

Features:

- 8V to 450V Input Voltage Range
- >90% Efficiency
- Drives from 1 to Hundreds of LEDs in Series/Parallel Combinations
- Regulated LED Drive Current
- Linear or PWM Brightness Control
- Resistor Programmable Oscillator Frequency
- SOIC-8 EP RoHS Compliant Package

Applications:

- Flat Panel Display RGB Backlighting
- Signage and Decorative LED Lighting
- DC/DC or AC/DC LED Driver Applications

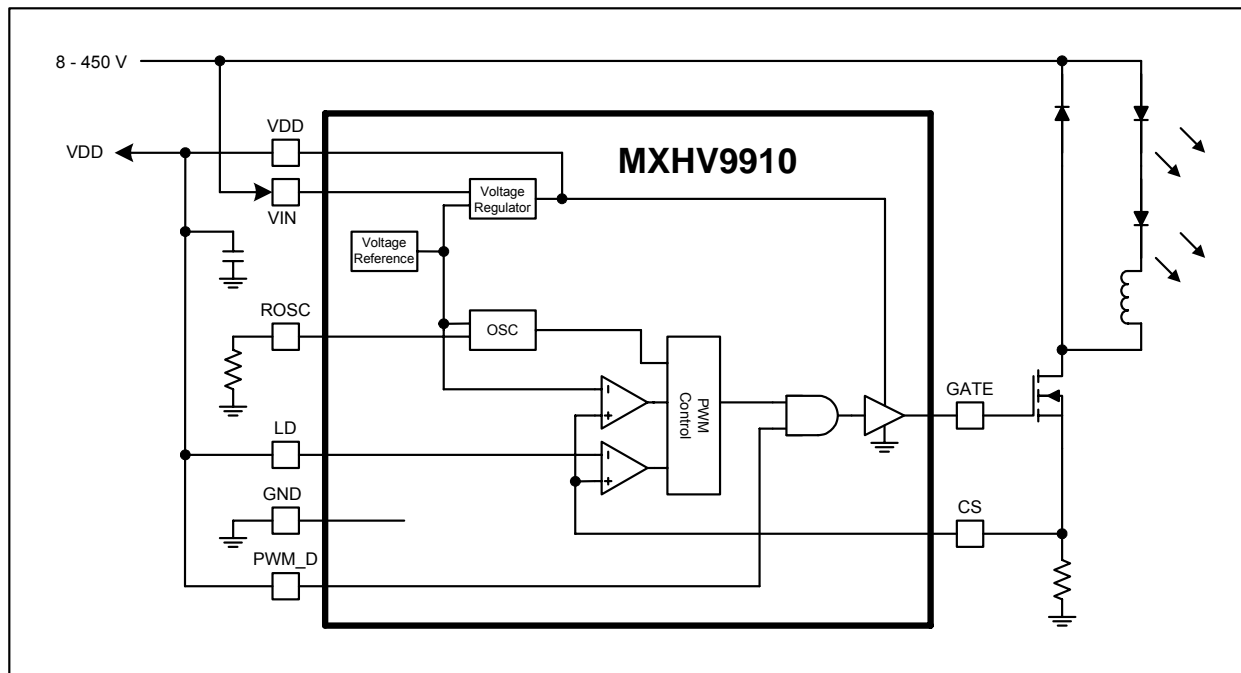
General Description

The MXHV9910 is a high-efficiency off-line LED driver. Manufactured using a dielectrically isolated process the MXHV9910 can operate from 8V to 450V. This highly versatile input operating voltage enables a broad range of High Brightness (HB) LED applications. The MXHV9910 drives an external MOSFET at a fixed oscillator frequency set by an external resistor. Peak constant current to an LED string is maintained by modulating the MOSFET GATE signal on and off through the external current sense resistor connected to the CS input. Dimming of and LED string is controlled by adjusting the duty cycle of the PWM input, or applying a control voltage from 0 to 250mV to the LD input.

Ordering Information

Part No.	Description	Qty
MXHV9910BE	SOIC-8 EP Tube	100
MXHV9910BETR	SOIC-8 EP Tape & Reel	2000

Functional Block Diagram and Typical Application



Absolute Maximum Ratings

Parameter	Symbol	Maximum	Units
VIN to GND		-0.5 to +460	V
CS		-0.3 to VDD+0.3	V
PD, PWM_D to GND		-0.3 to VDD+0.3	V
GATE to GND		-0.3 to VDD+0.3	V
VDDMAX		15	V
Thermal Resistance, Junction to Ambient	θ_{JA}	50 Typical ^(NOTE 1)	$^{\circ}\text{C}/\text{W}$
Power Dissipation		1.5 ^(NOTE 1,2)	W
Operating Ambient	TA	-40 to +85	$^{\circ}\text{C}$
Storage Temperature	TSTG	-55 to +150	$^{\circ}\text{C}$

Absolute Maximum Ratings are stress ratings. Stresses in excess of these ratings can cause permanent damage to the device. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this data sheet is not implied. Exposure of the device to the absolute maximum ratings for an extended period may degrade the device and affect its reliability.

