

Dual Monolithic Buck Regulator with Power-On Reset and Watchdog Timer

DESCRIPTION

Demonstration circuit 1359 is a Dual Monolithic Buck Regulator with Power-On Reset and Watchdog Timer featuring the LT3640. The board operates from inputs up to 35V and withstands transients up to 55V. The outputs are 3.3V, 0.8A and 1.2V, 1A. At light loads, both regulators operate in low ripple Burst Mode® to maintain high efficiency and low output ripple. Users can populate R13 on the EN/UVLO pin to provide a programmable under voltage lockout. Both channels have cycle-by-cycle current limit, providing protection against shorted outputs.

The power-on reset and watchdog timer periods are independently adjustable using external capacitors. Tight accuracy specifications and glitch immunity ensure reliable operation of the circuit. Watchdog can be enabled or disabled by JP1.

The circuit can be synchronized to an external clock connected to the SYNC terminal. If the SYNC function is used, the R_t resistor (R9) should be chosen to set the LT3640 internal switching frequency at least 20% below the lowest synchronization input frequency.

The LT3640 datasheet gives complete descriptions of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for working on or modifying the demo circuit 1359.

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

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PERFORMANCE SUMMARY

Specifications are at $T_A = 25^\circ\text{C}$

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
V_{IN}	Input Supply Range	$V_{OUT1} = 3.3\text{V}$, $I_{OUT1} = 0.8\text{A}$ $V_{OUT2} = 1.2\text{V}$, $I_{OUT2} = 1\text{A}$	5		35	V
V_{OUT1}	Output Voltage 1	$V_{IN} = 12\text{V}$, $I_{OUT1} = 0.8\text{A}$	3.20	3.30	3.40	V
V_{OUT2}	Output Voltage 2	$V_{IN} = 12\text{V}$, $I_{OUT2} = 1\text{A}$	1.16	1.20	1.24	V
I_{OUT1}	Output Current 1		0		0.8	A
I_{OUT2}	Output Current 2		0		1	A
I_Q	No Load Quiescent Current	$V_{IN} = 12\text{V}$, $V_{OUT1} = 3.3\text{V}$, $V_{OUT2} = 1.2\text{V}$, No Load		0.33		mA
F_{SW}	Switching Frequency		1.75	2	2.35	MHz
T_{WDU}	Watchdog Upper Boundary Period	$C7 = 1500\text{pF}$		55.5		ms
T_{WDL}	Watchdog Lower Boundary Period	$C7 = 1500\text{pF}$		3.5		ms
T_{RST}	Programmed Reset Period	$C8 = 1500\text{pF}$		55.5		ms

QUICK START PROCEDURE

Demonstration circuit 1359 is easy to set up to evaluate the performance of the LT3640. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

1. Place Jumper JP1 in the following position:
OFF: Watchdog Disabled
ON: Watchdog Enabled
2. With power off, connect the input power supply to VIN and GND.
3. With power off, connect loads from VOUT1 to GND and VOUT2 to GND.
4. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed 35V.

5. Check for the proper output voltages:

VOUT1 = 3.3V, VOUT2 = 1.2V

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 voltages are established, adjust the loads within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.
7. To test the watchdog timer, connect a clock input to the WDI terminal. Observe the output at the $\overline{\text{WDO}}$ terminal while the clock parameters are adjusted.
8. To test Power-On Reset, observe output at the RESET terminals: $\overline{\text{RST1}}$ and $\overline{\text{RST2}}$.

