



# SY8746A

## High Efficiency, 60V, 0.8A, 350kHz Constant Current Step-down Regulator

*Preliminary Specification*

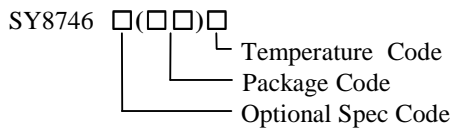
### General Description

SY8746A is a high efficiency, 12V-60V wide input voltage range DC/DC regulator targeting at LED lighting applications. The device integrates the low  $R_{DS(ON)}$  MOSFET and internal compensation. Along with the small SO8E package, the device achieves an extremely small solution size for LED driver design. SY8746A also supports PWM dimming and Analog dimming function.

### Features

- Low  $R_{DS(ON)}$  for internal switches :680m $\Omega$
- Input range: 12V-60V
- 350kHz switching frequency
- 1.2A MOSFET peak current limitation
- Mix/Analog/PWM dimming available
- Lower than 0.5% deep dimming level
- Adjustable thermal foldback temperature
- Dimming resistor to adjust output full load
- Compact package: SO8E

### Ordering Information



Ordering Number	Package type	Note
SY8746AFCC	SO8E	----

### Applications

- PAR Lamp
- Tube Lamp
- Bulb

### Typical Applications

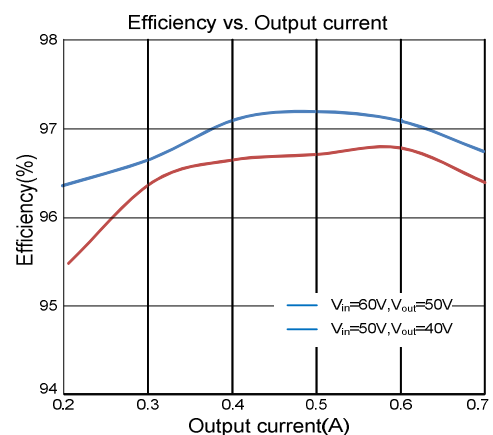
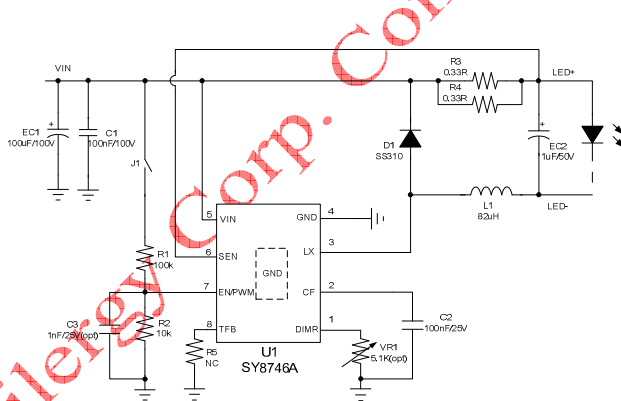
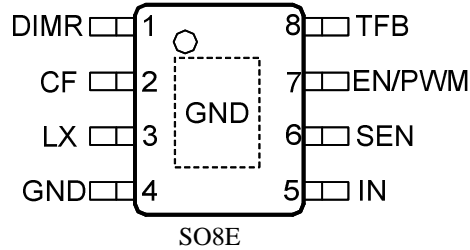


