

### GENERAL DESCRIPTION

The SGM6623 is a general-purpose miniature boost DC/DC switching regulator with high-efficiency for battery-backup and standby power systems. The acceptable input voltage range of 0.8V to 12V can be converted to a regulated 3.3V to 13V output voltage with efficiency as high as 90%. SGM6623 can be used as backup charger for systems with 1- to 4-cell batteries. It operates at a 600kHz nominal switching frequency, allowing the use of small and low-profile inductor for compact design. It also has several built-in protection features, such as cycle-by-cycle over-current limit, soft-start, thermal shutdown and open loop over-voltage protection.

The SGM6623 is available in a Green SOT-23-6 package.

### FEATURES

- 0.8V to 12V Input Voltage Range
- 3.3V to 13V Wide Output Voltage Range
- 4.4A Current Limited Integrated Switch
- Up to 90% Efficiency
- 600kHz Nominal Fixed Switching Frequency with Pulse Skipping at Light Loads
- Built-In Soft-Start Function
- Open Loop Over-Voltage Protection
- Enable Input Pin
- 47µA Typical Quiescent Current (to VS Pin)
- 0.4µA Typical Supply Current in Shutdown
- Available in a Green SOT-23-6 Package

### APPLICATIONS

- Mobile Phones
- Portable Equipment
- Hand-Held Instruments
- 1-, 2-, 3- or 4-Cell Battery Systems

### TYPICAL APPLICATION

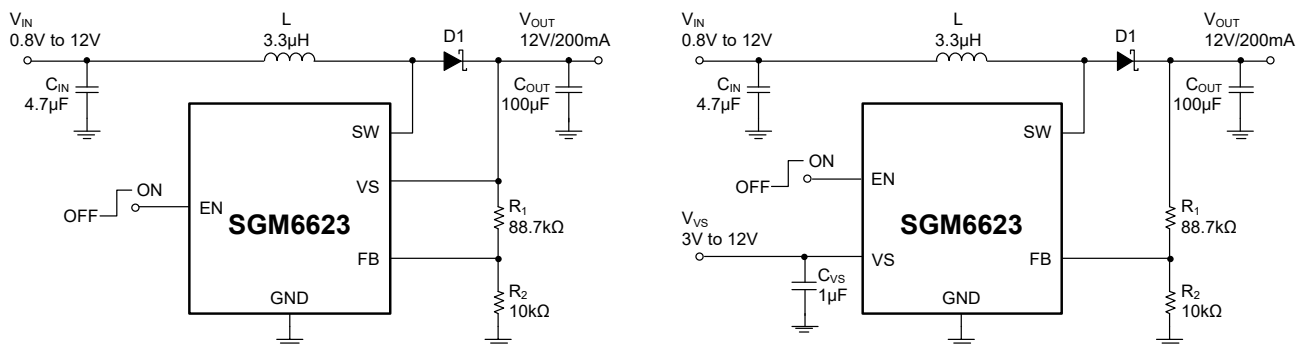


Figure 1. Typical Application Circuits

**PACKAGE/ORDERING INFORMATION**

| MODEL   | PACKAGE DESCRIPTION | SPECIFIED TEMPERATURE RANGE | ORDERING NUMBER | PACKAGE MARKING | PACKING OPTION      |
|---------|---------------------|-----------------------------|-----------------|-----------------|---------------------|
| SGM6623 | SOT-23-6            | -40°C to +85°C              | SGM6623YN6G/TR  | CB4XX           | Tape and Reel, 3000 |

**MARKING INFORMATION**

NOTE: XX = Date Code.

**YYY X X**

Date Code - Week  
Date Code - Year  
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**

Voltages on EN and FB ..... -0.3V to 6V  
 Voltages on SW and VS ..... -0.3V to 14.5V  
 Package Thermal Resistance  
 SOT-23-6,  $\theta_{JA}$  ..... 190°C/W  
 Junction Temperature ..... +150°C  
 Storage Temperature Range..... -65°C to +150°C  
 Lead Temperature (Soldering, 10s) ..... +260°C  
 ESD Susceptibility  
 HBM..... 3000V  
 CDM ..... 1000V

**RECOMMENDED OPERATING CONDITIONS**

Operating Ambient Temperature Range..... -40°C to +85°C  
 Operating Junction Temperature Range..... -40°C to +125°C

