

### GR-65J016SL: TOLT Cascode GaN HEMT (Preliminary)

#### Description

GR-65J016SL 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

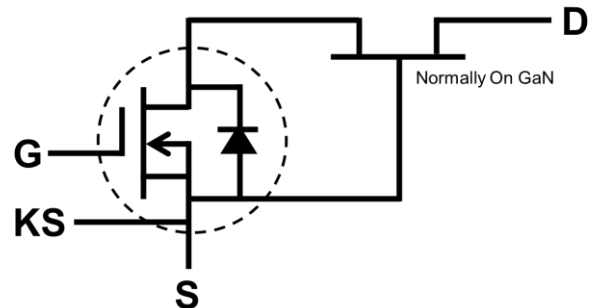
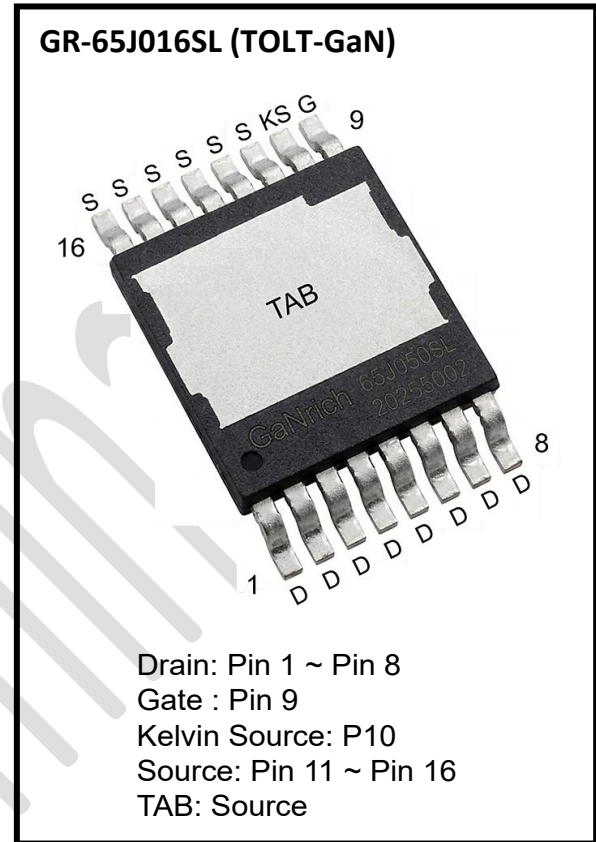
|                     |              |
|---------------------|--------------|
| Part Number         | GR-6J016SL   |
| $V_{DSS}$           | 650V         |
| $V_{(TR)DSS}$       | 800V         |
| $R_{DS(ON)}$ , typ. | 16m $\Omega$ |
| $Q_G$ , typ.        | 62.5nC       |
| Package             | TOLT-GaN     |

#### Features

- Gate drive voltage compatibility (-20V to +20V)
- High operating frequency
- 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 <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  |          | 84          | A    |
|                       | Drain current (continuous) at T <sub>C</sub> = 100°C operation |          | 53          | A    |
| I <sub>D, pulse</sub> | Pulsed drain current (pulse width: 10μs)                       |          | 315         | A    |
| P <sub>D</sub>        | Maximum power dissipation Tc=25 °C                             |          | 250         | 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  $< 1\mu\text{s}$

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

➤ **Table 2 Thermal Characteristics**

| Symbol          | Parameter                           | Value | Unit                      |
|-----------------|-------------------------------------|-------|---------------------------|
| $R_{\theta JA}$ | Thermal resistance junction-ambient | 50    | $^\circ\text{C}/\text{W}$ |
| $R_{\theta JC}$ | Thermal resistance junction-case    | 0.5   | $^\circ\text{C}/\text{W}$ |

