

High Efficiency 1MHz, 2.5A Continuous, 3A Peak, Synchronous Step Down Regulator

General Description

The SY8032E is a high-efficiency, high frequency synchronous step-down DC-DC regulator IC capable of delivering up to 2.5A output current. The SY8032E operates over a wide input voltage range from 2.7V to 5.5V 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 greater than 1MHz switching frequency.

Features

- Low $R_{DS(ON)}$ for internal switches (top/bottom):100m Ω /80m Ω ,2.5A
- 2.7-5.5V input voltage range
- 2.5A continuous, 3A peak load current capability
- High switching frequency minimizes the external components: 1MHz
- CCM only operation
- Internal softstart limits the inrush current
- 100% dropout operation
- RoHS Compliant and Halogen Free
- Compact package: SOT23-6. Other packages are available upon requests

Ordering Information

SY8032

└─ Temperature Code
└─ Package Code
└─ Optional Spec Code

Ordering Number	Package type	Note ^①
SY8032EABC	SOT23-6	----

Applications

- LCD TV
- Set Top Box
- Net PC
- Mini-Notebook PC
- Access Point Router

Typical Applications

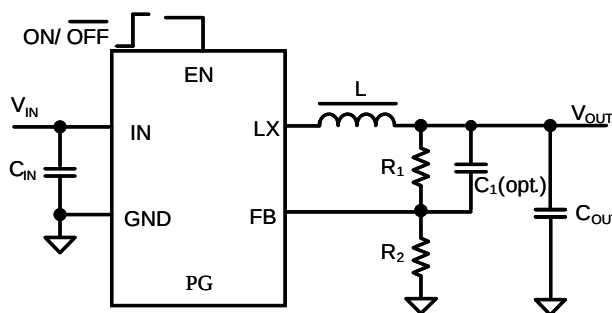


Figure 1.Schematic diagram

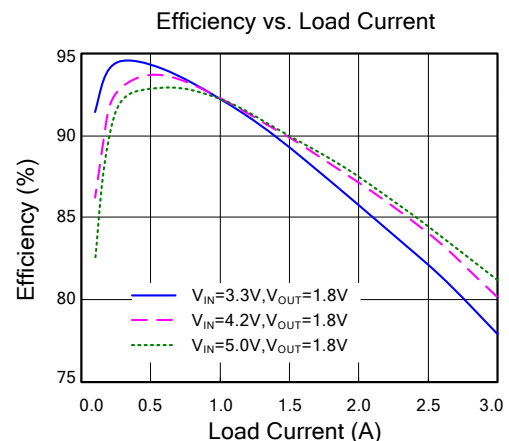
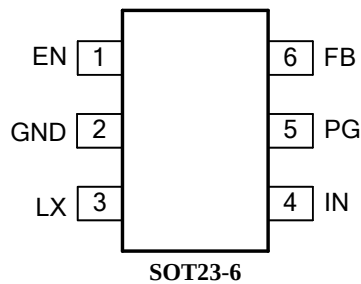


Figure 2. Efficiency vs Load Current

Pinout (top view)



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

Pin Name	Pin Number	Pin Description
EN	1	Enable control. Pull high to turn on. Do not float.
GND	2	Ground pin
LX	3	Inductor pin. Connect this pin to the switching node of inductor.
IN	4	Input pin. Decouple this pin to GND pin with at least 10uF ceramic cap.
PG	5	Power good indicator (Open drain output). Low if the output < 90% of regulation voltage; High otherwise. Connect a pull-up resistor to the input.
FB	6	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: $V_{out}=0.6*(1+R_1/R_2)$.

Absolute Maximum Ratings (Note 1)

Supply Input Voltage ----- 6.0V
 Enable, FB Voltage----- $V_{IN} + 0.6V$
 LX Voltage----- $-0.3V^{(*1)}$ to $6V^{(*2)}$
 Power Dissipation, P_D @ $T_A = 25\text{ }^\circ\text{C}$,
 SOT23-6 ----- 0.6W
 Package Thermal Resistance (Note 2)
 θ_{JA} ----- $140\text{ }^\circ\text{C/W}$
 θ_{JC} ----- $70\text{ }^\circ\text{C/W}$
 Junction Temperature Range ----- $-150\text{ }^\circ\text{C}$
 Lead Temperature (Soldering, 10 sec.) ----- $260\text{ }^\circ\text{C}$
 Storage Temperature Range ----- $-65\text{ }^\circ\text{C}$ to $150\text{ }^\circ\text{C}$
 (*1) LX Voltage tested down to $-3V < 10ns$
 (*2) LX Voltage tested up to $+7V < 50ns$

Recommended Operating Conditions (Note 3)

Supply Input Voltage ----- 2.7V to 5.5V
 Junction Temperature Range ----- $-40\text{ }^\circ\text{C}$ to $125\text{ }^\circ\text{C}$
 Ambient Temperature Range ----- $-40\text{ }^\circ\text{C}$ to $85\text{ }^\circ\text{C}$

