SGMGH22265
650V, TDFN Package, GaN E-mode Power Transistor

FEATURES

- **E-mode Transistor-Normally off Power Switch**
- **Footprint (5×6mm², 8×8mm²) for Compact Design**
- **Zero Reverse Recovery Loss**
- **Ultra High Switching Frequency**
- **RoHS Compliant and Halogen Free**

APPLICATIONS

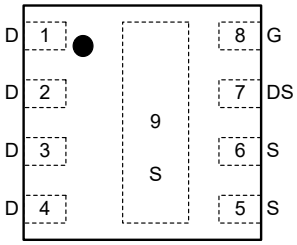
Fast Battery Charging
DC/DC Converters
Bridgeless Totem Pole PFC
High Efficiency Power Conversion

PRODUCT SUMMARY

R_{DSON} (TYP) V_{GS} = 6V	R_{DSON} (MAX) V_{GS} = 6V	I_D (MAX) T_C = +25℃
170mΩ	240mΩ	11A

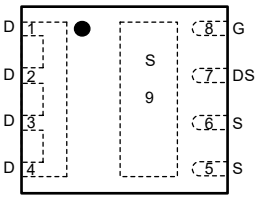
PIN CONFIGURATIONS

(TOP VIEW)



TDFN-8×8-8L

(TOP VIEW)



TDFN-5×6-8L

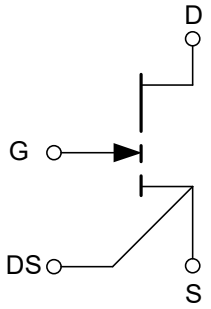
ABSOLUTE MAXIMUM RATINGS

PARAMETER		SYMBOL	VALUE	UNITS
Drain-to-Source Voltage		V_{DS}	650	V
Drain-to-Source Voltage Transient (1)		$V_{DS-TRANSLENT}$	800	V
Gate-to-Source Voltage		V_{GS}	-10 to 7	V
Drain Current	T_C = +25℃	I_D	11	A
	T_C = +100℃		7	
	T_A = +25℃		2.3	
	T_A = +70℃		1.8	
Drain Current (Pulse) (2)		I_{DM}	22	A
Total Dissipation	T_C = +25℃	P_D	75	W
	T_C = +100℃		30	
	T_A = +25℃		2.5	
	T_A = +70℃		1.6	
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. t_{PULSE} < 1μs.
2. t_{PULSE} < 10μs.

EQUIVALENT CIRCUIT



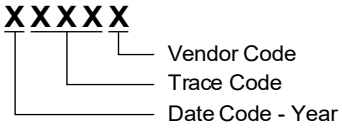
DS: Driver Source

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGMGH22265	TDFN-8×8-8L	-55℃ to +150℃	SGMGH22265TTGR8G/TR	SGMGH22265 TTGR8 XXXXX	Tape and Reel, 2500
	TDFN-5×6-8L	-55℃ to +150℃	SGMGH22265TTGQ8G/TR	SGM0GV TTGQ8 XXXXX	Tape and Reel, 3000

MARKING INFORMATION

NOTE: XXXXX = Date Code, Trace Code and Vendor 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.

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-Case Thermal Resistance	$R_{\theta JC}$	2	℃/W
Junction-to-Ambient Thermal Resistance	$R_{\theta JA}$	50	℃/W

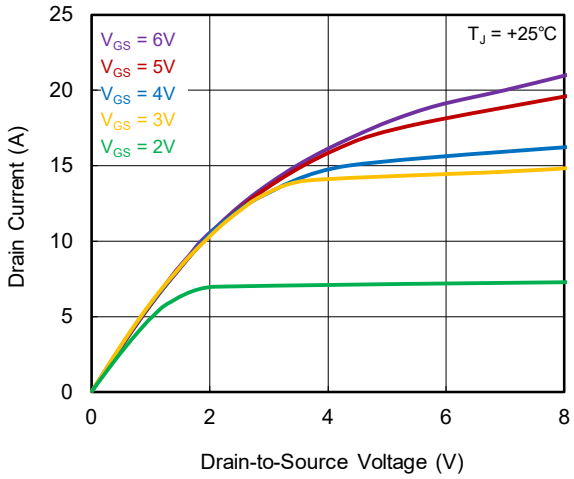
ELECTRICAL CHARACTERISTICS

(T_A = +25℃, unless otherwise noted.)