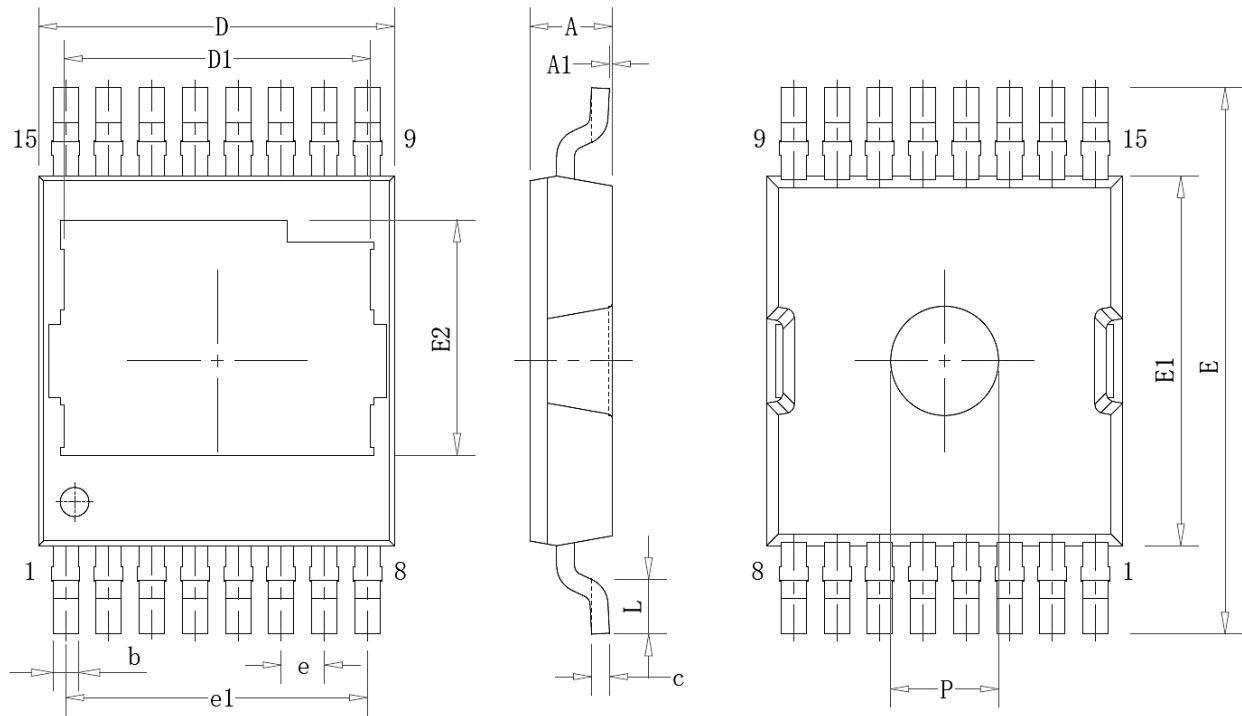
➤ **Table 3 ESD Rating**

| 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 ( $T_{CASE} = 25\text{ }^{\circ}\text{C}$  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      | $V_{GS}=10V$ , $I_D=20A$ , $T_J=25^{\circ}\text{C}$                               | -      | 16   | 20   | $m\Omega$ |
|               |                                        | $V_{GS}=10V$ , $I_D=20A$ , $T_J=150^{\circ}\text{C}$                              | -      | 30   | -    |           |
| $I_{DSS}$     | Drain-source leakage current           | $V_{GS}=0V$ , $V_{DS}=650V$ , $T_J=25^{\circ}\text{C}$                            | -      | 7.5  | 150  | $\mu A$   |
|               |                                        | $V_{GS}=0V$ , $V_{DS}=650V$ , $T_J=150^{\circ}\text{C}$                           | -      | 55   | -    |           |
| $I_{GSS}$     | Gate-to-source forward leakage current | $V_{GS}=20V$                                                                      | -      | -    | 400  | nA        |
|               | Gate-to-source reverse leakage current | $V_{GS}=-20V$                                                                     | -      | -    | -400 |           |
| $C_{ISS}$     | Input capacitance                      | $V_{GS}=0V$ , $V_{DS}=400V$ , $f=1MHz$                                            | -      | 4059 | -    | pF        |
| $C_{OSS}$     | Output capacitance                     |                                                                                   | -      | 269  | -    |           |
| $C_{RSS}$     | Reverse transfer capacitance           |                                                                                   | -      | 5.85 | -    |           |
| $Q_G$         | Gate charge                            | $V_{GS}=0\sim 10V$ , $V_{DS}=400V$ , $I_{DS}=20A$                                 | -      | 62.5 | -    | nC        |
| $Q_{GS}$      | Gate-source charge                     |                                                                                   | -      | 14.7 | -    |           |
| $Q_{GD}$      | Gate-drain charge                      |                                                                                   | -      | 24.7 | -    |           |
| $Q_{OSS}$     | Output charge                          | $V_{GS}=0V$ , $V_{DS}=0\sim 400V$                                                 | -      | 362  | -    |           |
| $t_{D(on)}$   | Turn-on delay time                     | $V_{DS}=400V$ , $V_{GS}=0$ to $10V$ , $I_{DS}=20A$ , $R_G=45\Omega$ , at $100MHz$ | -      | 42   | -    | ns        |
| $t_R$         | Rise time                              |                                                                                   | -      | 15   | -    |           |
| $t_{D(off)}$  | Turn-off delay time                    |                                                                                   | -      | 94   | -    |           |
| $t_F$         | Fall time                              |                                                                                   | -      | 6.0  | -    |           |
| $Q_{RR}$      | Reverse recovery charge                | $I_S=20A$ , $V_{DS}=400V$                                                         | -      | 44   | -    | nC        |