Electrical Characteristics

($V_{IN} = 5V$, $V_{OUT} = 2.5V$, $L = 2.2\mu H$, $C_{OUT} = 10\mu F$, $T_A = 25^\circ C$, unless otherwise specified)

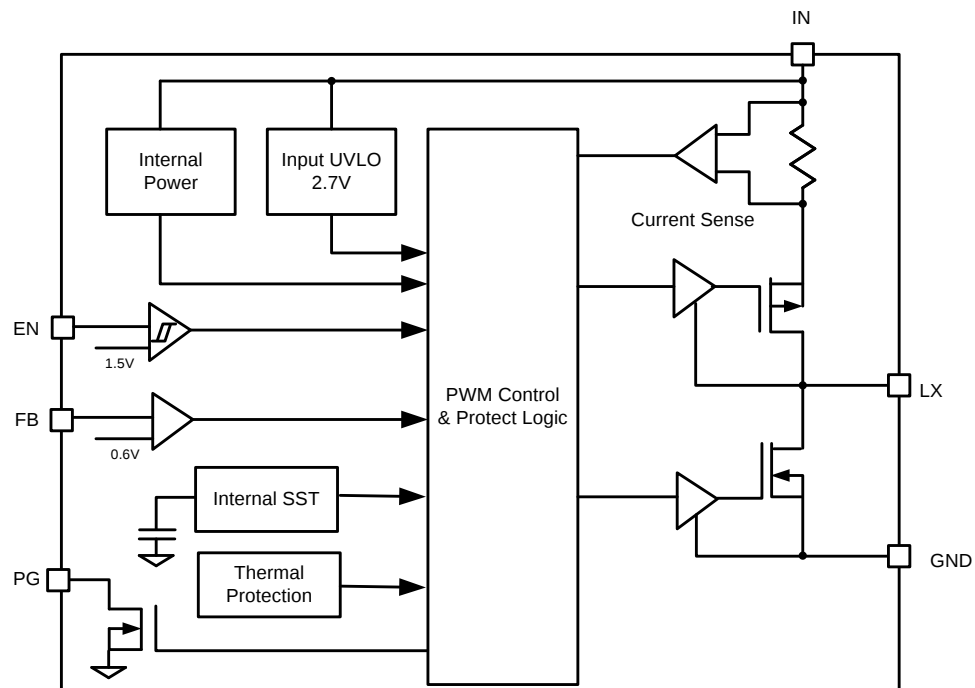
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.7		5.5	V
Shutdown Current	I_{SHDN}	EN=0		0.1	1	μA
Feedback Reference Voltage	V_{REF}		0.588	0.6	0.612	V
FB Input Current	I_{FB}	$V_{FB}=V_{IN}$	-50		50	nA
PFET RON	$R_{DS(ON),P}$			100		m Ω
NFET RON	$R_{DS(ON),N}$			80		m Ω
PFET Current Limit	I_{LIM}		3.5			A
EN rising threshold	V_{ENH}		1.5			V
EN falling threshold	V_{ENL}				0.4	V
Input UVLO threshold	V_{UVLO}				2.7	V
UVLO hysteresis	V_{HYS}			0.1		V
Oscillator Frequency	F_{OSC}	$I_{OUT}=500mA$		1		MHz
Min ON Time				90		ns
Max Duty Cycle			100			%
Thermal Shutdown Temperature	T_{SD}			160		$^\circ C$

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 for extended periods may affect device reliability.

