LT8618
High Efficiency 65V, 100mA Synchronous Buck Regulator

DESCRIPTION

Demonstration circuit 2822A features the LT®8618, a high efficiency 65V, 100mA synchronous step-down regulator. The DC2822A demo board is designed for 100mA at 5V output from a 5.5V to 60V input with switching frequency of 2MHz. The wide input range allows a variety of input sources, such as automotive batteries and industrial supplies. The LT8618 is a high efficiency, and high frequency synchronous monolithic step-down switching regulator in a 3mm × 2mm DFN package with exposed pads for low thermal resistance. The regulator's ultralow 2.5µA quiescent current with the output in full regulation enables applications requiring highest efficiency at very light load currents, such as automotive and battery powered portable instruments.

Peak current mode control with minimum on-time of as small as 35ns allows high step-down conversion even at high frequency. The LT8618 switching frequency can be programmed via an oscillator resistor over a 200kHz to 2.2MHz range. The default frequency of the DC2822A is 2MHz.

The DC2822A demo board has an EMI filter installed. The EMI performance of the board is shown on Figure 2. The red line in radiated EMI performance is CISPR25 Class 5 peak limit. The figure shows that the circuit passes the test with a wide margin.

The LT8618 data sheet gives a complete description of the part, operation and application information. The data sheet must be read in conjunction with this demo manual. The layout recommendations for best thermal performance are available in the data sheet Application Information section. Contact ADI applications engineer for technical support.

Design files for this circuit board are available.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
VIN_EMI	Input Supply Range with EMI Filter		5.5		60	V
V_{OUT}	Output Voltage		4.85	5	5.15	V
I_{OUT}	Maximum Output Current		100			mA
f_{SW}	Switching Frequency		1.85	2	2.15	MHz
EFF	Efficiency	V_{IN} = 12V , I_{OUT} = 100mA		90.5		%

QUICK START PROCEDURE

Demonstration circuit 2822A is easy to set up to evaluate the performance of the LT8618. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. With power off, connect the DC power supply to VEMI and GND, and load from V_{OUT} to GND.
2. Turn on the power at the input. Make sure that the input voltage does not exceed 65V.
3. Check for the proper output voltage (5V). If there is no output, temporarily disconnect the load to make sure that the load is not set too high or is shorted.
4. Once the proper output voltage is established, adjust the load within the operating ranges and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

