

## LED Driver Demo Board

**Input 30-160VAC // Output 350mA, 3.5-40V (35W max.)**

### General Description

The AN9911DB1 is an LED driver capable of driving up to 25 one-watt LEDs in series from an input of 110VAC. The demo board uses AN9911 in a buck topology with the HV7800 used for high side current sensing. The converter has a very good initial regulation ( $\pm 5\%$ ) and excellent line and load regulation over the entire input and output voltage range ( $< \pm 2\%$ ). The full load efficiency of the converter is typically greater than 85%.

The AN9911DB1 is protected against open LED and output short circuit conditions. It is also protected

from input under voltage conditions. It has a very good PWM dimming response, with typical rise and fall times of less than 5.0 $\mu$ s, which will allow high PWM dimming ratios.

The switching frequency of the AN9911DB1 can be synchronized to other AN9911 boards or to an external clock by connecting the clock to the SYNC pin of the AN9911DB3.

Specifications	
Input voltage	30 to 160VAC, 50Hz
Output voltage:	3.5 to 100V
Output current:	350mA $\pm 2\%$
Output power:	Up to 35W
Efficiency	85%
Output current ripple	20%
Output short circuit protection	Yes
Output overvoltage, open circuit protection	Yes
Constant Off Time	15 $\mu$ s
Switching frequency in Constant Off Time mode	About 60kHz (depends on the input and output voltage)
Constant frequency mode	Yes, 60kHz
Dimensions:	75 x 50 x 28 mm

### Warning!

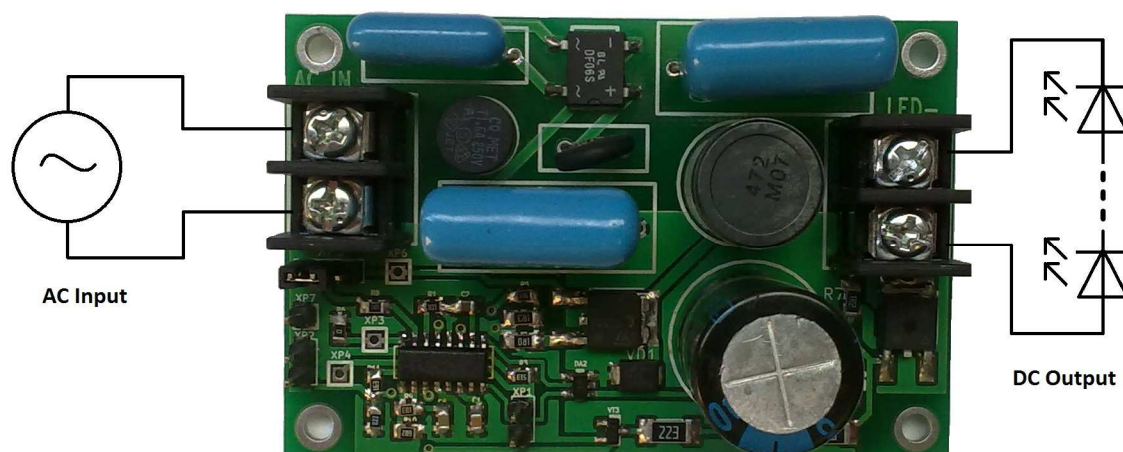
*Working with this board can cause serious bodily harm or death. Connecting the board to a source of line voltage will result in the presence of hazardous voltage throughout the system including the LED load.*

