LTC3261EMSE
High Voltage, Low Noise Inverting Charge Pump

DESCRIPTION

Demonstration circuit 1882A is a high voltage inverting charge pump featuring the LTC®3261EMSE. The LTC3261 operates with an input voltage from 4.5V to 32V. The demo board provides the means to select between Burst Mode® operation or constant-frequency mode operation, plus select an operating frequency of 500kHz, 200kHz, and 50kHz.

The LTC3261 data sheet gives a complete description of the device, operation and application information. The data sheet must be read in conjunction with this quick start guide for demo circuit 1882A.

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

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Voltage		4.5		32	V
V_{OUT}	Output Voltage	MODE = 0V MODE ≥ 2V		$-V_{IN}$ $-0.94 \cdot V_{IN}$		V 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 V_{IN} or V_{OUT} and GND terminals. See Figure 2 for proper scope probe technique.

1. Make sure the jumper settings are as follows:

   JP1: EN is in the ON position.

   JP2: MODE is in the BURST position.

   JP3: FREQ is in the 500kHz position.

2. Set PS1 to 15V and turn on supply.
3. Slowly increase the load from 0mA to –100mA and observe the output voltage and output ripple.
4. Set the load to 0mA.
5. Move the MODE jumper, JP2, from the BURST position to the CONT FREQ position and then repeat step 3.
6. Set the load to 0mA.
7. Move the FREQ jumper, JP3, from the 500kHz position to the 200kHz position.
8. Slowly increase the load from 0mA to –50mA and observe the output voltage and output ripple.
9. Set the load to 0mA.

QUICK START PROCEDURE

10. Move the FREQ jumper, JP3, from the 200kHz position to the 50kHz position.
11. Slowly increase the load from 0mA to –10mA and observe the output voltage and output ripple.
12. Turn off the load and PS1.
13. Set up the load, AM2 and VM2, for the power conversion efficiency measurement, as illustrated in Figure 3.
14. Set the MODE jumper, JP2, to the BURST position and the FREQ jumper, JP3, to the 500kHz position.
15. Set PS1 to 15V and turn on the supply.
16. Set the load to a desired current from 0mA to 100mA.
17. Calculate the power conversion efficiency from the following formula:

$$\text{Efficiency} = \frac{V_L \bullet I_L}{V_S \bullet I_S} \bullet 100\%$$

Figures 4 and 5 illustrate how the power conversion efficiency varies with load current in Burst Mode operation and in constant-frequency mode operation.

