarily disconnect the load to make sure that the load is not set too high or is shorted.

6. Once the proper output voltage is established, adjust the loads within the operating range and observe the output voltage regulation, efficiency and other parameters.

**NOTE.** Make sure that the power dissipation is limited below the thermal limit.

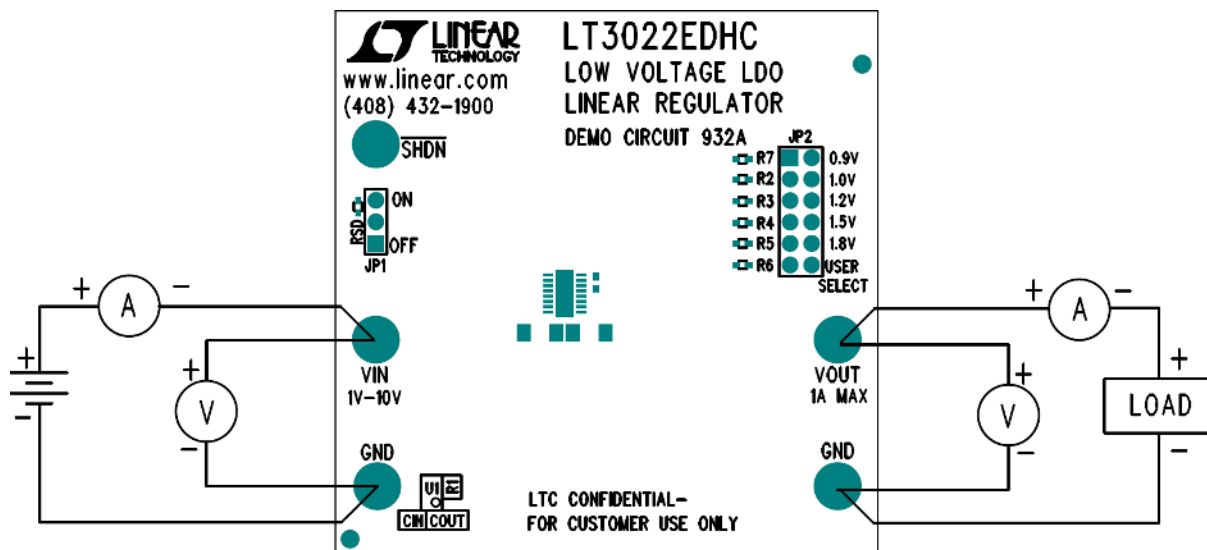


Figure 1. Measurement Equipment Setup

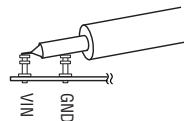
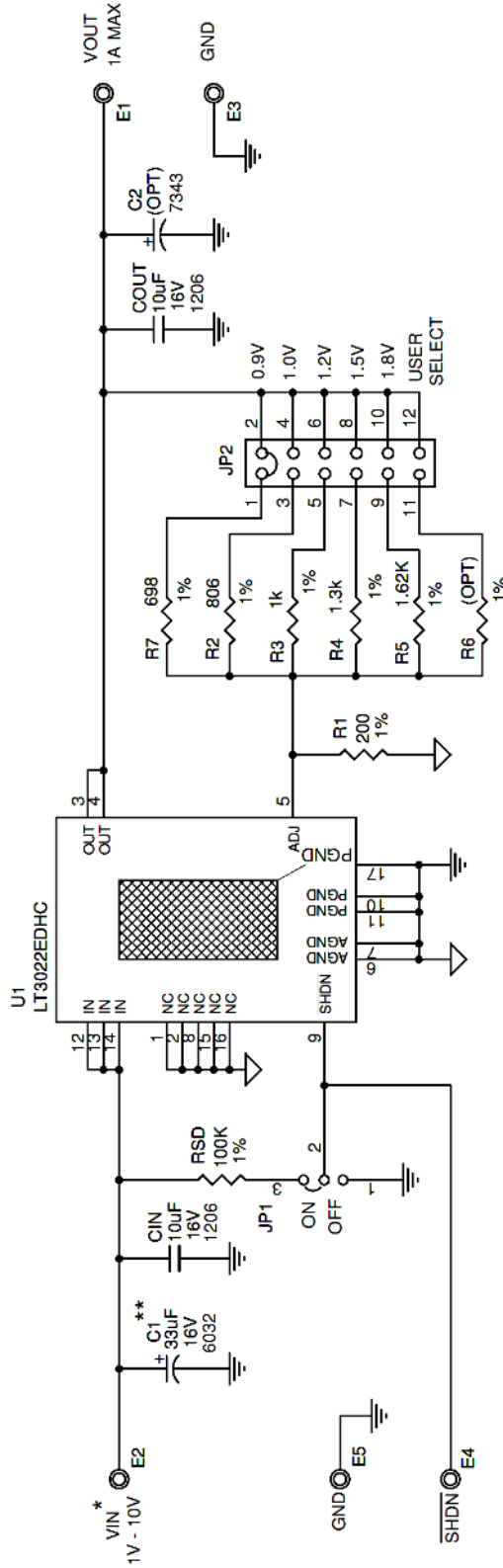


Figure 2. Measuring Input or Output Ripple

REVISION HISTORY				
ECO	REV	DESCRIPTION	APPROVED	DATE
	2	PRODUCTION	EDWIN L.	4-9-10



**NOTE: UNLESS OTHERWISE SPECIFIED**

1. ALL RESISTORS ARE IN 0402.
2. INSTALL SHUNTS AS SHOWN.

\* 0.95V IS THE MINIMUM INPUT VOLTAGE AT WHICH THE LT3022EDHC WILL OPERATE. THE MINIMUM VOLTAGE FOR A SPECIFIC REGULATOR CIRCUIT DEPENDS ON THE OUTPUT VOLTAGE (PLUS THE DROPOUT VOLTAGE).

\*\* CAPACITOR C1 IS AN OPTIONAL PART. IT WAS INSERTED ON THE DC932A TO DAMPEN THE (POSSIBLE) RINGING VOLTAGE DUE TO THE USE OF LONG INPUT LEADS. ON A NORMAL, TYPICAL PCB, WITH SHORT TRACES, THE CAPACITOR IS NOT NEEDED.

<b>CUSTOMER NOTICE</b>		CONTRACT NO.	
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	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		PCB DES. HZ	
		ENG. EDWIN L.	
		TITLE: SCHEMATIC	
		1630 McCarthy Blvd. Milpitas, CA 95035 Phone: (408)432-1900 www.linear.com Fax: (408)434-0507 LTC Confidential-For Customer Use Only	
<b>LOW VOLTAGE LDO LINEAR REGULATOR</b>			
SIZE	IC NO.	REV	
N/A	LT3022EDHC	2	
DATE:	Monday, April 26, 2010		SHEET 1 OF 1