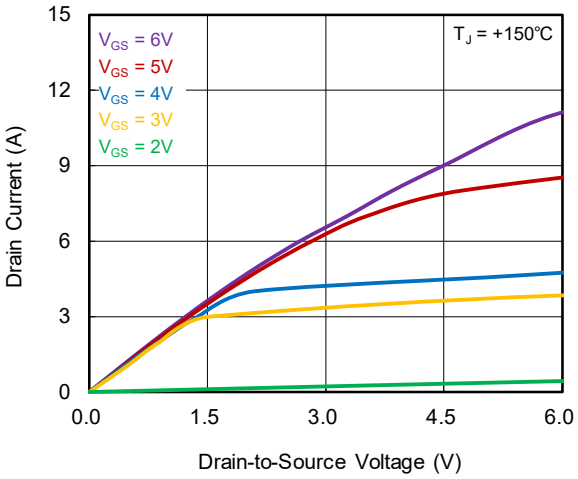
PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Static OFF Characteristics							
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0V, V_{DS} = 650V	T_J = +25℃			20	μA
			T_J = +150℃		5		
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = 6V, V_{DS} = 0V			20		μA
Static ON Characteristics							
Gate-to-Source Threshold Voltage	V_{GS_TH}	V_{GS} = V_{DS}, I_D = 1.7mA		1.1	1.6	2.6	V
Drain-to-Source On-State Resistance	R_{DSON}	V_{GS} = 6V, I_D = 3A	T_J = +25℃		170	240	mΩ
			T_J = +150℃		445		
Gate Resistance	R_G	f = 5MHz			2		Ω
Dynamic Characteristics							
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = 400V, f = 100kHz			53		pF
Output Capacitance	C_{OSS}				17		
Reverse Transfer Capacitance	C_{RSS}				0.2		
Output Capacitance Stored Energy	E_{OSS}				3.0		μJ
Effective Output Capacitance, Energy Related	C_{O_ER}	V_{GS} = 0V, V_{DS} = 0V to 400V			37		pF
Effective Output Capacitance, Time Related	C_{O_TR}				39		
Output Charge	Q_{OSS}				16		nC
Total Gate Charge	Q_G	V_{GS} = 0V to 6V, V_{DS} = 400V, I_D = 3A			1.8		
Gate-to-Source Charge	Q_{GS}				0.4		
Gate-to-Drain Charge	Q_{GD}				0.6		
Gate Plateau Voltage	V_{PLAT}				3.2		V
Switch Characteristics							
Turn-On Delay Time	t_{D_ON}	V_{GS} = -3V to 6V, V_{DS} = 400V, I_D = 5A, R_{G_ON} = 10Ω, R_{G_OFF} = 2Ω, L = 250uH			3		ns
Rise Time	t_R				4		
Turn-Off Delay Time	t_{D_OFF}				6		
Fall Time	t_F				8		
Switching Energy during Turn-On	E_{ON}				11.2		μJ
Switching Energy during Turn-Off	E_{OFF}				4.1		