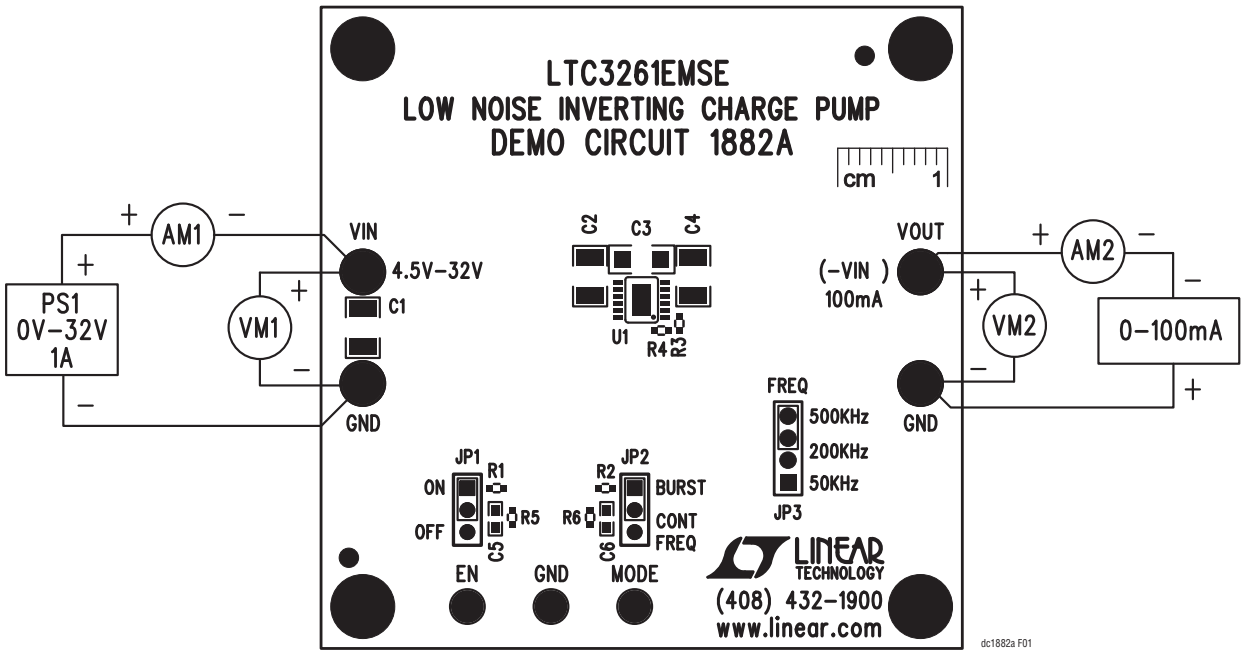


Figure 1. Proper Measurement Equipment Setup for DC1882A

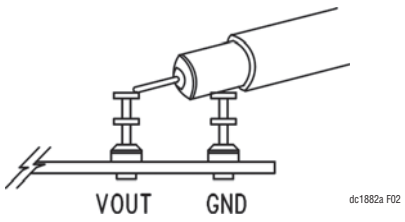


Figure 2. Measuring Input or Output Ripple

QUICK START PROCEDURE

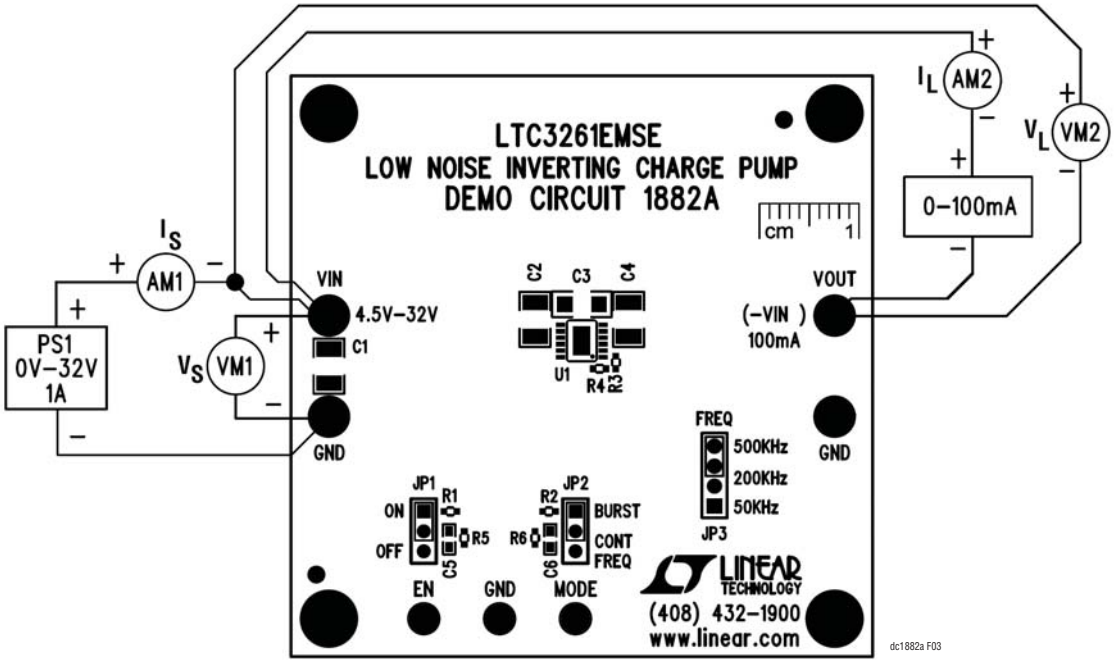


