Boost LED Driver for MR16 and AR111 Applications

General Description

VAS1390 is a LED driver IC with external power MOSFET for lighting applications. The distinctive topology makes it ideal for MR16 and AR111 applications which need good compatibility for DC and AC voltages. The device acted as a resistive load thus avoid flicker when applied electronic transformers. The current hysteresis control architecture can achieve high power factor.

VAS1390 operates from a 5V to 40V voltages input range. Its over voltage protection can avoid damage to circuit of open load.

VAS1390 provides excellent protection functions, such as MOSFET over current protection, R_{OVP} short to ground protection, UVLO and over heat protection, LED open protection.

The IC is available with SOP8 package.

Application

- MR16
- AR111

Features

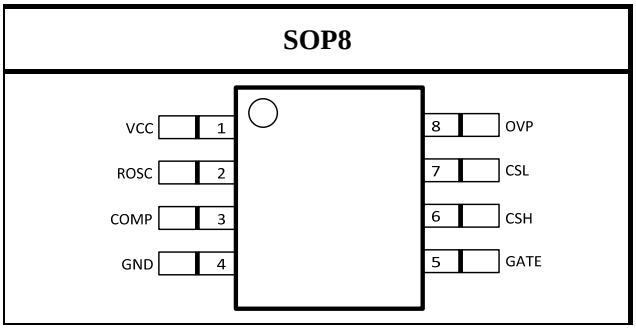
- External power MOS and 10V gate driver
- Input current hysteresis control
- Multiple protections
  - Over current protection
  - OVP short-to-GND protection
  - Output over voltage protection
  - Over temperature protection
- Compatible for various electronics and Triac dimming

Ordering Information

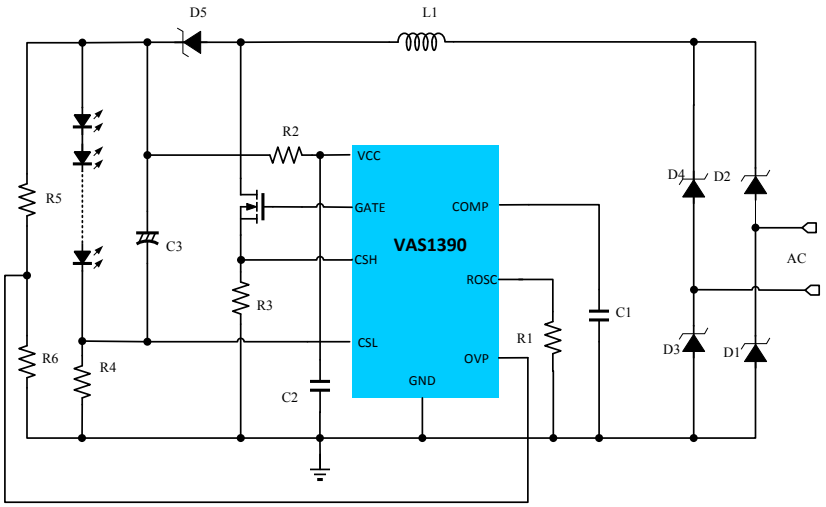
Order Number	Package Type	Temp. Range
VAS1390ID08E	SOP8	-40 °C to 85°C

