

GR-70E150DD: Enhancement Mode Power Transistor

Description

GR-70E150DD is an enhancement mode GaN on Silicon power transistor. 70E150DD provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.

Key Specifications

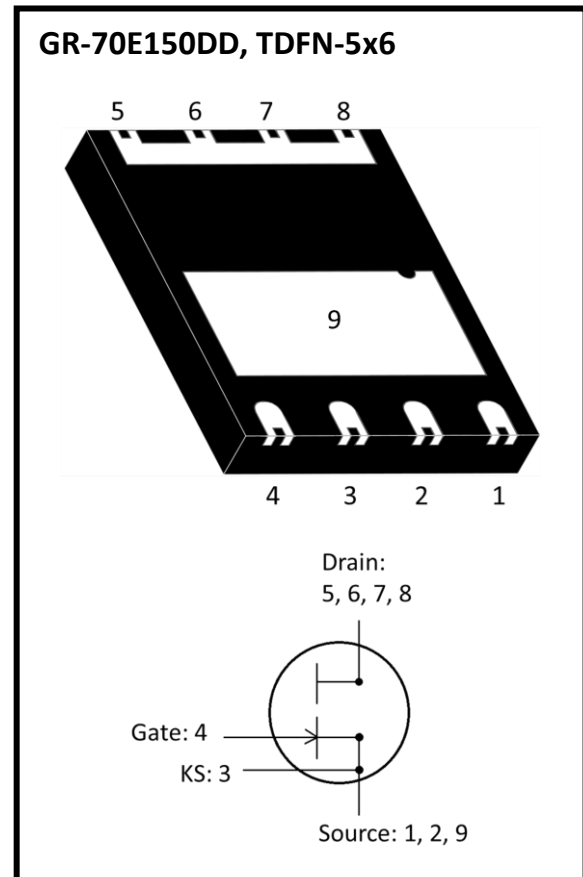
Part Number	GR-70E150DD
V_{DS} , min.	700V
I_D , continuous (25°C)	14.8A
$R_{DS(ON)}$, typ. @ $V_{GS}=6V$	145mΩ
Q_G , typ.	2.7nC
Package	TDFN-5x6

Features

- 700 V enhancement mode power transistor
- High operating frequency
- RoHS compliant

Applications

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



1. Electrical Characteristics

➤ **Table 1 Absolute maximum ratings**

Symbol	Parameter	Value	Unit
V_{DS}	Drain-source voltage	700	V
$V_{(TR)DS}$	Transient drain to source voltage ^a	800	V
V_{GS}	Gate- source voltage	-6V ~ +7V	V
I_D	Drain current (continuous) at $T_C = 25^\circ\text{C}$ operation	14.8	A
	Drain current (continuous) at $T_C = 100^\circ\text{C}$ operation	9.0	A
$I_{D, \text{Pulse}}$	Pulsed drain current (pulse width: 10 μs , $V_{GS}=6\text{V}$) ^b	54.4	A
P_D	Maximum power dissipation at $T_C = 25^\circ\text{C}$	66	W
T_J	Operating temperature	-40 to +150	$^\circ\text{C}$
T_S	Storage temperature	-40 to +150	$^\circ\text{C}$
MSL	Moisture sensitivity level	MSL3	-

a. In off-state, spike duty cycle $D < 0.01$, spike duration $< 1\mu\text{s}$

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

➤ **Table 2 Thermal Characteristics**

Symbol	Parameter	Value	Unit
$R_{\theta JC}$	Thermal resistance junction-case ^a	1.9	$^\circ\text{C}/\text{W}$
$R_{\theta JA}$	Thermal resistance junction-ambient ^b	70	$^\circ\text{C}/\text{W}$

a. Tested in package DFN8-5x6.

b. Device on 1 layer PCB.