Figure 3. Power Conversion Efficiency Measurement Setup

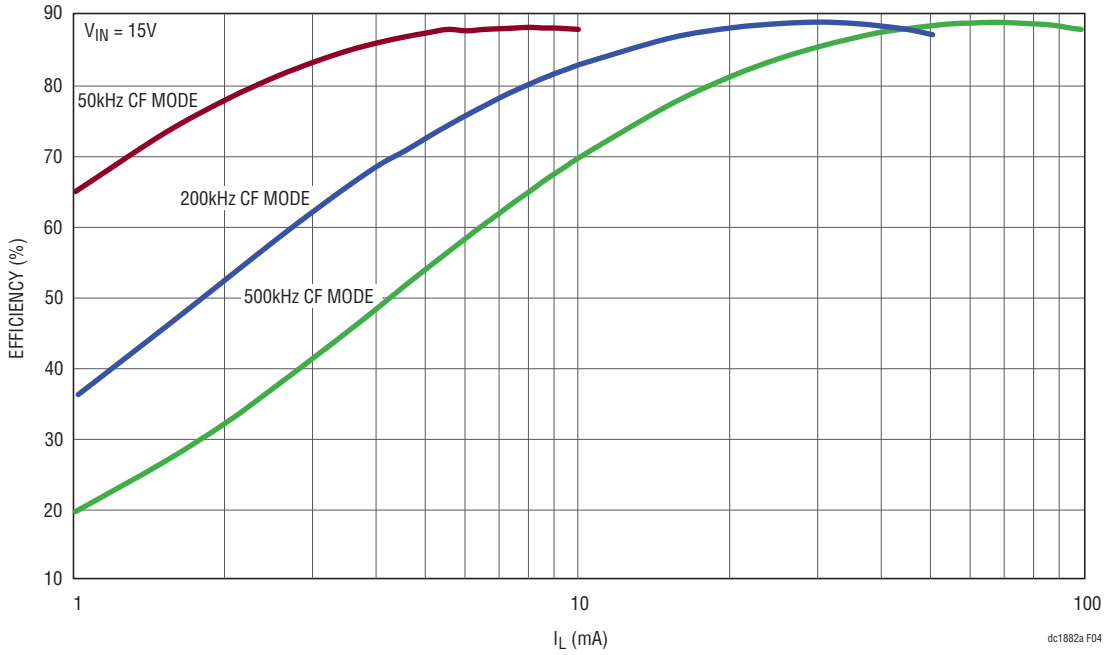


Figure 4. LTC3261 Constant-Frequency Mode Operation Power Conversion Efficiency

QUICK START PROCEDURE

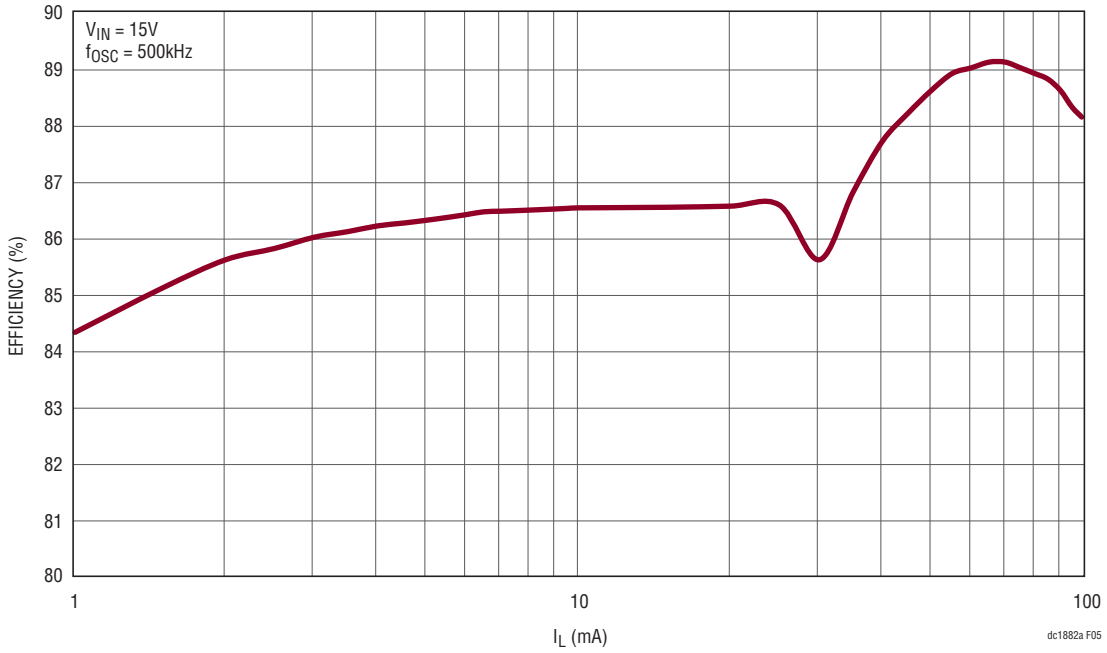
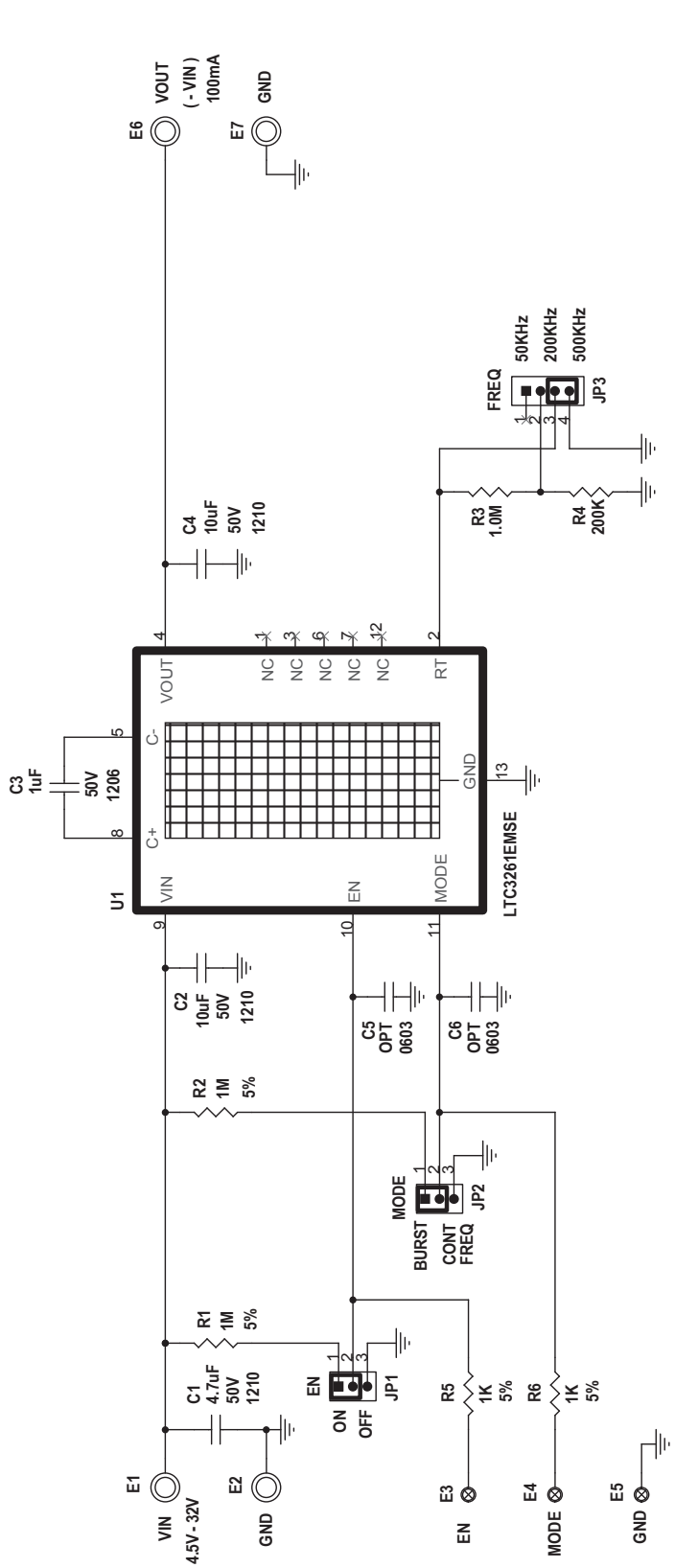


