AL8820

MR16, HIGH PF, HIGH EFFICIENCY LED DRIVER CONTROLLER

Description

AL8820 is an LED driver, develops a high PF, flicker-free, MR16 LED driver which is powered by electronic transformer（ET）.

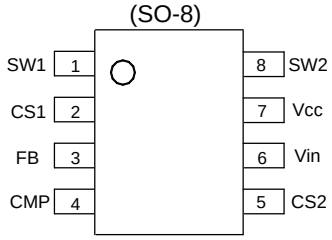
The device integrates two DC/DC regulators. The first stage boosts the input voltage to a setting value and provides power supply for the second stage. The second stage regulates the LED current to the target value. With proprietary control scheme, the LED driver is compatible with most of commonly used electronic transformers. The high switching frequency allows use of small size inductor and capacitor. The integrated low RDS(ON) MOSFETs reduce the power loss. And along with compact PSOP-8 package, AL8820 provides ideal solution for MR16 LED lighting.

Applications

- MR16 Lamps
- General Illumination Lamps

Pin Assignments

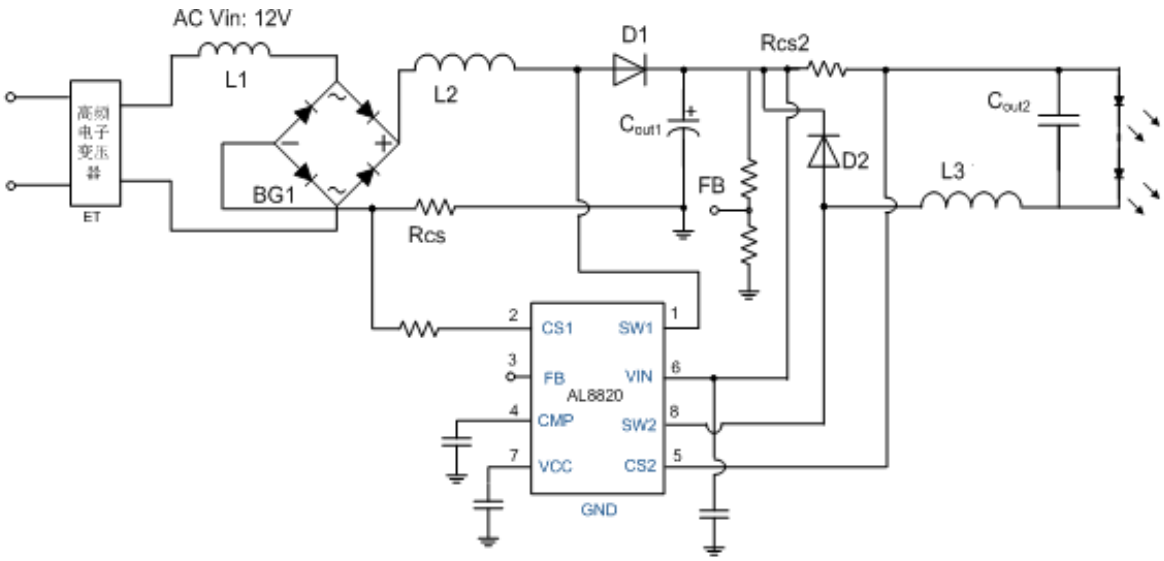
M Package
(SO-8)



Features

- Wide Input Voltage Range:5V to 35V
- Internal 40V NDMOS Switch
- 2A Output Current
- CCM Model
- Up to 1MHz Switching Frequency
- High PF and low THD(PF>09,THD<30% for 6W MR16 application)
- Compatible With Most of Commonly Used Electronic Transformers
- Internal Protections:
  - Under Voltage Lock Out (UVLO)
  - Output Short Protection
  - Output Open Protection
  - Over Temperature Protection
- Pb-free PSOP -8

