SY8201C

High Efficiency Fast Response, 1A, 27V Input Synchronous Step Down Regulator

General Description

The SY8201C develops a high efficiency synchronous step-down DC/DC converter capable of delivering 1A load current. The SY8201C operates over a wide input voltage range from 4.5V to 27V and integrates main switch and synchronous switch with very low $R_{DS(ON)}$ to minimize the conduction loss.

The SY8201C always operates under continuous condition mode. Low output ripple and small inductor and capacitor size are achieved with 1.15MHz switching frequency.

Ordering Information

SY8201 □(□□)□
- Temperature Code
- Package Code
- Optional Spec Code

Ordering Number	Package type	Note
SY8201CABC	SOT23-6	--

Features

- Low $R_{DS(ON)}$ for Internal Switches (Top/Bottom):350/150 mΩ
- 4.5-27V Input Voltage Range
- Instant PWM Architecture to Achieve Fast Transient Responses
- Internal Soft-start Limits the Inrush Current
- 2% 0.6V Reference
- RoHS Compliant and Halogen Free
- Compact Package: SOT23-6

Applications

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

Typical Applications

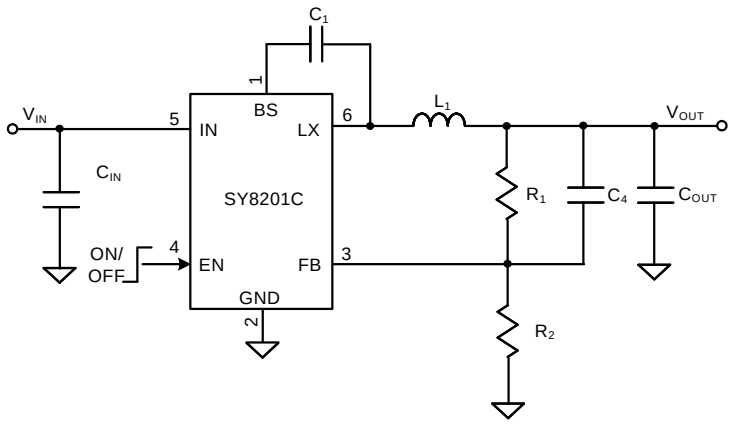


Figure1. Schematic Diagram

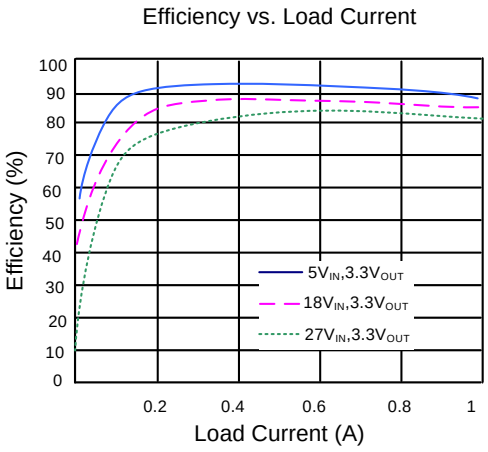
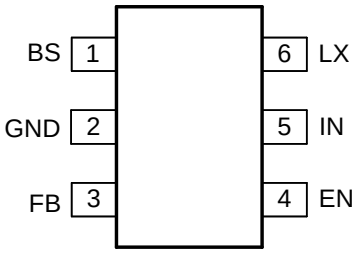


Figure2. Efficiency

Pinout (top view)



(SOT23-6)

Top Mark: **YU*xyz*, (**Device code: YU, ***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 the LX pin with a 0.1μF ceramic capacitor.
GND	2	Ground pin.
FB	3	Output feedback pin. Connect this pin to the center point of the output resistor divider (as shown in Figure1) to program the output voltage: $V_{OUT}=0.6\times(1+R_1/R_2)$
EN	4	Enable control. Pulled high to turn on. Do not leave it floating.
IN	5	Input pin. Decouple this pin to the GND pin with at least a 1μF ceramic capacitor.
LX	6	Inductor pin. Connect this pin to the switching node of the inductor.

