SGM853
Low Power Reset Timer with Two Voltage Detector Functions

GENERAL DESCRIPTION

The SGM853 is a reset timer with dual voltage detector featuring low power and small solution size for applications requiring a highly integrated solution.

As a reset timer, the SGM853 has an input (RESET pin) and a fixed delay push-pull 1× output (RESET_OUT pin). It generates a low-level reset signal for 500ms (TYP) if the input has a low-level voltage for 8s (TYP). Then the reset signal returns to high for subsequent loads reset.

The SGM853 also has two voltage detector functions with 4 inputs and 2 outputs including a push-pull 1× output and a push-pull 2× output. The 2× output provides greater source and sink current. On the one side, the ALL_PG output pin indicates whether the 3 input pins (SUS_PG, VCC_PG and AUX_PG) are in a high-level voltage at the same time. If the above 3 input pins are high at the same time, the ALL_PG output pin is set to high, and vice versa. On the other side, the PROCHOT_OUT output pin generates a fixed 12ms delay time and indicates whether the PROCHOT input pin is in a high-level voltage. If PROCHOT rises to high-level voltage, PROCHOT_OUT rises after a fixed 12ms delay time, and PROCHOT_OUT falls immediately when PROCHOT falls.

The SGM853 operates over a junction temperature range of -40℃ to +125℃. It is available in a Green UTQFN-1.6×1.6-12AL package.

FEATURES

- **Low Power Consumption**
- **Output Options:**
  - **2 Outputs: Push-Pull 1×**
  - **1 Output: Push-Pull 2×**
- **Available in a Green UTQFN-1.6×1.6-12AL Package**

APPLICATIONS

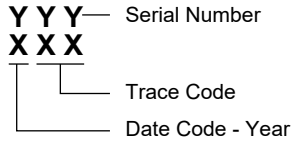
Smart Phones
Tablet PCs
Servers
Workstations
Storage Systems
Networking/Telecommunication Equipment

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGM853	UTQFN-1.6×1.6-12AL	-40℃ to +125℃	SGM853XUSH12G/TR	00A XXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXX = Date Code and Trace 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

Supply Voltage on VDD Relative to GND ..... -0.5V to 7V
DC Input Voltage .....GND - 0.5V to V_{DD} + 0.5V
Current at Input Pin..... -1mA to 1mA
Maximum Average or DC Current
Push-Pull 1× 20mA
Push-Pull 2× 40mA
Input leakage (Absolute Value).....1000nA
Maximum Average or DC Current.....90mA
Package Thermal Resistance
UTQFN-1.6×1.6-12AL, θ_{JA}..... 133℃/W
Junction Temperature.....+150℃
Storage Temperature Range .....-65℃ to +150℃
Lead Temperature (Soldering, 10s).....+260℃
ESD Susceptibility
HBM.....4000V
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

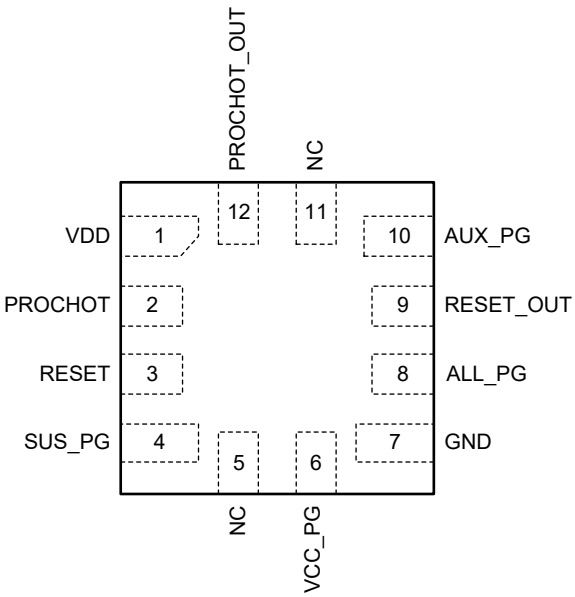
This integrated circuit can be damaged if ESD protections are not considered carefully. SGMICRO recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage. ESD damage can range from subtle performance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

