# SGM66023
# 3.5A Valley Current, 0.5V Ultra-Low Input, Synchronous Boost Converter

## GENERAL DESCRIPTION

The SGM66023 is a high power density synchronous Boost converter with 3.5A (TYP) valley current limit. The device supports wide input voltage range from 0.5V to 5.5V which is suitable for various input source type, such as Li-Ion battery, multiple alkaline batteries in series, and super capacitors. The device is capable of operating down to 0.5V input voltage after startup which is beneficial for maximizing the input source utilization.

The SGM66023 operates with 1MHz switching frequency at input voltage above 1.5V to allow the use of small inductor. The switching frequency folds back gradually to 0.5MHz as the input voltage drops from 1.5V to 1V. The device enters power-save mode at light load condition to maintain high efficiency over the entire load current range. The device consumes 24μA (TYP) quiescent current from VOUT in light load condition.

The SGM66023 provides various protection features such as over-voltage protection, short-circuit protection and thermal shutdown protection.

The SGM66023 is available in a Green SOT-563-6 package.

## APPLICATIONS

Audio Power Supply
Super Capacitor Backup
4G, GPRS Power Supply

## FEATURES

- **0.5V to 5.5V Input Voltage Range**
- **2.2V to 5.5V Output Voltage Range**
- **1.8V Minimal Startup $V_{IN}$**
  - **0.5V after Startup**
- **60mΩ Low-side/75mΩ High-side MOSFETs**
- **3.5A (TYP) Valley Switching Current Limit**
- **93.7% Efficiency at $V_{IN}$ = 3.6V, $V_{OUT}$ = 5V and $I_{OUT}$ = 1A**
- **1MHz and 0.5MHz Switching Frequency**
- **0.6μA (TYP) Shutdown Current from VIN and SW**
- **±2.9% Reference Voltage Accuracy over -40°C to +125°C**
- **Auto PFM Operation Mode at Light Load**
- **Pass-Through Mode when $V_{IN}$ > $V_{OUT}$**
- **True Disconnection during Shutdown**
- **Output Over-Voltage and Thermal Shutdown Protections**
- **Output Short-Circuit Protection**
- **Available in a Green SOT-563-6 Package**

## TYPICAL APPLICATION

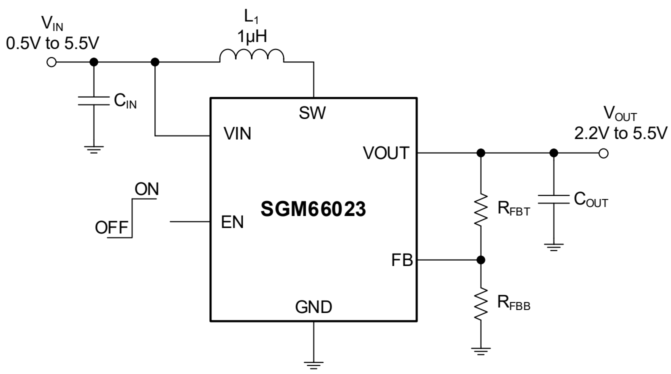



**Figure 1. Typical Application Circuit**

## PACKAGE/ORDERING INFORMATION

| MODEL | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION |
|---|---|---|---|---|---|
| SGM66023 | SOT-563-6 | -40℃ to +125℃ | SGM66023XKB6G/TR | 0CXX | Tape and Reel, 5000 |

## MARKING INFORMATION

NOTE: XX = Date Code.

**YY X X**

- X — Date Code - Week
- X — Date Code - Year
- YY — Serial Number

Green (RoHS & HSF): SG Micro Corp defines "Green" to mean Pb-Free (RoHS compatible) and free of halogen substances. If you have additional comments or questions, please contact your SGMICRO representative directly.

## ABSOLUTE MAXIMUM RATINGS

Voltage Range

VIN, EN, FB, SW, VOUT................................ -0.3V to 6.5V

Package Thermal Resistance

SOT-563-6, $\theta_{JA}$.................................................. 121.0℃/W

SOT-563-6, $\theta_{JB}$.................................................... 23.4℃/W

SOT-563-6, $\theta_{JC}$ .................................................... 61.5℃/W

Junction Temperature.................................................+150℃

Storage Temperature Range .......................-65℃ to +150℃

Lead Temperature (Soldering, 10s)............................+260℃

ESD Susceptibility [(1) (2)]

HBM..........................................................................±4000V

CDM .........................................................................±1000V

NOTES:

1. For human body model (HBM), all pins comply with ANSI/ESDA/JEDEC JS-001 specifications.
2. For charged device model (CDM), all pins comply with ANSI/ESDA/JEDEC JS-002 specifications.

## RECOMMENDED OPERATING CONDITIONS

Input Voltage Range, $V_{IN}$ ....................................0.5V to 5.5V

Output Voltage Setting Range, $V_{OUT}$...................2.2V to 5.5V

Effective Inductance Range, L

.............................................. 0.37μH to 2.9μH, 1.0μH (TYP)

Effective Input Capacitance Range, $C_{IN}$

..................................................................1μF to 4.7μF (TYP)

Effective Output Capacitance Range, $C_{OUT}$

................................................... 4μF to 1000μF, 10μF (TYP)

Operating Junction Temperature Range.......-40℃ to +125℃

## OVERSTRESS CAUTION

Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability. Functional operation of the device at any conditions beyond those indicated in the Recommended Operating Conditions section is not implied.

## ESD SENSITIVITY CAUTION

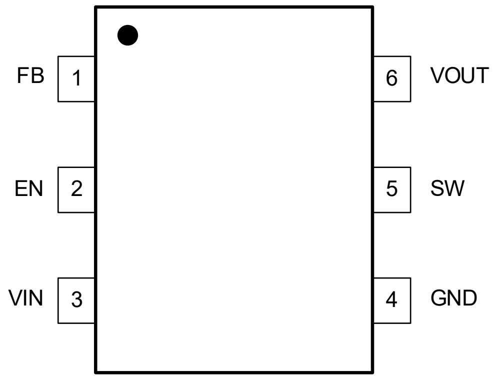
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because even small parametric changes could cause the device not to meet the published specifications.

## DISCLAIMER

SG Micro Corp reserves the right to make any change in circuit design, or specifications without prior notice.

## PIN CONFIGURATION

(TOP VIEW)




SOT-563-6

## PIN DESCRIPTION

| PIN | NAME | I/O | FUNCTION |
|---|---|---|---|
| 1 | FB | I | Boost Converter Output Feedback Pin. Connect a voltage divider from VOUT to this node. |
| 2 | EN | I | Enable Pin. Logic high turns the converter on. Logic low turns the converter off. Do not leave this pin floating. |
| 3 | VIN | I | Power Input Pin. Connect the input source and input capacitors to this pin. |
| 4 | GND | G | Ground Pin. All signals are referenced to this pin. |
| 5 | SW | P | Switch Node. Drain connection of low-side power FET. |
| 6 | VOUT | O | Output Voltage Pin. Connect the load and output capacitors to this pin. |

NOTE: I = input, O = output, P = power, G = ground.

