SGMNE12220
20V, Power, Single N-Channel, UTDFN Package, MOSFET

FEATURES

- **Low On-State Resistance**
- **Ultra-Low Q_G and Q_{GD}**
- **ESD Diode Protected Gate**
- **HBM > 2kV**
- **Ultra-Small Footprint "Tiny FET"**

PRODUCT SUMMARY

R_{DSON} (TYP) V_{GS} = 4.5V	R_{DSON} (MAX) V_{GS} = 4.5V	I_D (MAX) T_A = +25℃
100mΩ	125mΩ	2A

ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	VALUE	UNITS
Drain-to-Source Voltage		V_{DS}	20	V
Gate-to-Source Voltage		V_{GS}	±8	V
Drain Current (1)	T_A = +25℃	I_D	2	A
	T_A = +70℃		1.6	
Drain Current (Pulse) (2)		I_{DM}	4	A
Total Dissipation	T_A = +25℃	P_D	690	mW
	T_A = +70℃		440	
Junction Temperature		T_J	+150	℃
Storage Temperature Range		T_{STG}	-55 to +150	℃
Lead Temperature (Soldering, 10s)			+260	℃

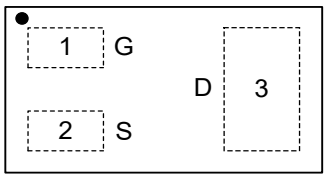
Stresses beyond those listed in Absolute Maximum Ratings may cause permanent damage to the device. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

NOTES:
1. The current will be limited by PCB, thermal design and operating temperature.

2. t_{PULSE} < 10μs

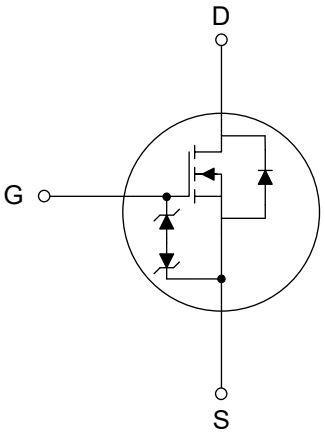
PIN CONFIGURATION

(TOP VIEW)



UTDFN-1×0.6-3L

EQUIVALENT CIRCUIT



APPLICATIONS

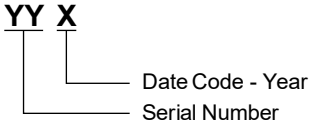
Optimized for Load Switch Applications
Optimized for General Purpose Switching Applications
Battery Applications
Handheld and Mobile Applications
IO Expansion Switch

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGMNE12220	UTDFN-1×0.6-3L	-55℃ to +150℃	SGMNE12220TUEM3G/TR	04X	Tape and Reel, 10000

MARKING INFORMATION

NOTE: X = 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.

ESD SENSITIVITY CAUTION

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

DISCLAIMER

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

THERMAL RESISTANCE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Junction-to-Ambient Thermal Resistance (1)	$R_{\theta JA}$	180	℃/W

NOTE: 1. $R_{\theta JA}$ is determined with the device mounted on one square inch of copper pad, 2oz copper on FR4 board.