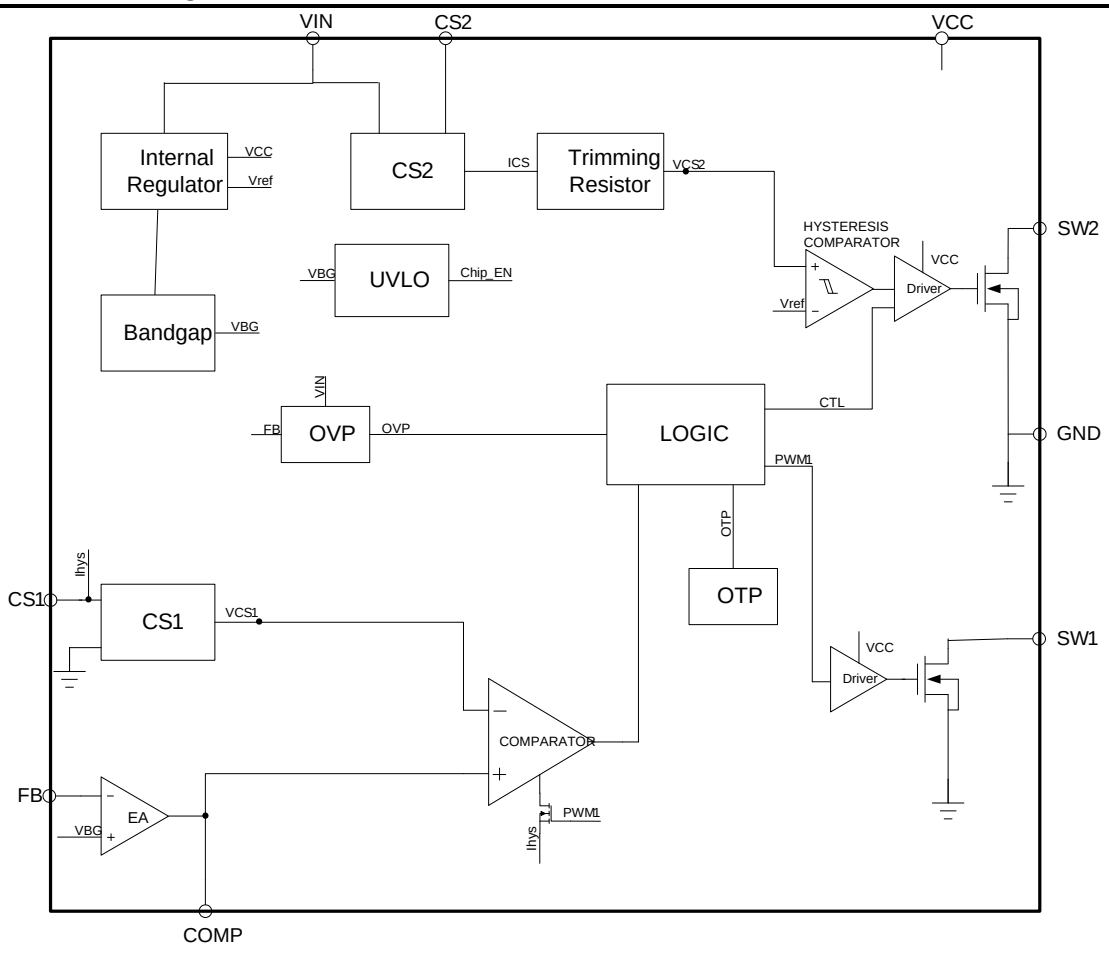
Typical Applications Circuit



Pin Descriptions

Pin Number	Pin Name	Function
1	**SW1**	Integrated Boost MOS
2	**CS1**	Boost Power Switch Current Sense Input.
3	**FB**	Feedback Pin
4	**CMP**	Soft-start and Boost Control Loop Compensation.
5	**CS2**	Buck Power Switch Current Sense Input.
6	**Vin**	IC input voltage, adding from Boost vout
7	**VCC**	Reference Voltage
8	**SW2**	Integrated Buck MOS
Solder pad	**GND**	Ground

Functional Block Diagram



Absolute Maximum Ratings (@T_A = +25°C, unless otherwise specified. Note 1)

Parameter	Symbol	Value	Unit
Vin	VIN	-0.3 to 35	V
SW1	VSW1	-0.3 to 40	V
SW2	VSW2	-0.3 to 40	V
COMP	VCOMP	-0.3 to 6	V
CS1	VCS	-0.3 to 6	V
CS2	VCS	-0.3 to 40	V
FB	VFB	-0.3 to 6	V
VCC	VCC	-0.3 to 6	V
Operating Junction Temperature	TJ	160	ºC
Storage Temperature	TSTG	-65 to 160	ºC
Lead Temperature (Soldering, 10sec)	TLEAD	260	ºC
ESD (MM)	MM	200	V
ESD (HBM)	HBM	2000	V

Note 1: Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “Recommended Operating Conditions” is not implied. Exposure to “Absolute Maximum Ratings” for extended periods may affect device reliability.