TYPICAL PERFORMANCE CHARACTERISTICS

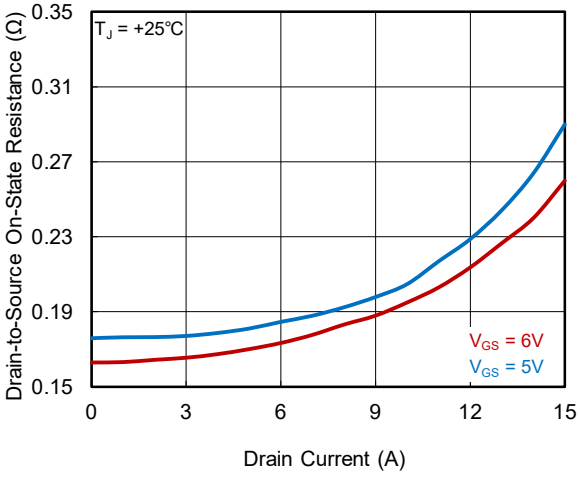
Output Characteristics



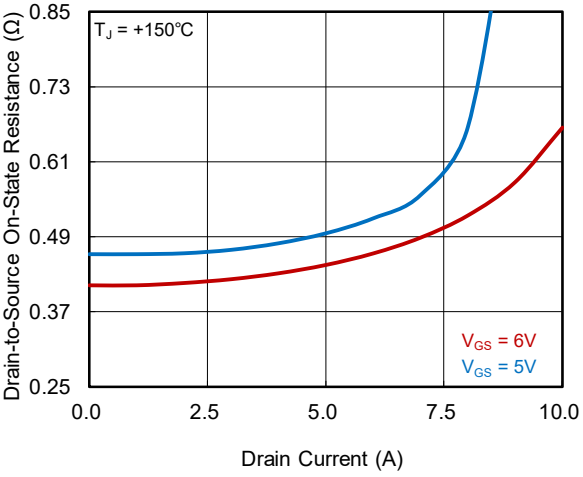
Output Characteristics



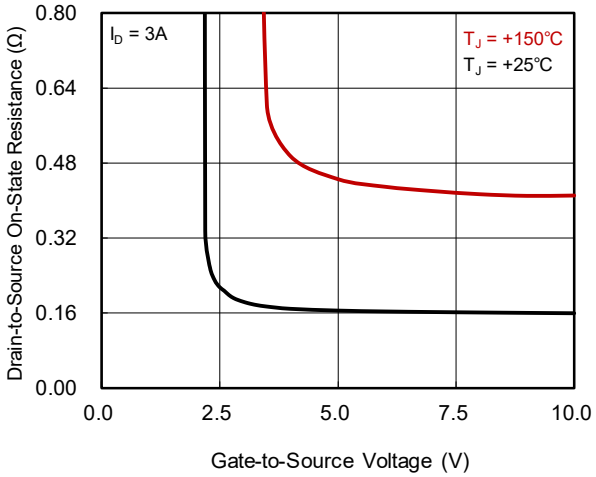
Drain-to-Source On-State Resistance vs. Drain Current



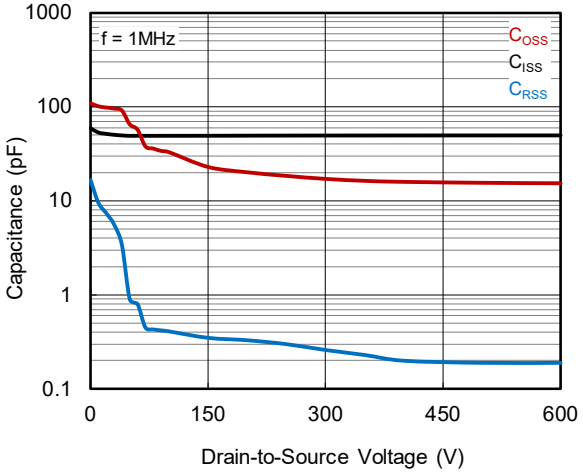
Drain-to-Source On-State Resistance vs. Drain Current