Figure 1. Schematic diagram

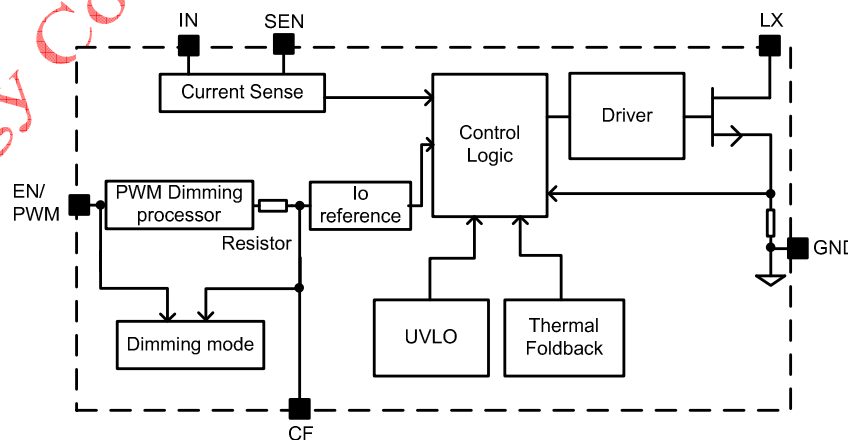
**Pinout (top view)**



**Top Mark: BRLxyz** (device code: BRL, x=year code, y=week code, z=lot number code)

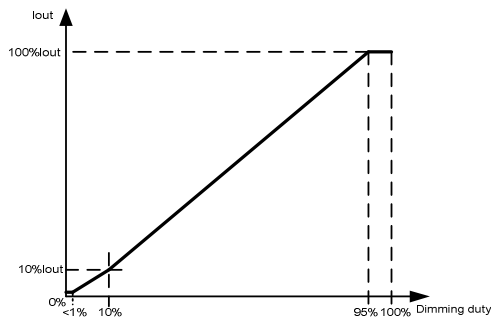
PIN	Pin Name	Pin Description
1	DIMR	Resistor Dimming Pin, adjust output load from 100% to 75% by changing the external resistor. If no use, connect DIMR to GND. Only available for mix dimming mode.
2	CF	Dimming mode selection: $V_{CF} \geq 1.6V$ , PWM dimming mode. $V_{CF} \leq 1.4V$ , analog or mix dimming mode.
3	LX	Inductor node. Connect an inductor between negative of LED and LX Pin.
4	GND	Ground Pin
5	IN	Input Pin. Decouple this Pin to GND Pin with $1\mu F$ ceramic cap. Also used as the positive current sense Pin.
6	SEN	Negative Current Sense Pin.
7	EN/PWM	Dimming mode selection: $V_{PWM} \geq 8.5V$ , add 0~1.0V signal to CF Pin, 0~1.0V analog dimming mode. $V_{PWM} \leq 6.5V$ , add PWM signal to PWM Pin, mix dimming mode. (when PWM duty $\geq 10\%$ , work at analog dimming; when PWM duty $< 10\%$ , work at PWM dimming). At analog dimming mode, recommend to connect a 100nF capacitor between CF Pin and GND.
8	TFB	Thermal foldback temperature adjust Pin

**Block Diagram**

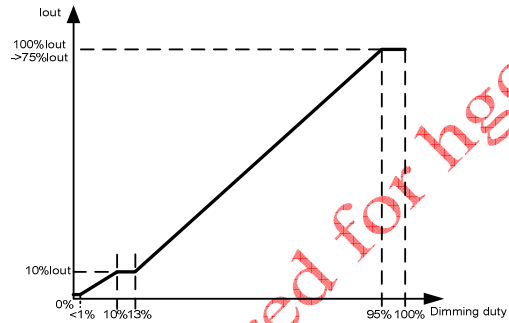


## Dimming Mode

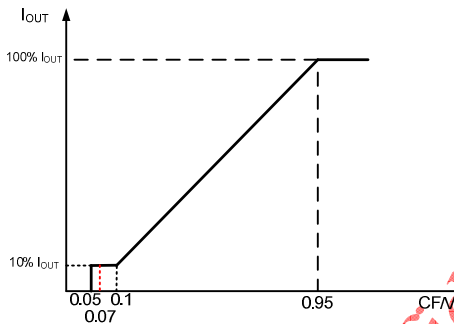
Mode Selection	PWM	CF	Dimming
Dimming Mode 1	--	$\geq 1.6V$	PWM ON/OFF dimming
Dimming Mode 2	$PWM \geq 8.5V$	$\leq 1.4V$	Analog dimming with 0-1V on CF Pin
Dimming Mode 3	$PWM \leq 6.5V$	$\leq 1.4V$	Mix dimming with PWM Signal on PWM Pin



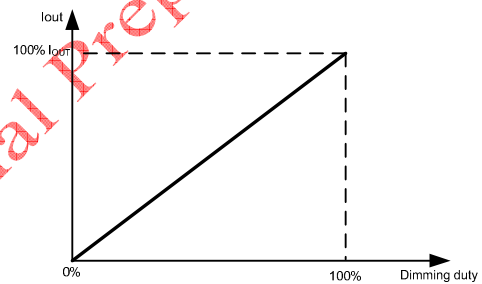
Mix dimming mode( $R_{DIMR}=0$ )



Mix dimming mode( $R_{DIMR}=NC$ )



CF 0-1V dimming mode



PWM ON/OFF dimming mode

## Absolute Maximum Ratings

LX, IN, PWM, CF	-0.3V to ~ 63V
SEN	-0.3V to $V_{IN}+0.6V$
Power Dissipation, PD @ $T_A = 25^{\circ}C$ SOP8-EP,	3.3W
Package Thermal Resistance (Note 2)	
$\theta_{JA}$	30°C/W
$\theta_{JC}$	10°C/W
Junction Temperature Range	-40°C to 150°C
Lead Temperature (Soldering, 10 sec.)	260°C
Storage Temperature Range	-65°C to 150°C

## Recommended Operating Conditions

IN	12V to 60V
SEN	$V_{IN}+0.4V$
Junction Temperature Range	-40°C to 125°C

## Electrical Characteristics

(VIN =48V, Vout=36V, Iout=100mA, TA = 25°C unless otherwise specified)

