

## GR-10E003GJ: E-mode GaN Power Transistor

### Description

GR-10E003GJ is an enhancement mode GaN on Silicon power transistor. 10E003GJ provides, high current and high operating speed which is suitable for DC to DC power supply applications.

### Key Specifications

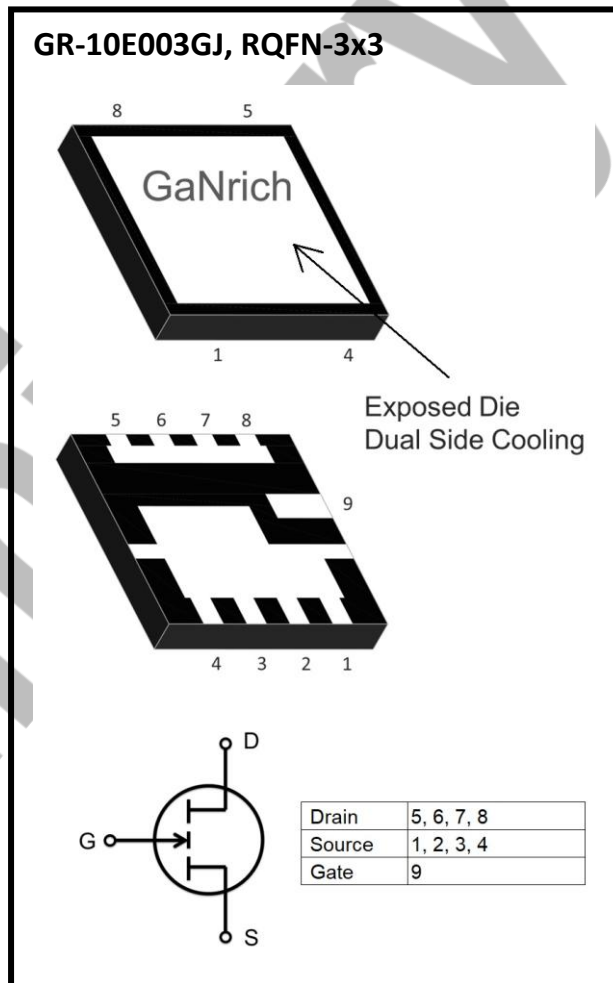
|                                               |               |
|-----------------------------------------------|---------------|
| Part Number                                   | GR-10E003GJ   |
| $V_{DS}$ , min.                               | 100V          |
| $I_{DS}$ , Pulse (25°C, TPULSE = 300 $\mu$ s) | 135A          |
| $R_{DS(ON)}$ , typ. @ $V_{GS}=5V$             | 3.2m $\Omega$ |
| $Q_G$ , typ.                                  | 9.5nC         |

### Features

- 100 V enhancement mode power transistor
- High operating frequency
- $R_{DS(on)}$  = Typ. 3.2 m $\Omega$
- RoHS compliant

### Applications

- High-Efficiency Synchronous Rectification (AC-DC/DC-DC)
- High-Frequency Multi-Topology DC-DC Converters
- High-Power Density DC-DC Power Modules
- Industrial & Automotive Motor Drives



## 1. Electrical Characteristics

➤ **Table 1 Absolute maximum ratings**

| Symbol        | Parameter                                                                                | Value       | Unit             |
|---------------|------------------------------------------------------------------------------------------|-------------|------------------|
| $V_{DSS}$     | Drain-source voltage                                                                     | 100         | V                |
| $V_{(TR)DSS}$ | Transient drain to source voltage <sup>a</sup>                                           | 120         | V                |
| $V_{GSS}$     | Gate- source voltage                                                                     | -6V ~ +6V   | V                |
| $I_D$         | Drain current (continuous) at $T_C = 25^\circ\text{C}$ operation                         | 49.5        | A                |
|               | Drain current (continuous) at $T_C = 100^\circ\text{C}$ operation                        | 34.1        | A                |
| $I_{D,Pulse}$ | Pulsed drain current (pulse width: 300 $\mu\text{s}$ , $V_{GS}=5\text{V}$ ) <sup>b</sup> | 135         | A                |
| $T_J$         | 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**