➤ **Table 3** Electrical Characteristics ($T_{CASE} = 25\text{ }^{\circ}\text{C}$ unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
BV_{DSS}	Drain-source voltage	$V_{GS} = 0V, I_D = 100\mu A$	700	-	-	V
$V_{GS(th)}$	Gate threshold voltage	$V_{DS} = V_{GS}, I_D = 1mA$	1.6	1.9	2.3	V
$R_{DS(on)}$	Drain-source on-resistance	$V_{GS} = 6V, I_D = 5A, T_J = 25^{\circ}\text{C}$	-	145	178	$m\Omega$
$R_{DS(on)}$	Drain-source on-resistance	$V_{GS} = 6V, I_D = 5A, T_J = 125^{\circ}\text{C}$	-	326	-	$m\Omega$
I_{DSS}	Drain-source leakage current	$V_{DS} = 700V, V_{GS} = 0V$	-	0.5	30	μA
I_{DSS}	Drain-source leakage current	$V_{DS} = 700V, V_{GS} = 0V$ $T_J = 150^{\circ}\text{C}$	-	5.0	-	μA
I_{GSS}	Gate-to-Source Forward Leakage current	$V_{DS} = 0V, V_{GS} = +6V$	-	85	-	μA
C_{ISS}	Input capacitance	$V_{DS} = 400V, V_{GS} = 0V,$ $f = 100KHz$	-	100	-	pF
C_{OSS}	Output capacitance		-	26.9	-	
C_{RSS}	Reverse transfer capacitance		-	2.30	-	
Q_G	Gate charge	$V_{DS} = 400V, V_{GS} = 6V,$ $I_{DS} = 5A$	-	2.70	-	nC
Q_{GS}	Gate-source charge		-	0.30	-	
Q_{GD}	Gate-drain charge		-	1.15	-	
Q_{OSS}	Output charge	$V_{DS} = 400V, V_{GS} = 0V$	-	19.5	-	nC
$t_{D(on)}$	Turn-on delay time	$V_{DS} = 400V, V_{GS} = 0 \sim 6V,$ $I_{DS} = 5A,$ $R_{G(ON)} = 15\Omega,$ $R_{G(OFF)} = 2\Omega,$	-	8.0	-	ns
t_R	Rise time		-	8.0	-	
$t_{D(off)}$	Turn-off delay time		-	10	-	
t_F	Fall time		-	25	-	
Q_{RR}	Source-Drain Recovery Charge	$V_{DS} = 400V, I_D = 5A$	-	0	-	nC

