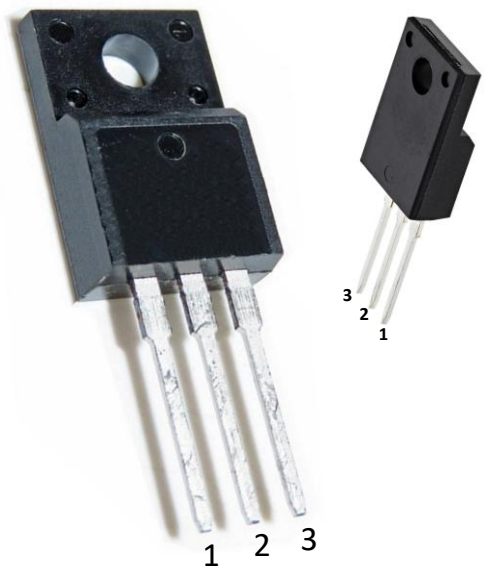
# GR-65J075JF: TO-220-FP Cascode GaN HEMT

## Description

GR-65J075JF 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.

**GR-65J075JF (TO-220-FP)**




Drain: Pin 2
Gate: Pin 1
Source: Pin 3

## Key Specifications

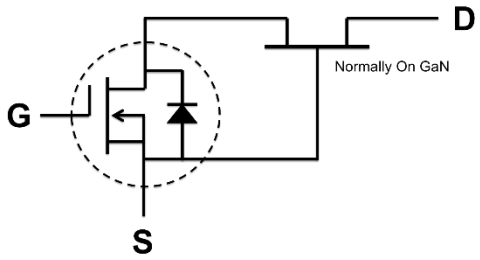
| | |
|---|---|
| Part Number | GR-65J075JF |
| $V_{DSS}$ | 650V |
| $V_{(TR)DSS}$ | 800V |
| $R_{DS(ON)}$, typ. | 74mΩ |
| $Q_G$, typ. | 12.1nC |
| Package | TO-220-FP |

## Features

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

## Applications

- Switch Mode Power Supplies (SMPS)
- AC-DC/DC-DC Converters: Boost, Buck, QR Flyback, ACF, AHB, LLC, Half/Full Bridge Application
- Motor Drives, Lighting, Server




**Cascode Device Structure**

# 1- Electrical Characteristics

## ➢ Table 1 Absolute maximum ratings

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-source voltage | | 650 | V |
| $V_{(TR)DSS}$ | Transient drain to source voltage[a] | | 800 | V |
| $V_{GSS}$ | Gate- source voltage | | -20 ~ +20 | V |
| $I_D$ | Drain current (continuous) at $T_C$ = 25°C operation | | 23.3 | A |
| | Drain current (continuous) at $T_C$ = 100°C operation | | 14.8 | A |
| $I_{D,Pulse}$ | Pulsed drain current (pulse width: 10μs) | | 87.5 | A |
| $P_D$ | Maximum power dissipation Tc=25 °C | | 29.7 | 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 | 63 | °C/W |
| $R_{\Theta JC}$ | Thermal resistance junction-case | 4.21 | °C/W |

➢ **Table 3 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 | - | 74 | 91 | mΩ |
| | | $V_{GS}$=10V, $I_D$=5A, $T_J$=150 °C | - | 137 | - | |
| $I_{DSS}$ | Drain-source leakage current | $V_{GS}$ =0V, $V_{DS}$ =650V, $T_J$=25°C | - | 3.0 | 60 | μA |
| | | $V_{GS}$ =0V, $V_{DS}$ =650V, $T_J$=150°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 | - | 875 | - | pF |
| $C_{OSS}$ | Output capacitance | | - | 32.1 | - | |
| $C_{RSS}$ | Reverse transfer capacitance | | - | 2.47 | - | |
| $Q_G$ | Gate charge | $V_{GS}$=0~10V, $V_{DS}$=400V, $I_{DS}$ =5A | - | 12.1 | - | nC |
| $Q_{GS}$ | Gate-source charge | | - | 2.41 | - | |
| $Q_{GD}$ | Drain-source charge | | | 3.92 | | |
| $Q_{OSS}$ | Output charge | $V_{GS}$=0V, $V_{DS}$=0~400V | - | 51.8 | - | |
| $t_{D(on)}$ | Turn-on delay time | $V_{DS}$=400V, $V_{GS}$=0 to 10V, $I_{DS}$=2A ,$R_G$=25Ω | - | 12 | - | ns |
| $t_{D(off)}$ | Turn-off delay time | | - | 18 | - | |
| $Q_{RR}$ | Reverse recovery charge | Is=5A, $V_{DS}$ =400V | - | 9.0 | - | nC |

