



SY5800

Single Stage Flyback And PFC Controller With Primary Side Control For LED Lighting *Preliminary datasheet*

General Description

The SY5800 is a single stage Flyback and PFC controller that targets at LED lighting applications. It receives the rectified AC input voltage up to 400V, and drives the Flyback converter in a quasi-resonant mode for high efficiency unity power factor applications.

Ordering Information

SY5800 □(□□)□
 □ Temperature Code
 □ Package Code
 □ Optional Spec Code

Temperature Range: -40° C to 85° C

Ordering Number	Package type	Note
SY5800FBC	MSOP10	----

Features

- Internal high current MOSFET driver: 1A sourcing and 2A sinking
- Low quiescent current at start up mode: 8uA typical
- 18V shunt regulator
- 17V rising UVLO with 7V hysteresis
- Valley turn-on of the primary MOSFET to achieve low switching loss
- Peak current mode control to ensure cycle by cycle current limit
- 0.5V max sense voltage on the primary side to minimize the conduction loss.
- Compact package: MSOP10

Applications

- LED Lighting
- Down light
- Lamp light

Typical Applications

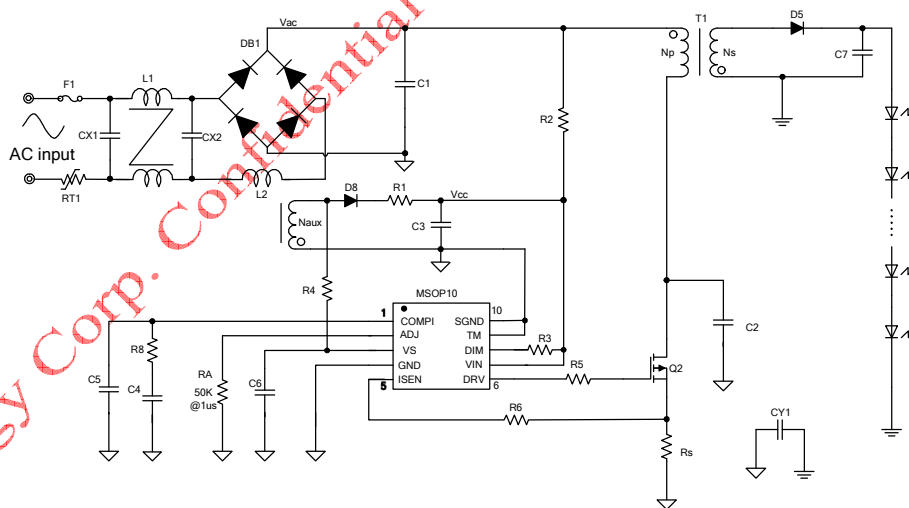
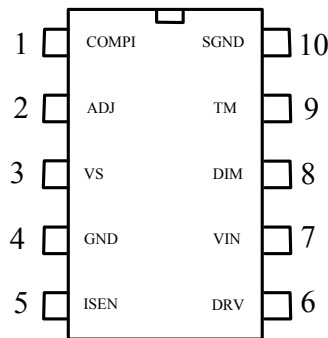


Figure 1. Schematic Diagram

Pinout (top view)



(MSOP10)

Top Mark: ADRxyz (device code: ADR, x=year code, y=week code, z=lot number code)

Pin Name	Pin number	Pin Description
VIN	7	Bypass this pin to ground with sufficient capacitance. There is an internal 18V shunt regulator to prevent this pin voltage from exceeding 18V. This pin also serves the function of the open LED feedback detection. If the voltage of the pin exceeds 18V, the open LED is flagged (used as OVP protection).
GND	4	Ground pin
VS	3	Valley sense input. The input is a voltage divided from the transformer overwinding voltage.
ISEN	5	Current sense input pin. Connect this pin to the source of the primary switch. Connect the sense resistor R_s from the source of the primary switch to GND. The maximum primary current is: $I_{pri,max} = 0.5V/R_s$
DRV	6	Gate drive pin. Connect this pin to the gate of primary MOSFET.
COMPI	1	Current compensation pin. Connect RC network between this pin and ground to program the best transient response.
ADJ	2	Connect resistor from this pin to ground to program the output current, improving the output current accuracy.
TM	9	Connect to ground.
SGND	10	Signal ground of chip
DIM	8	If the voltage of this pin is smaller than 0.3V, this chip is disabled. If the voltage of this pin is between 0.3V and 0.875V, the current reference is 10% of its full rated value. If the voltage of this pin increased from 0.875V to 1.125V, the current reference increases from 10% to 100% of its full rated value linearly. If the voltage on this pin is higher than 1.125V, the current reference is at its full rated value.

