SY8293

High Efficiency, 800kHz, 40V Input, 3A Non-synchronous Step Down Regulator

General Description

The SY8293 is a high efficiency 800 kHz, adaptive constant OFF time controlled non-synchronous step-down DC-DC regulator capable of delivering 3A output current respectively. The SY8293 can operate over a wide input voltage range from 5V to 40V and integrate the main 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 800 kHz switching frequency.

Ordering Information

SY8293 □(□□)□

- Temperature Code
- Package Code
- Optional Spec Code

Ordering Number	Package type	Note
SY8293FCC	SO8E	--

Features

- 5-40V Input Voltage Range
- Low $R_{DS(ON)}$ for Internal N-Channel Power FET: 180 mΩ
- 800kHz Switching Frequency
- Adaptive Constant OFF Time Control
- Internal Soft-start Limits the Inrush Current
- 2% 0.6V Reference
- RoHS Compliant and Halogen Free
- Compact Package: SO8E

Applications

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

Typical Applications

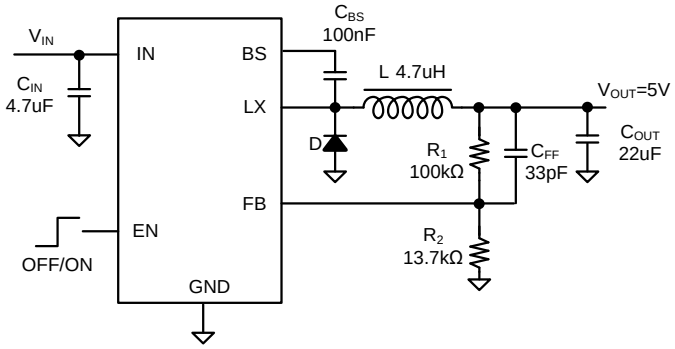

Figure 1. Schematic Diagram

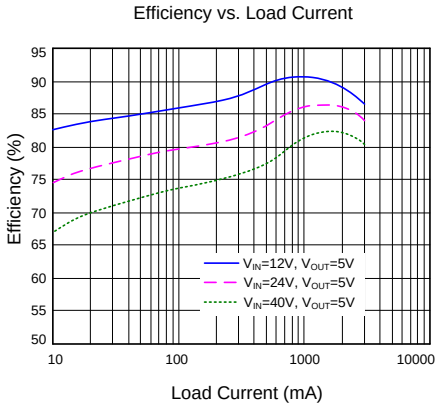

Figure2. Efficiency Figure

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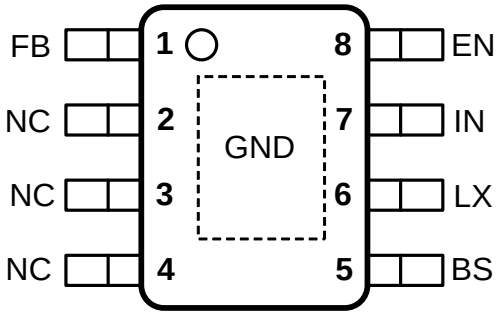
Pinout (top view)



(SO8E)

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

Pin Name	Pin Number	Pin Description
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: $V_{OUT}=0.6\times(1+R_1/R_2)$
GND	Exposed paddle	Ground pin
BS	5	Boot-strap pin. Supply high side gate driver. Decouple this pin to the LX pin with a 0.1μF ceramic capacitor.
LX	6	Inductor pin. Connect this pin to the switching node of inductor
IN	7	Input pin. Decouple this pin to GND pin with at least a 4.7μF ceramic capacitor.
EN	8	Enable control. Pull high to turn on. Do not leave it floating.
NC	2, 3, 4	Not connected.

Absolute Maximum Ratings (Note 1)

Supply Input Voltage ---------- 42V
Enable Voltage---------- V_{IN} + 0.6V
FB Voltage---------- 3.6V
BS to LX Voltage---------- 3.6V
Power Dissipation, PD @ TA = 25℃, SO8E---------- 3.3W
Package Thermal Resistance (Note 2)
θJA ---------- 30℃/W
θJC ---------- 10℃/W
Junction Temperature Range ---------- 150℃
Lead Temperature (Soldering, 10 sec.) ---------- 260℃
Storage Temperature Range ---------- -65℃ to 150℃

Recommended Operating Conditions (Note 3)

Supply Input Voltage ---------- 5V to 40V
BS to LX Voltage ---------- 3.3V
Junction Temperature Range ---------- -40℃ to 125℃
Ambient Temperature Range ---------- -40℃ to 85℃

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Electrical Characteristics

(V_{IN} = 12V, V_{OUT} = 5V, L=3.9uH, C_{OUT} =22uF, T_A = 25℃, I_{OUT} = 1A unless otherwise specified)

Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		5		40	V
Input UVLO Threshold	V_{UVLO}	Rising		4.5		V
Input UVLO Threshold		Falling		4.3		V
Input UVLO Hysteresis	V_{UVLO_HYS}			200		mV
Quiescent Current	I_Q	I_{OUT}=0, V_{FB}=V_{REF}×105%		160		μA
Shutdown Current	I_{SHDN}	EN=0			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
Power FET RON	$R_{DS(ON)1}$			180		mΩ
Power FET Current Limit	I_{LIM}		3.4			A
EN Rising Threshold	V_{ENH}		1.5			V
EN Falling Threshold	V_{ENL}				0.4	V
Minimum OFF Time	t_{OFF}				100	ns
Minimum ON Time	t_{OFF}				100	ns
Maximum ON Time	t_{ON}			2		us
Oscillator Frequency	f_{OSC}			800		kHz
Thermal Shutdown Temperature	T_{SD}			150		℃
Thermal Shutdown Recovery Hysteresis	T_{HYS}			15		℃

Note 1: Stresses beyond the "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specification 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℃ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard.

