



SY28611

Dimming Interface Converter

Compatible With 0/1~10V Dimming Resistor Dimming And PWM Dimming

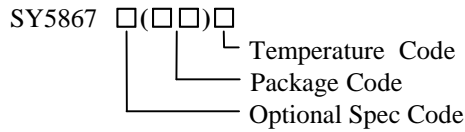
General Description

SY28611 is a dimming interface converter whose input signal can be a 0/1~10V dimming signal, resistor, or PWM signal. It recognizes the signal automatically. The final output of SY28611 is a PWM signal which is used to control a dimmable CC regulator or drive an opto-coupler to achieve isolated dimming. The frequency of output PWM signal and the source current to drive passive 0~10V dimmer/Resistor can be set by external capacitor and resistor.

Features

- Compatible with 0/1~10V Dimming, Resistor Dimming and PWM Dimming.
- Recognize Different Dimming Signal Automatically.
- Integrate 60V LDO Module to Simplify External Circuit.
- The Source Current for Passive 0/1~10V Dimmer Can Be Set.
- The Frequency of Output Can Be Set.
- Compact Package: SO8

Ordering Information



Applications

- LED Lighting

Ordering Number	Package type	Note
SY28611FAC	SO8	----

Typical Applications

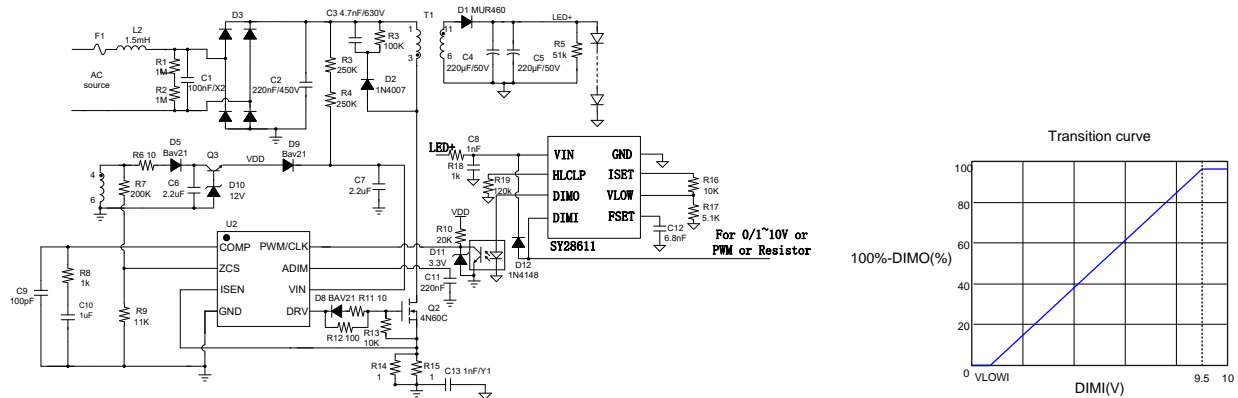
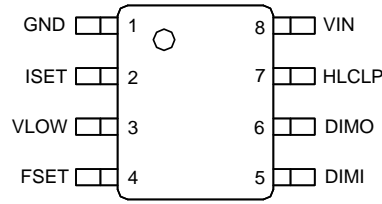


Fig.1 High clamp mode application Schematic

Pinout (top view)



(SO8)

Top Mark: **BKRxyz**, (Device code: BKR; *x=year code, y=week code, z=lot number code*)

