SGM818xQ
Micro-Power Voltage Detector for Automotive Applications

GENERAL DESCRIPTION

The SGM818xQ is a low power consumption voltage detector with high accuracy detection. It operates with a supply voltage (V_{DD}) range from 1V to 6V. It can provide circuit initialization for DSP-based and processor-based systems. The SGM818xQ offers two fixed threshold voltages of 1.6V and 2.9V.

Whenever V_{DD} falls below a factory preset threshold level (V_{TH}), the device will send out a reset signal. This signal will last the whole period until V_{DD} recovers. Once V_{DD} exceeds the release voltage (V_{TH} + V_{HYS}), the reset signal will maintain a certain delay time and be released.

This device is AEC-Q100 qualified (Automotive Electronics Council Standard Q100 Grade 1) and the use of this device is suitable for automotive applications.

The SGM818xQ is available in a Green SOT-23-3 package. It is specified over the -40℃ to +125℃ operating temperature range.

TYPICAL APPLICATION

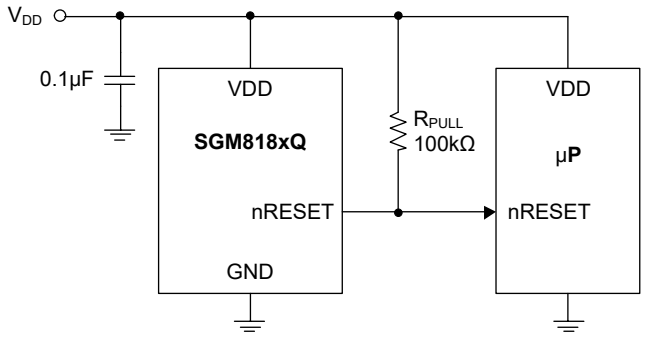


Figure 1. Typical Application Circuit

FEATURES

- **AEC-Q100 Qualified for Automotive Applications**
  Device Temperature Grade 1
  T_A = -40℃ to +125℃
- **High Accuracy: ±1.6% (MAX)**
- **Low Supply Current: 1μA (TYP)**
- **Fixed Detection Voltages: 1.6V and 2.9V**
- **No External Components Required**
- **Quick Reset within 37μs (TYP)**
- **Reset Active Timeout Period**
  B Version: 50ms (nRESET)
  Y Version: 7.0ms (nRESET)
- **Low Functional Supply Voltage: 1V**
- **N-Channel Open-Drain Output**
- **Available in a Green SOT-23-3 Package**

APPLICATIONS

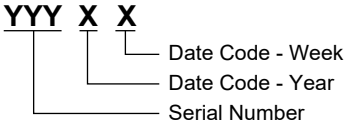
Automotive Applications
Computers
Controllers
Intelligent Instruments
Portable Equipment
μC Power Monitoring
Battery-Powered Equipment

PACKAGE/ORDERING INFORMATION

MODEL	THRESHOLD VOLTAGE (V)	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM818B-1.6Q	1.6	SOT-23-3	-40℃ to +125℃	SGM818B-1.6QN3G/TR	1GJXX	Tape and Reel, 3000
		SOT-23-3 (L-Type)	-40℃ to +125℃	SGM818B-1.6QLN3G/TR	1GMXX	Tape and Reel, 3000
SGM818B-2.9Q	2.9	SOT-23-3	-40℃ to +125℃	SGM818B-2.9QN3G/TR	1C6XX	Tape and Reel, 3000
		SOT-23-3 (L-Type)	-40℃ to +125℃	SGM818B-2.9QLN3G/TR	0O7XX	Tape and Reel, 3000
SGM818Y-1.6Q	1.6	SOT-23-3	-40℃ to +125℃	SGM818Y-1.6QN3G/TR	1GKXX	Tape and Reel, 3000
		SOT-23-3 (L-Type)	-40℃ to +125℃	SGM818Y-1.6QLN3G/TR	1GNXX	Tape and Reel, 3000
SGM818Y-2.9Q	2.9	SOT-23-3	-40℃ to +125℃	SGM818Y-2.9QN3G/TR	1GLXX	Tape and Reel, 3000
		SOT-23-3 (L-Type)	-40℃ to +125℃	SGM818Y-2.9QLN3G/TR	1GOXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XX = Date Code.



