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LT3032: Dual 150mA Positive/Negative Low Noise Low Dropout Linear Regulator

DESCRIPTION

Demonstration circuit 1622A is a dual 150mA linear regulator featuring the LT[®]3032. The LT3032 is a dual, positive and negative low dropout linear regulator. Each regulator supplies up to 150mA of output current with a typical 300mV dropout voltage. Each regulator's quiescent current is low (<3 μ A total in shutdown) and well controlled in dropout, making it an excellent choice for battery-powered circuits.

A 0.01 μ F bypass capacitor to each regulator reduces output voltage noise to 20 μ V_{RMS} (positive regulator)/30 μ V_{RMS} (negative regulator) over a 10Hz to 100kHz bandwidth. The LT3032 is stable with minimum output capacitor of 2.2 μ F. The regulators do not require any additional ESR.

Internal protection circuitry includes reverse output protection, current limiting and thermal limiting. Each regulator

is offered as an adjustable output device with an output voltage range down to the ± 1.22 V reference voltages.

The LT3032 is available in a unique low profile 14-lead 4mm \times 3mm \times 0.75mm DFN package with exposed back-side pads for each regulator.

The LT3032 data sheet gives a complete description of the part, operation and application information. The data sheet must be read in conjunction with this quick start guide for demo circuit 1622A.

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

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PERFORMANCE SUMMARY (T_A = 25°C)

PARAMETER	CONDITION	VALUE
Minimum INP Input Voltage	I _{LOAD} = 150mA	2.3V
Minimum INN Input Voltage	I _{LOAD} = -150mA	-2.3V
Maximum Input Voltage	V _{OUTP} = 5V, I _{LOAD} = -150mA	20V
	V _{OUTN} = -5V, I _{LOAD} = -90mA	-20V
Output Voltage V _{OUT}	J1, J2 Shunt in 7, 8	± 4.989 V $\pm 3\%$
Maximum Output Current	V _{INP} = 7V, V _{OUTP} = 5V	150mA
	V _{INN} = -7V, V _{OUTN} = -5V	-150mA

TRACKING POWER SUPPLY DESIGN

The demo board can be modified easily into a tracking supply design. Remove R6, R12 from the board and solder the resistor R13 onto the board. R13 should be less than 250k to minimize errors in the resultant output voltage caused by the ADJP/N pin bias current. The output voltage is:

$$V_{OUTP} = 1.22 + 2.44/R13 \times R_{TOP} (V)$$

$$V_{OUTN} = -1.22 - 2.44/R13 \times R_{BOT} (V)$$

Use a variable resistor in series with a fixed value resistor if the output voltage is adjustable.