Figure 5. LTC3261 Burst Mode Operation Power Conversion Efficiency

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
DC1826A Required Circuit Components				
1	2	C2, C4	CAP, CER, 10µF, 50V, X7S, 10%, 1210	TDK, C3225X7S1H106K
2	1	C3	CAP, CER, 1µF, 50V, X7R, 10%, 1206	MURATA, GRM31MR71H105KA88
5	1	U1	LOW NOISE INVERTING CHARGE PUMP	LINEAR TECHNOLOGY, LTC3261EMSE#PBF
Additional Demo Board Circuit Components				
1	1	C1	CAP, CER, 4.7µF, 50V, X7R, 10%, 1210	MURATA, GRM32ER71H475KA88L
3	2	R1, R2	RES, 1MΩ, 1/16W, 5%, 0402, SMD	VISHAY, CRCW04021M00JNED
4	2	R3	RES, 1MΩ, 1/16W, 1%, 0402, SMD	VISHAY, CRCW04021M00FKED
5	1	R4	RES, 200k, 1/10W, 1%, 0402, SMD	VISHAY, CRCW0402200KFKED
Hardware: For Demo Board Only				
1	3	JP1-JP2	HEADER, 3 PIN, 1 ROW, 0.079"	SAMTEC, TMM-103-02-L-S
2	1	JP3	HEADER, 4 PIN, 1 ROW, 0.079"	SAMTEC, TMM-104-02-L-S
3	3	JP1-JP3	SHUNT, 2mm	SAMTEC, 2SN-KB-G
4	4	E1, E2, E6, E7	TP, TURRET, 0.094", PBF	MILL-MAX, 2501-2-00-80-00-00-07-0
5	3	E3, E4, E5	TURRET, 0.061", DIA	MILL-MAX, 2308-2-00-80-00-00-07-0

SCHEMATIC DIAGRAM



NOTE: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 0402, 1%, 1/16W
2. INSTALL SHUNTS AS SHOWN.

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APPROVALS	
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APP ENG.	MARTY M.

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TITLE: SCHEMATIC

LOW NOISE INVERTING CHARGE PUMP

SIZE	IC NO.	REV.
N/A	LTC3261EMSE DEMO CIRCUIT 1882A	1
SCALE = NONE	DATE: 03-12-12	SHEET 1 OF 1

Figure 10. LTC3261 Low Noise Inverting Charge Pump

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