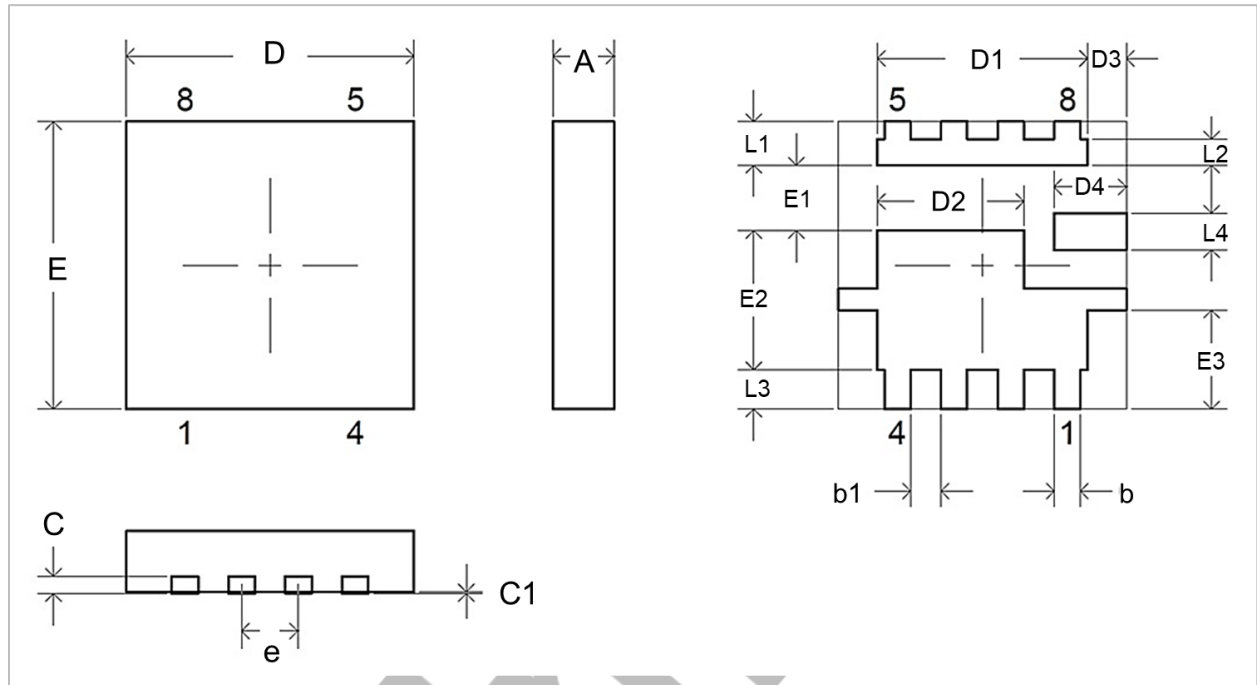
| Symbol               | Parameter                                | Value | Unit                      |
|----------------------|------------------------------------------|-------|---------------------------|
| $R_{\theta JC\_Top}$ | Thermal resistance junction-case, Top    | 0.65  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC\_Bot}$ | Thermal resistance junction-case, Bottom | 0.80  | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JA}$      | Thermal resistance junction-ambient      | 60    | $^\circ\text{C}/\text{W}$ |

a. Tested in package DFN 3x3.

