

## Universal Off-line LED Driver Demo Board

### Introduction

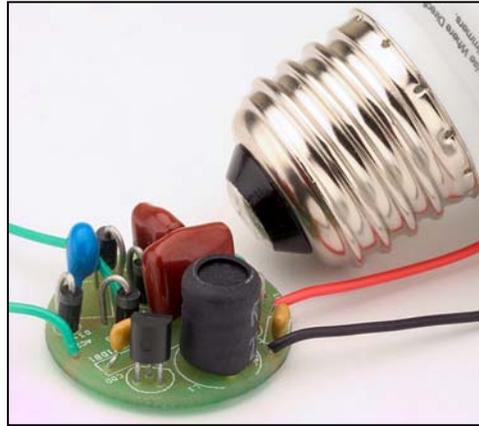
The Supertex HV9921DB1 demo board is a complete LED power driver to supply a string LEDs using the HV9921, an integrated 3-pin high input voltage constant-current buck regulator IC. The HV9921 integrates a 500V switching MOSFET and can operate directly from the rectified universal AC line voltage range of 80 to 265VAC.

The current in the LED string is internally programmed to 20mA ±15%. The HV9921DB1 is ideally suited for driving strings of LEDs having forward voltage from 20V to 50V at high efficiency (typically 80% at 120VAC).

The HV9921DB1 is a peak current-controlled buck converter operating with fixed off-time of 10.5us. Its fixed off-time control scheme provides good stability and tight regulation of the LED current throughout the input AC line voltage range. As its switching frequency varies over the AC line cycle, the HV9921 inherently introduces frequency dither and simplifies the compliance with EMI regulations.

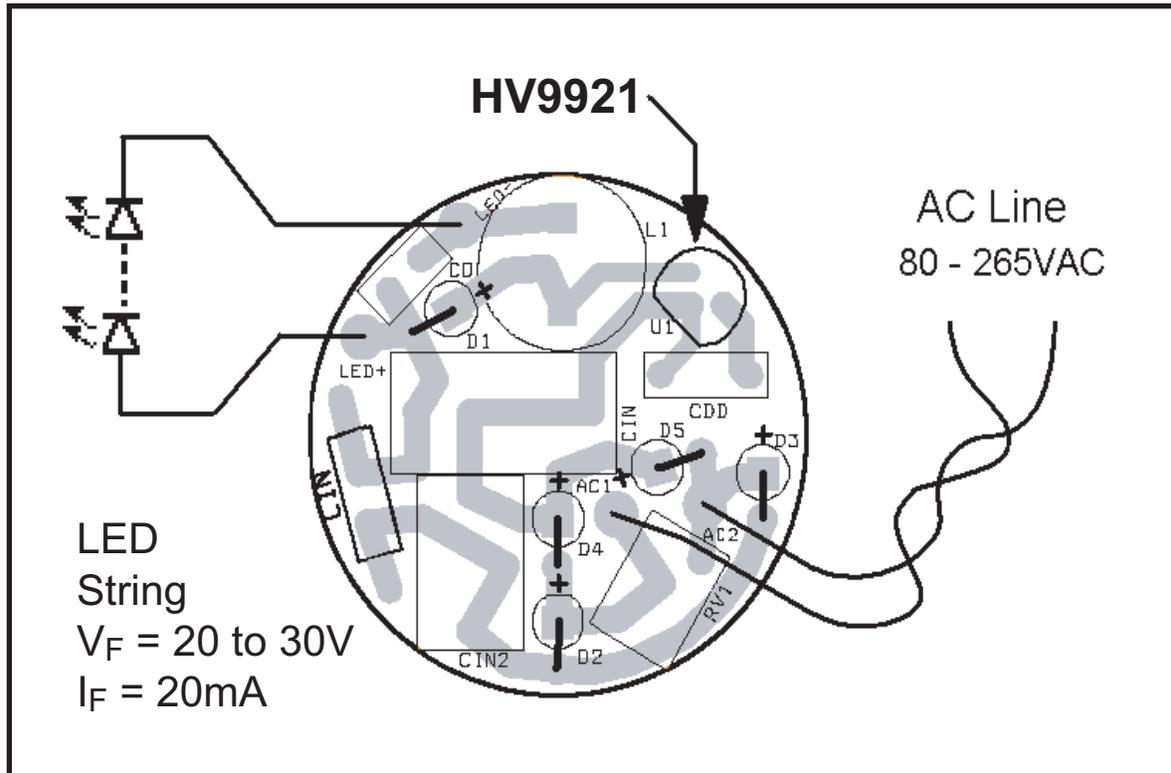
### Specifications

Input Voltage Range:	80 to 265VAC
Load Current:	20mA ± 15%
LED String Voltage:	20V to 50V
Efficiency @ 120VAC	80% (typ.)
Conducted EMI:	CISPR 15



Actual Size: 53.5mm x 26.75mm

### Board Layout and Connections



## Instructions

### HV9922DB1 Pinout

**LED+:** Connect the Anode of the LED string to this pin.

**LED-:** Connect the Cathode of the LED string to this pin.

**AC1, AC2:** Connect AC Line to these pins.

**Note:** The Board is not protected from output open/short circuit condition. Damage to the Demo Board may occur if the output load is not properly connected.

