

## **1A, Step-down High Brightness LED Driver**

### **General Description**

The HM4115 is a continuous conduction mode inductive step-down converter, designed for driving single or multiple series connected LED efficiently from a voltage source higher than the total LED chain voltage. The device operates from an input supply between 9V and 36V and provides an externally adjustable output current of up to 1A. Depending upon the supply voltage and external components, the HM4115 can provide more than 30 watts of output power.

The HM4115 includes the power switch and a high-side output current sensing circuit, which uses an external resistor to set the nominal average output current, and a dedicated DIM input accepts a wide range of pulsed dimming. The HM4115 is available in SOT89-5, TO-252, SOT-25 and MSOP-8L packages.

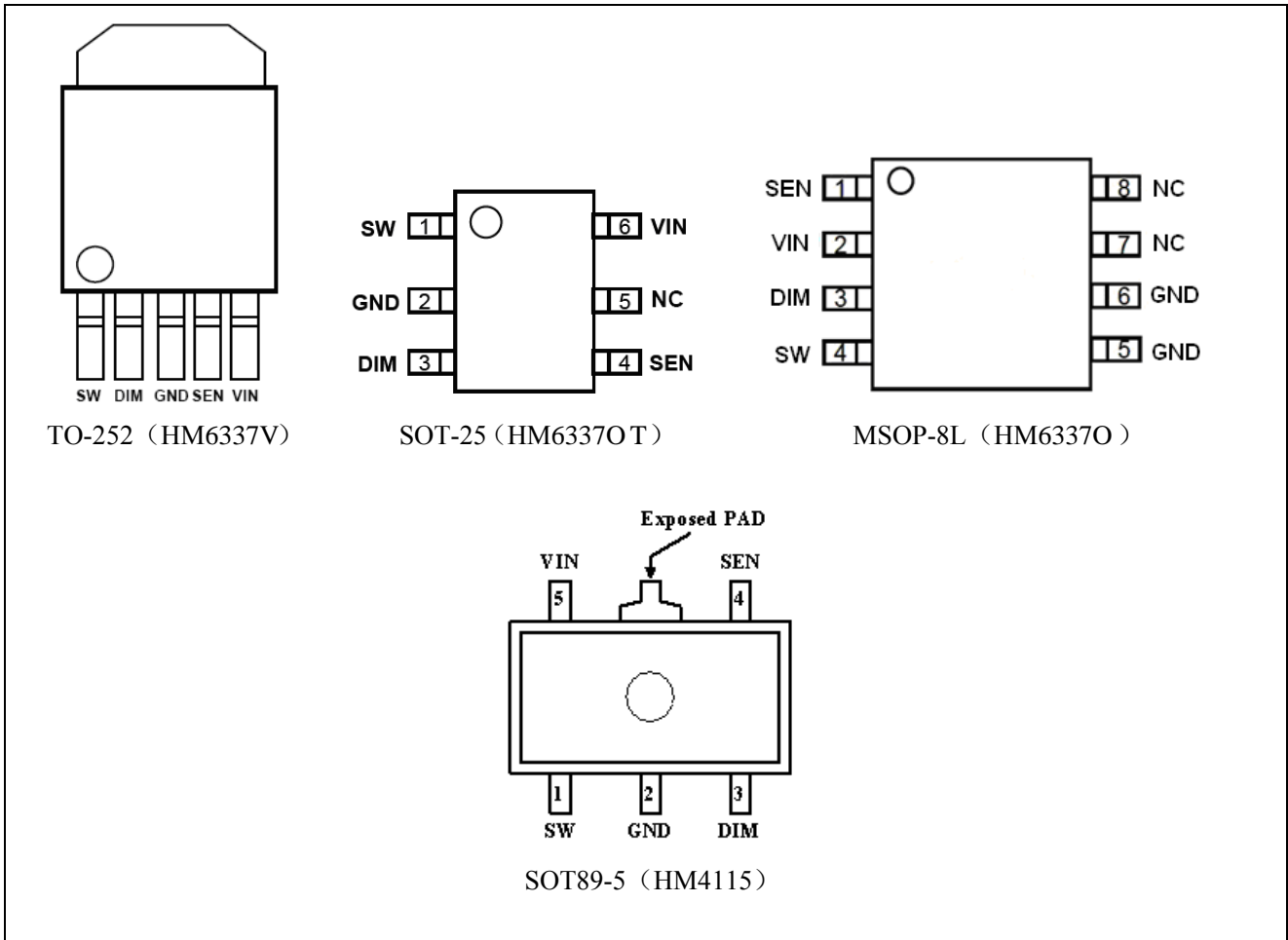
### **Features**

- Wide input voltage range: 9V to 36V
- Up to 1A output current
- Single pin on/off and brightness control using PWM
- Up to 1MHz switching frequency
- Typical 3% output current accuracy
- Inherent open-circuit LED protection
- High efficiency (up to 96%)
- High-Side Current Sense
- Hysteretic Control: No Compensation
- Adjustable Constant LED Current