Block Diagram

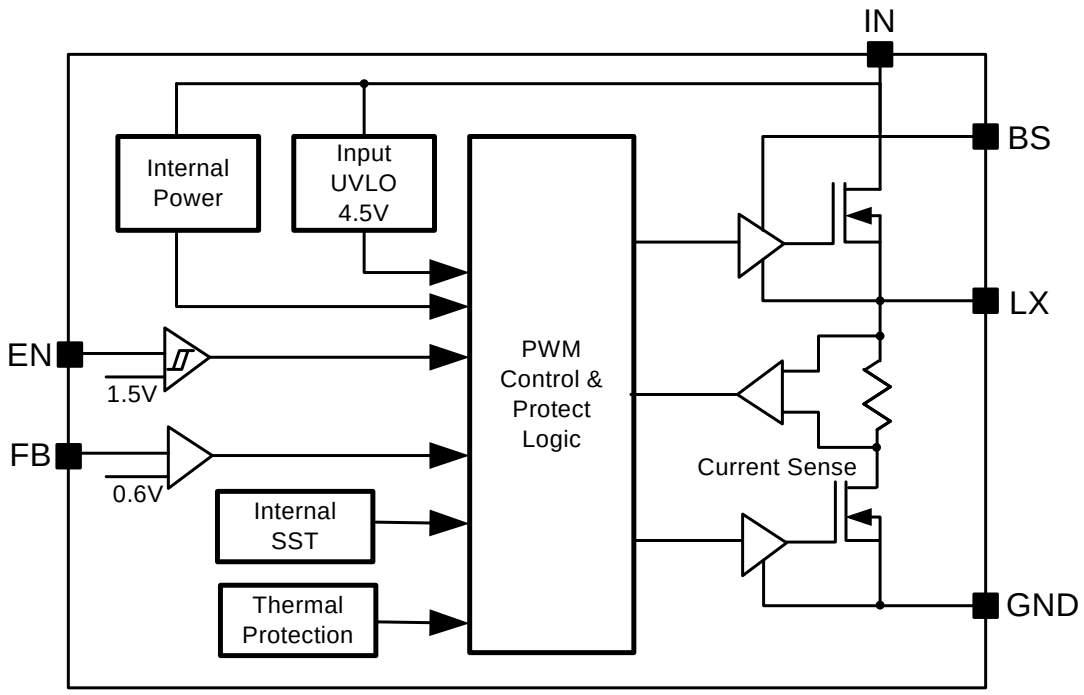


Figure3. Block Diagram

Absolute Maximum Ratings (Note 1)

Supply Input Voltage ---------- 30V
LX, EN Voltage---------- V_{IN} + 0.3V
FB, BS-LX Voltage---------- 4V
Power Dissipation, P_D @ T_A = 25℃, SOT23-6, ---------- 0.6W
Package Thermal Resistance (Note 2)
θ_{JA} ---------- 250℃/W
θ_{JC} ---------- 130℃/W
Junction Temperature Range ---------- 150℃
Lead Temperature (Soldering, 10 sec.) ---------- 260℃
Storage Temperature Range ---------- -65℃ to 150℃
Dynamic LX Voltage in 50ns Duration ----------IN+3V to GND-4V

Recommended Operating Conditions (Note 3)

Supply Input Voltage ---------- 4.5V to 27V
Junction Temperature Range ---------- -40℃ to 125℃
Ambient Temperature Range ---------- -40℃ to 85℃

Electrical Characteristics

(V_{IN} = 12V, V_{OUT} = 1.2V, L = 2.2μH, C_{OUT} = 10μF, T_A = 25℃, I_{OUT} = 1A unless otherwise specified)

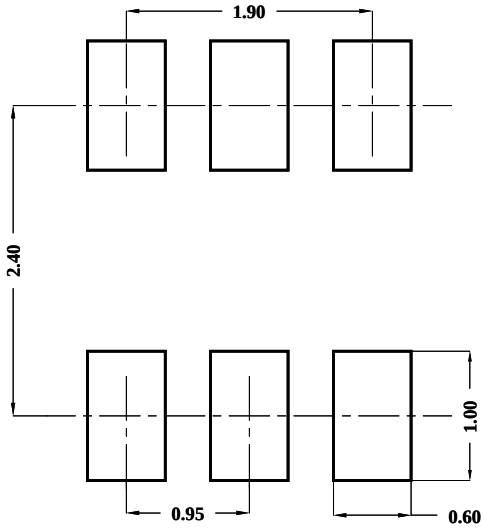
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		4.5		27	V
Shutdown Current	I_{SHDN}	EN=0		5	10	μA
Feedback Reference Voltage	V_{REF}		0.588	0.6	0.612	V
FB Input Current	I_{FB}	V_{FB}=V_{IN}	-50		50	nA
Top FET RON	$R_{DS(ON)1}$			0.35		Ω
Bottom FET RON	$R_{DS(ON)2}$			0.15		Ω
Bottom FET Valley Current Limit	I_{LIM}		1.5			A
EN Rising Threshold	V_{ENH}		1.5			V
EN Falling Threshold	V_{ENL}				0.4	V
Input UVLO Threshold	V_{UVLO}				4.5	V
Switching Frequency	f_{SW}			1.15		MHz
Min ON Time	$t_{ON,MIN}$			50		ns
Min OFF Time	$t_{OFF,MIN}$			100		ns
Thermal Shutdown Temperature	T_{SD}			150		℃
Thermal Shutdown Hysteresis	T_{HYS}			15		℃

Note 1: Stresses beyond "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 may affect device reliability.