ELECTRICAL CHARACTERISTICS

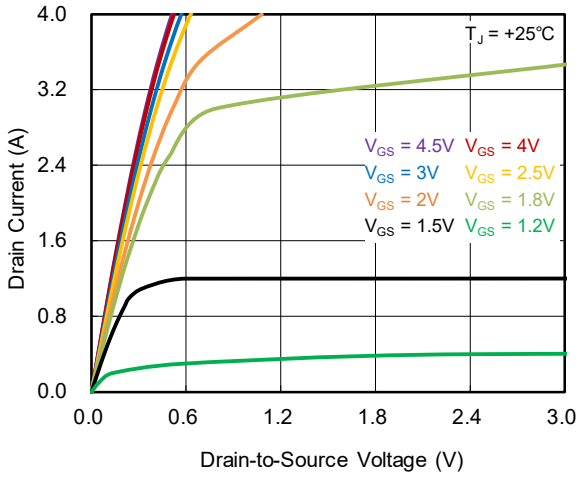
(T_A= +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNITS
Static OFF Characteristics						
Drain-to-Source Breakdown Voltage	V_{BR_DSS}	V_{GS} = 0V, I_D = 250μA	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0V, V_{DS} = 20V			1	μA
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = ±8V, V_{DS} = 0V			±10	μA
Static ON Characteristics						
Gate Threshold Voltage	V_{GS_TH}	V_{GS} = V_{DS}, I_D = 250μA	0.4	0.7	1	V
Static Drain-to-Source On-State Resistance	R_{DSON}	V_{GS} = 4.5V, I_D = 1.2A		100	125	mΩ
		V_{GS} = 2.5V, I_D = 1A		115	155	
		V_{GS} = 1.8V, I_D = 0.35A		145	190	
		V_{GS} = 1.5V, I_D = 0.01A		181	360	
		V_{GS} = 1.2V, I_D = 0.01A		400	800	
Diode Characteristics						
Forward Diode Voltage	V_{F_SD}	V_{GS} = 0V, I_S = 1A		0.9	1.2	V
Dynamic Characteristics						
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = 10V, f = 1MHz		71		pF
Output Capacitance	C_{OSS}			20		
Reverse Transfer Capacitance	C_{RSS}			12		
Total Gate Charge	Q_G	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 1A		1.3		nC
Gate-to-Source Charge	Q_{GS}			0.2		
Gate-to-Drain Charge	Q_{GD}			0.3		
Switch Characteristics						
Turn-On Delay Time	t_{D_ON}	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 1A, R_G = 3Ω		8		ns
Rise Time	t_R			25		
Turn-Off Delay Time	t_{D_OFF}			40		
Fall Time	t_F			33		

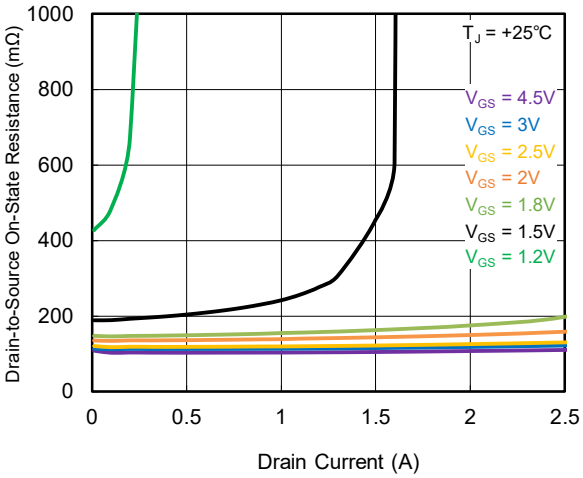
NOTE: 1. Please contact sales for SPICE Model support.

TYPICAL PERFORMANCE CHARACTERISTICS

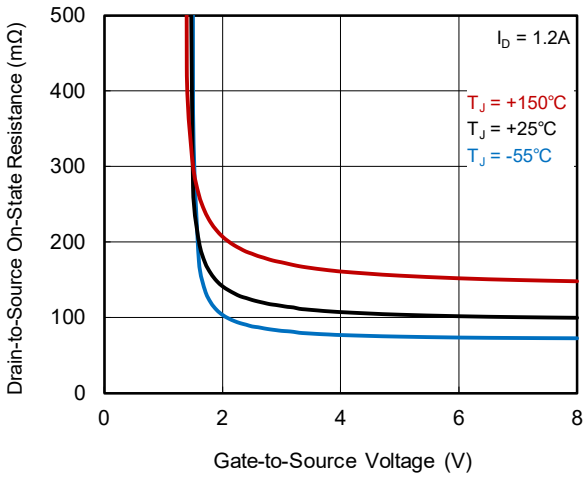
Output Characteristics



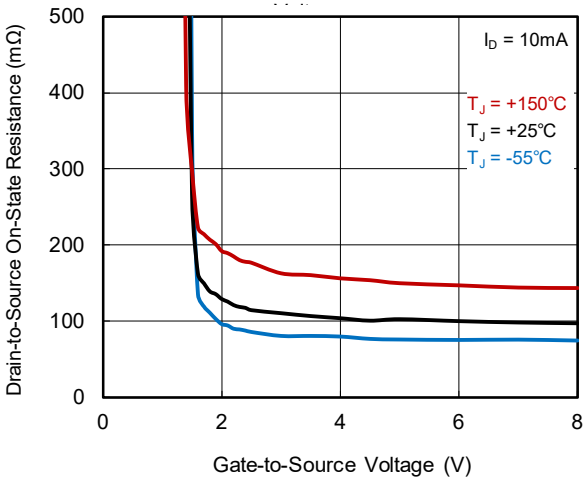
Drain-to-Source On-State Resistance vs. Drain Current



