GR-10E003DJ: E-mode GaN Power Transistor

Description

GR-10E003DJ is an enhancement mode GaN on Silicon power transistor. 10E003DJ provides, high current and high operating speed which is suitable for DC to DC power supply applications.

Key Specifications

Part Number	GR-10E003DJ
V_{DSS}, min.	100V
$I_{DS,\ Pulse\ (25°C,\ TPULSE\ =\ 300\ \mu s)}$	150A
$R_{DS(ON)}$, typ. @Vgs=6V	3.1mΩ
Q_G, typ.	16.8nC

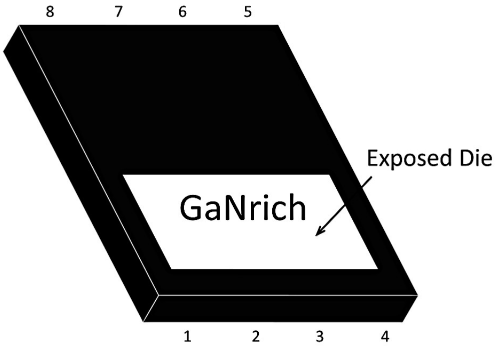
Features

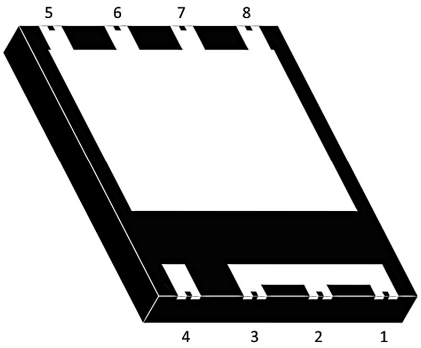
- 100 V enhancement mode power transistor
- High operating frequency
- RDS(on) = Typ. 3.1mΩ
- RoHS compliant
- Zero QRR.

Applications

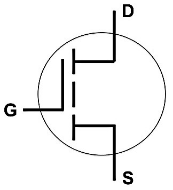
- ■ Switch Mode Power Supplies (SMPS)
- ■ DC-DC Converters
- ■ Fast Battery Charging
- ■ Appliance Motor Drives

GR-10E003DJ, DFN-5x6-8L





Drain	5, 6, 7, 8
Gate	4
Source	1, 2, 3



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1. Electrical Characteristics

➢ Table 1 Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-source voltage	100	V
$V_{(TR)DSS}$	Transient drain to source voltage[a]	120	V
V_{GSS}	Gate- source voltage	-4V ~ +6V	V
I_D	Drain current (continuous) at T_C = 25°C operation	55	A
	Drain current (continuous) at T_C = 100°C operation	38	A
$I_{D,Pulse}$	Pulsed drain current (pulse width: 300µs, Vgs=5V)[b]	150	A
T_J	Operating temperature	-40 to +150	°C
T_S	Storage temperature	-40 to +150	°C
MSL	Moisture sensitivity level	MSL3	

a. In off-state, spike duty cycle D<0.01, spike duration <1µs

b. Defined by product design and characterization. Value is not tested to full current in production

➢ Table 2 Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\Theta JC\_Top}$	Thermal resistance junction-case, Top	0.65	°C/W
$R_{\Theta JC\_Bot}$	Thermal resistance junction-case, Bottom	0.50	°C/W
$R_{\Theta JA}$	Thermal resistance junction-ambient	60	°C/W

a. Tested in package DFN-5x6.

