

QUICK START GUIDE FOR DEMONSTRATION CIRCUIT 620 HIGH CURRENT QUAD OUTPUT SWITCHING REGULATORS FOR TFT-LCD PANELS

LT1943

DESCRIPTION

Demonstration circuit 620 is a quad output power supply intended for use in large TFT-LCD panels. The circuit features the LT[®]1943 high current quad-output switching regulator and generates a 3.3V logic supply along with the triple output supply required for the TFT-LCD panels. With an input voltage range of 8V to 20V, a step down regulator provides 3.3V V_{LOGIC} with up to 2A current; a high power SEPIC converter, a lower power boost converter and an inverting converter provide three independent output voltages AV_{DD} , V_{ON} and V_{OFF} required by the LCD panels. A high side PNP provides delayed turn on of the V_{ON} signal and can source up to 30mA at 30V.

All four switchers are synchronized to the internal 1.2MHz clock, allowing the use of low profile inductors and ceramic capacitors. They all have soft-start to limit start-up inrush current.

Long wires run from input sources (such as wall adaptors) can cause large voltage spikes during initial plug-in. C17 is installed on DC620 to damp the possible voltage spikes. C17 is not required for applications when input source is close to the regulator. Please refer to Application Note 88 for details.

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

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Table 1. Performance Summary ($T_A = 25^\circ\text{C}$ unless otherwise noted)

PARAMETER	CONDITION	VALUE
Minimum Input Voltage	-40°C to 85°C	8V
Maximum Input Voltage	-40°C to 85°C	20V
Output Voltage V_{LOGIC}	$V_{\text{IN}} = 8\text{V to } 20\text{V}$, $I_{\text{OUT}} = 0\text{A to } 2\text{A}$	3.3V $\pm 3\%$
Maximum Output Current at V_{LOGIC}	$V_{\text{IN}} = 8\text{V to } 20\text{V}$ (Note 1)	2A
Typical Output Ripple V_{LOGIC}	$V_{\text{IN}} = 12\text{V}$, load at $V_{\text{LOGIC}} = 2\text{A}$ (20MHz BW)	23mV _{P-P}
Typical Output Ripple AV_{DD}	$V_{\text{IN}} = 12\text{V}$, load at $AV_{\text{DD}} = 500\text{mA}$ (20MHz BW)	64mV _{P-P}
Typical Switching Frequency		1.2MHz
On/Off Control	Logic Low Voltage-Off, -40°C to 85°C	0.4V MAX
	Logic High Voltage-On	2.4V MIN

Note 1: 2A maximum output current is guaranteed when V_{OFF} is unloaded. Since V_{OFF} is supplied from V_{LOGIC} , the load at V_{OFF} reduces the available current at V_{LOGIC} . More output current is available at higher input voltage. Please refer to the LT1943 data sheet for output current vs. input voltage curve.

QUICK START PROCEDURE

Demonstration circuit 620 is easy to set up to evaluate the performance of the LT1943. Refer to Figure 1 for proper measurement equipment setup 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

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- 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 input voltage does not exceed 20V. With power off, connect the input power supply to V_{IN} and GND.
 2. Turn on the power at the input.
 3. Check for the proper output voltages. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.
 4. 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.

