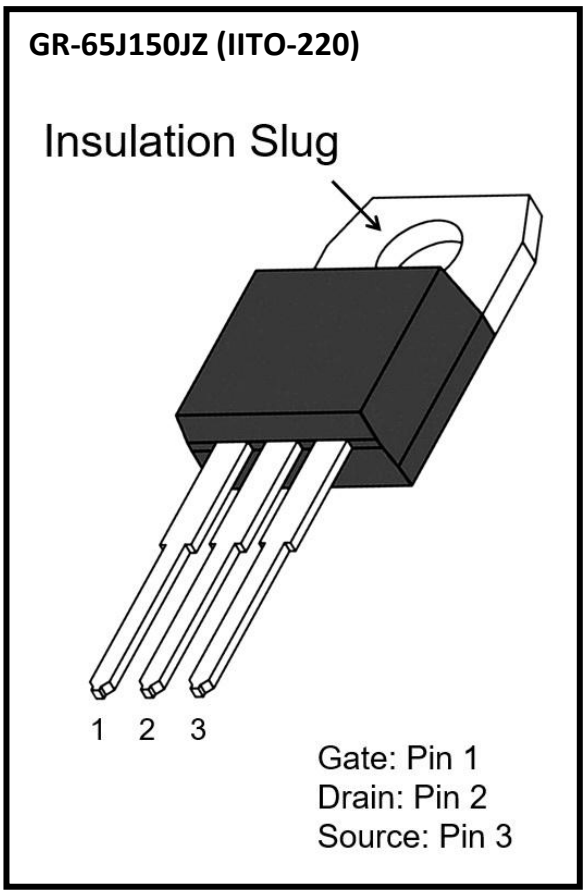
GR-65J150JZ: IITO-220-3L Cascode GaN HEMT

Description

GR-65J150JZ is a normally-off GaN High electron mobility transistor (HEMT) device using the cascode configuration, which provides high breakdown voltage, high current and high operating speed which is suitable for high power applications.



Key Specifications

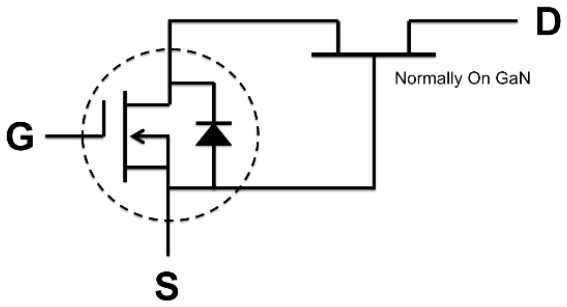
Part Number	GR-65J150JZ
V_{DSS}, min.	650V
$V_{(TR)DSS}$	800V
$R_{DS(ON)}$, typ.	142mΩ
Q_G, typ.	11.8nC
Package	IITO-220-3L

Features

- Gate drive voltage compatibility (-20V to +20V)
- High operating frequency
- Pin to Pin with CoolMOS/SJ and SiC MOSFET
- Inner Isolation TO-220
- Low Qrr
- ESD-resistant
- Comply with JEDEC standards

Applications

- Switch Mode Power Supplies (SMPS)
- AC-DC/ DC-DC Converters
- Motor Drives



Cascode Device Structure

1- Electrical Characteristics

➢ Table 1 Absolute maximum ratings

Symbol	Parameter		Value	Unit
V_{DSS}	Drain-source voltage		650	V
V_{GSS}	Gate- source voltage		-20V ~ +20V	V
I_D	Drain current (continuous) at T_C = 25°C operation		15.8	A
	Drain current (continuous) at T_C = 100°C operation		10.3	A
$I_{D, Pulse}$	Pulsed drain current (pulse width: 10μs)		59.3	A
P_D	Maximum power dissipation at T_C = 25°C		78	W
T_c	Operating temperature	Case	-55 to +150	°C
T_J		Junction	-55 to +150	°C
T_S	Storage temperature		-55 to +150	°C
T_{SOLD}	Soldering peak temperature[b]		260	°C
MSL	Moisture sensitivity level		MSL3	-

a. In off-state, spike duty cycle D<0.01, spike duration <1μs
b. For 10 sec., 1.6mm from the case

➢ Table 2 Thermal Characteristics

Symbol	Parameter	Value	Unit
$R_{\Theta JA}$	Thermal resistance junction-ambient	55	°C/W
$R_{\Theta JC}$	Thermal resistance junction-case	1.6	°C/W

