JWB19816

Low LED Current Ripple, High Efficiency Linear LED Driver

Parameters Subject to Change Without Notice

DESCRIPTION

The JWB19816 is a linear LED driver with power MOSFET integrated, and the output current is set by the external resistor. Patented current control strategy ensures low output current ripple and high accuracy while the system is simple with few external components and very low BOM cost.

JWB19816 provides over temperature protection. When temperature inside chip exceeds OTP_{CHIP}, JWB19816 decreases LED current, which can help chip cooling.

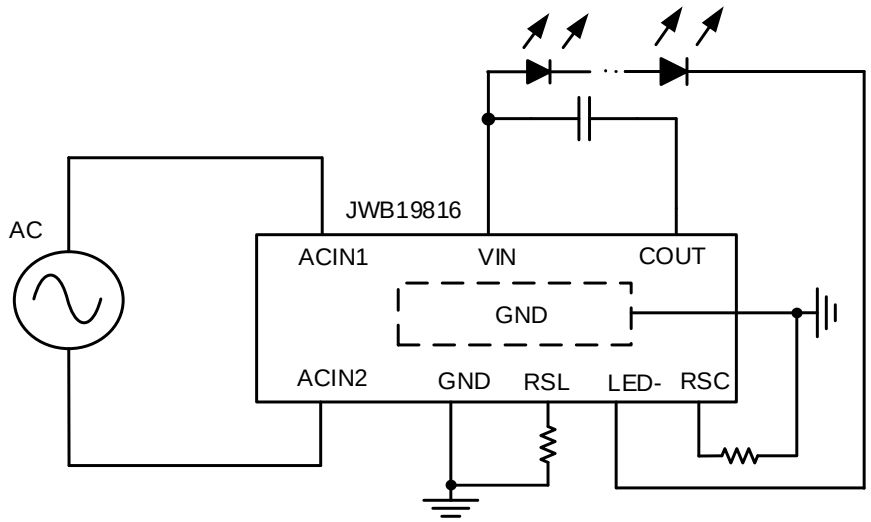
FEATURES

- 800V Bridge Rectifier Integrated
- 600V JFET & 500V MOSFET Integrated
- High-accuracy Output Current
- Over Temperature Protection
- Meet the IEC61000-3-2_2018 Standard
- Meet the requirements of SVM <0.4, Pst_LM <1, DF> 0.7
- No EMI Issues
- Low BOM Cost
- HSOP-8 Package

APPLICATIONS

- LED Bulb
- Other LED Lighting

TYPICAL APPLICATION



ORDER INFORMATION

DEVICE[1)]	PACKAGE	TOP MARKING[2)]	ENVIROPNMENTAL[3)]
JWB19816HSOPD#TR	HSOP-8	JWB19816 YW□□□□□	GREEN

Notes:

1) JW□□□#TR
- #TR: Tape and Reel (If TR is not shown, it means Tube)
- □□□: Package Code
- JW□: Part No.

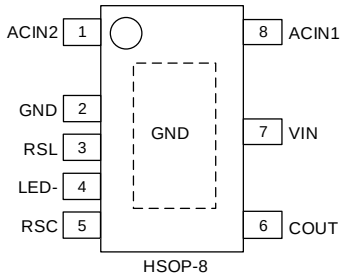
2) Line1: JW □□□□
- □□□□: Product code
- JW: JoulWatt LOGO

Line2: YW □□□□□
- □□: Lot number
- □: Week code
- □: Year code

3) All JoulWatt products are packaged with Pb-free and Halogen-free materials and compliant to RoHS standards.

PIN CONFIGURATION

TOP VIEW



HSOP-8

ABSOLUTE MAXIMUM RATING[1)]

VIN Pin.....600V
LED- Pin.....500V
COUT Pin.....500V
RSL&RSC Pin.....-0.4V to 8V
Iout_max@ *Tj= 150℃*.....100mA
Junction Temperature[2)3)].....150ºC
Lead Temperature 260ºC
Storage Temperature .....-65ºC to +150ºC

RECOMMENDED OPERATING CONDITIONS

VIN.....500V
LED-.....400V
COUT.....400V
Iout.....60mA
Junction Temperature (T_J) .....-40ºC to 125ºC

THERMAL PERFORMANCE[4)]

	θ_{JA}	θ_{JC}
HSOP-8	50	10ºC/W

Notes:

1) Exceeding these ratings may damage the device. These stress ratings do not imply function operation of the device at any other conditions beyond those indicated under RECOMMENDED OPERATING CONDITIONS.

