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).
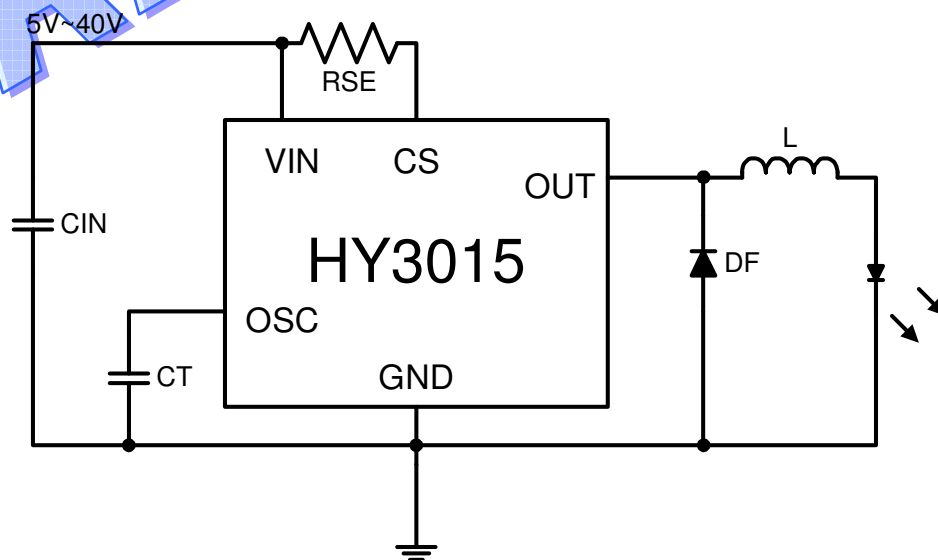
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Features

■ Only 5 external components required.

■ Operation from 5V to 40V.

■ Low standby current.

■ Output switching current to 1.5A.

■ Operation Frequency up to 180 kHz.
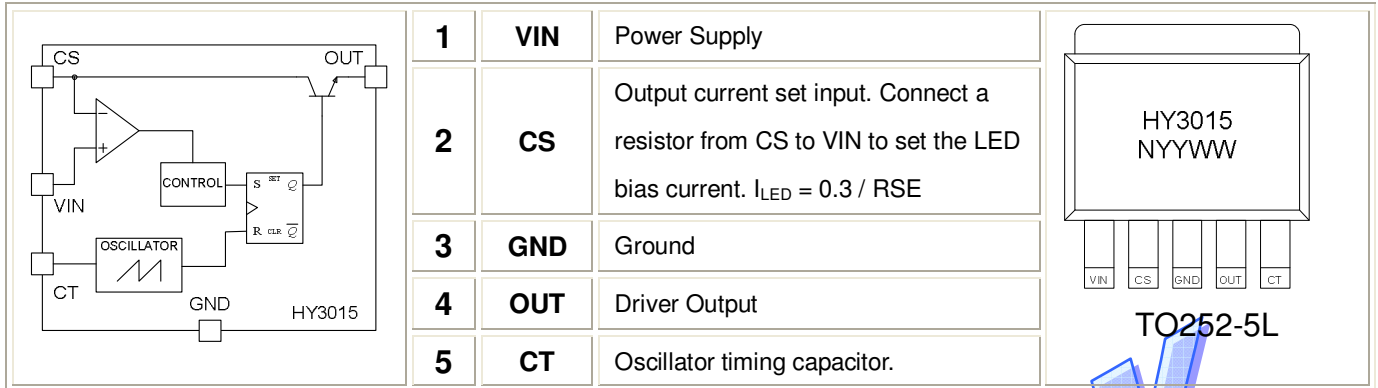
■ TO-252 5-pin power package.

Applications

■ DC/DC LED Driver Application.

■ Automotive LED Lighting Application.

■ Decorative Lighting.

■ MR16.