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

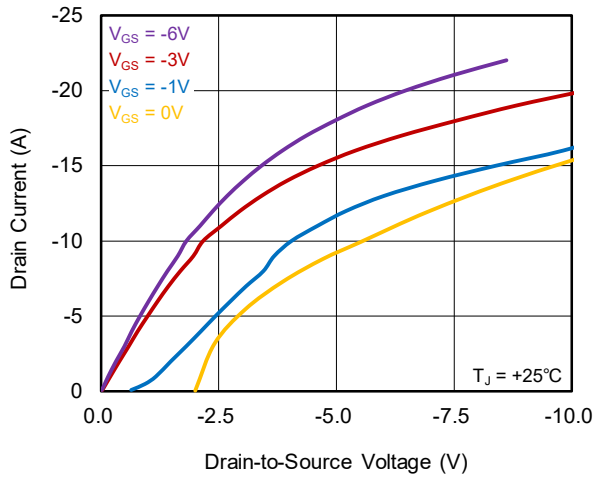


Capacitance Characteristics

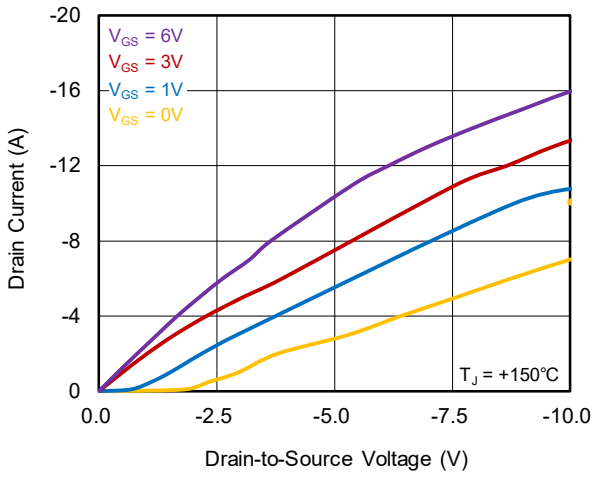


TYPICAL PERFORMANCE CHARACTERISTICS (continued)

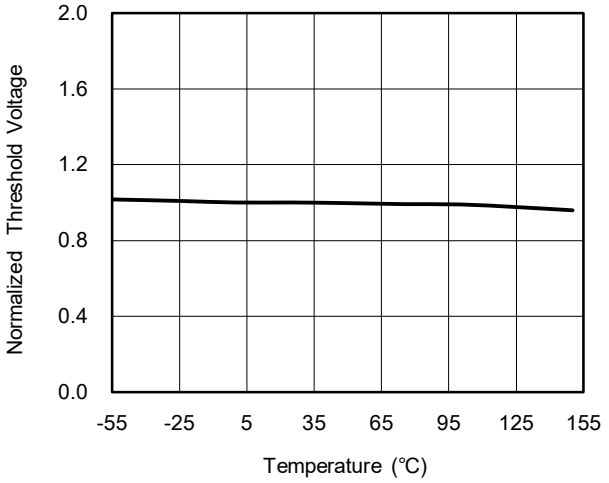
Channel Reverse Characteristics



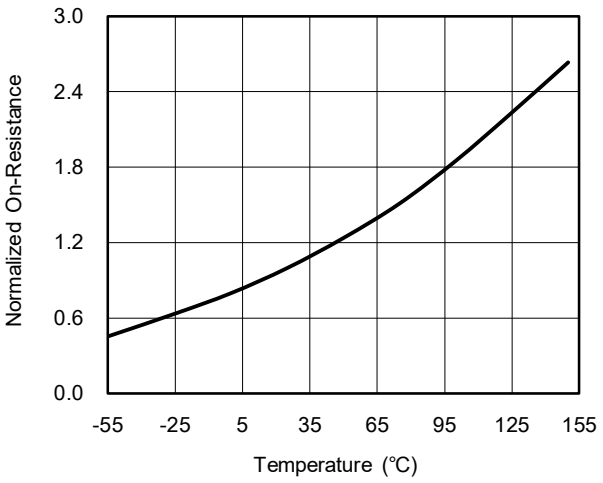
Channel Reverse Characteristics



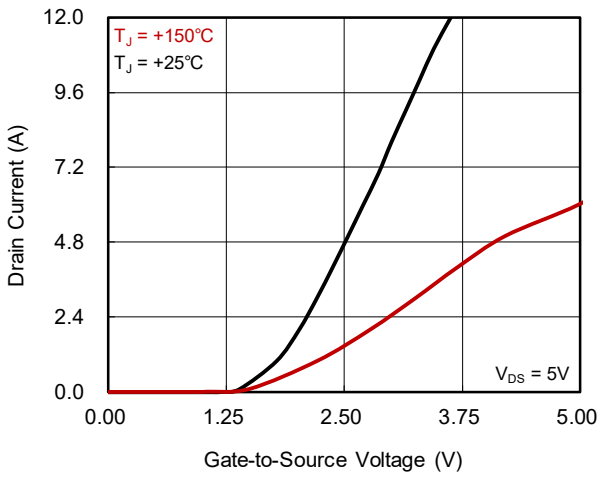
Normalized Threshold Voltage vs. Junction Temperature