(TOP VIEW)



UTQFN-1.6×1.6-12AL

PIN DESCRIPTION

PIN	NAME	TYPE	FUNCTION
1	VDD	P	Supply Voltage.
2	PROCHOT	I	Active High Digital Input with Schmitt Trigger.
3	RESET	I	Digital Input with Schmitt Trigger. The reset delay time of 8s.
4	SUS_PG	I	Digital Input with Schmitt Trigger. It has an internal 1.25MΩ pull-down resistor.
5, 11	NC	—	Leave it floating or connect it to GND.
6	VCC_PG	I	Digital Input with Schmitt Trigger. It has an internal 1.25MΩ pull-down resistor.
7	GND	G	Ground.
8	ALL_PG	O	Push-Pull 1× Output.
9	RESET_OUT	O	Push-Pull 1× Output.
10	AUX_PG	I	Digital Input with Schmitt Trigger. It has an internal 1.25MΩ pull-down resistor.
12	PROCHOT_OUT	O	Active High Push-Pull 2× Output.

NOTE: I: Input, O: Output, G: Ground, P: Power.

ELECTRICAL CHARACTERISTICS

(T_J = -40℃ to +125℃, typical values are at T_J = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Supply Voltage	V_{DD}			1.7	3.3	5.5	V
Capacitor Value at VDD	C_{VDD}				0.1		μF
Input Capacitance	C_{IN}				4		pF
Quiescent Current	I_Q	Static inputs and floating outputs			0.3	0.9	μA
Active Current	I_A	Static outputs, keep RESET pin low for 8.5s			0.8	1.6	μA
Maximal Voltage Applied to Any Pin in High-Impedance State	V_{OUT}					V_{DD}	V
Maximum Average or DC Current through VDD Pin (Per chip side)	I_{VDD}	T_J = +85℃				66	mA
		T_J = +110℃				65	mA
Maximum Average or DC Current through GND Pin (Per chip side)	I_{GND}	T_J = +85℃				34	mA
		T_J = +110℃				31	mA
High-Level Input Voltage	V_{IH}	V_{DD} = 1.8V		1.04		V_{DD}	V
		V_{DD} = 3.3V		1.85		V_{DD}	
		V_{DD} = 5.0V		2.94		V_{DD}	
Low-Level Input Voltage	V_{IL}	V_{DD} = 1.8V		0		0.62	V
		V_{DD} = 3.3V		0		1.42	
		V_{DD} = 5.0V		0		1.95	
High-Level Output Voltage	V_{OH}	Push-pull 1×, open-drain PMOS 1×	I_{OH} = 100μA, V_{DD} = 1.8V	1.60	1.79		V
			I_{OH} = 3mA, V_{DD} = 3.3V	2.71	3.12		
			I_{OH} = 5mA, V_{DD} = 5.0V	4.21	4.77		
		Push-pull 2×, open-drain PMOS 2×	I_{OH} = 100μA, V_{DD} = 1.8V	1.61	1.79		
			I_{OH} = 3mA, V_{DD} = 3.3V	2.84	3.21		
			I_{OH} = 5mA, V_{DD} = 5.0V	4.34	4.89		
Low-Level Output Voltage	V_{OL}	Push-pull 1×	I_{OL} = 100μA, V_{DD} = 1.8V		0.006	0.01	V
			I_{OL} = 3mA, V_{DD} = 3.3V		0.13	0.18	
			I_{OL} = 5mA, V_{DD} = 5.0V		0.20	0.26	
		Push-pull 2×	I_{OL} = 100μA, V_{DD} = 1.8V		0.003	0.01	
			I_{OL} = 3mA, V_{DD} = 3.3V		0.07	0.1	
			I_{OL} = 5mA, V_{DD} = 5.0V		0.1	0.14	
High-Level Output Current	I_{OH}	Push-pull 1×, open-drain PMOS 1×	V_{OH} = V_{DD} - 0.2V, V_{DD} = 1.8V	0.9	1.58		mA
			V_{OH} = 2.4V, V_{DD} = 3.3V	7.3	11.96		
			V_{OH} = 2.4V, V_{DD} = 5.0V	19.2	26.83		
		Push-pull 2×, open-drain PMOS 2×	V_{OH} = V_{DD} - 0.2V, V_{DD} = 1.8V	1.67	3.07		
			V_{OH} = 2.4V, V_{DD} = 3.3V	13.95	23.43		
			V_{OH} = 2.4V, V_{DD} = 5.0V	36.50	52.24		
Low-Level Output Current	I_{OL}	Push-pull 1×	V_{OL} = 0.15V, V_{DD} = 1.8V	1.49	2.3		mA
			V_{OL} = 0.4V, V_{DD} = 3.3V	5.93	8.64		
			V_{OL} = 0.4V, V_{DD} = 5.0V	7	9.79		
		Push-pull 2×	V_{OL} = 0.15V, V_{DD} = 1.8V	2.9	4.49		
			V_{OL} = 0.4V, V_{DD} = 3.3V	10.7	16.84		
			V_{OL} = 0.4V, V_{DD} = 5.0V	12.76	19.09		

