SGM811B/SGM812B
Microprocessor Supervisory Circuits with Manual Reset Input

GENERAL DESCRIPTION

The SGM811B and SGM812B are integrated microprocessor supervisory devices which can be reset under power-up, power-down or even voltage reduction brownout conditions. When V_{CC} is as low as 1V, the reset output can still operate. On the power-on state, the internal timer maintains a 200ms reset assertion that keeps the microprocessor in the reset state until the condition is stable.

The SGM811B has an active-low nRESET output, while the SGM812B has an active-high RESET output. The devices provide three reset threshold voltage options for 3V and 3.3V voltage monitoring.

The devices also provide a manual reset (nMR) function. It can reduce damage if the device loses its control or is locked.

The SGM811B and SGM812B are available in a Green SOT-143 package. They operates over an junction temperature range of -40℃ to +125℃.

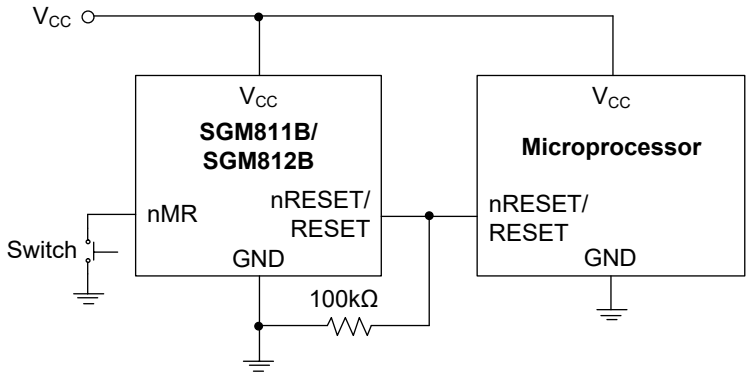
FEATURES

- **Superior Upgrade for MAX811/MAX812 and ADM811/ADM812**
- **High Accuracy Fixed Detection Options: 3V and 3.3V**
- **Low Supply Current: < 1μA (TYP)**
- **200ms (TYP) Power-on Reset Pulse Width**
- **Reset Output Options:**
  - **Active-Low nRESET Output: SGM811B**
  - **Active-High RESET Output: SGM812B**
- **Manual Reset Input**
- **Reset Valid Down to V_{CC} = 1V**
- **-40℃ to +125℃ Operating Temperature Range**
- **Available in a Green SOT-143 Package**

APPLICATIONS

Computers
Battery-Powered Applications
Portable Equipment
Automotive Equipment
Safety Systems
Intelligent Instruments
Critical μP Power Monitoring

TYPICAL APPLICATION

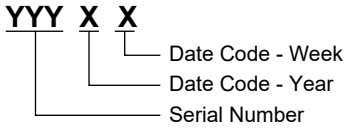


PACKAGE/ORDERING INFORMATION

MODEL	RESET THRESHOLD (V)	PACKAGE DESCRIPTION	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM811B	3.08	SOT-143	SGM811B-TXKA4G/TR	MNAXX	Tape and Reel, 3000
	2.93	SOT-143	SGM811B-SXKA4G/TR	MNBXX	Tape and Reel, 3000
	2.63	SOT-143	SGM811B-RXKA4G/TR	MNCXX	Tape and Reel, 3000
SGM812B	3.08	SOT-143	SGM812B-TXKA4G/TR	MN7XX	Tape and Reel, 3000
	2.93	SOT-143	SGM812B-SXKA4G/TR	MN8XX	Tape and Reel, 3000
	2.63	SOT-143	SGM812B-RXKA4G/TR	MN9XX	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

V_{CC} ..... -0.3V to 6V
All Other Inputs ..... -0.3V to V_{CC} + 0.3V
Input Current
V_{CC}, nMR 20mA
Output Current
nRESET/RESET 20mA
Package Thermal Resistance
SOT-143, θ_{JA} ..... 337℃/W
Power Dissipation @ T_A = +25℃
SOT-143, P_D 0.32W
Junction Temperature ..... +150℃
Storage Temperature Range ..... -65℃ to +150℃
Lead Temperature (Soldering, 10s) ..... +260℃
ESD Susceptibility
HBM 4000V
MM 400V
CDM 1000V

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

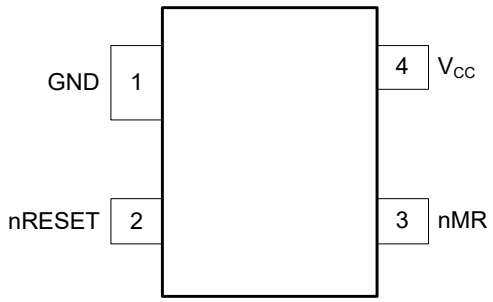
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance 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.

