

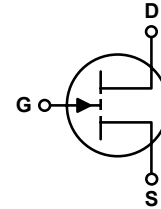
INN100W800A-Q

1. General description

GaN-on-Silicon enhancement mode high-electron-mobility-transistor (HEMT) in WLCSP with 0.9 mm x 0.9 mm package size.

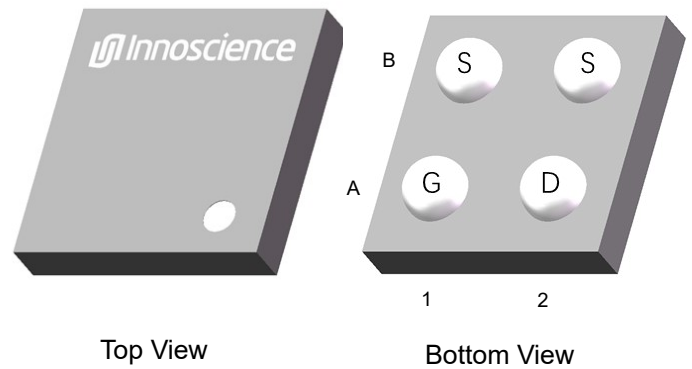
2. Features

- AEC-Q101 Qualified
- GaN-on-Silicon E-mode HEMT technology
- Very low gate charge
- Very small package size
- Zero reverse recovery charge



3. Applications

- LiDAR Application
- High Power Density DC-DC Converters
- Class-D Audio
- High Intensity Headlamps



4. Key performance parameters

Table 1 Key performance parameters at $T_J = 25\text{ }^\circ\text{C}$

Parameter	Value	Unit
$V_{DS,max}$	100	V
$R_{DS(on),max}$ @ $V_{GS} = 5\text{ V}$	80	m Ω
$Q_{G,typ}$ @ $V_{DS} = 50\text{ V}$	0.75	nC
$I_{DS,Pulse}(T_A = 25\text{ }^\circ\text{C})$	17	A
Q_{OSS} @ $V_{DS} = 50\text{ V}$	4	nC

5. Pin information

Table 2 Pin information

PIN	Pin Description	Pin Function
A1	Gate	Driver Gate
A2	Drain	Power Drain
B1,B2	Source	Power Source

Table 3 Ordering information

Type/Ordering Code	Package	Product Code
INN100W800A-Q	WLCSP 0.9 x 0.9	J33

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6. Maximum ratings

at $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified.

Continuous application of maximum ratings can deteriorate transistor lifetime. For further information, contact Innoscence sales office.

Table 4 Maximum ratings

SYMBOL	PARAMETER	MAX	UNIT
V_{DS}	Drain-to-Source Voltage (Continuous)	100	V
I_D	Continuous current($T_A = 25\text{ }^\circ\text{C}$)	1.7	A
	Pulsed ($T_A = 25\text{ }^\circ\text{C}$, $T_{PULSE} = 300\text{ }\mu\text{s}$)	17	A
V_{GS}	Gate-to-Source Voltage	6	V
	Gate-to-Source Voltage	-4	V
T_J	Operating Temperature	-40 to 150	$^\circ\text{C}$
T_{STG}	Storage Temperature	-55 to 150	$^\circ\text{C}$

7. Thermal characteristics

Table 5 Thermal characteristics

SYMBOL	PARAMETER	TYP	UNIT	Note/Test Condition
$R_{\theta JC}$	Thermal Resistance, Junction to Case	2.87	°C/W	-
$R_{\theta JB}$	Thermal Resistance, Junction to Board	45.12	°C/W	-
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient ¹	103.57	°C/W	-
T_{sold}	Maximum reflow soldering temperature	260	°C	MSL1

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

8. Electric characteristics

at $T_J = 25\text{ }^\circ\text{C}$ unless otherwise specified.

Table 6 Static characteristics

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	TEST CONDITIONS
BV_{DSS}	Drain-to-Source Voltage	100	-	-	V	$V_{GS} = 0\text{ V}$, $I_D = 115\text{ }\mu\text{A}$
I_{DSS}	Drain Source Leakage	-	0.01	10	μA	$V_{GS} = 0\text{ V}$, $V_{DS} = 100\text{ V}$
I_{GSS}	Gate-to-Source Forward Leakage	-	3	100	μA	$V_{GS} = 6\text{ V}$, $V_{DS} = 0\text{ V}$
	Gate-to-Source Reverse Leakage	-	0.1	10	μA	$V_{GS} = -4\text{ V}$, $V_{DS} = 0\text{ V}$
$V_{GS(TH)}$	Gate Threshold Voltage	0.7	1.1	2.1	V	$V_{DS} = V_{GS}$, $I_D = 0.6\text{ mA}$
$R_{DS(on)}$	Drain-Source On-state Resistance	-	53	80	$\text{m}\Omega$	$V_{GS} = 5\text{ V}$, $I_D = 1\text{ A}$
V_{SD}	Source-Drain Forward Voltage	-	2	-	V	$I_{SD} = 0.5\text{ A}$, $V_{GS} = 0\text{ V}$