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

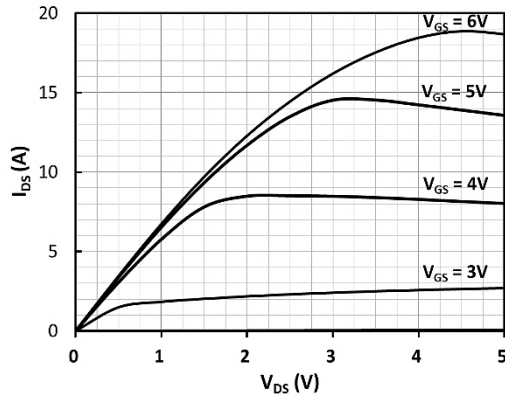


Fig 2. On-Resistance vs Drain Current and Temperature

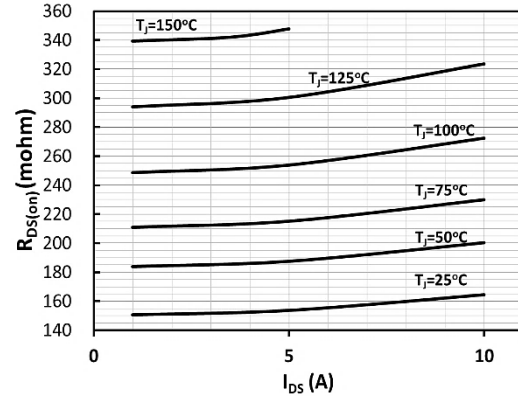


Fig 3. On-Resistance with Drain Current

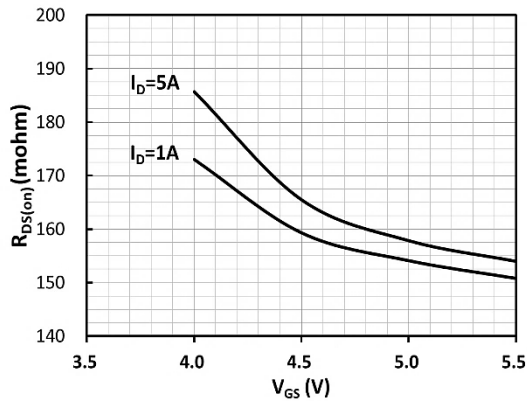


Fig 4. On-Resistance Variation with Temperature

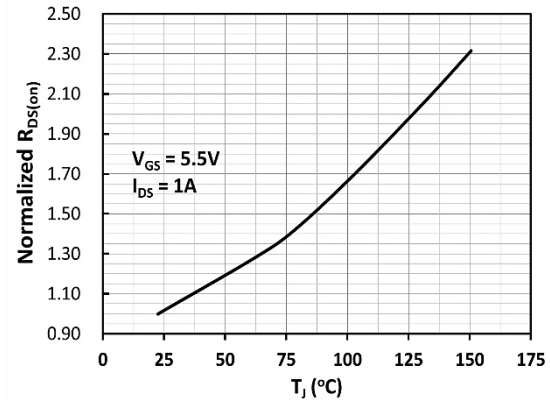


Fig 5. Threshold Voltage with Temperature

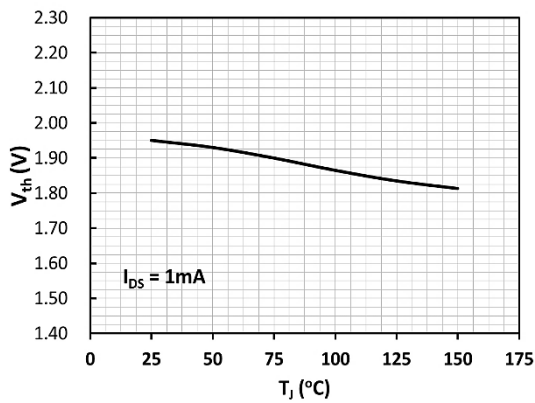