Recommended Operating Conditions

Symbol	Parameter	Min	Max	Unit
V_{in}	Power Supply Voltage	5	35	V
T_A	Ambient Temperature	-40	+105	°C

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

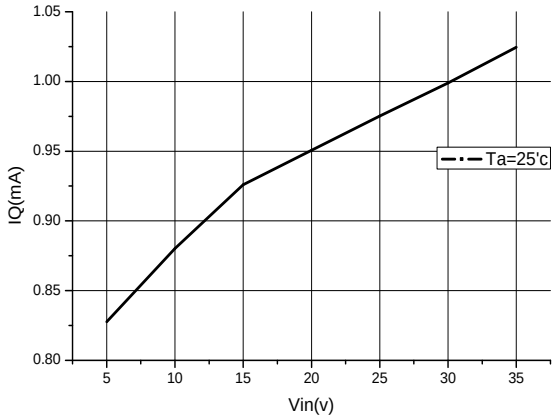
Parameters	Symbol	Conditions	Min	Typ	Max	Unit
Input Supply						
Input Voltage	VIN		5		35	V
Quiescent Current	I_Q	No switching		0.5		mA
Under-Voltage Lockout Voltage	V_{UVLO}	V_{IN} Rising		4.2		V
UVLO Hysteresis	V_{HYS}			500		mV
VCC Regulator						
Vcc Voltage	Vcc			5		V
Source Current Capability		Vcc =5V		15		mA
Load Regulation				4		%
Integrated NMOS_BUCK						
MOS Voltage stress	Vds			35		V
MOS Rdson	Rdson			200		mohm
Integrated NMOS_BOOST						
MOS Voltage stress	Vds			35		V
MOS Current stress	Ids			2		A
MOS Rdson				200		mohm
Compensation and Soft Start (COMP Pin)						
Error Amplifier Trans-conductance	GEA			1000		uA/V
Sourcing Current	IO-H	VCOMP=0.5V		68		uA
Sinking Current	IO-L	VCOMP=4.5V		68		uA
FB Voltage	VFB		1.18	1.22	1.26	V
FB OVP Voltage	Vovp			1.66		V
FB OVP Voltage Hysteresis	Vovp_hys			0.2		V
Hysteresis Compatitor (Boost)						
Boost sense voltage	Vcs1_min	Vcomp=0V	-88		-72	mV
Hys current	Ihys		85	100	115	uA

Hysteresis Compatitor(Buck)						
BUCK sense Voltage High level	VcsH		0.116	0.12	0.124	V
BUCK sense Voltage Low level	VcsL		0.087	0.09	0.093	V
Over-Temperature Protection						
Thermal Shutdown	TOTSD		140	160		ºC
Thermal Shutdown Hysteresis	THYS			20		ºC

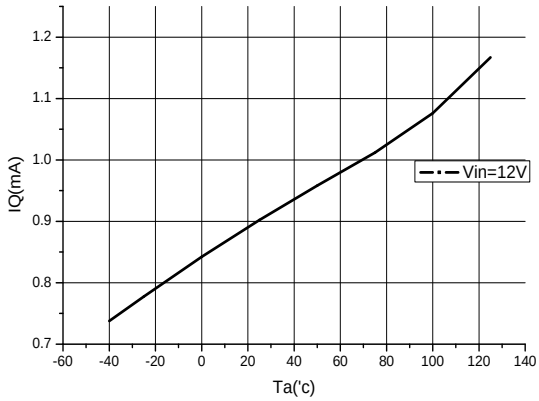
Note 2: These parameters, although guaranteed by design, are not 100% tested in production.

