

DESCRIPTION

PT6913 is a special current regulator to drive HV LED. Compact, few external components design is very flexible in many applications. PT6913 provides a programmable 10~100mA constant current. Maximum 400V input voltage provides high reliability for HV LED lighting. The simple driving topology will improve power factor, efficiency. EMI issue will be avoided with this linear control.

Special design is convenient in high-side application. LED open/short is protected by PT6913. The high voltage will be absorbed by PT6913 itself. LEDs will never face high voltage problem.

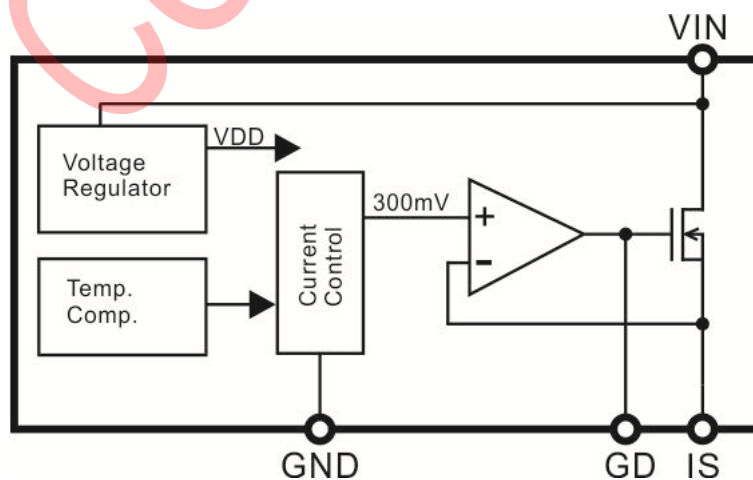
To improve driving capability, PT6913 provides a pin to drive external MOSFET. It will be flexible in larger current application.

PT6913 also provide temperature compensation. When internal junction temperature is higher than 135 °C, PT6913 will decrease the output current linearly. The output current will be zero when junction temperature reaches 150°C. This protection effectively avoids the flicker problem during abnormal environment temperature.

APPLICATIONS

- GU10, MR16, E11, E17 LED Bulb
- Compact Size LED Lighting
- TRIAC Dimming

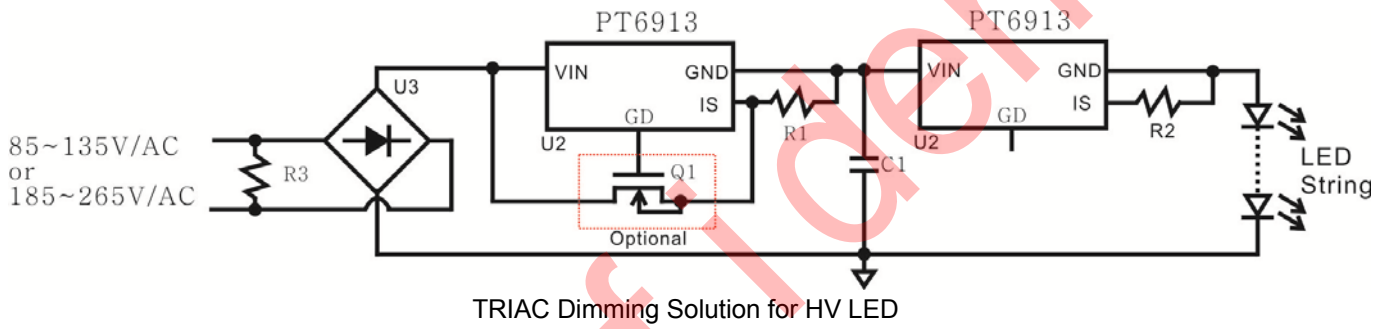
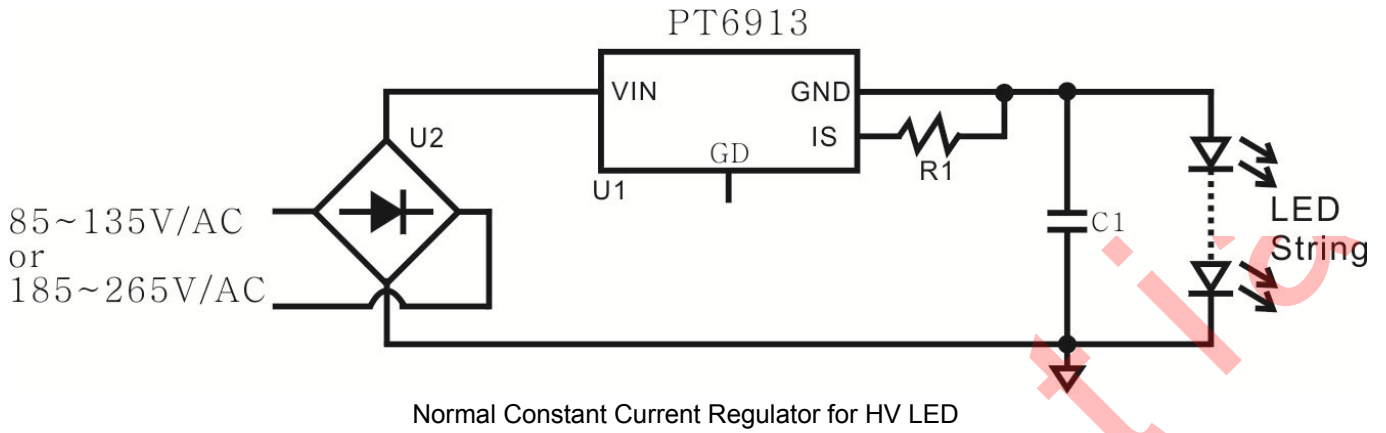
BLOCK DIAGRAM