**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.

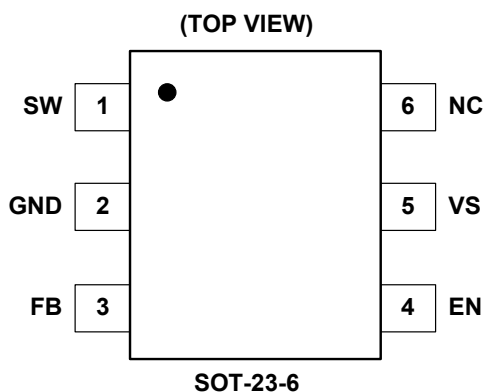
**ESD SENSITIVITY CAUTION**

This integrated circuit can be damaged by ESD if you don't pay attention to ESD protection. 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 very small parametric changes could cause the device not to meet its published specifications.

**DISCLAIMER**

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

## PIN CONFIGURATION



## PIN DESCRIPTION

| PIN | NAME | I/O | FUNCTION   |
|-----|------|-----|--|
| 1   | SW   | I   | Switching Node of the Device. Connect to the input source through the boost inductor.  |
| 2   | GND  | G   | Ground.  |
| 3   | FB   | I   | Feedback input to the error amplifier for regulated output.  |
| 4   | EN   | I   | Enable Pin of the Boost Regulator. Logic low disables the chip and logic high enables it. It needs to be pulled up to enable the device, otherwise the weak internal pull-down will disable it. Two levels logic or analog bias with edge slope rate > 10V/ms is desired for stable on/off transition. |
| 5   | VS   | I   | Supply Power Input for Internal Circuit. Connect to the output of converter.   |
| 6   | NC   | —   | Not connected. Recommend to solder it onto ground plane for better thermal dissipation.  |

NOTE: I = Input, O = Output, G = Ground.