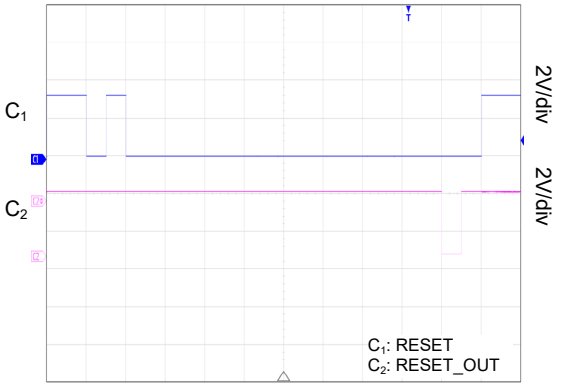
ELECTRICAL CHARACTERISTICS (Continued)

(T_J = -40℃ to +125℃, typical values are at T_J = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Internal Pull-Down Resistance	R_{PULL_DOWN}	SUS_PG, VCC_PG and AUX_PG Pins	967	1248	1524	kΩ
Delay1 Time	t_{DLY1}	T_J = +25℃	7.68	8	8.36	s
		T_J = -40℃ to +125℃	7.49	8	8.89	
Delay2 Time	t_{DLY2}	T_J = +25℃	475.94	500	526.02	ms
		T_J = -40℃ to +125℃	460.09	500	561.94	
Delay3 Time	t_{DLY3}	T_J = +25℃	11.59	12	12.8	ms
		T_J = -40℃ to +125℃	11.25	12	13.66	
Startup Time	t_{SU}	From V_{DD} rising past 1.35V		0.05		ms
Power-On Threshold	V_{PON}	V_{DD} level required to start up the chip	1.223	1.283	1.343	V
Power-Off Threshold	V_{POF}	V_{DD} level required to switch off the chip	0.73	0.91	1.089	V

