

Features

- Wide 24V to 100V Input Voltage Range
- 0.2V current sense voltage reference
- Directly drive 3~8 series 1W LED
- Excellent line and load regulation
- High efficiency up to 96%
- Minimum Drop Out 6V
- Internal optimize power HV-MOSFET
- Built in thermal shutdown function
- Built in UVLO function
- Built in current limiting function
- Built in LED open & short protection
- Built in soft-start circuit
- Available in SOP8 package

Applications

- EBIKE LED Lighting
- LED Lighting & LED LAMP
- General purpose lighting

General Description

The XL8005 is a monolithic high voltage switching regulator with PFM that is specifically designed to operate from a 24V~100V DC supply.

The XL8005 is a high efficiency LED driver switching regulator. The LED string is driven at DC constant current rather than constant voltage, thus providing constant current output and enhanced reliability.

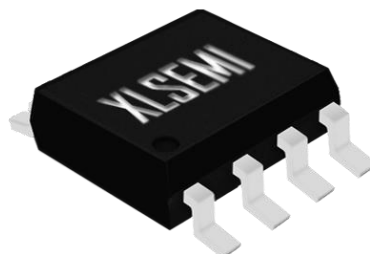


Figure1. Package Type of XL8005

100V 0.5A Switching Current Buck PFM LED Constant Current Driver

XL8005

Pin Configurations

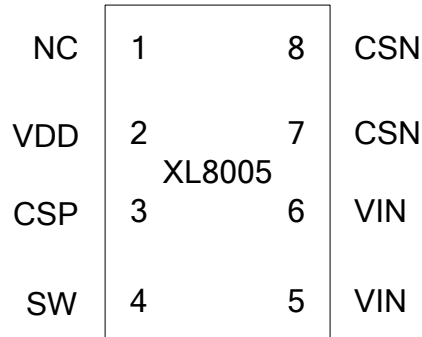


Figure2. Pin Configuration of XL8005 (Top View)

Table 1 Pin Description

Pin Number	Pin Name	Description
1	NC	No Connected.
2	VDD	The chip supply voltage Pin.
3	CSP	Current Sense Positive Terminal Pin.
4	SW	Output Switching Pin
5, 6	VIN	Input high voltage Pin. (Operation voltage 24V~ 100V)
7, 8	CSN	Current Sense Negative Terminal Pin.