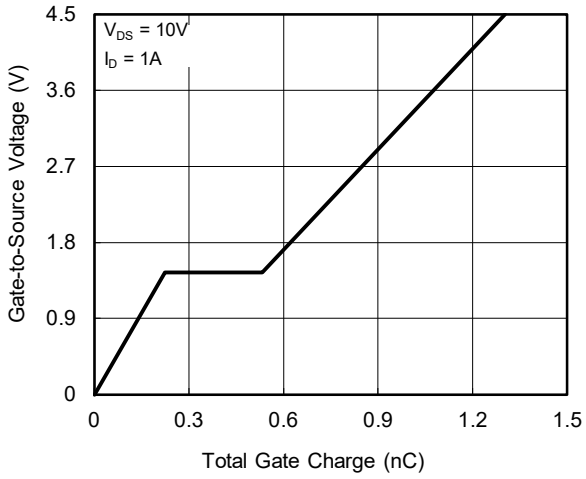
Drain-to-Source On-State Resistance vs. Gate-to-Source Voltage



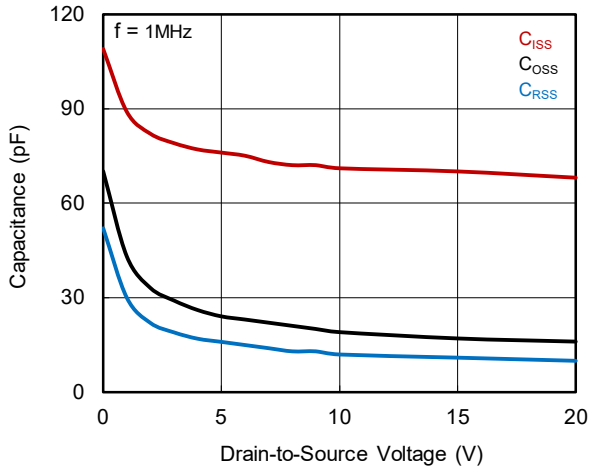
Drain-to-Source On-State Resistance vs. Gate-to-Source