Table 7 Dynamic characteristics

SYMBOL	PARAMETER	MIN	TYP	MAX	UNIT	TEST CONDITIONS
C _{ISS}	Input Capacitance	-	85	-	pF	V _{GS} = 0 V, V _{DS} = 50 V
C _{OSS}	Output Capacitance	-	41	-		V _{GS} = 0 V, V _{DS} = 50 V
C _{RSS}	Reverse Transfer Capacitance	-	1	-		V _{GS} = 0 V, V _{DS} = 50 V
C _{OSS(ER)}	Energy Related C _{OSS}	-	58	-		V _{GS} = 0 V, V _{DS} = 0 V to 50 V
C _{OSS(TR)}	Time Related C _{OSS}	-	80	-		V _{GS} = 0 V, V _{DS} = 0 V to 50 V
R _G	Gate resistance	-	2.3	-	Ω	f = 5MHz, open drain
Q _G	Total Gate Charge	-	0.75	-	nC	V _{GS} = 5 V, V _{DS} = 50 V, I _D = 1 A
Q _{GS}	Gate to Source Charge	-	0.16	-		V _{DS} = 50 V, I _D = 1 A
Q _{GD}	Gate to Drain Charge	-	0.13	-		V _{DS} = 50 V, I _D = 1 A
Q _{G(TH)}	Gate Charge at Threshold	-	0.1	-		V _{DS} = 50 V, I _D = 1 A
Q _{OSS}	Output Charge	-	4	-		V _{GS} = 0 V, V _{DS} = 50 V

9. Electric characteristics diagrams

at $T_J = 25^\circ\text{C}$ unless otherwise specified.

