

### GENERAL DESCRIPTION

PT4207 is an AC/DC buck constant current driver for high power LED lighting applications. The IC uses a constant off-time control scheme. Both off time and peak LED current is externally programmed. The operating duty cycle can be as wide as 100% and it can power LED load from a 20V-450V power supply. The peak LED current compensation makes sure the LED current is stable within the overall input range.

The PT4207 integrates a 350mA low side switch. Besides, it provides EXT pin to drive external low side power switch to extend current capacity. The dedicated DIM input can accept either a 0.5V-2.5V analog dim signal or a PWM dim signal. Multi protection is integrated into PT4207 including output open/short circuit protection and soft over temperature protection. Built in soft start greatly reduces the inrush current during start up.

PT4207 is available in SOP8 package.

### FEATURES

- Support 20VDC-450VDC input range application
- LED string up to hundreds of diodes
- Built-in 20V/350mA low side power switch
- Low side power switch extendable
- Up to 100% duty cycle
- 0.5V-2.5V analog dim and PWM dim acceptable
- Built in 4mS soft start
- LED string open/short circuit protection
- Soft over temperature protection

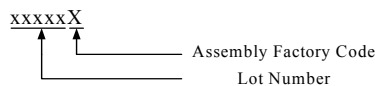
### APPLICATION

- AC/DC LED lighting
- RGB Backlighting LED Driver
- Signal and Decorative LED lighting
- E27/PAR30/PAR38 power supplier