## ELECTRICAL CHARACTERISTICS

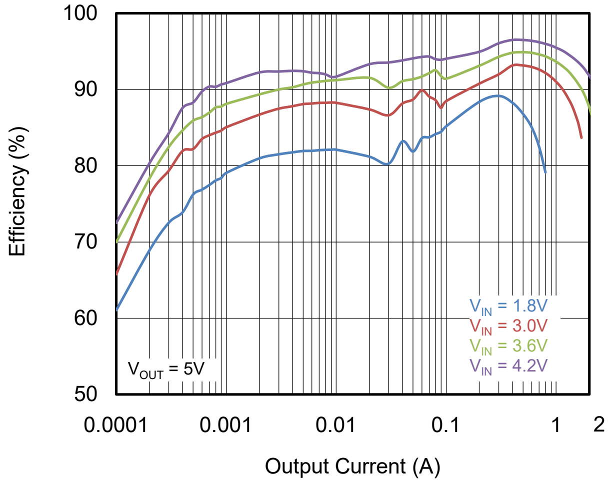
($T_J$ = -40℃ to +125℃, $V_{IN}$ = 3.6V and $V_{OUT}$ = 5.0V. Typical values are at $T_J$ = +25℃, unless otherwise noted.)

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNITS |
|---|---|---|---|---|---|---|
| **Power Supply** | | | | | | |
| Input Voltage Range | $V_{IN}$ | | 0.5 | | 5.5 | V |
| Under-Voltage Lockout Threshold | $V_{IN\_UVLO}$ | $V_{IN}$ rising | | 1.59 | 1.80 | V |
| | | $V_{IN}$ falling | | 0.4 | 0.5 | |
| Quiescent Current into VIN Pin | $I_Q$ | IC enabled, no load, no switching $V_{IN}$ = 1.8V to 5.5V, $V_{FB}$ = $V_{REF}$ + 0.1V, $T_J$ up to +125℃ | | 0.6 | 5 | μA |
| Quiescent Current into VOUT Pin | | IC enabled, no load, no switching $V_{OUT}$ = 2.2V to 5.5V, $V_{FB}$ = $V_{REF}$ + 0.1V, $T_J$ up to +125℃ | | 24 | 55 | μA |
| Shutdown Current into VIN and SW Pin | $I_{SD}$ | IC disabled, $V_{IN}$ = $V_{SW}$ = 3.6V, $T_J$ = +25℃ | | 0.6 | 1.5 | μA |
| **Output** | | | | | | |
| Output Voltage Setting Range | $V_{OUT}$ | | 2.2 | | 5.5 | V |
| Reference Voltage at the FB Pin | $V_{REF}$ | PWM mode & PFM mode | 575 | 592 | 610 | mV |
| Output Over-Voltage Protection Threshold | $V_{OVP}$ | $V_{OUT}$ rising | 5.5 | 5.8 | 6.1 | V |
| Over-Voltage Protection Hysteresis | $V_{OVP\_HYS}$ | | | 0.12 | | V |
| Leakage Current at FB Pin | $I_{FB\_LKG}$ | $T_J$ = +25℃ | | 1 | 20 | nA |
| | | $T_J$ = +125℃ | | 4 | | |
| Leakage Current into VOUT Pin | $I_{VOUT\_LKG}$ | IC disabled, $V_{IN}$ = 0V, $V_{SW}$ = 0V, $V_{OUT}$ = 5.5V, $T_J$ = +25℃ | | 2 | 7 | μA |
| Soft Startup Time | $t_{SS}$ | From active EN to VOUT regulation. $V_{IN}$ = 2.5V, $V_{OUT}$ = 5.0V, $C_{OUT\_EFF}$ = 10μF, $I_{OUT}$ = 0A | | 700 | | μs |
| **Power Switch** | | | | | | |
| High-side MOSFET On-Resistance | $R_{DSON}$ | $V_{OUT}$ = 5.0V | | 75 | | mΩ |
| Low-side MOSFET On-Resistance | | $V_{OUT}$ = 5.0V | | 60 | | mΩ |
| Switching Frequency | $f_{SW}$ | $V_{IN}$ = 3.6V, $V_{OUT}$ = 5.0V, PWM mode | | 1.0 | | MHz |
| | | $V_{IN}$ = 1.0V, $V_{OUT}$ = 5.0V, PWM mode | | 0.5 | | |
| Minimum On Time | $t_{ON\_MIN}$ | | | 100 | | ns |
| Minimum Off Time | $t_{OFF\_MIN}$ | | | 80 | | ns |
| Valley Current Limit | $I_{LIM\_SW}$ | $V_{IN}$ = 3.6V, $V_{OUT}$ = 5.0V | 2.7 | 3.5 | | A |
| Pre-charge Current | $I_{LIM\_CHG}$ | $V_{IN}$ = 1.8V to 5.5V, $V_{OUT}$ < 0.4V | | 300 | | mA |
| | $I_{LIM\_CHG\_MAX}$ | $V_{IN}$ = 2.4V, $V_{OUT}$ = 2.15V | | 1450 | | |
| **Logic Interface** | | | | | | |
| EN Logic High Threshold | $V_{EN\_H}$ | $V_{IN}$ > 1.8V or $V_{OUT}$ > 2.2V | | | 1.2 | V |
| EN Logic Low Threshold | $V_{EN\_L}$ | $V_{IN}$ > 1.8V or $V_{OUT}$ > 2.2V | 0.350 | 0.420 | 0.475 | V |
| **Protection** | | | | | | |
| Thermal Shutdown Threshold | $T_{SD}$ | $T_J$ rising | | 150 | | ℃ |
| Thermal Shutdown Hysteresis | $T_{SD\_HYS}$ | $T_J$ falling below $T_{SD}$ | | 20 | | ℃ |

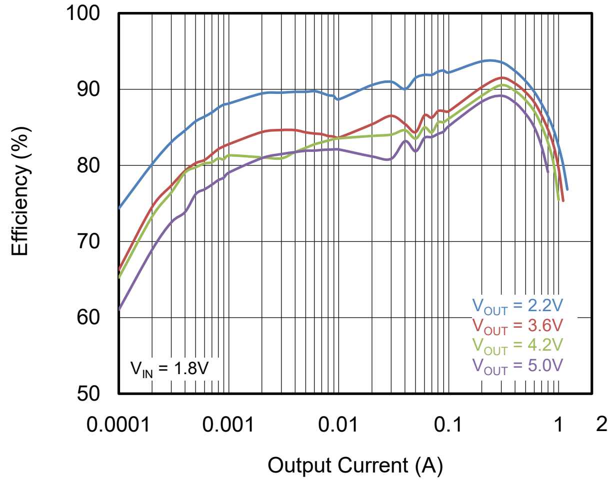
# TYPICAL PERFORMANCE CHARACTERISTICS

At $T_J$ = +25℃, $V_{IN}$ = 3.6V and $V_{OUT}$ = 5V, unless otherwise noted.

