LT3799
Offline Isolated Flyback Led Controller with PFC

DESCRIPTION

Demonstration circuit 1595A is an off-line isolated flyback converter featuring LT3799. The demo board is designed to drive a 20V nominal LED string at 1A from an input voltage range of 90VAC to 270VAC. It is also designed to comply with IEC 61000-3-2 Class C harmonics standard and EN55015B conducted EMI standard.

The LT3799 controls an isolated flyback converter in boundary mode, suitable for LED applications requiring 4W to over 100W of LED power. Its novel current sensing scheme delivers a well regulated output current to the secondary side without using an opto-coupler. Its unique bleeder circuit makes the LED driver compatible with TRIAC dimmers without additional components. Open- and shorted-LED protection ensures long term reliability.

The LT3799 is available in a low profile, thermally enhanced 16-lead MSOP package.

The LT3799 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1595A.

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

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PERFORMANCE SUMMARY (T_A = 25°C)

PARAMETER	CONDITIONS	VALUE
Input Range	Line Frequency, 50Hz/60Hz	90VAC to 270VAC
Output Current I_{OUT}	V_{IN} = 120VAC	1A
Maximum Output Voltage		25V
Minimum Output Voltage		16V

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QUICK START PROCEDURE

IMPORTANT NOTE TO CUSTOMERS:

HIGH VOLTAGES ARE PRESENTED ON THE DEMO CIRCUIT, AND CAN LEAD TO LETHAL INJURIES TO HUMAN BODY. ONLY QUALIFIED PERSONEL SHOULD OPERATE IT. IT IS STRONGLY RECOMMENDED TO USE SAFETY GLASSES AND AN ISOLATION TRANSFORMER.

NOTE. IMPROPER COMPONENTS REPLACEMENT ON THE DEMO CIRCUIT CAN CAUSE PERFORMANCE DETERIORATIONS, CIRCUIT MALFUNCTION, PROPERTY DAMAGE, AND EVEN LIFE-THREATHENING INJURIES. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERS FOR PROPER COMPONENT REPLACEMENT.

Demonstration circuit 1595A is easy to set up to evaluate the performance of the LT3799. Refer to Figure 1 for proper measurement equipment setup and complete the following procedure:

1. Connect a 1A LED string between LED$^+$ and LED$^-$ terminals.
2. With power off, connect the input power supply to Line (L) Input and Neutral (N) Input.
3. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed the maximum input voltage (270VAC).

4. Check for the proper output current.

Once the proper output currents are established, adjust the input voltage and/or the load and observe the output current regulation, efficiency, power factor and other parameters.

