

## GR-65J075JT: TO-247-3L Cascode GaN HEMT

### Description

GR-65J075JT 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

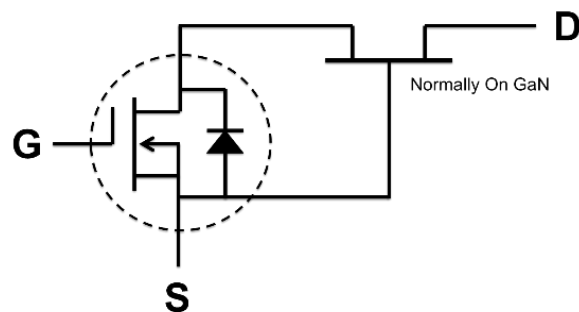
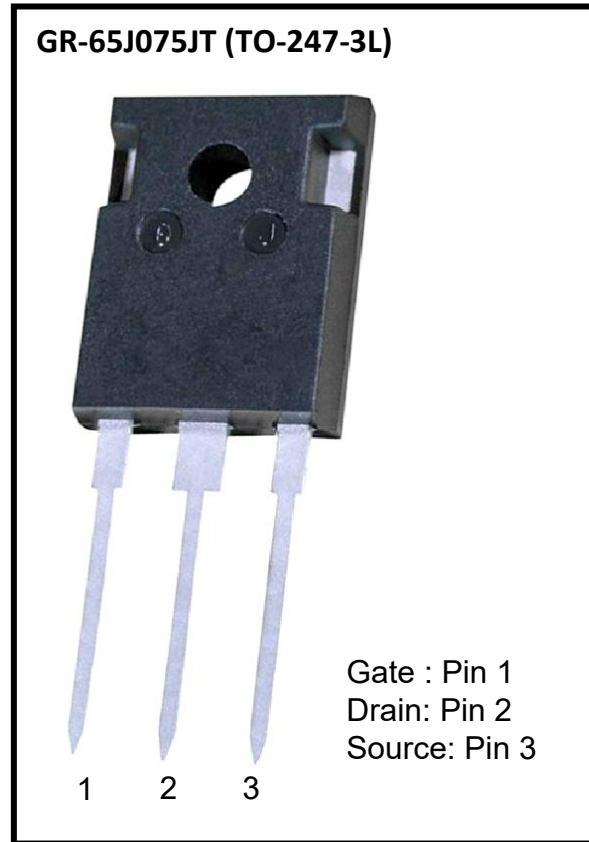
Part Number	GR-65J075JT
V <sub>DSS</sub>	650V
V <sub>(TR)DSS</sub>	800V
R <sub>DS(ON)</sub> , typ.	74mΩ
Q <sub>G</sub> , typ.	12nC
Package	TO-247-3L

### Features

- Gate drive voltage compatibility (-20V to +20V)
- High operating frequency
- Pin to Pin with CoolMOS/SJ and SiC MOSFET
- Low Q<sub>rr</sub>
- 1.5kV HBM ESD

### 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 <sub>DSS</sub>	Drain-source voltage	650	V
V <sub>GSS</sub>	Gate- source voltage	-20V ~ +20V	V
I <sub>D</sub>	Drain current (continuous) at T <sub>C</sub> = 25°C operation	25.6	A
	Drain current (continuous) at T <sub>C</sub> = 100°C operation	16.2	A
I <sub>D,pulse</sub>	Pulsed drain current (pulse width: 10μs)	96	A
P <sub>D</sub>	Maximum power dissipation T <sub>C</sub> =25 °C	114	W
T <sub>C</sub>	Operating temperature	Case	-55 to +150 °C
T <sub>J</sub>		Junction	-55 to +150 °C
T <sub>S</sub>	Storage temperature	-55 to +150	°C
T <sub>SOLD</sub>	Soldering peak temperature <sup>b</sup>	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 <sub>θJA</sub>	Thermal resistance junction-ambient	55	°C/W
R <sub>θJC</sub>	Thermal resistance junction-case	1.1	°C/W