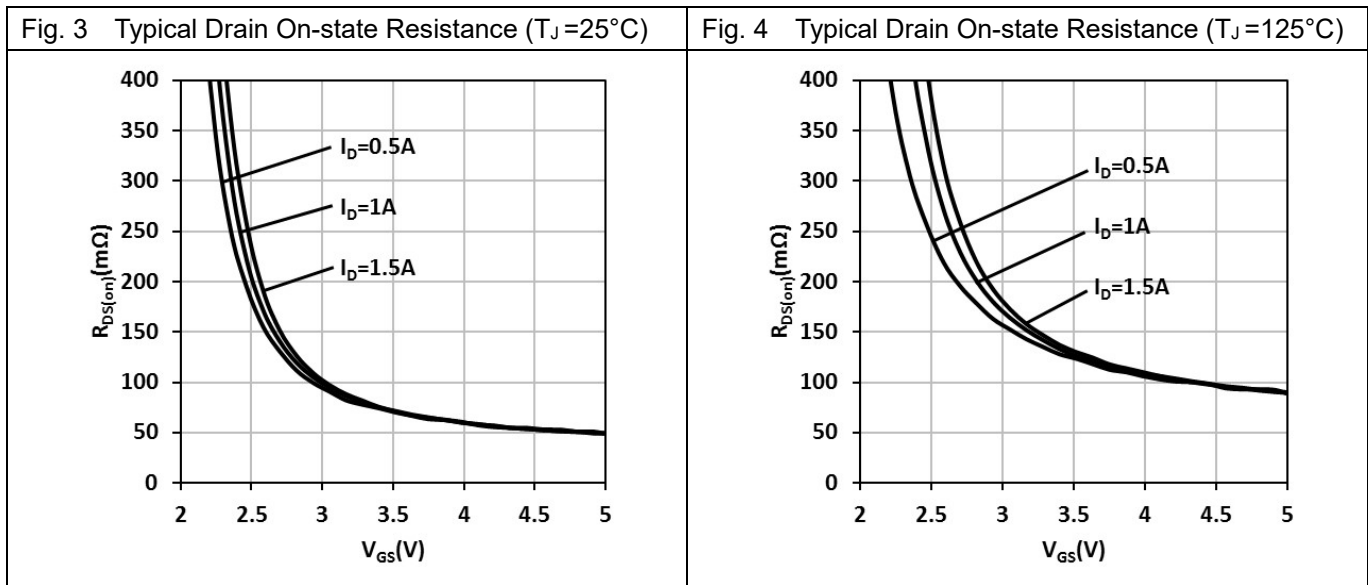
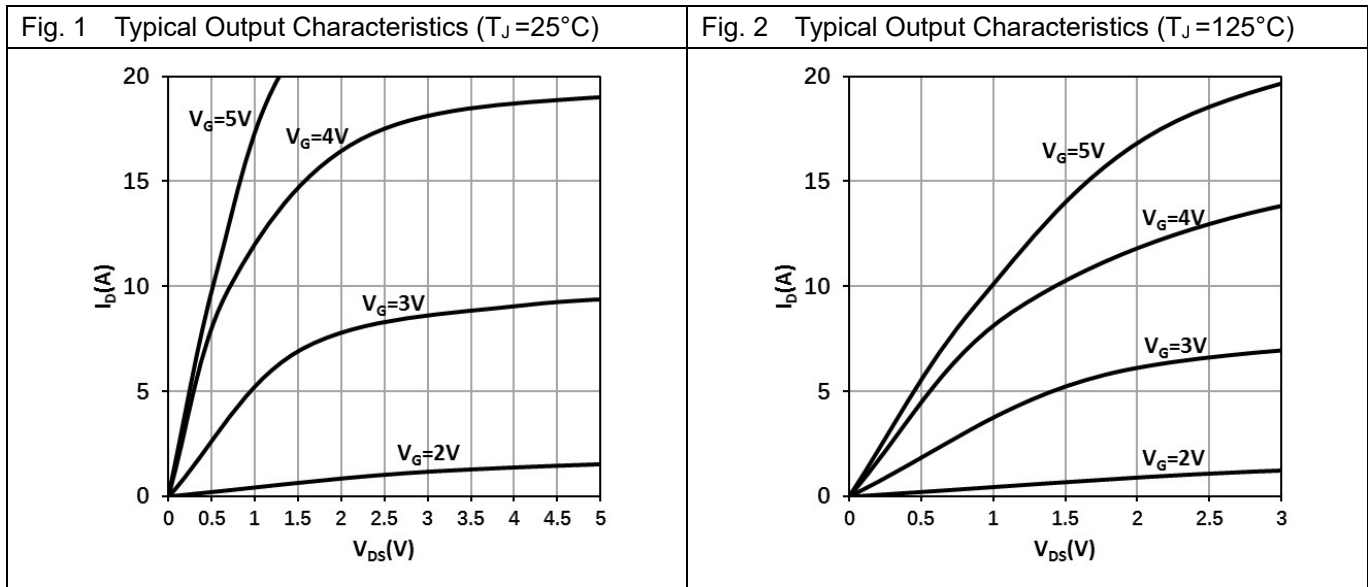


Fig. 5 Normalized On-State Resistance vs. Temp.

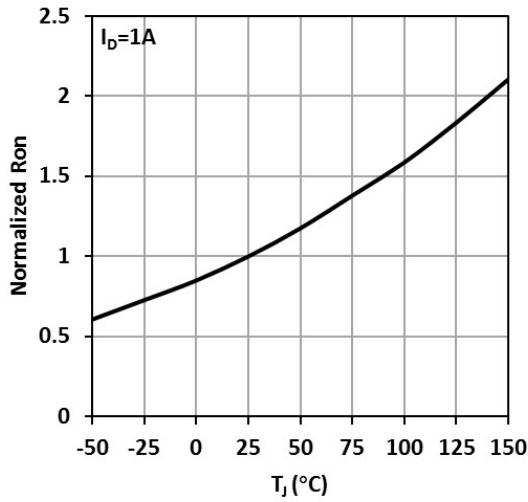


Fig. 6 Typical Transfer Characteristics

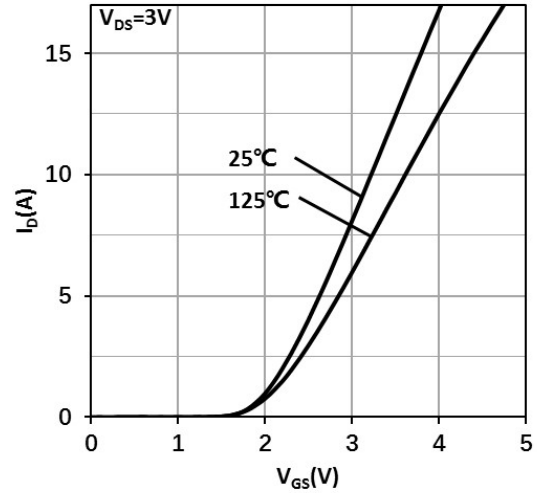


Fig. 7 Typ. Reverse Drain-Source Characteristics (V_{GS} ≤ 0, T_J = 25°C)

