

5.5V Maximum Output, 3A Valley Current, 1MHz Synchronous Boost with Auto Bypass Function

General Description

SY7069B is a high efficiency synchronous, step-up Boost converter designed for one-cell Li-Ion or Li-polymer, or a two to three-cell alkaline Ni-Cd or Ni-MH battery powered applications. It can convert down to 2.5V input voltage and up to 5.5V output voltage. It adopts NMOS for the main switch and PMOS for the synchronous switch.

SY7069B can disconnect the output from input during the shutdown mode. When input voltage exceeds the regulated output voltage, SY7069B enters bypass mode automatically.

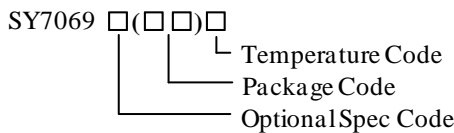
Features

- 2.5V Minimum Input Voltage
- Adjustable Output Voltage from 2.5V to 5.5V
- Min 3A Valley Current Limit
- Capable for Seamless Transition between Boost and Bypass Mode
- Load Disconnect During Shutdown
- Low $R_{DS(ON)}$ (Main Switch/Synchronous Switch) at 5.0V Output: 50mΩ/90mΩ
- Output OVP Protection
- Compact package TSOT23-6

Applications

- All Single Cell Li or Dual Cell Battery Operated Products as MP-3 Player, PDAs, and Other Portable Equipment.

Ordering Information



| Ordering Number | Package type | Note |
|-----------------|--------------|------|
| SY7069BADC | TSOT23-6 | ---- |

Typical Applications

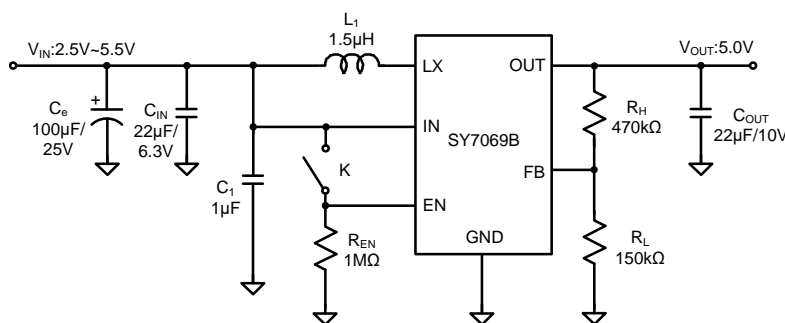


Figure 1. Schematic Diagram

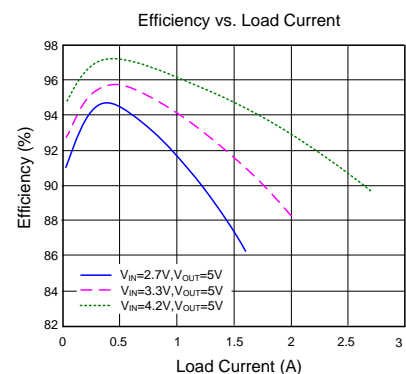
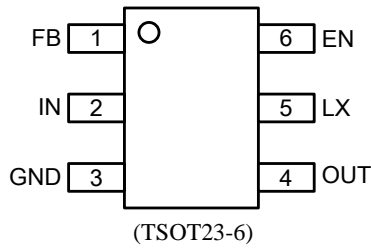


Figure 2. Efficiency vs. Load Current

Pinout (top view)



Top mark: **bDxyz** (Device code: bD, x=year code, y=week code, z=lot number code)

| Name | Pin Number | 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: $V_{OUT}=1.2 \times (1+R_H/R_L)$. |
| IN | 2 | Signal input pin. Decouple this pin to GND pin with at least a 1 μ F ceramic capacitor for noise immunity consideration. |
| GND | 3 | Ground pin. |
| OUT | 4 | Output pin. Decouple this pin to GND pin with at least a 22 μ F ceramic capacitor. |
| LX | 5 | Inductor node. Connect an inductor between the IN pin and the LX pin. |
| EN | 6 | Enable pin. Pull high to turn on. Do not leave it floating. |