Typical Applications Circuit

HY3015 V0.1

SCHEMATIC DIAGRAM AND PIN DESCRIPTION

1	VIN	Power Supply
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.

HY3015
NYYWW

TO252-5L

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	℃
T_S	Storage Temperature	-65 to 150	℃
P_D	Power Dissipation	Internally limited	**W**
ESD	ESD Protection HBM	2000	**V**

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RECOMMENDED OPERATING CONDITIONS

SYMBOL	PARAMETER	MIN	MAX	UNIT
VIN	Supply Voltage	5	40	**V**
T_A	Ambient Temperature	-40	85	℃
I_{OUT}	Output Current		1.5	**A**

ELECTRICAL CHARACTERISTICS

(VIN = 5V, TA = 25℃, UNLESS OTHERWISE SPECIFIED)

PARAMETER	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
Supply Current	I_{CC}	VIN=5V~40V, C_T=1.0nF			4	mA
Output Drop-out Voltage	V_{DP}	I_{OUT}=0.8A, V_{CS}-V_{OUT}		1	1.3	V
Output Off Current	I_{OFF}	V_{CS} - V_{OUT} = 40V		0.01	100	uA
Current Sense Voltage	V_S	VIN - V_{CS}	260	280	300	mV
Maximum Duty Cycle	T_{DC}	VIN = V_{CS}			85	%
Oscillator Charge Current	I_{CHG}	VIN=5V~40V, TA = 25℃			35	42	uA

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APPLICATION INFORMATION
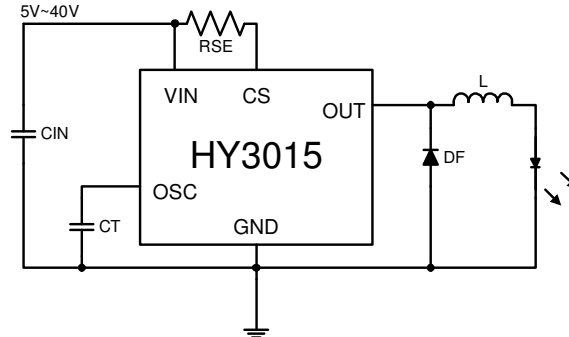
（ **Fig.1** ）

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 IPK flow though LED(s) was shown as below:

$$IPK = \frac{280mV}{RSE}$$

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 120mA then the RSE should be:

$$RSE = \frac{280mV}{500mA + 0.5 \times 120mA} = 0.5\Omega$$

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, VLED is the total forward voltage (at expecting current) of the LED string, VF is the forward voltage of the flywheel diode DF, VRSE is the peak value of the voltage drop across RSE which is 280mV, and VSAT is the saturation voltage of the switch which has a typical value of 1V, the value of inductance can be calculated.

$$L = \frac{VIN - VRSE - VSAT - VLED}{IPK} \times Ton \quad \text{(Ton is on state duty of period)}$$

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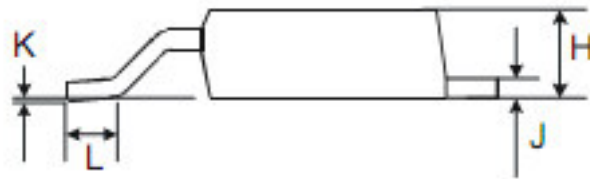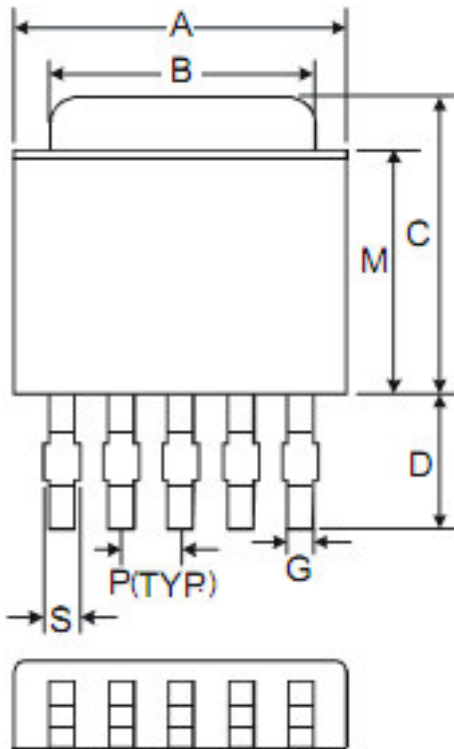
TO252-5L		
Dim	Min	Max
A	6.35	6.80
B	5.20	5.50
C	6.80	7.20
D	2.20	2.80
P	1.27 Typ	
S	0.50	0.80
G	0.40	0.60
H	2.20	2.40
J	0.46	0.58
K	0.00	0.15
L	0.90	1.50
M	5.40	5.59
All Dimensions in mm		

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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	2,500 Units/ Tape & Reel

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