



LED Driver Demo Board

Input 85-265VAC // Output 350mA, 50V (17.5W)

General Description

The AN9961 demo board is a high-brightness LED driver employing the average-mode constant current control scheme. The power conversion stage of the AN9961DB1 consists of a diode bridge rectifier followed by a buck converter operating with fixed off-time of 15µs.

The AN9961DB1 LED driver features tight regulation of the LED current within a few milliamps over the entire range of the input AC line and the output LED string voltage. The LED current accuracy is almost insensitive to the passive component tolerances, such as the output filter inductance or

the timing resistor. The accuracy of the LED current is mainly determined by the internal 275mV ± 3% reference voltage of the AN9961 control IC and by the external current sense resistor tolerance. Accurate current control is only achieved with continuous conduction of the filter inductor, i.e. when the LED current is greater than the inductor ripple current amplitude. PWM dimming can be achieved by applying a pulse-width modulated square wave signal between the PWMD and GND pins.

The AN9961DB1 features protection from an output short circuit condition. Open LED protection is inherent, since the output filter capacitor can accept the full rated rectified AC line voltage.

Please, note that the demo board is not CISPR15 compliant. An additional input EMI filter circuit is required to make the board meet conducted electro-magnetic emission limits.

Warning!

Working with this board can cause serious bodily harm or death. Connecting the board to a source of line voltage will result in the presence of hazardous voltage throughout the system including the LED load.

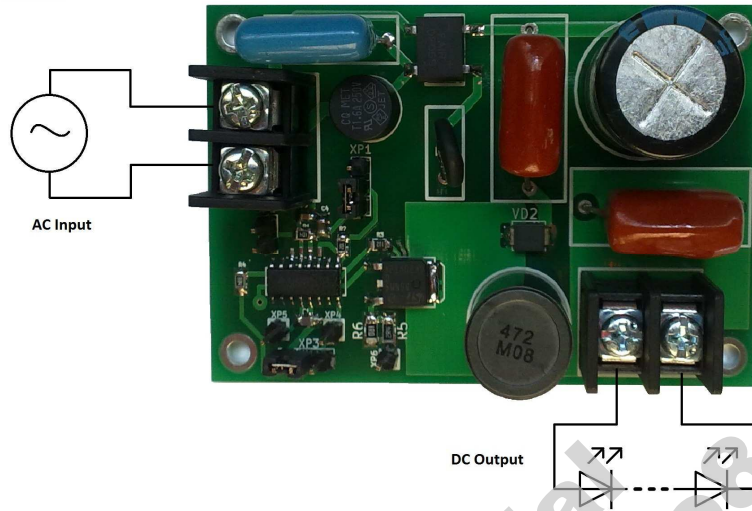
The board should only be handled by persons well aware of the dangers involved with working on live electrical equipment. Extreme care should be taken to protect against electric shock. Disconnect the board before attempting to make any changes to the system configuration. Always work with another person nearby who can offer assistance in case of an emergency. Wear safety glasses for eye protection.

The electrolytic capacitor carries a hazardous voltage for an extended time after the board is disconnected. Check the capacitor voltage before handling the board.

Specifications	
Input voltage	85 to 265VAC, 50Hz
Output voltage:	10 to 50V
Output current:	350mA +/-5%
Output power:	17.5W
Max. Input Current	0.25A RMS
Efficiency	90%
Output current ripple	20%
Output short circuit protection	Yes
Output overvoltage, open circuit protection	Yes
Constant Off Time	15 us
Switching frequency	About 60kHz (depends on the input and output voltage)
Dimensions:	75 x 50 x 30 mm



