SGMGH13270
700V, TDFN Package, GaN E-Mode Power Transistor

FEATURES

- **E-Mode Transistor-Normally off Power Switch**
- **Ultra High Switching Frequency**
- **No Reverse-Recovery Charge**
- **Low Gate Charge, Low Output Charge**
- **Qualified for Industrial Applications According to JEDEC Standards**
- **ESD Safeguard**
- **RoHS Compliant and Halogen Free**

APPLICATIONS

AC/DC Converter
DC/DC Converter
Totem Pole PFC
Fast Battery Charging
High Density Power Conversion
High Efficiency Power Conversion

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNITS
Drain-to-Source Voltage	V_{DS}	700	V
Drain-to-Source Voltage Transient (1)	$V_{DS\text{-}TRANSIENT}$	800	V
Drain-to-Source Voltage (Pulse) (2)	$V_{DS\text{-}PULSE}$	750	V
Gate-to-Source Voltage	V_{GS}	-6 to 7	V
Gate-to-Source Voltage (Pulse) (3)	$V_{GS\text{-}PULSE}$	-20 to 10	V
Drain Current	I_D	12	A
Drain Current (Pulse) (4)	I_{DM}	24	A
Total Dissipation	P_D	74	W
Junction Temperature	T_J	-55 to +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:

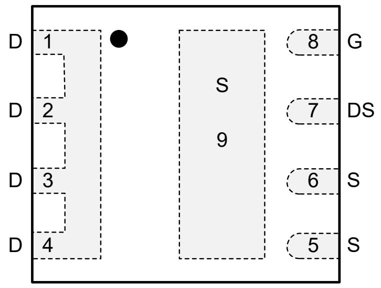
1. $t_{PULSE} < 200\mu s$.
2. $t_{PULSE} < 100ns$, total time < 10h.
3. T_J = -55℃ to +150℃, f = 100kHz, open drain, t_{PULSE} = 50ns, total time < 50s.
4. V_{GS} = 6V, T_C = +25℃, t_{PULSE} = 10μs.

PRODUCT SUMMARY

R_{DSON} (TYP) V_{GS} = 6V	R_{DSON} (MAX) V_{GS} = 6V	I_D (MAX) T_C = +25℃
132mΩ	170mΩ	12A

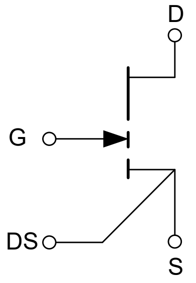
PIN CONFIGURATION

(TOP VIEW)



TDFN-5×6-8L

EQUIVALENT CIRCUIT



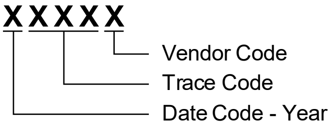
DS: Driver Source

PACKAGE/ORDERING INFORMATION

MODEL	PACKAGE DESCRIPTION	SPECIFIED TEMPERATURE RANGE	ORDERING NUMBER	PACKAGE MARKING	PACKING OPTION
SGMGH13270	TDFN-5×6-8L	-55℃ to +150℃	SGMGH13270TTGQ8G/TR	13270 TGQ8 XXXXX	Tape and Reel, 2500

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

PARAMETER	SYMBOL	TYP	UNITS
Junction-to-Ambient Thermal Resistance (1)	$R_{\theta JA}$	71.44	℃/W
Junction-to-Case Thermal Resistance	$R_{\theta JC}$	1.67	℃/W

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

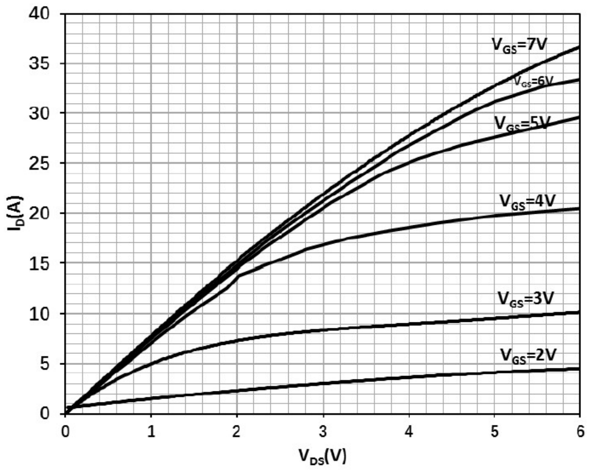
ELECTRICAL CHARACTERISTICS

(T_J = +25℃, unless otherwise noted.)

