



SY7070/SY7070A

0.7V Minimum Input, Fixed Output
100mA Maximum Output Current Synchronous Boost

General Description

SY7070/A is a high efficiency, synchronous, current hysteresis control; step-up boost converter designed for single-cell or dual-cell alkaline, NiMH, or NiCd battery-powered applications. It can convert down to 0.7V input voltage. It adopts NMOS for the main switch and PMOS for the synchronous switch.

Ordering Information

SY7070 □(□□)□
□ Temperature Code
□ Package Code
□ Optional Spec Code

Ordering Number	Package type	Note
SY7070AAC	SOT23-5	$V_{OUT}=3.3V$
SY7070AAAC	SOT23-5	$V_{OUT}=3.0V$

Features

- 0.7V Minimum input voltage
- 5.5uA typical quiescent current
- Input under-voltage lockout
- Bypass function during shutdown
- Low $R_{DS(ON)}$ (main switch/synchronous switch) at output: 0.5/0.7ohm
- Fixed output voltage
 - SY7070: fixed 3.3V
 - SY7070A: fixed 3.0V
- Typical 350mA peak current limit
- Compact SOT23-5 package.

Applications

- Battery powered applications
- Consumer and portable medical products
- Personal care products
- Smartphones
- White or status LEDs

Typical Applications

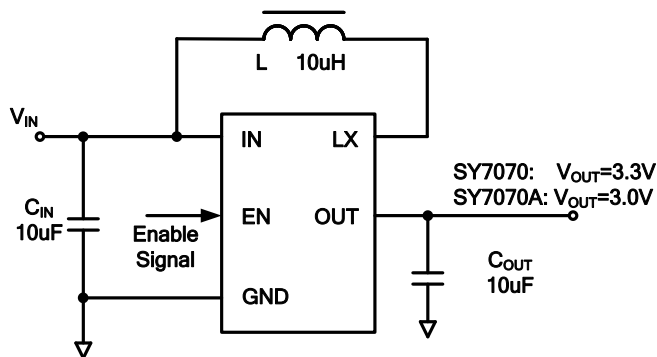
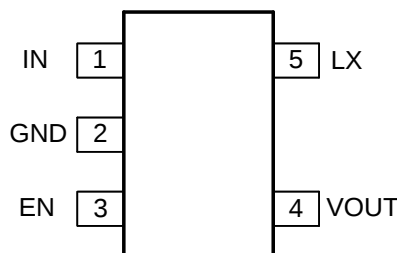


Figure 1. Schematic Diagram



SY7070/SY7070A

Pinout (top view)



(SOT23-5)

Top mark: SY7070: **RQ**xyz (Device code: RQ, x=*year code*, y=*week code*, z= *lot number code*)

SY7070A: **TY**xyz (Device code: TY, x=*year code*, y=*week code*, z= *lot number code*)

Name	Number	Description
IN	1	Input pin. Decouple this pin to GND pin with 10uF ceramic cap.
GND	2	Ground pin.
VOUT	4	Output pin. Decouple this pin to GND pin with a minimum of 10uF ceramic cap. SY7070, fixed 3.3V; SY7070A, fixed 3.0V.
LX	5	Inductor node. Connect an inductor between IN pin and LX pin.
EN	3	Enable pin. Pull it high to turn on or pull it low to shut down the part. Do not leave it floating.

Absolute Maximum Ratings (Note 1)

All Pins to GND----- 6V

Power Dissipation, P_D @ $T_A = 25^\circ\text{C}$ SOT23-5 ----- 0.6W

Package Thermal Resistance (Note 2)

θ_{JA} ----- 161°C/W

θ_{JC} ----- 130°C/W

Junction Temperature Range ----- 150°C

Lead Temperature (Soldering, 10 sec.) ----- 260°C

Storage Temperature Range ----- -65°C to 150°C

Recommended Operating Conditions (Note 3)

IN ----- 0.7V to 5.0V

EN ----- 0V to $V_{OUT}+0.3V$

All other pins ----- 0-5.0V

Junction Temperature Range ----- -40°C to 125°C

Ambient Temperature Range ----- -40°C to 85°C



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Electrical Characteristics

($V_{IN}=1.2V$, $V_{OUT}=3.3V$, $I_{OUT}=10mA$, $T_A = 25^{\circ}C$ unless otherwise specified)