➢ **Table 3 Electrical Characteristics** (T_{CASE} = 25 °C unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
V_{DSS}	Drain-source voltage	V_{GS}= 0V, I_D= 250µA	100	-	-	V
$V_{GS(th)}$	Gate threshold voltage	V_{DS}=V_{GS}, I_D= 1mA	0.8	1.1	1.5	V
$R_{DS(on)}$	Drain-source on-resistance	V_{GS}= 6V, I_D= 20A	-	3.1	4.0	mΩ
I_{DSS}	Drain-source leakage current	V_{DS}= 80V, V_{GS}= 0V	-	5	100	µA
I_{GSS}	Gate-to-Source Forward Leakage current	V_{GS} = +5V, T_J=25°C	-	80	1200	µA
	Gate-to-Source Forward Leakage current	V_{GS} = +5V, T_J=125°C	-	750	2500	µA
	Gate-to-Source Reverse Leakage current	V_{GS} = -4V, T_J=25°C	-	2.0	60	µA
C_{ISS}	Input capacitance	V_{DS}= 50V, V_{GS}= 0V	-	1436	-	pF
C_{OSS}	Output capacitance		-	695	-	
C_{RSS}	Reverse transfer capacitance		-	25	-	
Q_G	Gate charge	V_{DS}= 50V, V_{GS}= 5V, I_D= 20A	-	16.8	-	nC
Q_{GS}	Gate-source charge	V_{DS}= 50V, I_D= 20A	-	6.0	-	
Q_{GD}	Gate-drain charge		-	3.5	-	
Q_{OSS}	Output charge	V_{DS}= 50V, V_{GS}= 0V	-	59.5	-	
Q_{RR}	Source-Drain Recovery Charge	-	-	0	-	