Block Diagram

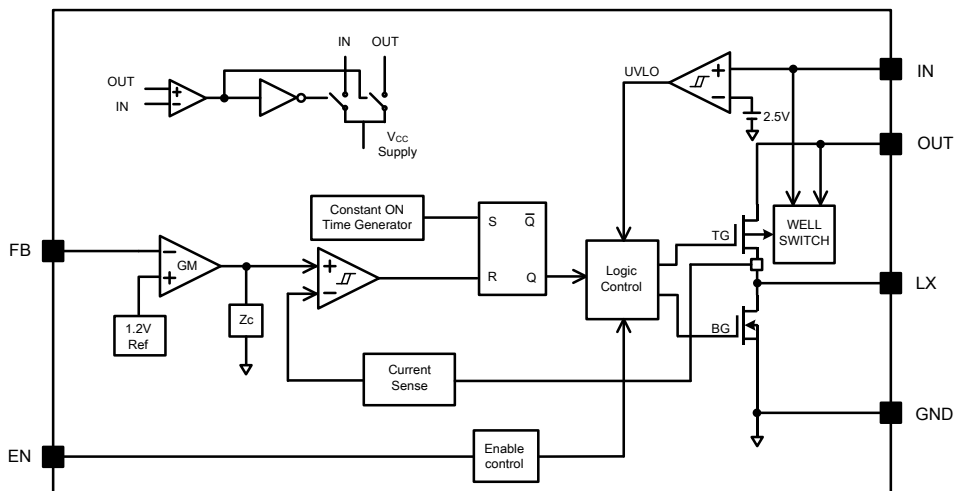


Figure3. Block Diagram

Absolute Maximum Ratings (Note 1)

| | |
|--|----------------|
| All Pins | 6.0V |
| Power Dissipation, P_D @ $T_A=25^\circ\text{C}$, TSOT23-6 | 1.92W |
| Package Thermal Resistance (Note 2) | |
| θ_{JA} | 52°C/W |
| θ_{JC} | 32°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 |

Recommended Operating Conditions (Note 3)

| | |
|----------------------------|----------------------|
| IN | 2.5V to 5.5V |
| OUT | 2.5V to 5.5V |
| EN, FB | 0V to $V_{OUT}+0.3V$ |
| All other pins | 0-5.5V |
| Junction Temperature Range | -40°C to 125°C |
| Ambient Temperature Range | -40°C to 85°C |

Electrical Characteristics

($V_{IN}=3.0V$, $V_{OUT}=5.0V$, $I_{OUT}=500mA$, $T_A = 25^\circ\text{C}$ unless otherwise specified)