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

Terminal Voltage (with Respect to GND), V_{DD} ..... -0.3V to 6V
All Other Inputs ..... -0.3V to 6V
Input Current, I_{VDD} 20mA
Package Thermal Resistance
SOT-23-3, θ_{JA} ..... 224.1℃/W
SOT-23-3, θ_{JB} ..... 81.9℃/W
SOT-23-3, θ_{JC} ..... 104.0℃/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 AEC-Q100-002 specification.

2. For charged device model (CDM), all pins comply with AEC-Q100-011 specification.

RECOMMENDED OPERATING CONDITIONS

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.

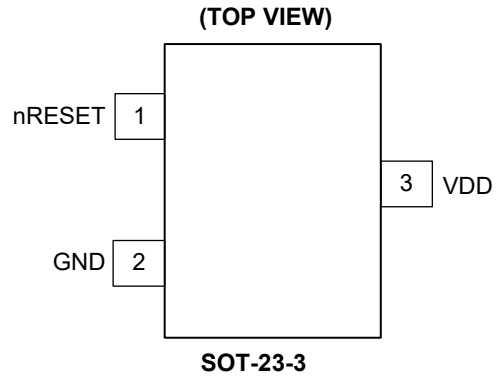
ESD SENSITIVITY CAUTION

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.

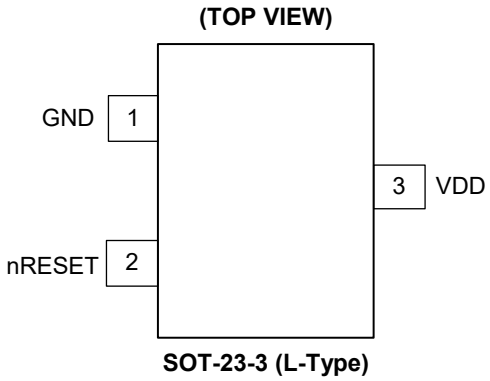
DISCLAIMER

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

PIN CONFIGURATIONS



SOT-23-3



SOT-23-3 (L-Type)

PIN DESCRIPTION

PIN		NAME	FUNCTION
SOT-23-3	SOT-23-3 (L-Type)		
2	1	GND	Ground.
1	2	nRESET	Active-Low Reset Output Pin.
3	3	VDD	Power Pin.

ELECTRICAL CHARACTERISTICS

(V_{DD} = 3V, T_A = -40℃ to +125℃, typical values are measured at T_A = +25℃, unless otherwise noted.)

PARAMETER		SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Operating V_{DD} (V_{OUT}) Range		V_{DD}		1		6	V
Supply Current		I_{DD}	V_{DD} = 4.5V		1	2.5	μA
Reset Threshold		V_{TH}			1.6		V
					2.9		
Threshold Voltage Accuracy		ΔV_{TH}		-1.6		1.6	%
V_{DD} Drop to Reset Delay		t_{RD}	$V_{DD} \geq 1.05 \times V_{TH}$, Drop = V_{TH} - 125mV		37		μs
Reset Active Timeout Period	B Version	t_{RP}		34	50	74	ms
	Y Version			4.5	7.0	9.5	
Reset Output Voltage Low (1)		V_{OL}	1.5V = V_{DD} < V_{TH}, I_{SINK} = 3.5mA			0.4	V
Hysteresis Width		V_{HYS}			0.64% × V_{TH}	1.6% × V_{TH}	V

NOTE:

1. V_{OL} can be calculated by $V_{OL} = V_{DD} - I_R \times R_{PU}$, where R_{PU} is the pull-up resistor and I_R is the current flowing through the pull-up resistor. For typical application, R_{PU} is 100kΩ and V_{OL} is less than 0.2V.