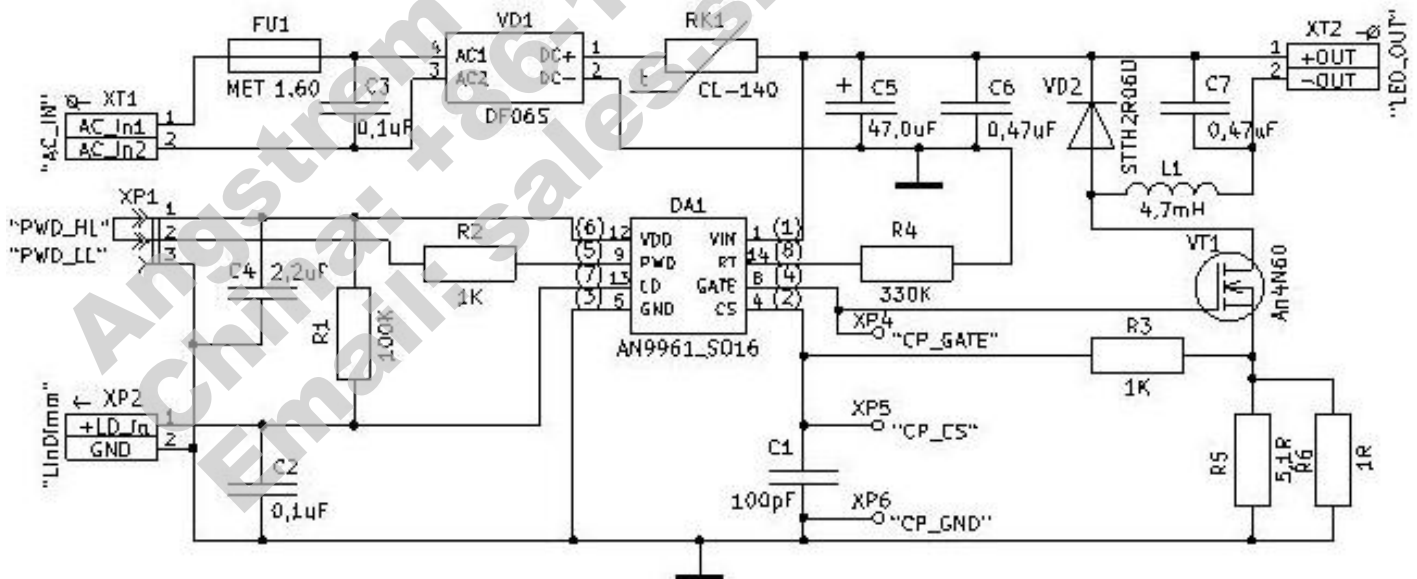
Board Connections



Connection Instructions

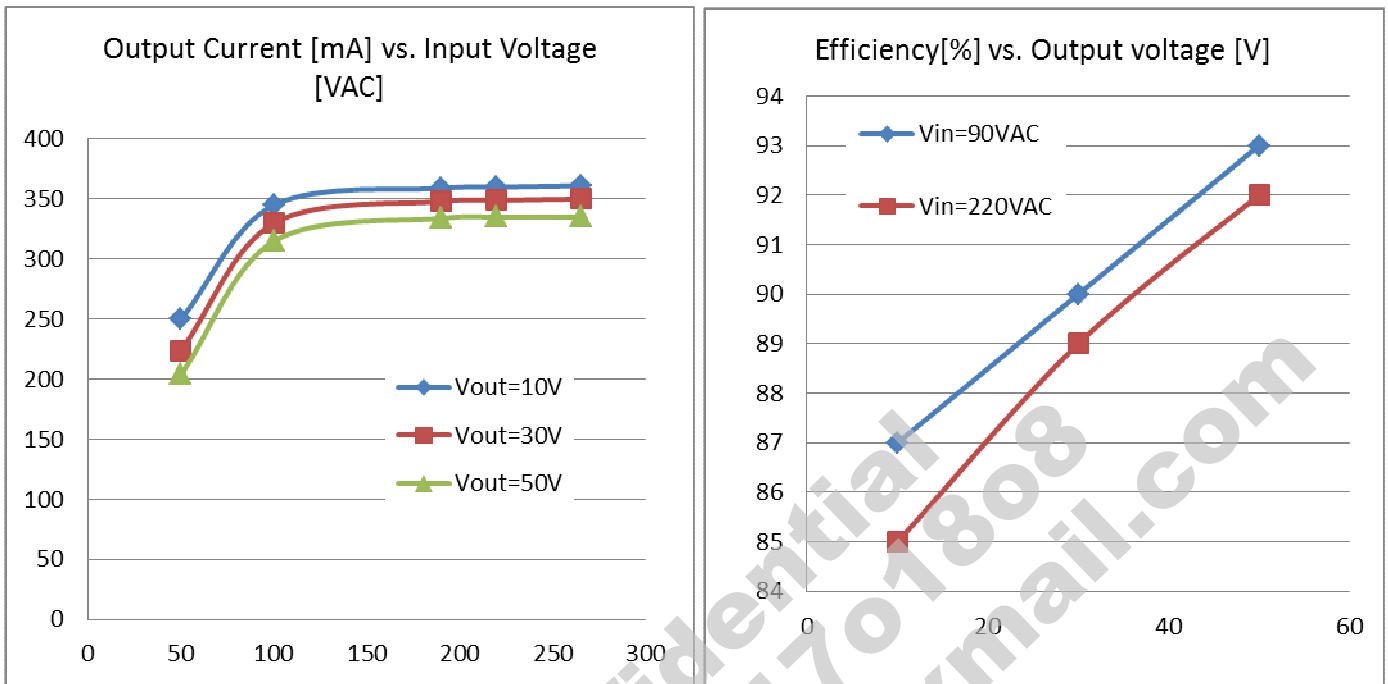
1. Carefully inspect the board for shipping damage, loose components, etc, before making connections.
2. Connect the board to the line and load as shown in the diagram. Be sure to check for correct polarity when connecting the LED string to avoid damage to the string. The LED string voltage can be anything between 10 and 50V.
3. Energize the mains supply.

