



SY8101A/B/C/D

High Efficiency 400kHz, 0.6A/1A/1.5A/2A, 16V Input Synchronous Step Down Regulator Preliminary Specification

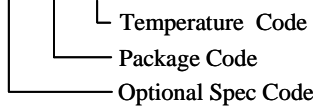
General Description

The SY8101A, SY8101B, SY8101C and SY8101D are high efficiency 400kHz synchronous step-down DC-DC converters capable of delivering 0.6A, 1A, 1.5A, 2A output currents, respectively. SY8101A/B/C/D operate over a wide input voltage range from 4V to 15V and integrate main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.

Low output voltage ripple and small external inductor and capacitor sizes are achieved with 400kHz switching frequency.

Ordering Information

SY8101□(□□)□



Temperature Range: -40°C to 85°C

Ordering Number	Package type	Note
SY8101AEBC	SSOT23-6	0.6A
SY8101BEBC	SSOT23-6	1A
SY8101CEBC	SSOT23-6	1.5A
SY8101DEBC	SSOT23-6	2A

Features

- Low $R_{DS(ON)}$ for internal switches (top/bottom)
 - SY8101A: 300/200 mΩ, 0.6A
 - SY8101B: 200/150 mΩ, 1A
 - SY8101C: 150/120 mΩ, 1.5A
 - SY8101D: 120/90 mΩ, 2A
- 4-15V input voltage range
- 400kHz switching frequency
- Internal softstart limits the inrush current
- 2% 0.6V reference
- RoHS Compliant and Halogen Free
- Compact package: SSOT23 6 pin

Applications

- Set Top Box
- Portable TV
- Access Point Router
- DSL Modem
- LCD TV

Typical Applications

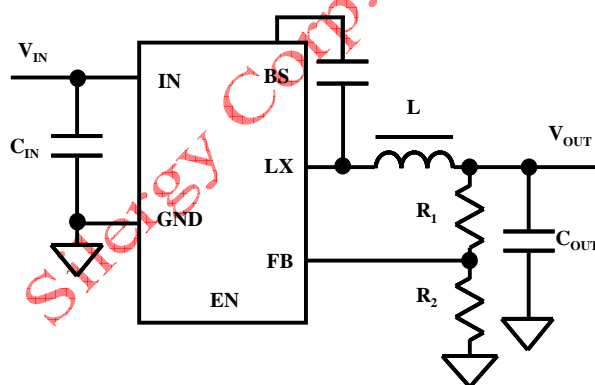


Figure 1. Schematic Diagram

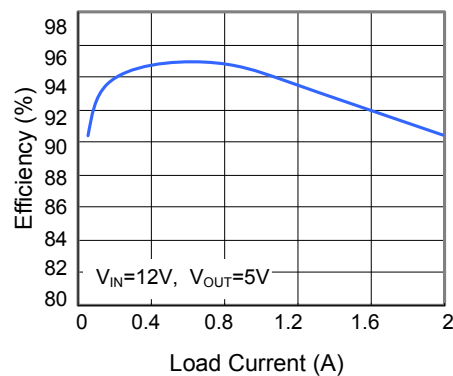
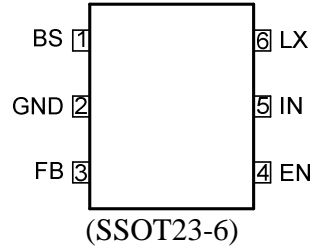


Figure 2. Efficiency vs Load Current



SY8101A/B/C/D

Pinout (top view)



Top Mark: **CF**_{xyz} for SY8101A, **BJ**_{xyz} for SY8101B, **BM**_{xyz} for SY8101C, **CG**_{xyz} for SY8101D
 (Device code: CF for SY8101A, etc.; *x*=year code, *y*=week code, *z*=lot number code)

Pin Name	Pin Number	Pin Description
BS	1	Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 0.1uF ceramic cap.
IN	5	Input pin. Decouple this pin to GND pin with at least 1uF ceramic cap
LX	6	Inductor pin. Connect this pin to the switching node of inductor
GND	2	Ground pin
FB	3	Output Feedback Pin. Connect this pin to the center point of the output resistor divider (as shown in Figure 1) to program the output voltage: $V_{out}=0.6*(1+R1/R2)$
EN	4	Enable control. Pull high to turn on. Do not float.

Absolute Maximum Ratings (Note 1)

Supply Input Voltage	16V
LX, EN Voltage	$V_{IN} + 0.3V$
FB, BS-LX Voltage	4V
Power Dissipation, P_D @ $T_A = 25^\circ C$ SSOT23-6,	0.6W
Package Thermal Resistance (Note 2)	
θ_{JA}	161°C/W
θ_{JC}	130°C/W
Junction Temperature Range	125°C
Lead Temperature (Soldering, 10 sec.)	260°C
Storage Temperature Range	-65°C to 150°C
ESD Susceptibility (Note 2)	
HBM (Human Body Mode)	2kV
MM (Machine Mode)	200V

Recommended Operating Conditions (Note 3)

Supply Input Voltage	4V to 15V
Junction Temperature Range	-40°C to 125°C
Ambient Temperature Range	-40°C to 85°C