Performance Characteristics

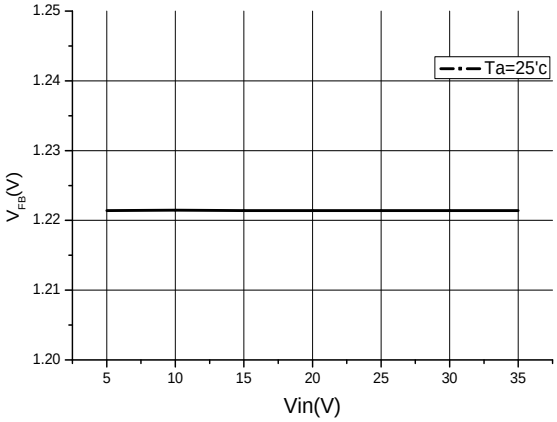
I_Q VS Vin



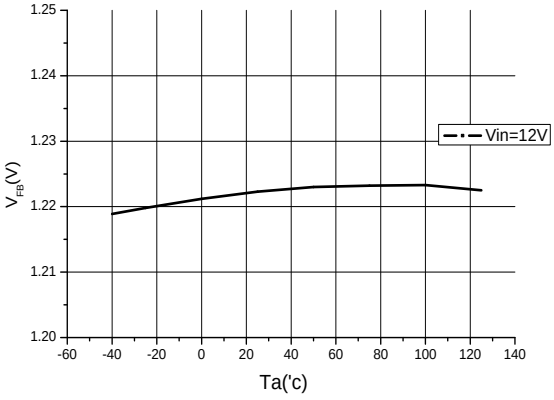
IQ VS Ta



FB VS Vin

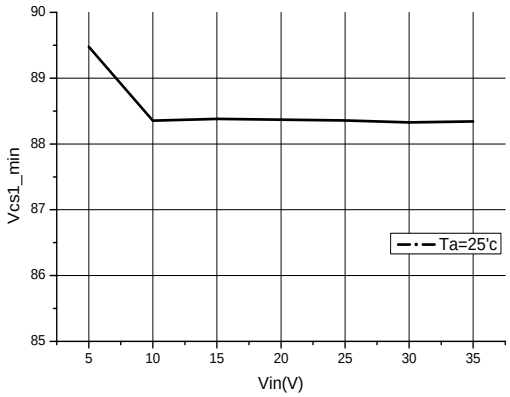


VFB VS Ta

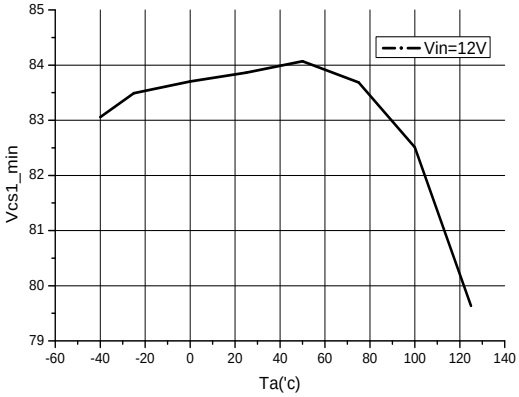


Performance Characteristics (Cont.)