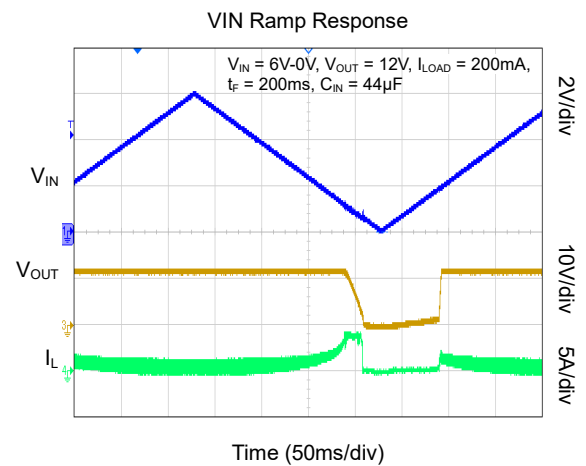
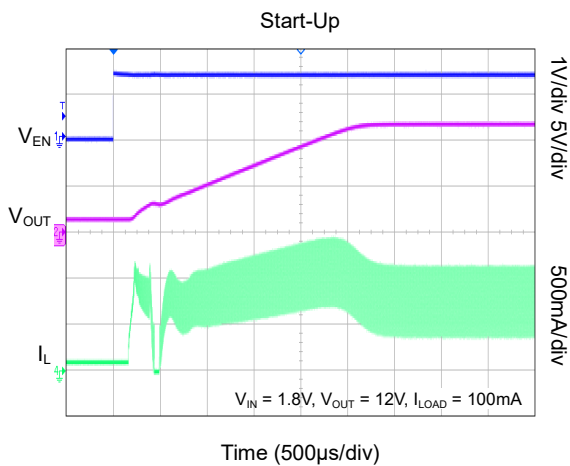
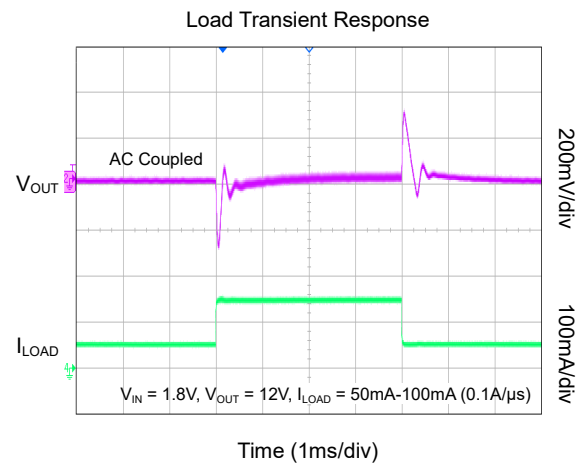
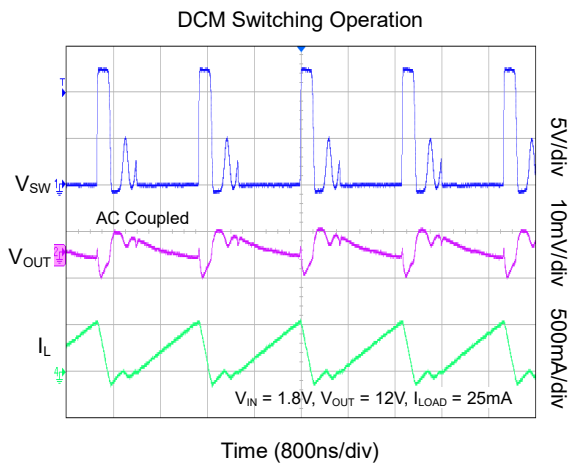
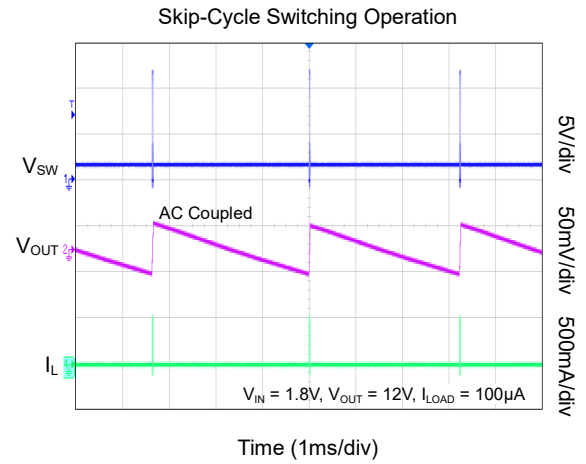
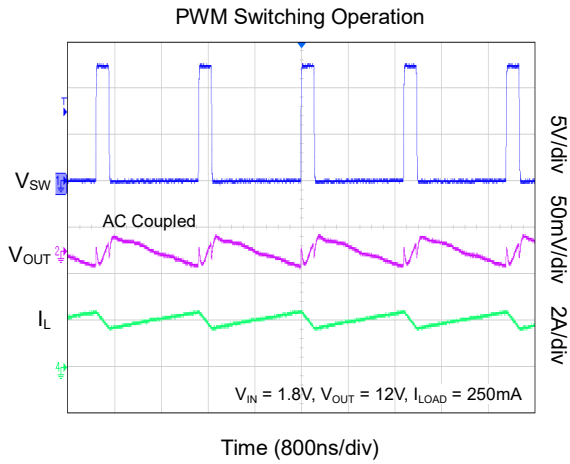
## ELECTRICAL CHARACTERISTICS

(V<sub>VS</sub> = 3.6V, V<sub>EN</sub> = 3.6V, Full = -40°C to +85°C, typical values are at T<sub>J</sub> = +25°C, unless otherwise noted.)