## 2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

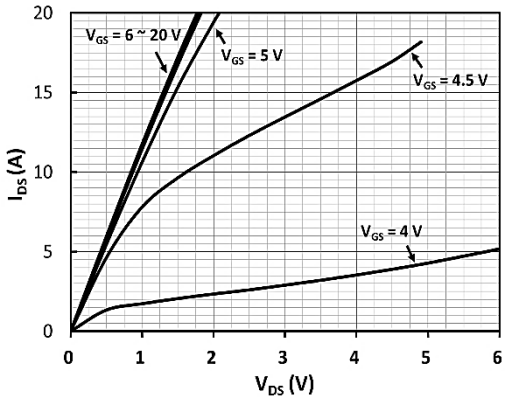



Fig 2. On-Resistance vs Drain Current and Temperature

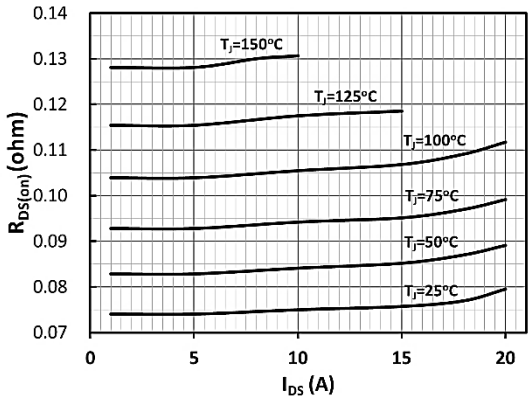



Fig 3. On-Resistance with Drain Current

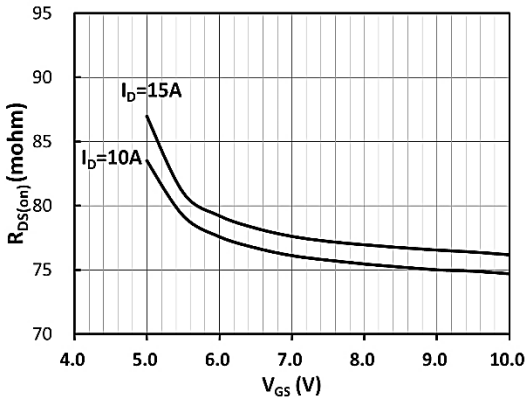



Fig 4. On-Resistance Variation with Temperature

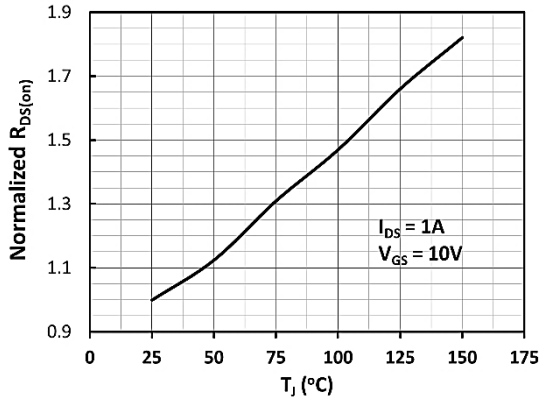