*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.*

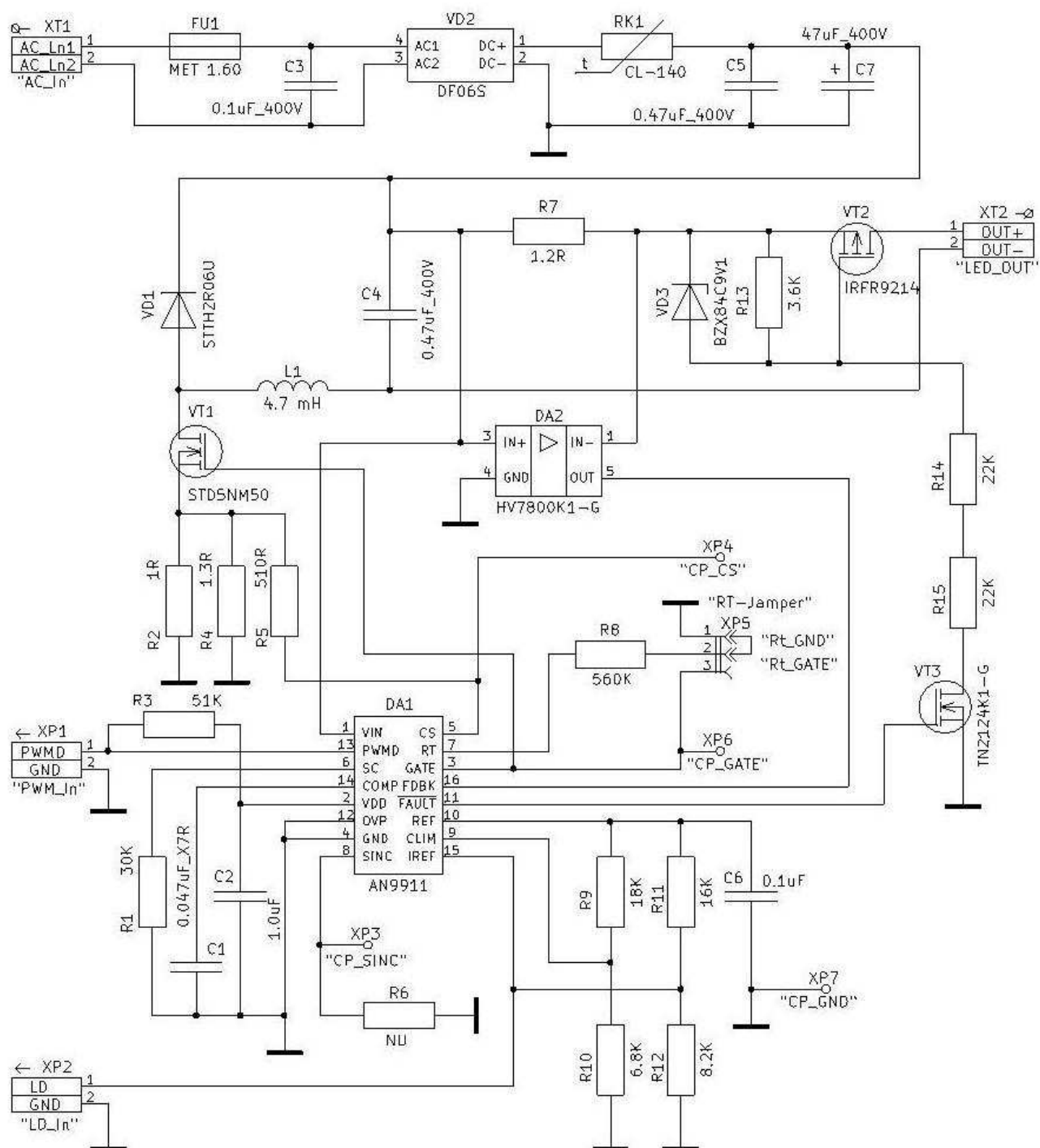


## Board Connections



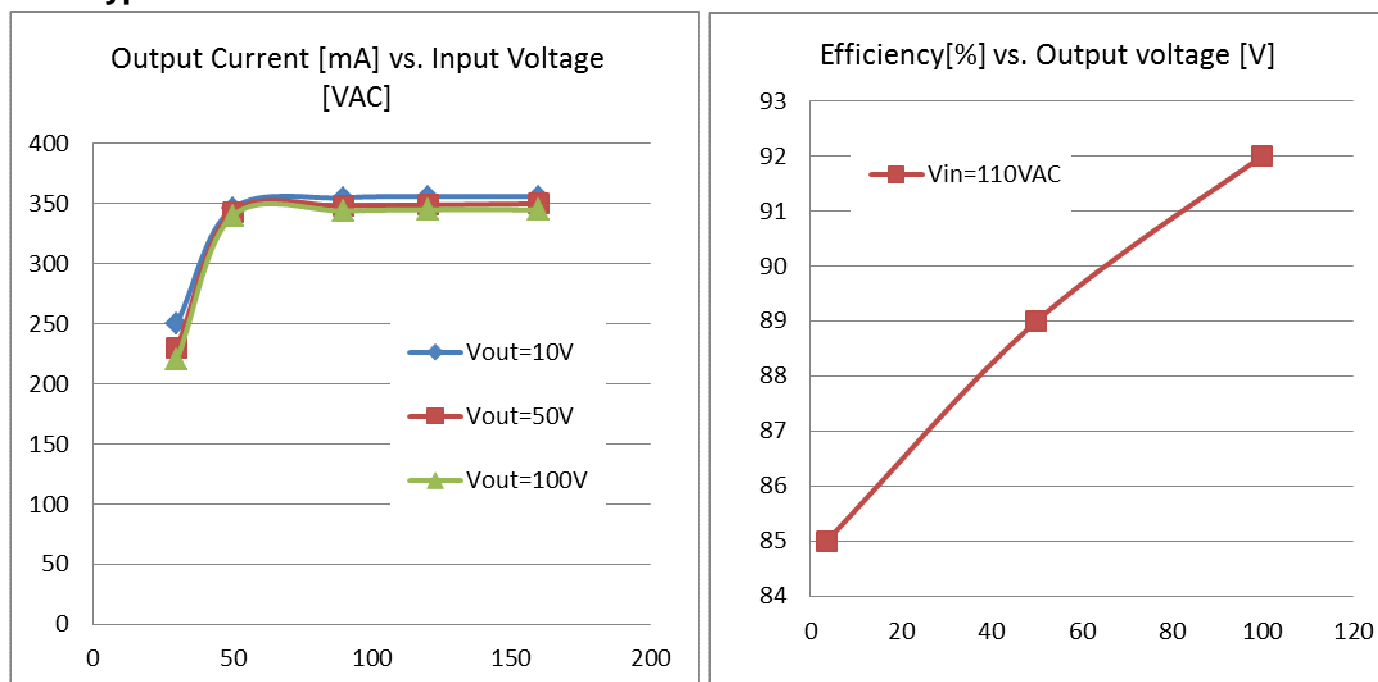
## Connection Instructions

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 3.5 and 100V.
3. Energize the mains supply.