Gate Charge Characteristics

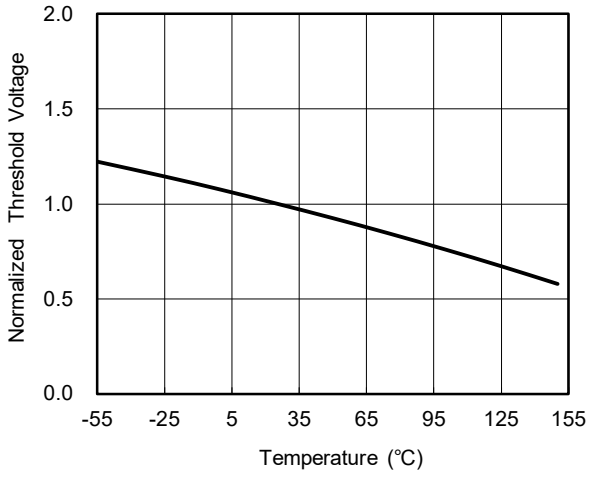


Capacitance Characteristics

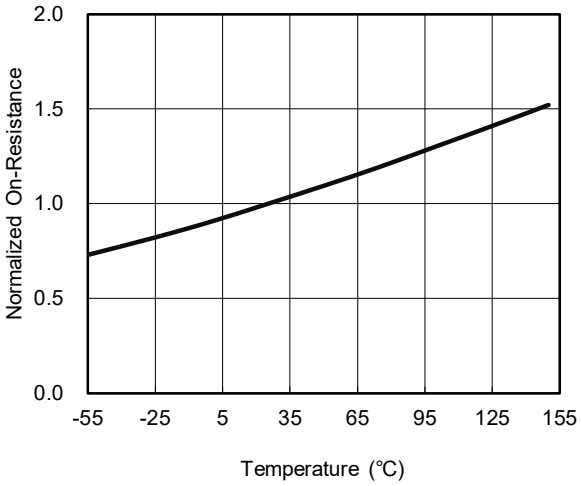


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

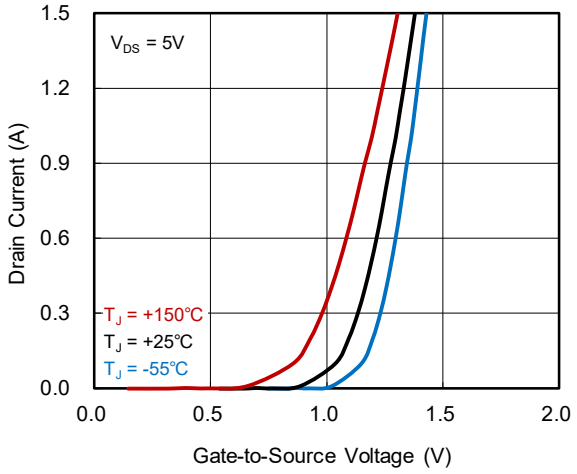
Normalized Threshold Voltage vs. Junction Temperature



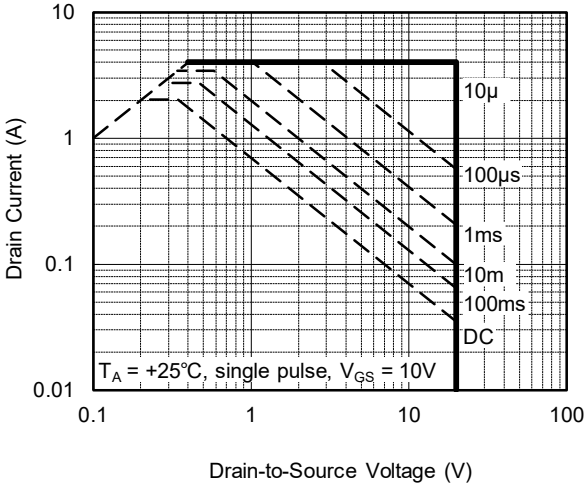
Normalized On-Resistance vs. Junction Temperature