Fig 5. Threshold Voltage with Temperature

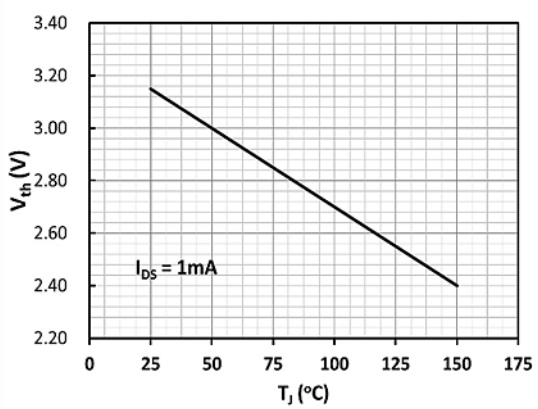



Fig 6. Capacitance Characteristics

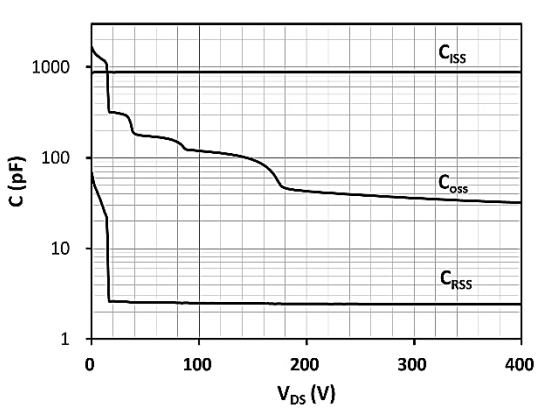


Fig 7. Gate Charge Characteristics, Qg

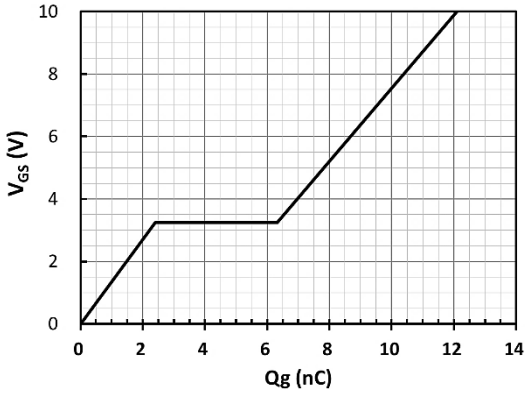



Fig 8. Capacitance Characteristics, Qoss

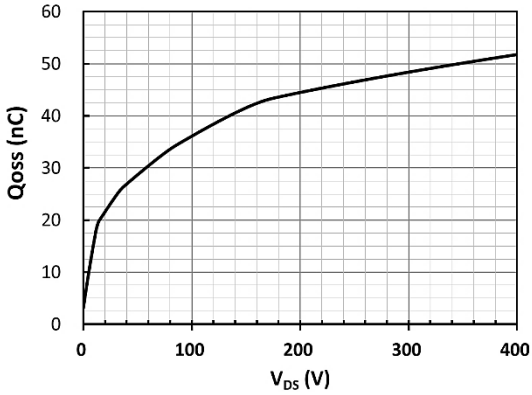
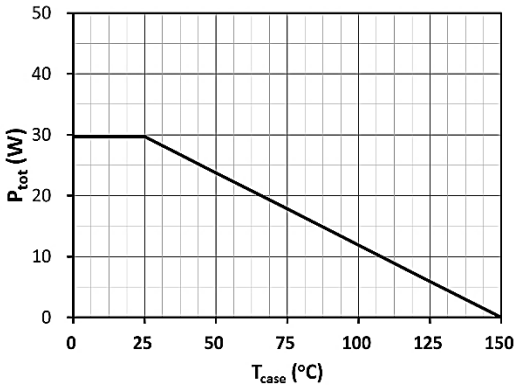
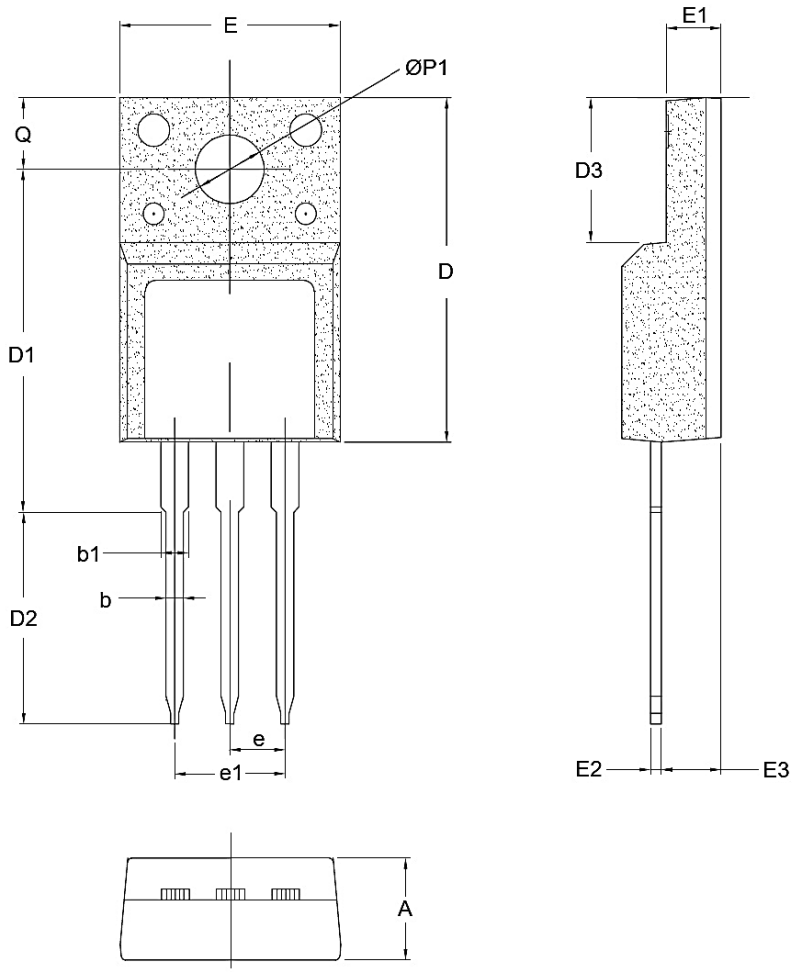