2) The JWB19816 includes thermal protection that is intended to protect the device in overload conditions. Continuous operation over the specified absolute maximum operating junction temperature may damage the device.

3) The device is not guaranteed to function outside of its operating conditions.

4) Measured on JESD51-7, 4-layer PCB.

ELECTRICAL CHARATERISTICS

Ta= 25 ℃, unless otherwise stated.

Advance Information, not production data, subject to change without notice.

Item	Symbol	Condition	Min.	Typ.	Max.	Unit.
VIN Maximum Voltage	V_{IN_BV}	I_{OUT}=0mA,VIN=150uA	600			V
LED- Maximum Voltage	V_{LED-_BV}	I_{OUT}=0mA,LED-=150uA	500			V
COUT Maximum Voltage	V_{COUT_BV}	I_{OUT}=0mA,COUT=150uA	500			V
VIN Quiescent Current	I_Q	VIN=15V，RSL=5V，RSC=5V			200	μA
VIN Over Voltage Protection Threshold	V_{IN_SUR}			420		V
VIN Over Voltage Protection Time	$T_{\_SUR}$			2.56		mS
LED- Channel Reference Voltage	V_{REF}		580	600	620	mV
COMP Voltage [5)]	V_{COMP}			0.17		V
Bridge Diode BV Voltage [5)]	V_{BR_BD}		800			V
Bridge Diode Forward Voltage Drop [5)]	V_{F_BD}	I_F=1A			1.1	V
Bridge Diode Average Forward Current [5)]	$I_{F(AV)}$				0.5	A
Bridge Diode Peak Forward Surge Current 1ms Single Half Sine Wave	I_{FSM}				30	A
Thermal Protection Threshold [5)]	OTP_{CHIP}		140	150	160	℃

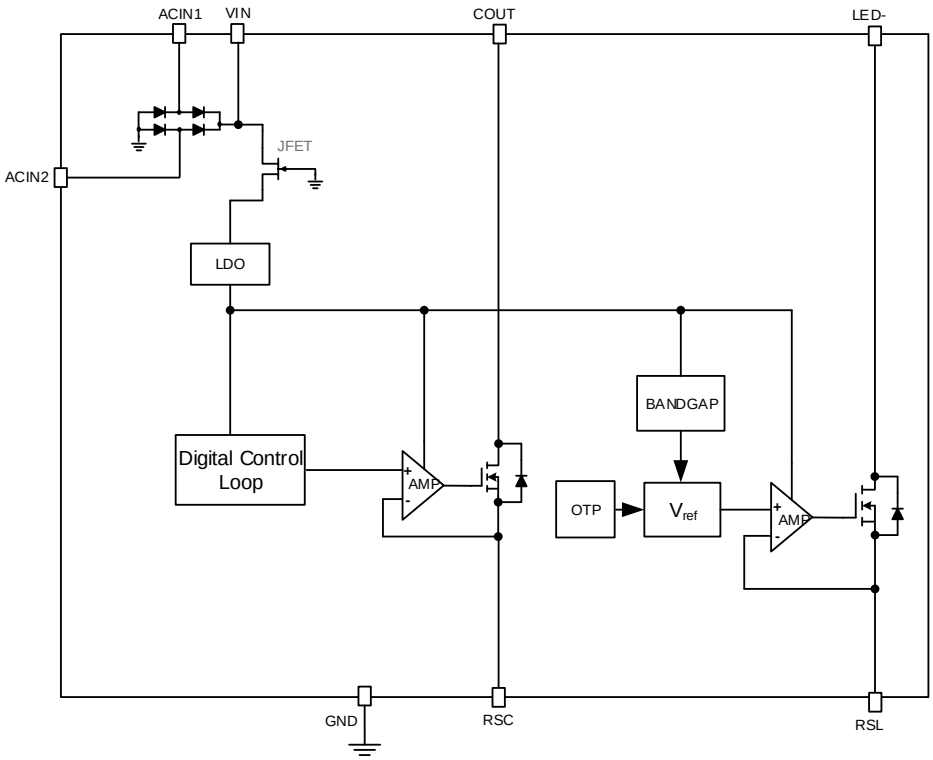
Notes:

5) Guaranteed by design

PIN DESCRIPTION

Pin HSOP-8	Name	Description
1	ACIN2	AC input
2	GND	Chip ground
3	RSL	LED current setup pin
4	LED-	LED current output pin
5	RSC	Electrolytic Capacitor (E-Cap) current setup pin
6	COUT	E-Cap current output pin
7	VIN	Power supply pin
8	ACIN1	AC input

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

JWB19816 is a double channel Linear LED driver for direct line operation.