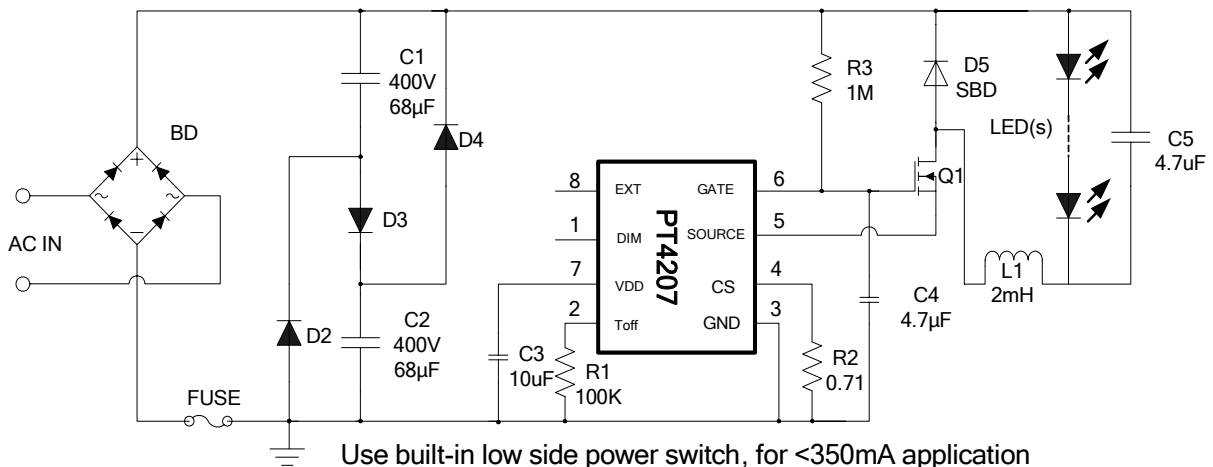
### ORDERING INFORMATION

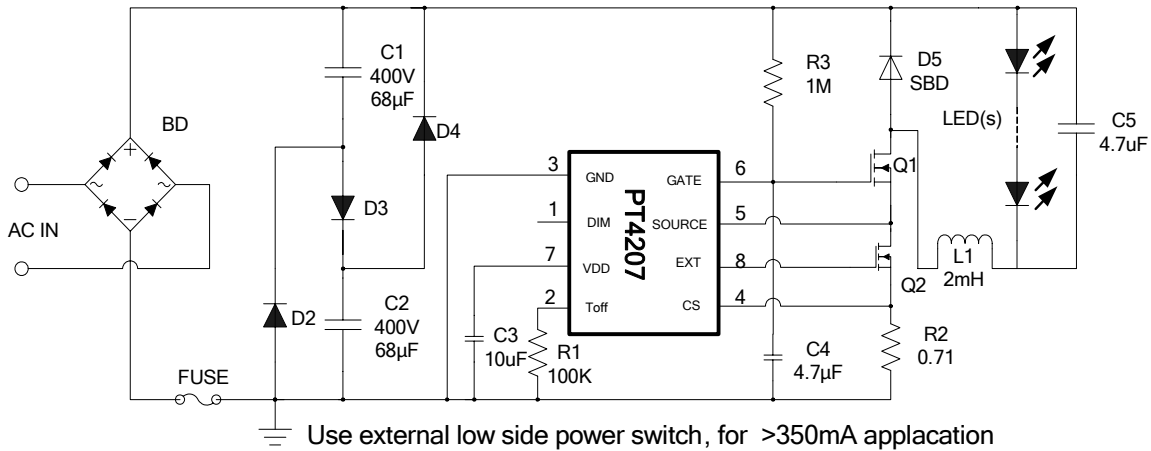
PACKAGE	TEMPERATURE RANGE	ORDERING PART NUMBER	TRANSPORT MEDIA	MARKING
SOP-8	-40 °C to 85 °C	PT4207ESOH	Tape and Reel	PT4207 xxxxxX

**Note:**

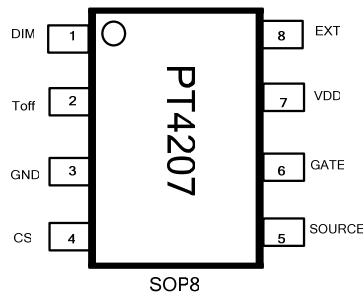


### TYPICAL APPLICATION





### PIN ASSIGNMENT



### PIN DESCRIPTIONS

No,	Name	Description
1	DIM	Dim signal input. This pin can accept either a 0.5V~2.5V analog dim signal or a PWM dim signal
2	Toff	Off time setting pin, off time is programmed by a resistor from this pin to GND
3	GND	Ground connection
4	CS	LED current sense input, connect a resistor from CS to GND to set peak LED current
5	SOURCE	Internal low side switch drain output, connect this pin to the source of high side MOSFET.
6	GATE	High side MOSFET gate bias pin, must connect a bypass capacitor from this pin to GND
7	VDD	Power supply input pin, must be locally bypassed
8	EXT	Low side extended MOSFET drive pin. Floating this pin if use internal switch, if external low side switch is used, connect this pin to the gate of external low-side MOSFET.

### ABSOLUTE MAXIMUM RATINGS (note1,2,3)

SYMBOL	ITEMS	VALUE	UNIT
V <sub>DD</sub>	Supply input	-0.3~6	V
GATE	GATE input voltage	-0.3~15	V
EXT	EXT output voltage	-0.3~ (V <sub>DD</sub> +0.3)	V
SOURCE	Max voltage of SOURCE	-0.3~20	V
VI/O	Other I/O pin voltage	-0.3~6	V
I <sub>GATE(MAX)</sub>	Max current into GATE	10	mA
P <sub>DMAX</sub>	Power dissipation(note 2)	Internally limited	W
P <sub>TRI</sub>	Package thermal resistance, SOP-8 R <sub>θJA</sub>	150	°C /W
T <sub>J</sub>	Operating junction temperature range	-40 to 150	°C
T <sub>STG</sub>	Storage temperature	-55 to 150	°C
HBM	ESD Susceptibility (Note 3)	2	kV

### RECOMMENDED OPERATING RANGE

SYMBOL	ITEMS	VALUE	UNIT
V <sub>DD</sub>	Power supply voltage	0 ~6	V
VI/O	Other I/O pin voltage	0 ~ 5	V
T <sub>OPT</sub>	Operating Temperature	-40 to +85	°C

**Note 1:** Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Recommended Operating Range indicates 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 Range. Specifications are not guaranteed for parameters where no limit is given, however, the typical value is a good indication of device performance.