➢ Table 3 ESD Rating

Symbol	Reference	Value	Unit
HBM (G-S) (G-D)	ANSI/ESDA/JEDEC JS-001-2024	2000	V
HBM (D-S)	ANSI/ESDA/JEDEC JS-001-2024	8000	V

➢ **Table 4 Electrical Characteristics** (T_{CASE} = 25 °C unless otherwise stated)

Symbol	Parameter	Conditions	Values			Unit
			min.	typ.	max.	
$V_{(BL)DSS}$	Drain-source voltage	V_{GS}=0V	650	-	-	V
$V_{GS(th)}$	Gate threshold voltage	V_{GS}=V_{DS} , I_D=1mA	2.0	3.0	4.0	V
$R_{DS(on)}$	Static drain-source on-resistance	V_{GS}=10V, I_D=5A, T_J=25 °C	-	142	175	mΩ
		V_{GS}=10V, I_D=5A, T_J=150 °C	-	284	-	
I_{DSS}	Drain-source leakage current	V_{GS} =0V, V_{DS} =650V, T_J=25°C	-	2.5	50	μA
		V_{GS} =0V, V_{DS} =650V, T_J=150°C	-	10	-	
I_{GSS}	Gate-to-source forward leakage current	V_{GS}=20V	-	-	100	nA
	Gate-to-source reverse leakage current	V_{GS}=-20V	-	-	-100	
C_{ISS}	Input capacitance	V_{GS}= 0V, V_{DS}= 400V, f= 1MHz	-	842	-	pF
C_{OSS}	Output capacitance		-	23.7	-	
C_{RSS}	Reverse transfer capacitance		-	1.72	-	
Q_G	Gate charge	V_{GS}= 0~10V, V_{DS}= 400V, I_{DS} = 10A	-	11.8	-	nC
Q_{GS}	Gate-source charge		-	3.2	-	
Q_{GD}	Drain-source charge		-	2.1	-	
Q_{OSS}	Output charge	V_{GS}=0V, V_{DS}=0~400V	-	36.5	-	
$t_{D(on)}$	Turn-on delay time	V_{DS}=400V, V_{GS}= 0 to 10V, I_{DS}=10A, R_G=50Ω	-	16.5	-	ns
t_R	Rise time		-	8.0	-	
$t_{D(off)}$	Turn-off delay time		-	26.0	-	
t_F	Fall time		-	5.2	-	
Q_{RR}	Reverse recovery charge	Is=5A, V_{DS}= 400V	-	6.0	-	nC
V_{SD}	Reverse Voltage	V_{GS}= 0V, I_S=10A	-	2.20	-	V
		V_{GS}= 0V, I_S=5A	-	1.45	-	