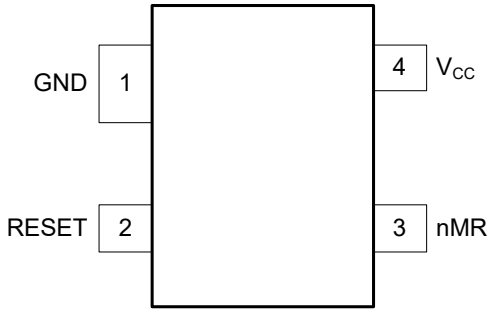
PIN CONFIGURATION

SGM811B (TOP VIEW)



SOT-143

SGM812B (TOP VIEW)



SOT-143

PIN DESCRIPTION

NAME	PIN NUMBER		FUNCTION
	SGM811B	SGM812B	
GND	1	1	Ground.
nRESET	2	—	Active-Low Reset Output Pin. If V_{CC} falls below the reset threshold or nMR is low, nRESET will keep low. If V_{CC} exceeds the reset threshold, the nRESET will keep low for 200ms (TYP).
RESET	—	2	Active-Low Reset Output Pin. If the V_{CC} falls below the reset threshold or nMR is low, RESET will keep high. If the V_{CC} exceeds the reset threshold, RESET will keep high for 200ms (TYP).
nMR	3	3	Manual Reset Input Pin. It is an active-low reset input with an internal pull-up resistor of 59kΩ. nRESET keeps low when nMR is low. When nMR is high, nRESET becomes high after a timeout period. The nMR can be driven by a CMOS logic or by a switch shorting to GND. If not used, leave it open or connect it to VCC.
V_{CC}	4	4	Supply Voltage Pin.

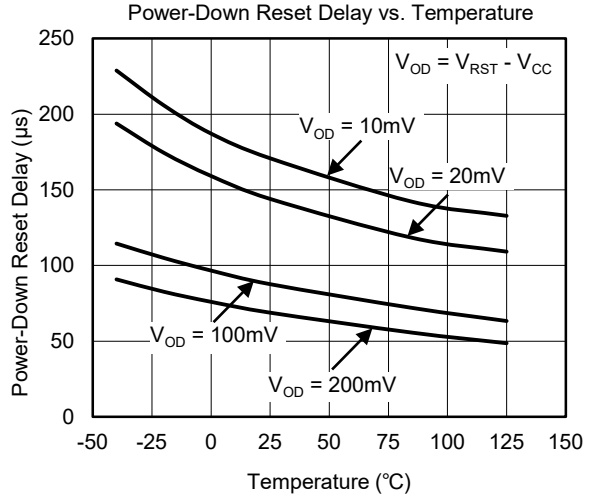
ELECTRICAL CHARACTERISTICS

(V_{CC} = 3.3V for T/S Models, V_{CC} = 3V for R Model, T_J = -40℃ to +125℃, typical values are at T_J = +25℃, unless otherwise noted.)