**Table 3 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	$V_{GS}=10V, I_D=5A, T_J=25\text{ °C}$	-	74	91	mΩ
		$V_{GS}=10V, I_D=5A, T_J=150\text{ °C}$	-	137	-	
$I_{DSS}$	Drain-source leakage current	$V_{GS}=0V, V_{DS}=650V, T_J=25\text{ °C}$	-	3.0	60	μA
		$V_{GS}=0V, V_{DS}=650V, T_J=150\text{ °C}$	-	15.0	-	
$I_{GSS}$	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	$V_{GS}=0V, V_{DS}=400V, f=1MHz$	-	737	-	pF
$C_{OSS}$	Output capacitance		-	35.9	-	
$C_{RSS}$	Reverse transfer capacitance		-	2.89	-	
$Q_G$	Gate charge	$V_{GS}=0\sim 10V, V_{DS}=400V, I_{DS}=5A$	-	12.0	-	nC
$Q_{GS}$	Gate-source charge		-	2.42	-	
$Q_{GD}$	Gate-drain charge		-	4.06	-	
$Q_{OSS}$	Output charge	$V_{GS}=0V, V_{DS}=0\sim 400V$	-	50.1	-	
$t_{D(on)}$	Turn-on delay time	$V_{DS}=400V, V_{GS}=0\text{ to }10V, I_{DS}=2A, R_G=25\Omega$	-	10.6	-	ns
$t_{D(off)}$	Turn-off delay time		-	16.9	-	
$Q_{RR}$	Reverse recovery charge	$I_S=5A, V_{DS}=400V$	-	7.9	-	nC
$V_{SD}$	Diode forward voltage	$V_{GS}=0V, I_{SD}=20A, T_J=25\text{ °C}$	-	2.5	-	V

