

GR-65J100JZ: ITO-220-3L Cascode GaN HEMT

Description

GR-65J100JZ 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

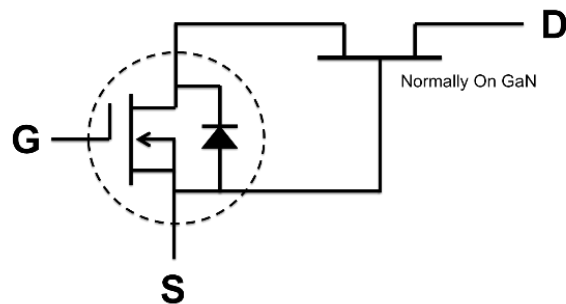
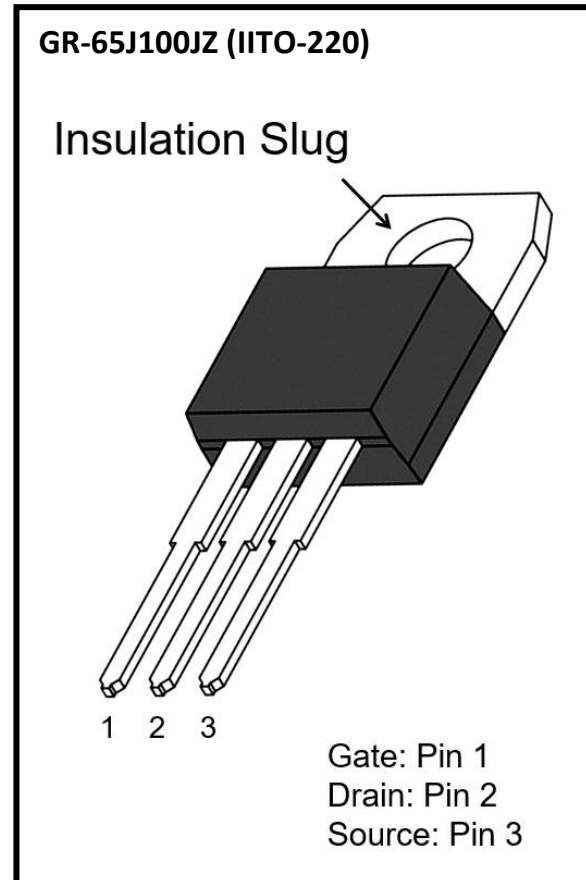
Part Number	GR-65J100JZ
V_{DSS} , min.	650V
$V_{(TR)DSS}$	800V
$R_{DS(ON)}$, typ.	98m Ω
Q_G , typ.	12nC
Package	IITO-220-3L

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 Q_{rr}
- 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_{DS}	Drain-source voltage		650	V
V_{GS}	Gate- source voltage		-20V ~ +20V	V
I_D	Drain current (continuous) at $T_C = 25^\circ\text{C}$ operation		20.9	A
	Drain current (continuous) at $T_C = 100^\circ\text{C}$ operation		13.2	A
$I_{D, \text{Pulse}}$	Pulsed drain current (pulse width: 10 μs)		78.4	A
P_D	Maximum power dissipation at $T_C = 25^\circ\text{C}$		89	W
T_C	Operating temperature	Case	-55 to +150	$^\circ\text{C}$
T_J		Junction	-55 to +150	$^\circ\text{C}$
T_S	Storage temperature		-55 to +150	$^\circ\text{C}$
T_{SOLD}	Soldering peak temperature ^b		260	$^\circ\text{C}$
MSL	Moisture sensitivity level		MSL3	-

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

b. For 10 sec., 1.6mm from the case

➤ **Table 2 Thermal Characteristics**

Symbol	Parameter	Value	Unit
$R_{\theta JA}$	Thermal resistance junction-ambient	55	$^\circ\text{C/W}$
$R_{\theta JC}$	Thermal resistance junction-case	1.4	$^\circ\text{C/W}$