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

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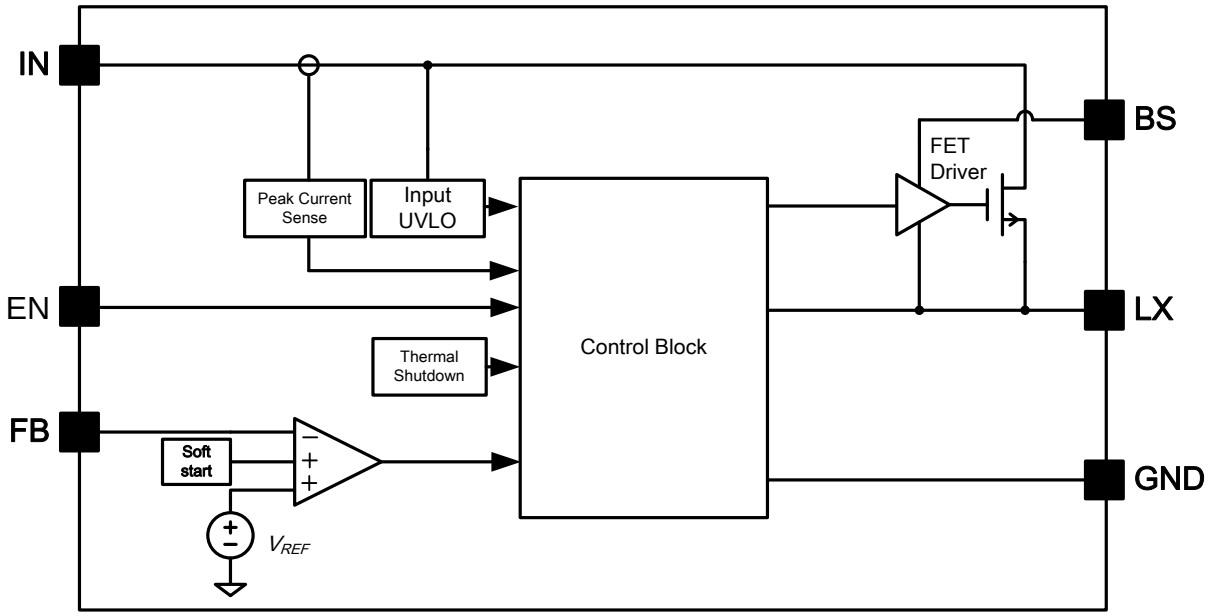
Block Diagram



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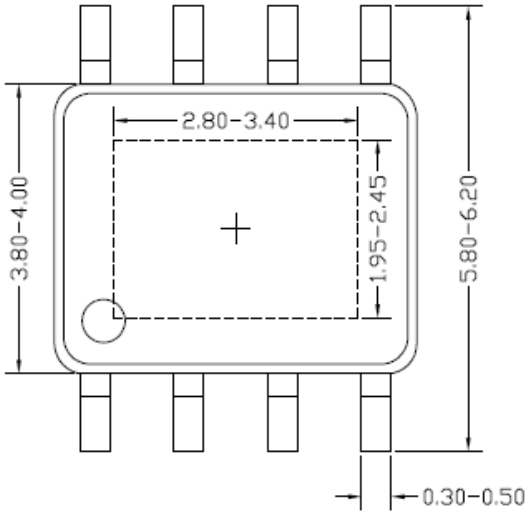
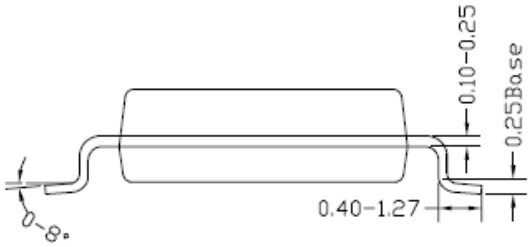
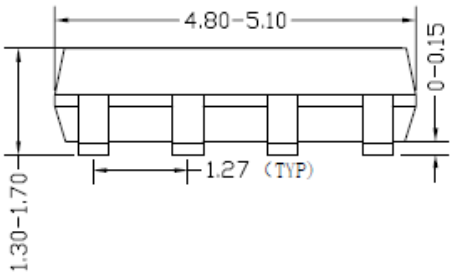
SO8E Package Outline & PCB layout



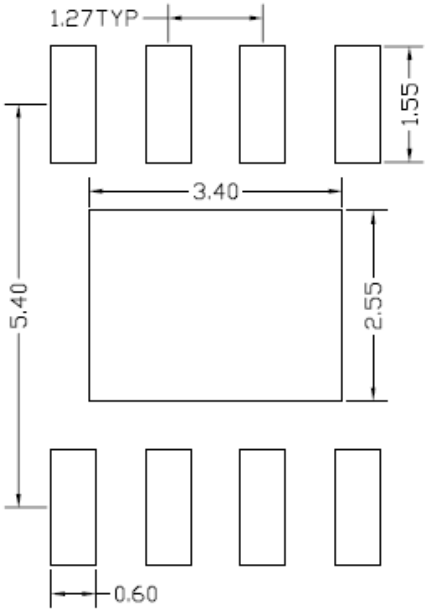
Top view



Side view



Front view



Recommended PCB layout (Reference Only)

Notes: **All dimension in millimeter and exclude mold flash & metal burr.**

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