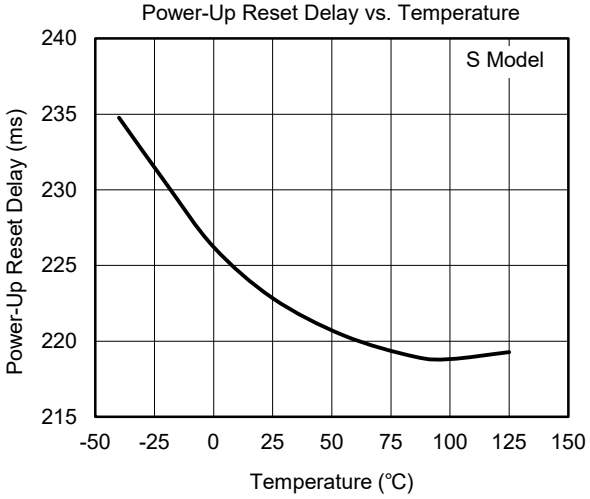
PARAMETER		SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Operating Voltage Range		V_{CC}			1.0		5.5	V
Supply Current		I_{SUPPLY}	V_{CC} = 3.6V			0.5	1.0	μA
			V_{CC} = 5.5V			0.6	1.4	
Reset Threshold		V_{RST}	T Model	T_J = +25℃	3.03	3.08	3.14	V
				T_J = -40℃ to +125℃	3.03		3.15	
			S Model	T_J = +25℃	2.88	2.93	2.98	
				T_J = -40℃ to +125℃	2.87		2.99	
			R Model	T_J = +25℃	2.59	2.63	2.67	
				T_J = -40℃ to +125℃	2.58		2.68	
Reset Threshold Hysteresis			T Model			13		mV
			S Model			13		
			R Model			12		
Reset Threshold Temperature Coefficient			T_J = -40℃ to +125℃			20		ppm/℃
V_{CC} to Reset Delay		t_{RD}	V_{RST} - V_{CC} = 100mV			84		μs
Reset Pulse Width		t_{RS}			140	200	290	ms
Manual Reset								
Minimum Pulse Width					300			ns
Glitch Immunity						130		ns
Reset Propagation Delay							400	ns
Pull-Up Resistance					40	59	81	kΩ
The Manual Reset Circuit Act on:	An Input Rising above		V_{CC} > $V_{RST(MAX)}$		0.7 × V_{CC}			V
	An Input Falling below		V_{CC} > $V_{RST(MAX)}$				0.3 × V_{CC}	
nRESET/RESET Output Voltage								
Low (SGM811B)			V_{CC} = $V_{RST(MIN)}$, I_{SINK} = 1.2mA				0.4	V
Low (SGM811B)			V_{CC} > 1.0V, I_{SINK} = 50μA				0.3	
High (SGM811B)			V_{CC} > $V_{RST(MAX)}$, I_{SOURCE} = 30μA		0.8 × V_{CC}			
Low (SGM812B)			V_{CC} = $V_{RST(MAX)}$, I_{SINK} = 1.2mA				0.4	
High (SGM812B)			1.8V < V_{CC} < $V_{RST(MIN)}$, I_{SOURCE} = 150μA		0.8 × V_{CC}			