➤ **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** ($T_{CASE} = 25\text{ °C}$ 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	$V_{GS}=10V$, $I_D=5A$, $T_J=25\text{ °C}$	-	98	121	mΩ
		$V_{GS}=10V$, $I_D=5A$, $T_J=150\text{ °C}$	-	196	-	
I_{DSS}	Drain-source leakage current	$V_{GS}=0V$, $V_{DS}=650V$, $T_J=25\text{ °C}$	-	2.5	50	μA
		$V_{GS}=0V$, $V_{DS}=650V$, $T_J=150\text{ °C}$	-	12	-	
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	$V_{GS}=0V$, $V_{DS}=400V$, $f=1MHz$	-	845	-	pF
C_{OSS}	Output capacitance		-	29.9	-	
C_{RSS}	Reverse transfer capacitance		-	1.75	-	
Q_G	Gate charge	$V_{GS}=0\sim10V$, $V_{DS}=400V$, $I_{DS}=10A$	-	12.0	-	nC
Q_{GS}	Gate-source charge		-	3.35	-	
Q_{GD}	Drain-source charge		-	2.20	-	
Q_{OSS}	Output charge	$V_{GS}=0V$, $V_{DS}=0\sim400V$	-	40.6	-	
$t_{D(on)}$	Turn-on delay time	$V_{DS}=400V$, $V_{GS}=0$ to $10V$, $I_{DS}=10A$, $R_G=60\Omega$	-	25	-	ns
t_R	Rise time		-	12	-	
$t_{D(off)}$	Turn-off delay time		-	40	-	
t_F	Fall time		-	8	-	
Q_{RR}	Reverse recovery charge	$I_S=10A$, $V_{DS}=400V$	-	7.0	-	nC
V_{SD}	Reverse Voltage	$V_{GS}=0V$, $I_S=12A$	-	2.05	-	V
		$V_{GS}=0V$, $I_S=5A$	-	1.20	-	