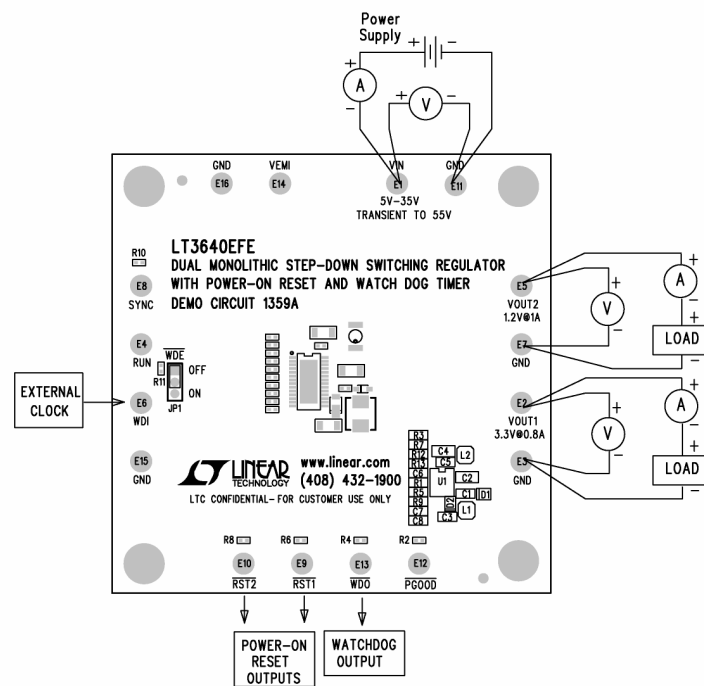


Figure 1. Proper Measurement Equipment Setup

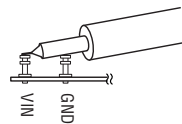
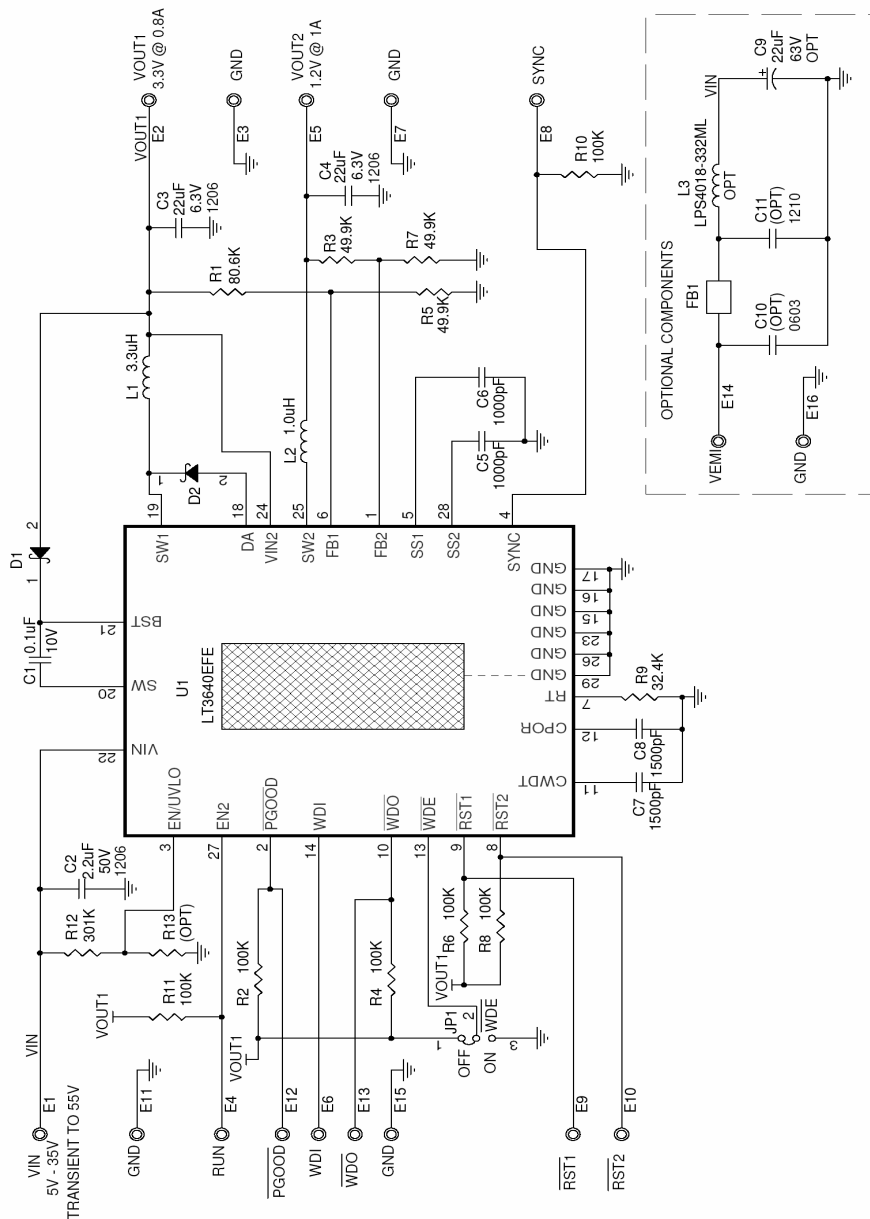


Figure 2. Measuring Input or Output Ripple



NOTE: UNLESS OTHERWISE SPECIFIED

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

REVISION HISTORY				
ECO	REV	DESCRIPTION	APPROVED	DATE
—	3	PRODUCTION	JAINO P.	5-19-10

CUSTOMER NOTICE LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER SPECIFICATIONS; HOWEVER, THE CUSTOMER'S RESPONSIBILITY TO PROVIDE CORRECT AND COMPLETE INFORMATION TO LINEAR TECHNOLOGY, AND TO PROVIDE CORRECT INFORMATION TO THE CUSTOMER'S END USER, IS THE CUSTOMER'S RESPONSIBILITY. LINEAR TECHNOLOGY CANNOT BE HELD RESPONSIBLE FOR ANY APPLICATION, COMPONENT SUBSTITUTION, AND PRINTED CIRCUIT BOARD LAYOUT WHICH MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.			APPROVALS <table><tr><td>PCB DES.</td><td>HZ</td><td>JANU P.</td></tr><tr><td>APP ENG.</td><td></td><td></td></tr></table>			PCB DES.	HZ	JANU P.	APP ENG.			 TITLE: SCHEMATIC DUAL MONOLITHIC STEP-DOWN SWITCHING REGULATOR WITH POWER-ON RESET AND WATCH DOG TIMER			1630 McCarthy Blvd. Millspace, CA 95035 Phone: (408)432-1900 Fax: (408)434-9507 LTC Confidential/For Customer Use Only www.linear.com		
PCB DES.	HZ	JANU P.															
APP ENG.																	
			SIZE N/A			IC NO. LT3640EFE			REV. 3								
			SCALE = NONE			DEMO CIRCUIT 1359A											
			DATE: Monday, July 19, 2010			SHEET 1			OF 1								