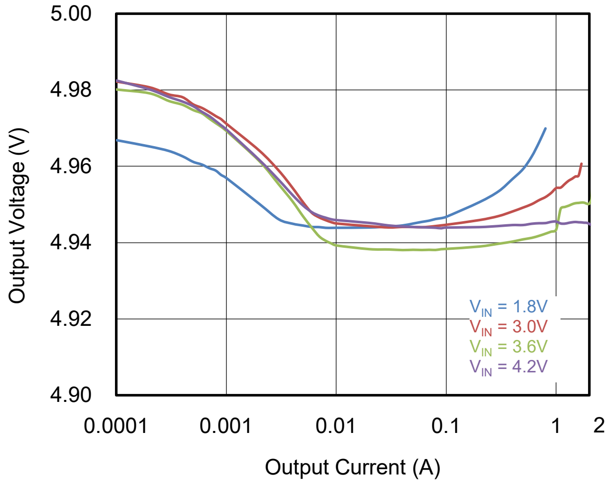
Efficiency vs. Output Current



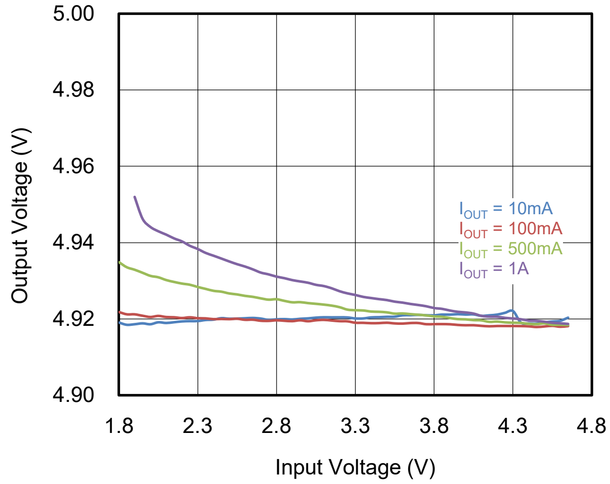

Efficiency vs. Output Current



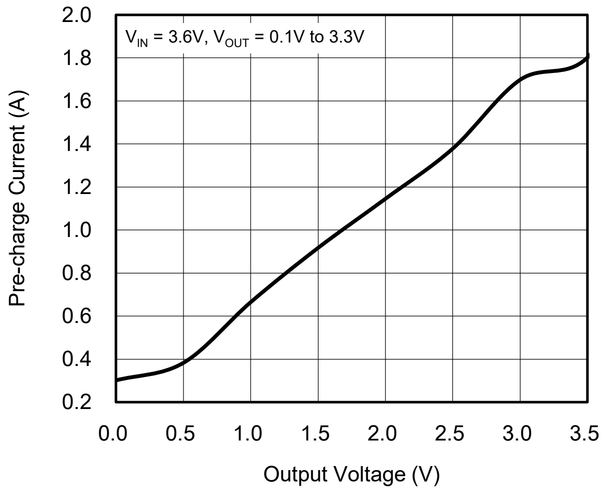

Load Regulation



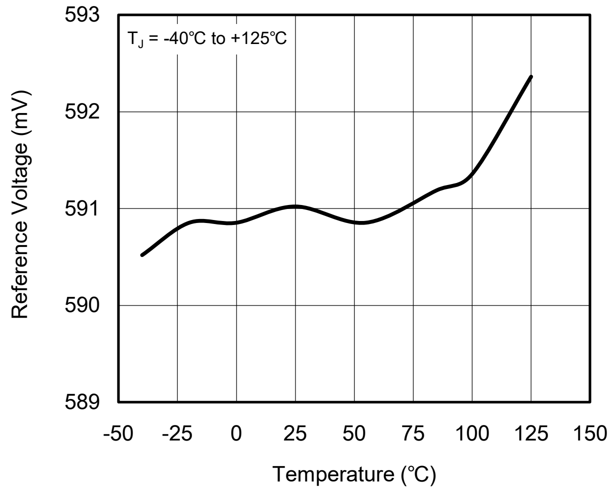

Line Regulation




Pre-charge Current vs. Output Voltage



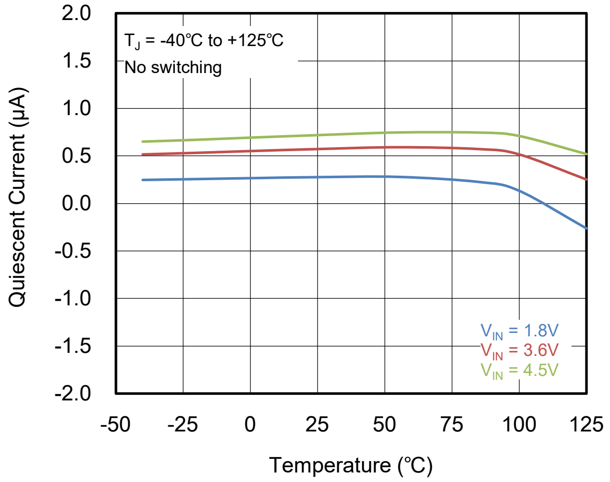

Reference Voltage vs. Temperature



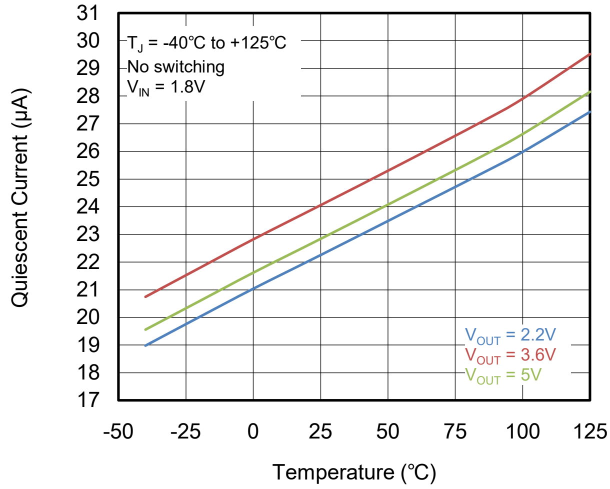
## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_J$ = +25℃, $V_{IN}$ = 3.6V and $V_{OUT}$ = 5V, unless otherwise noted.