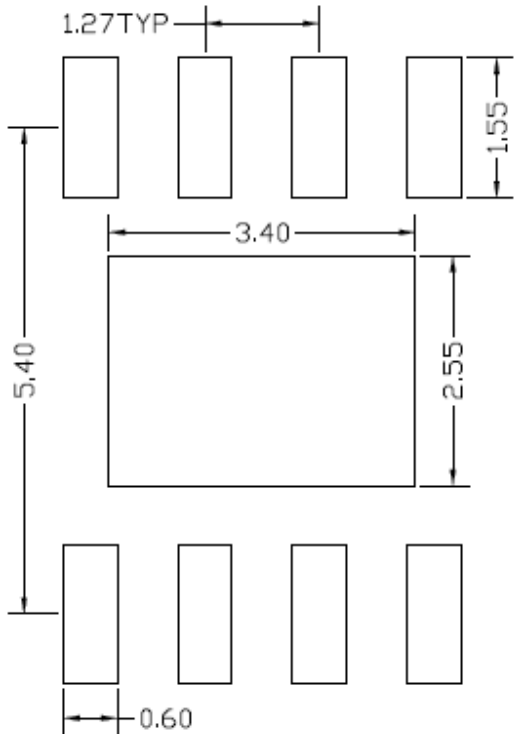
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
<b>Power Supply Section</b>						
Input Voltage Range	V <sub>IN</sub>		12		60	V
Input UVLO threshold	V <sub>UVLO_RISE</sub>				10.5	V
Input UVLO hysteresis	V <sub>UVLO_HYS</sub>				2	V
Shutdown current	I <sub>SHDN</sub>	EN/PWM=0	6	8	12	μA
Operating current	I <sub>VIN</sub>	EN/PWM=3.3V		1		mA
<b>Error Amplifier Section</b>						
Internal current sense reference	V <sub>IN-SEN</sub>		98	100	102	mV
Min current sense reference	V <sub>IN-SEN_MIN</sub>			10		mV
<b>Current Sense Section</b>						
Short circuit protection Voltage	V <sub>IN-SEN</sub>			250		mV
Short circuit Recover Voltage	V <sub>IN-SEN_RC</sub>			50		mV
<b>Driver Section</b>						
Min ON Time	t <sub>ON_MIN</sub>			100		ns
Switching Frequency	f <sub>s</sub>		300	350		kHz
<b>Integrated MOSFET Section</b>						
MOSFET BV			60			V
MOSFET ON Resistor	R <sub>DS(ON)</sub>			680		mΩ
MOSFET Current Limit	I <sub>LIM</sub>		1.0	1.2	1.5	A
<b>PWM Pin Section</b>						
PWM ON Voltage	V <sub>PWM_ON</sub>			1.3		V
PWM OFF Voltage	V <sub>PWM_OFF</sub>			0.85		V
<b>CF Pin Section</b>						
CF ON Voltage	V <sub>CF_ON</sub>	Dimming Mode 2	60	75	90	mV
CF OFF Voltage	V <sub>CF_OFF</sub>	Dimming Mode 2	35	50	60	mV
Linear dimming range on CF	V <sub>CF</sub>		100		950	mV
<b>Dimming Section</b>						
Dimming mode change	Duty	Dimming Mode 3	10		10.5	%
VREF when change dimming mode	V <sub>REF_MIN</sub>	Dimming Mode 3		10		mV
<b>Other Section</b>						
Thermal Foldback Temperature	T <sub>FB</sub>	R <sub>FB</sub> =0		105		°C
		R <sub>FB</sub> ≥ 100k		155		
Thermal Shutdown Temperature	T <sub>SD</sub>			T <sub>FB</sub> +10		°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.

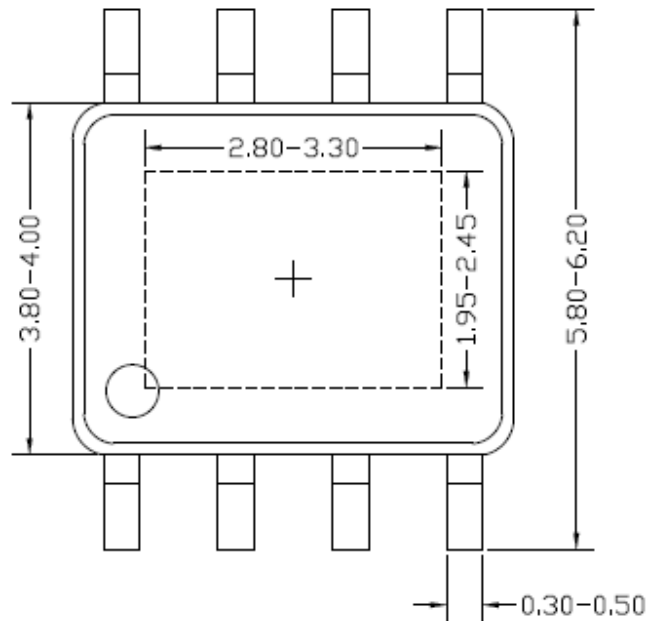
**Note 2:** θ<sub>JA</sub> is measured in the natural convection at TA = 25°C on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