Pin Name	Pin number	Pin Description
GND	1	Ground pin
ISET	2	Source current setting pin. V _{ISET} is a 1.5V voltage source. This pin is used to set the source current of DIMI pin for passive dimmer or resistor. $I_{DIMI} = \frac{5 \times 1.5}{R_{ISET}}$
VLOW	3	The zero coordinate setting pin. This pin is used to set the lowest input voltage which corresponds to 0% duty. The real minimum 0~10V input is $V_{LOWI} = 1.55 \cdot k1 \cdot V_{LOW} - k1 \cdot 0.926 + 0.2$ $k1 = 1$; (Low clamp mode) $k1 = \frac{14.58}{52.85 + 14.58} \cdot \frac{52.85 + (14.58 // R_{HLCLPD})}{14.58 // R_{HLCLPD}}$; (High clamp mode)
FSET	4	Dimming frequency setting pin. This pin is used to set the frequency of DIMO pin. $f_{DIM} = \frac{30 \cdot 10^{-6}}{(6.6 - V_{LOW}) \cdot C_{FSET}}$
DIMI	5	Dimming input pin. Dimming signal is connected to this pin. It maybe is a 0/1~10V analog signal, resistor or a PWM signal.
DIMO	6	Dimming output pin. This pin will output a PWM signal to driver opto-coupler for separation dimming.
HLCLP	7	High clamp and low clamp mode setting pin. If the voltage of HLCLP pin is larger than 100mV during IC start-up, it enters into low clamp mode, else it works in high clamp mode. In low clamp mode, if V _{DIMI} is less than the setting value, it is clamped internally. $V_{LCLP} = \frac{9.3}{2} \cdot (V_{HLCLP} - 0.2) + 0.2$ In High clamp mode, the clamp voltage is 9.5V fixedly, and the resistor connected to HLCLP is used to adjust the max duty. $D_{MAX} = \frac{67.79 \cdot R_{HLCLPD}}{67.43 \cdot R_{HLCLPD} + 770.59}$ For Example R _{HLCLP} =510k ohm $D_{MAX} = \frac{67.79 \cdot 510}{67.43 \cdot 510 + 770.59} = 98.3\%$
VIN	8	Power supply pin. This pin provides power supply for IC.

Block Diagram

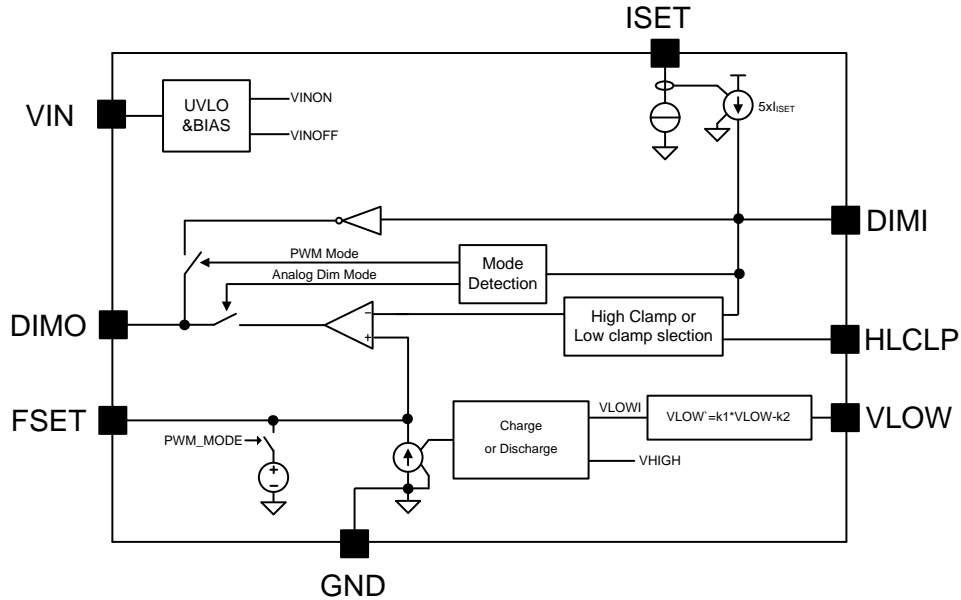


Fig.3 Block Diagram

Absolute Maximum Ratings (Note 1)

