LT8620
65V, 2A Micropower Synchronous Monolithic Step-Down Regulator

DESCRIPTION

Demonstration circuit 1992A is a 65V, 2A micropower synchronous monolithic step-down regulator featuring the LT®8620. The LT8620 is a compact, high efficiency, high speed synchronous monolithic step-down switching regulator that consumes only 2.5µA of quiescent current when output is regulated at 5V. Top and bottom power switches, compensation components and other necessary circuits are inside of the LT8620 to minimize external components and simplify design.

The SYNC pin on the demo board is grounded by default for low ripple Burst Mode® operation. To synchronous to an external clock, move JP1 to SYNC and apply the external clock to the SYNC turret. Once JP1 is on SYNC position, a DC voltage of higher than 2V or $INTV_{CC}$ can be applied to the SYNC turret pulse skipping operation. Figure 1 shows the efficiency of the circuit at 12V input.

The demo board has an EMI filter installed. The board and the IC are designed to minimize conducted and radiated EMI. The radiated EMI performances of the board are shown on Figure 2 to Figure 4. The limits on those figures are CISPR25, Class 5 peak limits. It shows the circuit passes the test with a wide margin.

The LT8620 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 1992A.

Design files for this circuit board are available at http://www.linear.com/demo/DC1992A

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range		5.5		65	V
V_{OUT}	Output Voltage		4.8	5	5.2	V
I_{OUT}	Maximum Output Current		2			A
f_{SW}	Switching Frequency		1.85	2	2.15	MHz
EFE	Efficiency at DC	I_{OUT} = 1A		92		%

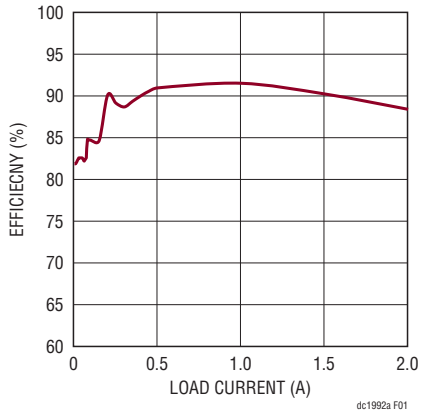


Figure 1. LT8620 $12V_{IN}$ to $5V_{OUT}$ Efficiency at 2MHz Switching Frequency

DESCRIPTION

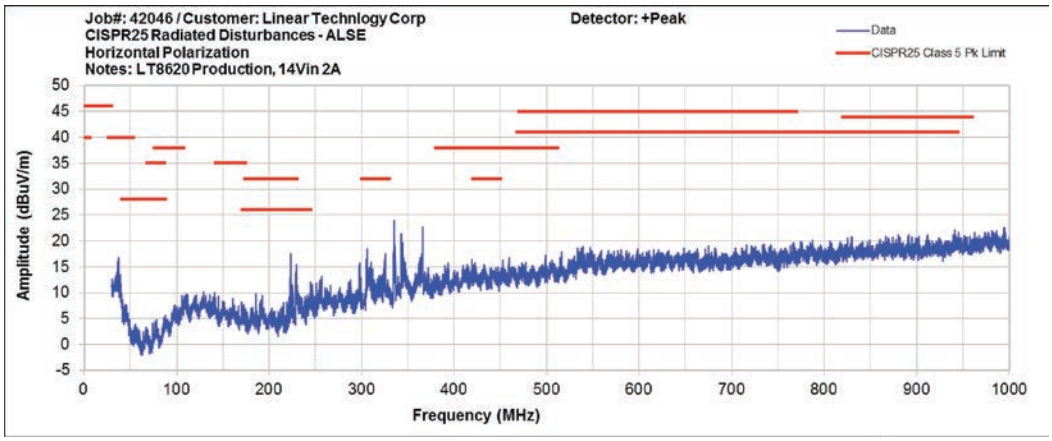


Figure 2. 30MHz to 1GHz Radiated EMI Performance. V_{IN} = 12V, V_{OUT} = 5V, I_{OUT} = 2A Antenna Polarization: Horizontal; Switching Frequency: 2MHz