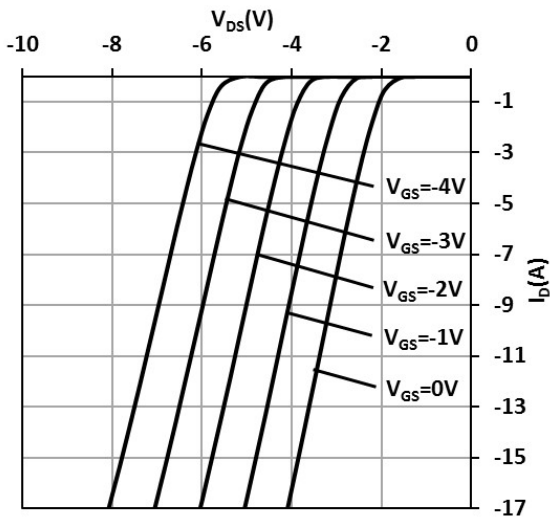


Fig. 8 Typ. Reverse Drain-Source Characteristics (V_{GS} ≥ 0, T_J = 25°C)

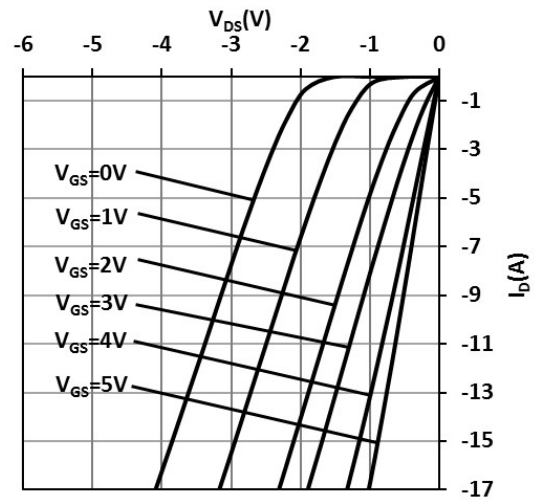


Fig. 9 Typ. Reverse Drain-Source Characteristics ($V_{GS} \leq 0$, $T_J = 125^\circ\text{C}$)

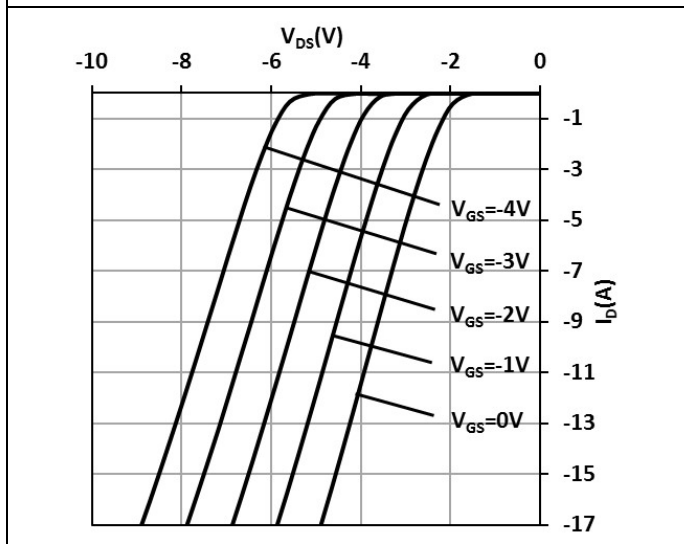


Fig. 10 Typ. Reverse Drain-Source Characteristics ($V_{GS} \geq 0$, $T_J = 125^\circ\text{C}$)

