



Description

HY3015 is a PWM power LED driver IC. The driving current is from few milliamps up to 1.5A. It allows high brightness power LED operating at high efficiency from 5Vdc to 40Vdc. Up to 180 KHz external controlled operation frequency. External current sense resistor controlled the maximum output current to LED(s).

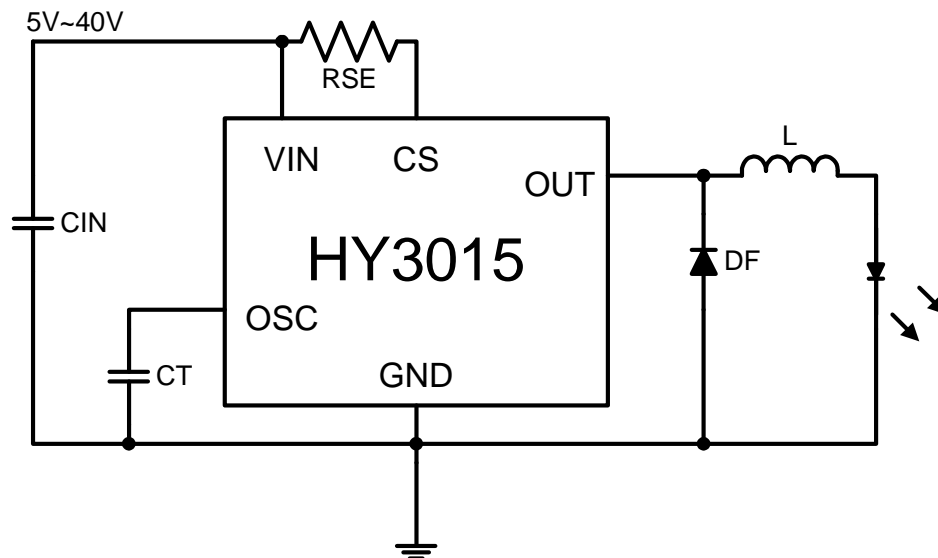
Features

- n Only 5 external components required.
- n Operation from 5V to 40V.
- n Low standby current.
- n Output switching current to 1.5A.
- n Operation Frequency up to 180 kHz.
- n TO-252 5-pin power package.

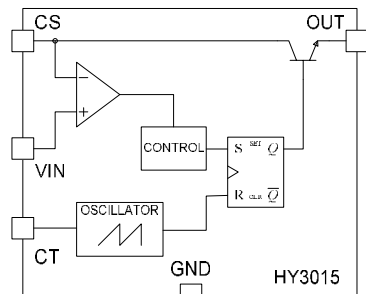
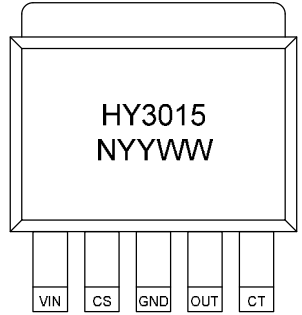
Applications

- n DC/DC LED Driver Application.
- n Automotive LED Lighting Application.
- n Decorative Lighting.
- n MR16.

Typical Applications Circuit



SCHEMATIC DIAGRAM AND PIN DESCRIPTION

	1	VIN	Power Supply	 <p>TO252-5L YY=YEAR WW=Weekly</p>
	2	CS	Output current set input. Connect a resistor from CS to VIN to set the LED bias current. $I_{LED} = 0.3 / RSE$	
	3	GND	Ground	
	4	OUT	Driver Output	
	5	CT	Oscillator timing capacitor.	

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	VALUE	UNIT
VIN	Supply Voltage	-0.3 to 40	V
OUT	Output Voltage	-0.3 to 40	V
I _{OUT}	Output Current	1.5	A
T _J	Maximum Junction Temperature	150	°C
T _S	Storage Temperature	-65 to 150	°C
P _D	Power Dissipation	Internally limited	W
ESD	ESD Protection HBM	2000	V



RECOMMENDED OPERATING CONDITIONS

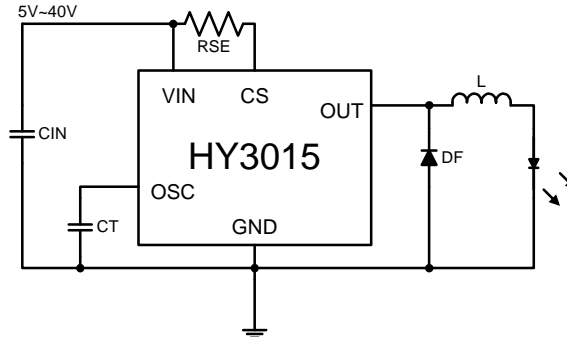
SYMBOL	PARAMETER	MIN	MAX	UNIT
V _{IN}	Supply Voltage	5	40	V
T _A	Ambient Temperature	-40	85	°C
I _{OUT}	Output Current		1.5	A