100V 0.5A Switching Current Buck PFM LED Constant Current Driver XL8005

Function Block

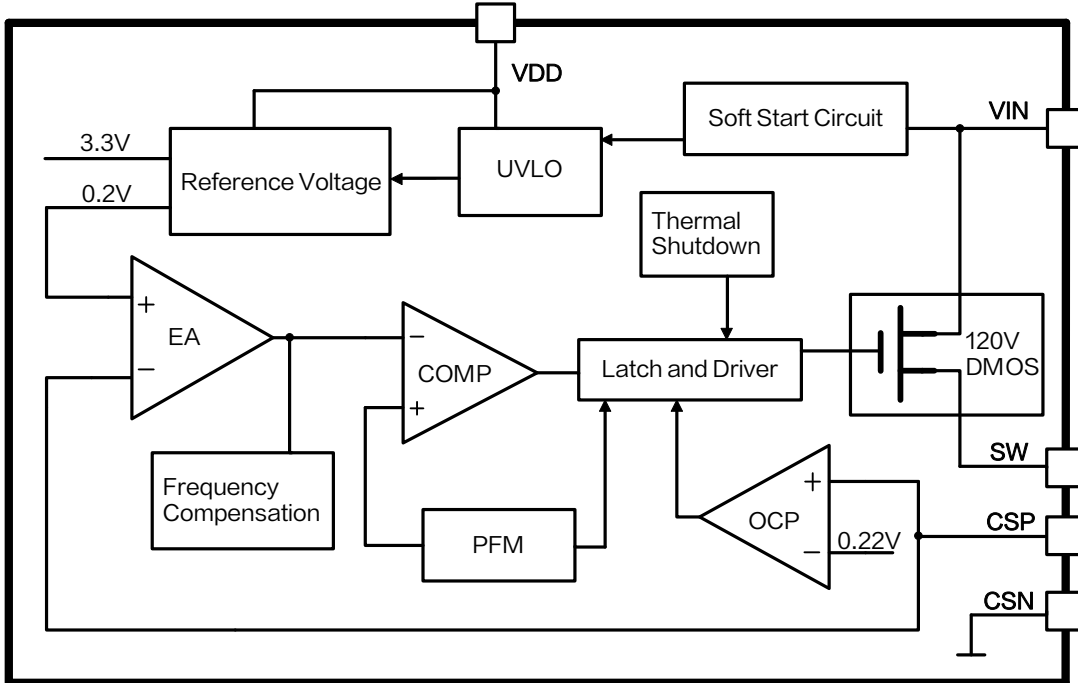
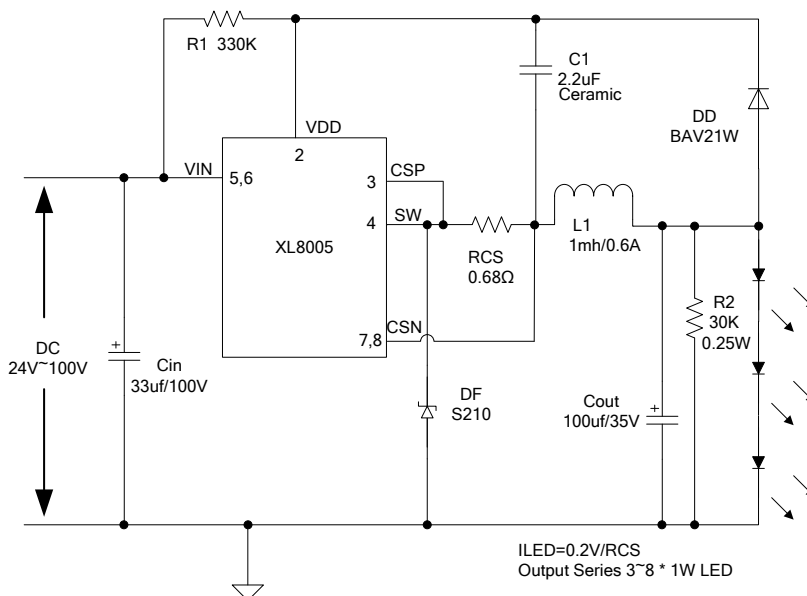


Figure3. Function Block Diagram of XL8005

Typical application circuit



- [1] Input DC 24V~100V.
- [2] Output Constant Current Drive Series 3~8 * 1W LED.
- [3] Support Output LED Open & Short Protection.

Figure4. XL8005 Typical Application (3W~8W LED lamp)

100V 0.5A Switching Current Buck PFM LED Constant Current Driver	XL8005
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Ordering Information

Order Information	Marking ID	Package Type	Packing Type
XL8005E1	XL8005E1	SOP8	2500 Units on Tape & Reel

XLSEMI Pb-free products, as designated with “E1” suffix in the par number, are RoHS compliant.

Absolute Maximum Ratings (Note1)

Parameter	Symbol	Value	Unit
Input Voltage	V_{in}	-0.3 to 120	V
Power Dissipation	P_D	Internally limited	mW
Thermal Resistance (SOP8) (Junction to Ambient, No Heatsink, Free Air)	R_{JA}	100	°C/W
Operating Junction Temperature	T_J	-40 to 125	°C
Storage Temperature	T_{STG}	-65 to 150	°C
Lead Temperature (Soldering, 10 sec)	T_{LEAD}	260	°C
ESD (HBM)		3000	V

Note1: Stresses greater than those listed under Maximum Ratings may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operation is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

100V 0.5A Switching Current Buck PFM LED Constant Current Driver	XL8005
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XL8005 Electrical Characteristics