I: Industry, -40~85℃ D: SOP
08 : Pin Number E: ROHS

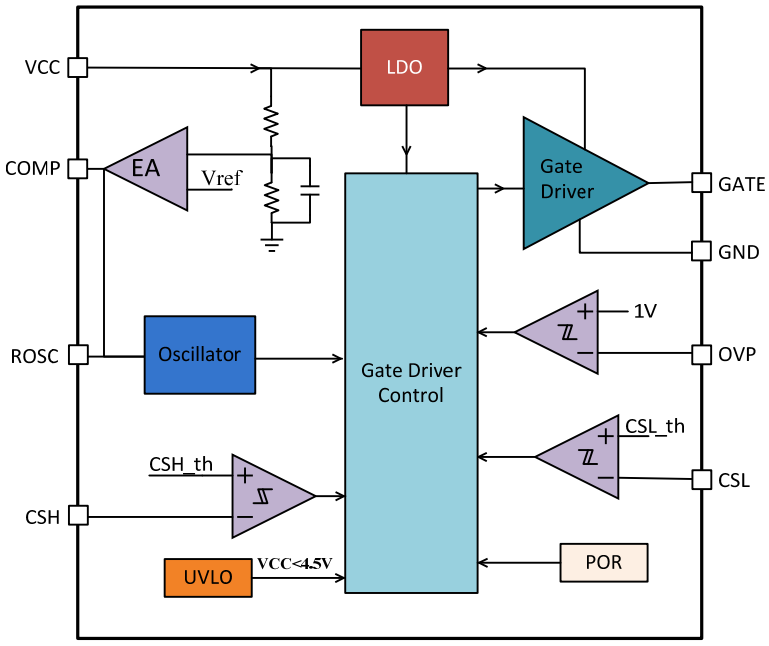
Pin Configuration



Typical Application Circuit



Block Diagram



PIN Description

PIN NO.	Name	Description
1	VCC	Power supply input.
2	ROSC	Internal clock period setting pin. Set the maximum working frequency of the system
3	COMP	Current compensation pin, connecting a cap to GND to adjust input current threshold
4	GND	Ground
5	GATE	Gate Drive Output. Connect to the gate of an external MOSFET
6	CSH	The input peak current detecting pin
7	CSL	The input valley current sense pin
8	OVP	Over voltage protection detecting pin. If the pin voltage higher than 1V, the MOSFET closed

Absolute Maximum Ratings(Note1)

Parameters	Maximum Ratings
VCC to GND	-0.3V to 44V
COMP, ROSC, OVP, CSH, CSL to GND	-0 .3V to 6V
GATE to GND	-0.3V to 18V
Operating temperature range	-40°C to +85°C
Junction temperature	-40°C to +150°C
Storage temperature range	-65°C to +150°C
ESD(HBM)	2000V

Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits. Electrical Characteristics state DC and AC electrical specifications under particular test conditions which guarantee specific performance limits. This assumes that the device is within the Operating Ratings. Specifications are not guaranteed for parameters where no limit is given, however, the typical value is a good indication of device performance.

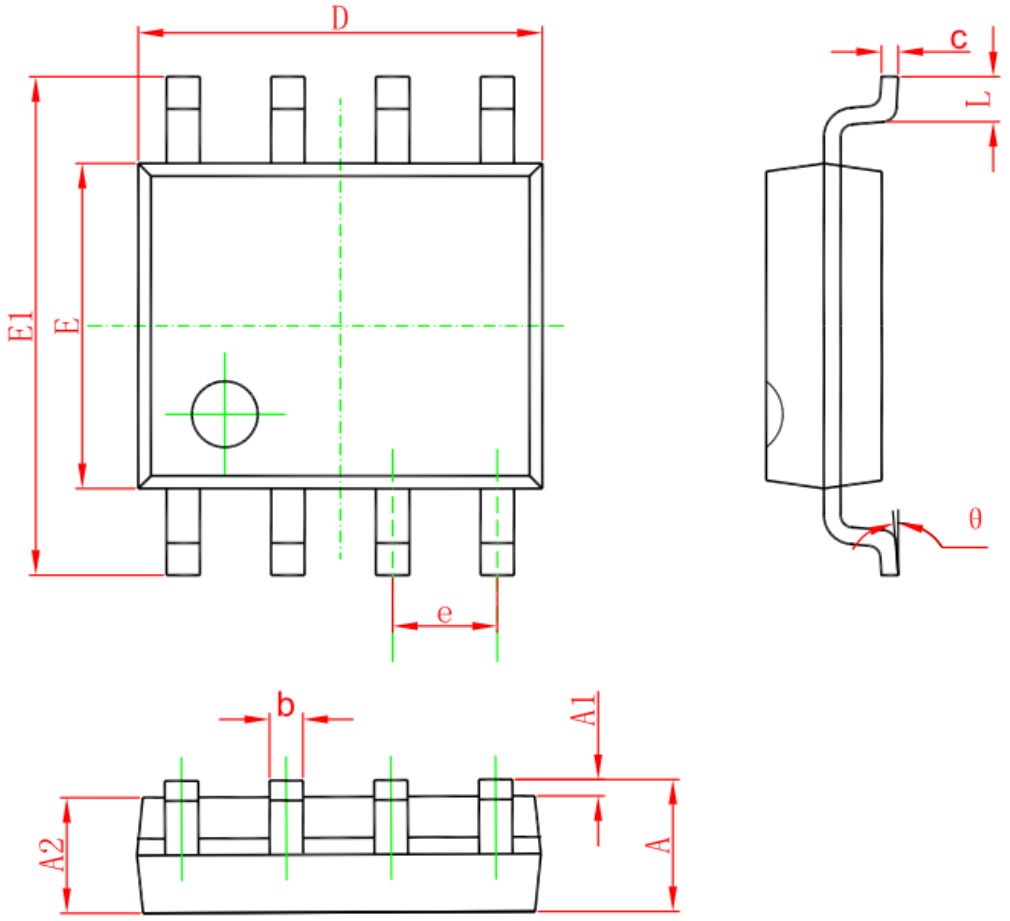
Electrical Characteristics

Typical case(Note2): VCC=12V, T_A=25°C(unless otherwise specified)