Theory of Operation

The input is the rectified voltage Vin from AC line by the internal bridge rectifier. When Vin is higher than the forward voltage (VF) of the LEDs, the current of LEDs begins to increase.

The E-Cap charging block works when the Vin voltage is higher than the E-Cap voltage. The E-Cap supplies current when the AC mains voltage is lower than the E-Cap voltage to eliminate the LED current ripple. The E-Cap current and LED string current are shown below.

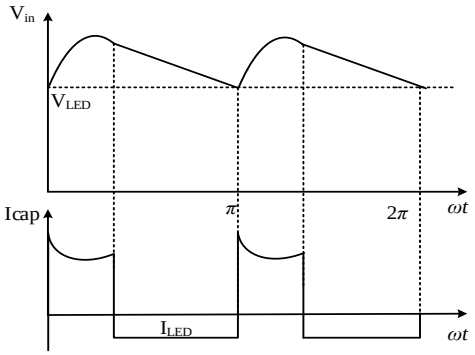


Figure.1 The E-Cap current and LED current

Soft Boot

When the internal VDD reaches 3.9V, the COMP voltage is clamped at V_{COMP} for 80mS in typical, then exits the clamp value.

LED Constant Peak Current Control

JWB19816 controls the LED peak current from the information of the current sensing resistor. The output LED peak current can be calculated as:

$$I_{PEAK} \approx V_{REF}/R_{SL}$$

Where

V_{REF} is the reference voltage;

R_{SL} is the current sensing resistor connected between RSL and chip ground.

VIN Over Voltage Protection

When the VIN voltage is higher than V_{IN_SUR}, the gate of two power MOSFET will be pulled down to zero for $T_{\_SUR}$ before the next detection.

Over Temperature Protection (OTP)

When the junction temperature of JWB19816 is higher than OTP_{CHIP}, LED current reduces by decreasing the LED- Reference Voltage (V_{REF}). The LED current drop slope is about -15%/10°C after OTP as the figure shown below.

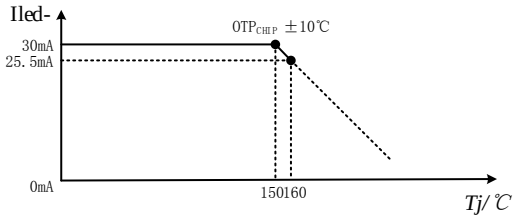


Figure.2 OTP Slope

APPLICATION REFERENCE

Note: Information in the following reference design sections is not part of JoulWatt component specification. Customers are responsible for determining suitability of components chosen for their purposes and should validate their design implementation to make sure the proper system functionality.

This reference design is suitable for 9W linear LED driver, using JWB19816, with low LED current ripple and high efficiency.