PARAMETER	SYMBOL	CONDITIONS		MIN	TYP	MAX	UNITS
Static Characteristics							
Zero Gate Voltage Drain Current	I_{DSS}	V_{GS} = 0V, V_{DS} = 700V	T_J = +25℃		0.5		μA
			T_J = +125℃		5.3		
Gate-to-Source Leakage Current	I_{GSS}	V_{GS} = 6V, V_{DS} = 0V			26		
Gate-to-Source Threshold Voltage	V_{GS_TH}	V_{GS} = V_{DS}, I_D = 10.7mA	T_J = +25℃	1.2	1.6	2.5	V
			T_J = +125℃		1.5		
Drain-to-Source On-State Resistance	R_{DSON}	V_{GS} = 6V, I_D = 0.5A, T_J = +25℃			132	170	mΩ
		V_{GS} = 6V, I_D = 4A	T_J = +25℃		132		
			T_J = +125℃		254		
Gate Resistance	R_G	f = 5MHz, open drain			10.5		Ω
Dynamic Characteristics							
Input Capacitance	C_{ISS}	V_{GS} = 0V, V_{DS} = 400V, f = 100kHz			83.1		pF
Output Capacitance	C_{OSS}				29.5		
Reverse Transfer Capacitance	C_{RSS}				0.3		
Effective Output Capacitance, Energy Related	C_{O_ER}	V_{GS} = 0V, V_{DS} = 0V to 400V			38.6		
Effective Output Capacitance, Time Related	C_{O_TR}				51.1		
Output Charge	Q_{OSS}				20.4		nC
Gate Charge Characteristics							
Total Gate Charge	Q_G	V_{GS} = 0V to 6V, V_{DS} = 400V, I_D = 4A			2.2		nC
Gate-to-Source Charge	Q_{GS}				0.2		
Gate-to-Drain Charge	Q_{GD}				0.8		
Gate Plateau Voltage	V_{PLAT}	V_{DS} = 400V, I_D = 4A			2.1		V
Reverse Conduction Characteristics							
Source-to-Drain Reverse Voltage	V_{SD}	V_{GS} = 0V, I_S = 4A			2.4		V
Pulsed Current, Reverse	$I_{S\text{-}PULSE}$	V_{GS} = 6V, t_{PULSE} = 10μs				24	A
Reverse Recovery Charge	Q_{RR}	V_{DS} = 400V, I_S = 6A			0		nC
Reverse Recovery Time	t_{RR}				0		ns
Peak Reverse Recovery Current	I_{RRM}				0		A

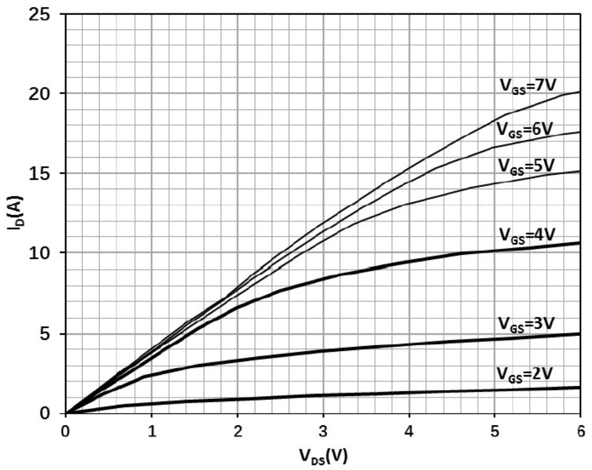
TYPICAL PERFORMANCE CHARACTERISTICS

Figure 1 Typ. output characteristics



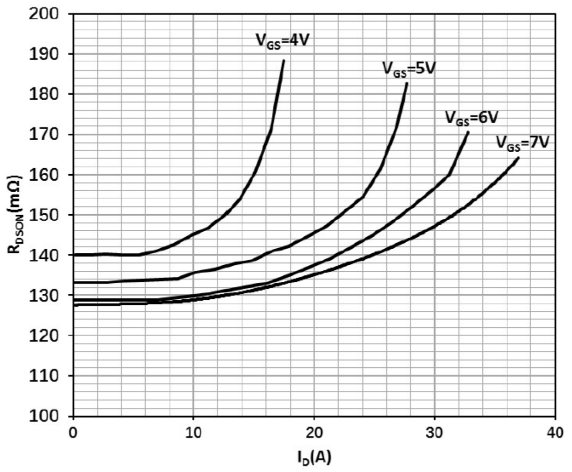
$I_D = f(V_{DS}, V_{GS})$; T_j = 25 °C, T_{Pulse}=10us, Duty=0.001%