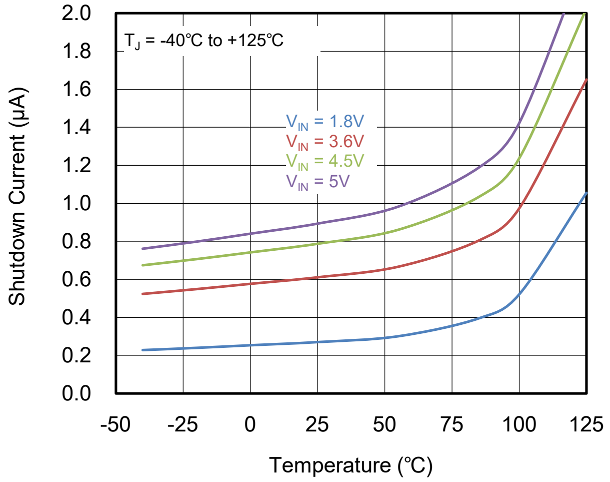
Quiescent Current into VIN vs. Temperature



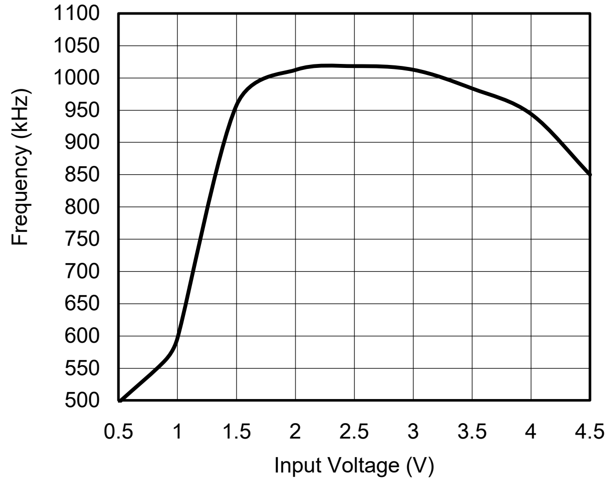

Quiescent Current into VOUT vs. Temperature



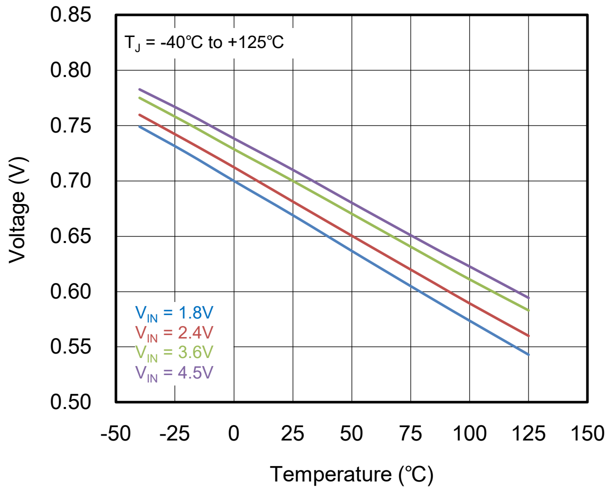

Shutdown Current vs. Temperature



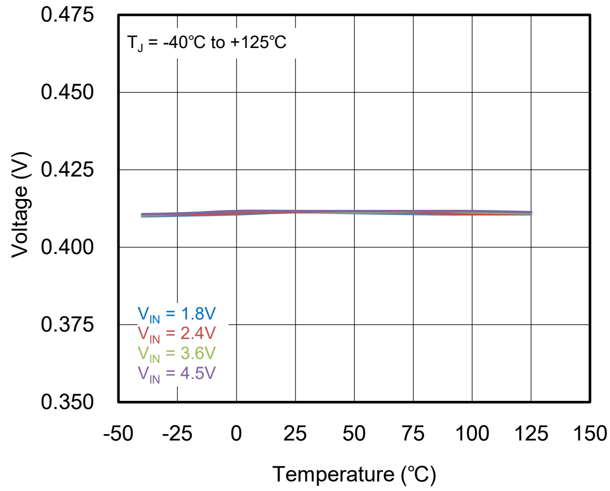

Switching Frequency vs. Input Voltage




EN Rising Threshold vs. Temperature



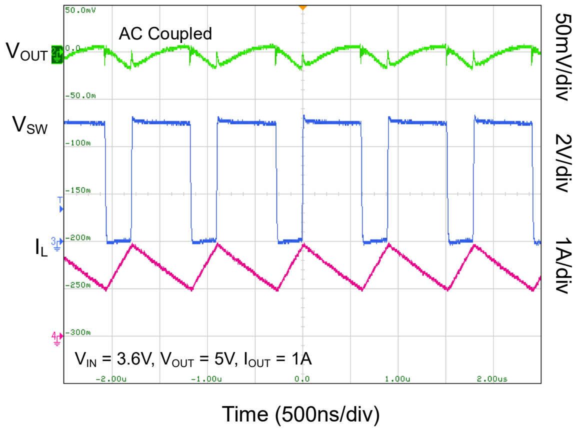

EN Falling Threshold vs. Temperature



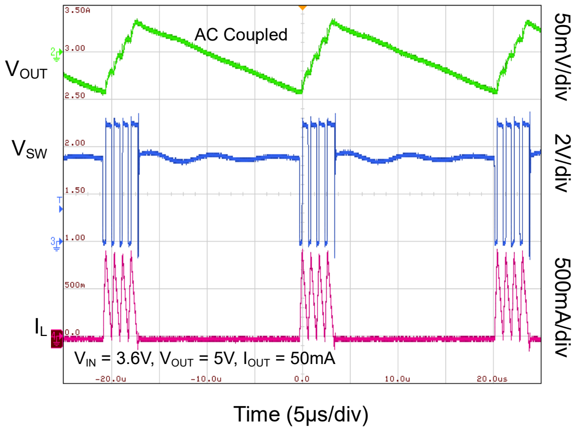
## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

At $T_J$ = +25℃, $V_{IN}$ = 3.6V and $V_{OUT}$ = 5V, unless otherwise noted.