T_a = 25°C; unless otherwise specified. Reference test circuit figure4

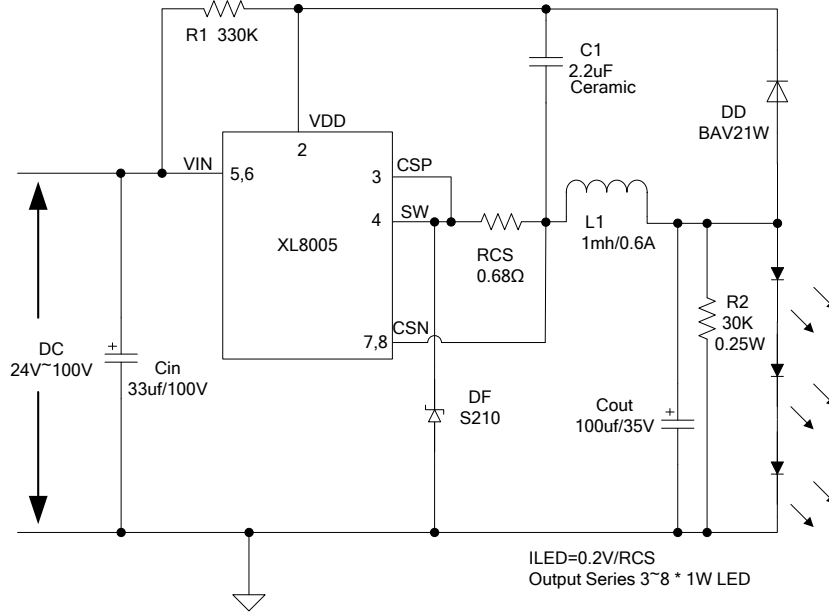
Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
VCSP	CSP Voltage	V _{IN} = 24V to 100V, I _{led} =0.3A, P _{out} =8W	190	200	210	mV
η	Efficiency	V _{IN} =48V, I _{led} =0.3A, P _{out} =8W	–	94.8	–	%
η	Efficiency	V _{IN} =60V, I _{led} =0.3A, P _{out} =8W	–	94.0	–	%
η	Efficiency	V _{IN} =72V, I _{led} =0.3A, P _{out} =8W	–	92.8	–	%
η	Efficiency	V _{IN} =84V, I _{led} =0.3A, P _{out} =8W	–	92.3	–	%

Electrical Characteristics (DC Parameters)

Parameters	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input operation voltage	V _{IN}		24		100	V
Switching Frequency	F _{osc}	Figure4 (8*1W) V _{IN} =48V	47.4	59.3	71.1	KHz
Switching Frequency	F _{osc}	Figure4 (8*1W) V _{IN} =60V	56.2	70.3	84.3	KHz
Switching Frequency	F _{osc}	Figure4 (8*1W) V _{IN} =72V	61.2	76.5	91.8	KHz
Switching Frequency	F _{osc}	Figure4 (8*1W) V _{IN} =84V	64.1	80.2	96.2	KHz
DMOS Drain–Source Breakdown Voltage	V _{BRDS}	V _{GS} =0V, I _{DS} =250uA	120			V
DMOS Drain–Source on resistor	R _{DSON}	I _{DS} =0.5A, V _{GS} =10V		0.1	0.15	Ohm
Thermal Shutdown	OTP	T _j		165		°C
Thermal Shutdown Window				25		°C

100V 0.5A Switching Current Buck PFM LED Constant Current Driver XL8005

Typical application circuit (3W ~ 8W)



- [1] Input DC 24V~100V.
- [2] Output Constant Current Drive Series 3~8 * 1W LED.
- [3] Support Output LED Open & Short Protection.

Figure5. XL8005 Typical Application (3W~8W LED lamp)