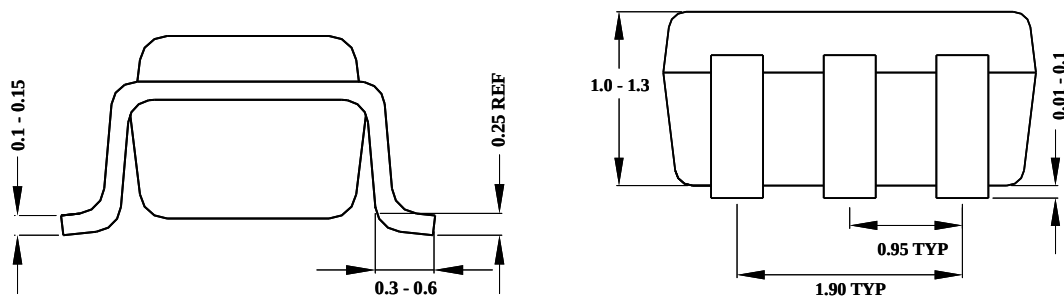
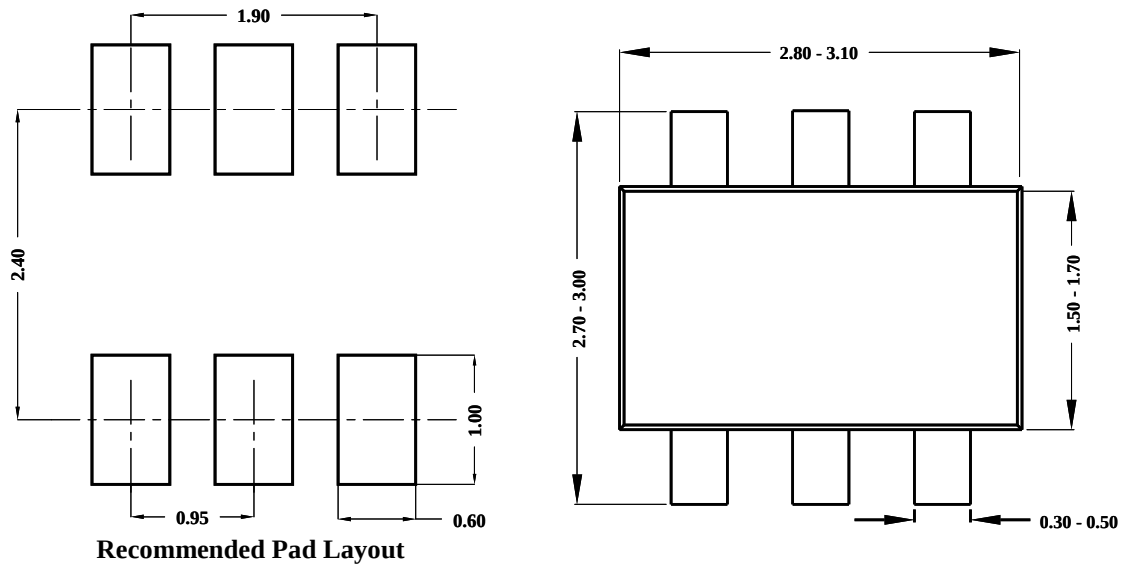
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Pin 2 of SOT23-6 packages is the case position for θ_{JC} measurement.

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

Function Block



SOT23-6 Package outline & PCB layout design



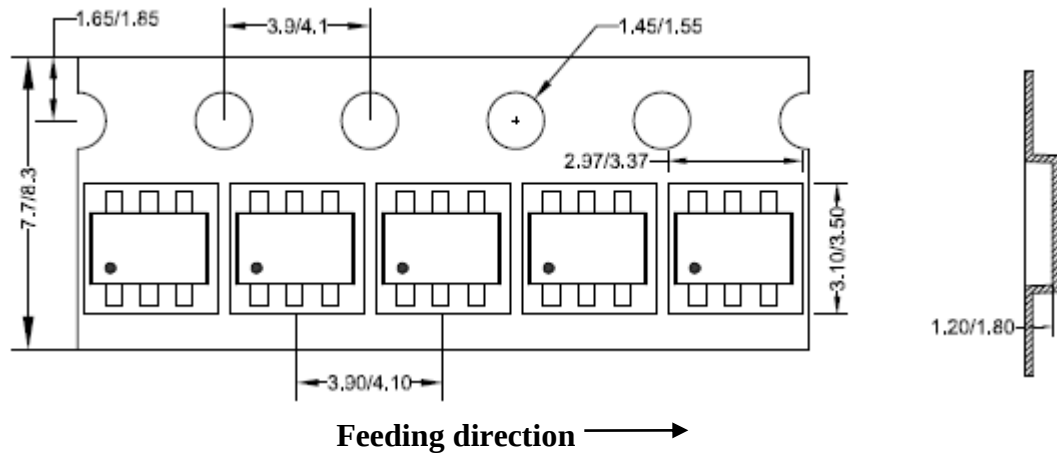
Notes: All dimensions are in millimeters.

All dimensions don't include mold flash & metal burr.

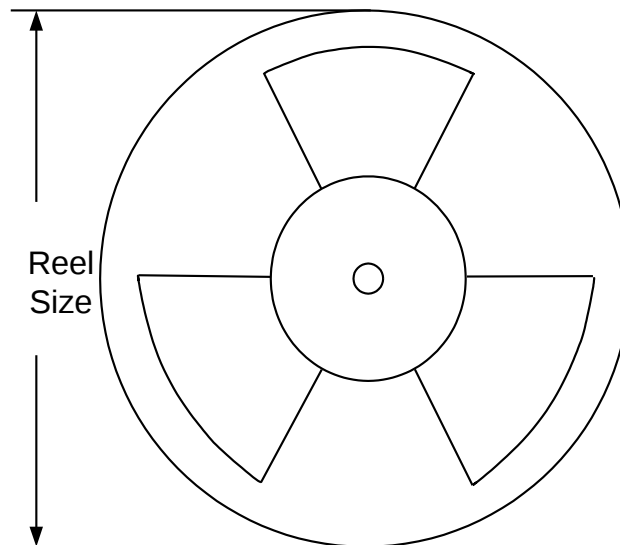
Taping & Reel Specification

1. Taping orientation

SOT23-6



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