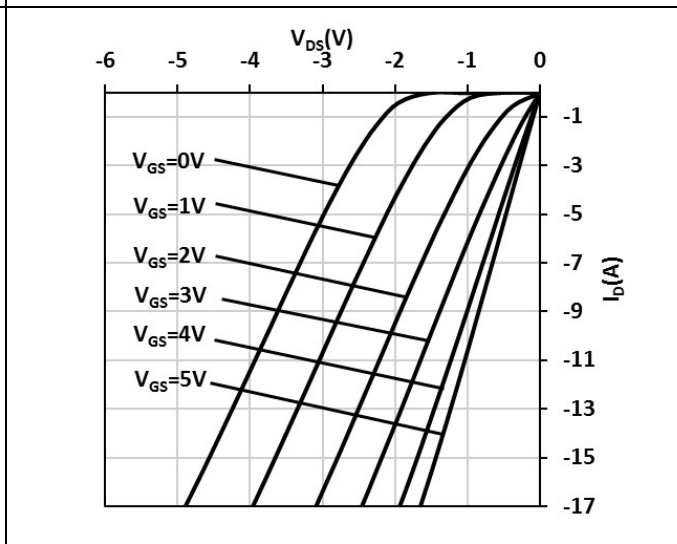


Fig. 11 Typ. Capacitances Characteristics

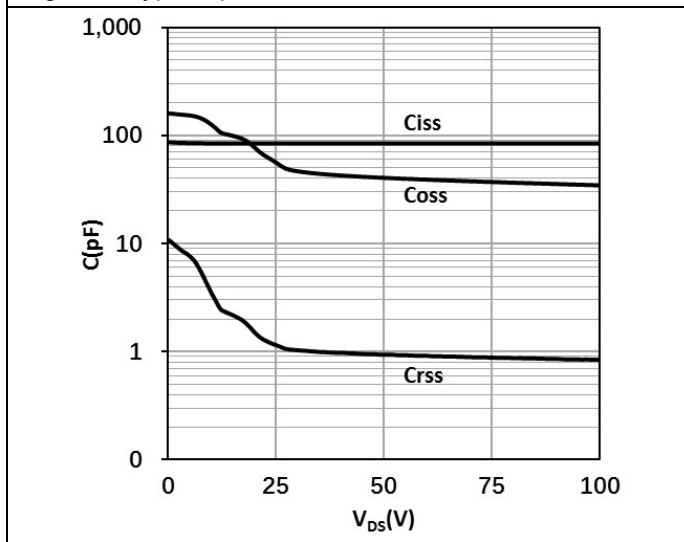


Fig. 12 Typ. Gate Charge

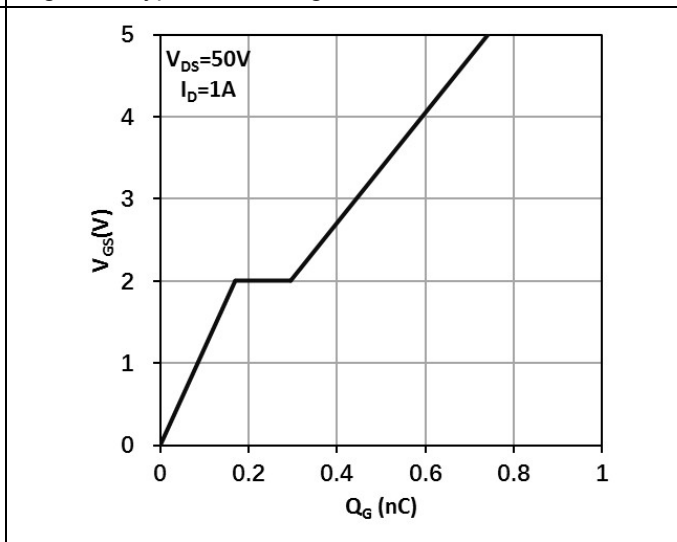


Fig. 13 Normalized Threshold Voltage vs. Temp.

