

High Efficiency 6.5V, 2A continuous, 3A peak, 1MHz Synchronous Step Down Regulator

General Description

The SY8079 is a high-efficiency, high frequency synchronous step-down DC-DC regulator IC capable of delivering up to 2A output current. The SY8079 operates over a wide input voltage range from 2.7V to 6.5V and integrates 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):125m Ω /95m Ω
- 2.7-6.5V input voltage range
- 2A continuous, 3A peak load current capability
- 1MHz switching frequency minimizes the external components
- Internal softstart limits the inrush current
- 100% dropout operation
- RoHS Compliant and Halogen Free
- Compact package: SOT23-5

Ordering Information

SY8079 ☐ ☐ ☐ ☐ ☐
 Temperature Code
 Package Code
 Optional Spec Code

Applications

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

Ordering Number	Package type	Note
SY8079AAC	SOT23-5	

Typical Applications

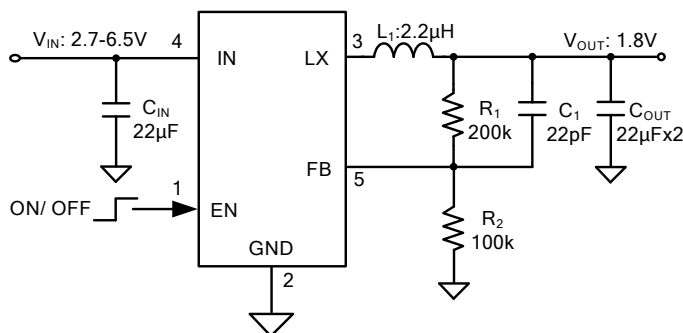


Figure 1. Schematic diagram

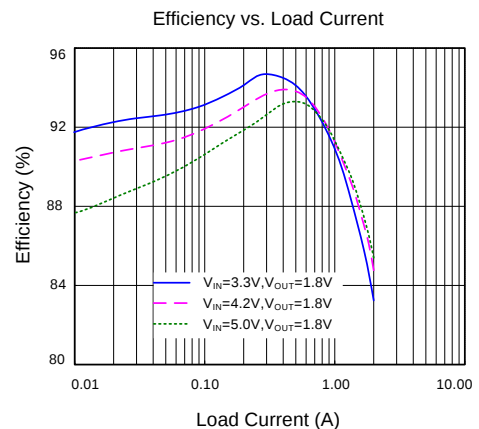
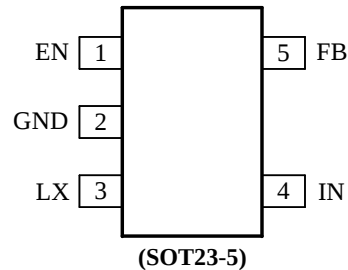


Figure 2. Efficiency vs Load Current

Pinout (top view)



Top Mark: UHxyz (device code: UH, 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 10 μ F ceramic cap.
FB	5	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: $V_{out}=0.6*(1+R_1/R_2)$.

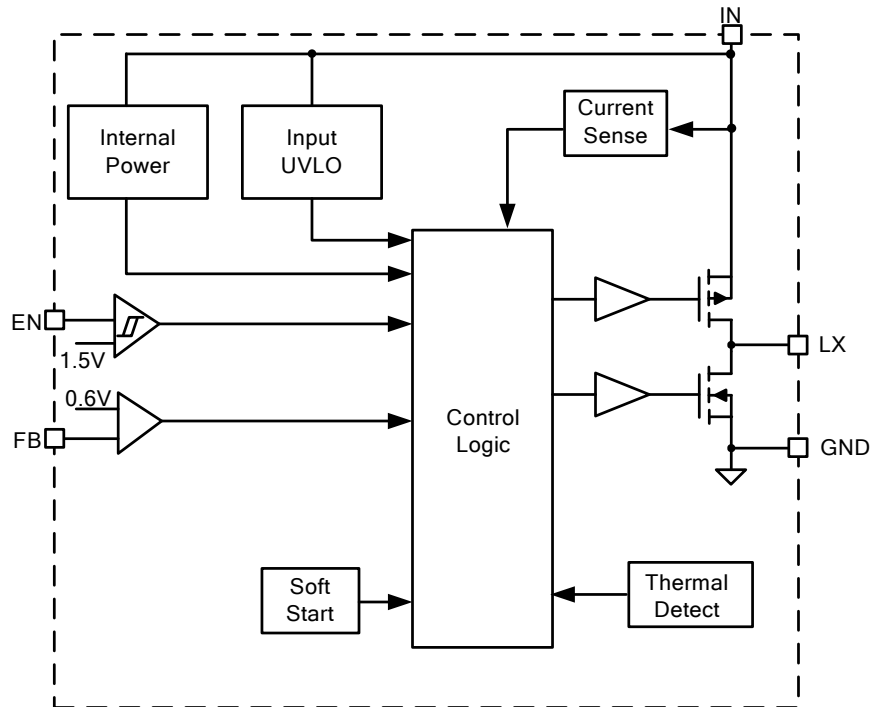
Absolute Maximum Ratings (Note 1)