## 2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

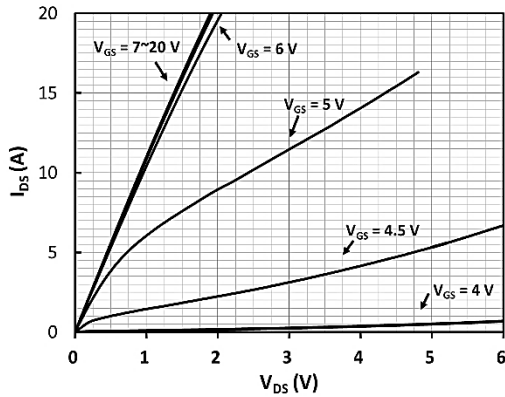


Fig 2. On-Resistance vs Drain Current and Temperature

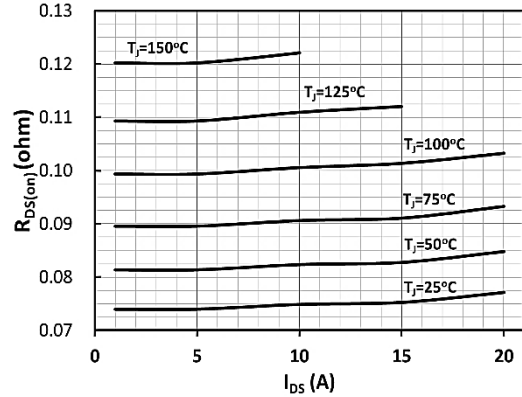


Fig 3. On-Resistance with Drain Current

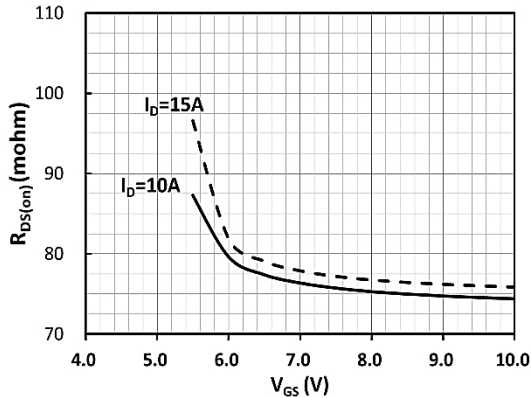


Fig 4. On-Resistance Variation with Temperature

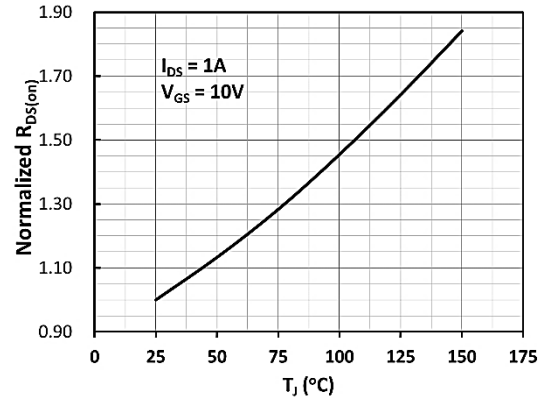


Fig 5. Threshold Voltage with Temperature

