

GR-65J035SL: TOLT Cascode GaN HEMT (Preliminary)

Description

GR-65J035SL 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

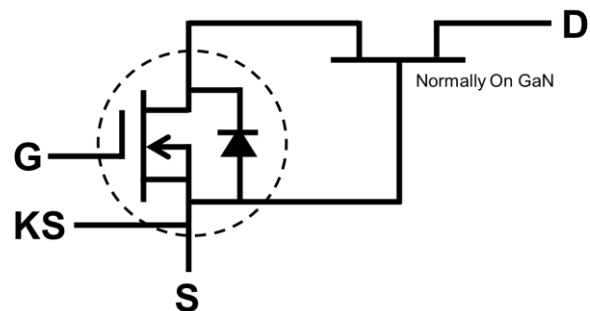
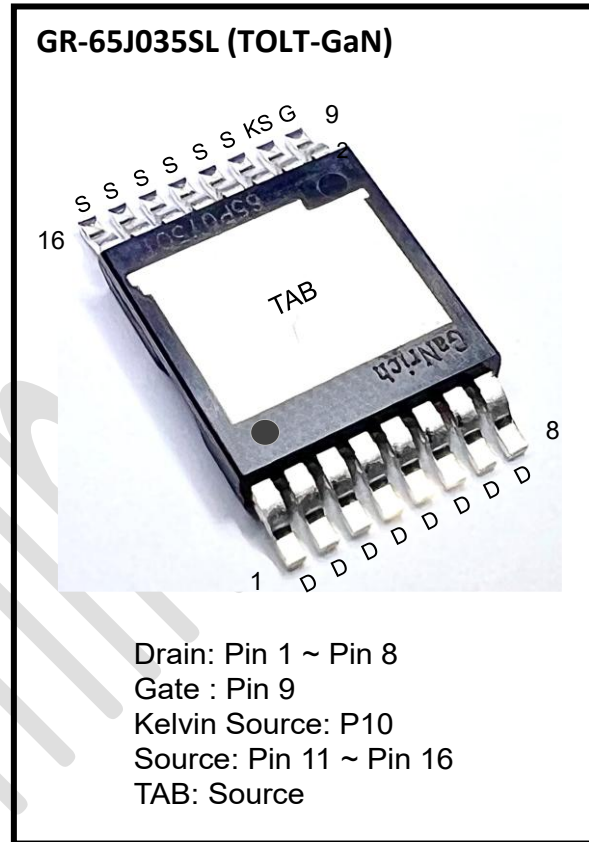
| | |
|----------------------------|------------|
| Part Number | GR-6J035SL |
| V _{DSS} | 650V |
| V _{(TR)DSS} | 800V |
| R _{DS(ON)} , typ. | 34mΩ |
| Q _G , typ. | 24.0nC |
| Package | TOLT-GaN |

Features

- Gate drive voltage compatibility (-20V to +20V)
- High operating frequency
- Low Q_{rr}
- 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 _{DSS} | Drain-source voltage | 650 | V |
| V _{GSS} | Gate- source voltage | -20V ~ +20V | V |
| I _D | Drain current (continuous) at T _C = 25°C operation | 52.0 | A |
| | Drain current (continuous) at T _C = 100°C operation | 33.0 | A |
| I _{D, pulse} | Pulsed drain current (pulse width: 10μs) | 195 | A |
| P _D | Maximum power dissipation T _C =25°C | 192 | 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 _{θJA} | Thermal resistance junction-ambient | 55 | °C/W |
| R _{θJC} | Thermal resistance junction-case | 0.65 | °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 | $V_{GS}=10V, I_D=20A, T_J=25\text{ °C}$ | - | 34 | 42 | mΩ |
| | | $V_{GS}=10V, I_D=20A, T_J=150\text{ °C}$ | - | 64 | - | |
| I_{DSS} | Drain-source leakage current | $V_{GS}=0V, V_{DS}=650V, T_J=25\text{ °C}$ | - | 3.5 | 70 | μA |
| | | $V_{GS}=0V, V_{DS}=650V, T_J=150\text{ °C}$ | - | 17.5 | - | |
| 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 | $V_{GS}=0V, V_{DS}=400V, f=1MHz$ | - | 1495 | - | pF |
| C_{OSS} | Output capacitance | | - | 98 | - | |
| C_{RSS} | Reverse transfer capacitance | | - | 4.8 | - | |
| Q_G | Gate charge | $V_{GS}=0\sim 10V, V_{DS}=400V, I_{DS}=20A$ | - | 24 | - | nC |
| Q_{GS} | Gate-source charge | | - | 5.75 | - | |
| Q_{GD} | Gate-drain charge | | - | 5.25 | - | |
| Q_{OSS} | Output charge | $V_{GS}=0V, V_{DS}=0\sim 400V$ | - | 148 | - | |
| $t_{D(on)}$ | Turn-on delay time | $V_{DS}=400V, V_{GS}=0\text{ to }10V, I_{DS}=10A, R_G=25\Omega$ | - | 24.5 | - | ns |
| $t_{D(off)}$ | Turn-off delay time | | - | 53 | - | |
| Q_{RR} | Reverse recovery charge | $I_S=20A, V_{DS}=400V$ | - | 18 | - | nC |