Absolute Maximum Ratings (Note 1)

VIN, DR,	18V
DIM.....	$V_{IN} + 0.3V$
ISEN, COMPI, VS, TM, ADJ.....	3.6V
Power Dissipation, @ $T_A = 25^\circ C$ MSOP10.....	0.6W
Package Thermal Resistance (Note 2)	
Junction Temperature Range	$150^\circ C$
Lead Temperature (Soldering, 10 sec.)	$260^\circ C$



SILERGY

Storage Temperature Range ----- -65°C to 150°C
HBM (Human Body Mode) ----- 2kV

Recommended Operating Conditions (Note 3)

VIN, DR, ----- 16V
DIM ----- VIN+0.3V
ISEN, COMPI, VS, TM,ADJ ----- 3.3V
Junction Temperature Range ----- -40°C to 125°C
Ambient Temperature Range ----- -40°C to 85°C

Block Diagram

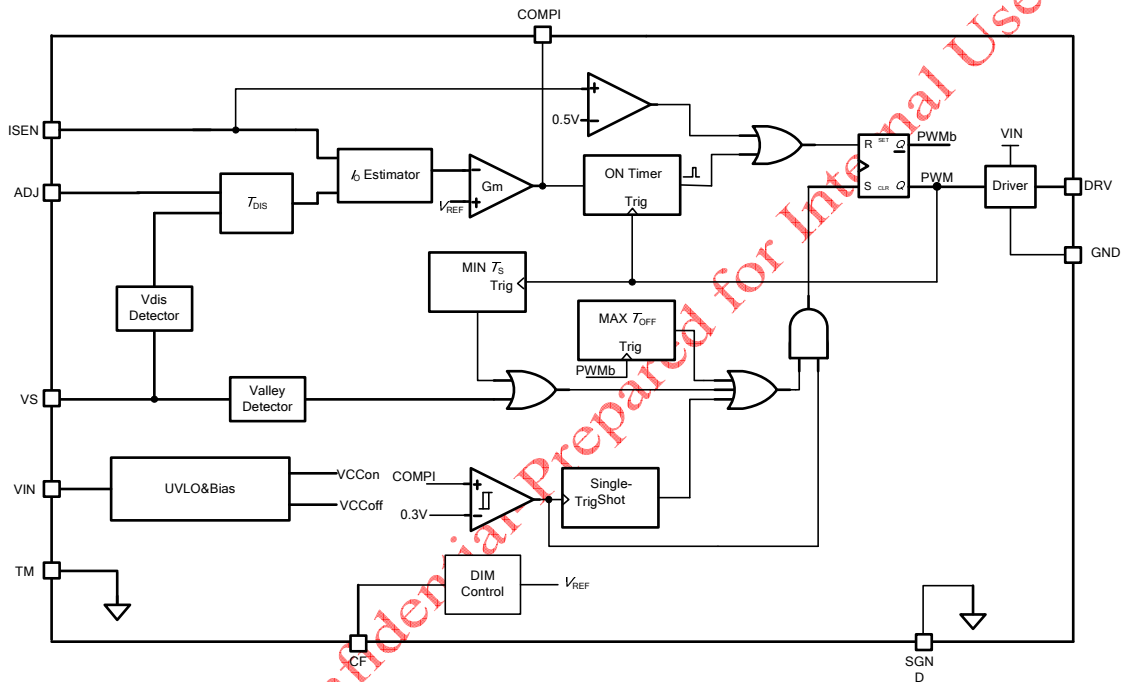


Figure2. Simplified Block Diagram

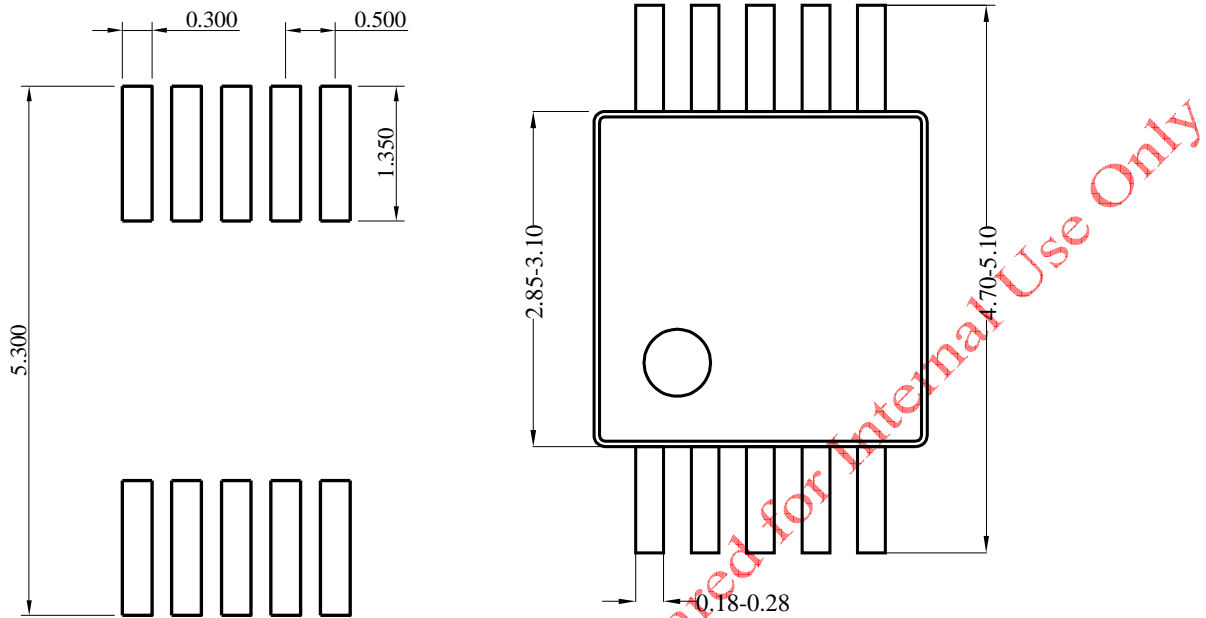
**SILERGY****SY5800****Electrical Characteristics** $(V_{CC} = 12V, T_A = 25^{\circ}C, I_{MAX} = 1A \text{ unless otherwise specified})$

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{CC}		7		18	V
Start up Current	I_{START}			8		μA
Operating Current	I_{CC}				10	mA