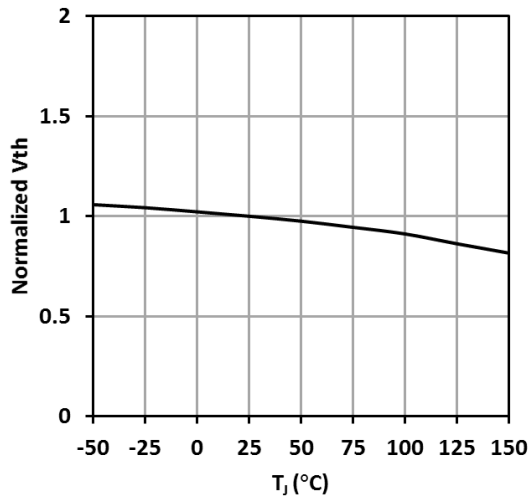


Fig. 14 Output Charge

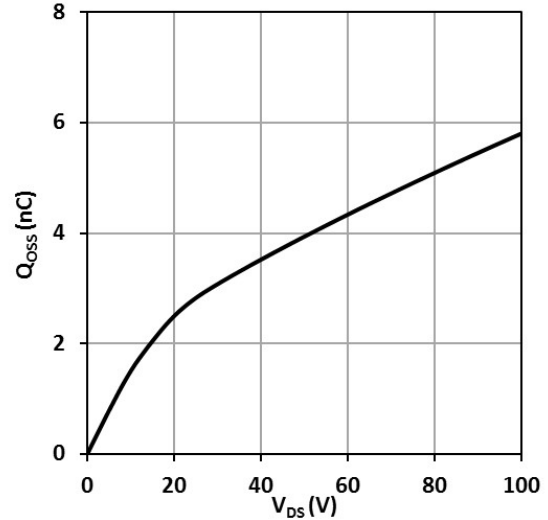


Fig. 15 Output Capacitance Stored Energy

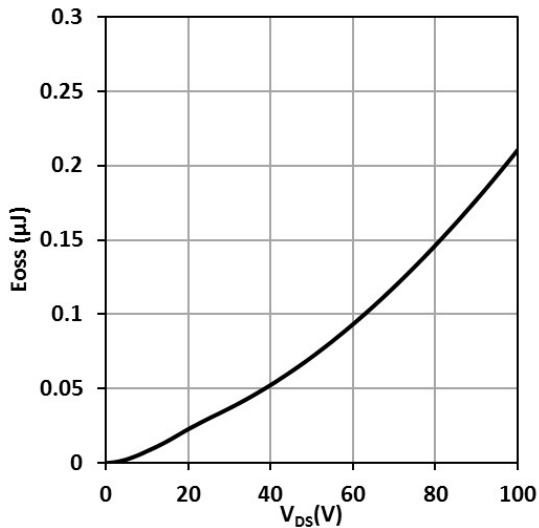


Fig. 16 Power Dissipation

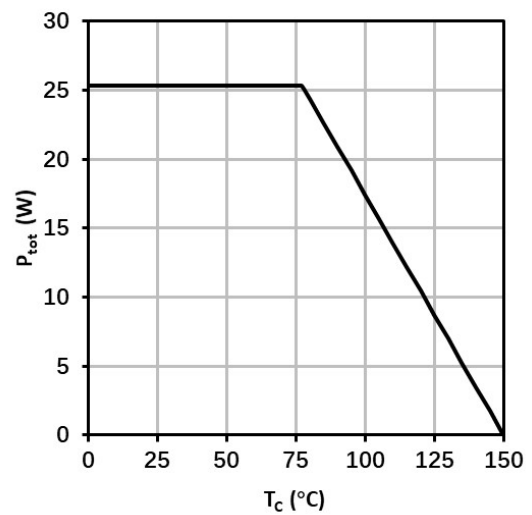


Fig. 17 Safe Operating Area

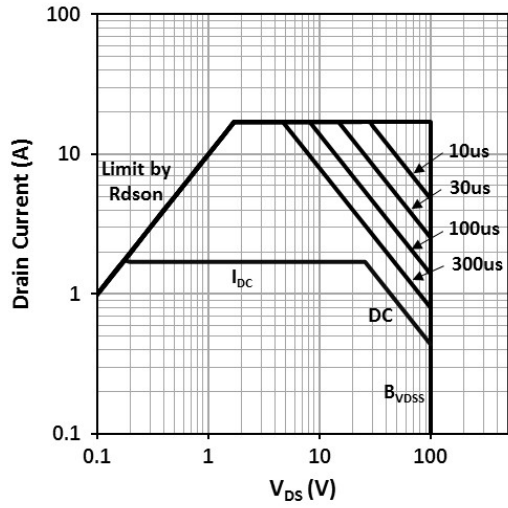
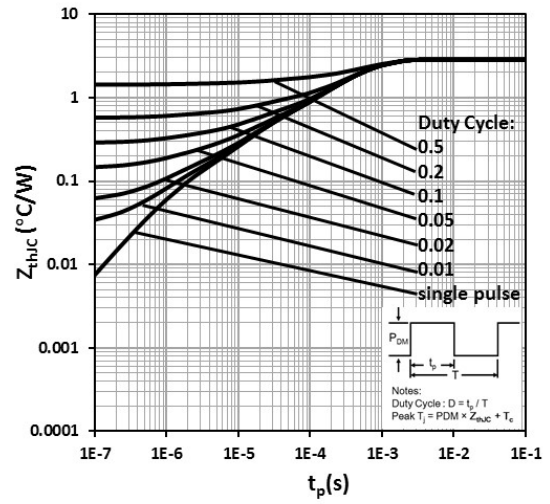
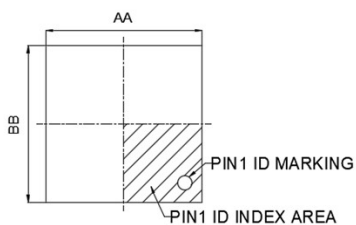