Schematic Diagram

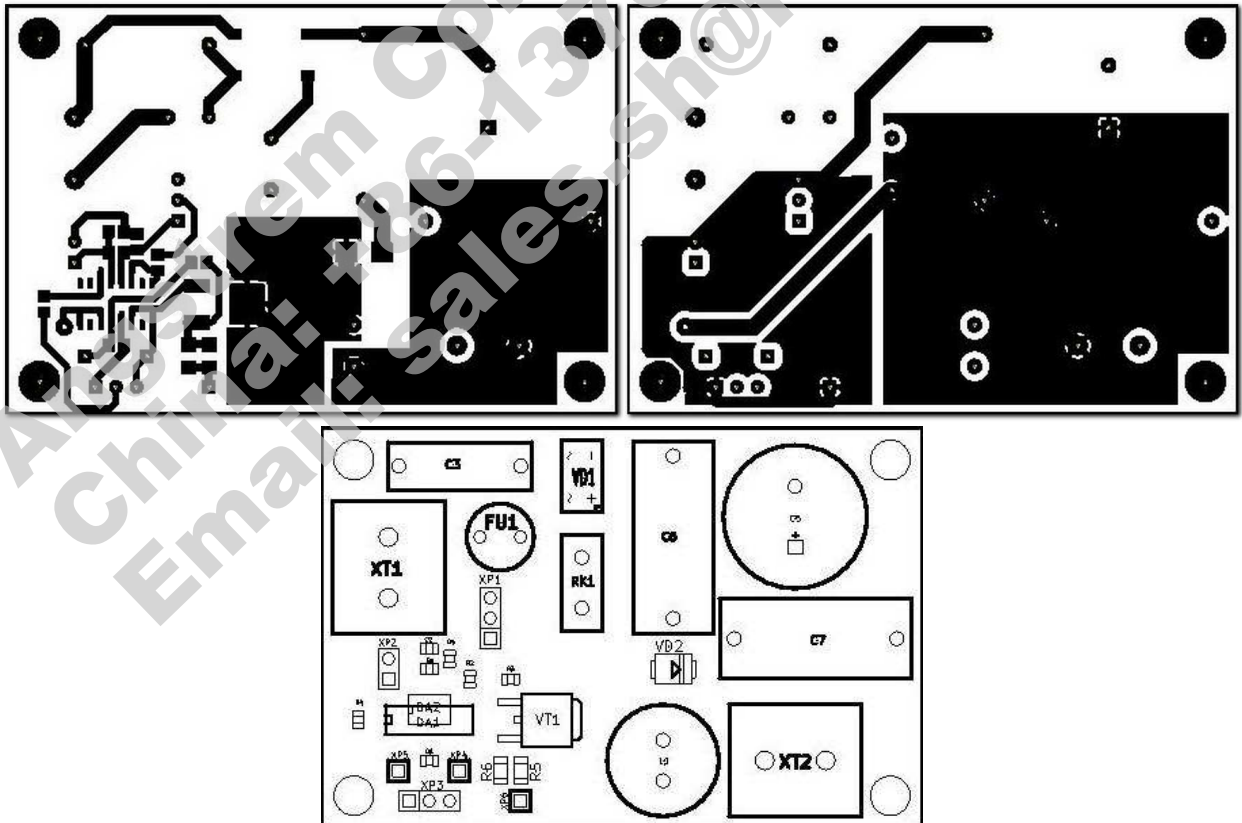




Typical Characteristics



PCB Layout



**Bill of Materials**

Qty	REF	Description	Manufacturer	Product Number
1	C1	Cap Cer X7R 0805 100pF 50V	Kemet	C0805C101K1RACTU
1	C2	Cap Cer X7R 0805 0.1uF 50V	Kemet	C0805C104K1RACTU
1	C3	Cap MEF 0.1uF 400V	Shengxin	CL21-0.1uF-400V
1	C4	Cap Cer X7R 0805 2.2uF 25V	Kemet	C0805C225K1RACTU
1	C5	Cap AlEl ED Rad 450V 22uF	Panasonic ECG	ECA-2WM220
2	C6, C7	Cap MEF 0.47uF 400V	Shengxin	CL21-0.47uF-400V
1	DA1	IC LED Driver SO-8 (SO-16)	Angstrom	AN9961
1	FU1	Fuse 1.6 A 250V	Conquer	MET1.6
1	L2	Inductor 4.7 mH 0.48A	Sumida	RCP1317NP-472L
1	VD1	Rect Bridge 600V 0.5A	Vishay	DF06S
1	VD2	Diode UltraFast SMB 600V 2A	ST	STTH2R06U
1	VT1	Transistor N-MOSFET 600V 4A	Angstrom	AN4N60
1	R1	Res 0805 5% 100kOhm	---	---
1	R2	Res 0805 5% 1kOhm	---	---
1	R3	Res 0805 5% 1kOhm	---	---
1	R4	Res 0805 5% 330kOhm	---	---
1	R5	Res 1206 5% 51Ohm	---	---
1	R6	Res 1206 5% 10hm	---	---
1	RK1	50ohm Thermistor Tolerance B± 25%	GE SENSING	CL-140
2	XT1, XT2	Terminal Block 250VAC 1A	Ningbo	TB-10-2
6	XP1-XP6	PLS-connectors step 2.54mm	Connfly Electronic	DS1021

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