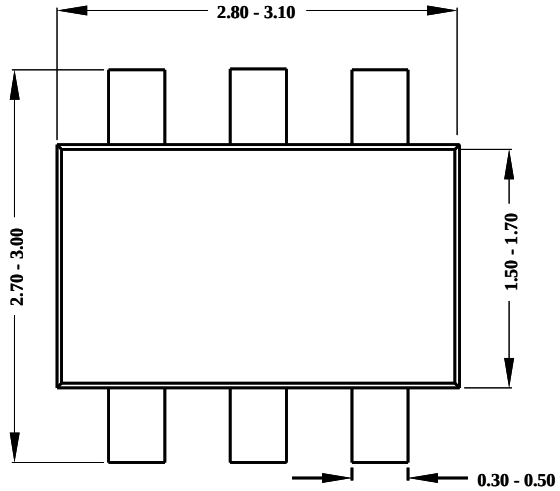
Note 2: θ_{JA} is measured in the natural convection at T_A = 25℃ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Pin 2 of SOT23-6 package is the case position for θ_{JC} measurement.

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

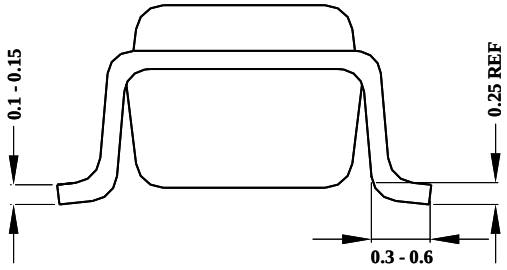
SOT23-6 Package Outline & PCB Layout

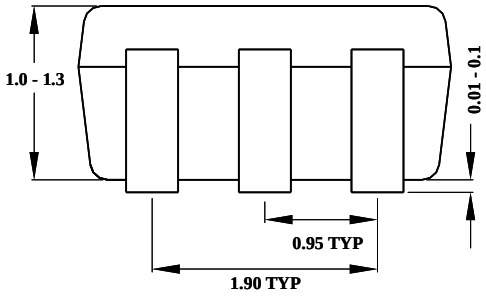


Recommended Pad Layout



Top View



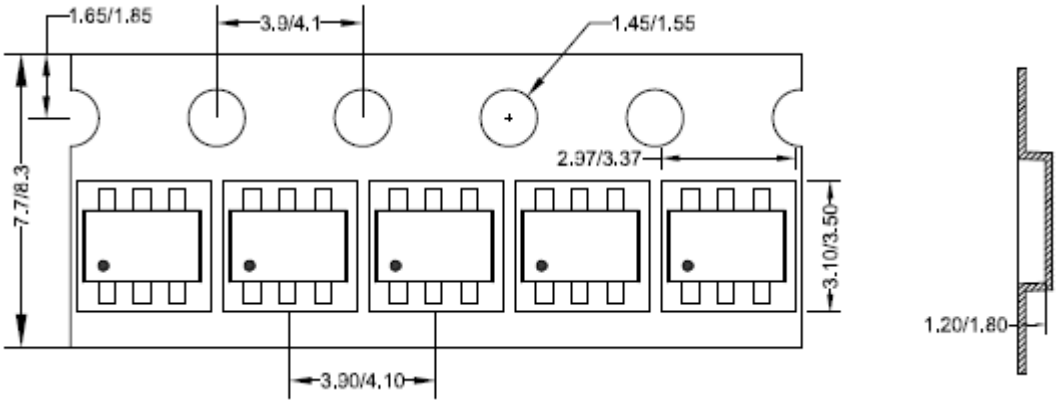


Notes: **All dimension in millimeter**
All dimension do not include mold flash & metal burr

Taping & Reel Specification

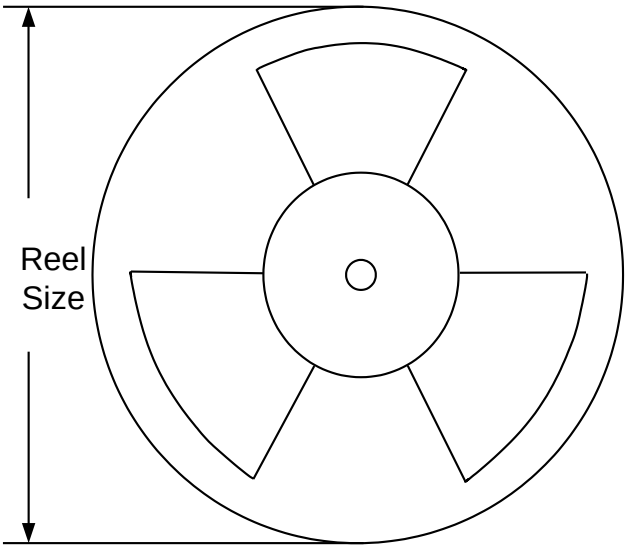
1. Taping orientation

SOT23-6



Feeding direction ⟶

2. Carrier Tape & Reel specification for packages



Package types	Tape width (mm)	Pocket pitch(mm)	Reel size (Inch)	Trailer length(mm)	Leader length (mm)	Qty per reel
SOT23-6	8	4	7"	280	160	3000

3. Others: NA