Figure 2 Typ. output characteristics



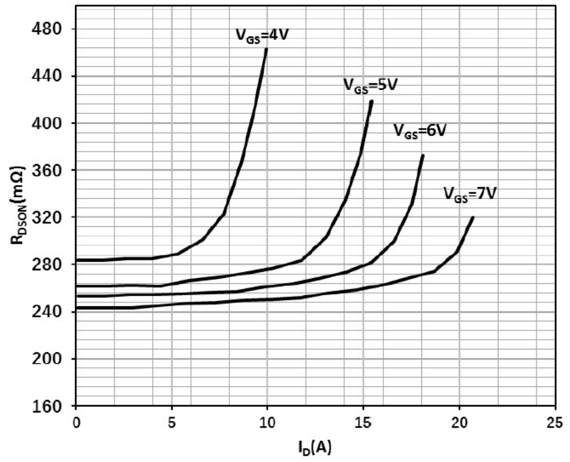
$I_D = f(V_{DS}, V_{GS})$; T_j = 125 °C, T_{Pulse}=10us, Duty=0.001%

Figure 3 Typ. Drain-source on-state resistance



$R_{DS(on)} = f(I_D, V_{GS})$; T_j = 25 °C, T_{Pulse}=10us, Duty=0.001%

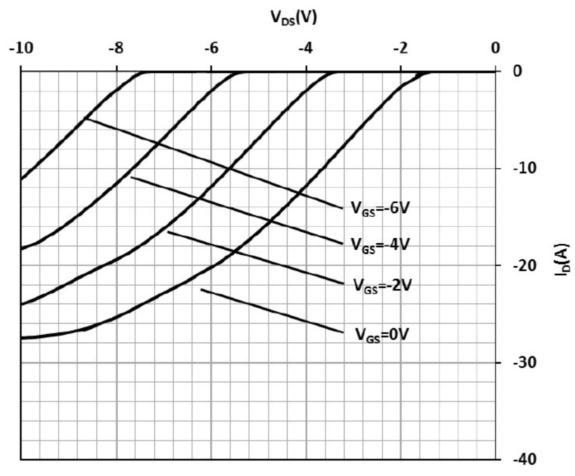
Figure 4 Typ. Drain-source on-state resistance



$R_{DS(on)} = f(I_D, V_{GS})$; T_j = 125 °C, T_{Pulse}=10us, Duty=0.001%

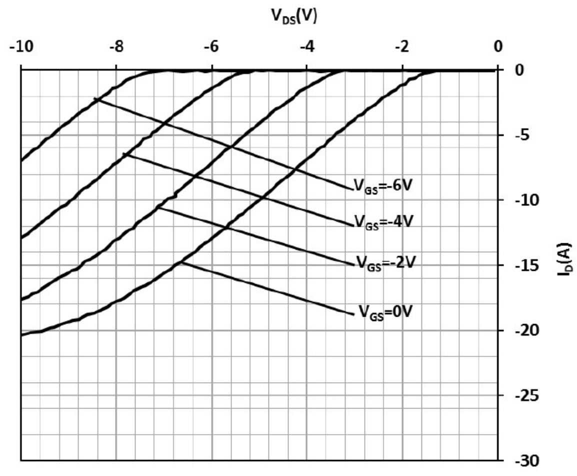
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Figure 5 Typ. channel reverse characteristics