TYPICAL PERFORMANCE CHARACTERISTICS

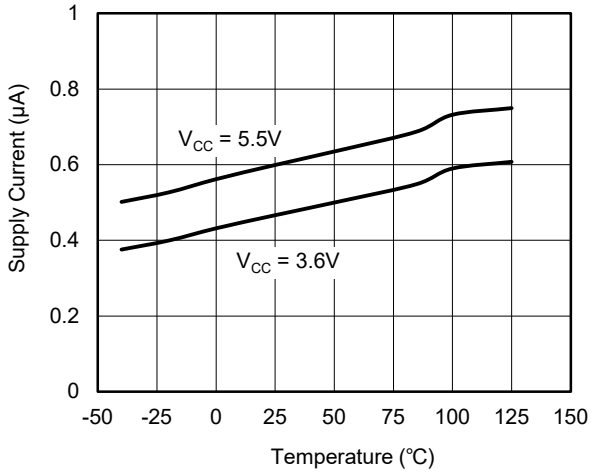
Power-Down Reset Delay vs. Temperature



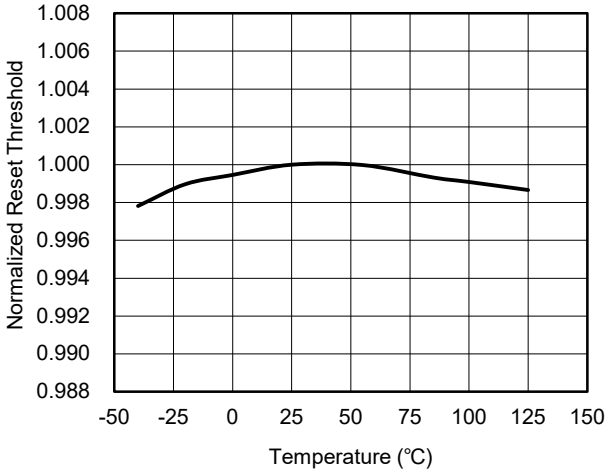
Power-Up Reset Delay vs. Temperature



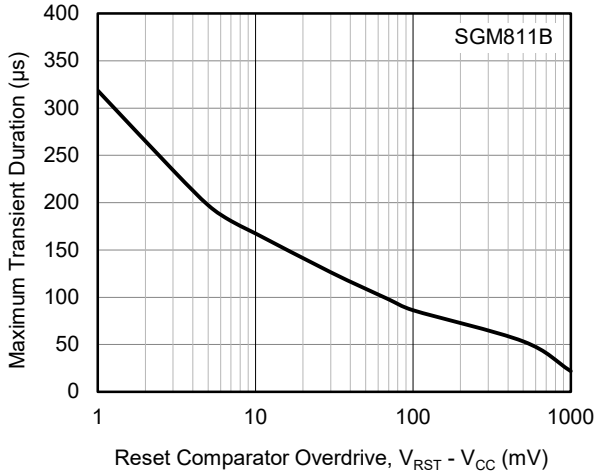
Supply Current vs. Temperature (No Load)



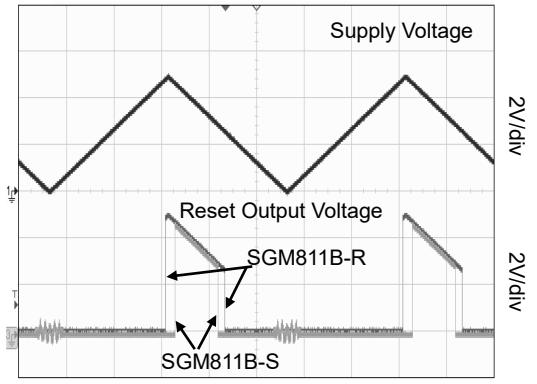
Normalized Reset Voltage Threshold vs. Temperature



Maximum Transient Duration without Causing a Reset Pulse vs. Reset Comparator Overdrive



Reset Output Voltage vs. Supply Voltage



APPLICATION INFORMATION

Manual Reset Input

The SGM811B and SGM812B provide a manual reset (nMR) function that allows users to reset the system manually. It is an active-low reset input with an internal pull-up resistor of 59kΩ. When the nMR is low, and for t_{RS} (200ms, TYP) after nMR returns high, the reset remains active. The nMR can be driven by a CMOS logic or by a reset switch shorting to GND. If not used, leave it open or connect it to the V_{CC}. When the device is far away from the reset switch or used in a noisy environment, a 0.1μF capacitor is recommended to connect between nMR and GND.

Precise Reset Threshold

When the supply voltage drops significantly for the power supply fault, the SGM811B and SGM812B can even operate normally, which greatly reduces the possibility of system failure. In addition, the internal reference voltage accuracy of the SGM811B and SGM812B is very high, which provides high reliability of the devices.

nRESET Valid to V_{CC} = 0V (SGM811B)

The nRESET of SGM811B will stop sinking current and become open circuit if V_{CC} is below 1.0V. And if a high impedance CMOS logic input is connected to the nRESET, the logic level of the CMOS input is undetermined. To solve the problem, it is recommended to use a 100kΩ resistor between nRESET and GND.

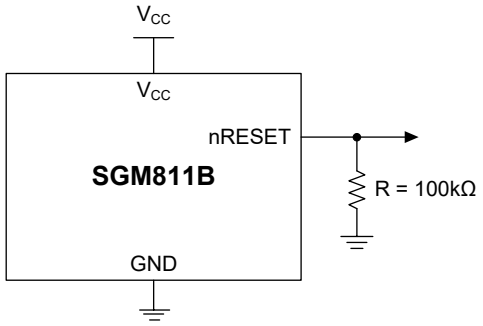


Figure 1. nRESET Valid to V_{CC} = 0V Circuit

Reset Output

To ensure sufficient time for the power supply and microprocessor to stabilize after power-up, a 200ms (TYP) reset output will hold by the internal timer after V_{CC} exceeds the reset threshold voltage. Similarly, a 200ms (TYP) reset output will also exist after the power supply recover from brownout or interruption that allows the power supply and microprocessor to have enough time to reach a steady state (Figure 2).

The SGM811B has an active-low nRESET output, while the SGM812B has an active-high RESET output. When V_{CC} is as low as 1V during power-down, the nRESET of the SGM811B will continue output a low level. This not only keeps the microprocessor shutdown when the supply voltage falls, but also prevents the microprocessor occurring false actions when it powers up.

