SY8133

High Efficiency 400KHz, 3A,16V Input Synchronous Step Down Regulator

Preliminary SPECIFICATION

General Description

The SY8133 is a high efficiency 400 KHz synchronous step-down DC-DC converters capable of delivering 3A output current. SY8133 operates over a wide input voltage range from 4V to 15V and integrate main switch and synchronous switch with very low Rds(on) to minimize the conduction loss.

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

Applications

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

Features

- low Rds(on) for internal switches (top/bottom) 120/80 mΩ,
- 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: SO8 with exposed paddle

Ordering Information

SY8133□(□□)□

- Temperature Code: C: -40°C~85°C
- Package Code: FC: SO8E
- Spec Code

Typical Applications

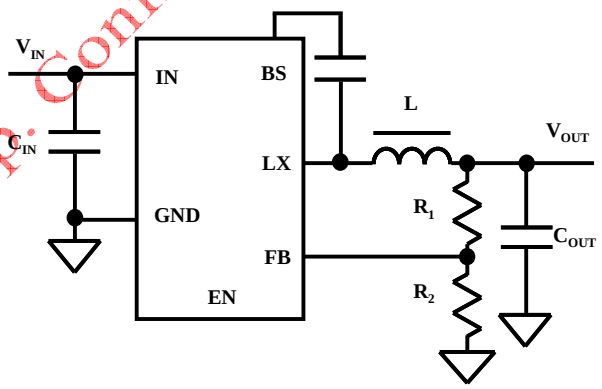
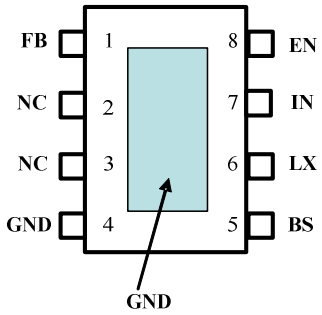


Figure 1

Pinout (top view)



(SO8E)

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

Pin Name	Pin Number	Pin Description
BS	5	Boot-Strap Pin. Supply high side gate driver. Decouple this pin to LX pin with 0.1uF ceramic cap.
IN	7	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	4	Ground pin
FB	1	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: Vout=0.6*(1+R1/R2)
EN	8	Enable control. Pull high to turn on. Do not float.
NC	2,3	No connection.

Absolute Maximum Ratings (Note 1)

Supply Input Voltage ---------- 16V
Enable, FB Voltage---------- V_{IN} + 0.6V
Power Dissipation, P_D @ T_A = 25°C SO8E ---------- 1.2W
Package Thermal Resistance (Note 2)
θ_{JA} ---------- 50°C/W
θ_{JC} ---------- 10°C/W
Junction Temperature Range ---------- 150°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 = 2.2uH, C_{OUT} = 10uF, T_A = 25°C, I_{OUT} = 1A unless otherwise specified)

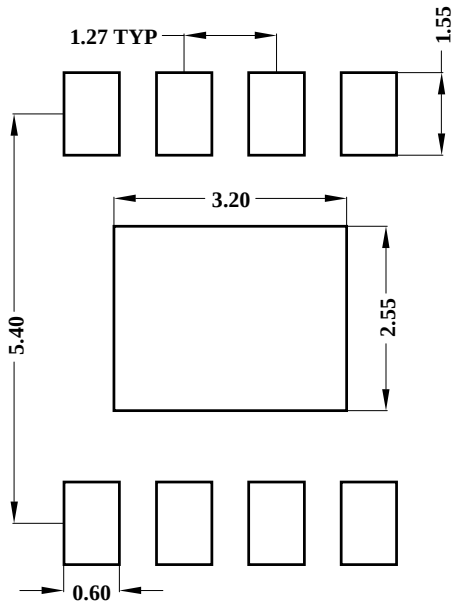
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	VIN		4		15	V
Quiescent Current	I_Q	$I_{OUT=0}$, VFB=VREF+5%		200		μA
Shutdown Current	I_{SHDN}	EN=0		1	5	μA
Feedback Reference Voltage	VREF		0.588	0.6	0.612	V
FB Input Current	IFB	VFB=VIN	-50		50	nA
Top FET RON	RDS(ON)1			0.12		Ω
Bottom FET RON	RDS(ON)2			0.08		Ω
Top FET Current Limit	ILIM		4			A
EN rising threshold	VENH		1.5			V
EN falling threshold	VENL				0.4	V
Input UVLO threshold	V_{UVLO}				3.9	V
UVLO hysteresis	V_{HYS}			0.3		V
Oscillator Frequency	F_{OSC}	IOUT=200mA		0.4		MHz
Min ON Time				50		ns
Max Duty Cycle			90			%
Thermal Shutdown Temperature	T_{SD}			160		°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.

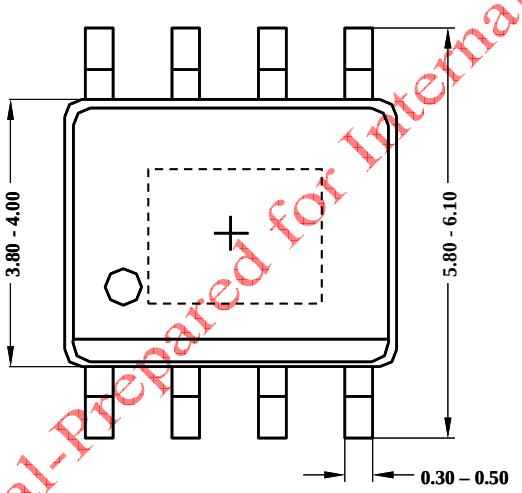
Note 2: θ_{JA} is measured in the natural convection at TA = 25°C on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Paddle of SO8E packages is the case position for θ_{JC} measurement.

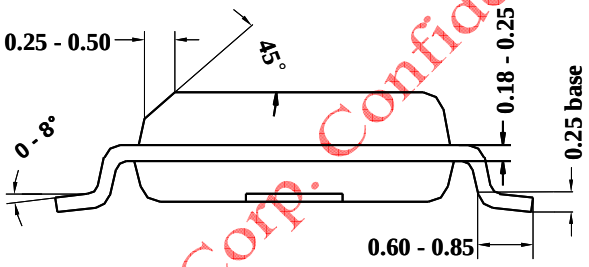
Note 3: The device is not guaranteed to function outside its operating conditions.

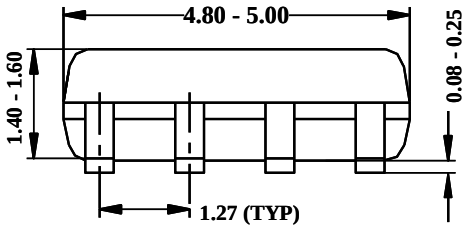
SO8E Package outline & PCB layout design



Recommended Pad Layout







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