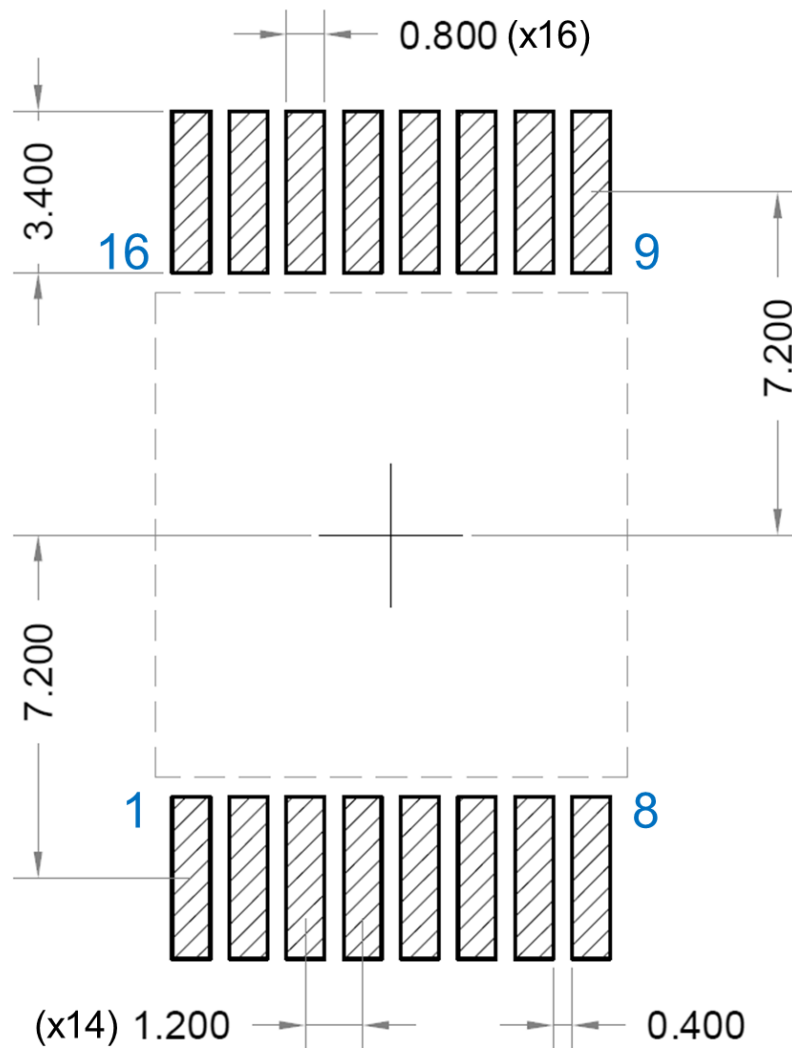
## 2- Package Outline Dimensions, GR-TOLT-GaN