VIN	-----	-0.3V~58V
IIN	-----	-10mA
ISET, FSET, VLOW	-----	-0.3V~3.6V
DIMI, DIMO	-----	0.3V~20V
Power Dissipation, @ TA = 25°C SO8	-----	0.8W
Package Thermal Resistance (Note 2)		
SO8, θ_{JA}	-----	88°C/W
SO8, θ_{JC}	-----	45°C/W
Maximum Junction Temperature	-----	125°C
Lead Temperature (Soldering, 10 sec.)	-----	260°C
Storage Temperature Range	-----	-65°C to 150°C

Recommended Operating Conditions

VIN	-----	$V_{VIN,ON} \sim 55V$
Junction Temperature Range	-----	-40°C to 125°C

Electrical Characteristics

($V_{IN} = 15V$, $T_A = 25^\circ C$ unless otherwise specified)

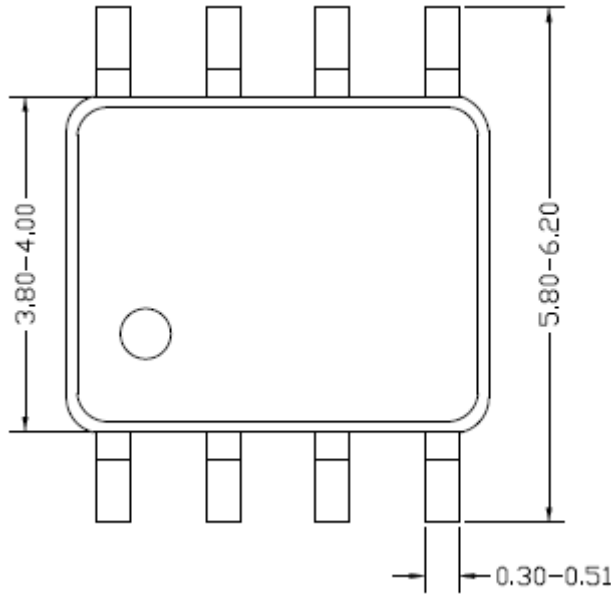
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Power Supply Section						
VIN Voltage Range	V_{VIN}		V_{VIN_ON}		55	V
VIN Turn-on Threshold	V_{VIN_ON}		8.4	9.2	10.2	V
VIN Turn-off Threshold	V_{VIN_OFF}			$V_{IN_ON}-1.7$		V
VIN Over Voltage Protection	V_{VIN_OVP}		52	55	59	V
DIMI Section						
Range of Minimum Dimming voltage	V_{LOW_Range}		0		V_{ISET}	V
Ref Voltage of ISET	V_{ISET}		1.45	1.5	1.55	V
MAX DIMI Source Current	I_{SR_MAX}	ISET=3.75K	1.85	2.0	2.15	mA
Maximum Dimming Voltage	V_{HIGH}		9.2	9.5	9.8	V
Max Duty of PWM	D_{PWM_MAX}			99(note 3)		%
PWM ON Voltage Threshold	V_{PWM_ON}		2.3			V
PWM OFF Voltage Threshold	V_{PWM_OFF}				0.8	V
PWM Frequency Range	f_{PWM}		400		10k	Hz
Thermal Section						
Thermal Shut Down Temperature	T_{SD}			145		$^\circ C$

Note 1: Stresses beyond the “Absolute Maximum Ratings” may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

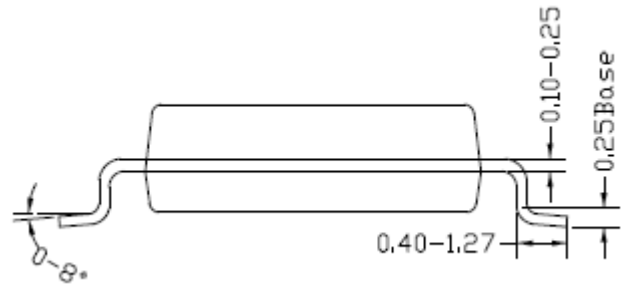
Note 2: Θ_{JA} is measured in the natural convection at $T_A = 25^\circ C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Test condition: Device mounted on 2” x 2” FR-4 substrate PCB, 2oz copper, with minimum recommended pad on top layer and thermal vias to bottom layer ground plane.