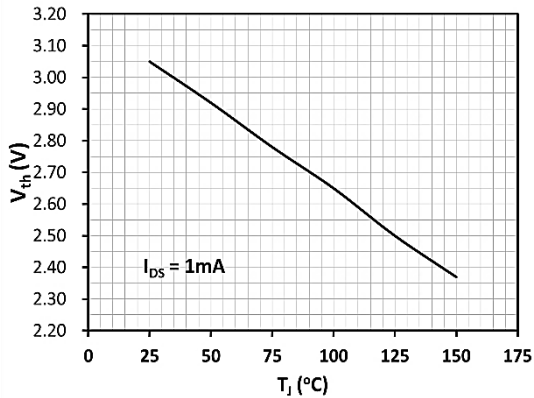


Fig 6. Capacitance Characteristics

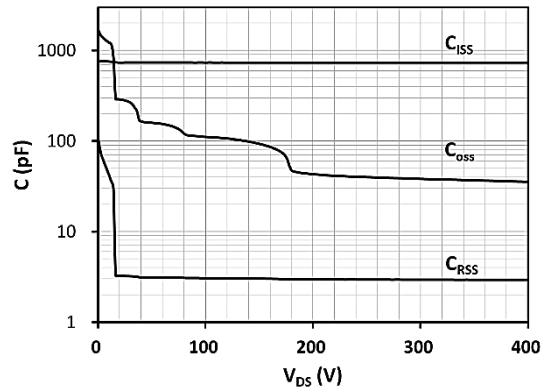


Fig 7. Gate Charge Characteristics, Qg

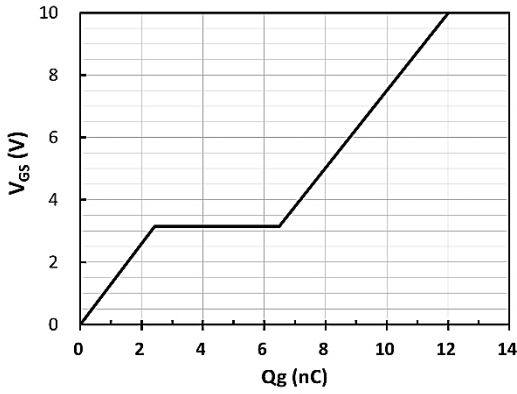


Fig 8. Capacitance Characteristics, Qoss

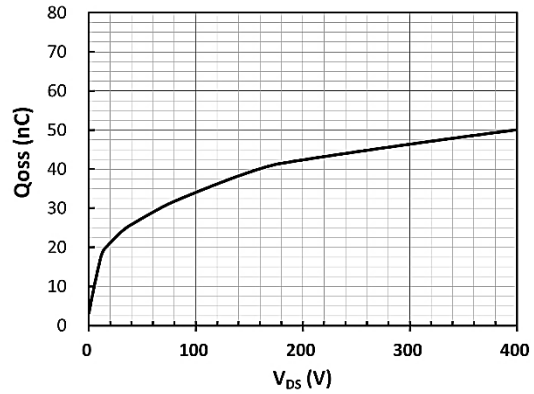


Fig 9. Power Dissipation Derating, Ptot

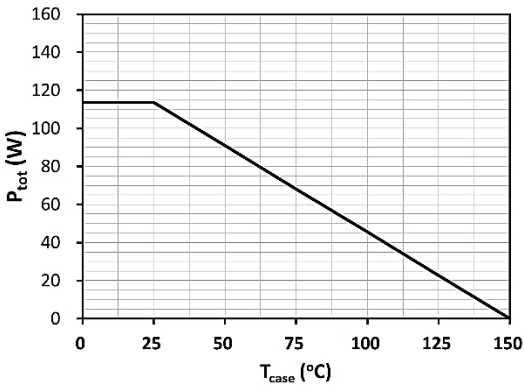
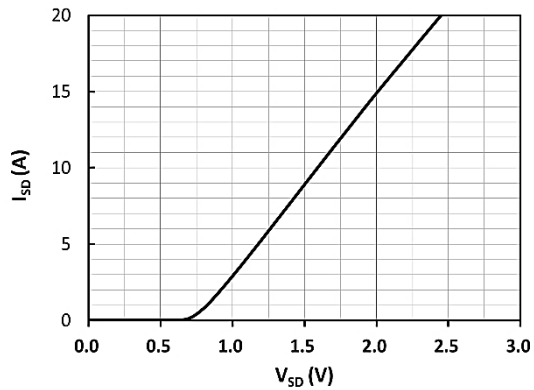
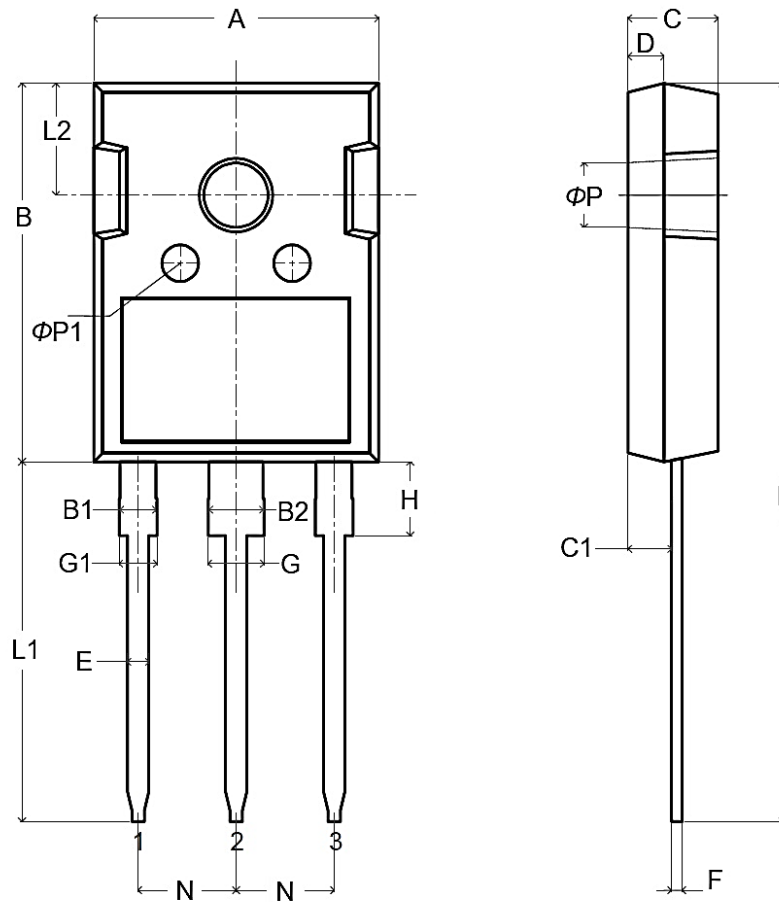