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

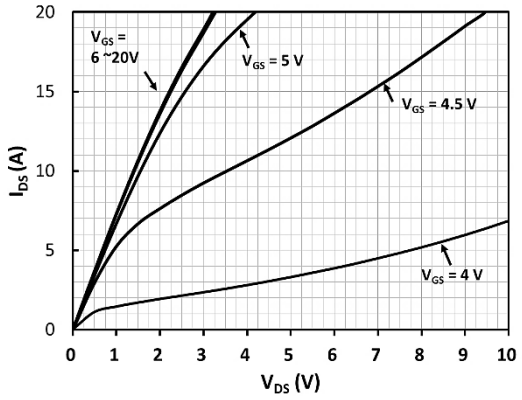


Fig 2. On-Resistance vs Drain Current and Temperature

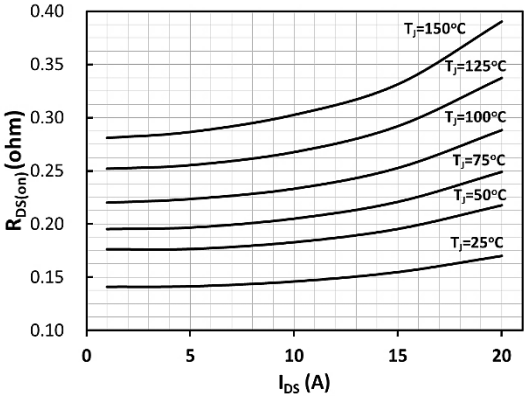


Fig 3. On-Resistance with Drain Current

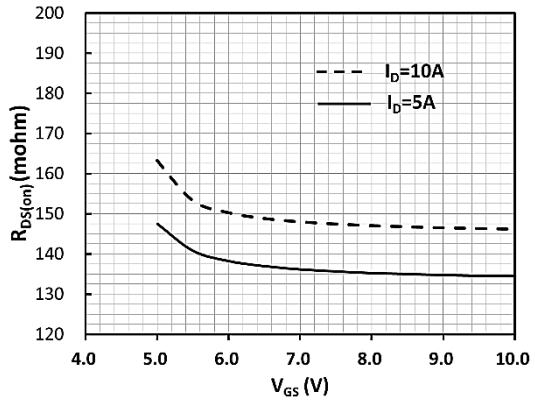


Fig 4. On-Resistance Variation with Temperature

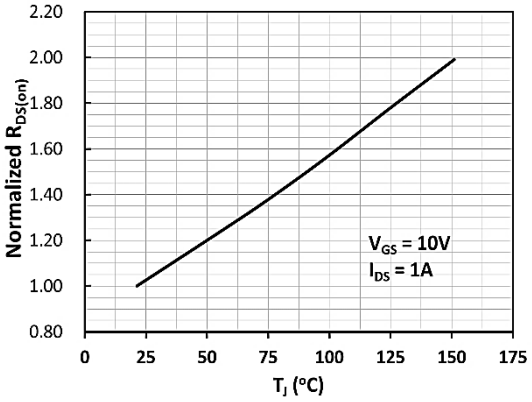


Fig 5. Threshold Voltage with Temperature

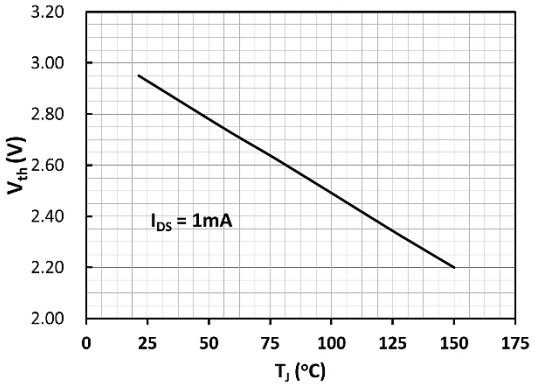


Fig 6. Capacitance Characteristics