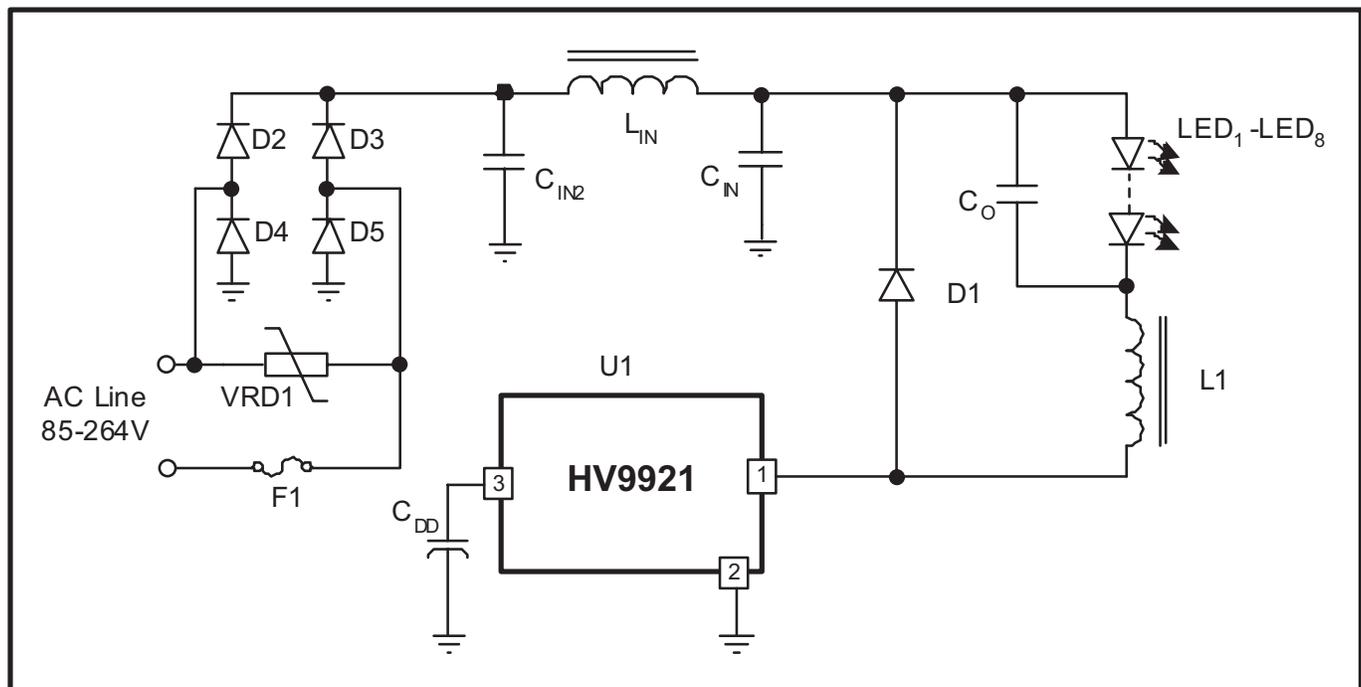
### Testing HV9921DB1

Connect the LED string to the output terminals.

Check the polarity of the LED connection, anode end of the string should be connected to the positive output, cathode should be connected to the negative output. Connect the AC input to the input terminals. Apply the AC voltage at the input terminals and the LED string should start to glow. The HV9921DB1 will regulate constant 20mA current in the LED.

An ammeter can be connected in series with the LED(s) to measure the output current. The average current reading may be smaller than 20mA. This is due to the interruptions in the LED current when the input AC line voltage falls below the forward voltage of the LED string. The average current will also vary over the AC line voltage range. Additional hold-up capacitance can be included across  $C_{IN}$ , if these interruptions are not desirable.

## Schematic Diagram



## HV9921DB1 – List of Materials

Reference	Part Number	Manufacturer	Description
C <sub>IN</sub>	ECQ-E4104KF	Panasonic	0.1μF, 400V, Metalized Polyester Film
C <sub>IN2</sub>	ECQ-E4333KF	Panasonic	0.033μF, 400V, Metalized Polyester Film
C <sub>O</sub>	B37981M1103K054	Epcos	0.01μF, 100V, X7R, MLCC
C <sub>DD</sub>	B37987F5104K054	Epcos	0.1μF, 50V, X7R, MLCC
L1	RL-5480-3-68000	Renco Electronics	68mH, 36mA, Mini-Drum
L <sub>IN</sub>	CTH6-222K	Central Technologies	2.2mH, 64mA, Axial
D1	MUR160	On Semiconductor	Diode, UF 600V 1A 75ns
D2-5	1N4005	Diodes, Inc	Diode, 600V 1A
VRD1	ERZ-V05D431	Panasonic	Surge Absorber
U1	HV9921N3	Supertex, Inc	LED Driver IC
F1	N/A	N/A	Integrated PCB Fuse

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