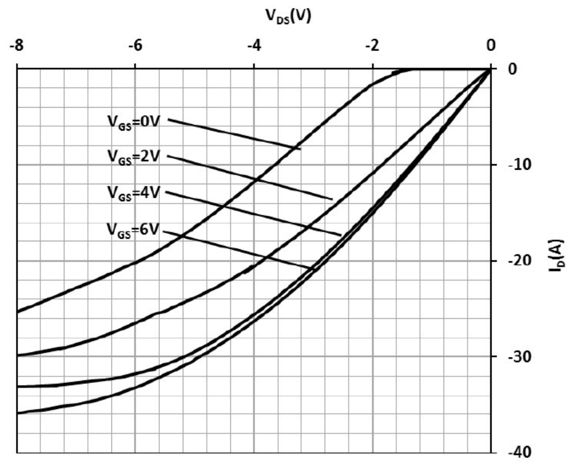
$I_D = f(V_{DS}, V_{GS})$; T_j = 25 °C, T_{Pulse}=10us, Duty=0.001%

Figure 6 Typ. channel reverse characteristics



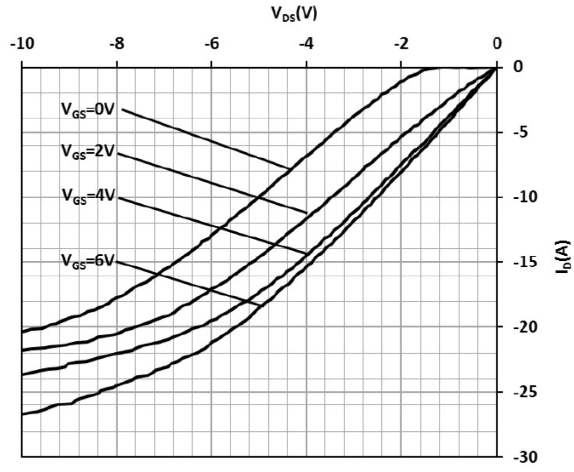
$I_D = f(V_{DS}, V_{GS})$; T_j = 125 °C, T_{Pulse}=10us, Duty=0.001%

Figure 7 Typ. channel reverse characteristics



$I_D = f(V_{DS}, V_{GS})$; T_j = 25 °C, T_{Pulse}=10us, Duty=0.001%

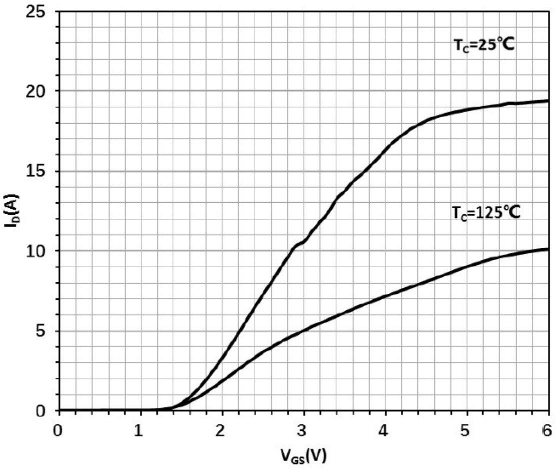
Figure 8 Typ. channel reverse characteristics



$I_D = f(V_{DS}, V_{GS})$; T_j = 125 °C, T_{Pulse}=10us, Duty=0.001%

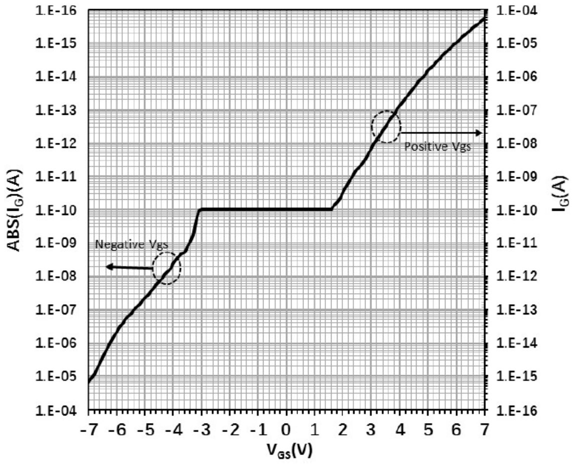
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Figure 9 Typ. transfer characteristics