Fig 6. Capacitance Characteristics

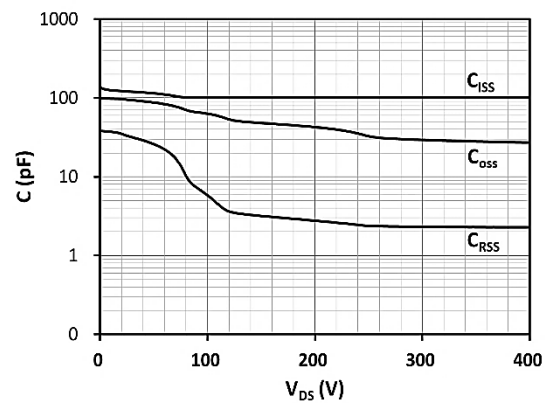


Fig 7. Gate Charge Characteristics, Q_g

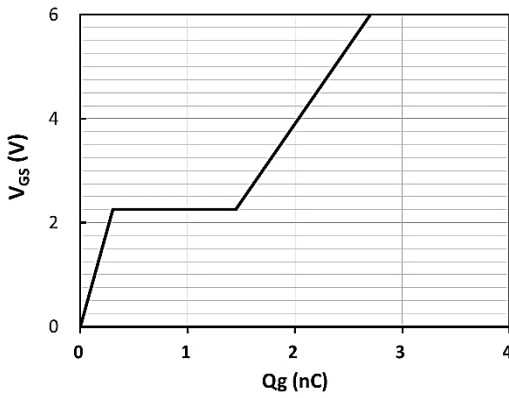


Fig 8. Capacitance Characteristics, Q_{oss}

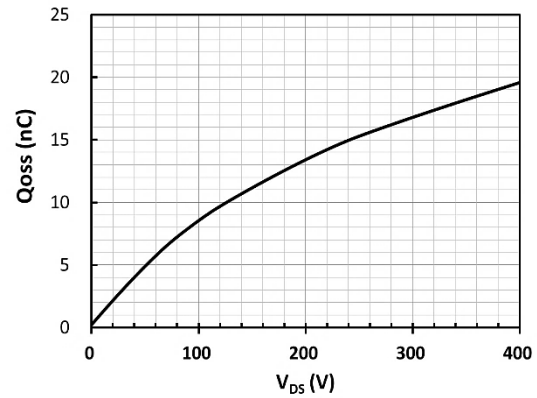
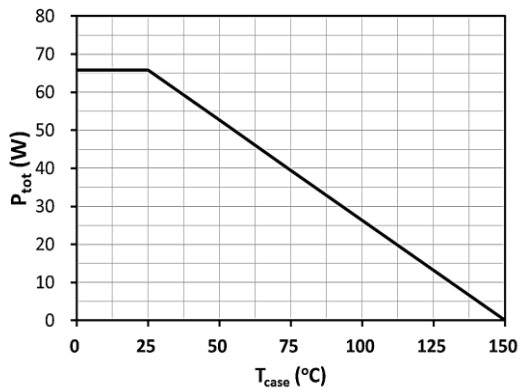
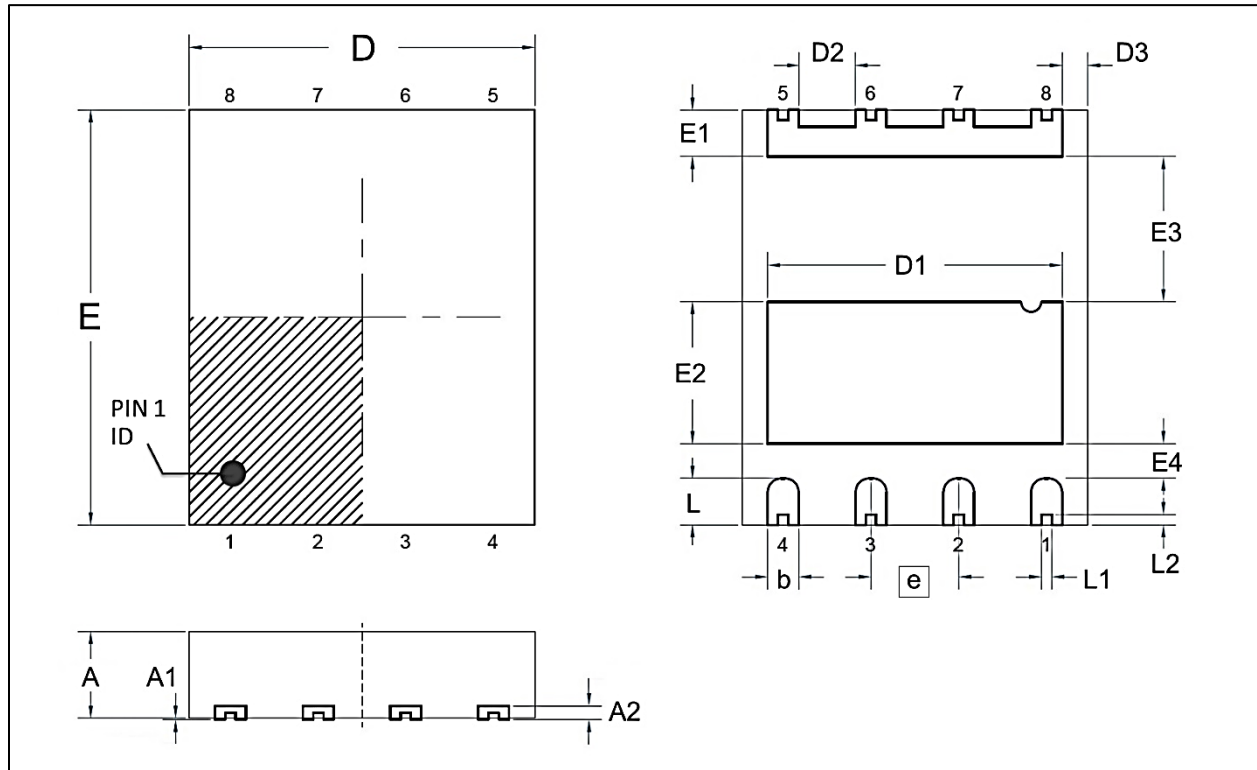


Fig 9. Power Dissipation Derating, P_{tot}



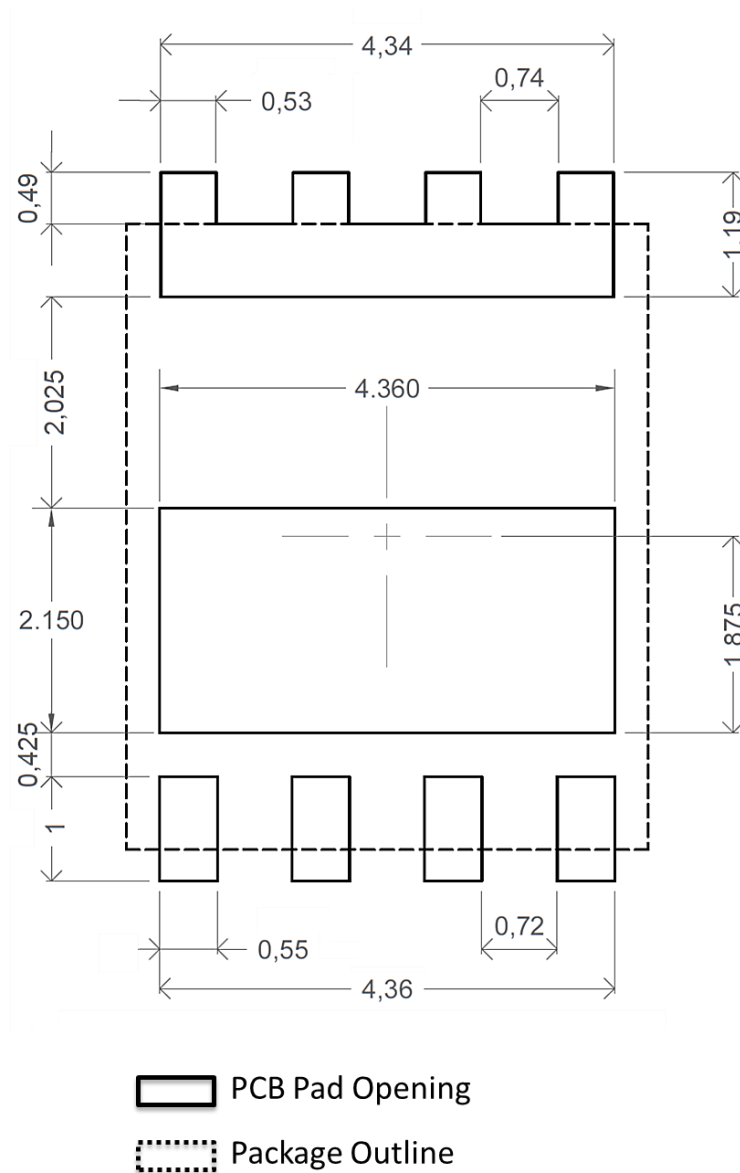
3. Package Outline Dimensions (GR-DFN8-5x6)