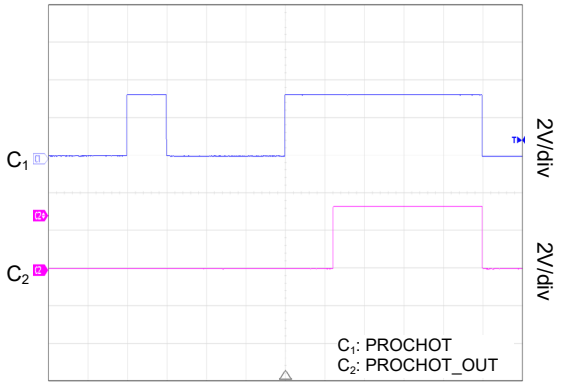
TYPICAL PERFORMANCE CHARACTERISTICS

RESET Delay



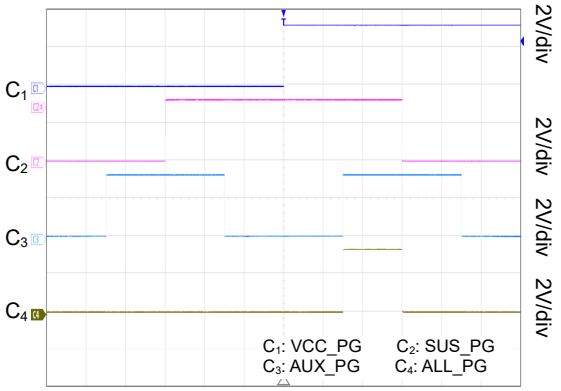
Time (1s/div)

PROCHOT Delay



Time (10ms/div)

Logic



Time (10ms/div)