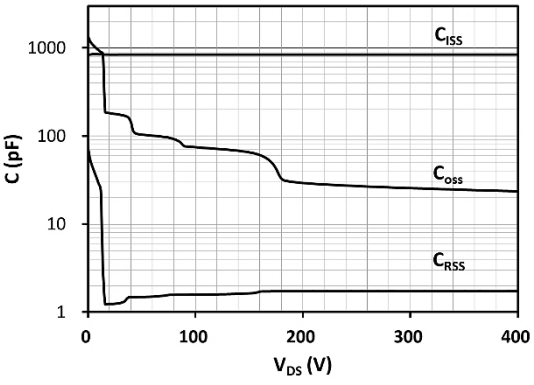


Fig 7. Gate Charge Characteristics, Qg

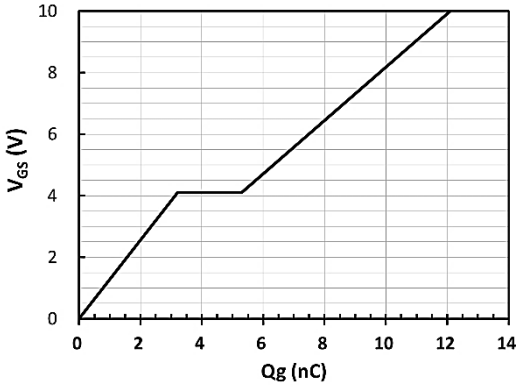


Fig 8. Capacitance Characteristics, Qoss

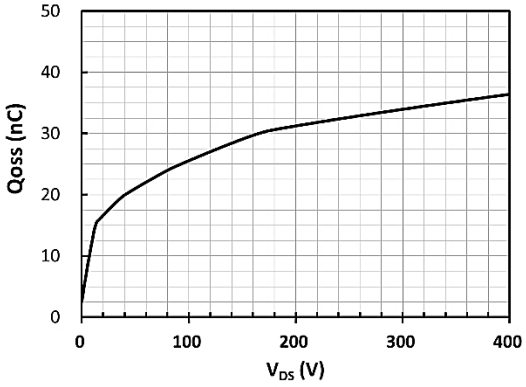


Fig 9. Power Dissipation Derating, Ptot

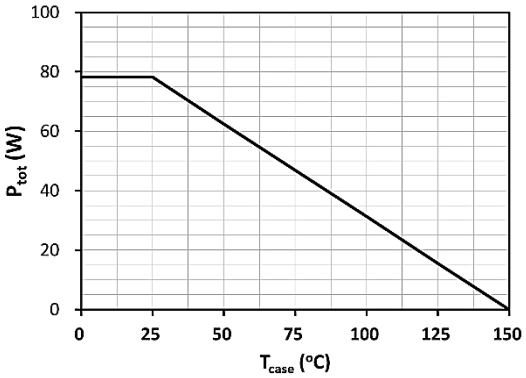
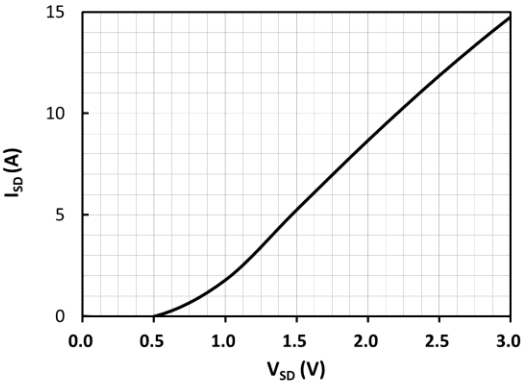
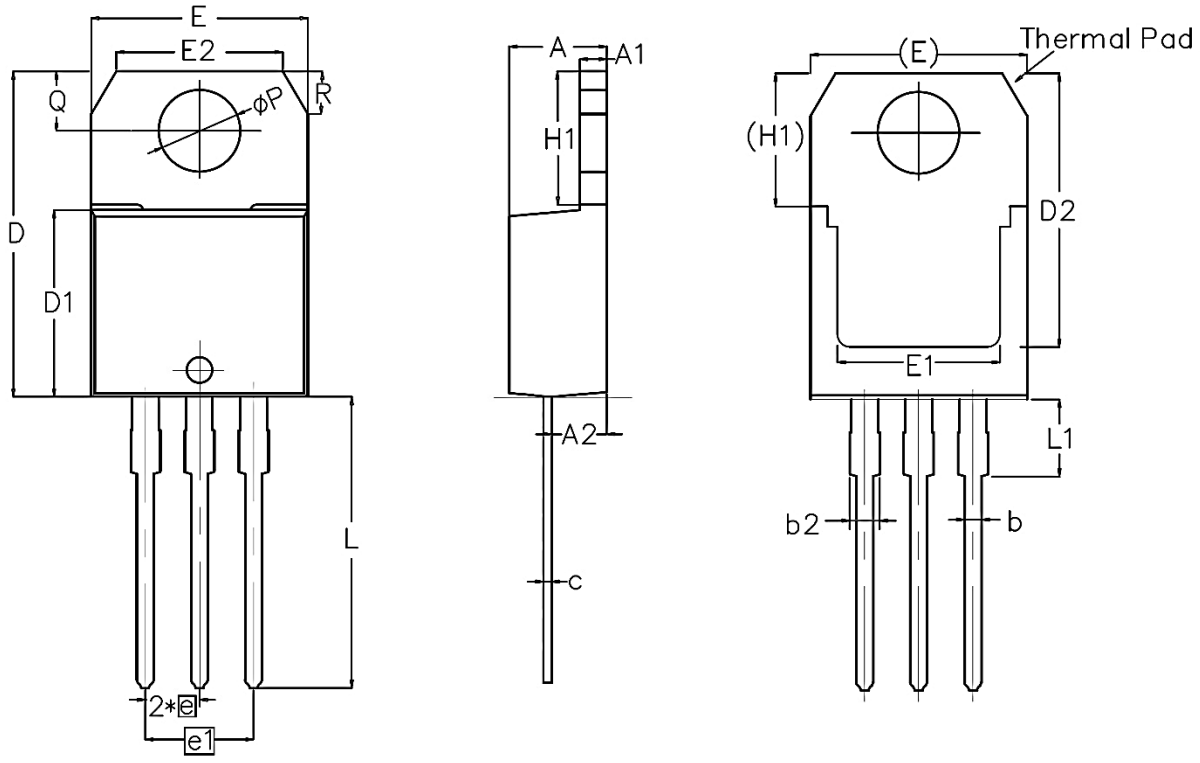


Fig 10. Source-drain diode forward characteristics



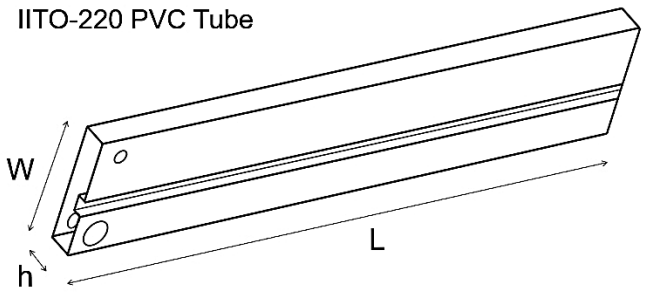
3- Package Outline Dimensions, GR-IITO-220-3L