**Note 3:** The device is not guaranteed to function outside its operating conditions

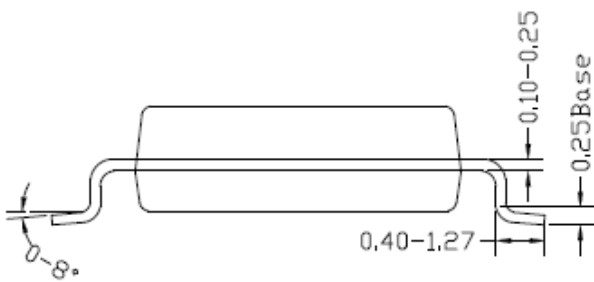
**SO8E Package outline & PCB layout design**



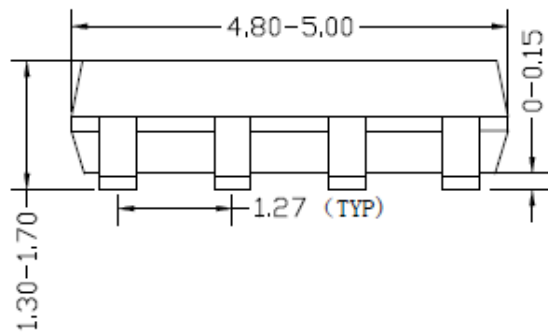
**Recommended PCB Layout  
(Reference Only)**



**Top view**



**Side view**

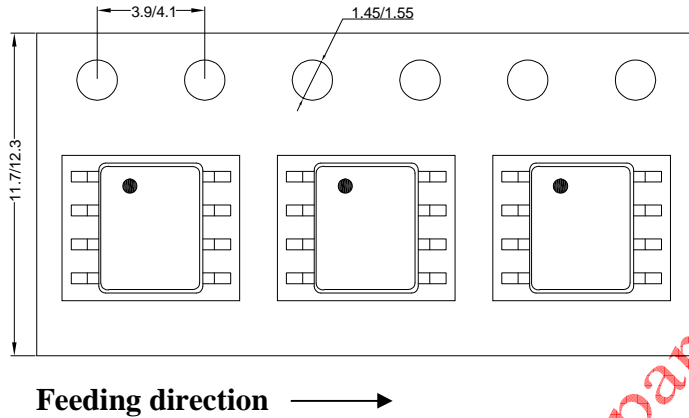


**Front view**

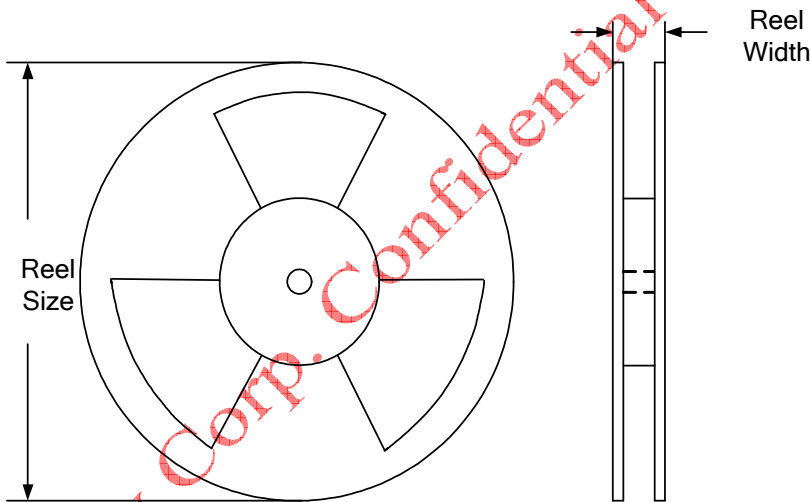
**Notes: All dimensions in millimeter and exclude mold flash & metal burr.**

**Taping & Reel Specification**

**1. SO8E**



**2. Carrier Tape & Reel specification for packages**



Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Reel width(mm)	Trailer length(mm)	Leader length (mm)	Qty per reel
SO8E	12	8	13"	12.4	400	400	2500

**3. Others: NA**

单击下面可查看定价，库存，交付和生命周期等信息

[>>SILERGY\(矽力杰\)](#)