| PARAMETER                                    | SYMBOL                    | CONDITIONS                                    | TEMP  | MIN   | TYP   | MAX   | UNITS |
|--|---------------------------|---|-------|-------|-------|-------|-------|
| <b>Supply Current</b>                        |                           |   |       |       |       |       |       |
| Sustainable Input Voltage Range              | V <sub>IN</sub>           | The VS pin connects to output                 | +25°C | 0.8   |       | 12    | V     |
| Minimum VS Voltage for Start-Up              | V <sub>VS_START_MIN</sub> | The VS pin connects to output                 | +25°C |       | 1.5   |       | V     |
| VS Input Voltage Range                       | V <sub>VS</sub>           | V <sub>IN</sub> is in 0.8V to 12.5V range     | +25°C | 3     |       | 13    | V     |
| Operating Quiescent Current into VS          | I <sub>Q</sub>            | No switching, no load                         | Full  |       | 47    | 65    | μA    |
| Shutdown Current                             | I <sub>SHDN</sub>         | V <sub>EN</sub> = GND                         | +25°C |       |       | 1     | μA    |
|  |                           |   | Full  |       |       | 1.5   |       |
| <b>Enable and Reference Control</b>          |                           |   |       |       |       |       |       |
| EN Logic High Voltage                        | V <sub>IH</sub>           |   | Full  | 1.1   |       |       | V     |
| EN Logic Low Voltage                         | V <sub>IL</sub>           |   | Full  |       |       | 0.3   | V     |
| EN Internal Pull-Down Resistor               | R <sub>EN</sub>           |   | Full  | 400   | 570   | 740   | kΩ    |
| <b>Voltage and Current Control</b>           |                           |   |       |       |       |       |       |
| Voltage Feedback Regulation Voltage          | V <sub>REF</sub>          |   | Full  | 1.177 | 1.205 | 1.231 | V     |
| Voltage Feedback Input Bias Current          | I <sub>FB</sub>           | V <sub>FB</sub> = 1.3V                        | Full  |       |       | 170   | nA    |
| Switching Frequency                          | f <sub>SW</sub>           |   | Full  | 480   | 600   | 720   | kHz   |
| Maximum Duty Cycle                           | D <sub>MAX</sub>          |   | +25°C |       | 96    |       | %     |
| Over-Voltage Protection Threshold            | V <sub>OVP</sub>          |   | +25°C | 13.3  | 13.8  | 14.3  | V     |
| Over-Voltage Protection Threshold Hysteresis | V <sub>OVP_HYS</sub>      |   | +25°C |       | 0.43  |       | V     |
| <b>Power Switch</b>                          |                           |   |       |       |       |       |       |
| N-Channel MOSFET On-Resistance               | R <sub>DSON</sub>         | V <sub>VS</sub> = 3.6V                        | +25°C |       | 70    | 90    | mΩ    |
|  |                           |   | Full  |       |       | 110   |       |
| N-Channel Leakage Current                    | I <sub>LN_NFET</sub>      | V <sub>SW</sub> = 13.2V, V <sub>EN</sub> = 0V | +25°C |       |       | 1     | μA    |
|  |                           |   | Full  |       |       | 1.5   |       |
| N-Channel MOSFET Current Limit               | I <sub>LIM</sub>          |   | +25°C | 3.65  | 4.4   | 5.25  | A     |
| <b>Thermal Shutdown</b>                      |                           |   |       |       |       |       |       |
| Thermal Shutdown Threshold                   | T <sub>SHDN</sub>         |   |       |       | 165   |       | °C    |
| Thermal Shutdown Threshold Hysteresis        | T <sub>HYS</sub>          |   |       |       | 15    |       | °C    |