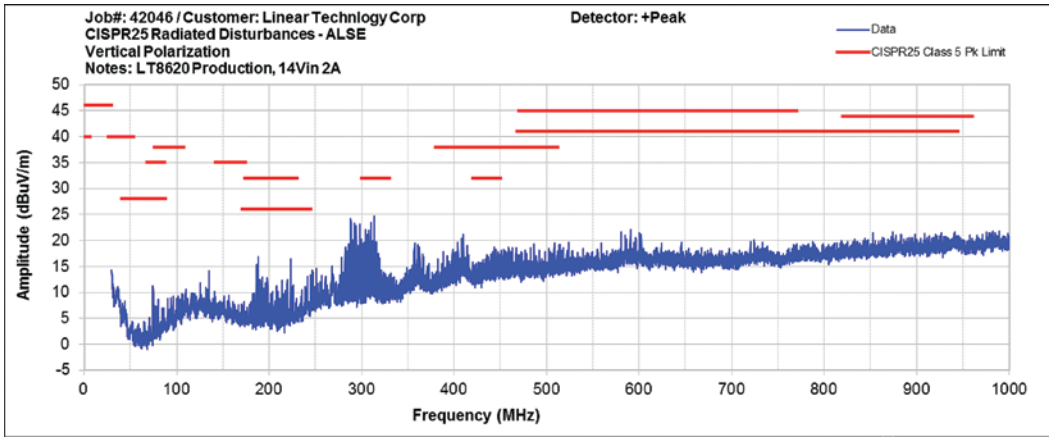


Figure 3. 30MHz to 1GHz Radiated EMI Performance. V_{IN} = 12V, V_{OUT} = 5V, I_{OUT} = 2A Antenna Polarization: Vertical; Switching Frequency: 2MHz

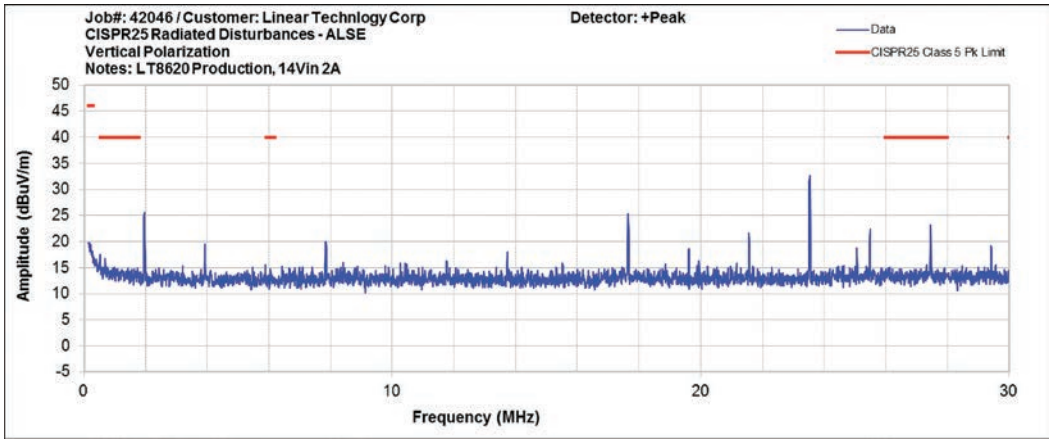


Figure 4. 150kHz to 30MHz Radiated EMI Performance. V_{IN} = 12V, V_{OUT} = 5V, I_{OUT} = 2A Antenna Polarization: Vertical; Switching Frequency: 2MHz (In the Frequency Range Between 150kHz and 30MHz, Only Vertical Polarization Is Required)

QUICK START PROCEDURE

Demonstration circuit 1992A is easy to set up to evaluate the performance of the LT8620. Refer to Figure 5 and Figure 6 for proper measurement equipment setup and follow the procedure below:

1. With power off, connect the input power supply to V_{IN} and GND.
2. With power off, connect the load VOUT and GND.
3. Check JP1 setting
4. Turn on the power at the input.
5. Carefully evaluate other design parameters as needed.