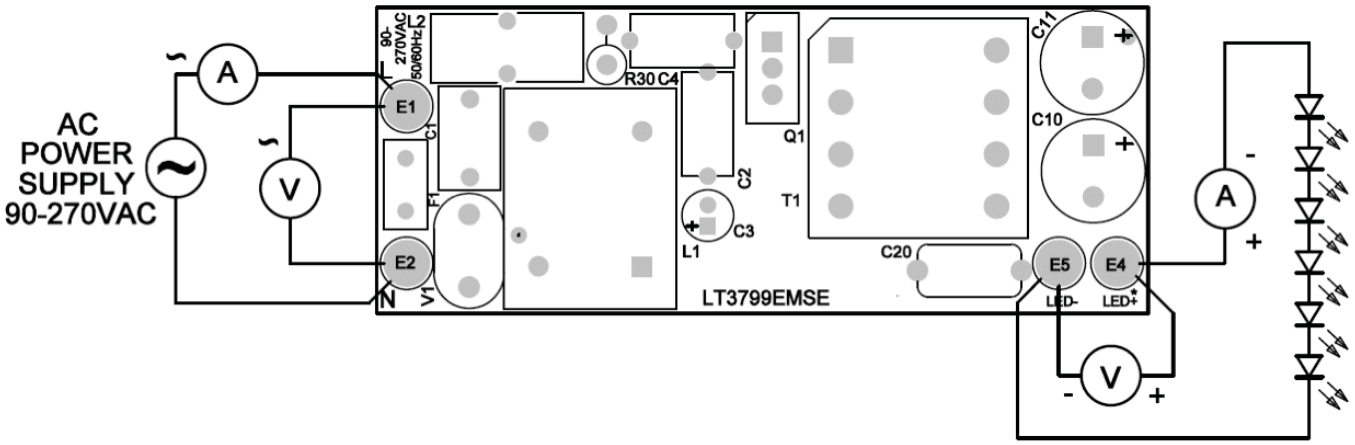


Figure 1. Proper Measurement Equipment Setup

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QUICK START PROCEDURE

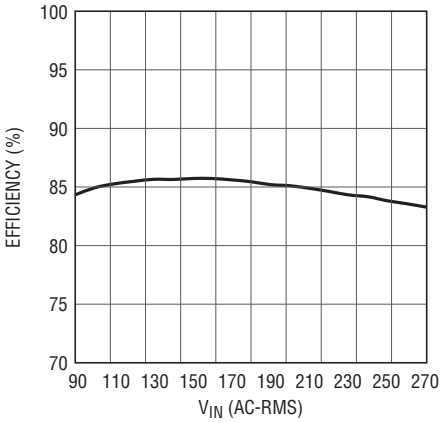


Figure 2. Efficiency vs V_{IN}

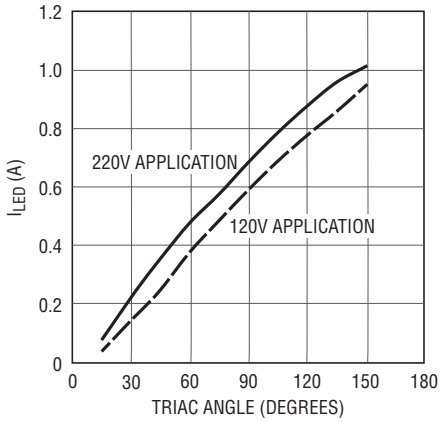


Figure 3. LED Current vs TRIAC Angle

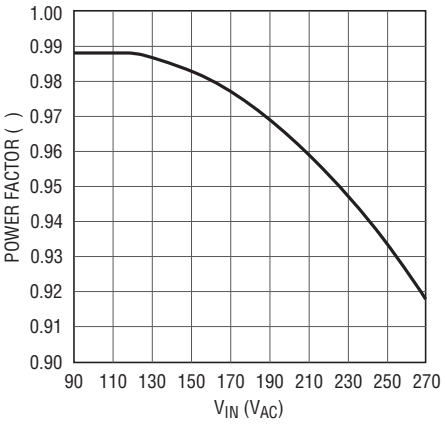


Figure 4. Power Factor vs Input Voltage

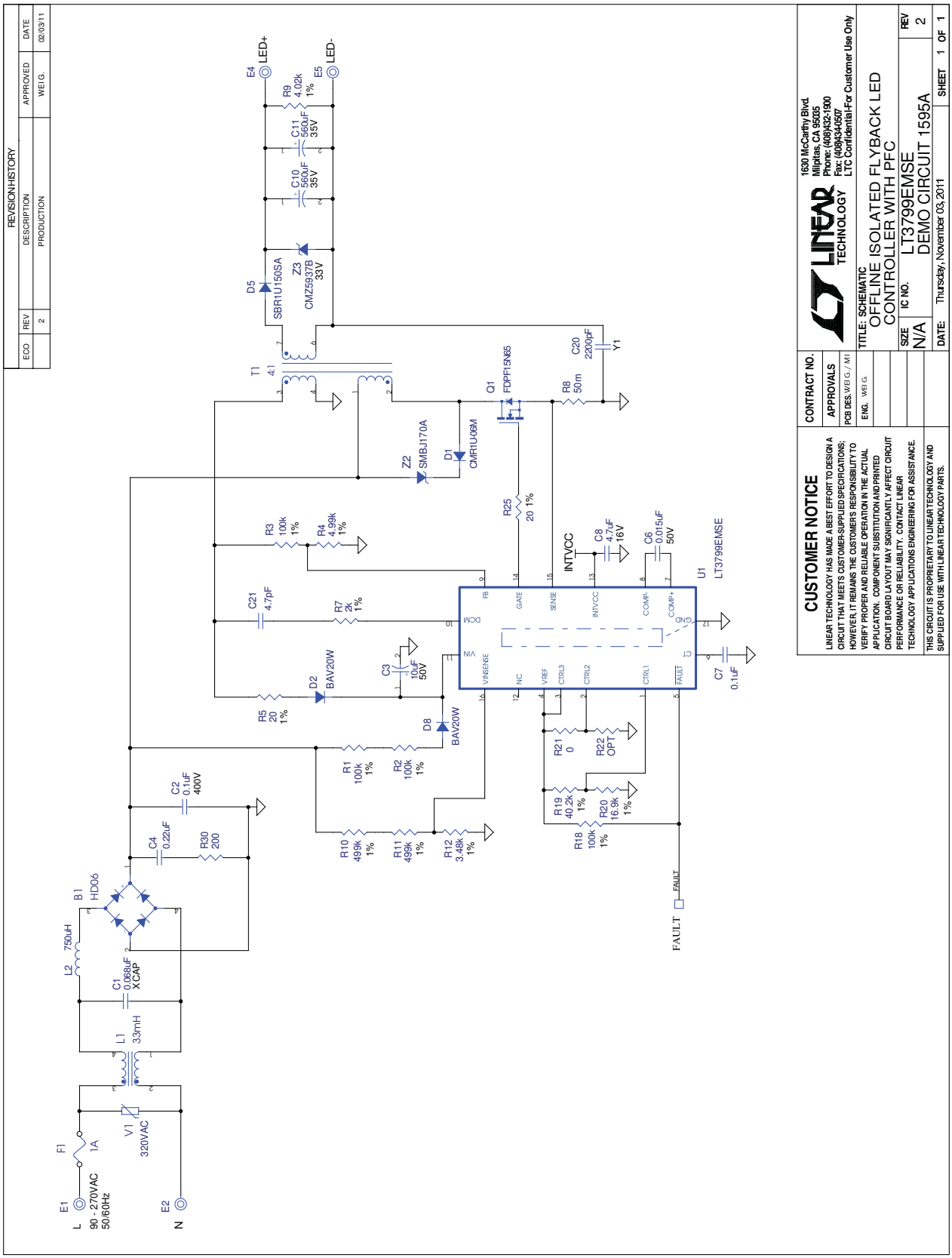
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PARTS LIST