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

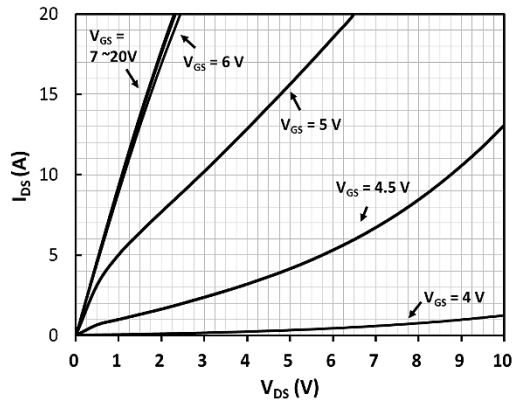


Fig 2. On-Resistance vs Drain Current and Temperature

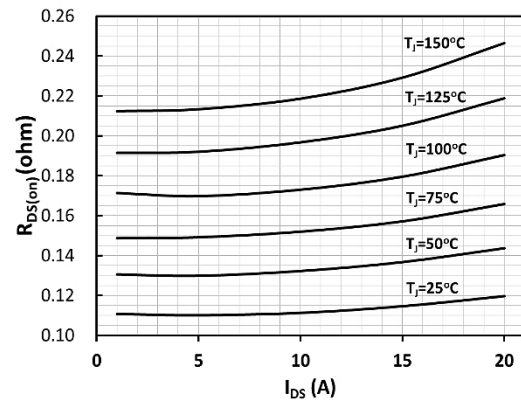


Fig 3. On-Resistance with Drain Current

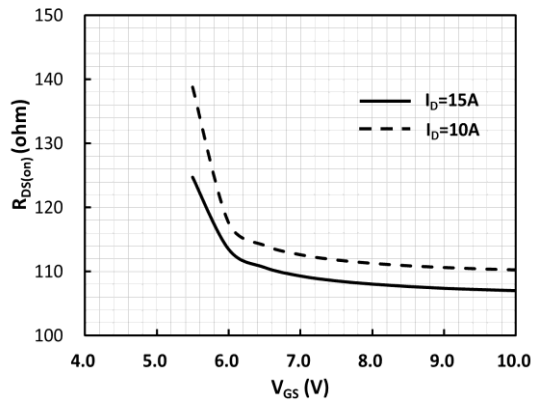


Fig 4. On-Resistance Variation with Temperature

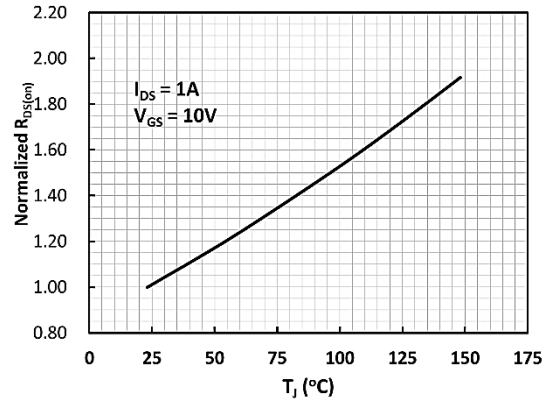


Fig 5. Threshold Voltage with Temperature

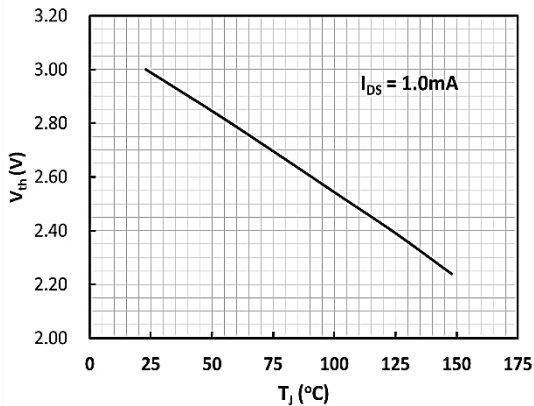