FEATURES

- 5V~400V Operating Voltage
- 10~100mA Programmable Output Current
- $\pm 5\%$ Current Accuracy (**Target**)
- Less Than 150uA Operating Current
- Parallel Using for High Current Application
- Driving External MOSFET for Larger Current
- LED Short Protection
- Temperature Compensation
When $T_j > 135^\circ\text{C}$, output current will be decreased.
Output current will be zero when $T_j = 150^\circ\text{C}$
- Electrical Capacitor Needless
- High Power Factor
- High Efficiency
- Few External Components
- SOT89-5 Package

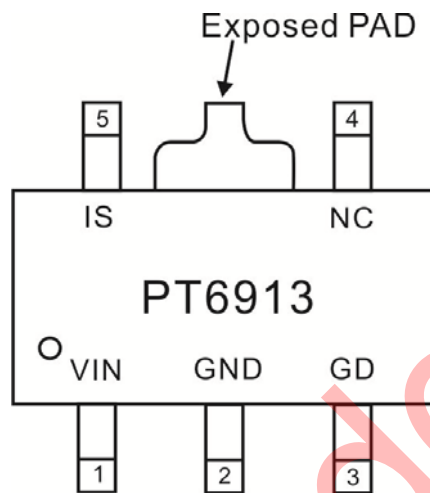
TYPICAL APPLICATION



ORDER INFORMATION

Valid Part Number	Package Type	Top Code
PT6913	SOT89-5	PT6913

PIN CONFIGURATION



PIN DESCRIPTION

Pin Name	Description	Pin No.
VIN	IC Power Supply. VIN pin can be connected to high-voltage directly.	1
GND	IC Ground. The LED current is provided from this pin in typical application.	2
GD	Gate Drive. To improve PT6913 driving capability, GD can be connected with external MOSFET.	3
NC	No Connection.	4
IS	Output Current Setting. The output current is programmable from 10mA to 100mA by a resistor across IS pin and IC GND pin.	5

FUNCTION DESCRIPTION

OPERATION

The PT6913 is conveniently used for high side application. The positive terminal of HV LED is connected with GND of PT6913. The negative terminal of HV LED is connected with GND of DC-BUS. The VIN of PT6913 can be connected to rectified voltage after bridge directly. The maximum 400V operating voltage can cover most AC applications.

OUTPUT CURRENT

The output current is set by the resistor across IS and GND. It can be calculated as following equation.

$$I_{LED} = \frac{300mV}{R_{IS}}$$

TEMPERATURE COMPESATION

The PT6913 integrates temperature compensation. When the junction temperature is higher than 135°C typically, the output current or the reference voltage of IS will be decreased by 20mV/°C. Normally, the output current will be zero if the junction temperature rises up to 150°C.

This function is useful when environment temperature is abnormal high. PT6913 will try to reduce the environment temperature by reduce the LED current. The temperature will be balanced at some level if the abnormal condition is not removed. The device will be protected and flicker doesn't happen.

LED SHORT PROTECTION

The worst case is LED shorted with two terminals. PT6913 will try to regulate constant current. The voltage across PT6913 will be very high. The junction temperature of PT6913 will be increased by higher power dissipation. It will work into temperature compensation mode. It means that LED short protection is realized by temperature compensation.