TIMING DIAGRAM

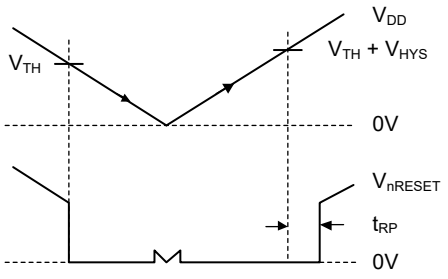
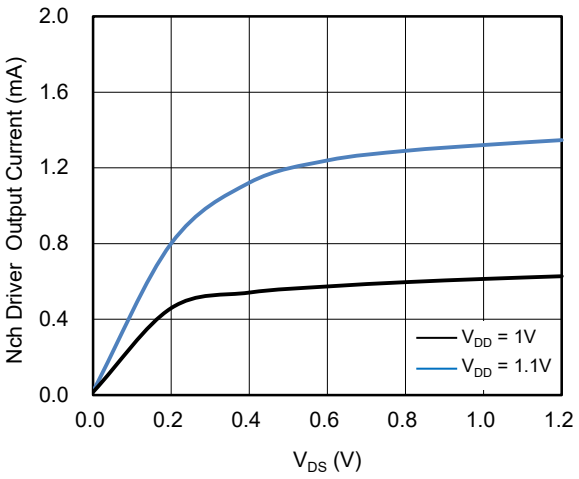