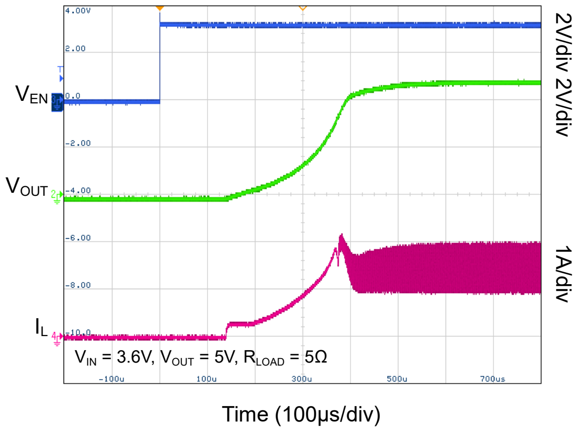
Ripple Heavy Load



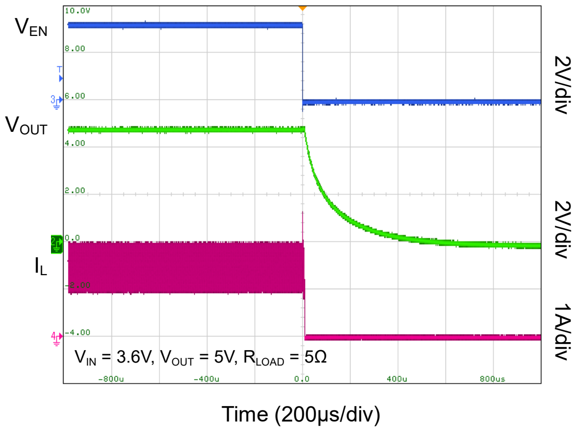

Ripple Light Load



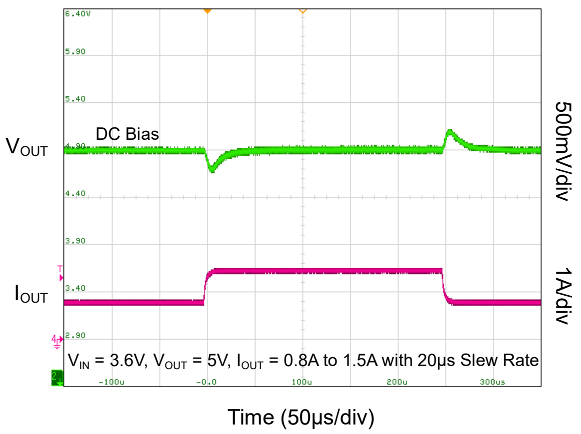

EN Startup Waveform



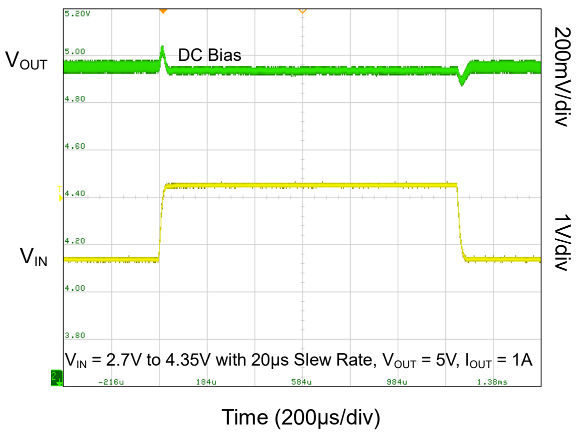

EN Shutdown Waveform




Load Transient



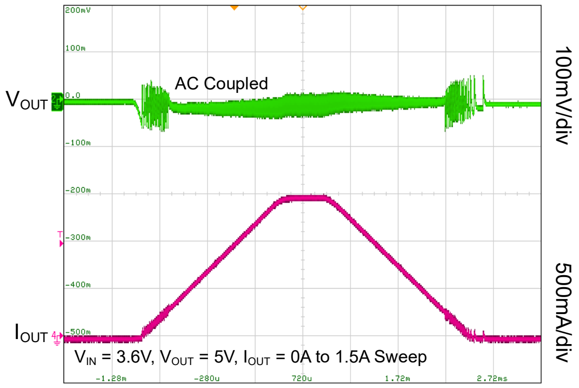

Line Transient



## TYPICAL PERFORMANCE CHARACTERISTICS (continued)

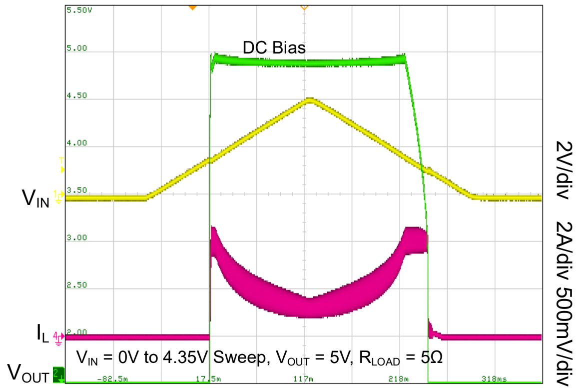
At $T_J$ = +25℃, $V_{IN}$ = 3.6V and $V_{OUT}$ = 5V, unless otherwise noted.

Load Sweep



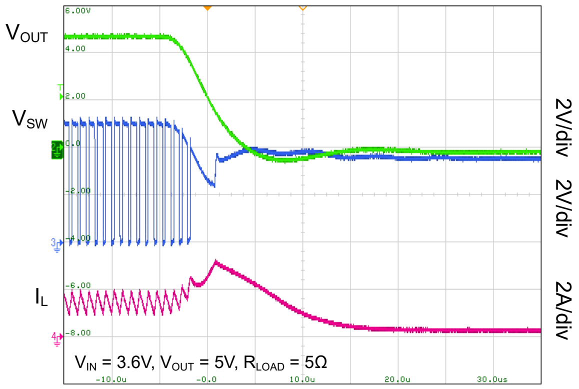

Time (500μs/div)

Line Sweep



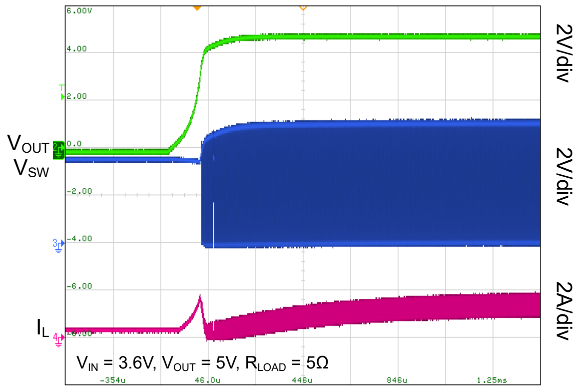

Time (50ms/div)

Short-Circuit Protection Entry




Time (5μs/div)

Short-Circuit Protection Recovery




Time (200μs/div)