Fig. 18 Max. Transient Thermal Impedance

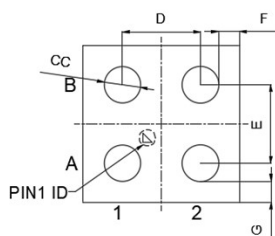


10. Package outlines

Package Reference

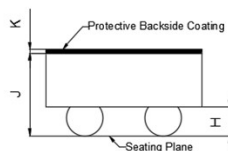


TOP VIEW



BOTTOM VIEW

SYMBOL	MILLIMETER			NOTE
	MIN	NOM	MAX	
AA	0.875	0.9	0.925	
BB	0.875	0.9	0.925	
CC	0.181	0.208	0.235	4X
D	0.45 BASIC			2X
E	0.45 BASIC			2X
F	0.121 REF			4X
G	0.121 REF			4X
H	0.135	0.165	0.195	
J	0.439	0.474	0.509	
K	0.022	0.025	0.028	

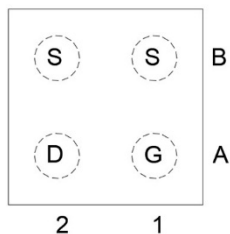


SIDE VIEW

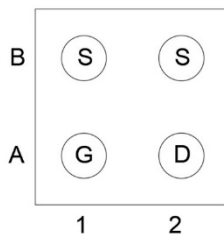
NOTE:

- 1) ALL DIMENSION ARE IN MILLIMETERS.
- 2) BOTTOM VIEW IS SOLDER BUMP VIEW.
- 3) COMPLIES WITH JEDEC MO-211.
- 4) DRAWING IS NOT TO SCALE.
- 5) AA, BB IS PACKAGE SIZE
- 6) SOLDER BUMP COPLANARITY SHALL BE 0.05 MILLIMETERS MAX