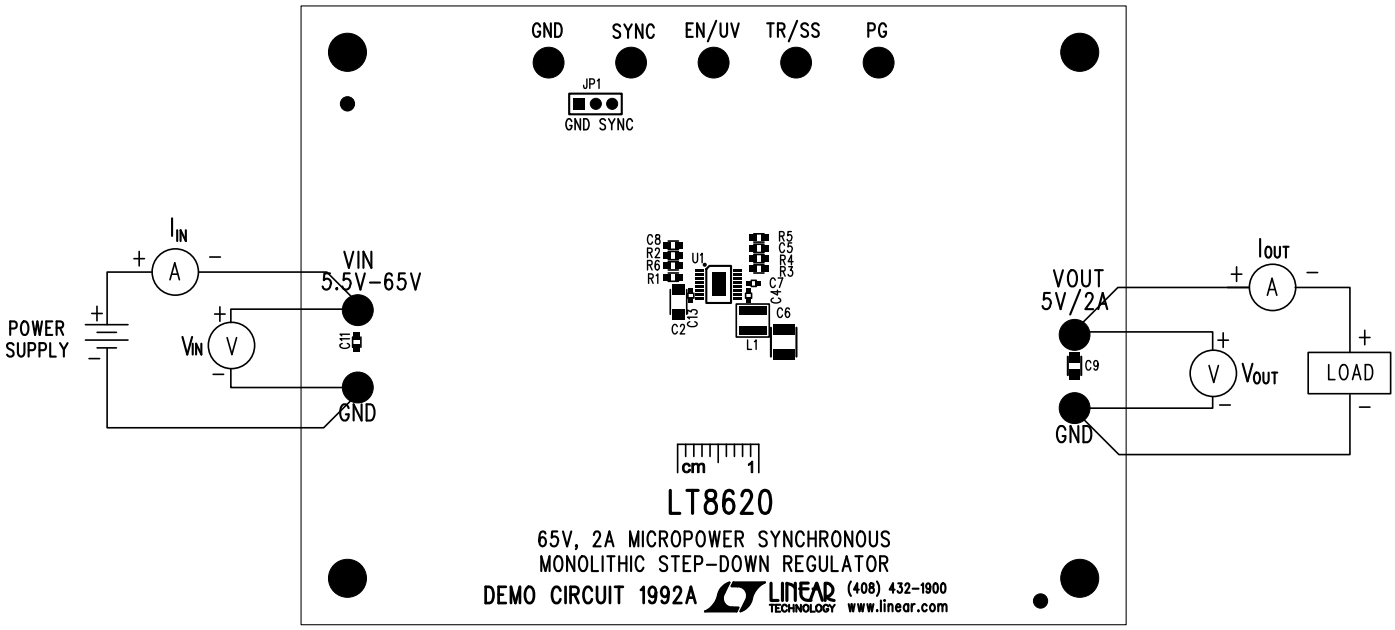


Figure 5. Proper Measurement Equipment Setup

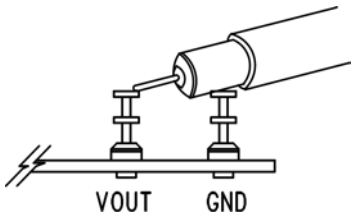
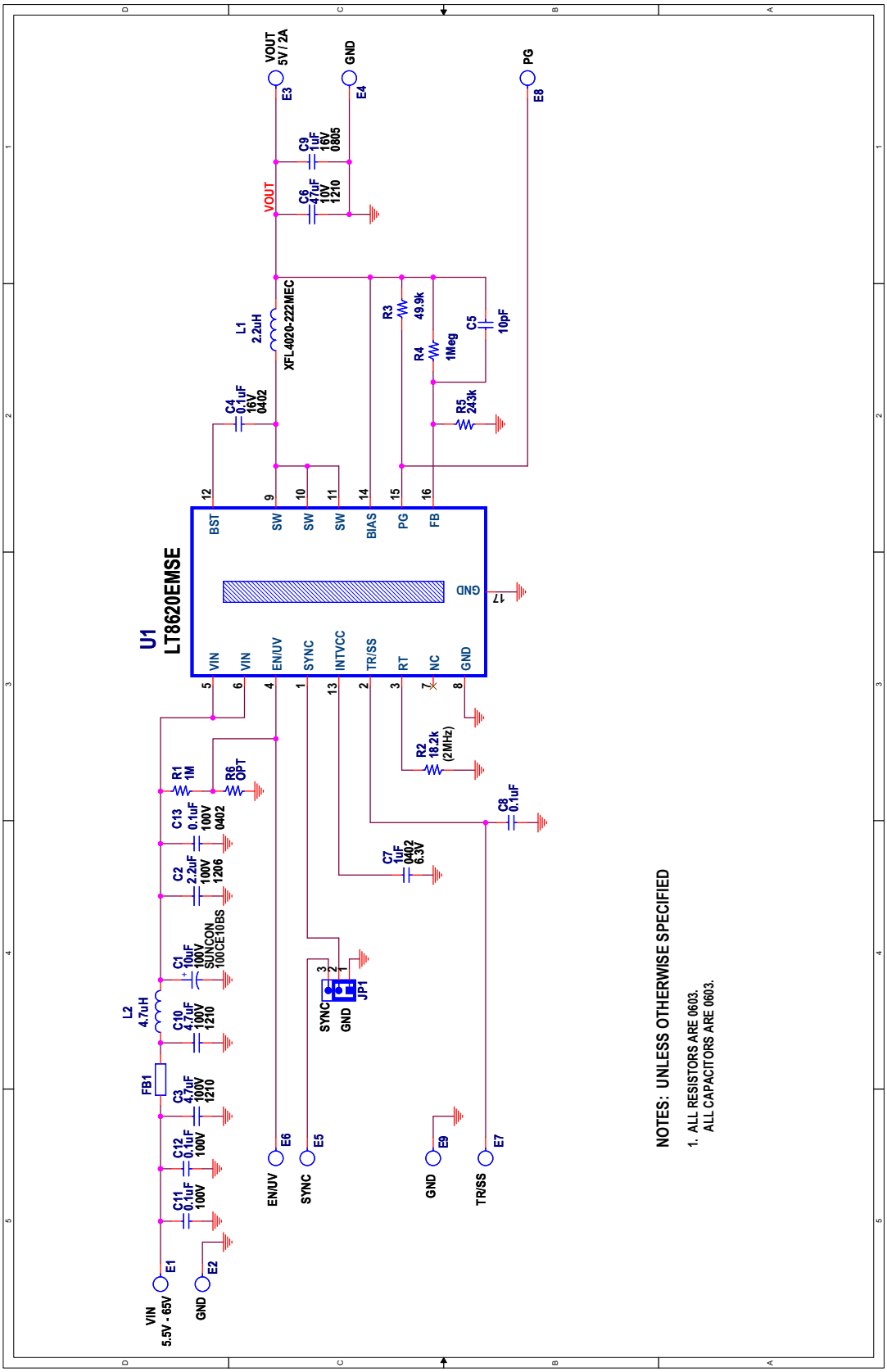


