Universal LED Driver

SMD302

2011/3/22

FEATURES

- 90% efficiency
- Universal input
- Constant Current LED Driver
- Linear Dimming
- LED string from one to hundreds of diodes
- Internal over thermal protection
- SOT-26 package
- Complete protection with OVP/OTP/ESD…

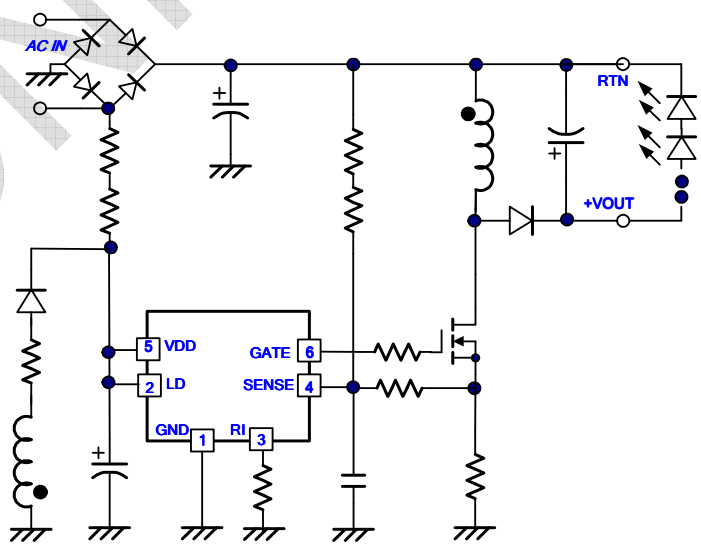
DESCRIPTION

The SMD302 is a PWM high-efficiency LED driver control IC. It allows efficient operation of High Brightness (HB) LEDs from voltage sources ranging for universal input. The controls an external MOSFET at fixed switching frequency up to 300kHz. The frequency can be programmed using a single external resistor. The LED string is driven at constant current rather than constant voltage, thus providing constant light output and enhanced reliability. The output current can be programmed between a few milliamps and up to more than 1.0A. Output current to an LED string can be programmed to any value between zero and its maximum value by applying an external control voltage at the linear dimming control input of the SMD302.

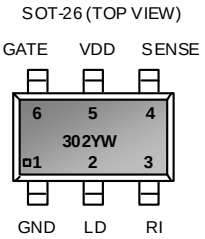
APPLICATIONS

- AC/DC LED Driver for cost effective applications (i.e. E27; T8; MR16 & small power LED driver adaptor..)
- LED monitor light BAR driver
- Charger; Open Frame or Industry power supply

TYPICAL CIRCUIT



PACKAGE INFORMATION



302 : SMD302
Y : Year code (0~9: 2010~2019)
W : Week code

PIN FUNCTIONS

Pin No.	Pin Name	Function
1	GND	Ground
2	LD	Linear Dimming input pin
3	RI	Program Full load switching frequency by resistor connect to GND
4	SENSE	Current sensor PIN to limits total power
5	VDD	Supply voltage of PWM from auxiliary winding with internal OVP
6	GATE	Totem-pot with voltage clamping to driver external Power MOSFET

ABSOLUTE MAXIMUM RATINGS *(Note 1)*

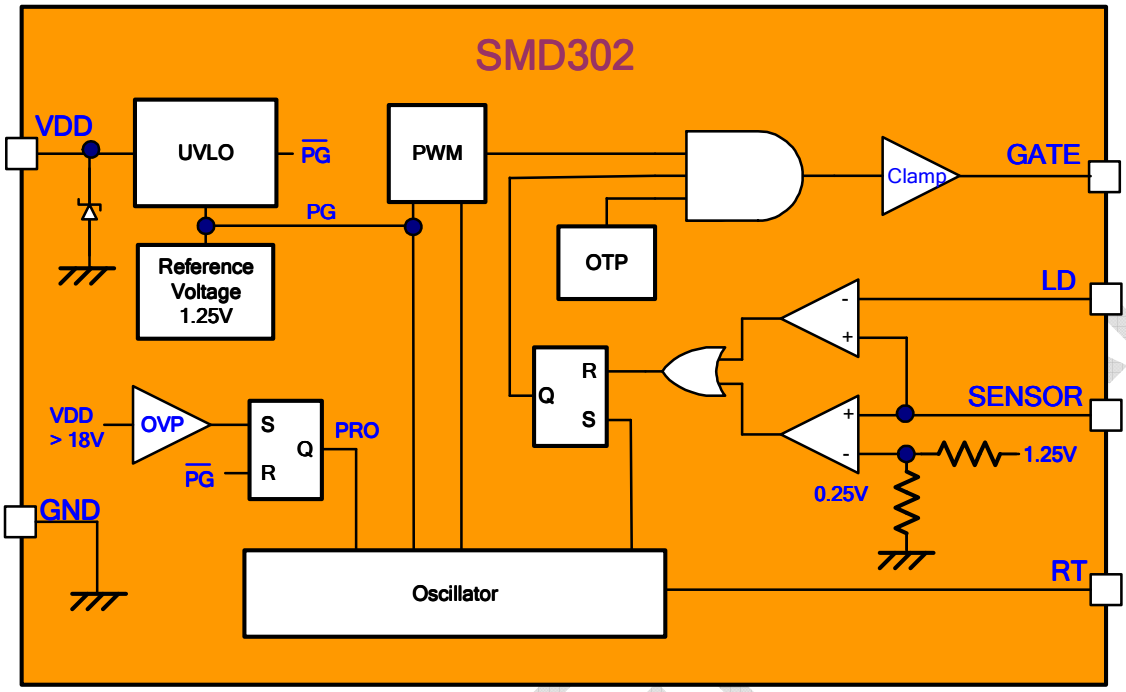
Item	Symbol	Ratings	Units
VDD pin voltage	V_{DD}	-0.3 to OVP	V
GATE pin voltage	V_{GATE}	-0.3 to $V_{G(clamp)}$	V
LD, SENSE, RI pin voltage	V_{LD} ,V_{SENSE}, V_{RI}	-0.3 to (Vdd + 0.3V)	V
ESD Human Body Model	HBM	3	KV
ESD Machine Model	MM	250	V