FUNCTIONAL BLOCK DIAGRAM

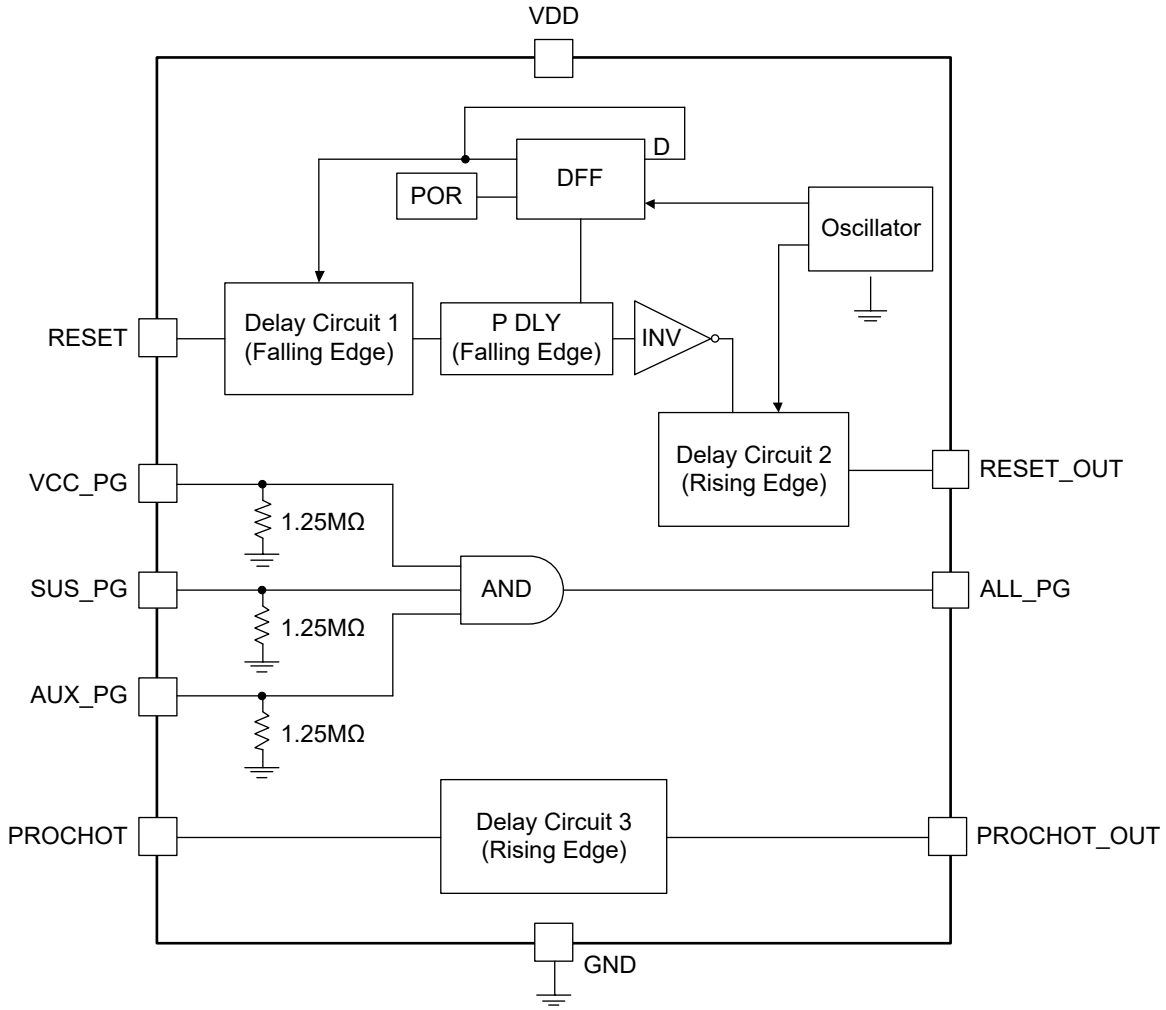


Figure 1. SGM853 Block Diagram

APPLICATION INFORMATION

The SGM853 is both a reset timer and a dual voltage detector that features low power and small solution size for applications requiring a highly integrated solution.

Reset Timer

A reset event occurs and forces the reset input (RESET pin) in a low-level input voltage for at least 8s. The RESET_OUT generates a low-level reset signal for 500ms to shut down the subsequent loads or PMIC. Then the reset signal returns to a high-level voltage until the input pin is in the next low-level state for more than 8s.

If the RESET is released and returns to high-level voltage within 8s, the counter resets and the RESET_OUT remains high.

Detector 1: ALL_PG

The ALL_PG output pin monitors 3 input pins at the same time: SUS_PG, VCC_PG and AUX_PG pins. If the application scenario requires voltage detection on up to 3 power rails, connect the power rail to the above three input pins respectively.

Detector 2: PROCHOT and PROCHOT_OUT

The PROCHOT_OUT pin is used to monitor PROCHOT input pin. If the PROCHOT input rises to a high-level voltage, the PROCHOT_OUT rises after a fixed delay time of 12ms, and PROCHOT_OUT falls immediately when PROCHOT in low-level voltage. If PROCHOT keeps in high-level voltage within 12ms, the PROCHOT_OUT remains low.

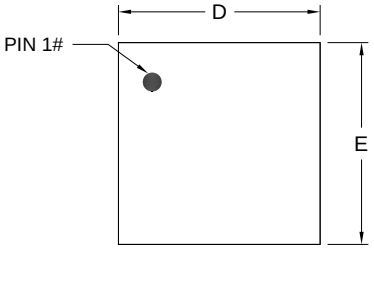
REVISION HISTORY

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

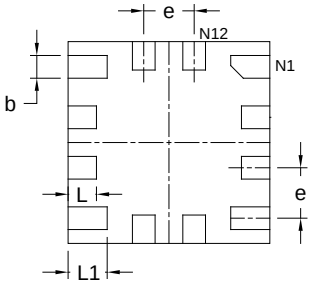
Changes from Original (OCTOBER 2022) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