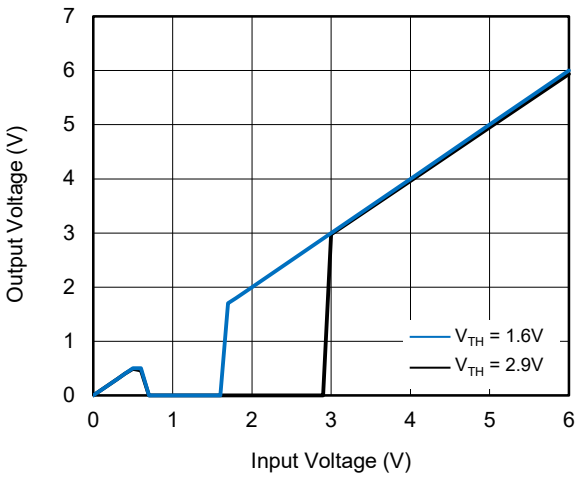
Figure 2. Timing Diagram

TYPICAL PERFORMANCE CHARACTERISTICS

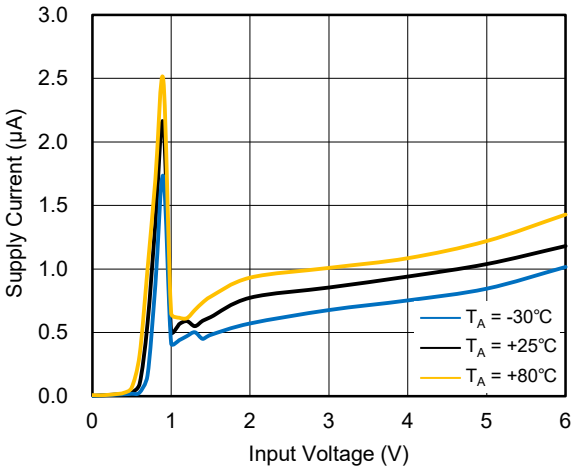
Nch Driver Output Current vs. V_{DS}



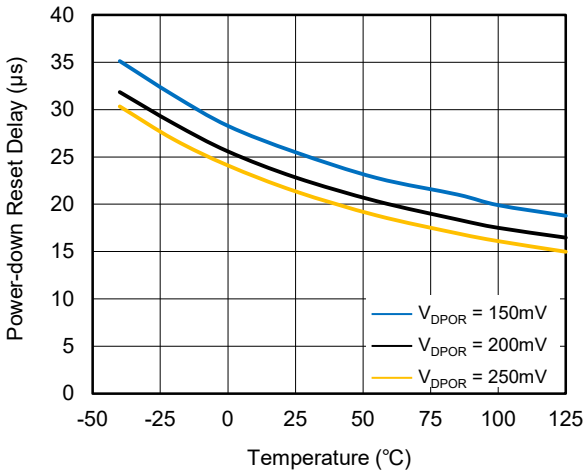
Output Voltage vs. Input Voltage



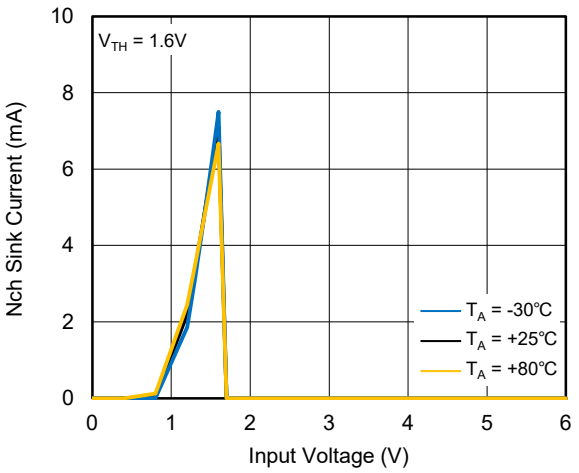
Supply Current vs. Input Voltage



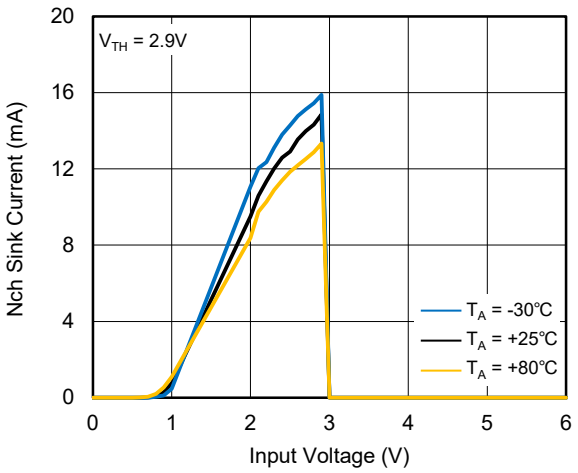
Power-down Reset Delay vs. Temperature



Nch Sink Current vs. Input Voltage

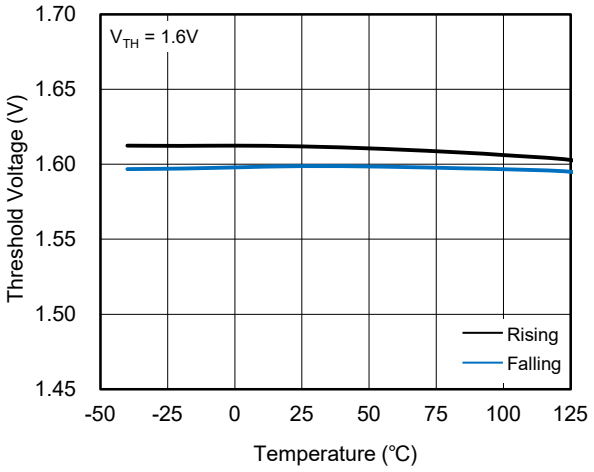


Nch Sink Current vs. Input Voltage

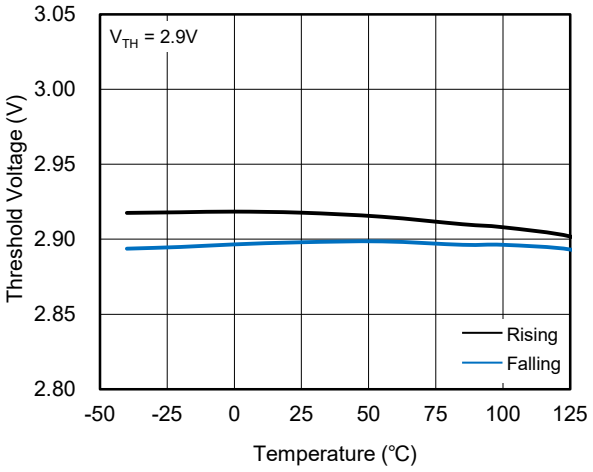


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

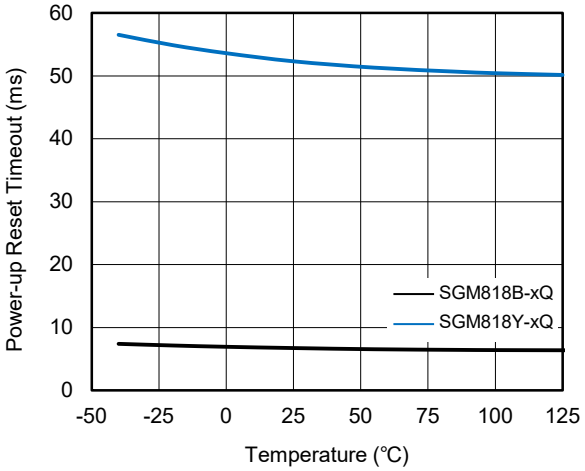
Threshold Voltage vs. Temperature



Threshold Voltage vs. Temperature



Power-up Reset Timeout vs. Temperature



FUNCTIONAL BLOCK DIAGRAM

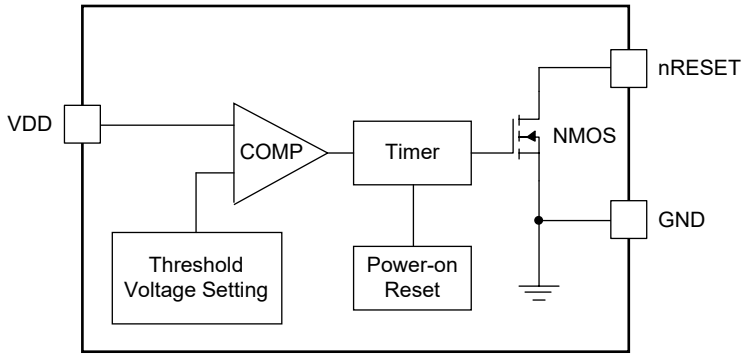


Figure 3. Block Diagram

APPLICATION INFORMATION

Multiple Supplies