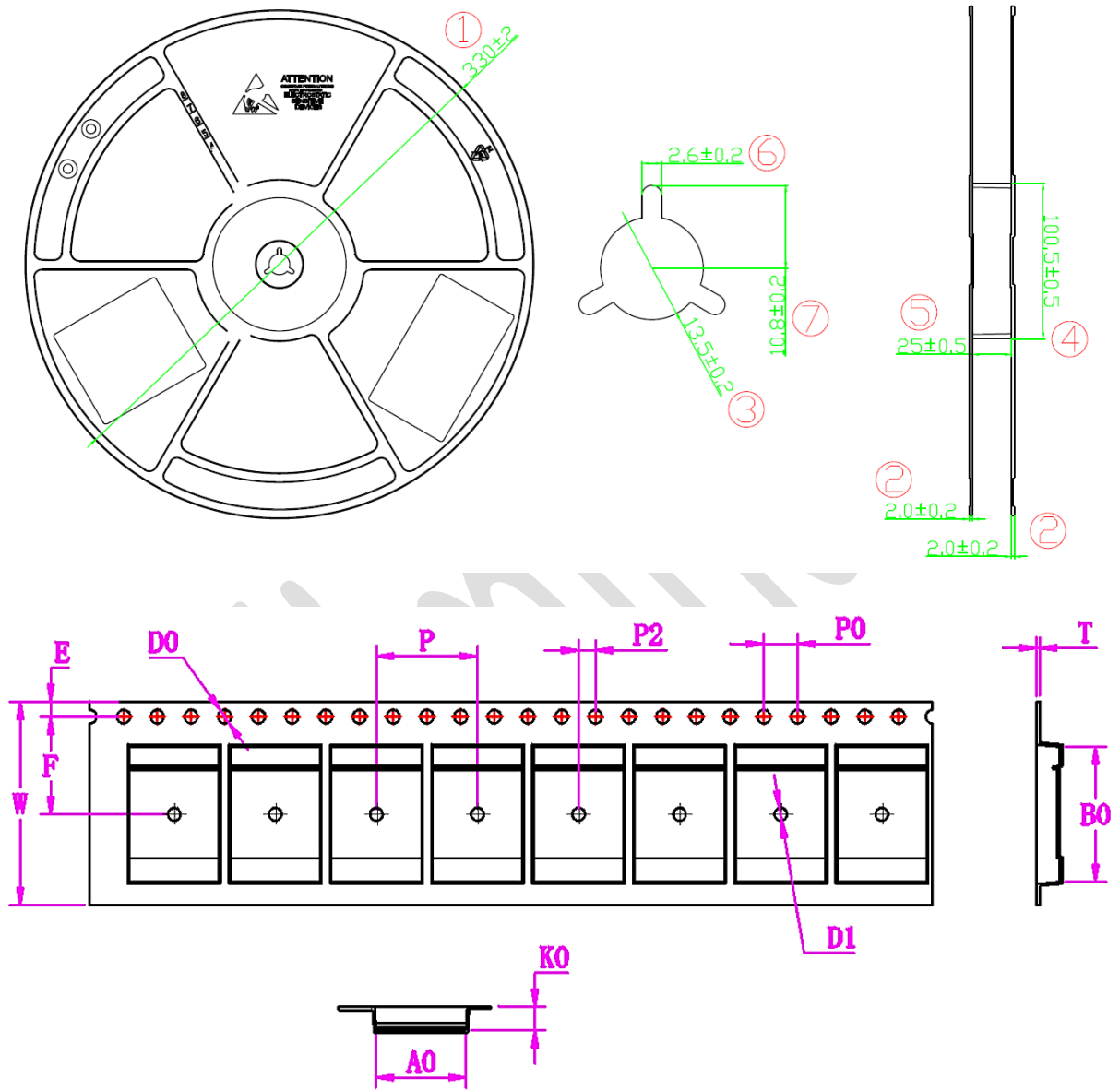
➤ Table 5 Dimension of GR-TOLT-GaN

| SYMBOL | DIMENSION (IN MM) |      |      | SYMBOL | DIMENSION (IN MM) |       |       |
|--------|-------------------|------|------|--------|-------------------|-------|-------|
|        | MIN.              | NOM. | MAX. |        | MIN.              | NOM.  | MAX.  |
| A      | 2.25              | 2.30 | 2.35 | E1     | 10.00             | 10.15 | 10.30 |
| A1     | 0.01              | --   | 0.16 | E2     | 6.31              | 6.46  | 6.61  |
| b      | 0.65              | 0.70 | 0.75 | e      | 1.20              |       |       |
| c      | 0.45              | 0.50 | 0.55 | e1     | 8.40              |       |       |
| D      | 9.70              | 9.90 | 11.1 | L      | 1.40              | 1.50  | 1.60  |
| D1     | 8.37              | 8.52 | 8.67 | P      | 2.90              | 3.00  | 3.10  |
| E      | 14.8              | 15.0 | 15.2 |        |                   |       |       |
|        |                   |      |      |        |                   |       |       |