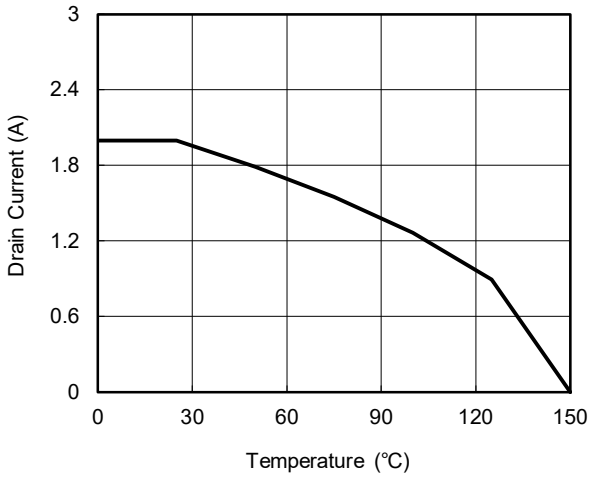
Transfer Characteristics



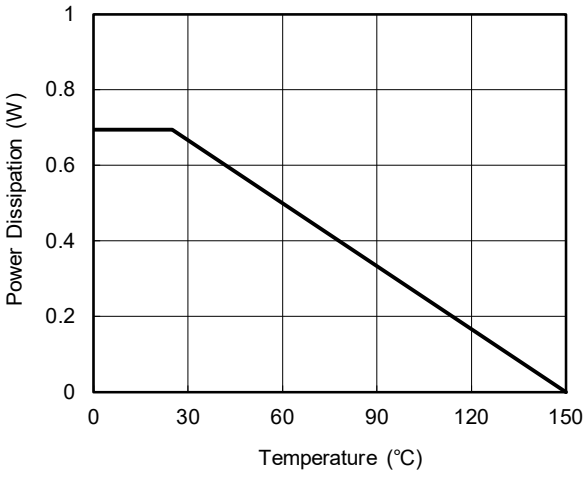
Safe Operating Area



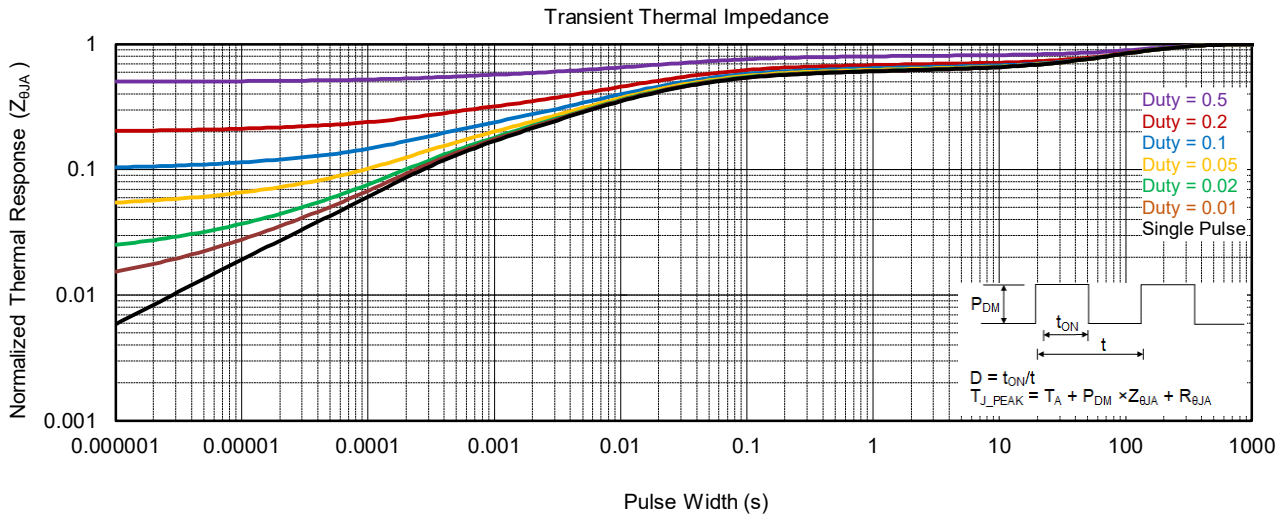
Drain Current vs. Junction Temperature



Power Dissipation vs. Junction Temperature



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



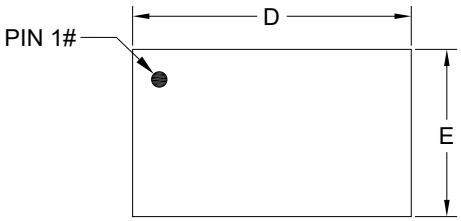
REVISION HISTORY

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

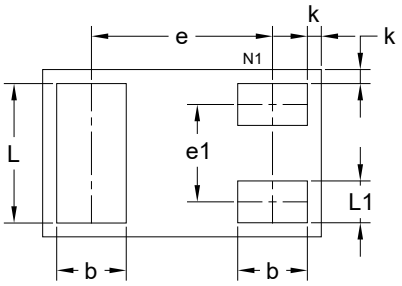
Changes from Original (DECEMBER 2024) to REV.A	Page
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