**Note 2:** The maximum power dissipation must be derated at elevated temperatures and is dictated by T<sub>JMAX</sub>, θ<sub>JA</sub>, and the ambient temperature T<sub>A</sub>. The maximum allowable power dissipation is P<sub>DMAX</sub> = (T<sub>JMAX</sub> - T<sub>A</sub>) / θ<sub>JA</sub> or the number given in Absolute Maximum Ratings, whichever is lower.

**Note 3:** Human body model, 100pF discharged through a 1.5kΩ resistor.

**ELECTRICAL CHARACTERISTICS** (Note 4, 5)

 $V_{DD}=5.5V$ ,  $T_A=25^{\circ}C$  unless specified otherwise.

SYMBOL	ITEMS	CONDITIONS	MIN.	TYP.	MAX.	UNIT
<b>MOSFET GATE bias pin</b>						
$V_{GATE}$ Clamp	GATE clamp voltage	$I_{GATE}=5mA$	12	13.5	15	V
$I_{GATE}$ Clamp	GATE continues clamp current			10		mA
<b>Power supply VDD</b>						
$V_{UVLO}$	VDD UVLO threshold	VDD falling		3.5		V
VDDH	VDD start up threshold	VDD rising	5.2	5.5	5.8	V
$V_{DDHYS}$	VDD ripple voltage			0.5		V
$I_{VDD}$	VDD charge current	VDD=0		7.5		mA
$V_{DD}$ Clamp	VDD clamp voltage	$I_{DD}=5mA$	5.6	6.0	6.4	V
$I_{DD}$ Clamp	VDD continues clamp current			10		mA
<b>OFF time setting pin Toff</b>						
$T_{OFF}$	OFF time	$R_i=100Kohm$	9.5	10	10.5	uS
<b>Dim input pin DIM</b>						
$V_{DIM}$	DIM floating voltage		4.0	4.5	5.0	V
$V_{DIMH}$	DIM input logic high level		2.5			V
$V_{DIML}$	DIM input logic low level				0.35	V
$V_{DIM\_DC}$	DIM input analog dim range		0.5		2.5	V
$I_{DIM}$	DIM pull up current	$V_{DD}=5.5V$ , $V_{DIM}=0V$		20		uA
<b>Current sense input pin CS</b>						
$V_{CS}$	CS peak reference voltage	Duty=0	340	350	360	mV
$T_{ONMIN}$	Minimum turn on time			230		ns
<b>Internal switch output pin SOURCE</b>						
$R_{sc}$	Rdson of internal switch			1.5	2	Ohm
$T_{RSC}$	SOURCE rise time	Drive 4N60 SOURCE		50		ns
$T_{FSC}$	SOURCE fall time	Drive 4N60 SOURCE		50		ns
$I_{leak}$	Internal switch leak current	$V_{DIM}=0$ , $V_{SOURCE}=20V$			1	uA
$D_{max}$	SOURCE maximum duty cycle				100	%
$D_{min}$	SOURCE minimum duty cycle		0			%