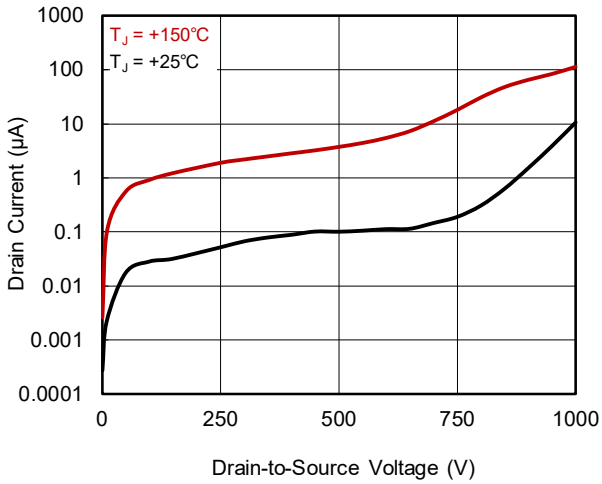
Normalized On-Resistance vs. Junction Temperature



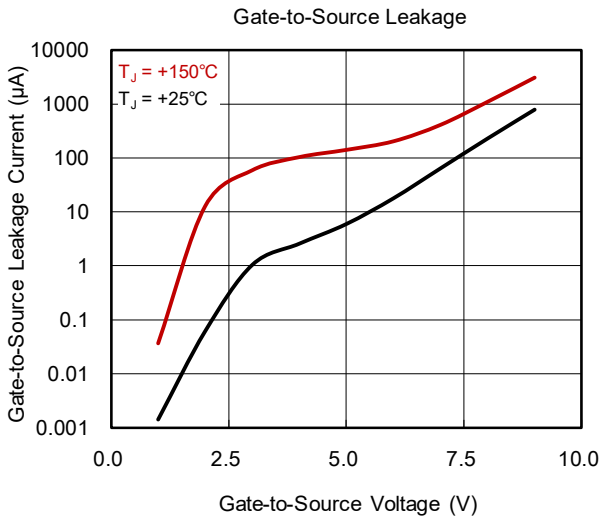
Transfer Characteristics



Drain-Source Leakage Characteristics



TYPICAL PERFORMANCE CHARACTERISTICS (continued)



REVISION HISTORY

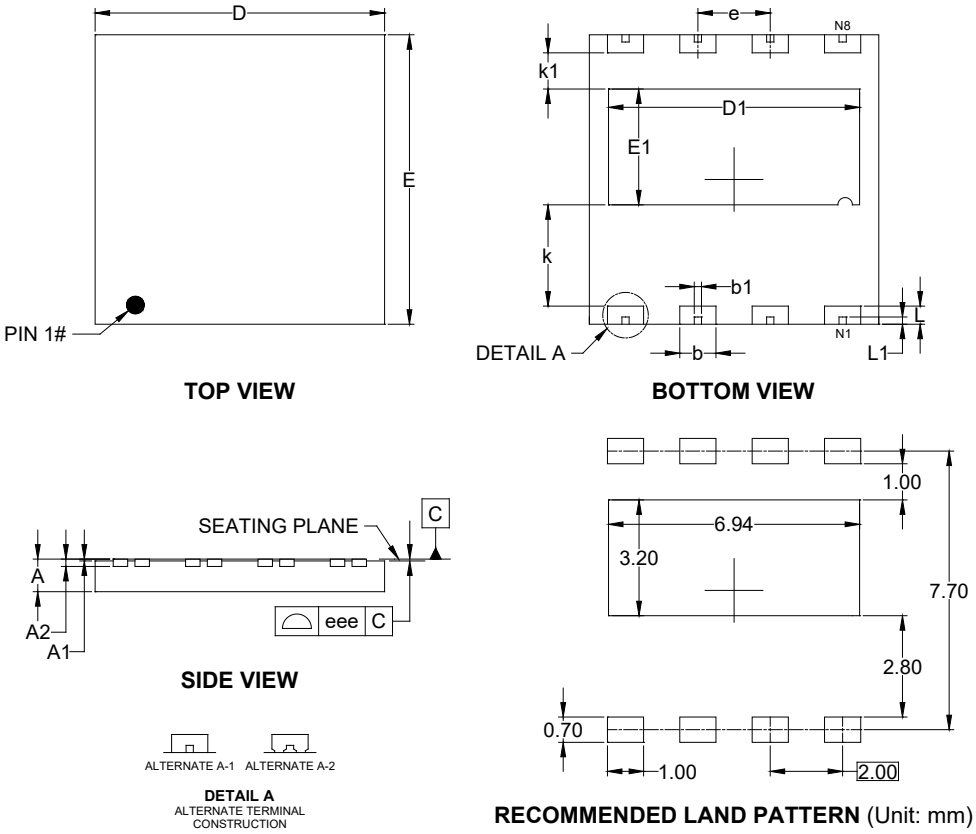
NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