Fig 6. Capacitance Characteristics

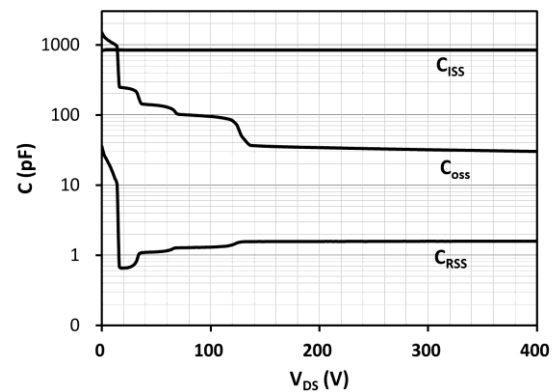


Fig 7. Gate Charge Characteristics, Q_g

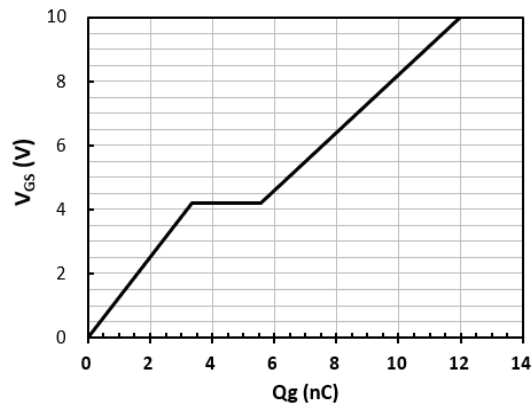


Fig 8. Capacitance Characteristics, Q_{oss}

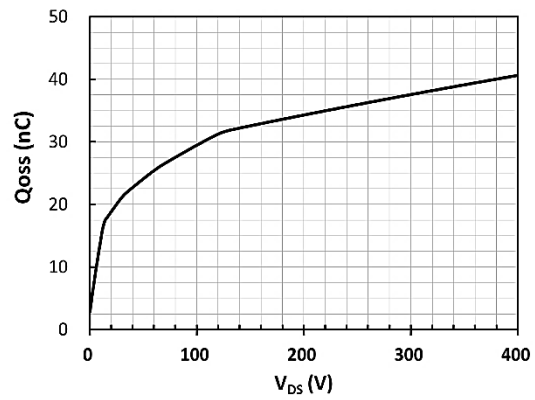


Fig 9. Power Dissipation Derating, P_{tot}

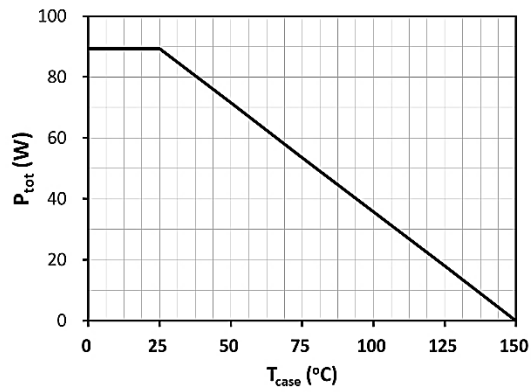
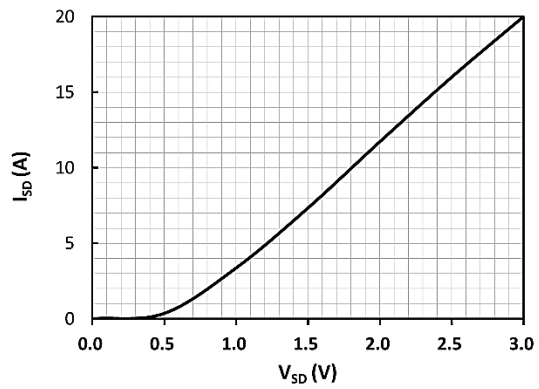
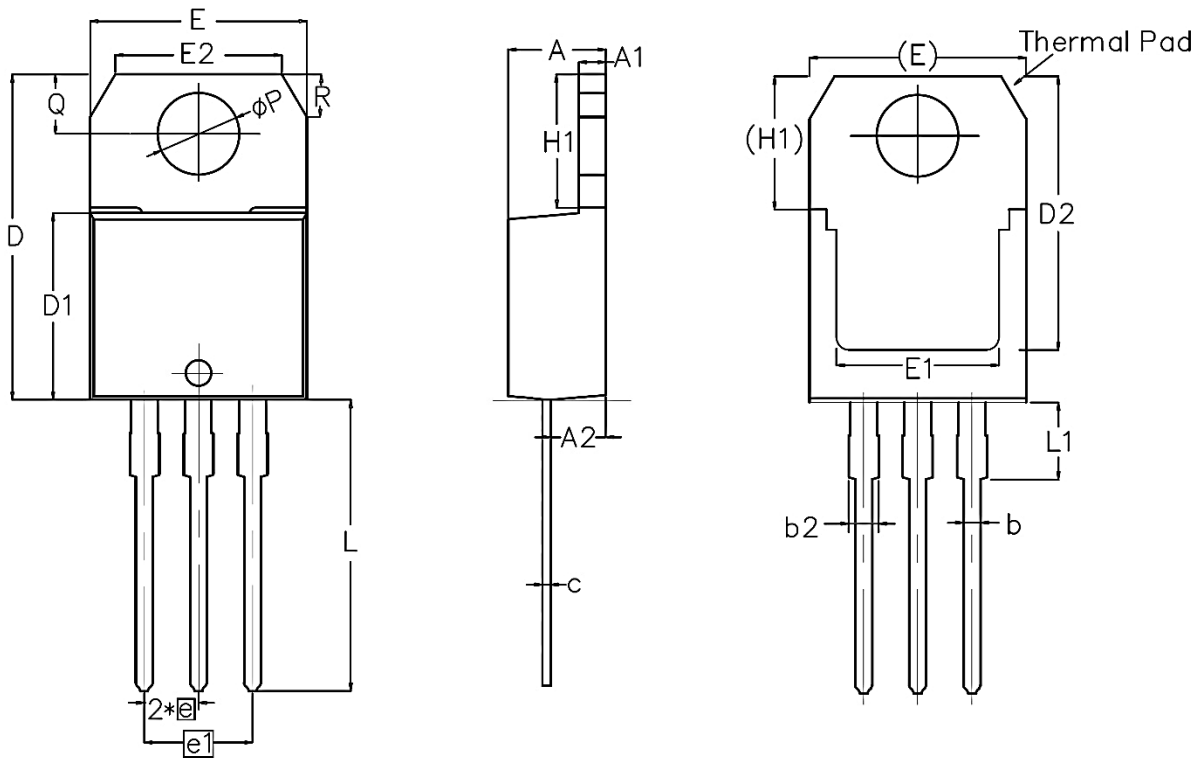