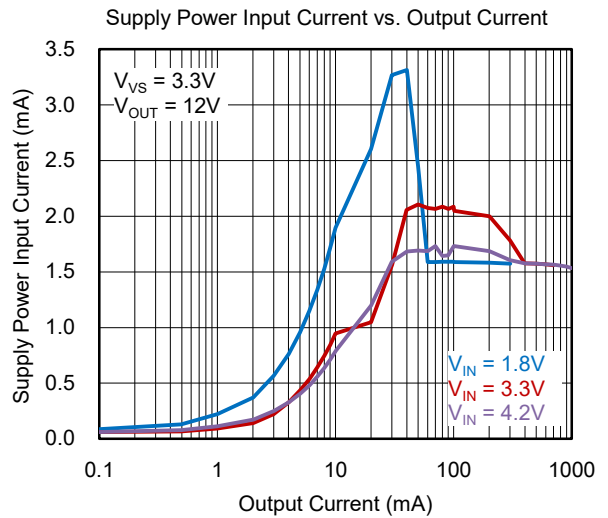
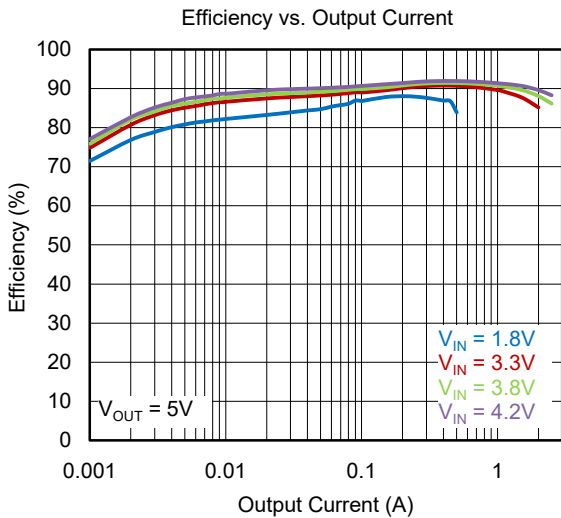
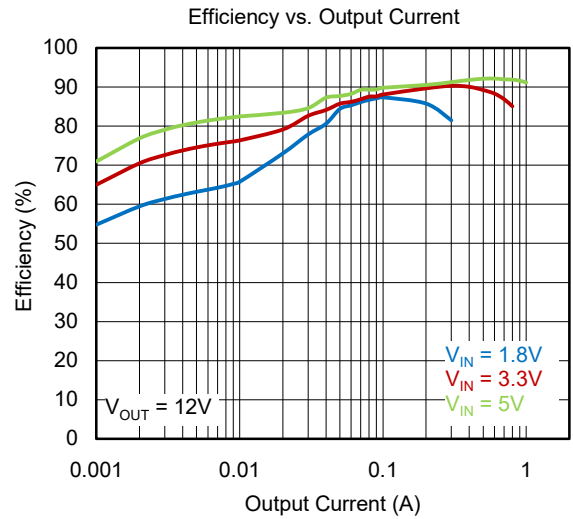
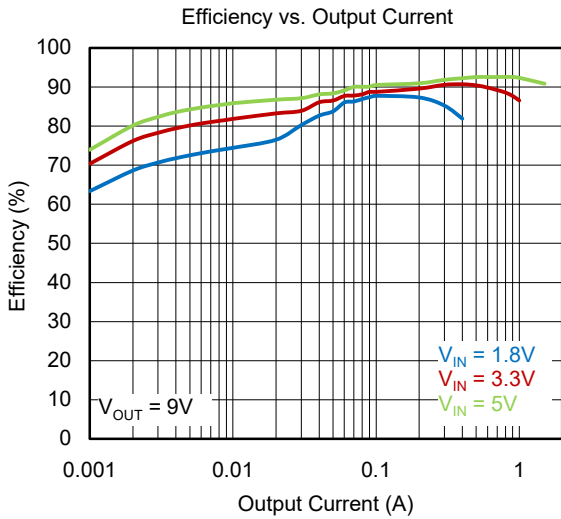
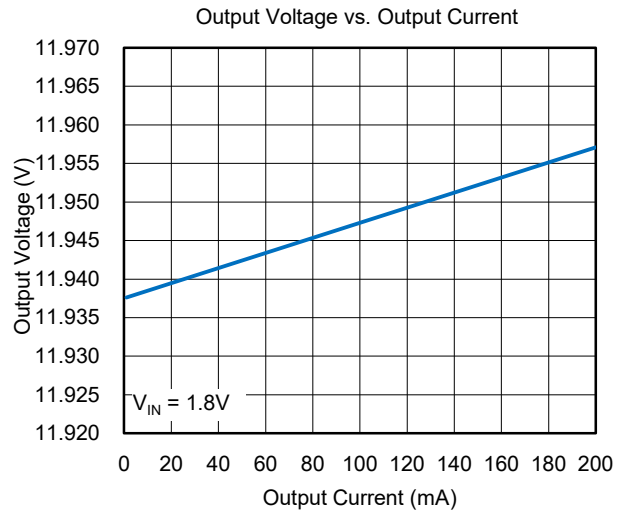
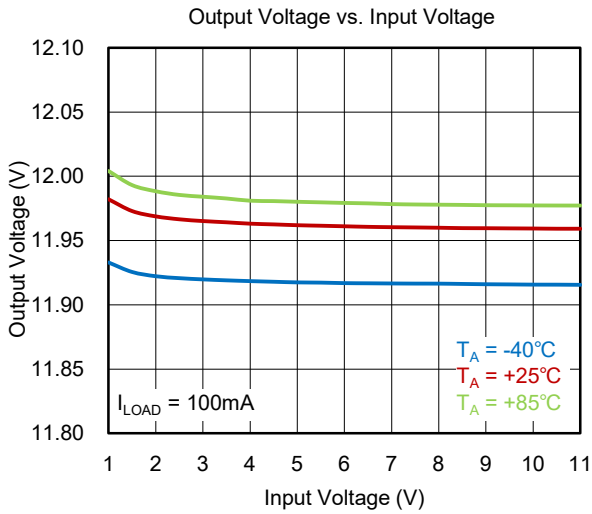
TYPICAL PERFORMANCE CHARACTERISTICS

$T_J = +25^\circ\text{C}$ ,  $C_{IN} = 4.7\mu\text{F}$ ,  $C_{OUT} = 100\mu\text{F}$ ,  $L = 3.3\mu\text{H}$  and  $V_{VS} = V_{OUT}$ , unless otherwise noted.