Primary Current Sense Voltage	I_{SEN}	Peak Current Limit		0.5		V
Adjust the Discharge Time	R_{ADJ}	R=50k		1		μS
Gate Driver Output peak current	I_{SOURCE}			1		A
	I_{SINK}			2		A
VCC Rising UVLO Threshold	$U_{VLO,UP}$				17	V
VCC UVLO Hysteresis	$V_{UVLO,HYSS}$			7		V
VCC Shunt Regulator Voltage	$V_{CC,REG}$		16	17	18	V
Maximum frequency	f_{MAX}			100		KHz
Min ON Time	$T_{ON,MIN}$	ON Leading Edge Blanking Time	400			ns
Thermal Shutdown Temperature	T_{SD}			150		C
Maximum on time	$T_{ON,MAX}$			27		μS
Maximum off time	$T_{OFF,MAX}$			20		μS
Burst point	V_{COMPH}	Goes to burst mode		0.3		V
	V_{COMPL}	Out burst mode		0.2		V
Valley sense pin	I_{SINK}				2	mA
	I_{SOURCE}				2	mA
Internal Reference Voltage		$V_{DIM} > 1.125V$		0.3		V

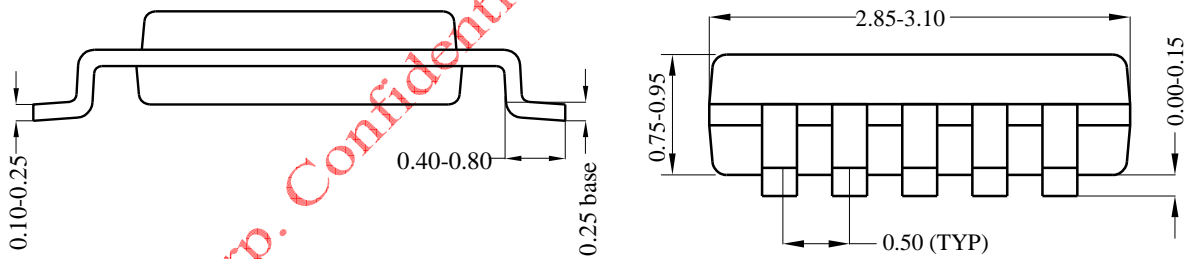
Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure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

MSO10 Package outline & PCB layout



Recommended Pad Layout



Notes: All dimension in MM
 All dimension do not include mold flash & metal burr