## FUNCTIONAL BLOCK DIAGRAM

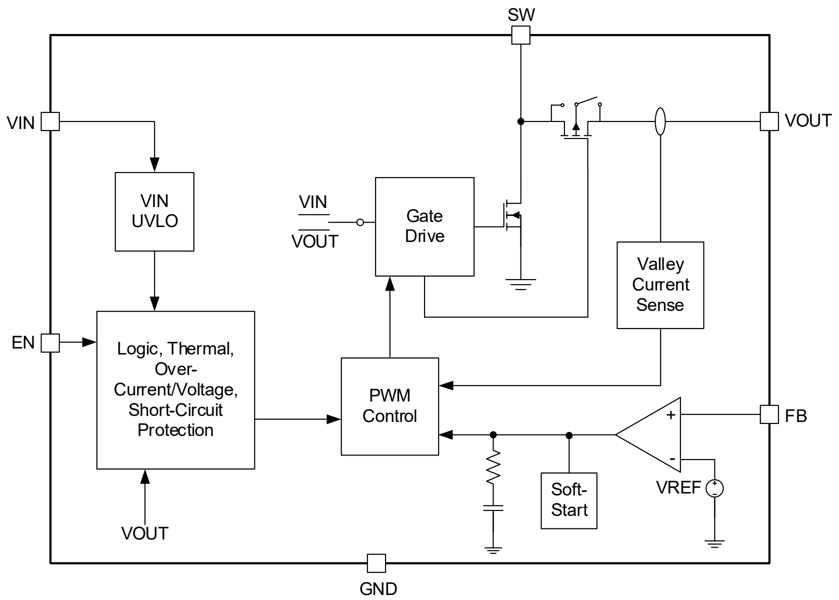



**Figure 2. Block Diagram**

# DETAILED DESCRIPTION

## Overview

The SGM66023 is a high power density synchronous Boost converter with 3.5A (TYP) valley current limit. The device supports wide input voltage range from 0.5V to 5.5V. The SGM66023 operates with 1MHz switching frequency at input voltage above 1.5V to allow the use of small inductance. The switching frequency folds back gradually to 0.5MHz as the input voltage drops from 1.5V to 1V. The SGM66023 can enter power-save mode at light load condition to maintain high efficiency over the entire load current range. The 24μA (TYP) quiescent current into VOUT pin maximizes the light load efficiency. The SGM66023 provides input disconnect feature during shutdown. In addition, the SGM66023 provides various protection features such as over-voltage protection, short-circuit protection and thermal shutdown protection.

## Input Under-Voltage Lockout (UVLO)

The SGM66023 integrates VIN under-voltage lockout (UVLO) feature to protect the device from malfunctioning. The UVLO rising threshold is 1.59V (TYP), and after boosting the output voltage, the SGM66023 can operate with input voltage higher than 0.5V (TYP).

## Enable and Soft-Start

When the input voltage is valid, pulling the EN input to logic high will enable the device and the output reaches target voltage after about 700μs delay (for typical application of 2.5V input voltage, 5V output voltage, 10μF output effective capacitance and 0A load).

When output voltage is less than 0.4V, the pre-charge current is $I_{LIM\_CHG}$. When output voltage is higher than 0.4V but less than input voltage, the pre-charge current can slightly increase with the output voltage growing. When output voltage is higher than input voltage, SGM66023 starts switching and boosts up the output voltage to the target voltage.

## Device Shutdown

The SGM66023 enters shutdown mode when EN pin is pulled to logic low (less than 0.4V). In shutdown mode, true load disconnect is implemented to minimize the shutdown current and all control circuits are turned off to reduce the device current to 0.6μA (TYP).

## Switching Frequency

The SGM66023 operates with a quasi-constant 1MHz switching frequency at input voltage above 1.5V. The switching frequency folds back gradually to 0.5MHz as the input voltage drops from 1.5V to 1V. The switching frequency is fixed at a quasi-constant 0.5MHz when input voltage is below 1V.

## Current Limit Operation

The SGM66023 implements a built-in 3.5A (TYP) valley current limit. If an overload occurs, the inductor valley current will be clamped to the valley current limit. Under this condition, the output voltage of SGM66023 will be decreased to maintain a constant power operation.

Due to the limitation of the inductor valley current, the output current has the maximum continuous value $I_{OUT(CL)}$, and can be defined as Equation 1.

$$I_{OUT(CL)} = (1 - D) \times (I_{LIM} + \frac{1}{2}\Delta I_{L(P-P)}) \quad (1)$$

where:
- D is the duty cycle.
- $\Delta I_{L(P-P)}$ is the inductor ripple current.

The duty cycle considering efficiency is defined by Equation 2.

$$D = 1 - \frac{V_{IN} \times \eta}{V_{OUT}} \quad (2)$$

where:
- $V_{OUT}$ is the output voltage of the Boost converter.
- $V_{IN}$ is the input voltage of the Boost converter.
- η is the efficiency of the converter, use 90% for most applications.

The peak-to-peak inductor ripple current is defined by Equation 3.

$$\Delta I_{L(P-P)} = \frac{V_{IN} \times D}{L \times f_{SW}} \quad (3)$$

where:
- L is the inductance value of the inductor.
- $f_{SW}$ is the switching frequency.
- D is the duty cycle.
- $V_{IN}$ is the input voltage of the Boost converter.

## DETAILED DESCRIPTION (continued)

### Pass-Through Operation

When the input voltage is higher than output voltage, and FB pin voltage is higher than the 101% of $V_{REF}$, the high-side P-MOSFET of SGM66023 is fully turned on as the gate of P-MOSFET connected to the ground, which means that the SGM66023 enters pass-through mode, and when $V_{IN}$ is lower than output voltage or FB pin voltage is less than 96% of $V_{REF}$, the SGM66023 exits pass-through mode and regulates the output voltage again.

### Over-Voltage Protection

SGM66023 integrates over-voltage protection (OVP) to protect the device in the event of feedback resistor short-to-ground or incorrect feedback resistor value being populated. The SGM66023 stops switching when the OVP threshold of 5.8V (TYP) is reached. When the output voltage is 100mV lower than the OVP threshold, the device resumes switching.

### Thermal Shutdown

If the junction temperature exceeds the +150℃ (TYP), the SGM66023 will go into thermal shutdown mode. When the junction temperature drops below the thermal shutdown recovery temperature +130℃ (TYP), the switching will resume automatically.

### Device Functional Modes

The SGM66023 operates in two switching operation modes depending on the load current, PWM mode in mid load or heavy load conditions and power-save mode (PSM) in light load conditions, respectively. The SGM66023 uses the internal components to compensate the regulating loop and achieves the rapid load transient response and excellent stability.

#### PWM Mode

The SGM66023 uses a quasi-constant 1MHz frequency pulse width modulation (PWM) at mid to heavy load current. Based on the input voltage to output voltage ratio, a calculating circuit determines the required on-time. At the start of each switching cycle, the low-side N-MOSFET is turned on firstly, and forcing the inductor current to rise due to the input voltage applied across it. While the on-time expires, the low-side MOSFET will be turned off and the high-side P-MOSFET will be turned on to transfer the energy stored by the inductor to charge the output capacitor and supply the load. The current at the source of the switch is internally measured to determine the start of the next switching cycle, by comparing it with the valley current threshold generated by the error amplifier.

#### Power-Save Mode

To reduce light load loss and increase the efficiency, power-save mode (PSM) feature is included in the SGM66023. The SGM66023 determines whether entering power-save mode based on internal compensation voltage. When the inductor current is maintained at the minimum level, the output voltage rises, thereby affecting the comp voltage. Once the comp voltage reaches the default threshold, SGM66023 enters PSM and stops switching. When the output voltage drops causing SGM66023 to exit PSM, the device will switch again.

# APPLICATION INFORMATION

## Typical Application

The SGM66023 can be used as a power solution for portable devices and super-capacitor backups. For portable devices using single-cell Li-Ion battery application, the SGM66023 can output 5V and 3A.