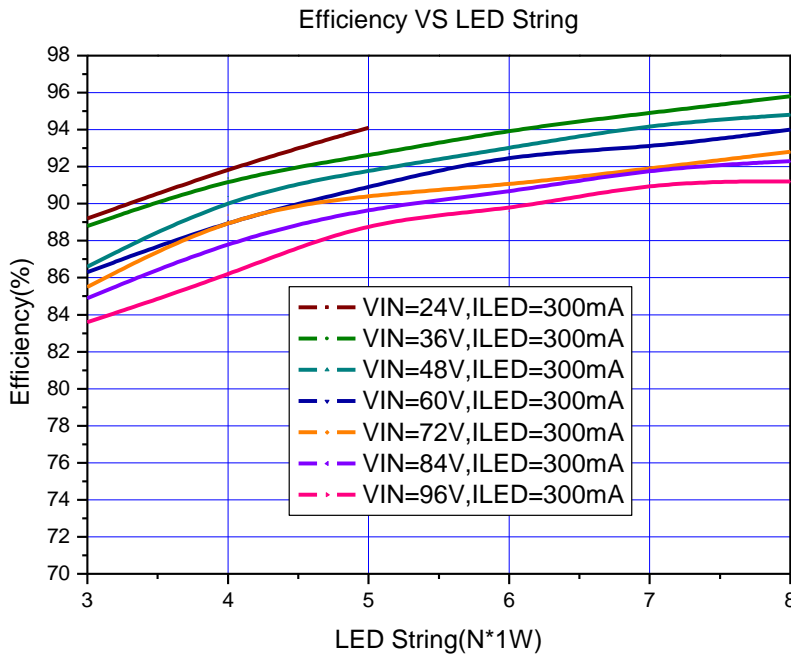
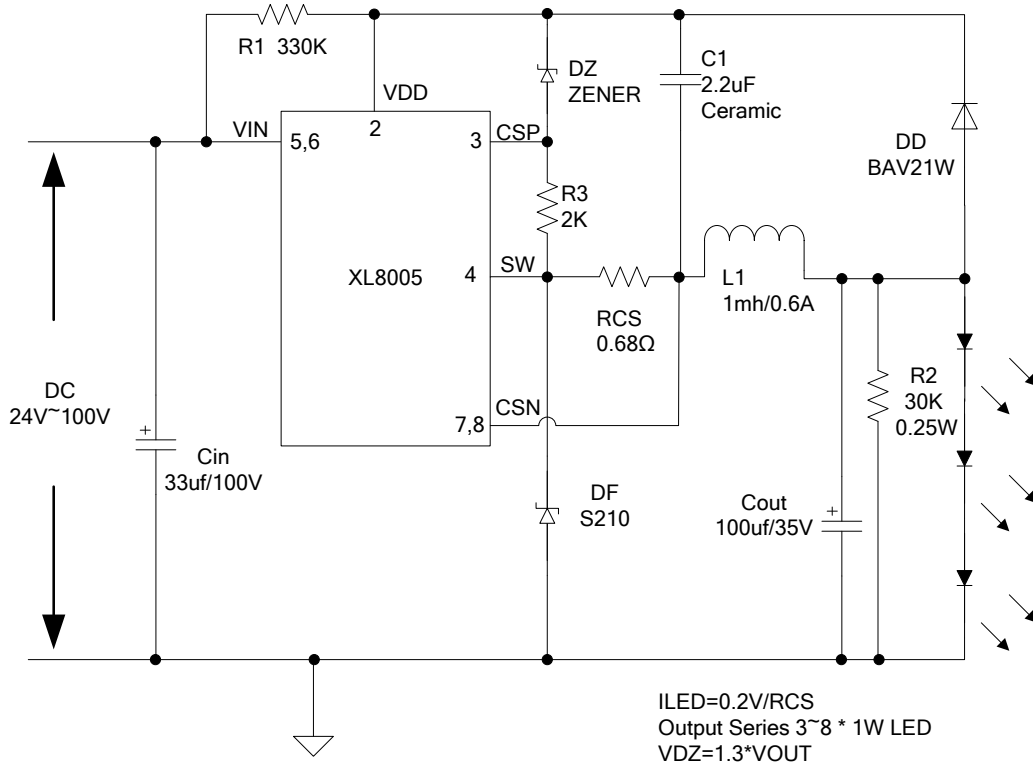


Figure6. XL8005 System Application& efficiency curve

100V 0.5A Switching Current Buck PFM LED Constant Current Driver XL8005

Typical application circuit (LED Open Protection)