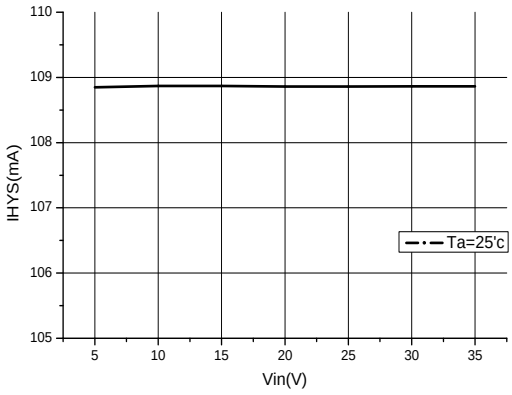
V_{cs1_min} VS Vin



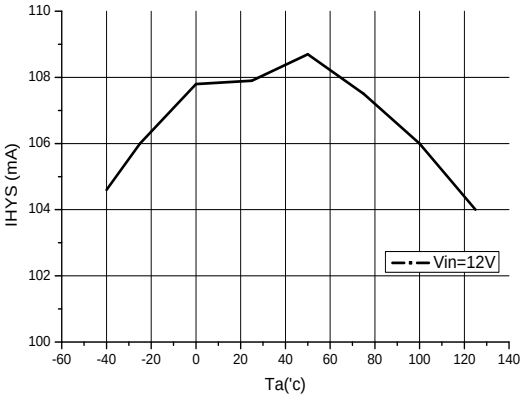
V_{cs1_min} VS Ta



I_{HYS} VS Vin

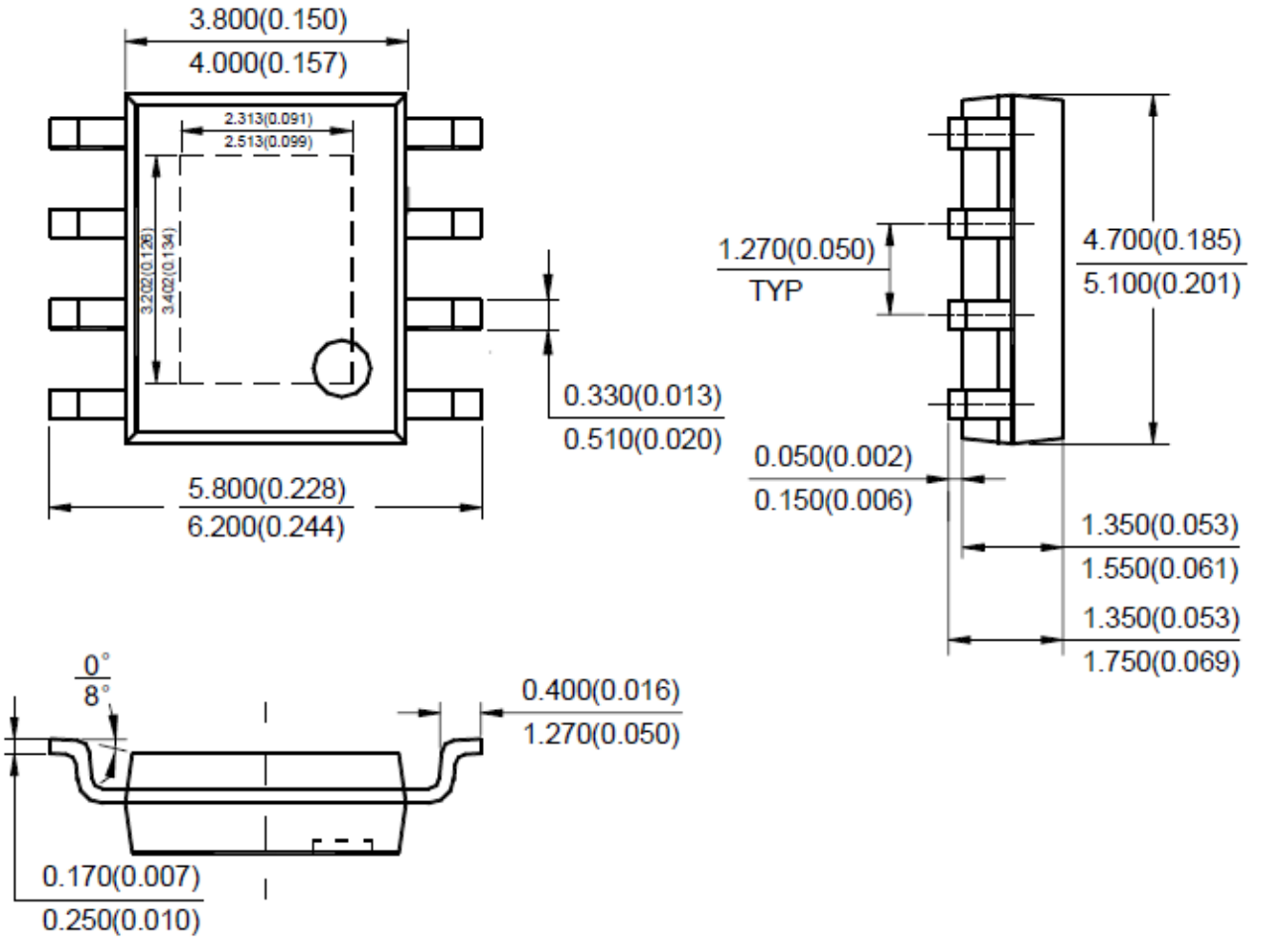


I_{HYS} VS Ta



Package Outline Dimensions (All dimensions in mm(inch).)

PSOP-8 **Unit: mm(inch)**



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