ITEM	QTY	REFERENCE	PART DESCRIPTION	MANUFACTURER/PART NUMBER
Required Circuit Components				
1	1	B1	RECTIFIER, BRIDGE 600V 0.8A	DIODES INC. HD06-T
2	1	C1	CAP, 0.068µF 20% 305VAC MKP	VISHAY BFC2 339 20683
3	1	C2	CAP, 0.1µF 10% 450V	RUBYCON 450MMK104J
4	1	C3	CAP, 10µF 20% 50V ALUM	RUBYCON 50YXJ10M 5X11
5	1	C4	CAP, 0.22µF 20% 450V FILM	RUBYCON 450MMK 224K
6	1	C6	CAP, 0603 0.015µF 10% 50V X7R	AVX 06035C153KAT2A
7	1	C7	CAP, 0603 0.1µF 10% 50V X7R	AVX 06035C104KAT2A
8	1	C8	CAP, 0805 4.7µF 20% 16V X5R	AVX 0805YD475MAT2A
9	2	C10, C11	CAP, 560µF 20% 35V ELEC	RUBYCON 35ZLJ560M 10X20
10	1	C20	CAP, 2.2nF 10% Y5B TYPE "Y1"	VISHAY 440LD22-R
11	1	C21	CAP, 0603 4.7pF ±0.1pF 50V NP0	AVX 06035A4R7CAT2A
12	1	D1	DIODE, FAST SWITCHING	DIODES INC. US1J-13-F
13	2	D2, D8	DIODE, FAST SWITCHING	DIODES INC. BAV20W-7-F
14	1	D5	DIODE, 150V , 1A, SBR	DIODES INC. SBR1U150SA
15	1	F1	FUSE, 1A	BUSSMAN SS-5H-1A
16	1	L1	IND, 33mH	WURTH ELECTRONIK 7448640418
17	1	L2	IND, 750µH	WURTH ELECTRONIK 750311431
18	1	Q1	XSTR, MOSFET, N-CHANNEL 650V	FAIRCHILD SEMI FDPF15N65
19	2	R1, R2	RES, 1206 100kΩ 1% 1/4W	VISHAY CRCW1206100KFKEA
20	2	R3, R18	RES, 0603 100kΩ 1% 1/10W	VISHAY CRCW0603100KFKEA
21	1	R4	RES, 0603 4.99kΩ 1% 1/10W	VISHAY CRCW06034K99FKEA
22	2	R5, R25	RES, 0603 20Ω 1% 1/10W	VISHAY CRCW060320R0FKEA
23	1	R7	RES, 0603 2kΩ 1% 1/10W	VISHAY CRCW06032K00FKEA
24	1	R8	RES, 1206 0.05Ω 1% 1/4W	VENKEL LCR1206-R050GT
25	1	R9	RES, 1206 4.02kΩ 1% 1/4W	VISHAY CRCW12064K02FKEA
26	2	R10, R11	RES, 1206 499kΩ 1% 1/4W	VISHAY CRCW1206499KFKEA
27	1	R12	RES, 0603 3.48kΩ 1% 1/10W	VISHAY CRCW06033K48FKEA
28	1	R19	RES, 0603 40.2kΩ 1% 1/10W	VISHAY CRCW060340K2FKEA
29	1	R20	RES, 0603 16.9kΩ 1% 1/10W	VISHAY CRCW060316K9FKEA
30	1	R21	RES, 0603 0kΩ JUMPER	VISHAY CRCW06030000Z0EA
31	1	R30	RES, 200Ω 5% 1W METAL OXIDE	KOA MOS1CT52R201J
32	1	T1	XFMR, FLYBACK	COILCRAFT JA4429-AL
33	1	U1	IC, TRAIC DMMABLE OFFLINE LED DRIVER	LINEAR TECH. LT3799EMSE
34	1	V1	VARISTOR, 320V RMS 13.5MM RADIAL	SEI CV1320K10T
35	1	Z2	DIODE, TRANSIENT VOLTAGE SUPPRESSOR 170V	DIODES INC. SMBJ170A
36	1	Z3	DIODE, ZENER, 33V	DIODES INC.SMAZ33-13-F
Additional Demo Board Circuit Components				
1	0	R22	RES, 0603 OPTION	OPTION
Hardware				
1	4	E1, E2, E4, E5	TURRET	MILL MAX MILL-MAX 2501-2-00-80-00-00-07-0

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SCHEMATIC DIAGRAM



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This notice contains important safety information about temperatures and voltages. For further safety concerns, please contact a LTC application engineer.

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