Electrical Characteristics

($V_{IN} = 12V$, $V_{OUT} = 2.5V$, $L = 2.2\mu H$, $C_{OUT} = 10\mu F$, $T_A = 25^\circ C$, $I_{OUT} = 1A$ unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		4		15	V
Quiescent Current	I_Q	$I_{OUT}=0$, $V_{FB}=V_{REF}\times 105\%$		200		μA
Shutdown Current	I_{SHDN}	$EN=0$		1	5	μA
Feedback Reference Voltage	V_{REF}		0.588	0.6	0.612	V
FB Input Current	I_{FB}	$V_{FB}=V_{IN}$	-50		50	nA
Top FET RON	$R_{DS(ON)1}$	SY8101A		0.3		Ω
		SY8101B		0.2		Ω
		SY8101C		0.15		Ω
		SY8101D		0.12		Ω
Bottom FET RON	$R_{DS(ON)2}$	SY8101A		0.2		Ω
		SY8101B		0.15		Ω
		SY8101C		0.12		Ω
		SY8101D		0.09		Ω
Top FET Current Limit	I_{LIM}	SY8101A	0.9			A
		SY8101B	1.3			A
		SY8101C	1.8			A
		SY8101D	2.4			A
Line Regulation	$\Delta V_{OUT}/V_{OUT}$	$V_{IN}=4V\sim 15V$, $I_{OUT}=0.2A$		0.2	0.5	%
Load Regulation	$\Delta V_{OUT}/V_{OUT}$	$I_{OUT}=0.2$ to $2A$		1	2	%
EN Rising Threshold	V_{ENH}		1.5			V
EN Falling Threshold	V_{ENL}				0.4	V
Input UVLO Threshold	V_{UVLO}				3.9	V
UVLO Hysteresis	V_{HYS}			0.3		V
Oscillator Frequency	F_{OSC}	$I_{OUT}=200mA$		0.4		MHz
Min ON Time				50		ns
Max Duty Cycle			90			%
Thermal Shutdown Temperature	T_{SD}			160		$^\circ C$

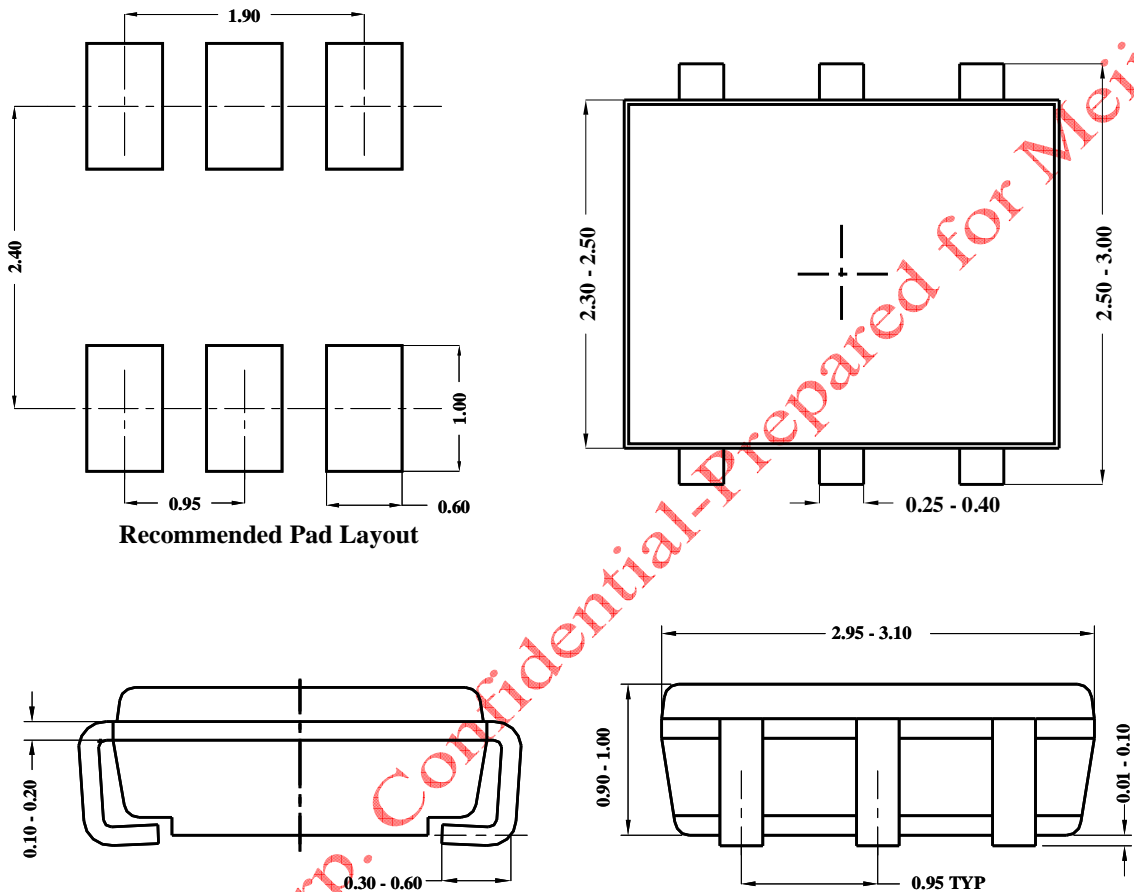
Note 1: Stresses listed as the above “Absolute Maximum Ratings” may cause permanent damage to the device. These are for stress ratings. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure 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. Pin 2 of SSOT-23-6 packages is the case position for θ_{JC} measurement.

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

Note 4: Line Regulation and Load Regulation are tested on evaluation board.

SSOT23-6 Package outline & PCB layout design



**Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.**