OCTOBER 2024 – REV.A to REV.A.1	Page
Updated electrical characteristics section	3

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

PACKAGE OUTLINE DIMENSIONS

TDFN-8×8-8L

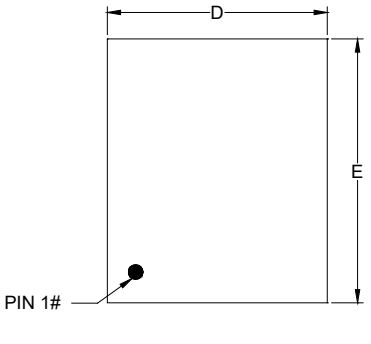


Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.800	-	1.000
A1	0.000	-	0.050
A2		0.203 REF	
b	0.950	-	1.050
b1		0.200 REF	
D	7.900	-	8.100
E	7.900	-	8.100
D1	6.840	-	7.040
E1	3.100	-	3.300
e		2.000 BSC	
k		2.800 REF	
k1		1.000 REF	
L	0.400	-	0.600
L1		0.200 REF	
eee		0.080	

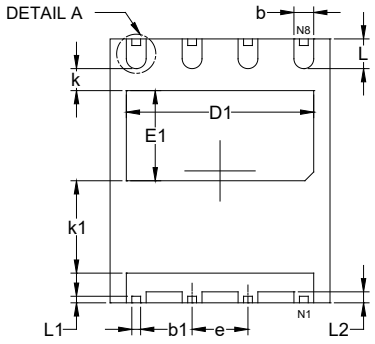
NOTE: This drawing is subject to change without notice.

PACKAGE OUTLINE DIMENSIONS

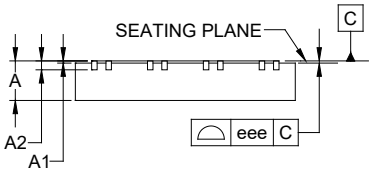
TDFN-5×6-8L



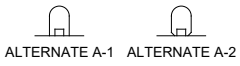
TOP VIEW



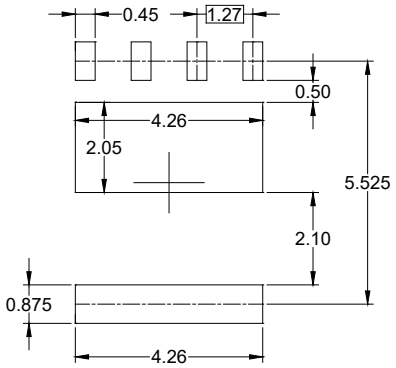
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL CONSTRUCTION