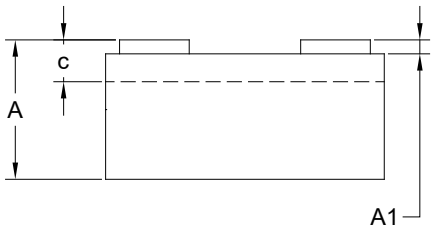
UTDFN-1×0.6-3L



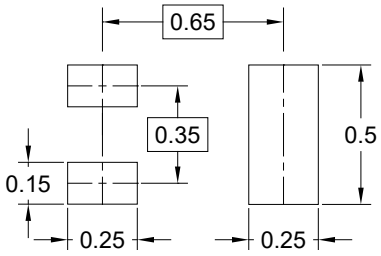
TOP VIEW



BOTTOM VIEW



SIDE VIEW



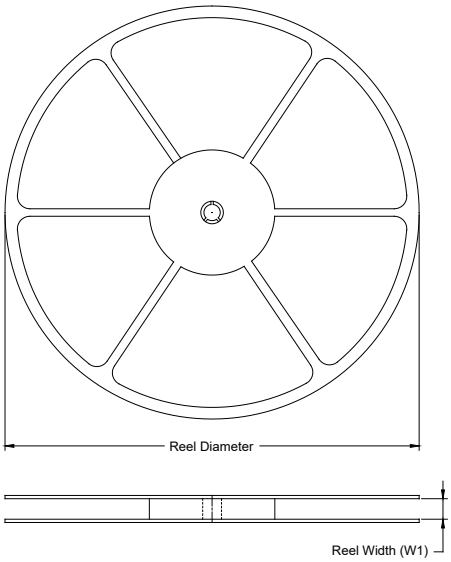
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.450	0.500	0.550
A1	0.000	-	0.050
b	0.200	0.250	0.300
c	0.120	0.150	0.180
D	0.950	1.000	1.050
E	0.550	0.600	0.650
e	0.650 BSC		
e1	0.350 BSC		
k	0.050 REF		
L	0.450	0.500	0.550
L1	0.100	0.150	0.200

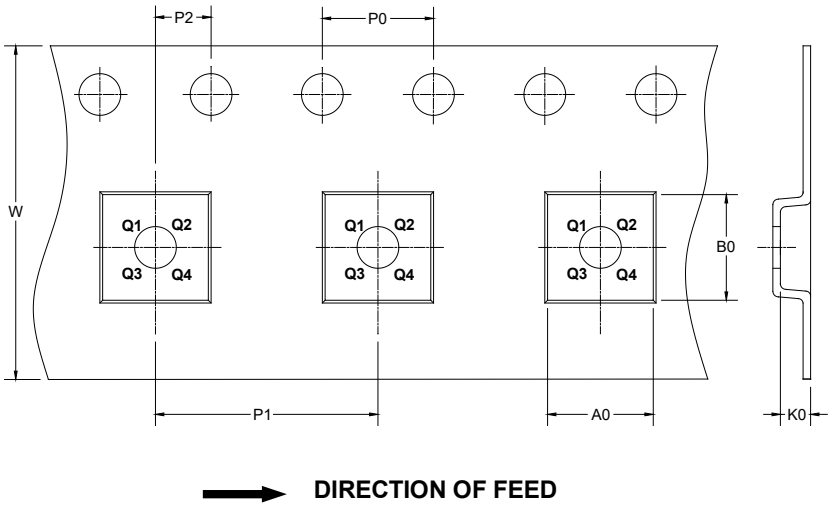
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



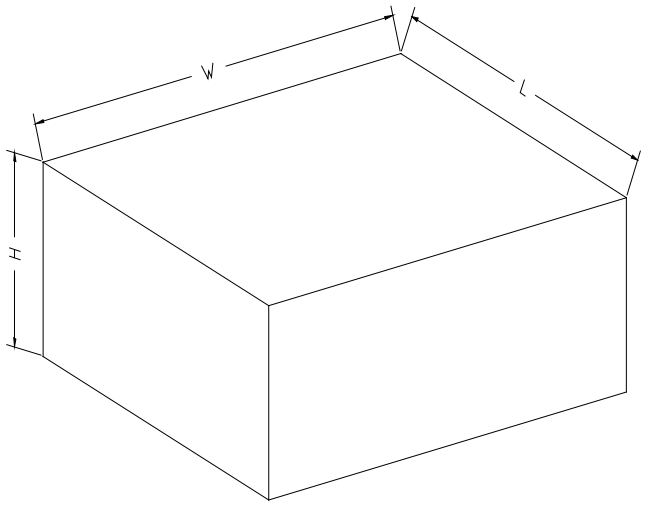
NOTE: The picture is only for reference. Please make the object as the standard.

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
UTDFN-1×0.6-3L	7"	8.6	0.70	1.15	0.57	4.0	2.0	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

DD0002