### **Applications**

- Low voltage halogen replacement LEDs
- Automotive lighting
- Low voltage industrial lighting
- Illuminated signs

**Pin Configuration**



**Pin Function**

PIN NAMES	DESCRIPTION
GND	Signal and power ground. Connect directly to ground plane.
SW	Switch Output. SW is the drain of the internal N-Ch MOSFET switch.
DIM	Logic level dimming input. Drive DIM low to turn off the current regulator. Drive DIM high to enable the current regulator.
SEN	Current sense input
VIN	Input Supply Pin. Must be locally bypassed.
NC	No connection
Thermal Pad	Internally connected to GND. Mount on board for lower thermal resistance.



**Absolute Maximum Ratings**

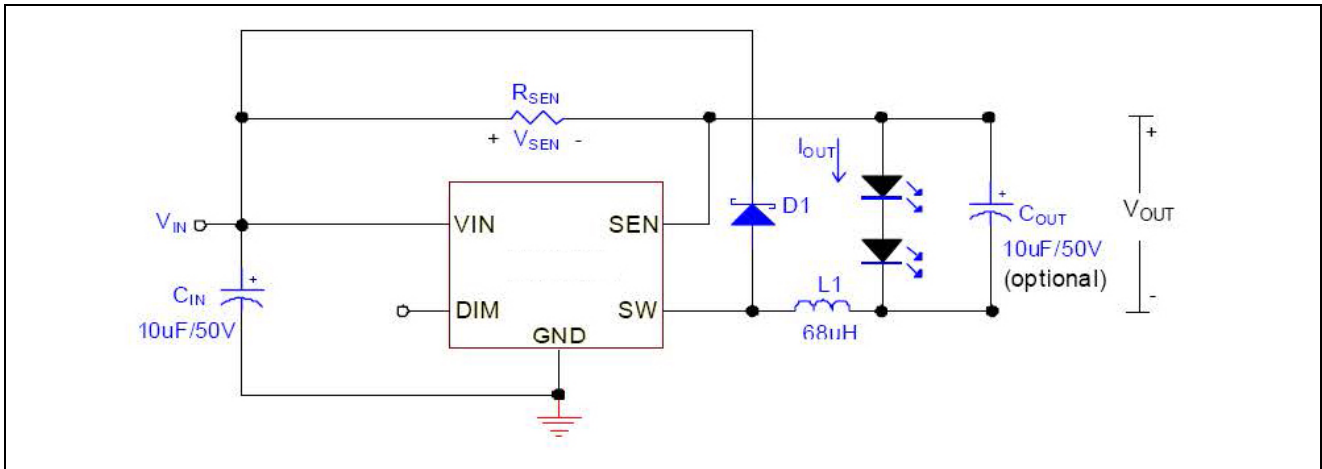
SYMBOL	ITEMS	VALUE	UNIT
V <sub>IN</sub>	Supply Voltage	0~40	V
SW	Drain of the internal power switch	-0.5~45	V
DIM	Logic level dimming input	-0.3~6	V
I <sub>SW</sub>	Switch output current	1.2	A
P <sub>DMAX</sub>	Power Dissipation (SOT89-5)	1.5	W
P <sub>TR</sub>	Thermal Resistance, SOT89-5 $\theta_{JA}$	45	°C/W
T <sub>J</sub>	Operation Junction Temperature Range	-40 to 150	°C
T <sub>STG</sub>	Storage Temperature	-55 to 150	°C
	ESD Susceptibility (Note 3)	2	kV
T <sub>OPT</sub>	Operating Temperature	-40 to +125	°C

**Electrical Characteristics (Note 4,5)**

The following specifications apply for V<sub>IN</sub>=12V, T<sub>A</sub>=25°C, unless specified otherwise.