Fig 10. Source-drain diode forward characteristics



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

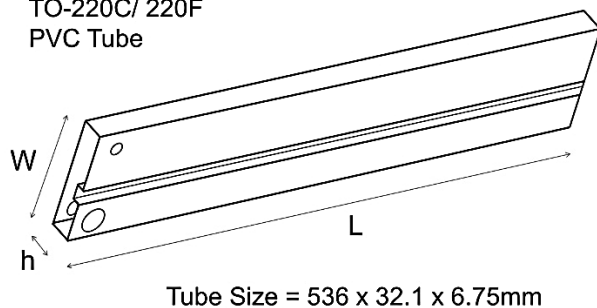


➤ Table 5 Dimension of GR-IITO-220-3L

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	ØP	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				

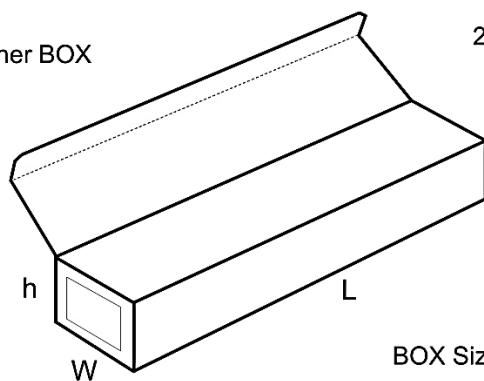
4- Tube Package Information

TO-220C/ 220F
PVC Tube

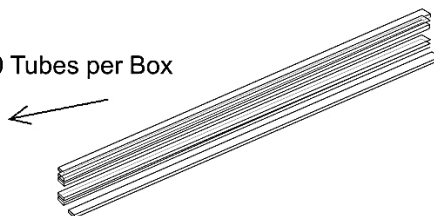


Tube Size = 536 x 32.1 x 6.75mm

Inner BOX

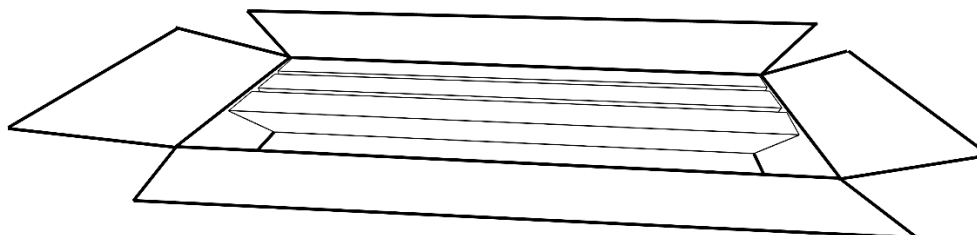


20 Tubes per Box



BOX Size = 560 x 138 x 46mm

Carton



Carton Size = 575 x 254 x 155mm

Package Type	Tube	Inner Box	Carton
TO-220C/ TO-220F	50 EA	1000 EA	5000 EA
-	-	X20 Tube	X5 Box

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.