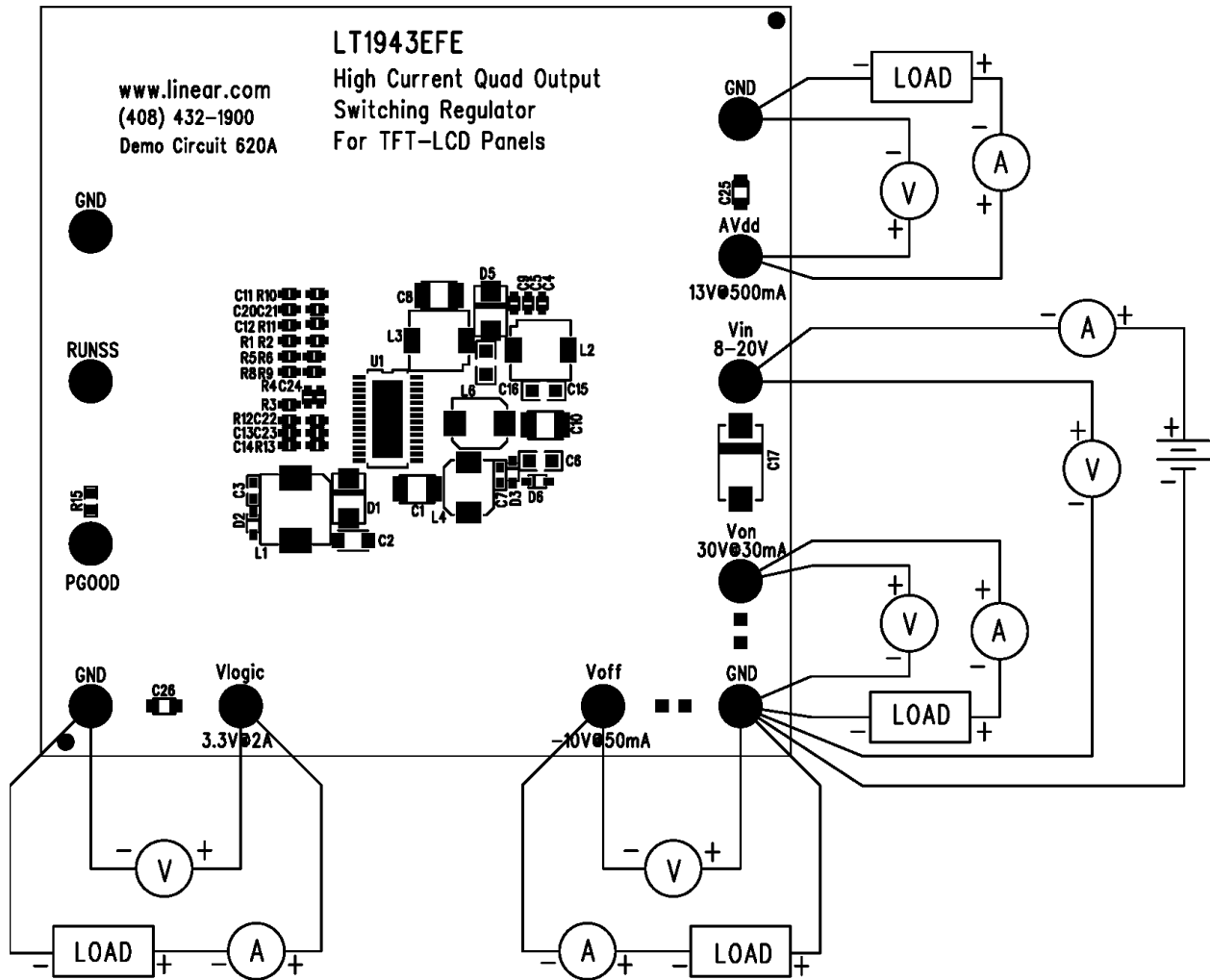


Figure 1. Proper Measurement Equipment Setup