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

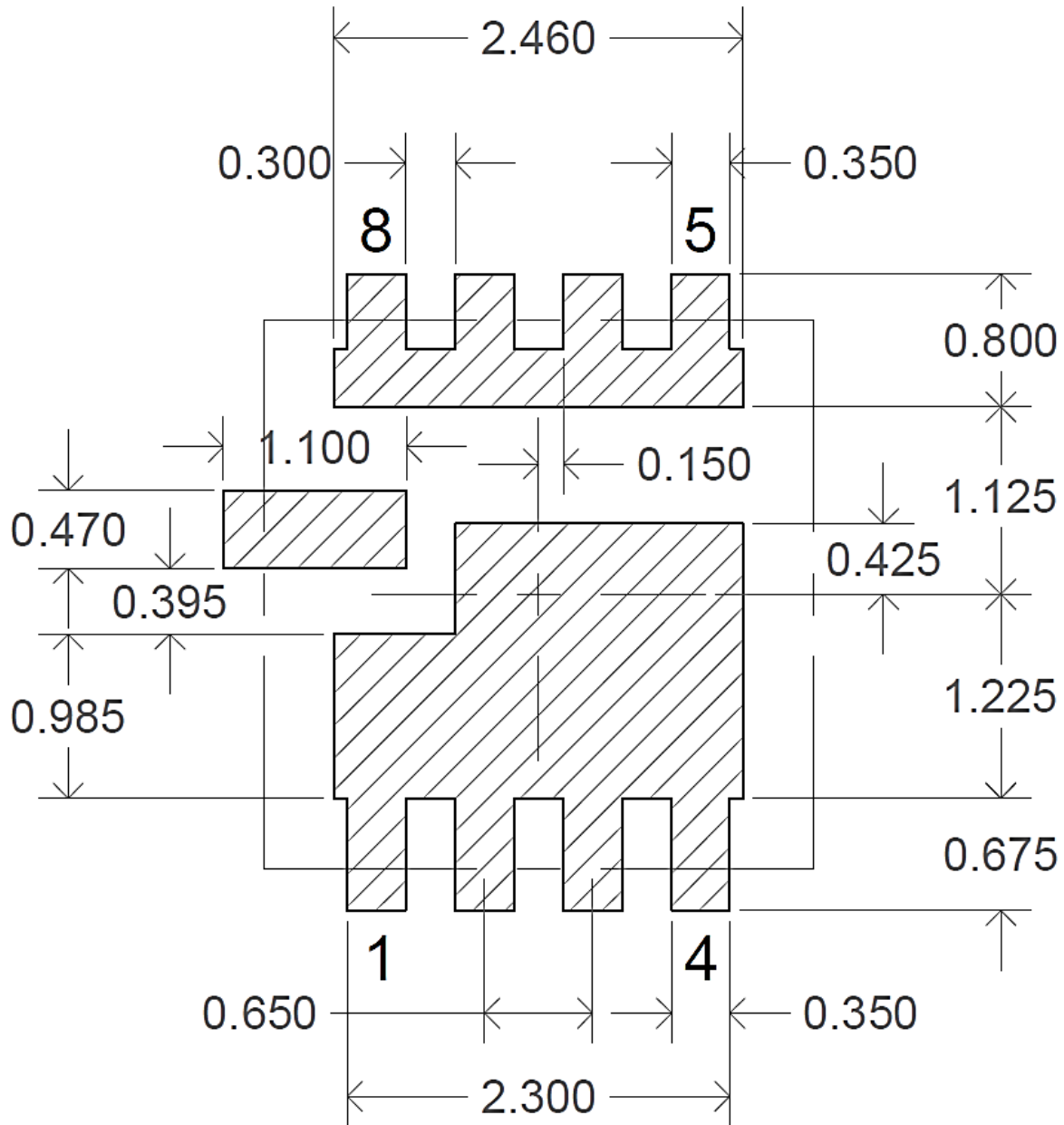
| Symbol       | Parameter                              | Conditions                                | Values |      |      | Unit      |
|--------------|----------------------------------------|-------------------------------------------|--------|------|------|-----------|
|              |                                        |                                           | min.   | typ. | max. |           |
| $V_{DS}$     | Drain-source voltage                   | $V_{GS} = 0V, I_D = 150\mu A$             | 100    | -    | -    | V         |
| $V_{GS(th)}$ | Gate threshold voltage                 | $V_{DS} = V_{GS}, I_D = 15mA$             | 0.8    | 1.2  | 1.8  | V         |
| $R_{DS(on)}$ | Drain-source on-resistance             | $V_{GS} = 5V, I_D = 50A$                  | -      | 3.2  | 4.2  | $m\Omega$ |
| $I_{DSS}$    | Drain-source leakage current           | $V_{DS} = 80V, V_{GS} = 0V$               | -      | 5.0  | 400  | $\mu A$   |
| $I_{GSS}$    | Gate-to-Source Forward Leakage current | $V_{GS} = +5V$                            | -      | 0.1  | 20   | mA        |
|              | Gate-to-Source Forward Leakage current | $V_{GS} = +5V, T_J = 125^{\circ}\text{C}$ | -      | 0.42 | 12.6 | mA        |
|              | Gate-to-Source Reverse Leakage current | $V_{GS} = -4V$                            | -      | 0.08 | 2.4  | mA        |
| $C_{ISS}$    | Input capacitance                      | $V_{DS} = 50V, V_{GS} = 0V$               | -      | 895  | -    | pF        |
| $C_{OSS}$    | Output capacitance                     |                                           | -      | 435  | -    |           |
| $C_{RSS}$    | Reverse transfer capacitance           |                                           | -      | 50   | -    |           |
| $Q_G$        | Gate charge                            | $V_{DS} = 50V, V_{GS} = 5V, I_D = 50A$    | -      | 9.5  | -    | nC        |
| $Q_{GS}$     | Gate-source charge                     | $V_{DS} = 50V, I_D = 50A$                 | -      | 2.0  | -    |           |
| $Q_{GD}$     | Gate-drain charge                      |                                           |        | 1.7  |      |           |
| $Q_{OSS}$    | Output charge                          | $V_{DS} = 50V, V_{GS} = 0V$               | -      | 56.3 | -    |           |
| $Q_{RR}$     | Source-Drain Recovery Charge           | -                                         | -      | 0    | -    |           |