TYPICAL PERFORMANCE CHARACTERISTICS (continued)

T<sub>J</sub> = +25°C, C<sub>IN</sub> = 4.7µF, C<sub>OUT</sub> = 100µF, L = 3.3µH and V<sub>VS</sub> = V<sub>OUT</sub>, unless otherwise noted.



FUNCTIONAL BLOCK DIAGRAM

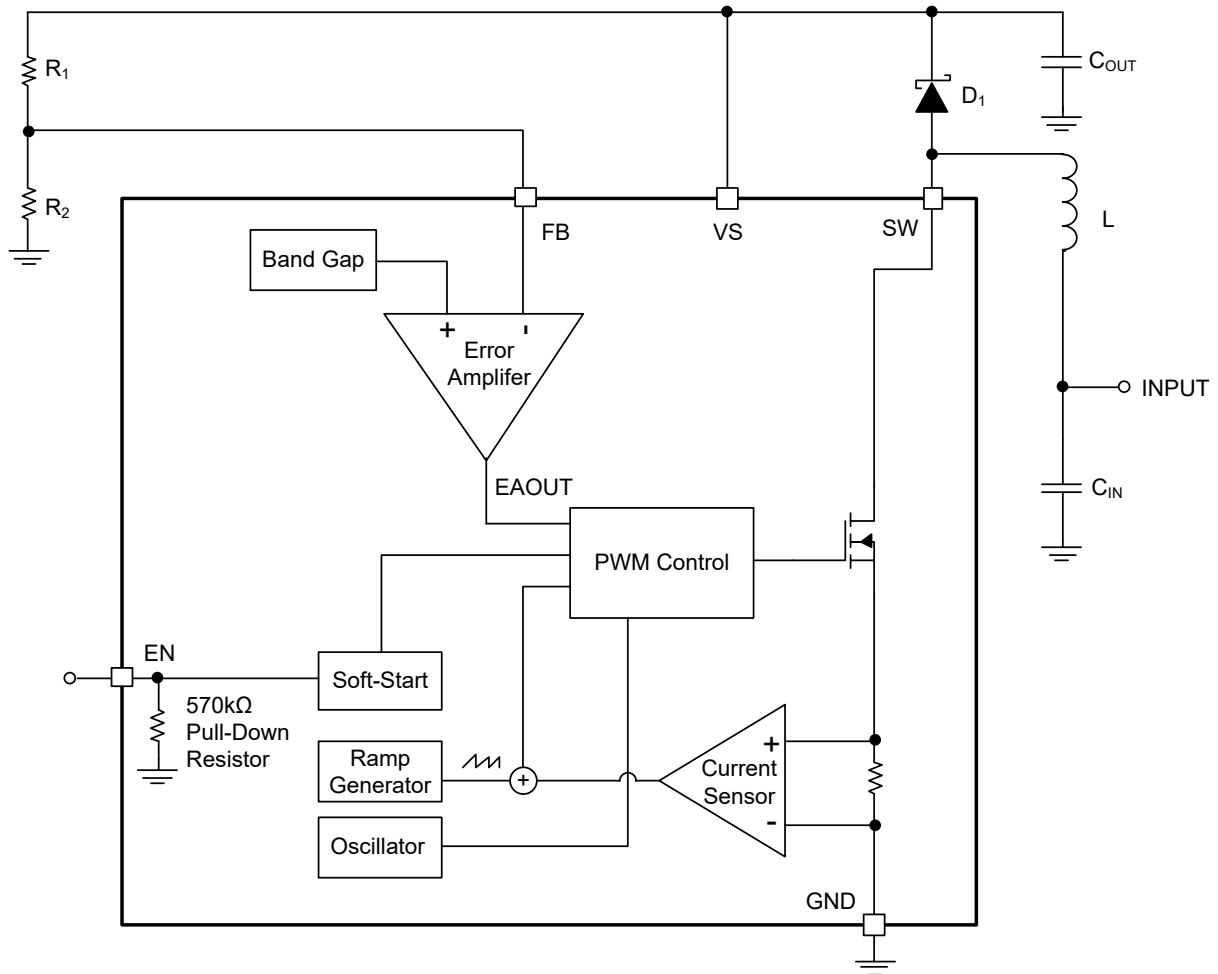


Figure 2. Block Diagram

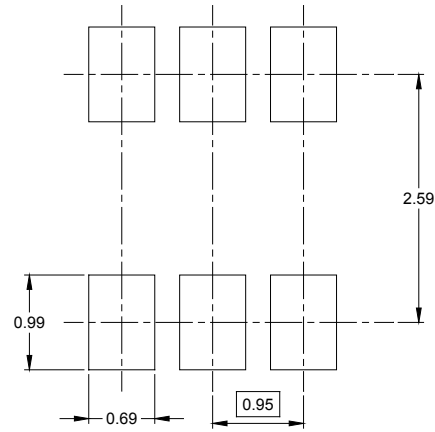
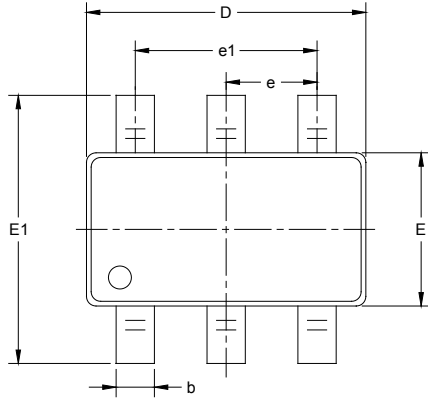
REVISION HISTORY

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

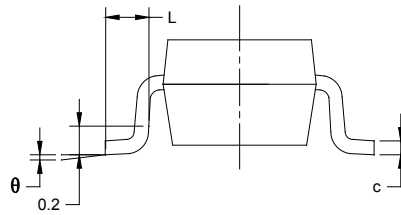
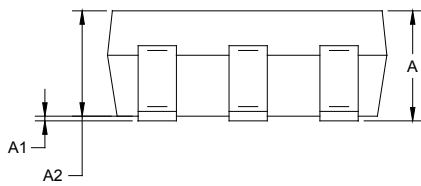
| SEPTEMBER 2021 – REV.A.2 to REV.A.3                   | Page    |
|---|---------|
| Updated Pin Description section .....                 | 3       |
| JULY 2020 – REV.A.1 to REV.A.2                        | Page    |
| Updated switching frequency .....                     | 1, 4, 7 |
| FEBRUARY 2020 – REV.A to REV.A.1                      | Page    |
| Updated Pin Description section .....                 | 3       |
| Updated Detailed Description section .....            | 8       |
| Changes from Original (SEPTEMBER 2019) to REV.A       | Page    |
| Changed from product preview to production data ..... | All     |

PACKAGE OUTLINE DIMENSIONS

SOT-23-6



RECOMMENDED LAND PATTERN (Unit: mm)