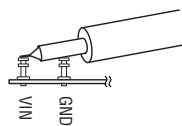
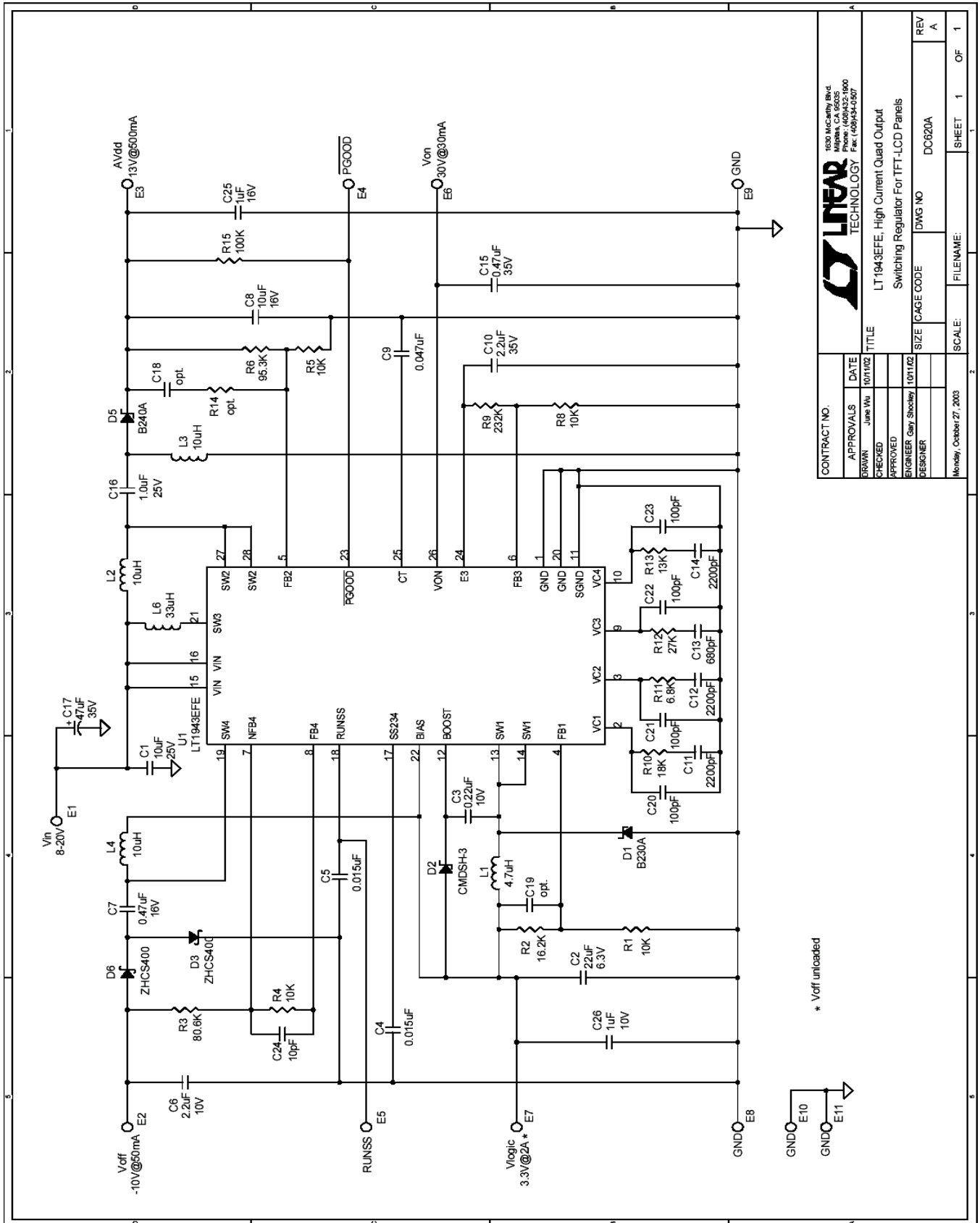