ELECTRICAL CHARACTERISTICS

(V_{IN} = 5V, T_A = 25°C, UNLESS OTHERWISE SPECIFIED)

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Current	I _{CC}	V _{IN} =5V~40V, C _T =1.0nF			4	mA
Output Drop-out Voltage	V _{DP}	I _{OUT} =1.0A, V _{CS} -V _{OUT}		1	1.3	V
Output Off Current	I _{OFF}	V _{CS} - V _{OUT} = 40V		0.01	300	uA
Current Sense Voltage	V _S	V _{IN} - V _{CS}	270	300	330	mV
Maximum Duty Cycle	T _{DC}	V _{IN} = V _{CS}		85		%
Oscillator Charge Current	I _{CHG}	V _{IN} =5V~40V, T _A = 25°C		35	42	uA

APPLICATION INFORMATION



(Fig.1)

Fig.1 shows the HY3015 typical application circuit for input voltage range from 5V to 40V. Only 5 external components were required Buck power conversion topology was used and total forward voltage of the LED(s) should lower than supply voltage by 1.6V at least.

LED Driving Current

The peak current I_{PK} flow through LED(s) was shown as below:

$$I_{PK} = \frac{300mV}{RSE}$$

The average current on LED(s) was determined by the peak-to-peak ripple current that was decided by inductor L. Assume the target average current 500mA on LED(s) and ripple current 100mA then the RSE should be:

$$RSE = \frac{300mV}{500mA + 0.5 \times 100mA} = 0.5\Omega$$

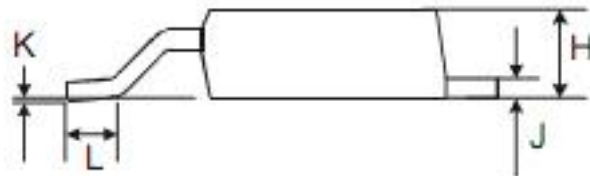
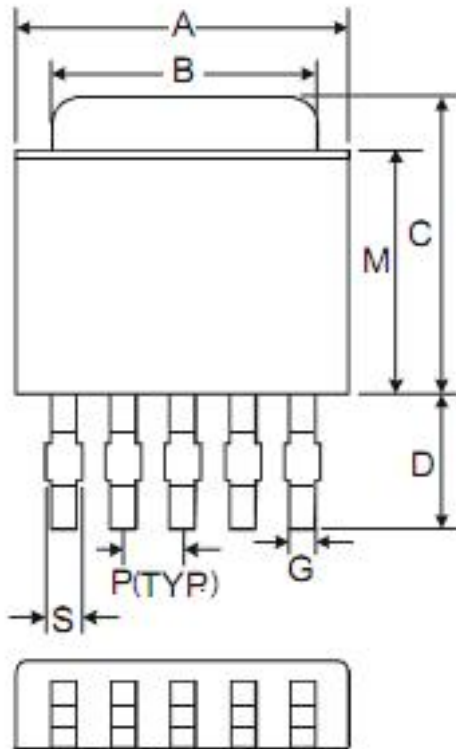
The RSE value should higher than 200mΩ so that driving current won't over the recommended maximum driving current 1.5A.

Inductor

In order to reduce the current ripple on LED(s), the L value should high enough to keep the system working at continuous-conduction mode that inductor current won't fall to zero. Where, V_{LED} is the total forward voltage (at expecting current) of the LED string, V_F is the forward voltage of the flywheel diode DF, V_{RSE} is the peak value of the voltage drop across RSE which is 280mV, and V_{SAT} is the saturation voltage of the switch which has a typical value of 1V, the value of inductance can be calculated.

$$L = \frac{VIN - V_{RSE} - V_{SAT} - V_{LED}}{I_{PK}} \times T_{on} \quad (\text{Ton is on state duty of period})$$

Package Outline Dimensions



TO252-5L		
Dim	Min	Max
A	6.35	6.80
B	5.20	5.50
C	6.80	7.20
D	2.20	2.80
P	1.27 Typ	
S	0.50	0.80
G	0.40	0.60
H	2.20	2.40
J	0.46	0.58
K	0.00	0.15
L	0.90	1.50
M	5.40	5.59
All Dimensions in mm		



ORDERING INFORMATION

HY3015 TA5 R

Circuit Type

Package Type
TA5 : TO252-5L

Shipping
R: Tape & Reel

ORDERING REMEMBER	OUTPUT VOLTAGE	PACKAGE	SHIPPING
HY3015TA5R	N/A	TO252-5L	3,000 Units/ Tape & Reel