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

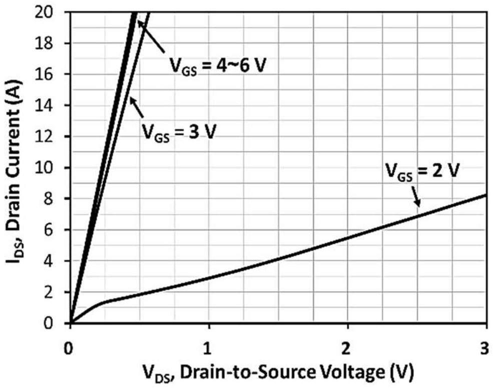


Fig 2. On-Resistance vs Drain Current and Temperature

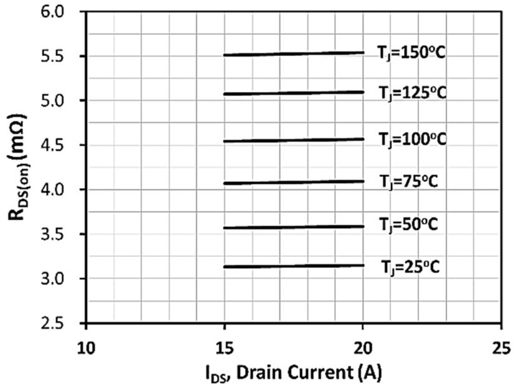


Fig 3. On-Resistance with Drain Current

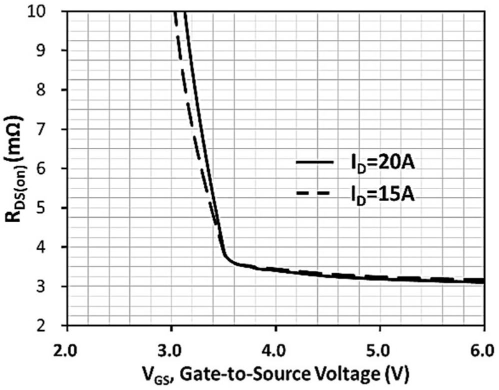


Fig 4. On-Resistance Variation with Temperature

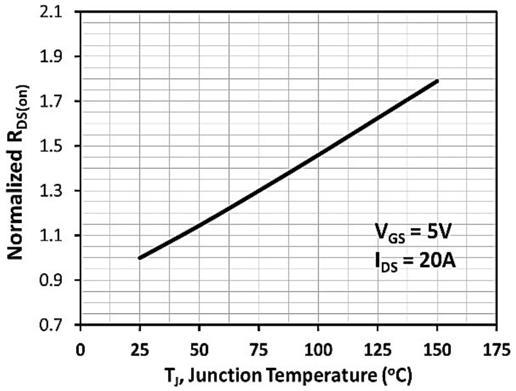