Fig 9. Power Dissipation Derating, Ptot



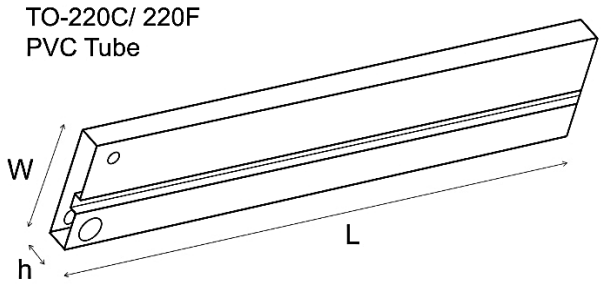
## 3- Package Outline Dimensions, GR-TO-220-FP



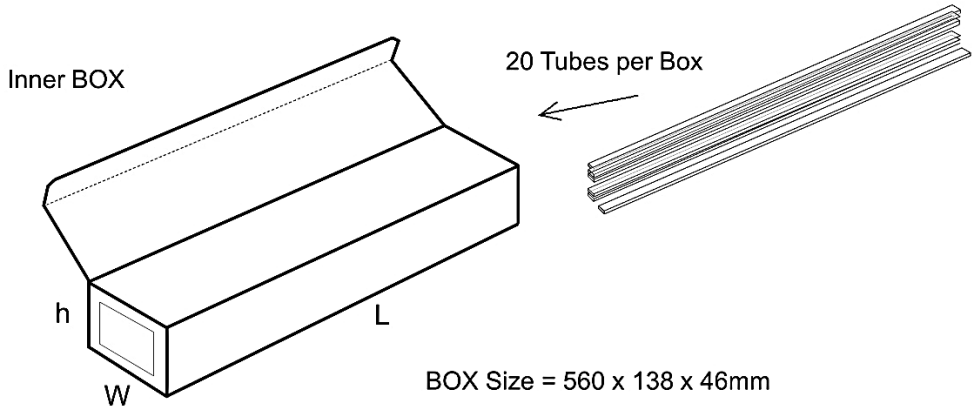

➢ **Table 4 Dimension of GR-TO-220-FP**

| SYMBOL | DIMENSION (IN MM) | | | SYMBOL | DIMENSION (IN MM) | | |
|---|---|---|---|---|---|---|---|
| | MIN. | NOM. | MAX. | | MIN. | NOM. | MAX. |
| **A** | 4.40 | 4.70 | 5.00 | **D1** | 15.5 | 15.8 | 16.1 |
| **b** | 1.18 | 1.28 | 1.48 | **D2** | 9.45 | 9.75 | 10.0 |
| **b1** | 0.70 | 0.80 | 0.95 | **D3** | 6.38 | 6.68 | 6.98 |
| **e** | 2.54 BSC | | | **E1** | 2.24 | 2.54 | 2.84 |
| **e1** | 5.08 BSC | | | **E2** | 0.45 | 0.50 | 0.66 |
| **D** | 15.57 | 15.87 | 16.17 | **E3** | 2.46 | 2.76 | 3.06 |
| **E** | 9.86 | 10.16 | 10.46 | **Q** | 3.00 | 3.30 | 3.60 |
| **-** | - | - | - | **ϕP1** | 3.22 | 3.42 | 3.62 |

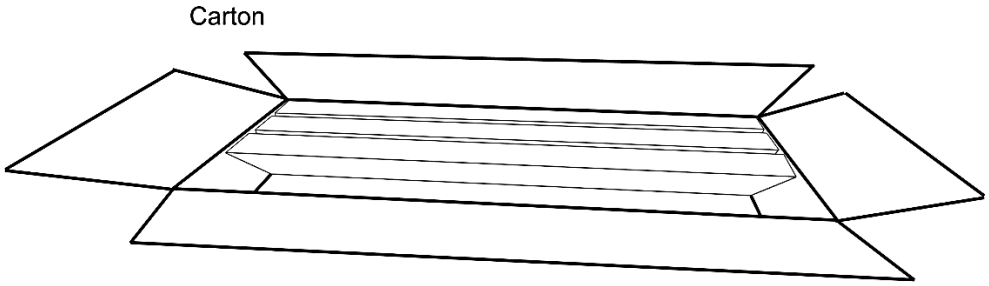
## 4- Tube Package Information




Tube Size = 536 x 32.1 x 6.75mm




BOX Size = 560 x 138 x 46mm




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 | 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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