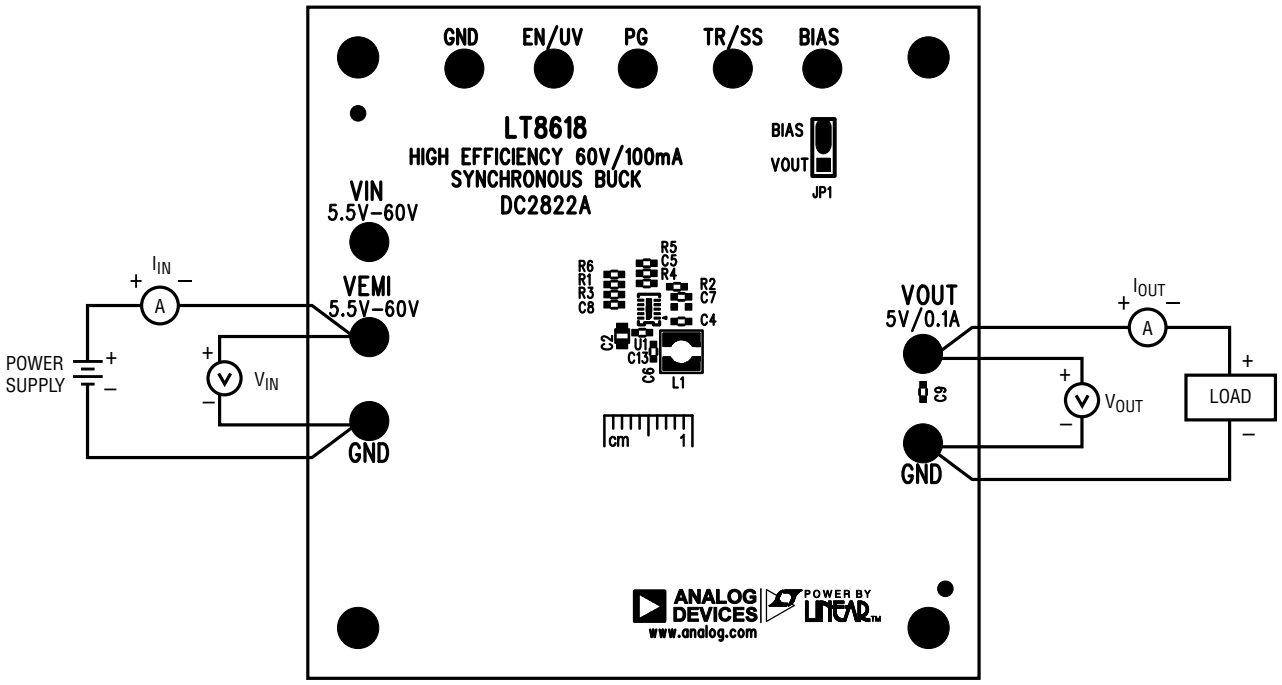


Figure 1. Proper Measurement Equipment Setup

QUICK START PROCEDURE

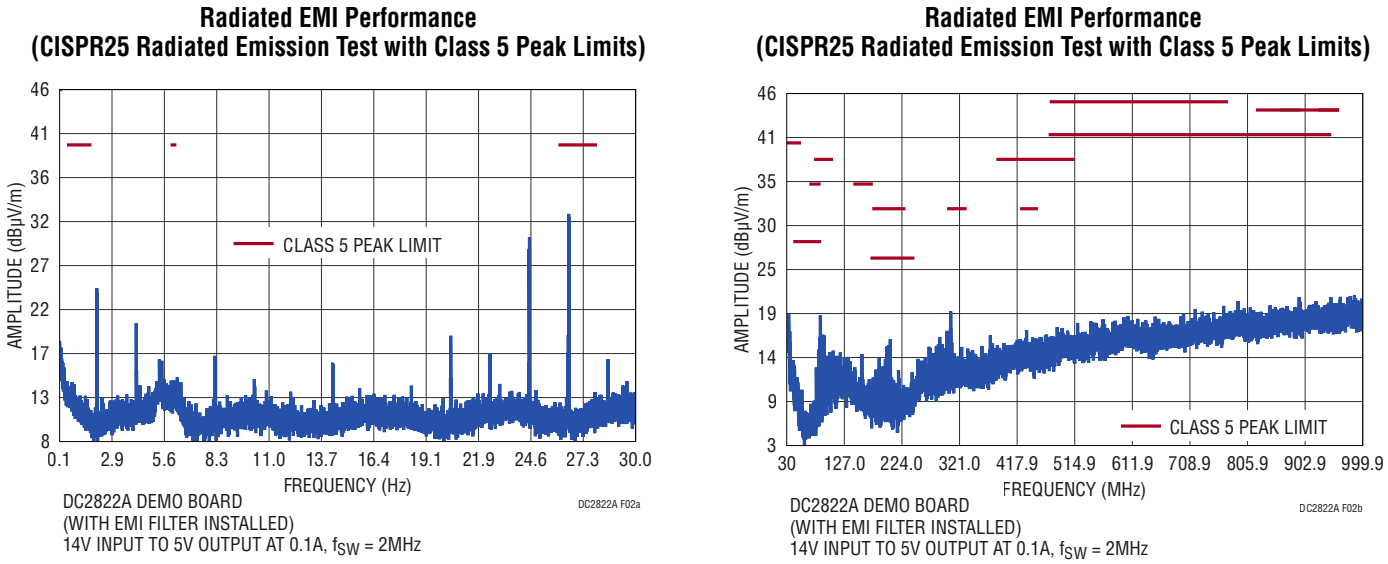