### 3- Recommended PCB Soldering Footprint, GR-TOLT

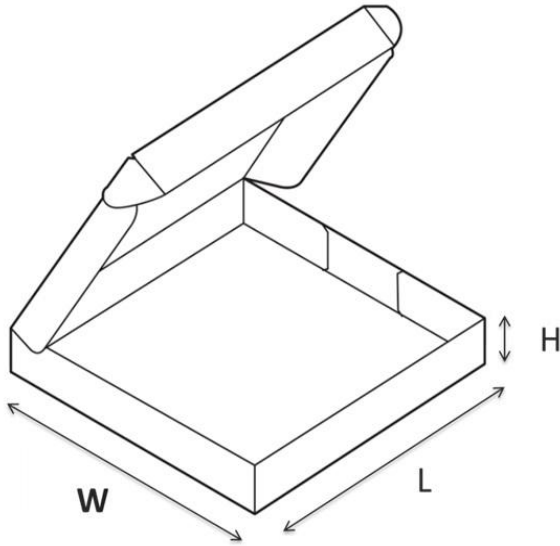


### 4- Tape Reel & Package Information



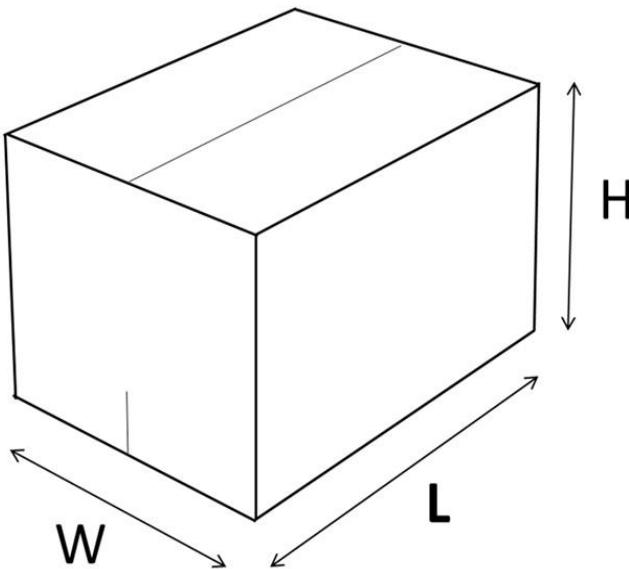
| Symbol | A0       | B0       | K0       | D0      | D1        | P        | P0      |
|--------|----------|----------|----------|---------|-----------|----------|---------|
| Spec.  | 10.3±0.1 | 15.6±0.1 | 2.9±0.1  | 1.5±0.1 | 1.6±0.1   | 12.0±0.1 | 4.0±0.1 |
| Symbol | W        | E        | F        | P2      | T         | -        | 10*P0   |
| Spec.  | 24.0±0.3 | 1.75±0.1 | 11.5±0.1 | 2.0±0.1 | 0.35±0.05 | -        | 40±0.2  |

## 5- Box Dimensions



|        | Inner BOX, mm |
|--------|---------------|
| L      | 360           |
| W      | 340           |
| H      | 50            |
| Weight | 2.0 KG        |

Each box contains one Reel, and  
each Reel contains 2000 components



|        | Outer Carton (mm) |
|--------|-------------------|
| L      | 380               |
| W      | 360               |
| H      | 340               |
| Weight | 14.5 KG           |

Each Carton contains 6 boxes,  
Total of 12500 components

## 6- Change Log

| Version | Date           | Description                        |
|---------|----------------|------------------------------------|
| 01      | Dec 17, 2025   | Initial version                    |
| 02      | April 16, 2026 | Electrical characteristics revised |

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