➤ Table 4 Dimension of GR-DFN8-5x6

SYMBOL	DIMENSION (MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	0.80	0.85	0.90	E1	0.575	0.675	0.775
A1	--	0.02	0.05	E2	1.95	2.05	2.15
A3	0.203 REF			E3	2.00	2.10	2.20
b	0.35	0.45	0.55	E4	0.40	0.50	0.60
D	4.90	5.00	5.10	L	0.575	0.675	0.775
E	5.90	6.00	6.10	L1	0.05	0.10	0.20
D1	4.16	4.26	4.36	L2	0.05	0.10	0.20
D2	0.72	0.82	0.92	-	-	-	-
D3	0.27	0.37	0.47	-	-	-	-

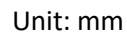
4. Recommended PCB Soldering Footprint, GR-TDFN-5x6



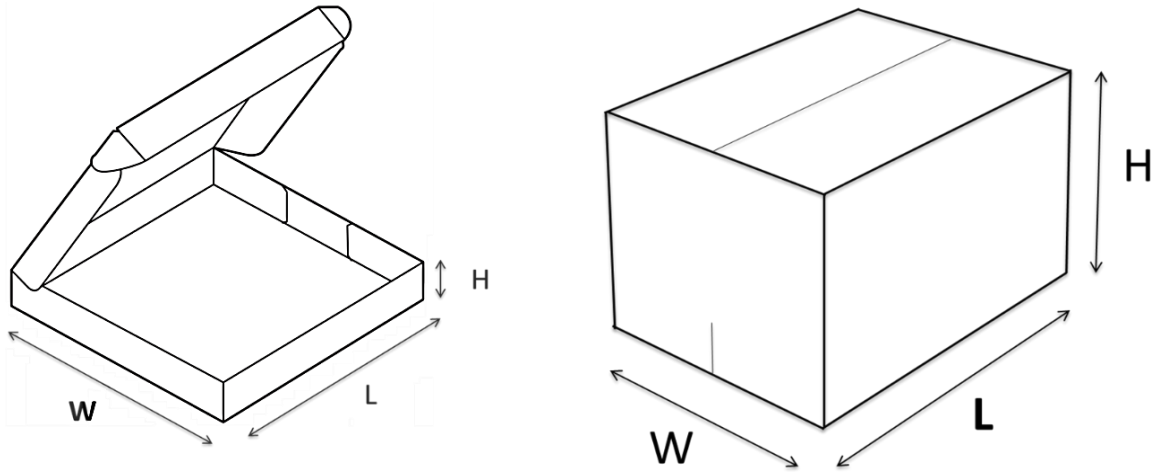
Notes:

- (1) Drawing is not to scale.
- (2) All dimension are in millimeters

TDFN-5x6 Carrier Tape (13" Reel, W=12mm)



TDFN-5x6 Package Information



	Inner BOX, mm	Outer Carton, mm
L	355	370
W	345	370
H	50	282

Notes

One inner box contains 3,500 components.

The weight of one inner box is approximately 1.15kg.

Each Carton contains 5 boxes, Total of 12500 components.

The weight of one outer carton is approximately 5.75kg.

6. Change Log

Version	Date	Description
0.1	NOV 24, 2024	Initial version
0.2	NOV 12, 2025	Add Characteristic Curve & Reel Information
0.3	April 16, 2026	Electrical characteristics and typical characteristic curves revised

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