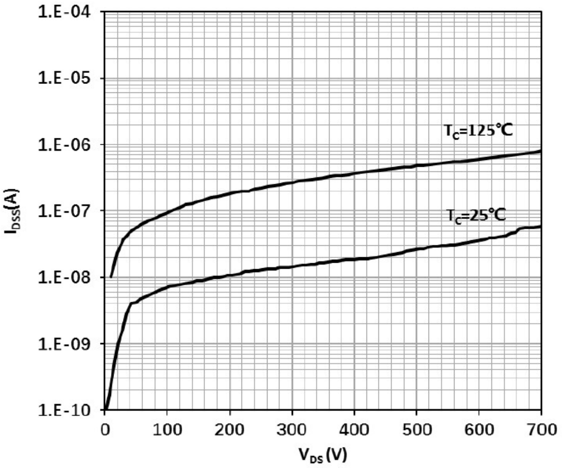
$I_D = f(V_{GS})$; V_{DS}= 3 V, T_{Pulse}=10us, Duty=0.001%

Figure 10 Typ. Gate-to-Source leakage



$I_G = f(V_{GS})$; test resolution limit 0.1nA

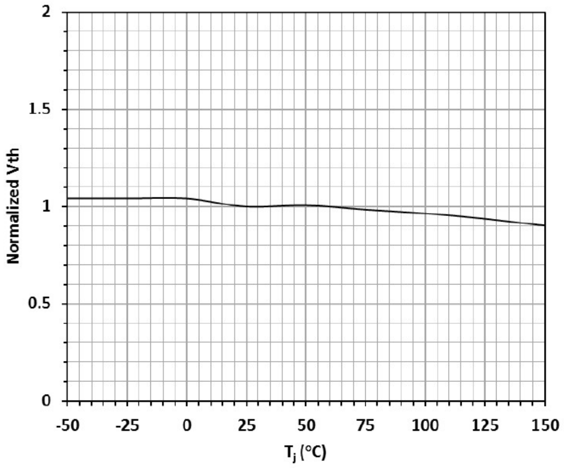
Figure 11 Drain-source leakage characteristics



$I_{DSS} = f(V_{DS})$; V_{GS} = 0 V

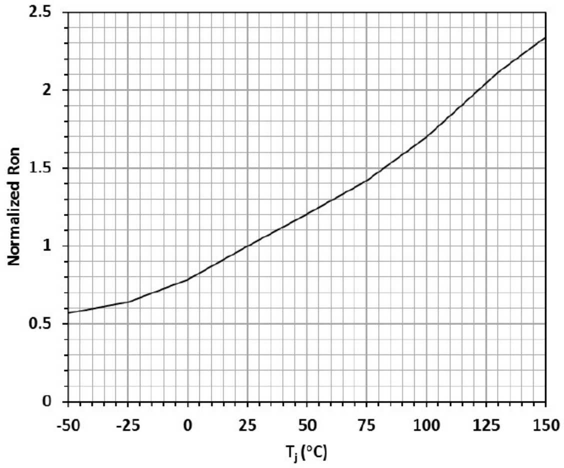
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Figure 12 Gate threshold voltage



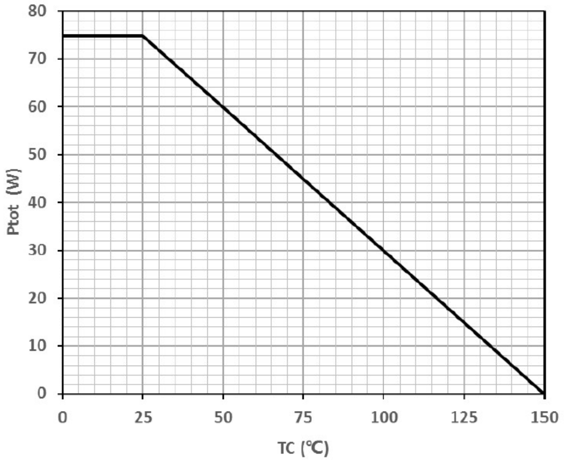
$V_{TH} = f(T_j)$; $V_{GS} = V_{DS}$; I_D = 10.7mA

Figure 13 Drain-source on-state resistance



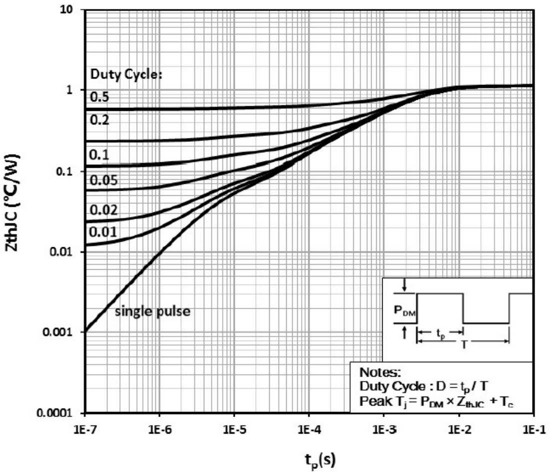
$R_{DS(on)} = f(T_j)$; I_D = 4 A; V_{GS}=6V, Duty=0.001%