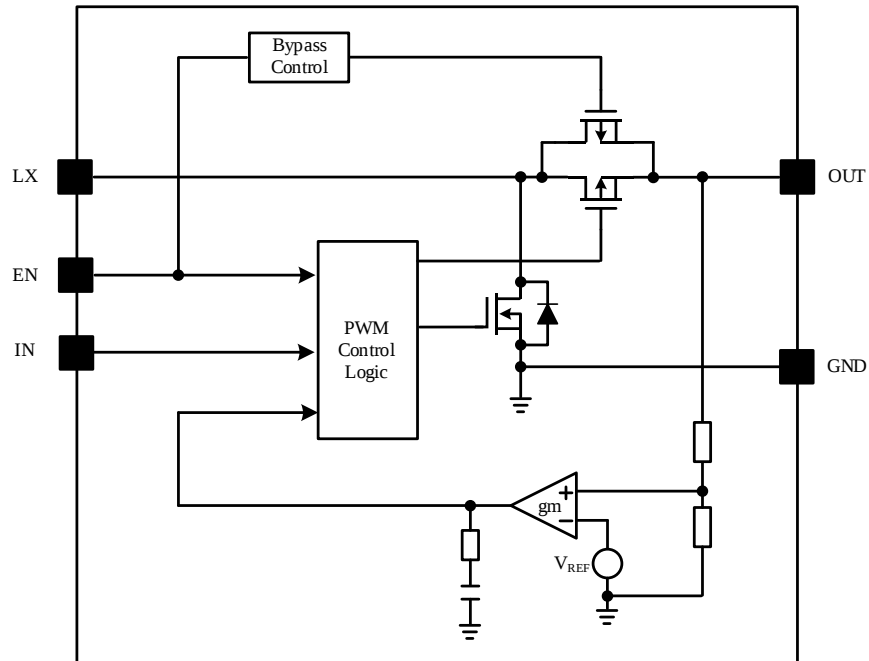
Parameter	Symbol	Test Conditions	Min	Typ	Max	Unit
Input Voltage	V_{IN}		0.7		5.0	V
Minimum V_{IN} at start-up	V_{START}			0.75		V
Quiescent Current	V_{IN}	$I_o=0mA, V_{EN}=V_{IN}=1.2V$, $V_{OUT}=3.4V$		0.5		μA
	V_{OUT}			5.5		
Shut Down Current	I_{SHDN}	$V_{EN}=0V, V_{IN}=3.0V$			1	μA
EN Rising Threshold	V_{ENH}	$V_{IN} \leq 1.6$	$0.75 \times V_{IN}$			V
		$1.6 < V_{IN} < 5.0$	1.2			V
EN Falling Threshold	V_{ENL}	$V_{IN} \leq 1.6$			$0.2 \times V_{IN}$	V
		$1.6 < V_{IN} < 5.0$			0.32	V
Low Side Main FET R_{ON}	$R_{DS(ON)1}$	$V_{OUT}=3.3V$		0.5		Ω
Synchronous FET R_{ON}	$R_{DS(ON)2}$	$V_{OUT}=3.3V$		0.7		Ω
Main FET Current Limit	I_{LIM}		300	350		mA
Output Voltage	V_{OUT}	SY7070	3.201	3.3	3.399	V
		SY7070A	2.901	3.0	3.099	V
Thermal Shutdown Temperature	T_{SD}			150		$^{\circ}C$
Thermal Shutdown Hysteresis	T_{HYS}			20		$^{\circ}C$
Under Voltage Lockout For Turn Off Protection	V_{UVLO}	V_{IN} decreasing		0.6		V

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.

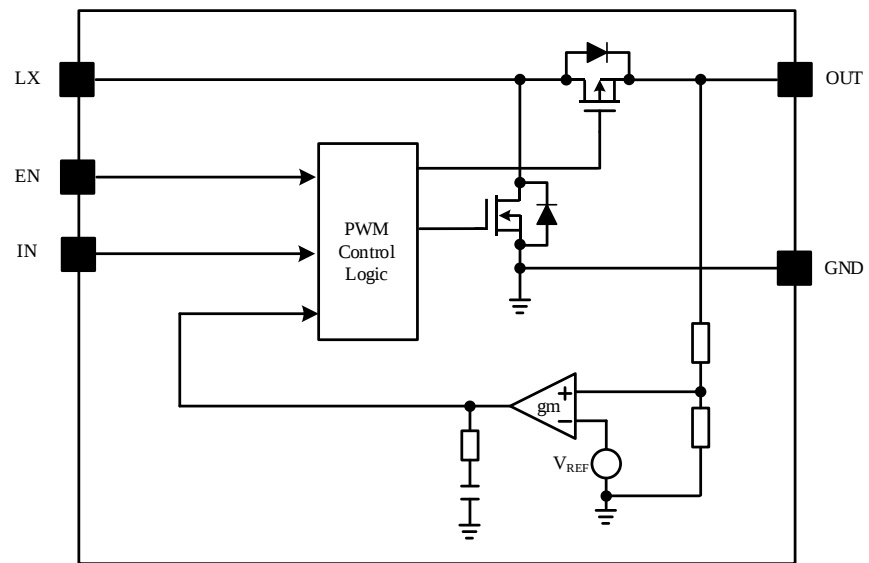
Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^{\circ}C$ on a low effective single layer thermal conductivity test board of JEDEC 51-3 thermal measurement standard. Test condition: Device mounted on 2” x 2” FR-4 substrate PCB, 2oz copper, with minimum recommended pad on top layer and thermal vias to bottom layer ground plane.