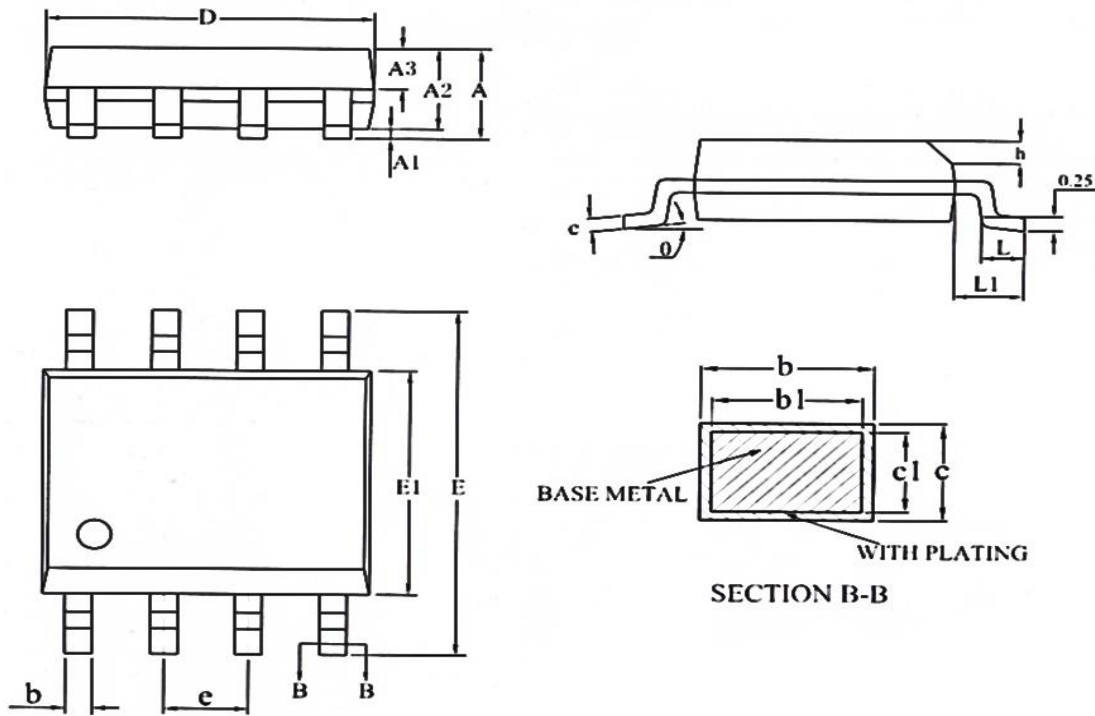
$I_{LED} = 0.2V/RCS$
 Output Series 3~8 * 1W LED
 $V_{DZ} = 1.3 * V_{OUT}$

- [1] Input DC 24V~100V.
- [2] Output Constant Current Drive Series 3~8 * 1W LED.
- [3] Support Output LED Open & Short Protection.

Figure7. XL8005 System Application (LED Open Protection)

Package Information

SOP8



Symbol	Dimensions In Millimeters			Dimensions In Inches		
	Min.	Nom.	Max.	Min.	Nom.	Max.
A	1.35	1.55	1.75	0.053	0.061	0.069
A1	0.05	-	0.25	0.002	-	0.010
A2	1.25	1.40	1.65	0.049	0.055	0.065
A3	0.50	0.60	0.70	0.019	0.024	0.028
b	0.30	-	0.51	0.012	-	0.020
b1	0.29	0.41	0.48	0.011	0.016	0.018
c	0.17	-	0.25	0.007	-	0.010
c1	0.17	0.20	0.23	0.007	0.008	0.009
D	4.70	4.90	5.10	0.185	0.193	0.200
E	5.80	6.00	6.20	0.228	0.236	0.244
E1	3.80	3.90	4.00	0.150	0.154	0.157
e	1.14	1.27	1.40	0.045	0.050	0.055
h	0.25	-	0.50	0.010	-	0.020
L	0.45	-	0.80	0.017	-	0.031
L1	0.82	1.03	1.23	0.032	0.040	0.048
θ	0	-	8°	0	-	8°

100V 0.5A Switching Current Buck PFM LED Constant Current Driver**XL8005**

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