Figure 2. EMI Performance of the DC2822A. V_{IN} = 14V, I_{OUT} = 100mA

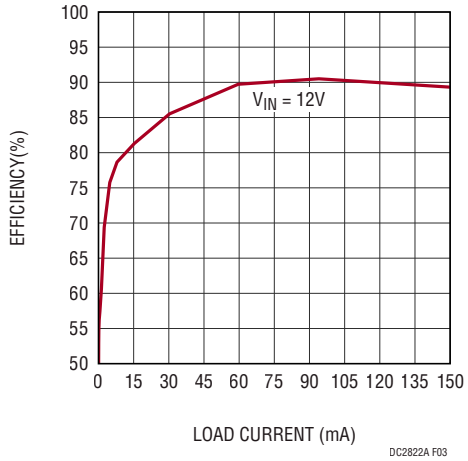
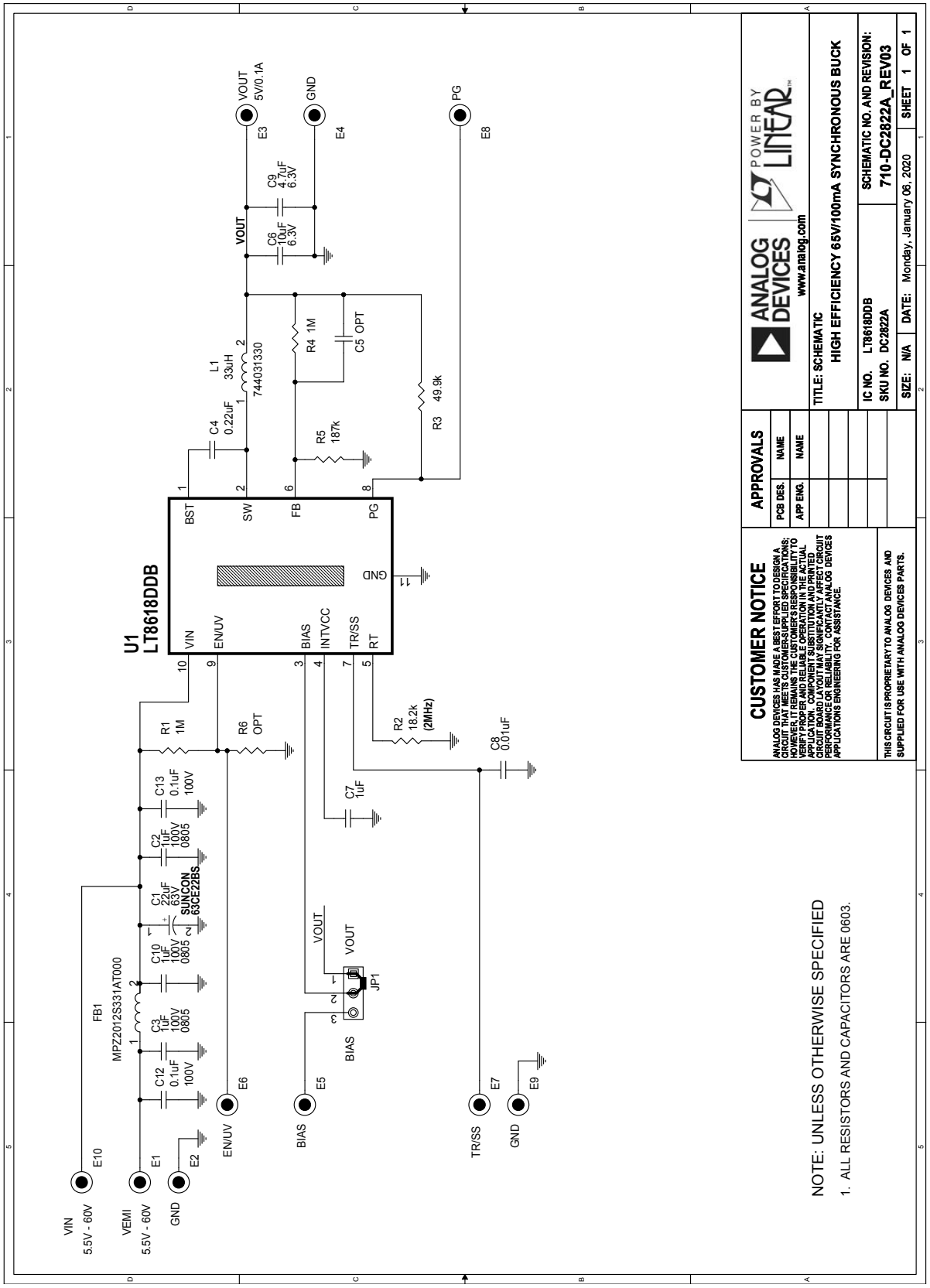