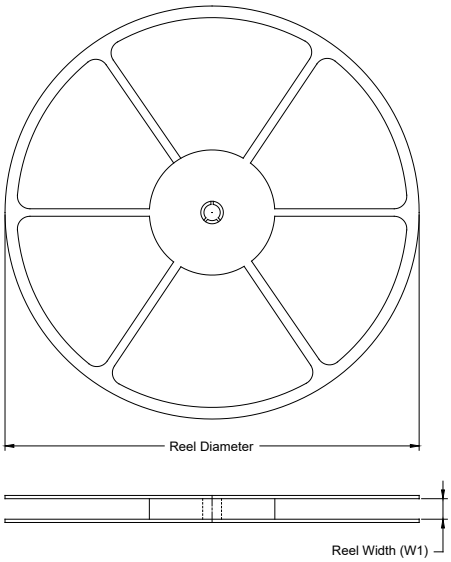
RECOMMENDED LAND PATTERN (Unit: mm)

Symbol	Dimensions In Millimeters		
	MIN	NOM	MAX
A	0.800	-	1.000
A1	0.000	-	0.050
A2		0.203 REF	
b	0.400	-	0.500
b1		0.200 REF	
D	4.900	-	5.100
E	5.900	-	6.100
D1	4.160	-	4.360
E1	1.950	-	2.150
e		1.270 BSC	
k		0.500 REF	
k1		2.100 REF	
L	0.575	-	0.775
L1		0.150 REF	
L2		0.250 REF	
eee		0.080	

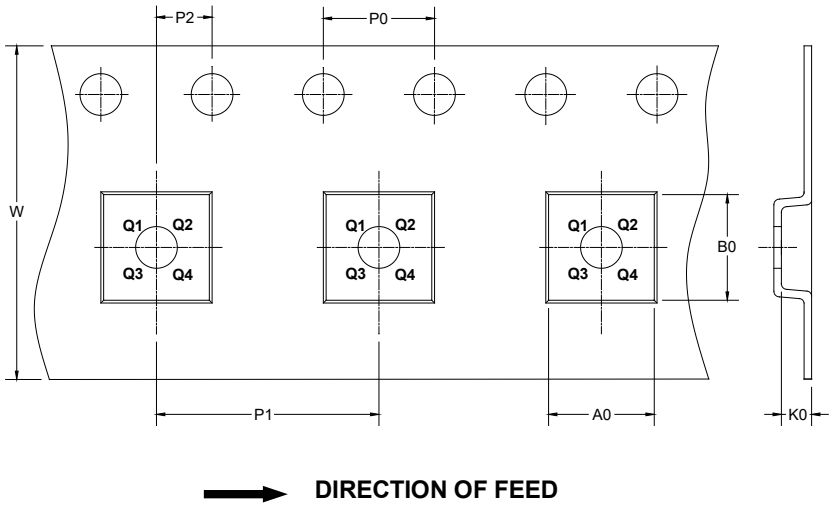
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



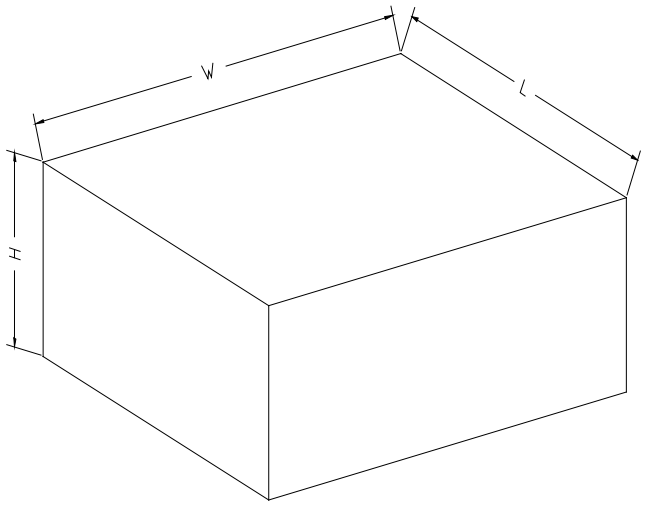
NOTE: The picture is only for reference. Please make the object as the standard.

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
TDFN-8×8-8L	13"	16.4	8.30	8.30	1.10	4.0	12.0	2.0	16.0	Q2
TDFN-5×6-8L	13"	12.4	5.30	6.30	1.30	4.0	8.0	2.0	12.0	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
13″	386	280	370	5

DD0002