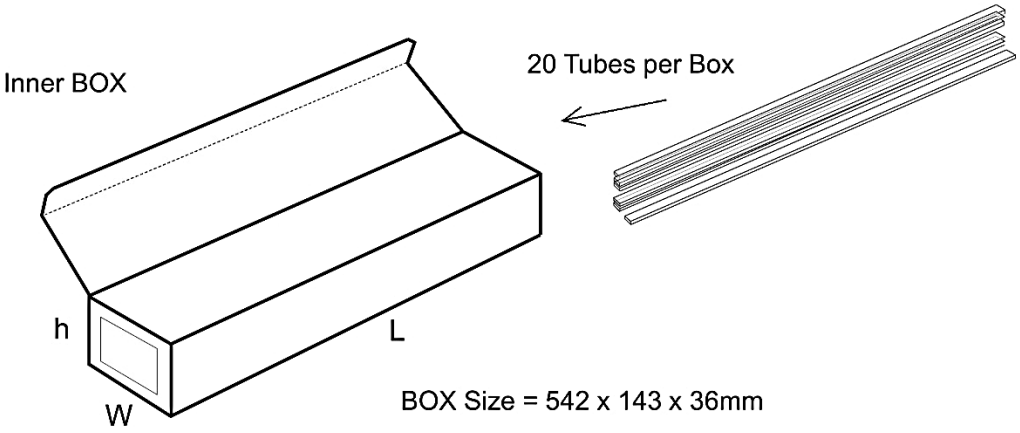
➢ **Table 5 Dimension of GR-IITO-220-3L**

SYMBOL	DIMENSION (IN MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	4.35	4.45	4.75	**E**	10.00	10.18	10.40
A1	1.14	1.27	1.40	**E1**	6.86	7.60	8.89
A2	2.40	2.60	2.80	**E2**	7.50	7.80	8.10
b	0.69	0.85	1.01	**e**	2.41	2.54	2.67
b1	0.38	0.83	0.97	**e1**	4.88	5.08	5.28
b2	1.20	1.46	1.73	**H1**	6.00	6.20	6.40
b3	1.14	1.44	1.73	**L**	13.00	13.35	13.70
c	0.36	0.50	0.61	**L1**	2.70	3.00	3.30
c1	0.36	0.48	0.56	**ΦP**	3.70	3.80	3.95
D	15.2	15.5	15.8	**Q**	2.60	2.80	3.00
D1	8.50	--	9.20	**R**	1.70	2.00	2.20
D2	12.20	12.85	12.88				

4- Tube Package Information

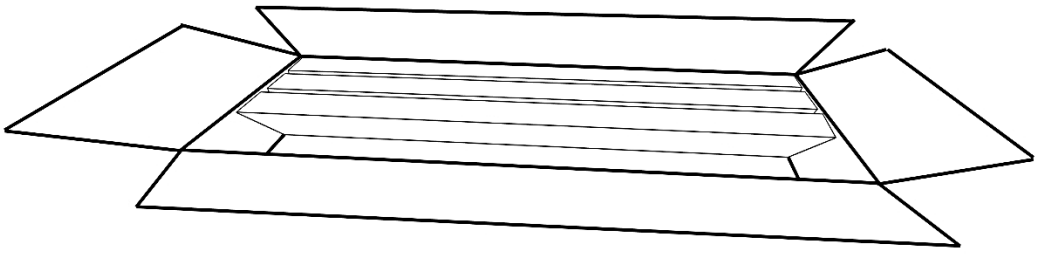


Tube Size = 532 x 33 x 7mm



BOX Size = 542 x 143 x 36mm

Carton



Carton Size = 570 x 210 x 200mm

Package Type	-	ITEM	Tube	Inner BOX	Carton	Unit
IITO220	Tube	Quantity	50	1000	5000	PCS
		Volume	532 x 33 x 7	542 x 143 x 36	570 x 210 x 200	mm
		Weight	0.14	2.9	15.2	KG

5- Change Log

Version	Date	Description
01	March 28, 2025	Initial version
02	Oct 15, 2025	Tube package information revised
03	April 16, 2026	Electrical characteristics revised

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