Fig 5. Threshold Voltage with Temperature

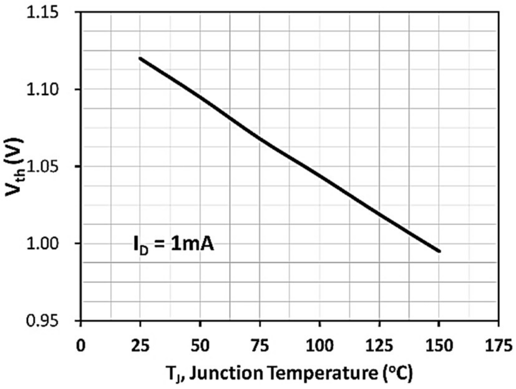


Fig 6. Capacitance Characteristics

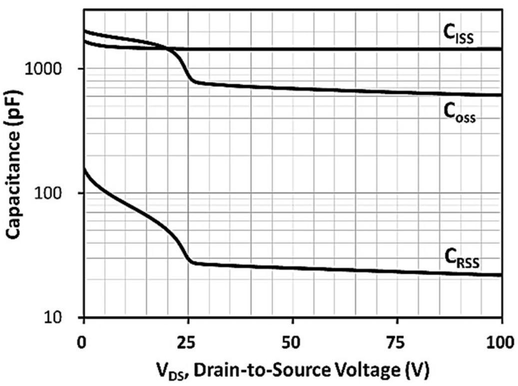


Fig 7. Gate Charge Characteristics, Qg

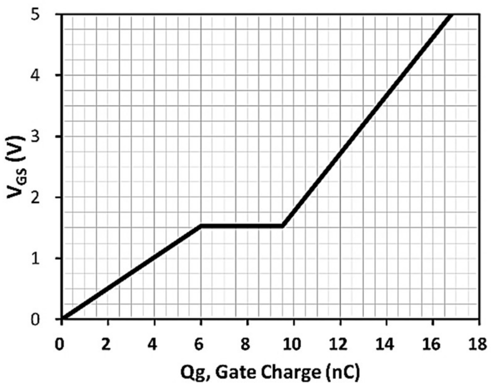


Fig 8. Capacitance Characteristics, Qoss

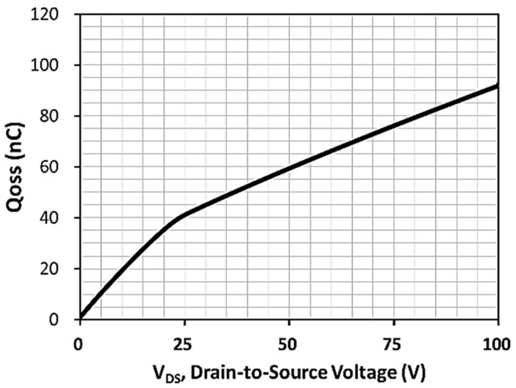
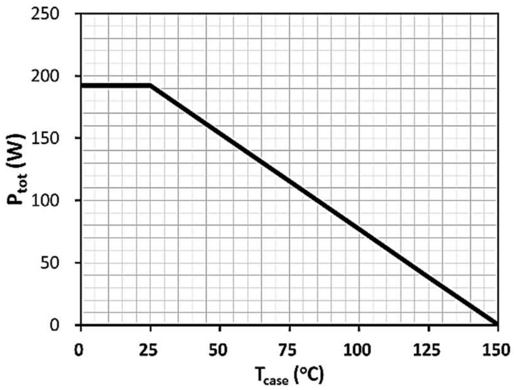
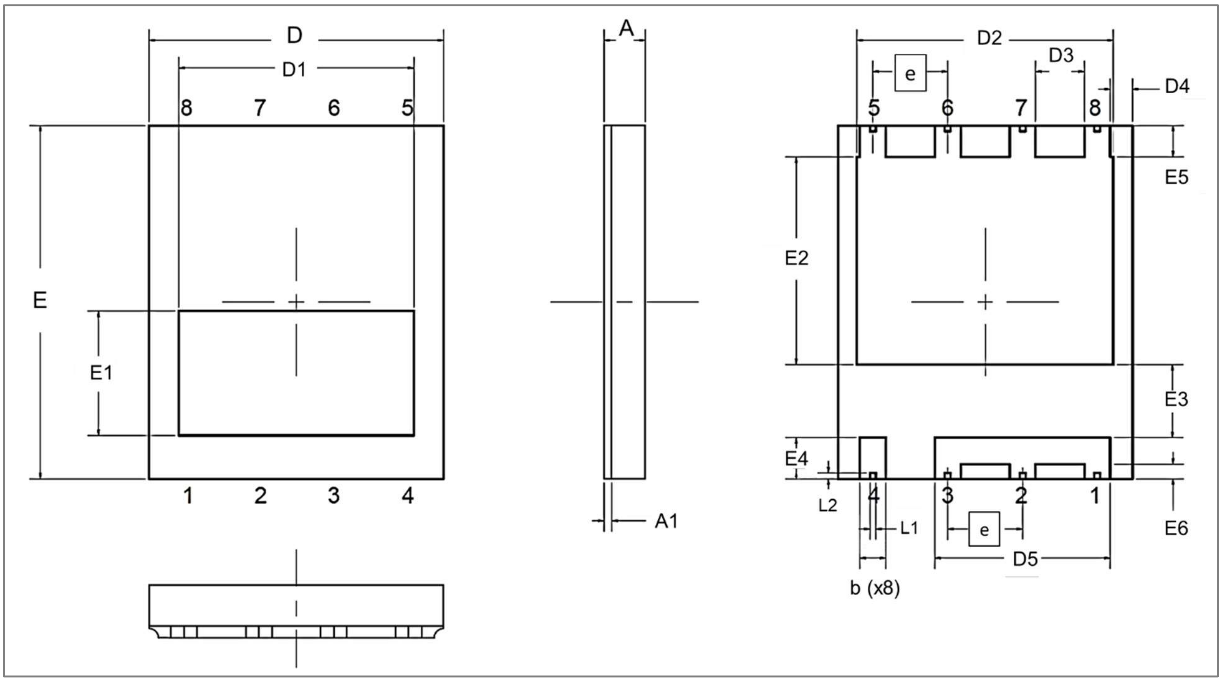