Figure 14 Power dissipation



$P_{tot} = f(T_C)$

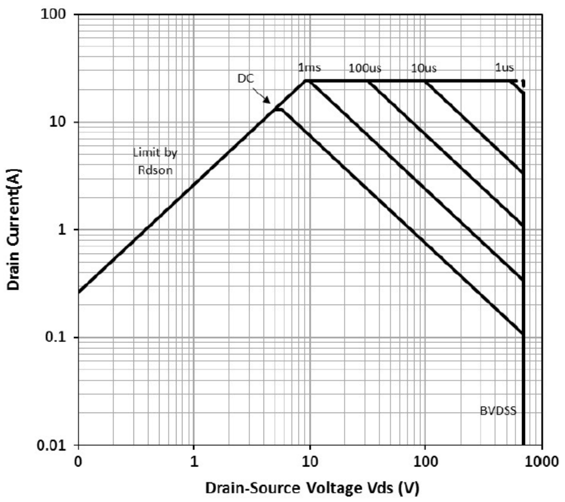
Figure 15 Max.transient thermal impedance



$Z_{thJC} = f(t_P, D)$

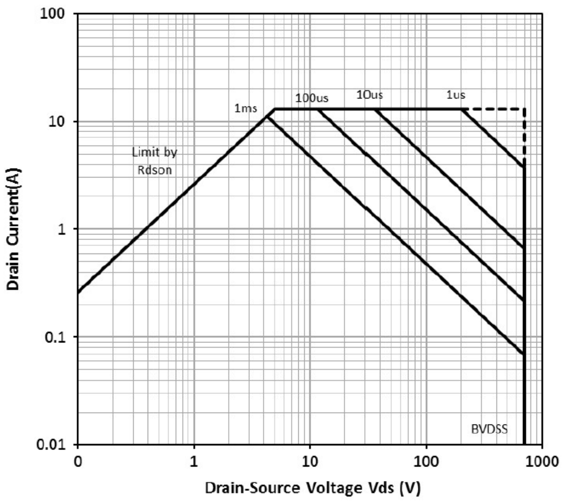
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Figure 16 Safe operating area



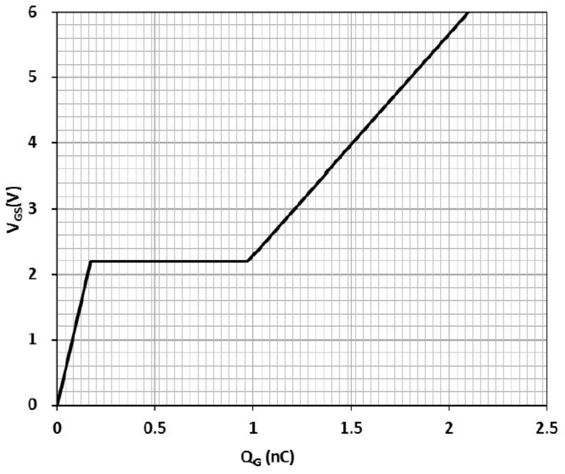
$I_D = f(V_{DS})$; $T_C = 25$ °C, Duty=0

Figure 17 Safe operating area



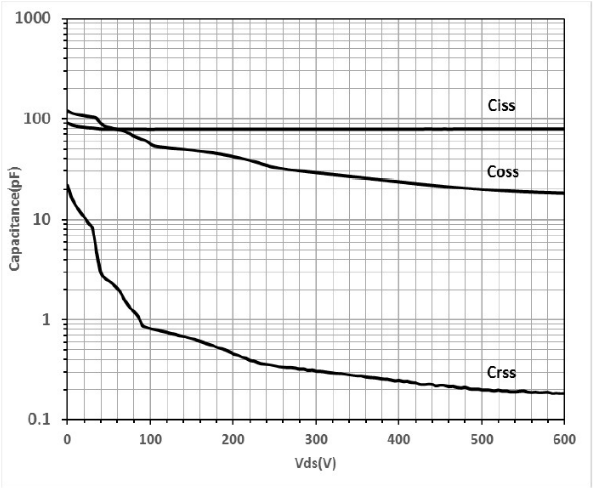
$I_D = f(V_{DS})$; $T_C = 125$ °C, Duty=0