Glitch Immunity

The SGM811B and SGM812B have an internal filter circuit, which makes them have glitch immunity ability to bear the fast transient glitches on the power supply.

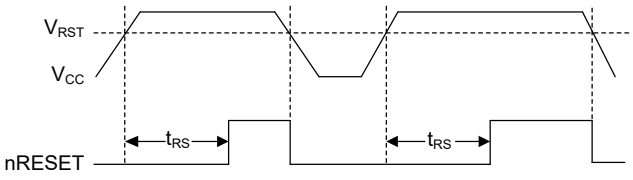


Figure 2. Power Fail nRESET Timing

Interfacing to Other Devices Output

In order to allow the SGM811B and SGM812B to be integrated with a variety of devices, it is guaranteed that the reset output is proportional to the VCC when the VCC is more than 1V. This allows the device to be used with any supply voltage between the minimum and maximum of the V_{CC}, including 3V and 3.3V.

REVISION HISTORY

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

JUNE 2022 – REV.A.2 to REV.A.3	Page
Updated General Description section	1
Updated Application Information section	6

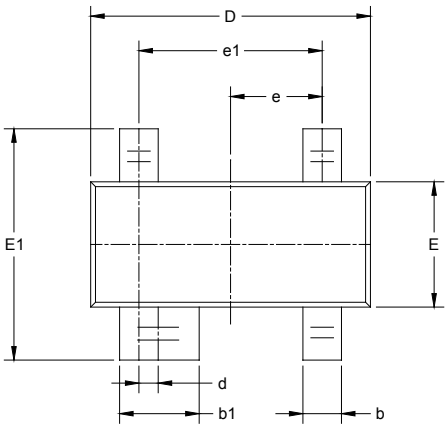
SEPTEMBER 2021 – REV.A.1 to REV.A.2	Page
Changed Electrical Characteristics	4

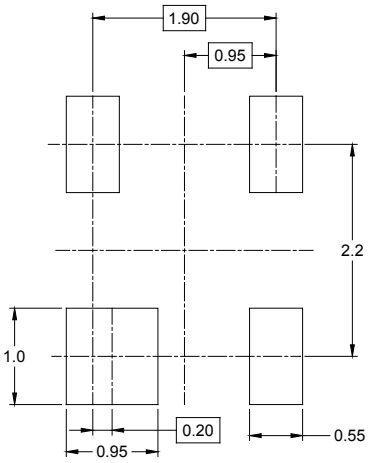
FEBRUARY 2021 – REV.A to REV.A.1	Page
Changed Electrical Characteristics and Typical Performance Characteristics sections	4, 5

Changes from Original (DECEMBER 2018) to REV.A	
Changed from product preview to production data	All

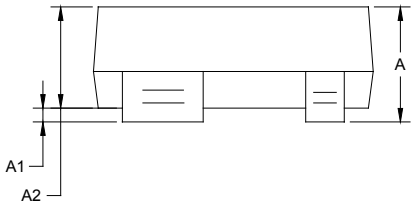
PACKAGE OUTLINE DIMENSIONS

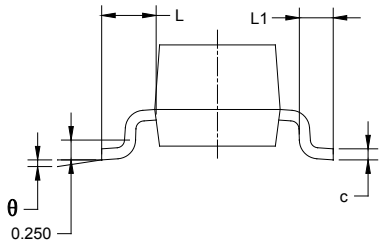
SOT-143





RECOMMENDED LAND PATTERN (Unit: mm)