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit
VIN to GND	-	-0.3~+700	V
IS to GND	-	-0.3~+7.0	V
GD to GND	-	-0.3~+30.0	V
Maximum Output Current	I _{OUT}	120	mA
Operating Temperature	T _{OPR}	-40~+105	°C
Storage Temperature	T _{STG}	-50~+150	°C
Continuous Power Dissipation(Ta=25°C)	P _{TOT}	1.5(TBD)	W

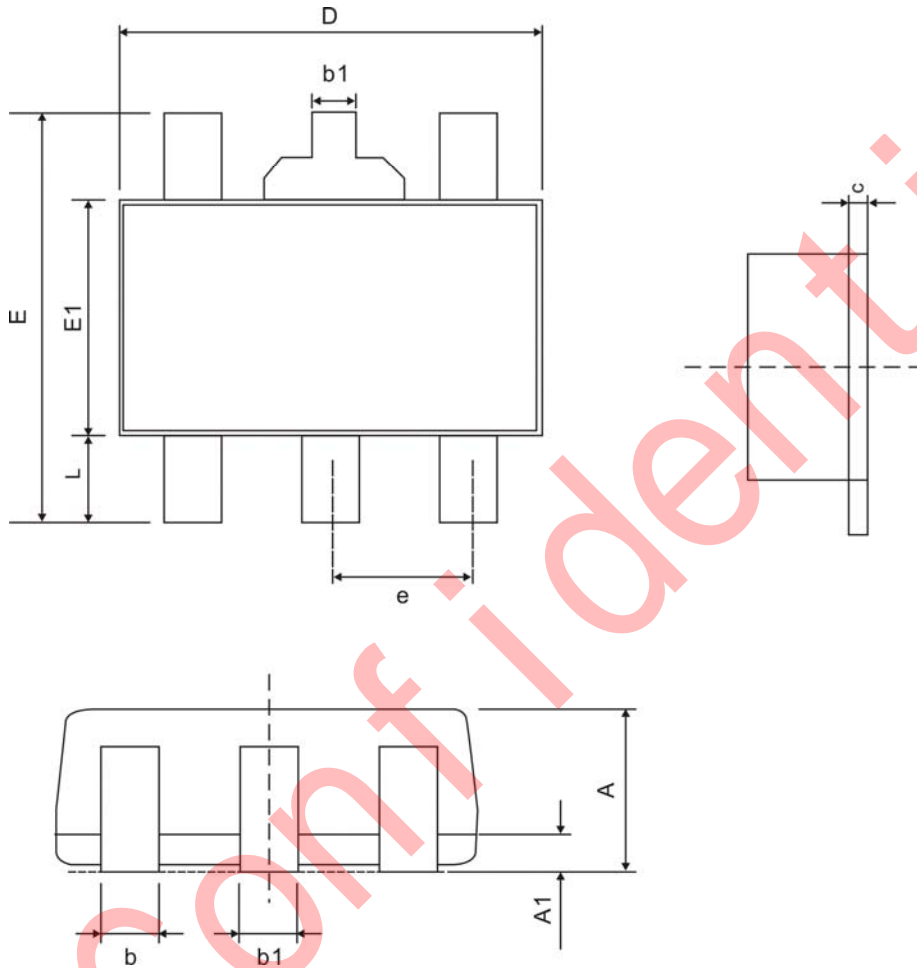
ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, $V_{IN}=30V$, $T_A=25^{\circ}C$)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Input Supply Voltage ¹	V_{IN}		5.0		400	V
Input Active Current	I_{AC}			150	250	uA
IS Voltage	V_{IS}		285	300	315	mV
Output Current Range	I_{OUTR}		10		100	mA
Output Current	I_{OUT}	$R_{IS}=6\Omega$	47.5	50	52.5	mA
Output Current Regulation	ΔI_{OUT}	$V_{IN}=6\sim 40V$, $R_{RS}=10\Omega$			3	%
GD Driving Capability	I_{GD}				30	uA
Temperature Compensation	T_{TRIG}			135		$^{\circ}C$
Temperature Coefficient of RS after 135 $^{\circ}C$	K_T			20		mV/ $^{\circ}C$

PACKAGE INFORMATION

SOT89-5



Symbol	Dimensions In Millimeters		
	Min	Nom	Max
A	1.40	1.50	1.60
A1	0.30	0.40	0.50
b	0.36	0.42	0.48
b1	0.41	0.47	0.53
c	0.380	0.400	0.430
e	1.40	1.50	1.60
D	4.40	4.50	4.60
E	-	-	4.25
E1	2.40	2.50	2.60
L	0.80	-	-

Notes:

- 1 All dimensions are in millimeters
- 2 Refer to JEDEC TO-243

REVISION HISTORY

Date	Revision No.	Reference No.	Modification
9/7/2011	PT6913 REF1.0		Initial version
11/9/2011	PT6913 REF2.0		New Definition
11/18/2011	PT6913 PREF2.1		New Definition

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