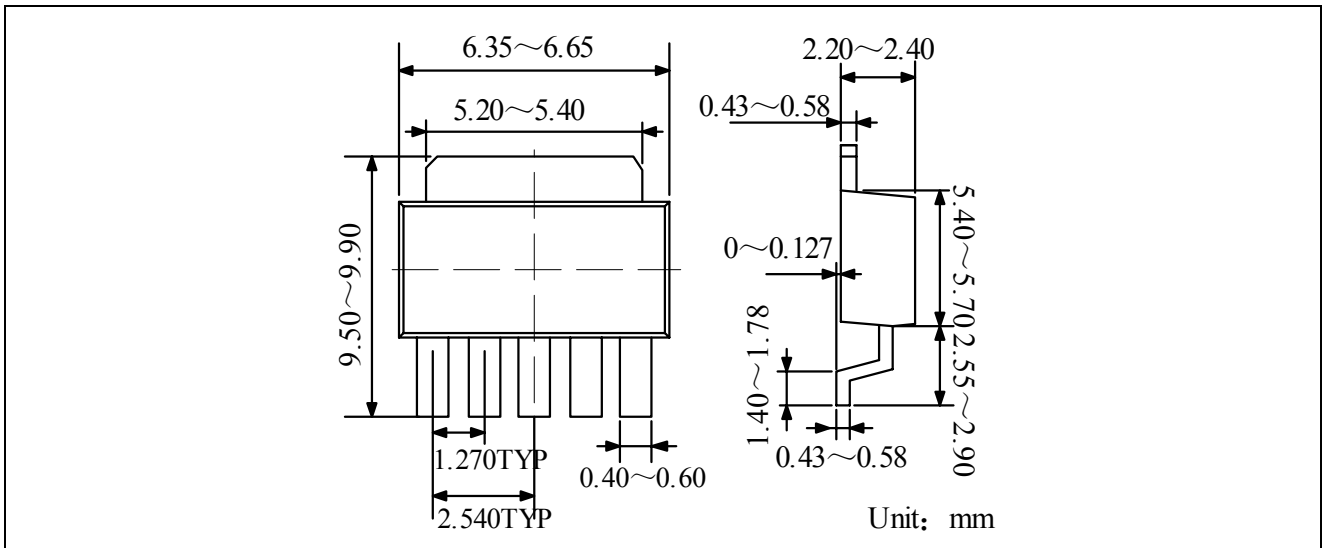
SYMBOL	ITEMS	CONDITIONS	Min.	Typ.	Max.	UNIT
V <sub>IN</sub>	Input Voltage		9		36	V
V <sub>UVLO</sub>	Under voltage lock out	V <sub>IN</sub> falling	5.4	5.8	6.1	V
V <sub>UVLO, HYS</sub>	UVLO hysteresis	V <sub>IN</sub> rising		200		mV
F <sub>SW</sub>	Max. Switching Frequency				1	MHz
<b>Current Sense</b>						
V <sub>SEN</sub>	Mean current sense threshold voltage	V <sub>IN</sub> -V <sub>SEN</sub>	95	100	105	mV
<b>Operating Current</b>						
I <sub>IN</sub>	supply current	V <sub>IN</sub> =9~36V		1	2	mA
<b>DIM Input</b>						
V <sub>DIM</sub>	Internal supply voltage	DIM floating		5		V
V <sub>DIM_H</sub>	DIM input voltage High		3.5			V
V <sub>DIM_L</sub>	DIM input voltage Low				0.5	V
Duty <sub>DIM</sub>	Duty cycle range of low frequency dimming	f <sub>DIM</sub> =100Hz~1KHz	1		100	%
R <sub>DIM</sub>	DIM pull up resistor to Internal supply voltage			100		KΩ
<b>Output Switch</b>						
R <sub>SW</sub>	SW On Resistance	V <sub>IN</sub> =12V		0.45		Ω
I <sub>SWmean</sub>	Continuous SW Current				1	A
I <sub>LEAK</sub>	SW Leakage Current			0.5	5	μA
<b>Thermal Shutdown</b>						
T <sub>SD</sub>	Thermal Shutdown Threshold			165		°C
T <sub>SD-hys</sub>	Thermal Shutdown hysteresis			30		°C