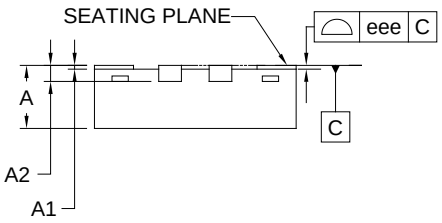
UTQFN-1.6×1.6-12AL



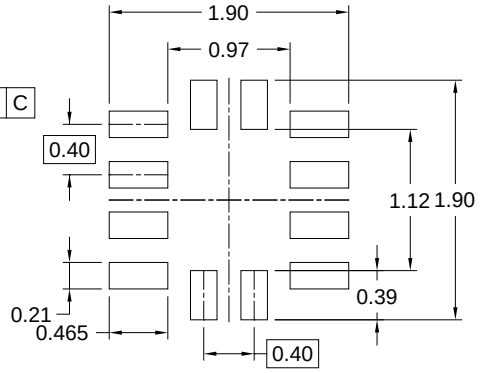
TOP VIEW



BOTTOM VIEW



SIDE VIEW



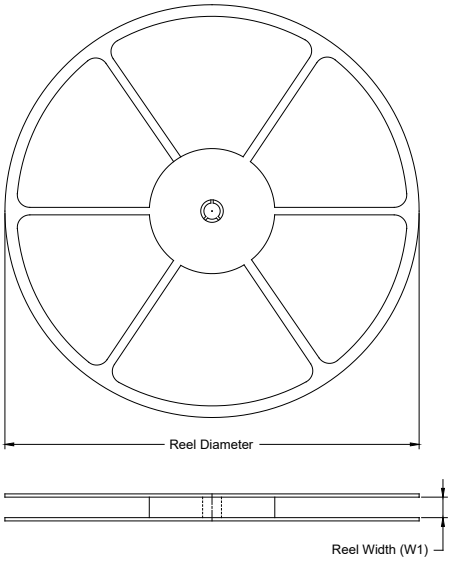
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	MOD	MAX
A	0.450	0.500	0.550
A1	0.000	-	0.050
A2	0.127 REF		
b	0.130	0.180	0.230
D	1.500	1.600	1.700
E	1.500	1.600	1.700
L	0.125	0.225	0.325
L1	0.210	0.310	0.410
e	0.400 BSC		
eee	0.080		

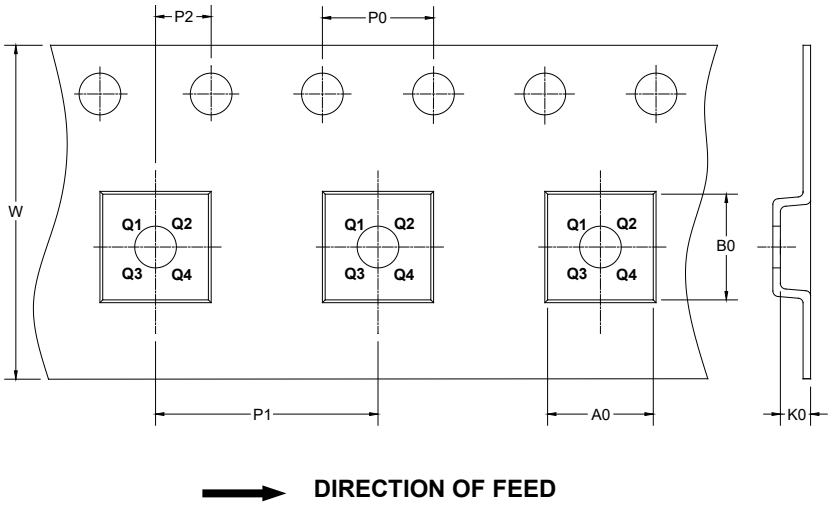
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



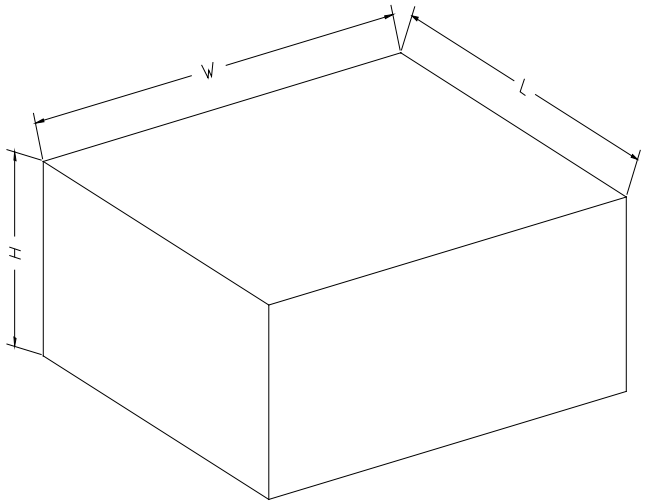
NOTE: The picture is only for reference. Please make the object as the standard.

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
UTQFN-1.6×1.6-12AL	7″	9.0	1.80	1.80	0.69	4.0	4.0	2.0	8.0	Q2

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
13″	386	280	370	5

DD0002