Note 1: Stresses exceeding the absolute maximum ratings may damage the device. The device may not function or be operable above the recommended operating conditions and stressing the parts to these levels is not recommended. In addition, extended exposure to stresses above the recommended operating conditions may affect device reliability. The absolute maximum ratings are stress ratings only.

POWER DISSIPATION TABLE

SOT-23-6 PACKAGE			
Operational junction temperature	T_J	-40 to +150	ºC
Storage temperature	T_{STG}	-55 to +150	ºC
Junction-to-Air Thermal Resistance	θJA	250	ºC/W

BLOCK DIAGRAM



ORDERING INFORMATION

Product Number	Package	ROHS
SMD302MG	SOT-26	Green

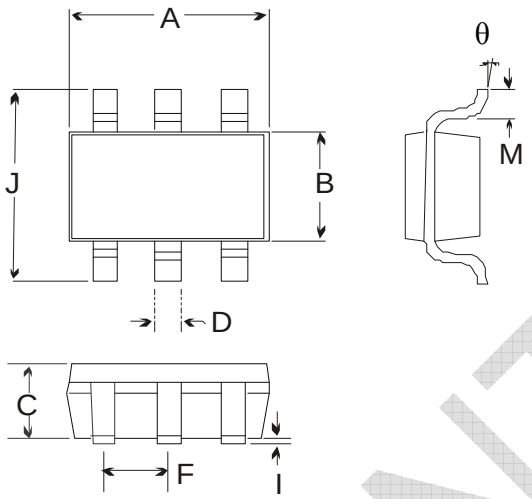
ELECTRICAL CHARACTERISTICS

（Ta=25℃,**RI=390KΩ, VDD=15V**,unless otherwise noted）

Parameter	Test Conditions	Symbol	Min	Typ	Max	Units
Initial start current on V_{DD} PIN	V_{DD} = 10V, PIN Gate open	$I_{VDDSTART}$	-	3.0	12.0	uA
Maximal V_{DD} clamping voltage	When an external voltage applied to pin V_{DD}	V_{DDMAX}		19.0		V
V_{DD} OVP		V_{DDOVP}	16.0	17.0	18.0	
V_{DD} current available for internal circuitry 1	V_{DD} = 15V	$I_{DD(ext)}$	-	0.5	1.0	mA
V_{DD} under voltage lockout threshold	V_{DD} rising	$UVLO_{(on)}$	11.0	12.0	13.0	V
V_{DD} under voltage lockout hysteresis	V_{DD} falling	$UVLO_{(off)}$	8.0	9.0	10.0	V
Current sense pull-in threshold voltage	@TA = -40℃ to +85℃	$V_{CS(hi)}$	240	250	260	mV
GATE output clamp voltage	V_{DD} = 6 ~ 18V	$V_{G(clamp)}$	8.0	9.0	10.0	V
GATE low output voltage	I_{OUT} =-10mA	$V_{GATE(lo)}$	0		0.3	V
Oscillator frequency	R_{OSC} = 1.00MΩ	f_{OSC}	20	24	30	kHz
	R_{OSC} = 226kΩ		80	96	120	
Maximum Oscillator PWM Duty Cycle	F_{PWMhf} = 25kHz, at GATE, CS to GND.	D_{MAXhf}	90	95	100	%
Linear Dimming pin voltage range	@TA = <85℃, Vin = 20V	V_{LD}	0		$V_{CS(hi)}$	mV
Current sense blanking interval	V_{CS} = 0.25V, V_{LD} = V_{DD}	T_{BLANK}		250	380	ns
Delay from CS trip to GATE lo	Vin = 20V, V_{LD} = 0.15, V_{CS} = 0 to 0.22V after T_{BLANK}	t_{DELAY}		80	150	ns
GATE output rise time	C_{GATE} = 500pF	t_{RISE}		60	350	ns
GATE output fall time	C_{GATE} = 500pF	t_{FALL}		50	250	ns
Thermal shut down		T_{SD}		150		℃

PACKAGE DIMENSION

SOT-26 Package Outline Dimensions



Symbol	Dimension in Millimeters		Dimensions in Inches	
	Min	Max	Min	Max
A	2.692	3.099	0.106	0.122
B	1.397	1.803	0.055	0.071
C	-------	1.450	-------	0.058
D	0.300	0.550	0.012	0.022
F	0.838	1.041	0.033	0.041
I	0.050	0.150	0.002	0.006
J	2.600	3.000	0.102	0.118
M	0.300	0.600	0.012	0.024
θ	0	10°	0	10°