Figure 6. Measure Output Ripple

PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	C2	CAP., X7R, 2.2µF, 100V, 10%, 1206	MURATA, GRM31CR72A225K
2	1	C4	CAP., X7R, 0.1µF, 16V, 10%, 0402	MURATA, GRM155R71C104KA88D
3	1	C5	CAP., C0G, 10pF, 25V, 10%, 0603	AVX, 06033A100KAT2A
4	1	C6	CAP., X7R, 47µF, 10V, 10%, 1210	MURATA, GRM32ER71A476KE2015L
5	1	C7	CAP., X5R, 1.0µF, 10V, 10%, 0402	MURATA, GRM155R61A105K
6	1	C8	CAP., X7R, 0.1µF, 16V, 10%, 0603	MURATA, GRM188R71C104K
7	1	L1	IND, 2.2µH XFL4020	COILCRAFT, XFL4020-222MEC
8	1	R2	RES., CHIP, 18.2k, 1/10W, 1%, 0603	VISHAY, CRCW060318K2FKED
9	1	R3	RES., CHIP, 49.9k, 1/16W, 1%, 0603	VISHAY, CRCW060349K9FKED
10	2	R1, R4	RES., CHIP, 1M, 1/16W, 1%, 0603	VISHAY, CRCW06031M00FKED
11	1	R5	RES., CHIP, 243k, 1/16W, 1%, 0603	VISHAY, CRCW0603243KFKED
12	1	U1	IC, LT8620EMSE, MSE16	LINEAR TECH. CORP., LT8620EMSE#PBF
Additional Demo Board Circuit Components				
1	1	C1	CAP., ALUM, 10µF, 100V	SUN ELECT, 100CE10BS
2	2	C3, C10	CAP., X7S, 4.7µF, 100V, 10%, 1210	TDK, C3225X7S2A475K
3	1	C9	CAP., X7R, 1.0µF, 16V, 10%, 0805	AVX, 0805YC105KAT2A
4	2	C11, C12	CAP., X7R, 0.1µF, 100V, 10%, 0603	MURATA, GRM188R72A104K
5	1	C13	CAP., X5R, 0.1µF, 100V, 10%, 0402	MURATA, GRM155R62A104K
6	1	FB1	FERRITE BEAD 0805	TDK, MPZ2012S221A
7	1	L2	IND, 4.7µH IHLP2020BZ-01	VISHAY, IHLP2020BZ-ER4R7M01
8	0	R6 (OPT)	RES., 0603	
Hardware: For Demo Board Only				
1	9	E1-E9	TESTPOINT, TURRET, 0.094" PBF	MILL-MAX, 2501-2-00-80-00-00-07-0
2	1	JP1	3 PIN 0.079" SINGLE ROW HEADER	SULLIN, NRPN031PAEN-RC
3	1	XJP1	SHUNT, 0.079" CENTER	SAMTEC, 2SN-BK-G
4	4	MH1-MH4	STAND-OFF, NYLON 0.50" TALL	KEYSTONE, 8833(SNAP ON)

SCHEMATIC DIAGRAM



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