Symbol	Parameter	Condition	spec			Unit
			Min.	Typ.	Max.	
V_{CC}	Input Voltage Range		5		40	V
UVLO	Under voltage Lockout	VCC Rising		4.5	5	V
ΔUVLO	UVLO Hysteresis			0.2		V
I_Q	Quiescent Current	VCC=12V		400	600	μA
V_{CSH_th}	Input Peak Current Threshold			250		mV
V_{CSL_th}	Input Valley Current Threshold			300		mV
f_{OSC}	Maximum Operation Frequency Setting	R_{EXT}=24KΩ		1		MHz
T_{otp}	OTP Threshold			160		°C
T_{otp_HYS}	OTP Hysteresis			20		°C
V_{OVP_TH}	Over Voltage Protection Threshold		0.95	1	1.05	V
V_{OVP_HYS}	Over Voltage Protection Hysteresis			±5%		

Note 2: Production testing of the device is performed at 25°C. Functional operation of the device and parameters specified over other temperature range, are guaranteed by design, characterization and process control.

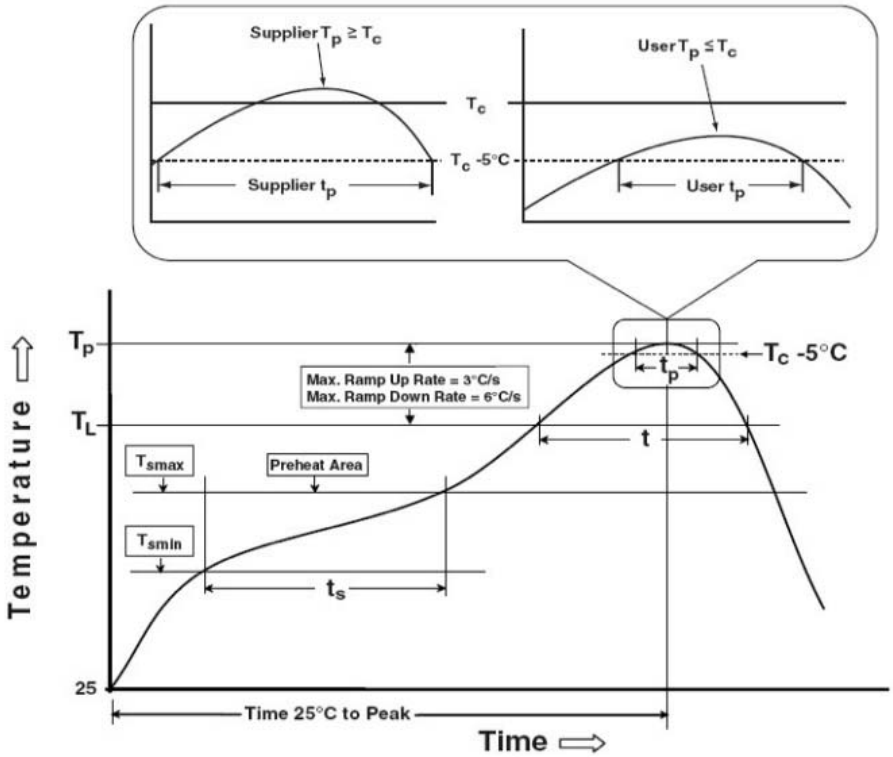
Package Information (SOP8)



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.006	0.010
D	4.700	5.100	0.185	0.200
E	3.800	4.000	0.150	0.157
E1	5.800	6.200	0.228	0.244
e	1.270(BSC)		0.050(BSC)	
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°

Classification Reflow Profiles

Profile Feature	Pb-Free Assembly
Preheat & Soak Temperature min (Tsmin) Temperature max(Tsmax) Time (Tsmin to Tsmax) (ts)	150°C 200°C 60 -120 seconds
Average ramp-up rate (Tsmax to Tp)	3°C/second max.
Liquidous temperature (TL) Time at liquidous (tL)	217 °C 60 -150 seconds
Peak package body temperature (Tp)*	Max 260°C
Time (tp)* * within 5°C of the specified classification temperature (Tc)	Max 30 seconds
Average ramp-down rate (Tp to Tsma x)	6°C/second max.
Time 25 °C to peak temperature	8 minutes max



Classification Profile

! CAUTION

Storage Conditions

1) This product should be used within 12 months after delivered. Store in manufacturer's package keeping the seal of aluminum coated baggage or tightly re-closed box with the following conditions. [Temperature: 8℃…30℃, Humidity: 30%...70%R.H.]

2) Keep the seal of aluminum coated baggage immediately before usage.

3) After breaking the seal of aluminum coated baggage, this product should be used within 1 week on the following conditions.[Temperature:≤30℃, Humidity:≤60%R.H.]