**Application Circuits**

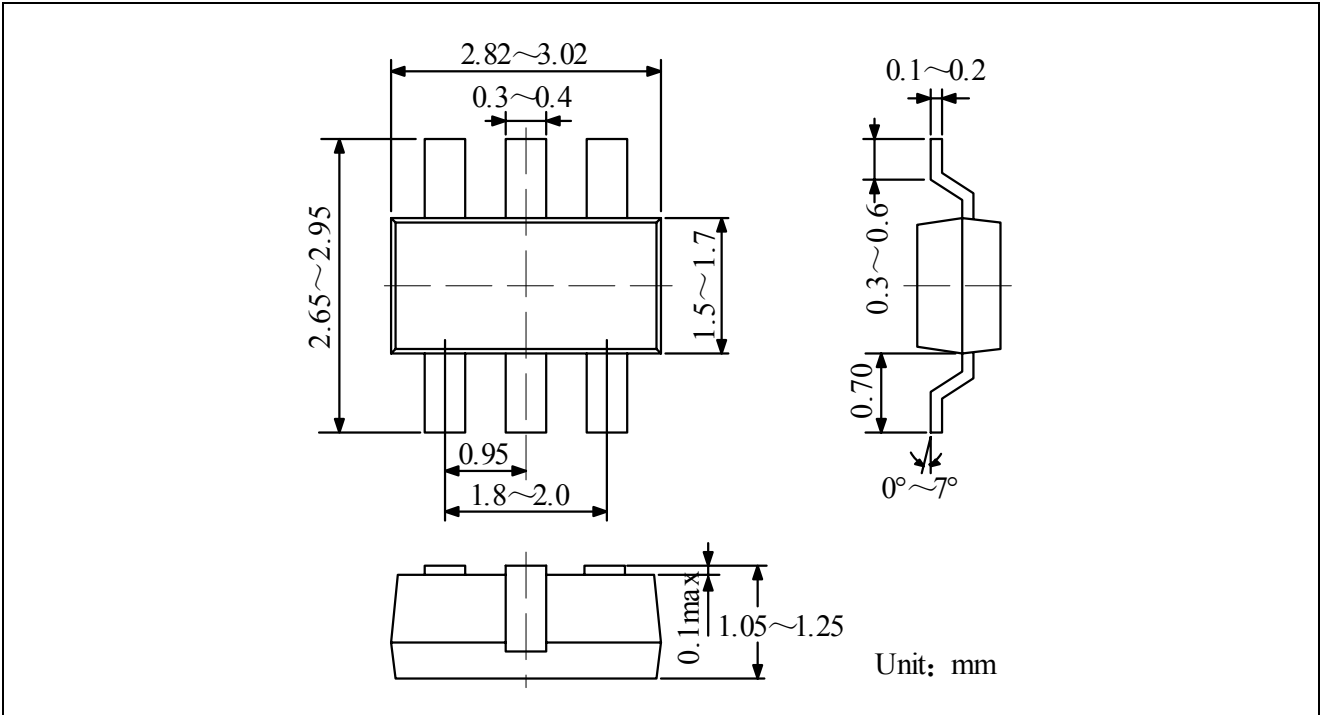


**Package Dimension**

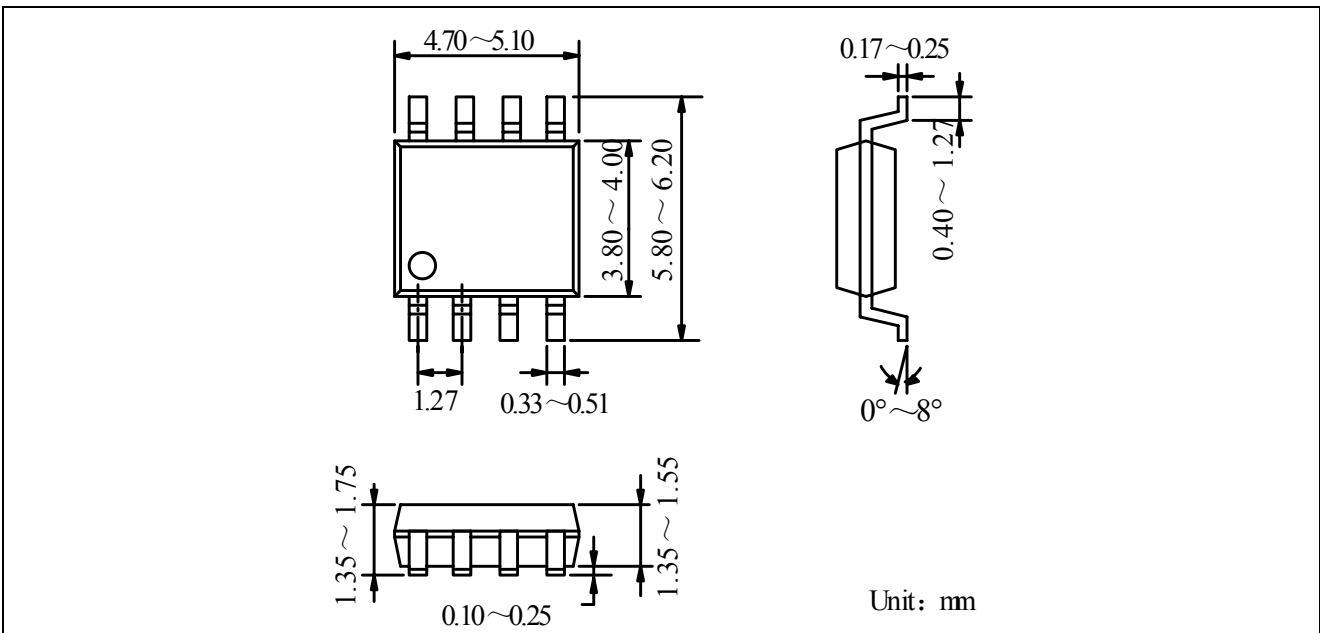
TO-252



SOT-25



MSOP-8L



SOT89-5