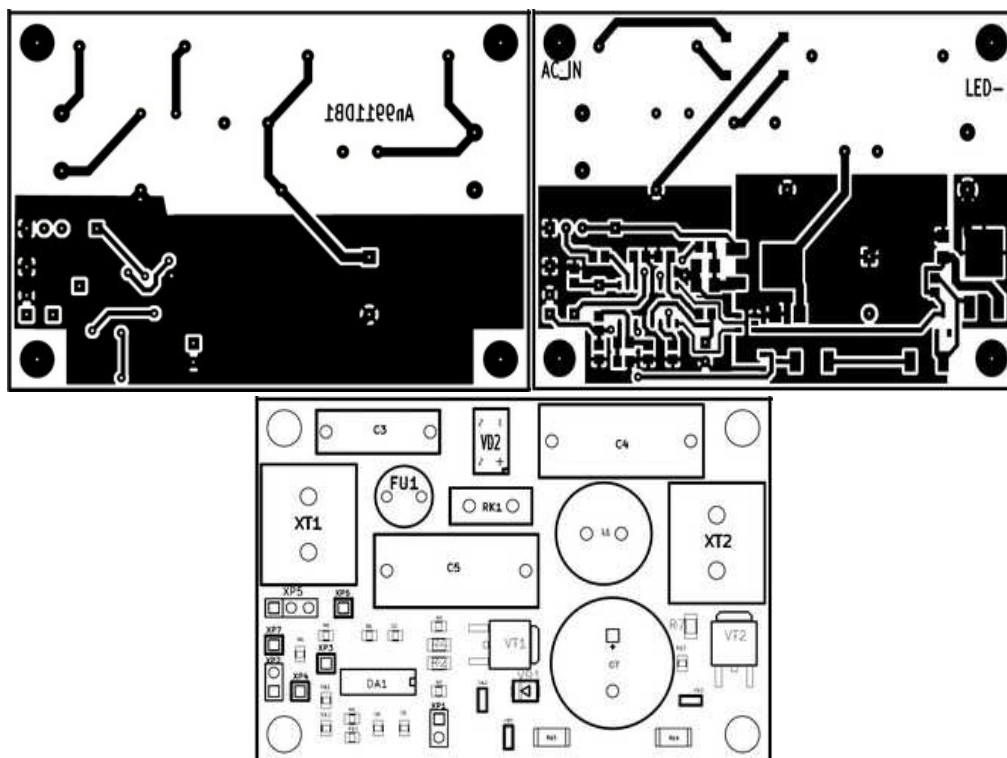
**Schematic Diagram**



## Typical Characteristics



## PCB Layout



**Bill of Materials**

Qty	REF	Description	Manufacturer	Product Number
1	C1	Cap Cer X7R 0805 0.047uF 25V	Kemet	C0805C473K1RACTU
1	C2	Cap Cer X7R 0805 1uF 25V	Kemet	C0805C105K1RACTU
1	C3	Cap MEF 0.1uF 400V	Shengxin	CL21-0.1uF-400V
2	C4, C5	Cap MEF 0.47uF 400V	Shengxin	CL21-0.47uF-400V
1	C6	Cap Cer X7R 0805 0.1uF 25V	Kemet	C0805C104K1RACTU
1	C7	Cap Alel ED Rad 400V 47uF	Panasonic ECG	ECA-2WM220
1	DA1	IC LED Driver SO-16	Angstrem	AN9911
1	DA2	IC Operational Amplifier	Supertex	HV7800K1-G
1	FU1	Fuse 1.6 A 250V	Conquer	MET1.6
1	L1	Inductor 4.7 mH 0.48A	Sumida	RCP1317NP-472L
1	VD1	Diode UltraFast SMB 600V 2A	ST	STTH2R06U
1	VD2	Rect Bridge 600V 0.5A	Vishay	DF06S
1	VD3	Zener Diode 9.1V 250mW	Diotec	BZX84C9V1
1	VT1	Transistor N-MOSFET 600V 4A	Angstrem	IRFR9214
1	VT2	Transistor P-MOSFET 250V 2.7A	IR	AN4N60
1	VT3	Transistor N-MOSFET 240V 15 Ohm	Supertex	TN2124K1-G
1	R1	Res 0805 5% 30kOhm	---	---
1	R2	Res 1206 1% 1Ohm	---	---
1	R3	Res 0805 5% 51kOhm	---	---
1	R4	Res 1206 1% 1.3Ohm	---	---
1	R5	Res 1206 1% 510Ohm	---	---
1	R6	NU	---	---
1	R7	Res 1206 5% 1.2Ohm	---	---
1	R8	Res 0805 5% 560kOhm	---	---
1	R9	Res 0805 5% 18kOhm	---	---
1	R10	Res 0805 5% 6.8kOhm	---	---
1	R11	Res 0805 5% 16kOhm	---	---
1	R12	Res 0805 5% 6.8kOhm	---	---
1	R13	Res 0805 5% 3.6kOhm	---	---
1	R14	Res 2010 5% 22kOhm	---	---
1	R15	2010 5% 22kOhm	---	---
1	RK1	50ohm Thermistor Tolerance B $\pm$ 25%	GE SENSING	CL-140
2	XT1, XT2	Terminal Block 250VAC 1A	Ninqbo	TB-10-2
6	XP1-XP6	PLS-connectors step 2.54mm	Connfly Electronic	DS1021