The pull-up resistor connected to the SGM818xQ will connect to the supply voltage monitored on the VDD pin of the IC. However, the systems using open-drain output can level-shift the monitored supply voltages into the reset circuit powered by some other supply.

High Accuracy of the Reset Threshold

The reset threshold voltages of most μP supervisor ICs are 1.6% to 2% lower than the nominal supply voltages. If the voltage is within 1.6% of the nominal supply, the reset will not assert, and if the voltage is within 2% of the nominal supply, the reset will assert.

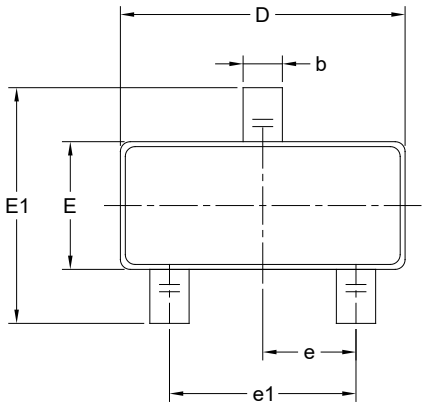
REVISION HISTORY

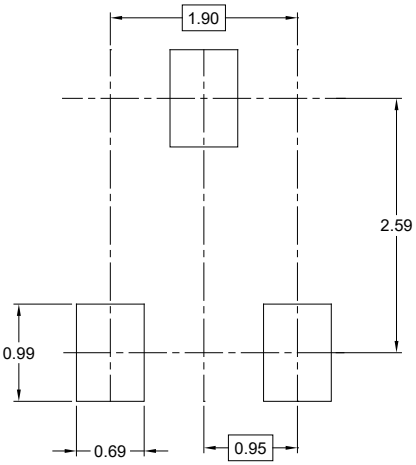
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from Original (NOVEMBER 2024) to REV.A	Page
Changed from product preview to production data	All

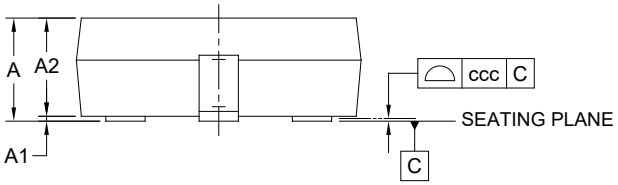
PACKAGE OUTLINE DIMENSIONS

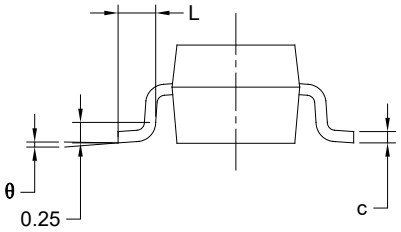
SOT-23-3





RECOMMENDED LAND PATTERN (Unit: mm)