Fig 9. Power Dissipation Derating, Ptot



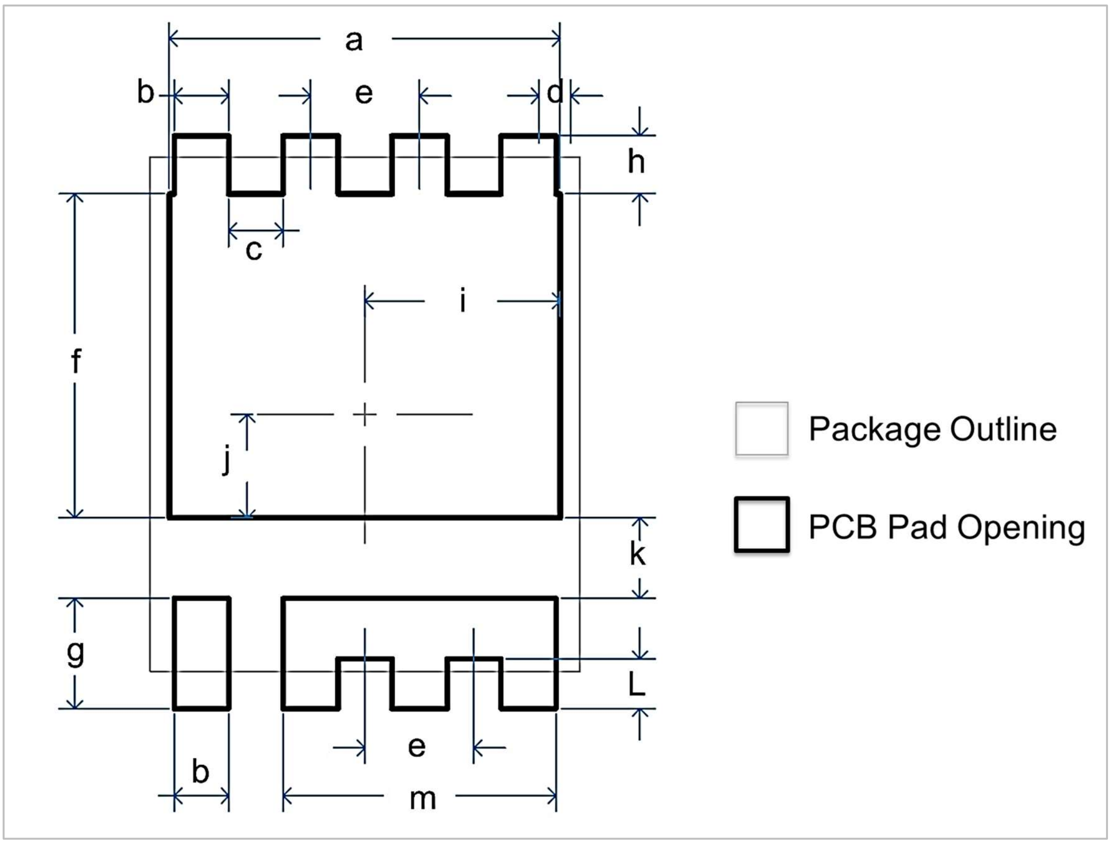
2. Package Outline Dimensions



- **Table 4 Dimension of GR-DFN-5x6-8L**

SYMBOL	DIMENSION (IN MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	---	---	0.70	**D5**	2.88	2.98	3.08
A1	0.13			**E1**	2.112 REF		
A2	0.42	0.45	0.48	**E2**	3.43	3.53	3.63
D	4.90	5.00	5.10	**E3**	1.14	1.24	1.34
E	2.90	6.00	3.10	**E4**	0.60	0.70	0.80
e	1.270 BSC			**E5**	0.43	0.53	0.63
b	0.34	0.44	0.54	**E6**	0.15	0.25	0.35
D1	3.994 REF			**L1**	0.05	0.10	0.20
D2	4.25	4.35	4.45	**L2**	0.05	0.10	0.20
D3	0.73	0.83	0.93				
D4	0.275	0.375	0.475				