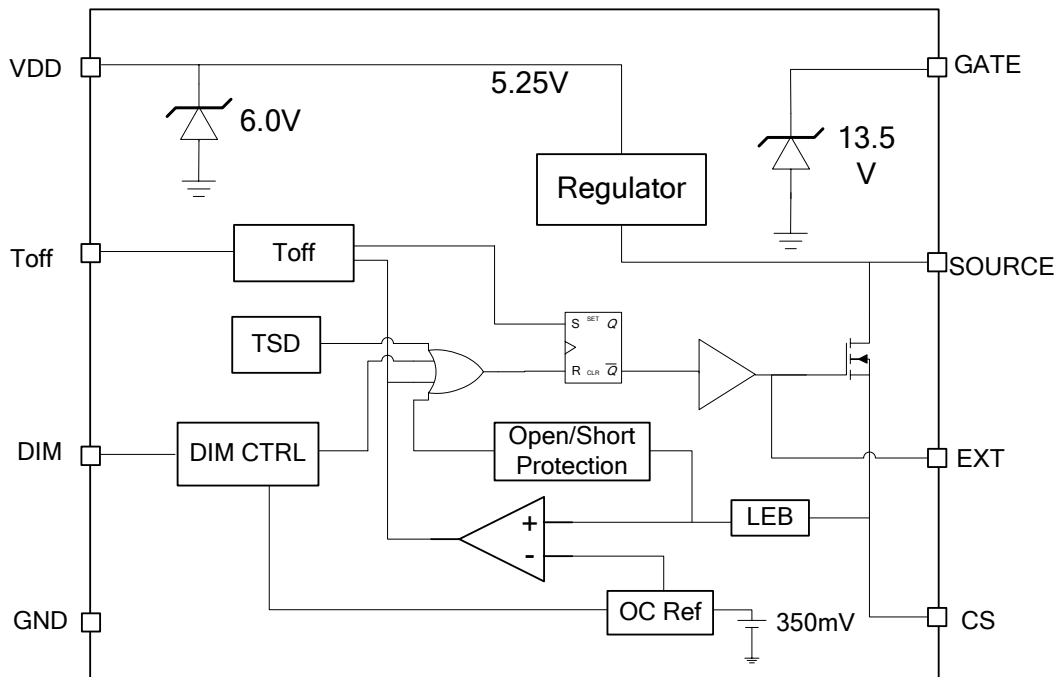
### ELECTRICAL CHARACTERISTICS (Continued) (Note 4, 5)

SYMBOL	ITEMS	CONDITIONS	MIN.	TYP.	MAX.	UNIT
External MOS drive output pin EXT						
$T_{R\_EXT}$	EXT rise time	Cl <sub>oad</sub> =500fF, 10%-90%		10		nS
$T_{F\_EXT}$	EXT fall time	Cl <sub>oad</sub> =500fF, 90%-10%		10		nS
Protection						
$T_{PROT}$	Over temperature protection junction temperature			135		°C
$T_{JMAX}$	Maximum operating junction temperature			150		°C
$T_{SS}$	Soft start time	R <sub>i</sub> =100Kohm		4		mS
T <sub>open</sub>	Load open circuit protection detection time			10.0		mS
T <sub>restart</sub>	Load open circuit restart time			1		mS

**Note 4:** Typical parameters are measured at 25°C and represent the parametric norm.

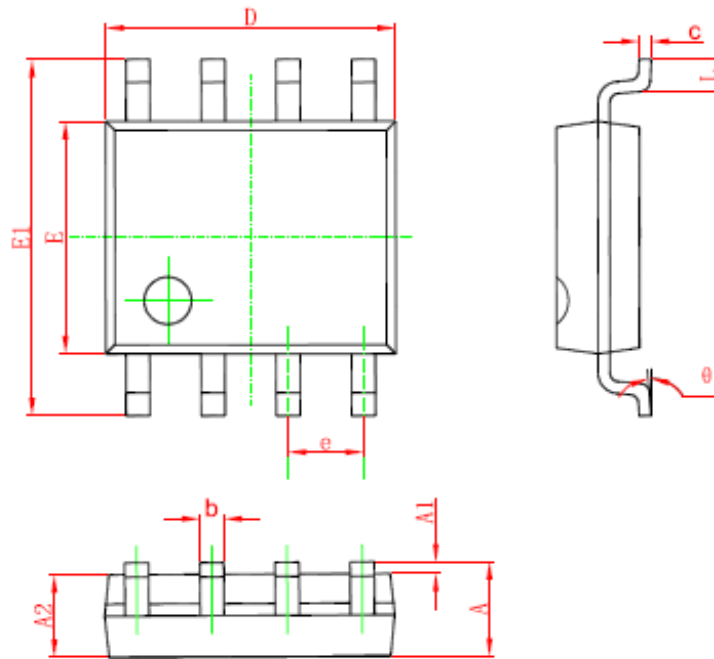
**Note 5:** Datasheet min/max specification limits are guaranteed by design, test, or statistical analysis.

### BLOCK DIAGRAM



### PACKAGE INFORMATION

#### SOP-8 Package



Symbol	Dimension in Millimeters		Dimension 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	0.060
θ	0°	8°	0°	8°