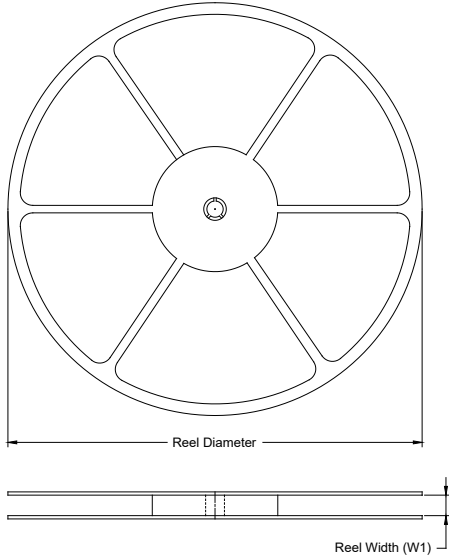


| Symbol | Dimensions<br>In Millimeters |       | Dimensions<br>In Inches |       |
|--------|------------------------------|-------|-------------------------|-------|
|        | MIN                          | MAX   | MIN                     | MAX   |
| A      | 1.050                        | 1.250 | 0.041                   | 0.049 |
| A1     | 0.000                        | 0.100 | 0.000                   | 0.004 |
| A2     | 1.050                        | 1.150 | 0.041                   | 0.045 |
| b      | 0.300                        | 0.500 | 0.012                   | 0.020 |
| c      | 0.100                        | 0.200 | 0.004                   | 0.008 |
| D      | 2.820                        | 3.020 | 0.111                   | 0.119 |
| E      | 1.500                        | 1.700 | 0.059                   | 0.067 |
| E1     | 2.650                        | 2.950 | 0.104                   | 0.116 |
| e      | 0.950 BSC                    |       | 0.037 BSC               |       |
| e1     | 1.900 BSC                    |       | 0.075 BSC               |       |
| L      | 0.300                        | 0.600 | 0.012                   | 0.024 |
| θ      | 0°                           | 8°    | 0°                      | 8°    |

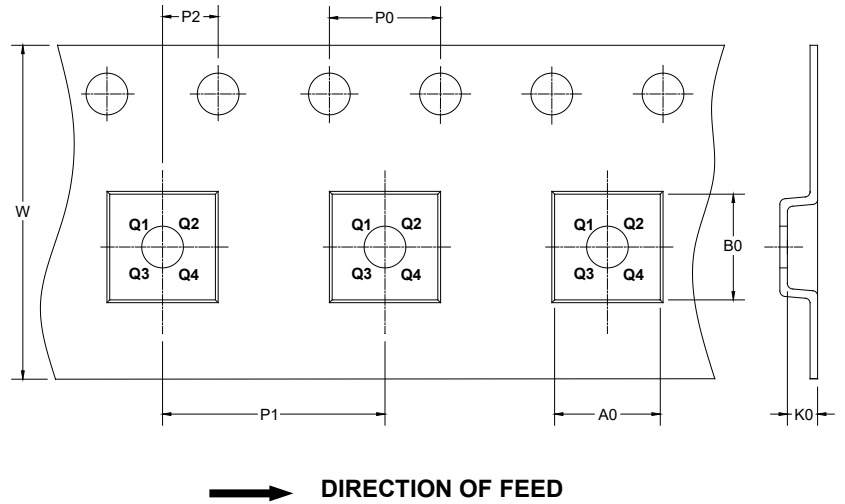


TAPE AND REEL INFORMATION

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-23-6     | 7"            | 9.5                | 3.17    | 3.23    | 1.37    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |

000001

# PACKAGE INFORMATION

## 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

## X-ON Electronics

Largest Supplier of Electrical and Electronic Components

*Click to view similar products for [Switching Controllers](#) category:*

*Click to view products by [SGMICRO](#) manufacturer:*

Other Similar products are found below :

[NCP1218AD65R2G](#) [NCP1244BD065R2G](#) [NCP6153MNTWG](#) [NCP81101BMNTXG](#) [NCP81205MNTXG](#) [SJE6600](#) [SG3845DM](#)  
[NCP4204MNTXG](#) [NCP6132AMNR2G](#) [NCP81102MNTXG](#) [NCP81206MNTXG](#) [MAX1653ESET](#) [NCP1240FD065R2G](#)  
[NCP1361BABAYSNT1G](#) [NCP1230P100G](#) [NX2124CSTR](#) [NCP1366BABAYDR2G](#) [NCP81174NMNTXG](#) [NCP4308DMTTWG](#)  
[NCP4308AMTTWG](#) [NCP1366AABAYDR2G](#) [NCP1251FSN65T1G](#) [NCP1246BLD065R2G](#) [NTE7233](#) [ISL69122IRAZ](#) [MB39A136PFT-G-](#)  
[BND-ERE1](#) [NCP1256BSN100T1G](#) [LV5768V-A-TLM-E](#) [NCP1365BABCYDR2G](#) [NCP1365AABCYDR2G](#) [NCP1246ALD065R2G](#)  
[AZ494AP-E1](#) [CR1510-10](#) [NCP4205MNTXG](#) [XC9221C093MR-G](#) [XRP6141ELTR-F](#) [RY8017](#) [LP6260SQVF](#) [LP6298QVF](#) [ISL6121LIB](#)  
[ISL6225CA](#) [ISL6244HRZ](#) [ISL6268CAZ](#) [ISL6315IRZ](#) [ISL6420AIAZ-TK](#) [ISL6420AIRZ](#) [ISL6420IAZ](#) [ISL6421ERZ](#) [ISL6440IA](#)  
[ISL6441IRZ-TK](#)