Fig 10. Source-drain diode forward characteristics



**3- Package Outline Dimensions, GR-TO-247-3L**

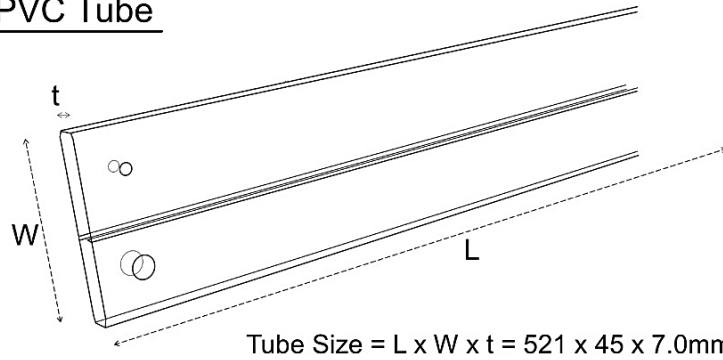


➤ **Table 4 Dimension of GR-TO-247-3L**

SYMBOL	DIMENSION (IN MM)			SYMBOL	DIMENSION (IN MM)		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	15.6	15.8	16.0	G	2.90	3.10	3.30
B	19.9	21.0	21.2	G1	1.90	2.10	2.30
B1	1.80	2.00	2.20	H	3.90	4.10	4.30
B2	2.80	3.00	3.20	L	40.5	40.95	41.4
C	4.80	5.00	5.20	L1	19.7	19.95	20.2
C1	2.20	2.40	2.60	L2	6.04	6.20	6.30
D	1.90	2.00	2.10	N	5.30	5.44	5.68
E	1.00	1.20	1.40	ΦP1	3.40	3.60	3.80
F	0.50	0.60	0.70	ΦP2	2.20	2.35	2.50

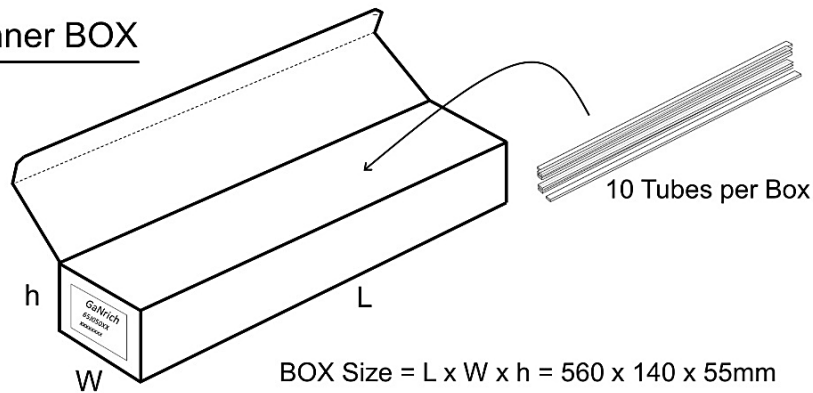
#### 4- Tube Package Information

TO-247-3L, TO-247-4L  
PVC Tube



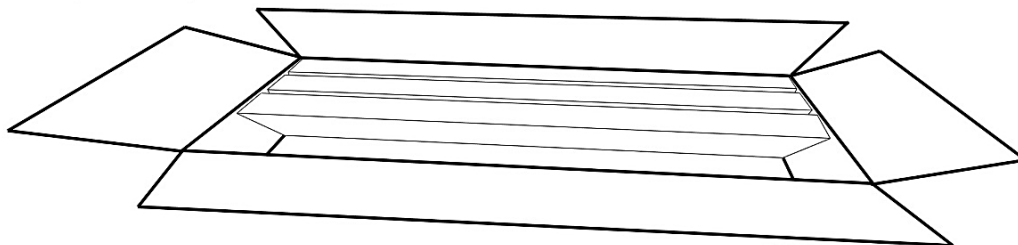
Tube Size = L x W x t = 521 x 45 x 7.0mm

Inner BOX



BOX Size = L x W x h = 560 x 140 x 55mm

Carton



Carton Size = 575 x 160 x 295mm

Package Type	Tube	Inner Box	Carton
TO-247-3L TO-247-4L	30 EA	300 EA	1500 EA
-	-	X10 Tube	X5 Box

## 5- Change Log

Version	Date	Description
01	Nov 28, 2023	Initial version
02	March 27, 2025	Electrical characteristics, Curve and Package information revised
03	April 16, 2026	Electrical characteristics revised

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