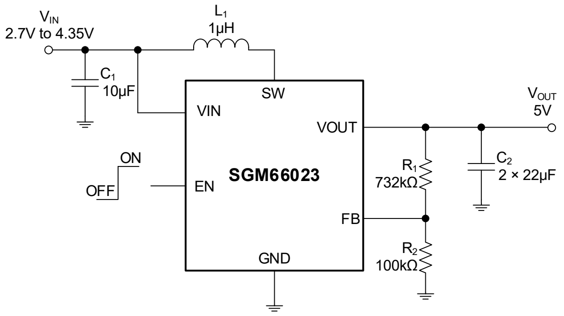



**Figure 3. Li-Ion Battery to 5V Boost Converter**

## Design Requirements

The design parameters are listed in Table 1.

**Table 1. Design Parameters**

| Parameters | Values |
|---|---|
| Input Voltage | 2.7V to 4.35V |
| Output Voltage | 5V |
| Output Current | 1.5A |
| Output Voltage Ripple | ±50mV |

## Detailed Design Procedure

### Setting the Output Voltage

The SGM66023 supports output voltage up to 5.5V, and a resistor divider connected at FB pin is used to configure the output voltage. The resistive divider value is calculated via Equation 4.

$$\frac{V_{OUT} - V_{FB}}{R_1} = \frac{V_{FB}}{R_2} \tag{4}$$

For simplicity, 100kΩ is recommended for $R_2$. A 732kΩ resistor for $R_1$ configures the output voltage to 5V. A lower value of $R_1$ and $R_2$ increases the noise immunity. A higher value of $R_1$ and $R_2$ reduces the quiescent current which can benefit the light load efficiency.

### Inductor Selection

Inductor is an essential element for current DC/DC switch mode power supplies regardless of topology. Inductor serves as the energy storage element for power conversion. Inductance and saturation current of inductor are two most important criterions for inductor selection. For general design guidance, the selected inductance should provide a peak-to-peak ripple current that is around 30% of the average inductor current at full load and nominal input voltage. The average inductor current for a Boost converter is the input current. Equation 5 shows the calculation of inductance selection, where $f_{SW}$ is the switching frequency and $\Delta I_L$ is the inductor ripple current.

$$L = \frac{V_{IN} \times (V_{OUT} - V_{IN})}{\Delta I_L \times f_{SW} \times V_{OUT}} \tag{5}$$

The 3.5A (TYP) valley current limit and the inductor current ripple should be considered when selecting the saturation current of the inductor.

The inductor also affects the close loop response of the DC/DC converter. The SGM66023 is an internally compensated device, and the loop response is optimized for inductor in the range of 0.33μH to 1.3μH.

**Table 2. Recommended Inductors for the SGM66023**

| Part Number | L (μH) | DCR MAX (mΩ) | Saturation Current (A) | Size (L×W×H) | Vendor |
|---|---|---|---|---|---|
| DFE322520F-1R0M=P2 | 1 | 19 | 6.7 | 3.2 × 2.5 × 2 | muRata |
| VLS3012HBX-1R0M | 1 | 39 | 6.11 | 3.0 × 3.0 × 1.2 | TDK |
| 74438357010 | 1 | 13.5 | 9.6 | 4.1 × 4.1 × 3.1 | Wurth Elecktronik |

### Input Capacitor Selection

Boost converter's input capacitor has continuous current throughout the entire switching cycle and a 10μF ceramic capacitor is recommended to place as close as possible between the VIN pin and GND pin. For applications where the SGM66023 is located far away from the input source, a 47μF or higher capacitance capacitor is recommended to damp the wiring harness inductance.

### Output Capacitor Selection

The output capacitors of Boost converter dictate the output voltage ripple and load transient response. Equation 6 is used to estimate the necessary capacitance to achieve desired output voltage ripple, where ΔV is the maximum allowed ripple.

$$C_{MIN} = \frac{I_{OUT} \times (V_{OUT} - V_{IN})}{f_{SW} \times \Delta V \times V_{OUT}} \tag{6}$$

## APPLICATION INFORMATION (continued)

Since SGM66023 is an internally compensated device, the loop response is optimized for capacitor in the range of 10μF to 47μF. Due to the DC bias nature of ceramic capacitors, care should be taken by verifying manufacturer's datasheet to ensure enough effective capacitance at desired output voltage. A pair of 22μF in parallel is recommended for typical application. When using tantalum or aluminum electrolytic capacitors, the ESR must be considered.

### Layout Guidelines

Layout is a critical step to ensure the performance of any switch mode power supplies, especially for high switching frequency and high current converters. Poor layout could result in system instability, EMI failure, and device damage. Thus, place the inductor, input capacitors and output capacitors as close to the IC as possible, and use wide and short traces for current carrying traces to minimize PCB parasitic inductance. The length and area connected to the SW pin should be minimized because the SW pin is a source of interference.

For Boost converter, the current loop of the output capacitor from VOUT pin back to the GND pin of the device should be as small as possible to optimize the overshoot at SW pin and VOUT pin.