Note 3: Increase VIN pin voltage gradually higher than V_{VIN_ON} voltage then turn down to 12V.

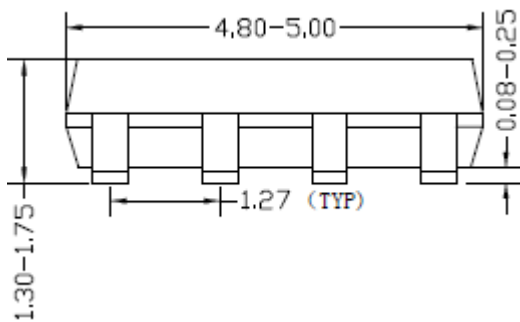
SO8 Package outline & PCB layout design



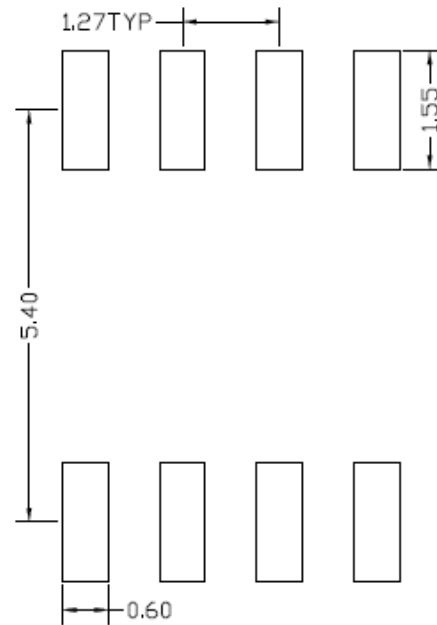
Top view



Side view



Front view

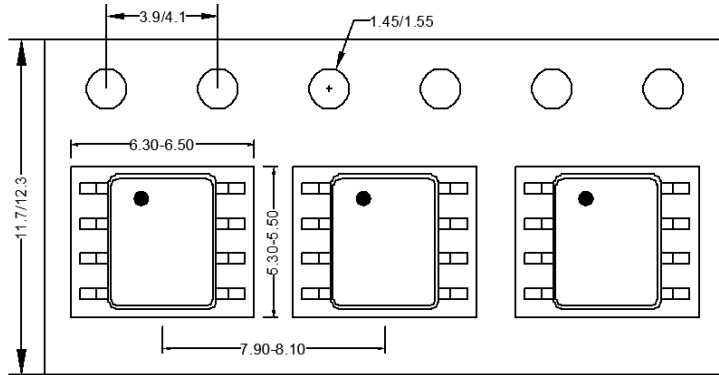


**Recommended Pad Layout
(Reference only)**

Notes: All dimension in millimeter and exclude mold flash & metal burr.

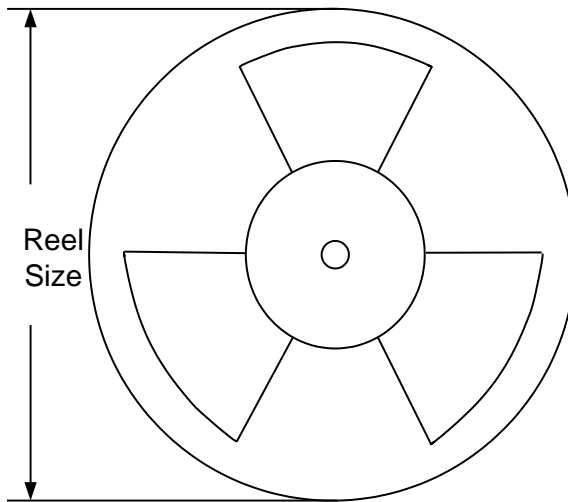
Taping & Reel Specification

1. Taping orientation for packages (SO8)



Feeding direction →

2. Carrier Tape & Reel specification for packages



Package type	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer length(mm)	Leader length (mm)	Qty per reel
SO8	12	8	13"	400	400	2500