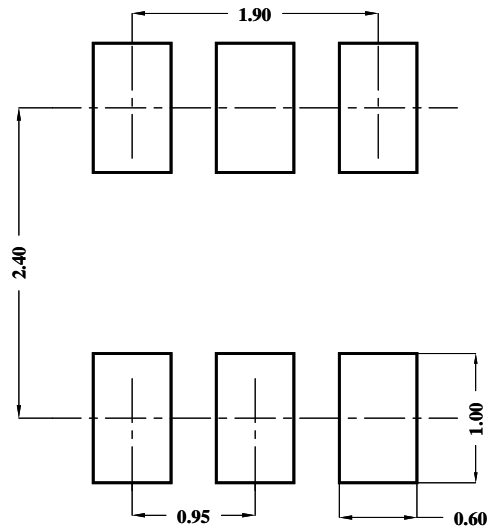
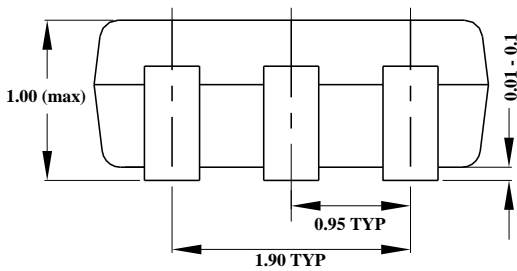
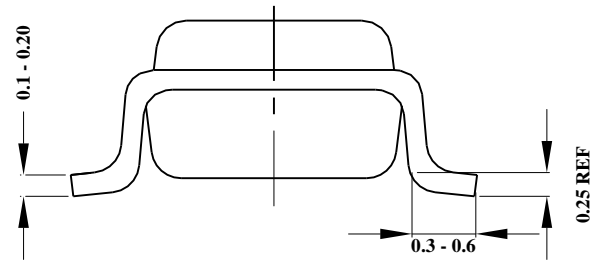
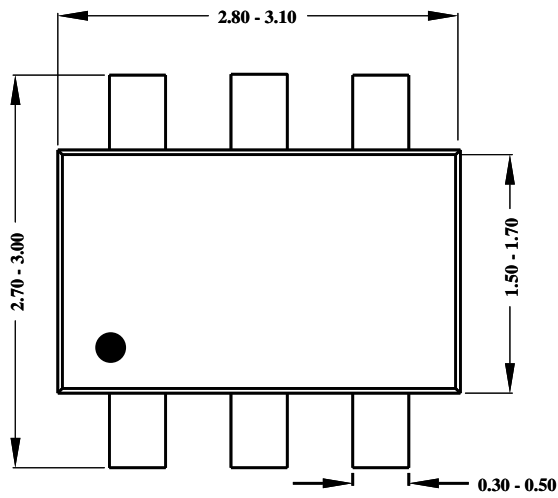
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|-------------------------------|----------------|--|-------|------|-------|------------------|
| Input Voltage | V_{IN} | | 2.5 | | 5.5 | V |
| Output Voltage Range | V_{OUT} | | 2.5 | | 5.5 | V |
| Quiescent Current | V_{IN} | $I_O=0A, V_{EN}=V_{IN}=3.0V, V_{OUT}=5.0V, V_{FB}=105\% V_{REF}$ | | 8 | | μA |
| | V_{OUT} | | | 32 | | μA |
| Shutdown Current | I_{SHDN} | $V_{EN}=0V, V_{IN}=3.0V$ | | 0.1 | 1 | μA |
| Linear Charge Current | I_{CHARGE} | $V_{OUT}<0.5V_{IN}$ | | 1.5 | | A |
| Input Vin UVLO Threshold | V_{UVLO} | | | | 2.5 | V |
| V_{IN} UVLO Hysteresis | V_{SYS} | | | 0.1 | | V |
| EN Rising Threshold | V_{ENH} | | 1.2 | | | V |
| EN Falling Threshold | V_{ENL} | | | | 0.4 | V |
| Low Side Main FET R_{ON} | $R_{DS(ON)1}$ | $V_{OUT}=5.0V$ | | 50 | | $m\Omega$ |
| Synchronous FET R_{ON} | $R_{DS(ON)2}$ | $V_{OUT}=5.0V$ | | 90 | | $m\Omega$ |
| Synchronous FET Current Limit | I_{LIM} | | 3.0 | | | A |
| Switching Frequency | f_{SW} | | | 1.0 | | MHz |
| Feedback Reference Voltage | V_{REF} | | 1.182 | 1.2 | 1.218 | V |
| Minimum ON Time | t_{ON_MIN} | | | 80 | | ns |
| Minimum OFF Time | t_{OFF_MIN} | | | 80 | | ns |
| OUT Pin OVP Protection | | | | 6.0 | | V |
| OUT Pin OVP Hysteresis | OVP_{HYS} | | | 0.25 | | V |
| Thermal Shutdown Temperature | T_{SD} | | | 150 | | $^\circ\text{C}$ |
| Thermal Shutdown Hysteresis | T_{HYS} | | | 20 | | $^\circ\text{C}$ |

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 may affect device reliability.