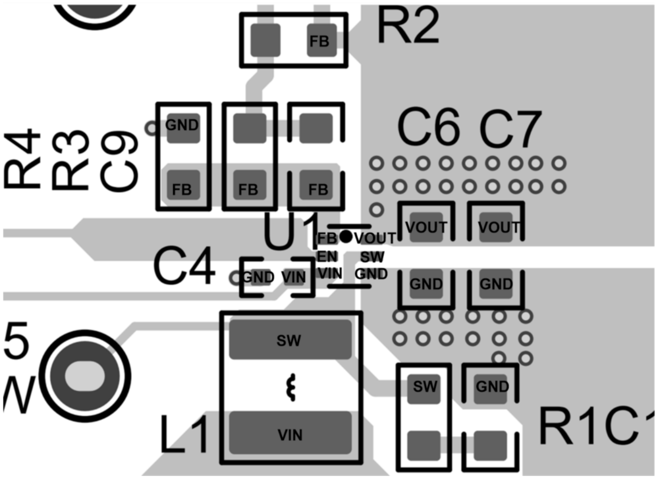



**Figure 4. Layout Example**

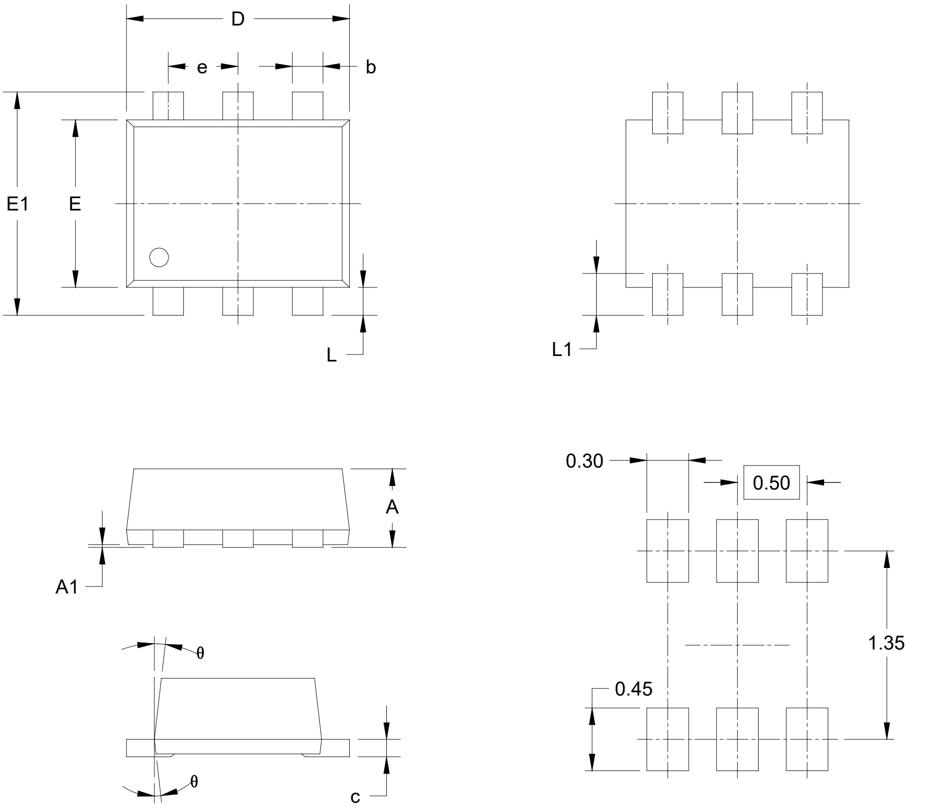
## REVISION HISTORY

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

| Changes from Original (APRIL 2025) to REV.A | Page |
|---|---|
| Changed from product preview to production data | All |

# PACKAGE OUTLINE DIMENSIONS

## SOT-563-6



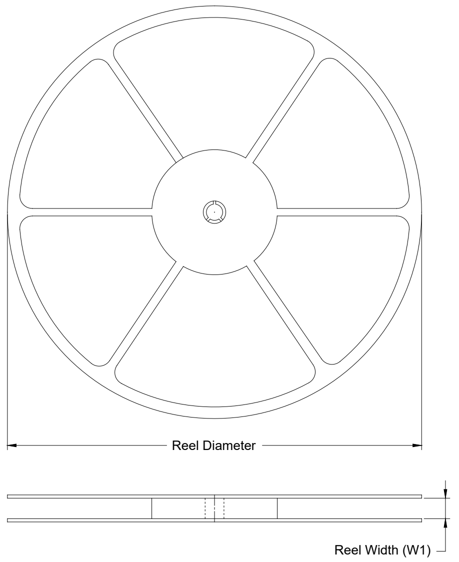

**RECOMMENDED LAND PATTERN** (Unit: mm)

| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 0.525 | 0.600 | 0.021 | 0.024 |
| A1 | 0.000 | 0.050 | 0.000 | 0.002 |
| b | 0.170 | 0.270 | 0.007 | 0.011 |
| c | 0.090 | 0.180 | 0.004 | 0.007 |
| D | 1.500 | 1.700 | 0.059 | 0.067 |
| E | 1.100 | 1.300 | 0.043 | 0.051 |
| E1 | 1.500 | 1.700 | 0.059 | 0.067 |
| e | 0.450 | 0.550 | 0.018 | 0.022 |
| L | 0.100 | 0.300 | 0.004 | 0.012 |
| L1 | 0.200 | 0.400 | 0.008 | 0.016 |
| θ | 9° REF | | 9° REF | |

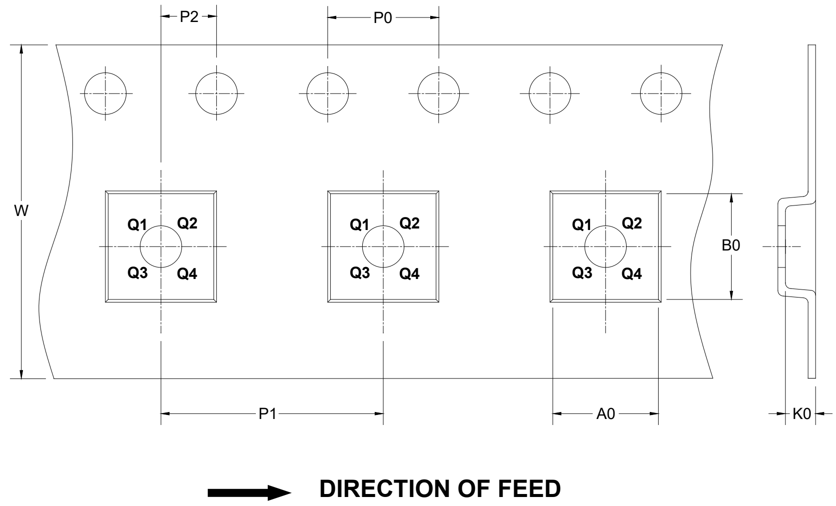
NOTES:
1. Body dimensions do not include mode flash or protrusion.
2. This drawing is subject to change without notice.

# TAPE AND REEL INFORMATION

## REEL DIMENSIONS




## TAPE DIMENSIONS



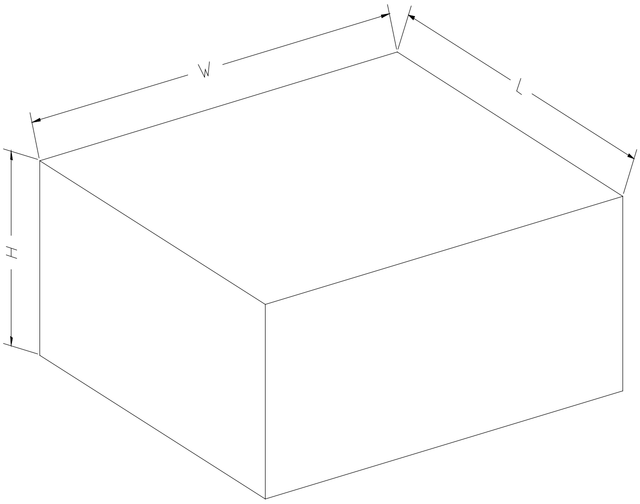

NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF TAPE AND REEL

| Package Type | Reel Diameter | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|---|---|---|---|---|---|---|---|---|---|---|
| SOT-563-6 | 7" | 9.5 | 1.78 | 1.78 | 0.69 | 4.0 | 4.0 | 2.0 | 8.0 | Q3 |

DD0001

## CARTON BOX DIMENSIONS




NOTE: The picture is only for reference. Please make the object as the standard.

## KEY PARAMETER LIST OF CARTON BOX

| Reel Type | Length (mm) | Width (mm) | Height (mm) | Pizza/Carton |
|---|---|---|---|---|
| 7″ (Option) | 368 | 227 | 224 | 8 |
| 7″ | 442 | 410 | 224 | 18 |

DD0002