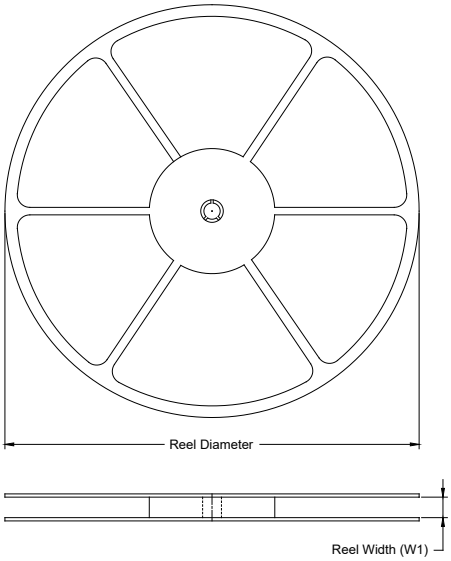




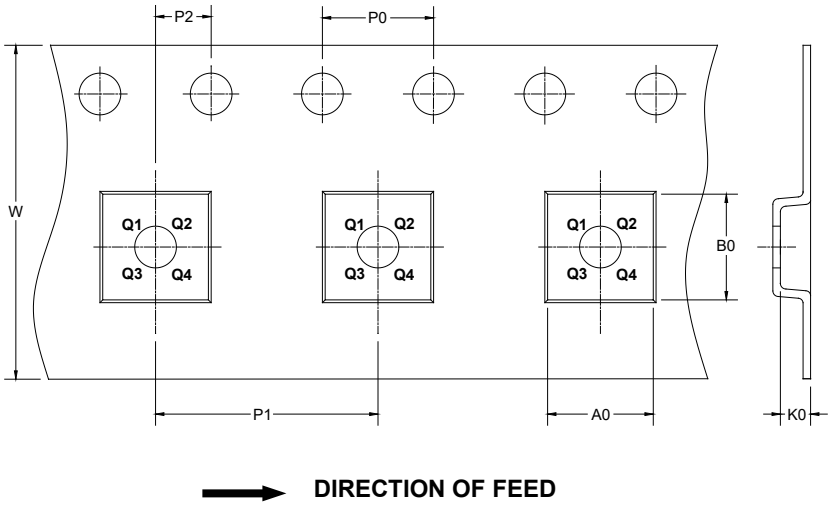
Symbol	Dimensions In Millimeters		Dimensions In Inches	
	MIN	MAX	MIN	MAX
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
b1	0.750	0.900	0.030	0.035
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
d	0.200 TYP		0.008 TYP	
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.95 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.55 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



DIRECTION OF FEED

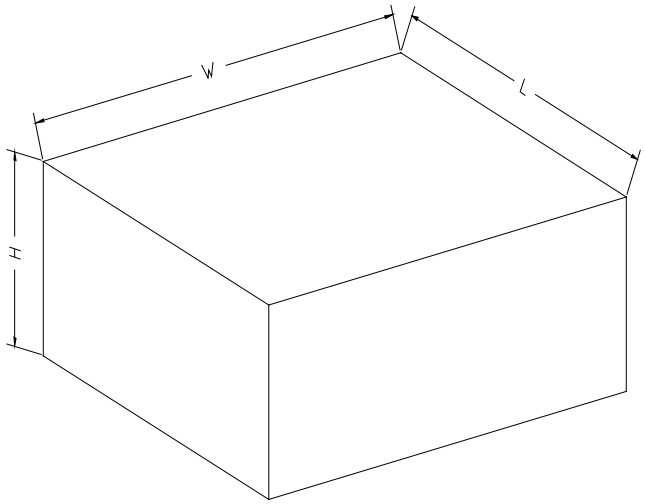
NOTE: The picture is only for reference. Please make the object as the standard.

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-143	7″	9.5	3.20	2.80	1.30	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

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Click to view pricing, inventory, delivery, and lifecycle information:

SGMICRO:

SGM890B-2.9XN5G/TR SGM2208XO5G/TR SGM2212-2.8XOA3G/TR SGM706B-RXMS8G/TR
SGM2022-HYN6/TR SGM2205-3.3XS8G/TR SGM892B-2.7LXN3G/TR SGM2020-1.8YN5G/TR
SGM2036-1.85YN5G/TR SGM2036-2.6YN5G/TR SGM2205-12XKC3G/TR SGM2588FYN5G/TR
SGM3836DYTQ16G/TR SGM836-3.0XTDI6G/TR SGM2200H-2.8YN3LG/TR SGM2203-3.0AYK3LG/TR
SGM2558BYS8G/TR SGM2588KYN5G/TR SGM897PXTN6G/TR SGM2540YUDV8G/TR
SGM621AXTDB8G/TR SGM836-3.0XN6G/TR SGM890B-1.0XN5G/TR SGM2200H-2.5YC5G/TR
SGM4064YDE8G/TR SGM8255A-2XMS8G/TR SGM891B-2.5XN5G/TR SGM892B-2.5XUDH4G/TR
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