Supply Input Voltage----- -0.3V to 7.0V
 LX Voltage----- -0.3V^{(*)1} to 7V^{(*)2}
 All other pins----- -0.3V to 7.0V
 Power Dissipation, P_D @ T_A = 25 °C,
 SOT23-5 ----- 0.6W
 Package Thermal Resistance (Note 2)
 θ_{JA} ----- 170 °C/W
 θ_{JC} ----- 130 °C/W
 Junction Temperature Range ----- -40 °C to 150 °C
 Lead Temperature (Soldering, 10 sec.) ----- 260 °C
 Storage Temperature Range ----- -65 °C to 150 °C
 (*)1 LX Voltage tested down to -3V<10ns
 (*)2 LX Voltage tested up to +7.5V<50ns

Recommended Operating Conditions (Note 3)

Supply Input Voltage ----- 2.7V to 6.5V
 Enable, FB Voltage ----- V_{IN}+0.3V
 Junction Temperature Range ----- -40 °C to 125 °C
 Ambient Temperature Range ----- -40 °C to 85 °C

Block Diagram



Electrical Characteristics

($V_{IN} = 5V$, $V_{OUT} = 2.5V$, $L = 2.2\mu H$, $C_{OUT} = 22\mu F$, $T_A = 25^\circ C$, unless otherwise specified)

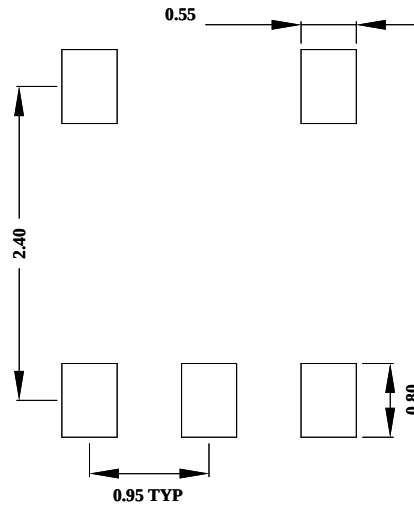
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage Range	V_{IN}		2.7		6.5	V
Quiescent Current	I_Q	$I_{OUT}=0$, $V_{FB}=V_{REF} \cdot 105\%$		55		μA
Shutdown Current	I_{SHDN}	$EN=0$		0.1	1	μA
Feedback Reference Voltage	V_{REF}		0.588	0.6	0.612	V
PFET RON	$R_{DS(ON),P}$			125		$m\Omega$
NFET RON	$R_{DS(ON),N}$			95		$m\Omega$
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}				2.65	V
UVLO hysteresis	V_{HYS}			0.2		V
Oscillator Frequency	F_{OSC}	$I_{OUT}=500mA$		1		MHz
Short Circuit Protection Threshold	V_{SCP}			0.3		V
Min ON Time				75		ns
Max Duty Cycle			100			%
Soft Start Time	T_{SS}			1.0		ms
Output Discharge Switch On Resistance	R_{DISCH}			50		Ω
Thermal Shutdown Temperature	T_{SD}			150		$^\circ C$

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.