Recommended PCB footprint



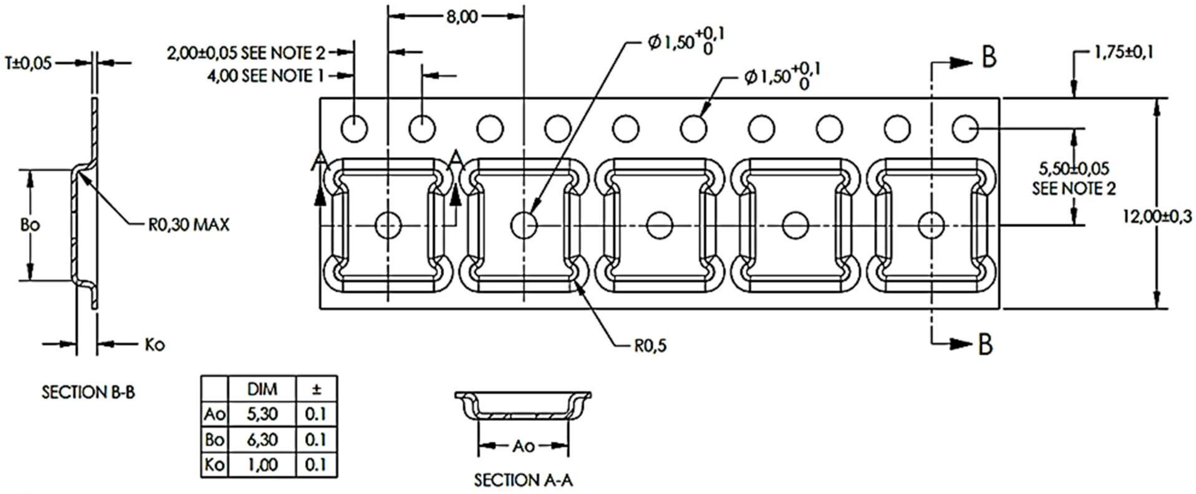
➢ Table 5 PCB Footprint Dimension

SYMBOL	DIMENSION	SYMBOL	DIMENSION
a	4.550	**h**	0.680
b	0.640	**i**	2.275
c	0.630	**j**	1.210
d	0.375	**k**	0.940
e	1.270	**L**	0.580
f	3.780	**m**	3.180
g	1.280	-	-

Notes:
(1) All dimensions are in mm.
(2) Drawing is not to Scale.

3. Tape and Reel Information

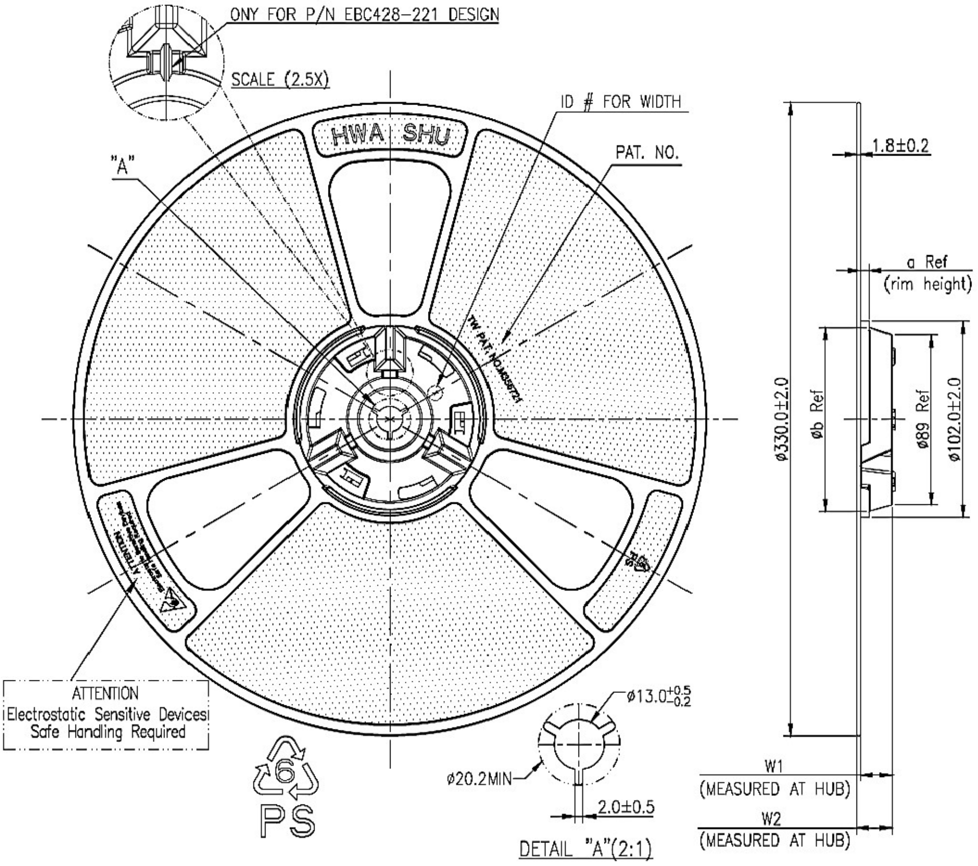
13” Reel, Carrier Tape W=12mm



	DIM	±
Ao	5,30	0.1
Bo	6,30	0.1
Ko	1,00	0.1

Unit: mm

4.



5.

6. Change Log

Version	Date	Description
0.1	March 28, 2025	Initial version
0.2	October 22, 2025	Revised electrical characteristic curves.

- ***Note:*** GaNrich semiconductor reserves the right to revise products and/or specifications without notice.