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

Function Block

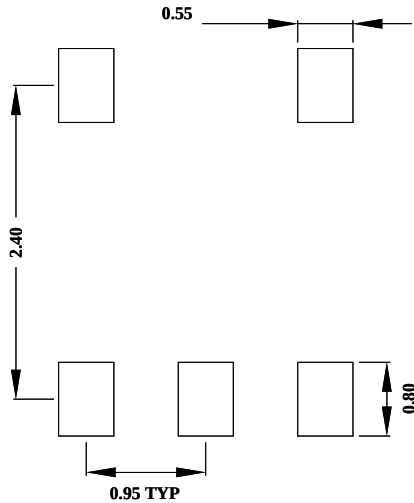


(SY7070)

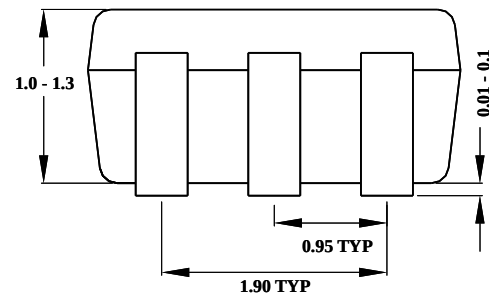
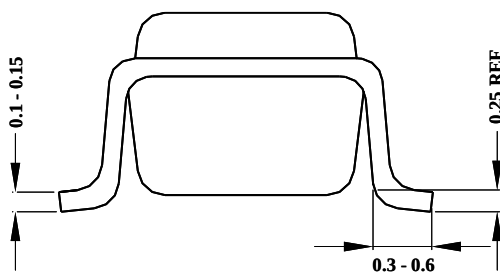
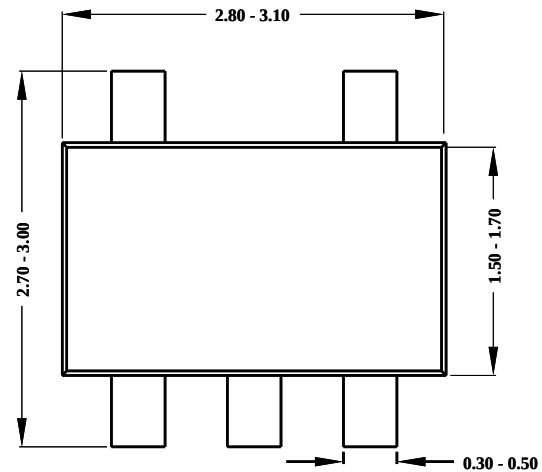


(SY7070A)

SOT23-5 Package outline & PCB layout design



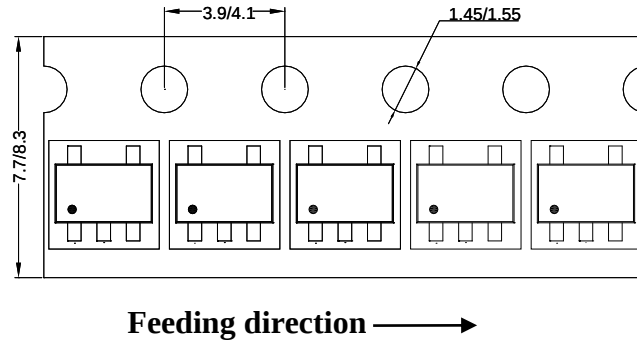
Recommended Pad Layout



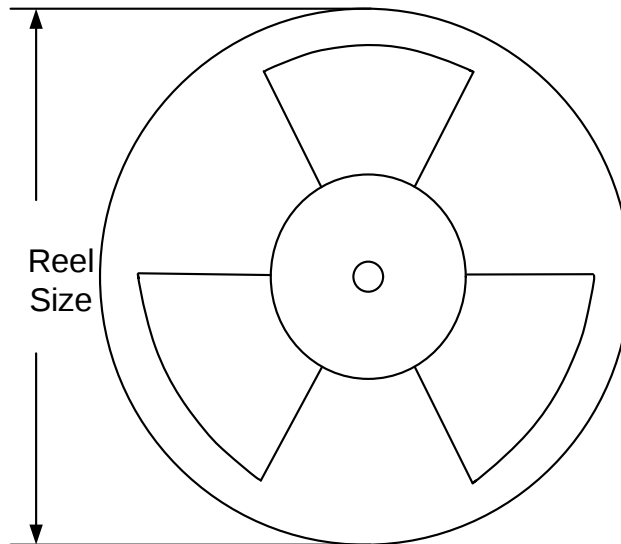
Notes: All dimensions are in millimeters.
All dimensions don't include mold flash & metal burr.

Taping & Reel Specification

1. SOT23-5 taping orientation



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