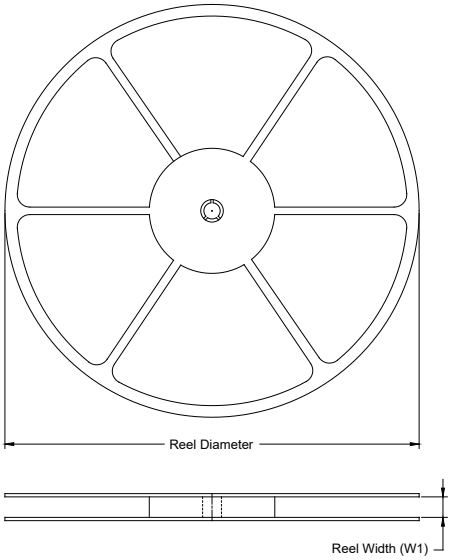


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	-	-	1.450
A1	0.000	-	0.150
A2	0.900	-	1.300
b	0.300	-	0.500
c	0.080	-	0.220
D	2.750	-	3.050
E	1.450	-	1.750
E1	2.600	-	3.000
e	0.950 BSC		
e1	1.900 BSC		
L	0.300	-	0.600
θ	0°	-	8°
ccc	0.100		

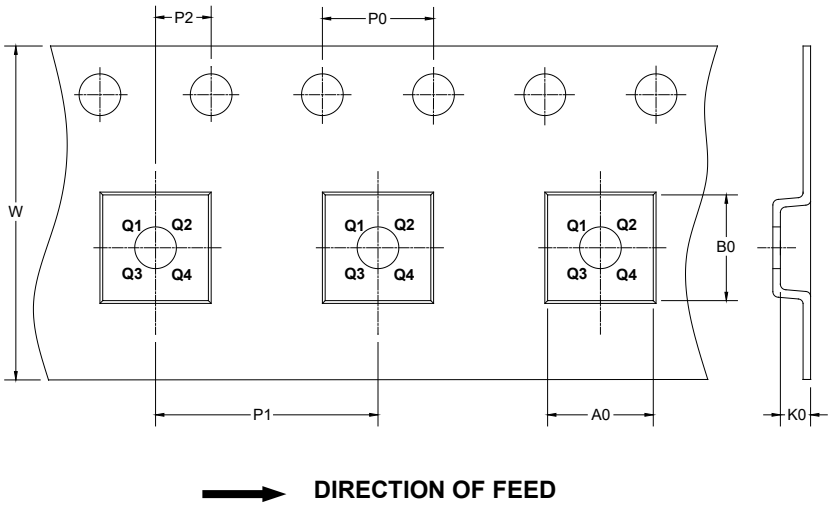
NOTES:
1. This drawing is subject to change without notice.
2. The dimensions do not include mold flashes, protrusions or gate burrs.
3. Reference JEDEC MO-178.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

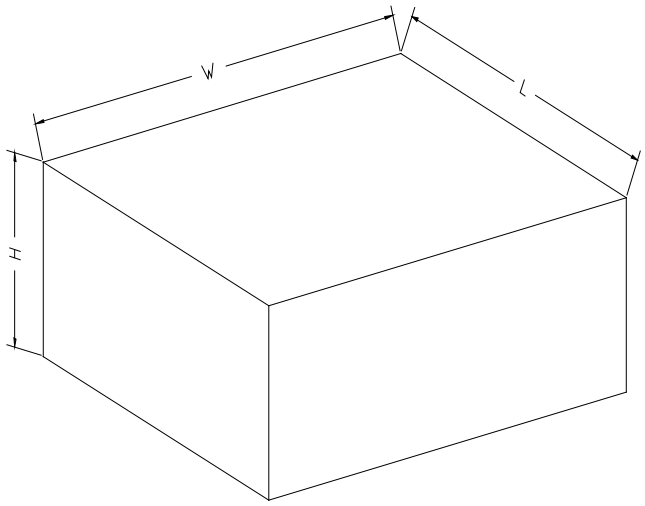
NOTE: The picture is only for reference. Please make the object as the standard.

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-23-3	7"	9.5	3.18	3.28	1.32	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