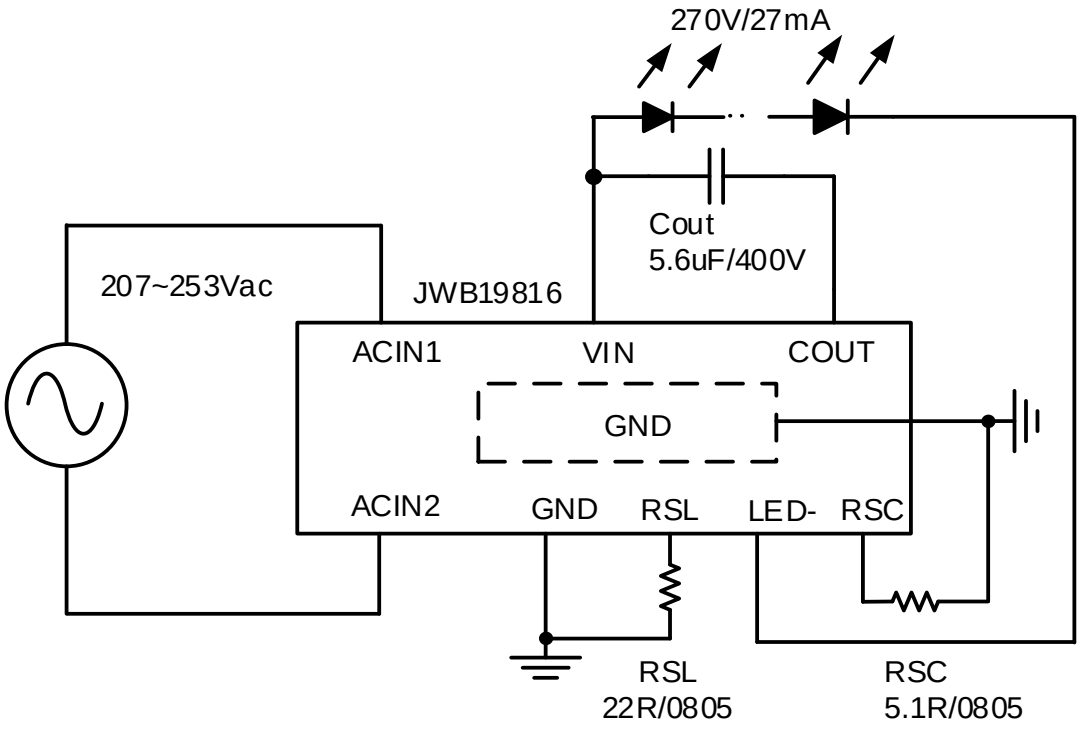
Reference 1：

V_{IN}: 207VAC~253VAC

V_{OUT}: 270V

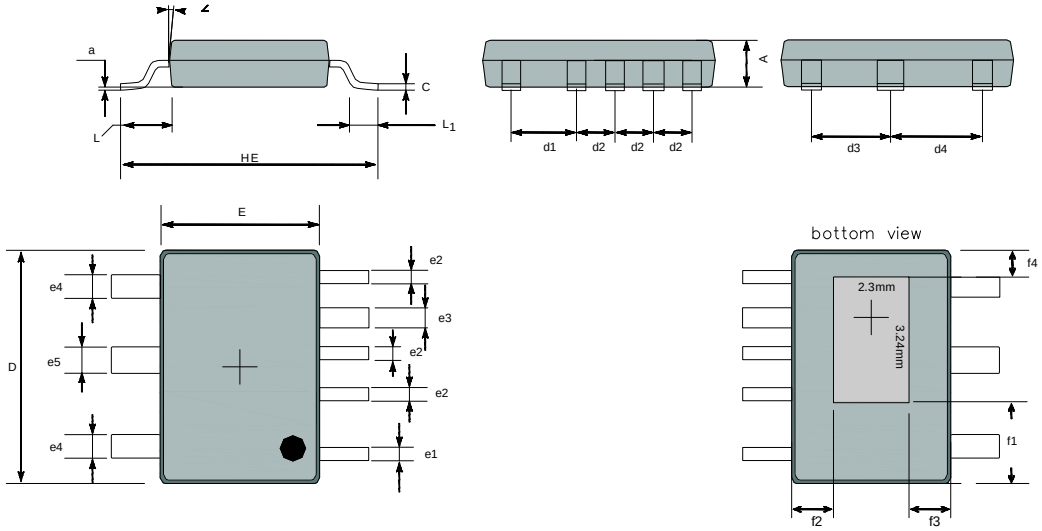
I_{OUT}: 27mA

PF: >0.5



PACKAGE OUTLINE

HSOP-8 UNIT：mm



UNIT		A	C	D	E	HE	d1	d2	d3	d4	e1	e2	e3	e4	e5	L	L_1	a	∠	f1	f2	f3	f4
mm	max	1.25	0.22	6.3	4.0	6.1	2.1	0.75	1.65	2.15	0.45	0.4	0.5	0.7	0.9	1.15	0.8	0.2 (ref.)	12°	1.60 (ref.)	0.80 (ref.)	1.43 (ref.)	0.66 (ref.)
	min	1.05	0.15	6.1	3.8	5.9	1.9	0.55	1.45	1.95	0.25	0.2	0.3	0.5	0.7	0.95	0.4						

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