Note 1: 4 layer PCB

Note 2: Assumes T_{JMAX} = 125 $^{\circ}\text{C}$, Heat Dissipation = (T_{JMAX} - 50 $^{\circ}\text{C}$) / θ_{JA}

Pin Description

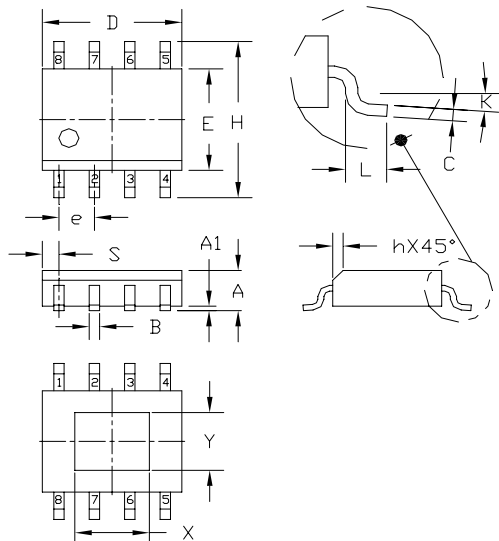
Pin No.	Pin Name	Description
1	VIN	Input Voltage 8V to 450V DC
2	CS	LED Current Sense input. Internal current sense threshold is set at 250mV. The external sense resistor sets the maximum LED current.
3	GND	Device Ground
4	GATE	External MOSFET Gate Driver Output
5	PWM_D	Low frequency PWM Dimming Control input with internal pull-down resistor.
6	VDD	7.8V regulated supply voltage output. Requires a storage capacitor to ground.
7	LD	Linear Dimming. Sets the current limit lower than the internal 250mV threshold at the current sense comparator.
8	ROSC	Resistor to ground sets the oscillator / primary PWM frequency.

Electrical Characteristics

TA=25 °C unless otherwise specified.

Parameter	Symbol	Condition	Min	Typ	Max	Units
Input DC Voltage Range	V _{INDC}	DC input voltage	8		450	V
Shut-Down mode supply current	I _{INSD}	PWM_D to GND V _{IN} = 15-450V			1	mA
Internal DC Voltage Regulator	V _{DD}	V _{IN} = 15-450V, I _{DD(ext)} = 0 Gate output open.		7.8		V
Maximum voltage to V _{DD} pin	V _{DDmax}	External voltage applied to the V _{DD} pin			12	
V _{DD} current available for external circuitry	I _{DD(ext)}	V _{IN} = Limited by package power dissipation.		1.0		mA
PWM_D input low voltage		V _{IN} = 8-450V			0.5	V
PWM_D input high voltage		V _{IN} = 8-450V	2.4			V
PWM_D pull-down resistance	R _{EN}			135		kΩ
Current sense threshold voltage	V _{CS(hi)}			250		mV
GATE high output voltage	V _{GATE(hi)}	I _{OUT} = 10mA		V _{DD} -0.3		V
GATE low output voltage	V _{GATE(lo)}	I _{OUT} = -10mA		0.3		V
Oscillator frequency	f _{OSC}	R _{OSC} = 400kΩ		64		kHz
Maximum Oscillator PWM Duty Cycle	D _{MAXhf}		85			%
Linear Dimming Voltage Range	V _{LD}	V _{IN} = 15V	0		250	mV
Current Sense Blanking Interval	T _{BLANK}			400		nS
Delay from CS trip to GATE lo	t _{DELAY}			300		nS
GATE output rise time	t _{RISE}	C _{GATE} = 500pF		16		nS
GATE output fall time	t _{FALL}	C _{GATE} = 500pF		7		nS

8 LEAD SOIC WITH EXPOSED PAD



DIM.	INCH		MM.		NOTE
	MIN.	MAX.	MIN.	MAX.	
A	.053	.069	1.35	1.75	----
A1	.004	.010	.10	.25	----
B	.013	.020	.33	.51	----
C	.008	.010	.19	.25	----
D	.1890	.1968	4.80	5.00	②
E	.150	.157	3.80	4.00	③
F	.050	BSC	1.27	BSC	----
H	.228	.244	5.80	6.20	----
h	.010	.020	.25	.50	----
S	.0155	.0255	.394	.648	----
K	0°	8°	0°	8°	----
L	.016	.050	.40	1.27	----
X	.080	.130	2.032	3.302	----
Y	.080	.095	2.032	2.413	----

- 5. TERMINAL NUMBERS ARE SHOWN FOR REFERENCE ONLY.
- 4. "L" IS THE LENGTH OF TERMINAL FOR SOLDERING TO A SUBSTRATE.
- ③ DIMENSION "E" DOES NOT INCLUDE INTER-LEAD FLASH OR PROTRUSIONS. INTER-LEAD FLASH AND PROTRUSION SHALL NOT EXCEED .010" (0.25mm) PER SIDE.
- ② DIMENSION "D" DOES NOT INCLUDE MOLD FLASH, PROTRUSIONS OR GATE BURRS. MOLD FLASH, PROTRUSIONS AND GATE BURRS SHALL NOT EXCEED .006" (0.15mm) PER SIDE.
- 1. REFERENCE DRAWING JEDEC MS012, VARIATION AA.

NOTES: (UNLESS OTHERWISE SPECIFIED)

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