Figure 3. Efficiency. V_{IN} = 12V, f_{SW} = 2MHz

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C1	CAP., 22µF, ALUM. ELECT., 63V, 20%, 6.3 × 7.7mm, CE-BS	SUN ELECTRONIC INDUSTRIES CORP, 63CE22BS
2	3	C2, C3, C10	CAP., 1µF, X7S, 100V, 20%, 0805	MURATA, GRJ21BC72A105ME11L
3	1	C4	CAP., 0.22µF, X7R, 16V, 10%, 0603	AVX, 0603YC224KAT2A
4	1	C6	CAP., 10µF, X5R, 6.3V, 20%, 0603	MURATA, GRM188R60J106ME47D
5	1	C7	CAP., 1µF, X7R, 16V, 10%, 0603	KEMET, C0603C105K4RAC7867
6	1	C8	CAP., 0.01µF, X7R, 16V, 10%, 0603	AVX, 0603YC103KAT2A
7	1	C9	CAP., 4.7µF, X5R, 6.3V, 10%, 0603	KEMET, C0603C475K9PACTU
8	2	C12, C13	CAP., 0.1µF, X7R, 100V, 10%, 0603	AVX, 06031C104KAT2A
9	1	FB1	IND., 300Ω, FERRITE BEAD, 25%, 250mA, 0402, AEC-Q200	MMZ1005Y301CTD25
10	1	L1	IND., 33µH, PWR, SHIELDED, 30%, 0.42A, 660mΩ, 3816	WURTH ELEKTRONIK, 744031330
11	2	R1, R4	RES., 1MΩ, 1%, 1/10W, 0603, AEC-Q200	VISHAY, CRCW06031M00FKEA
12	1	R2	RES., 18.2kΩ, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ3EKF1822
13	1	R3	RES., 49.9kΩ, 1%, 1/10W, 0603	NIC, NRC06F4992TRF
14	1	R5	RES., 187kΩ, 1%, 1/10W, 0603, AEC-Q200	PANASONIC, ERJ3EKF1873V
15	1	U1	IC, 60V, 100mA BUCK REGULATOR, DFN-10	ANALOG DEVICES, LT8618EDDB#PBF
Additional Demo Board Circuit Components				
1	0	C5	CAP., OPTION, 0603	
2	0	R6	RES., OPTION, 0603	
Hardware				
1	10	E1-E10	TEST POINT,TURRET, 0.094" MTG. HOLE, PCB 0.062" THK	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	CONN., HDR, MALE, 1 × 3, 2mm, VERT, ST, THT, NO SUBS. ALLOWED	WURTH ELEKTRONIK, 62000311121
3	4	MP1-MP4	STANDOFF, NYLON, SNAP-ON, 0.50"	WURTH ELEKTRONIK, 702935000
4	1	XJP1	CONN., SHUNT, FEMALE, 2 POS, 2mm	WURTH ELEKTRONIK, 60800213421

SCHEMATIC DIAGRAM



Rev. 0

ESD Caution
ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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