Figure 18 Typ. gate charge



$V_{GS} = f(Q_G)$; $V_{DCLINK} = 400$ V; $I_D = 4$ A

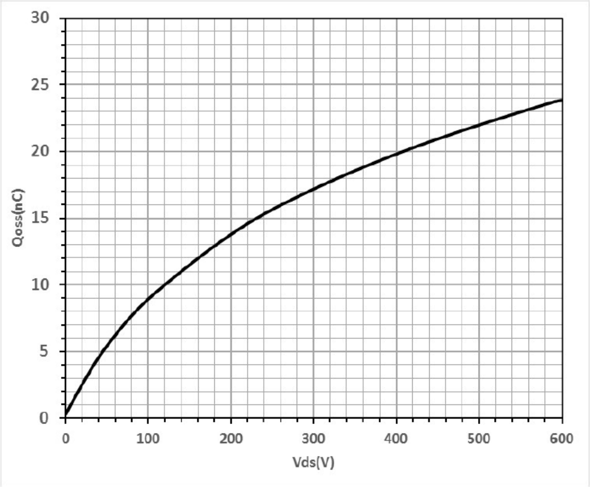
Figure 19 Typ. capacitances



$C_{XSS} = f(V_{DS})$; Freq. = 100 kHz

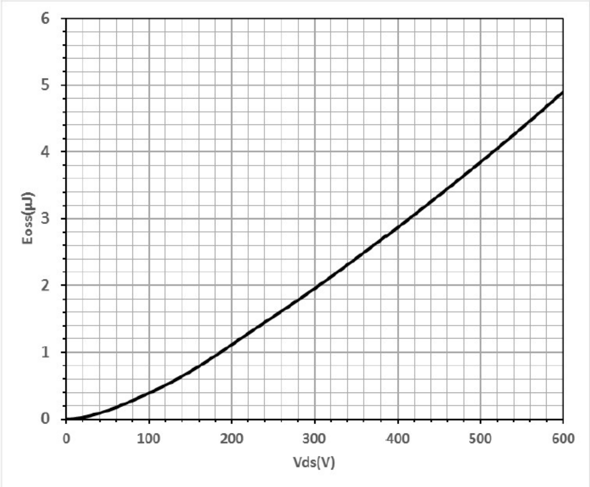
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

Figure 20 Typ. output charge



$Q_{OSS} = f(V_{DS})$; Freq. = 100 kHz

Figure 21 Typ. C_{OSS} stored Energy



$E_{OSS} = f(V_{DS})$; Freq. = 100 kHz

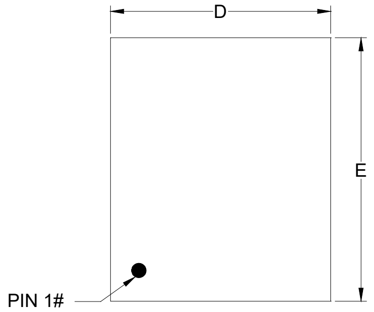
REVISION HISTORY

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

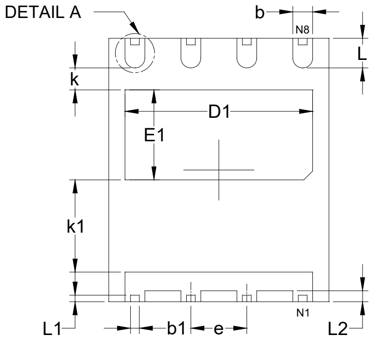
Changes from Original to REV.A (JUNE 2026)	**Page**
Changed from product preview to production data	All