Figure 2. Measuring Input or Output Ripple

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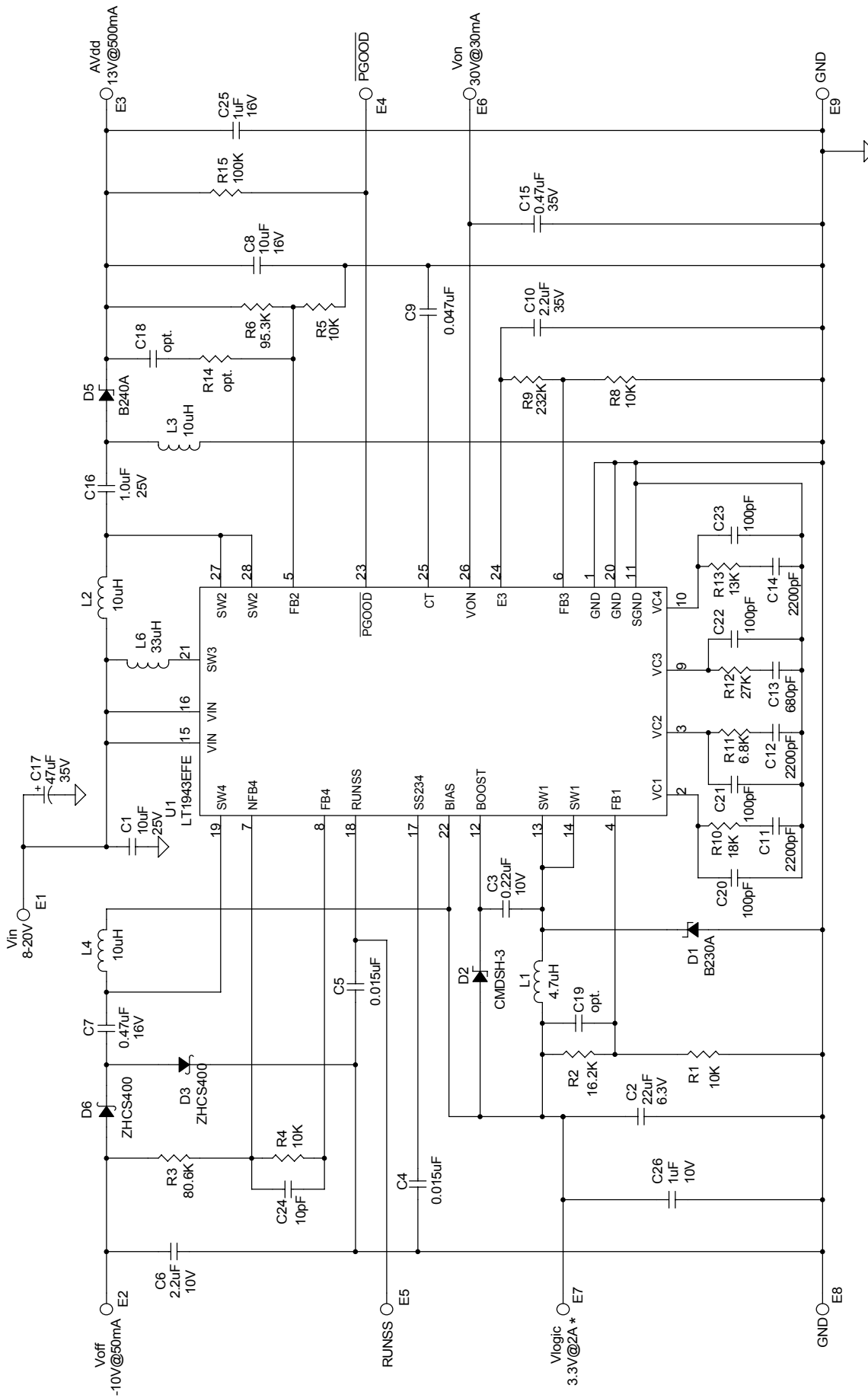
CONTRACT NO.		APPROVALS		DATE	
DRAWN		June Wu		10/11/02	
CHECKED		APPROVED		ENGINEER Gary Stroscher	
DESIGNER		10/11/02		SIZE	
DWG NO		DC620A		REV	
SCALE:		FILENAME:		SHEET 1 OF 1	
Monday, October 27, 2003				REV A	

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LINEAR
TECHNOLOGY

LT1943EFE, High Current Quad Output
Switching Regulator For TFT-LCD Panels

* Voff unloaded



* Voff unloaded

CONTRACT NO.		APPROVALS		DATE	
DRAWN		June Wu		10/11/02	
CHECKED					
ENGINEER		Gary Shockey		10/11/02	
DESIGNER					
Friday, September 12, 2003		SCALE:		FILENAME:	
REV		CAGE CODE		DWG NO	
A				DC620A	
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TITLE
LT1943EFE: High Current Quad Output
Switching Regulator For TFT-LCD Panels

SIZE		CAGE CODE		DWG NO	
				DC620A	
SCALE:		FILENAME:		SHEET	
1		1		OF	
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6/17/2005

Item	Qty	Reference	Part Description	Manufacture / Part #
37	1	R9	RES., CHIP, 232K, 1/16W, 1% 0402	AAC, CR05-2323FM
38	1	R15	RES., CHIP, 100K, 1/16W, 5% 0603	AAC, CR16-104JM
39	0	R14 (OPT.)	RES., CHIP, 0402	
40	1	U1 (Tape & Reel)	I.C.LT1943EFE, TSSOP28FE	LINEAR., LT1943EFE
41	1		PRINTED CIRCUIT BOARD	DEMO CIRCUIT #620A