## 2. Package Outline Dimensions



➤ Table 4 Dimension of GR-RQFN-3x3

| SYMBOL | DIMENSION (IN MM) |      |      | SYMBOL | DIMENSION (IN MM) |       |       |
|--------|-------------------|------|------|--------|-------------------|-------|-------|
|        | MIN.              | NOM. | MAX. |        | MIN.              | NOM.  | MAX.  |
| A      | ---               | ---  | 0.70 | D3     | 0.345             | 0.445 | 0.545 |
| C      | 0.203 REF         |      |      | D4     | 0.73              | 0.83  | 0.93  |
| C1     | ---               | ---  | 0.05 | E1     | 0.65              | 0.75  | 0.85  |
| D      | 3.20              | 3.30 | 3.40 | E2     | 1.50              | 1.60  | 1.70  |
| E      | 3.20              | 3.30 | 3.40 | E3     | 1.035             | 1.135 | 1.235 |
| e      | 0.65 BSC          |      |      | L1     | 0.40              | 0.50  | 0.60  |
| b      | 0.20              | 0.30 | 0.40 | L2     | 0.20              | 0.30  | 0.40  |
| b1     | 0.25              | 0.35 | 0.45 | L3     | 0.35              | 0.45  | 0.55  |
| D1     | 2.31              | 2.41 | 2.51 | L4     | 0.32              | 0.42  | 0.52  |
| D2     | 1.58              | 1.68 | 1.78 | ---    | ---               | ---   | ---   |

**3. Recommended PCB footprint (Unit: mm)**

\*All dimensions are in units mm

\*Not to Scale

#### 4. Change Log

| Version | Date           | Description                        |
|---------|----------------|------------------------------------|
| 0.1     | March 28, 2025 | Initial version                    |
| 0.2     | April 16, 2026 | Electrical characteristics revised |

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