PACKAGE OUTLINE DIMENSIONS

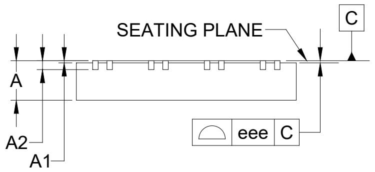
TDFN-5×6-8L



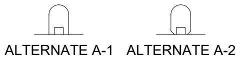
TOP VIEW



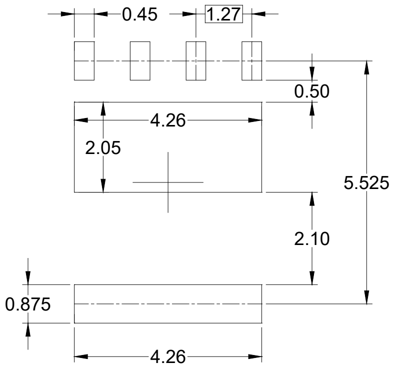
BOTTOM VIEW



SIDE VIEW



DETAIL A
ALTERNATE TERMINAL
CONSTRUCTION



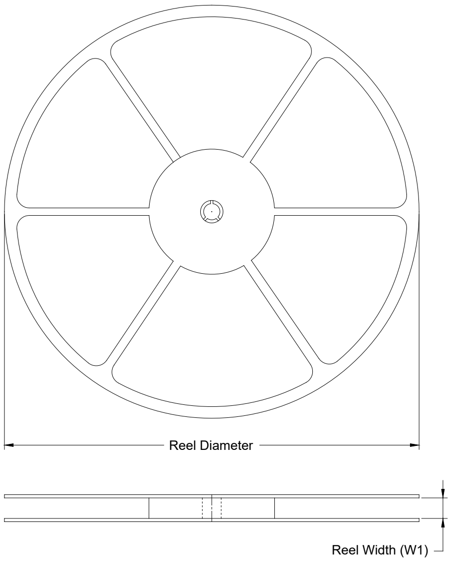
RECOMMENDED LAND PATTERN (Unit: mm)

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		

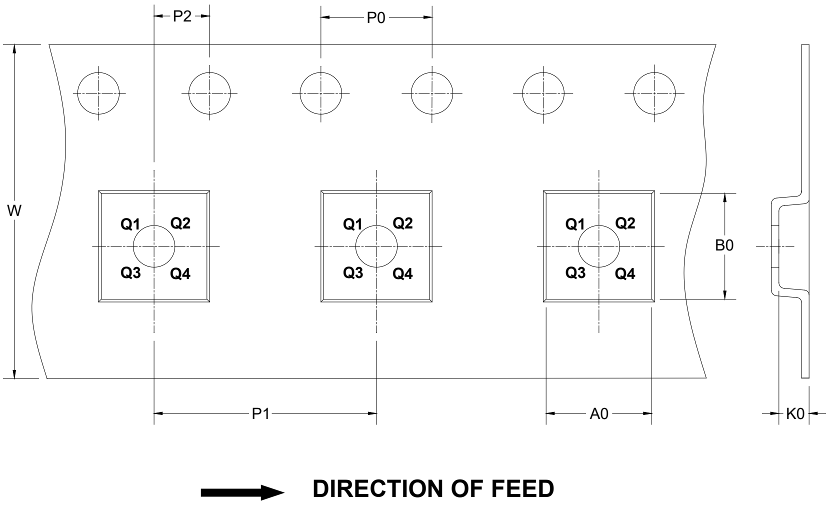
NOTE: This drawing is subject to change without notice.

TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



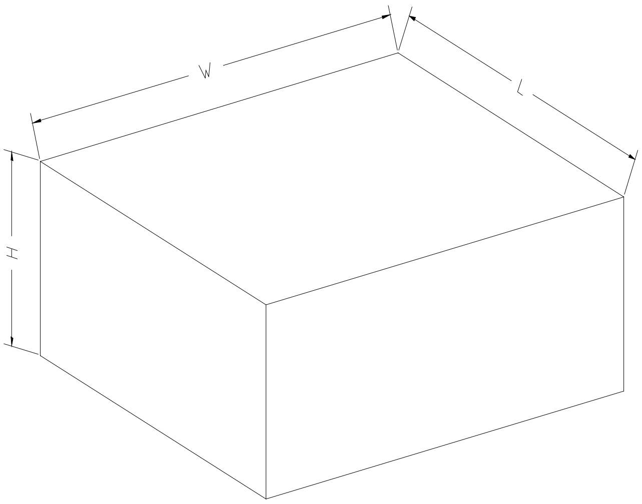
NOTE: The picture is only for reference. Please make the object as the standard.

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-5×6-8L	13"	12.4	5.30	6.30	1.20	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