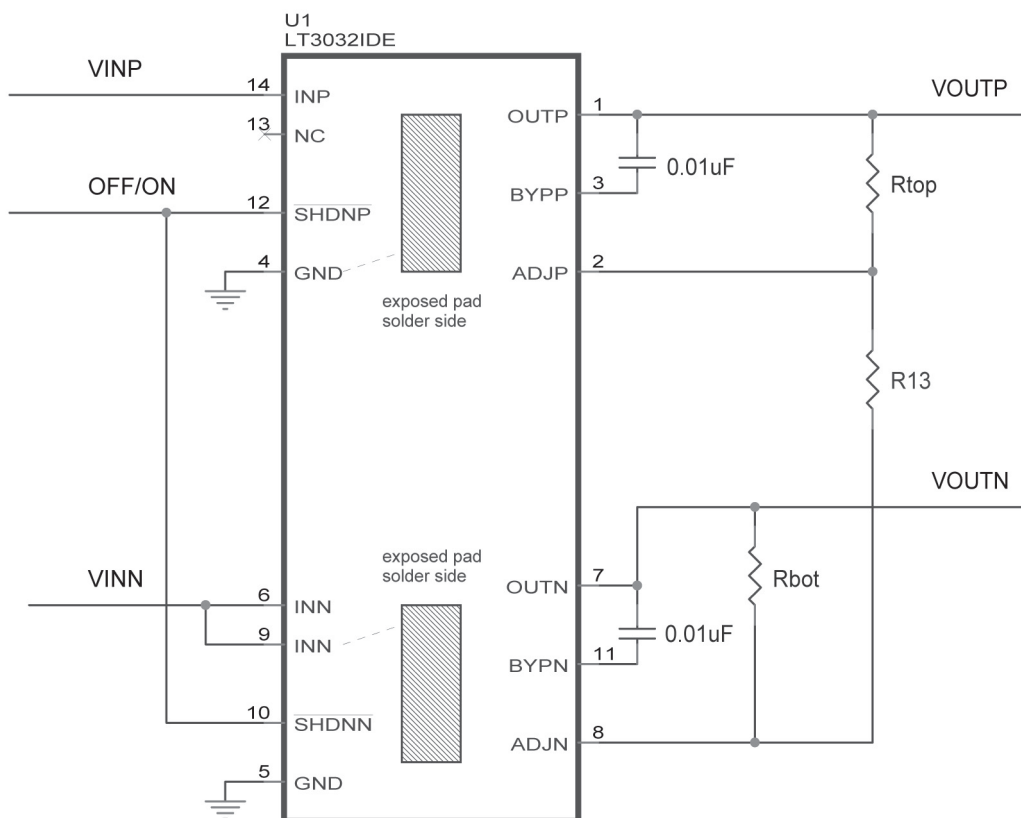


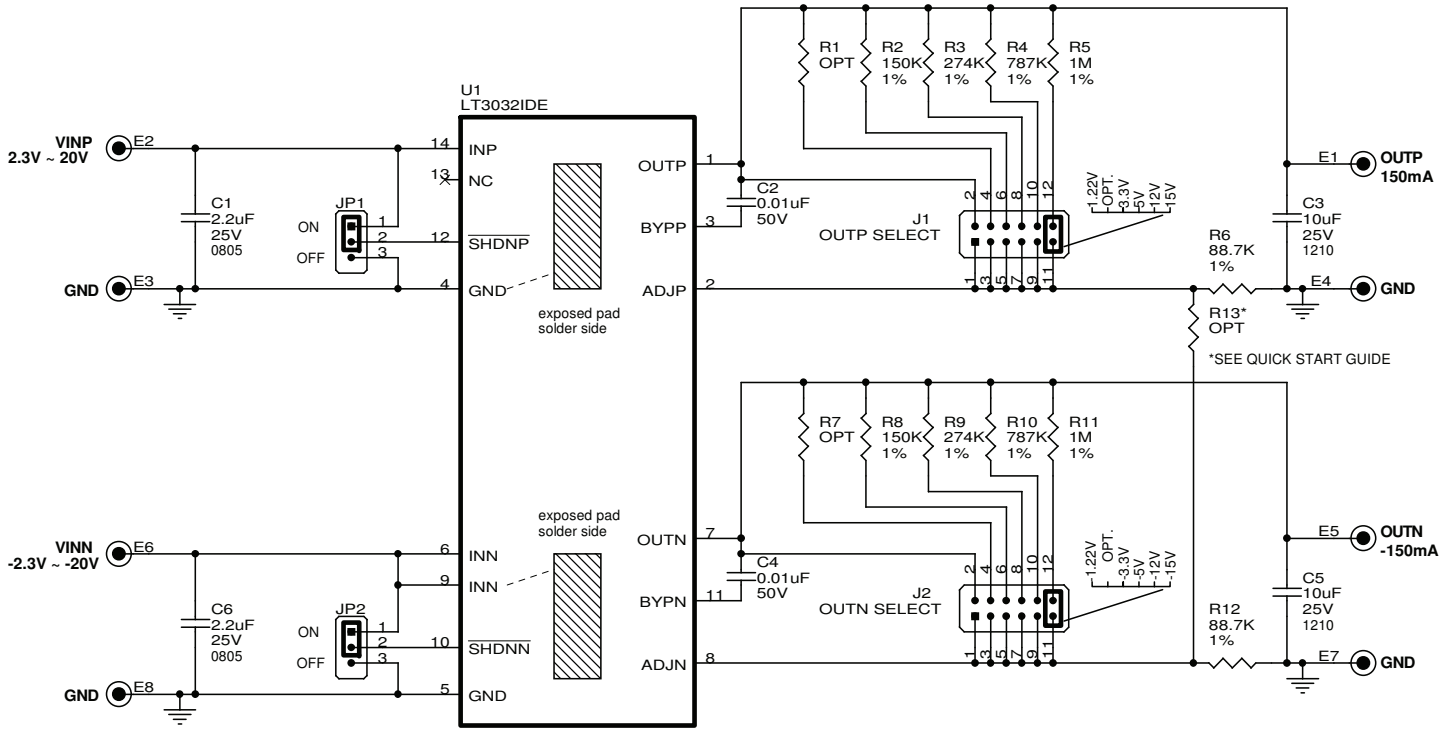
Figure 2. Tracking Power Supply Design

DEMO MANUAL DC1622A

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	2	C2, C4	CAP, CHIP X7R, 0.01 μ F, 50V, 0603	TDK, C1608X7R1H103K
2	2	C1, C6	CAP, CHIP X5R, 2.2 μ F, 25V, 0805	AVX, 08053C225KAT2A
3	2	C3, C5	CAP, CHIP X7R, 10 μ F, 25V, 1210	TDK, C3225X7R1E106M
4	2	R2, R8	RES., CHIP 150k 1% 0603	VISHAY, CRCW0603150KFKEA
5	2	R6, R12	RES., CHIP 88.7k 1% 0603	VISHAY, CRCW060388K7FKEA
Additional Demo Board Circuit Components				
1	2	R3, R9	RES., CHIP 274k 1% 0603	VISHAY, CRCW0603274KFKEA
2	2	R4, R10	RES., CHIP 787k 1% 0603	VISHAY, CRCW0603787KFKEA
3	2	R5, R11	RES., CHIP 1M 1% 0603	VISHAY, CRCW06031M00FKEA
4	0	R1, R7, R13	OPT.	
Hardware: For Demo Board Only				
1	8	E1-E8	TURRET, TESTPOINT	MILL-MAX, 2501-2-00-80-00-00-07-0
2	2	JP1, JP2	HEADER, 1X3 PINS, 2MM	SAMTEC, TMM-103-02-L-S
3	2	J1-J2	HEADER, 2X6 PINS, 2MM	SAMTEC, TMM-106-02-L-D
4	4	JP1, JP2, J1, J2	SHUNT	SAMTEC, 2SN-BK-G

REVISION HISTORY				
ECO	REV	DESCRIPTION	APPROVED	DATE
	1	PRODUCTION	M. ZHU	12-14-09



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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 DUAL 150mA POSITIVE / NEGATIVE LOW NOISE LOW DROPOUT LINEAR REGULATOR										
		PCB DES. K. LAC											
		ENG. M. ZHU											
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		<table border="1"> <tr> <td>SIZE</td> <td>IC NO.</td> <td>REV</td> </tr> <tr> <td>A</td> <td>LT3032IDE</td> <td>1</td> </tr> <tr> <td colspan="2">DEMO CIRCUIT 1622A</td> <td></td> </tr> </table>	SIZE	IC NO.	REV	A	LT3032IDE	1	DEMO CIRCUIT 1622A			DATE: Tuesday, February 16, 2010	
SIZE	IC NO.	REV											
A	LT3032IDE	1											
DEMO CIRCUIT 1622A													
		SHEET 1 OF 2											

DEMO MANUAL DC1622A

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