Note 2: θ_{JA} is measured in the natural convection at $T_A = 25^\circ\text{C}$ on a two-layer Silergy Evaluation Board.

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

TSOT23-6 Package outline & PCB layout



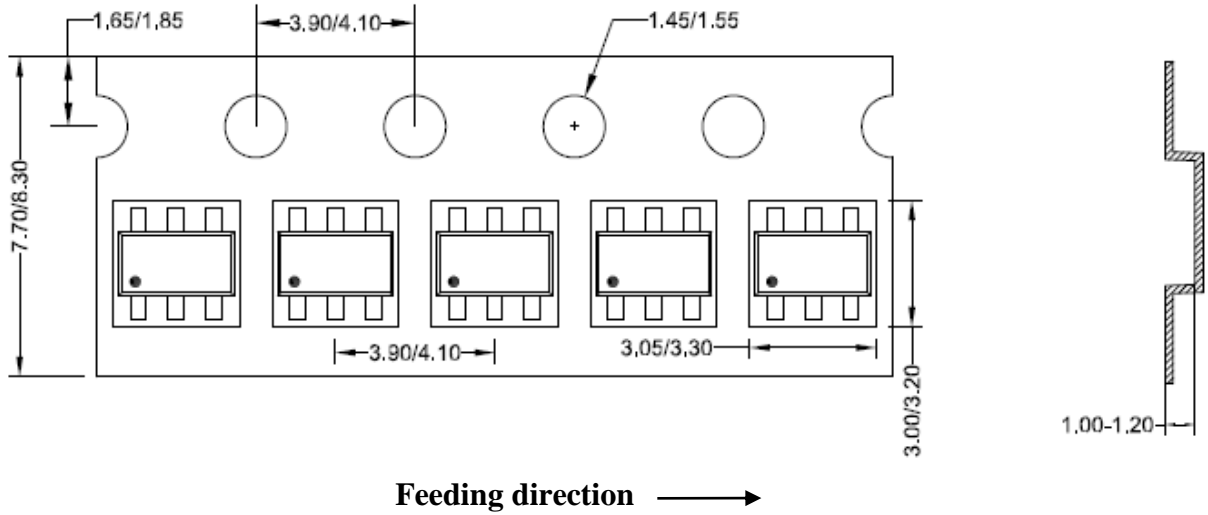
Recommended Pad Layout

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

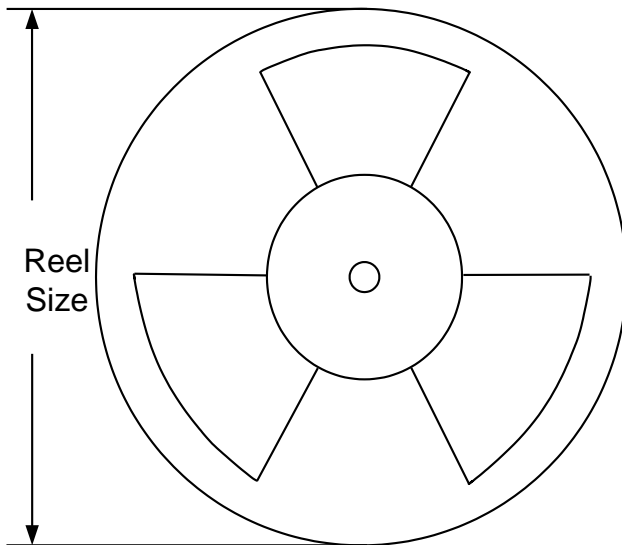
Taping & Reel Specification

1. Taping orientation

TSOT23-6



2. Carrier Tape & Reel specification for packages



| Package type | Tape width (mm) | Pocket pitch(mm) | Reel size (Inch) | Trailer length(mm) | Leader length (mm) | Qty per reel |
|--------------|-----------------|------------------|------------------|--------------------|--------------------|--------------|
| TSOT23-6 | 8 | 4 | 7 | 400 | 160 | 3000 |

3. Others: NA