PIN configuration

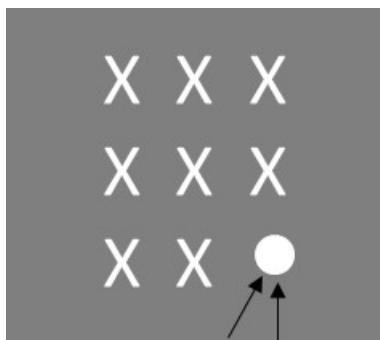


TOP VIEW



BOTTOM VIEW

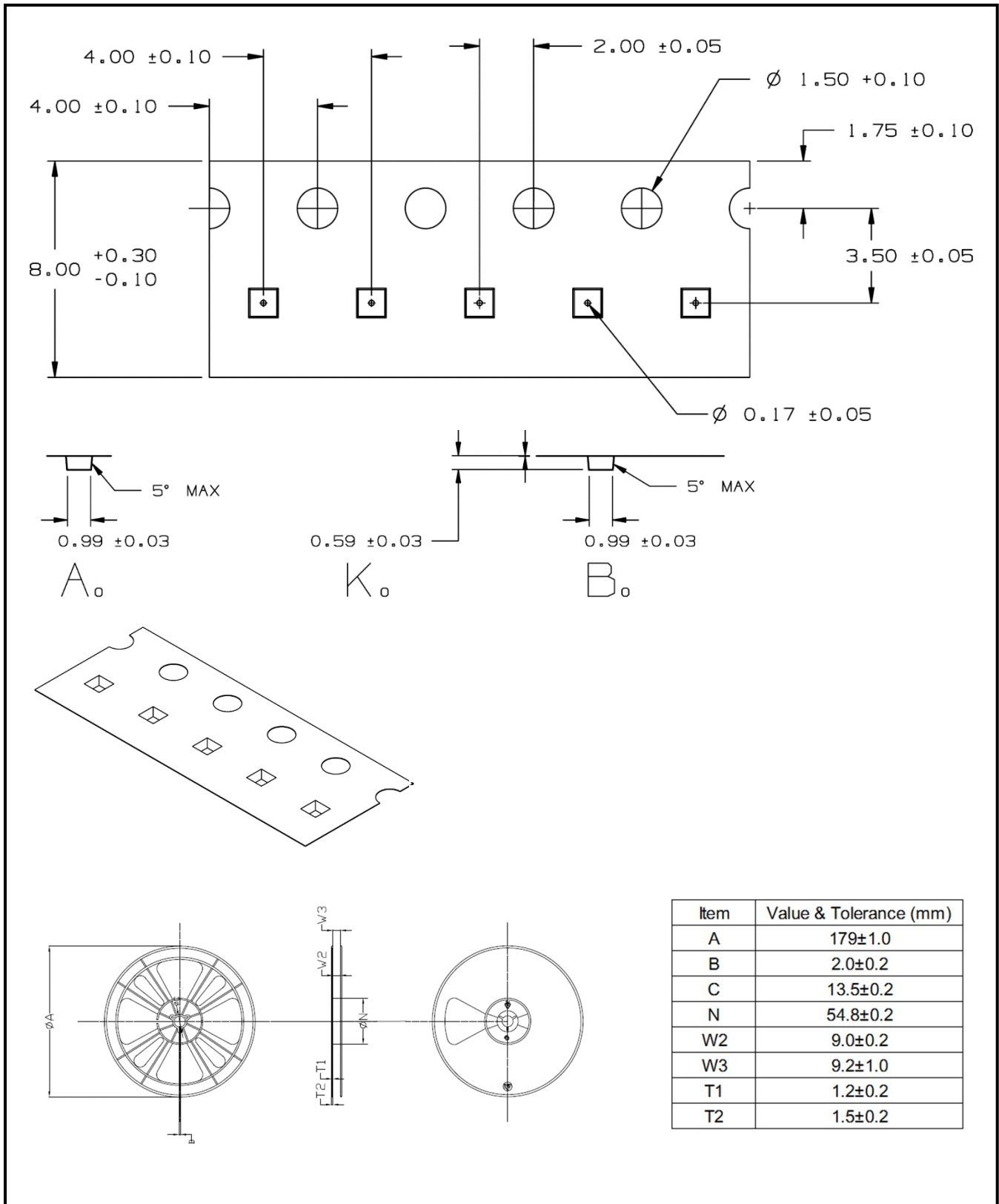
Marking Reference



Gate Position
Die Orientation Dot

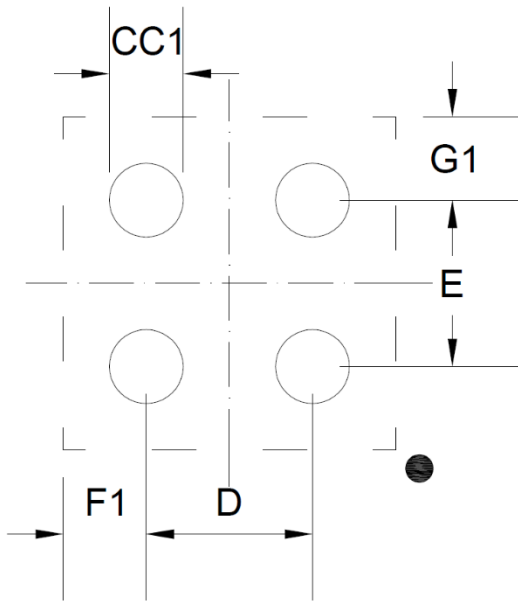
Row	Description	Example
Row 1	Product Code	XXX
Row 2	Lot Code	XXX
Row 3		XX

11. Reel information



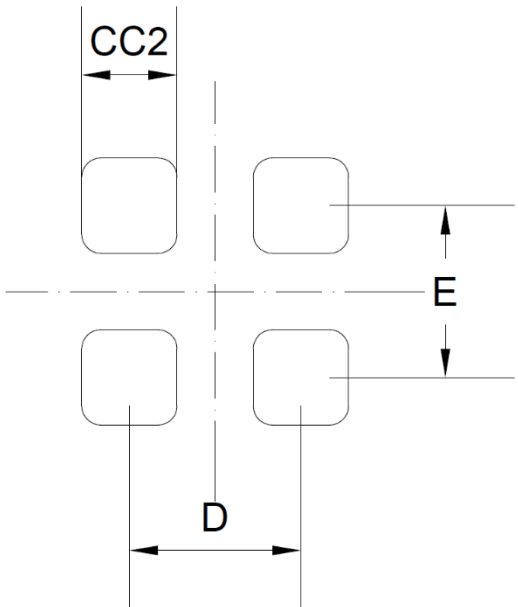
12. Land Pattern

Recommended land pattern



SYMBOL	MILLIMETER	NOTE
CC1	0.20	4X
D	0.45	2X
E	0.45	2X
F1	0.225	4X
G1	0.225	4X

Recommended Stencil drawing



SYMBOL	MILLIMETER	NOTE
CC2	0.25	4X
D	0.45	2X
E	0.45	2X

13. Revision history

Major changes since the last revision

Revision	Date	Description of changes
1.0	2024-06-27	Version 1.0 release

Important Notice

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