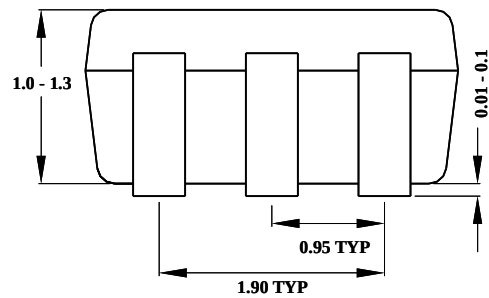
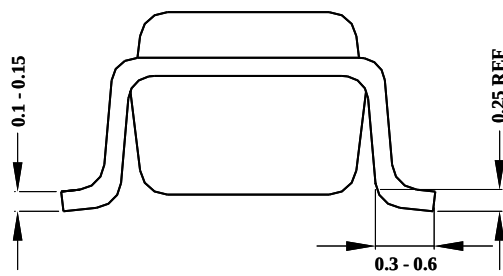
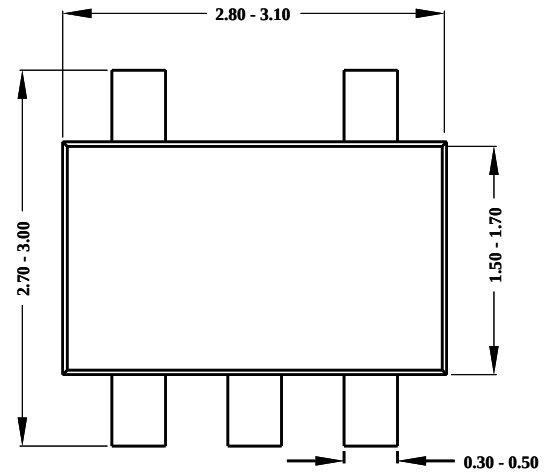
Note 2: Test condition: Device mounted on 2” x 2” FR-4 substrate PCB, 2oz copper, with minimum recommended pad on top layer and thermal vias to bottom layer ground plane.

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

SOT23-5 Package outline & PCB layout design



Recommended Pad Layout

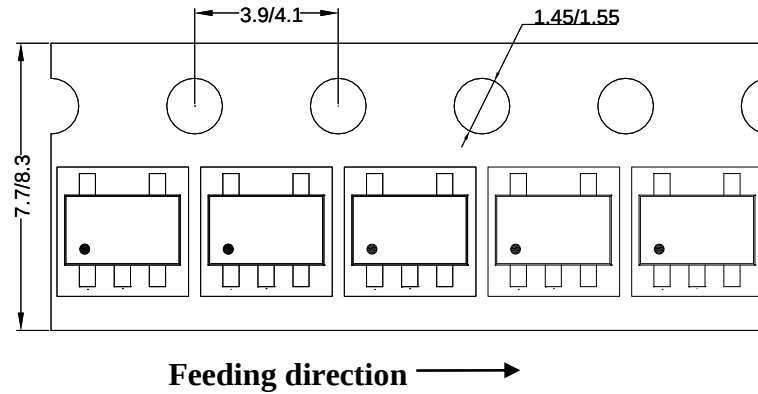


Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.

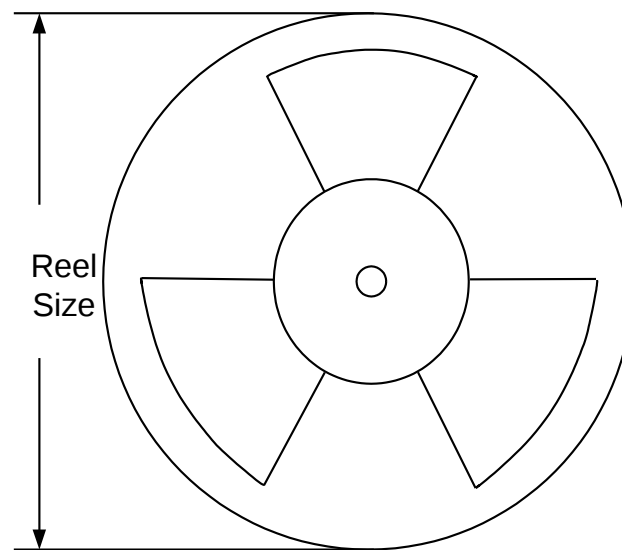
Taping & Reel Specification

1. Taping orientation

SOT23-5



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
SOT23-5	8	4	7"	280	160	3000

3. Others: NA