2- Typical Characteristic Curves

Fig 1. On-Region Characteristics

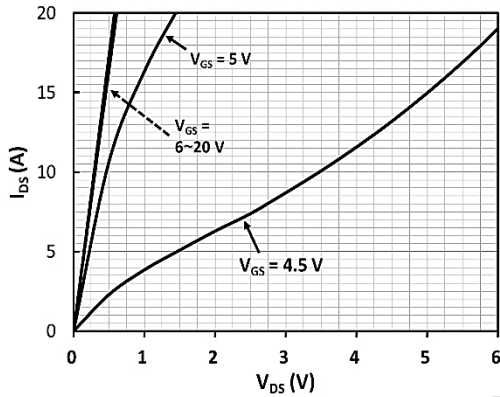


Fig 2. On-Resistance vs Drain Current and Temperature

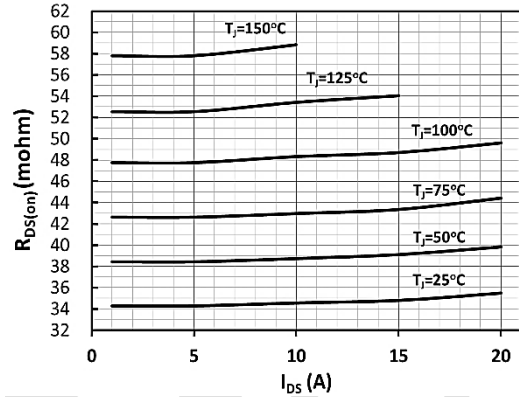


Fig 3. On-Resistance with Drain Current

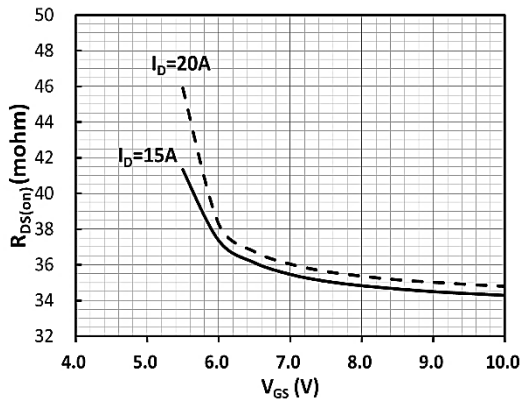


Fig 4. On-Resistance Variation with Temperature

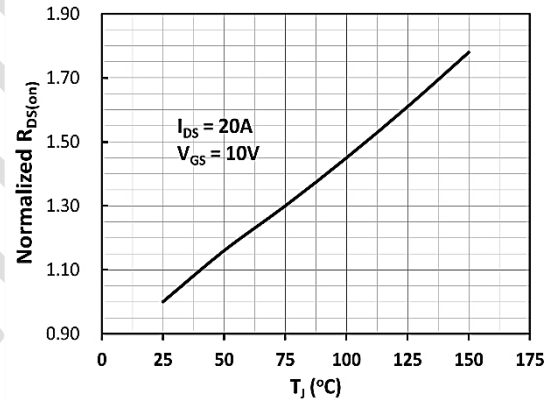


Fig 5. Threshold Voltage with Temperature

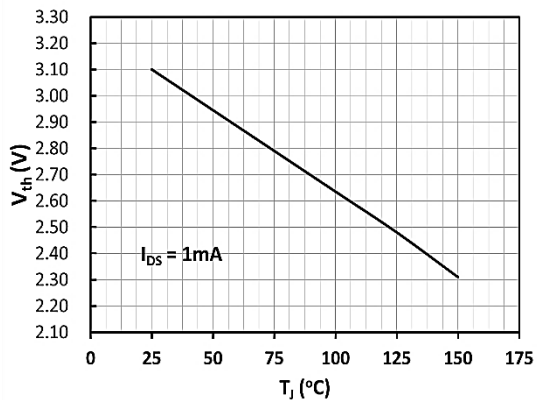


Fig 6. Capacitance Characteristics

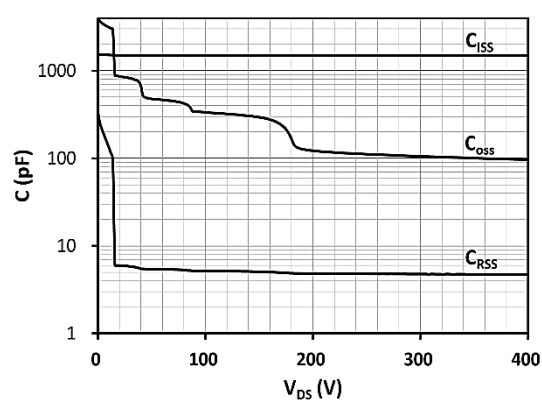


Fig 7. Gate Charge Characteristics, Qg

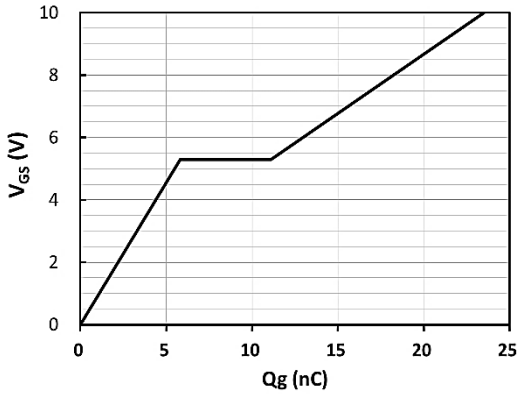


Fig 8. Capacitance Characteristics, Qoss

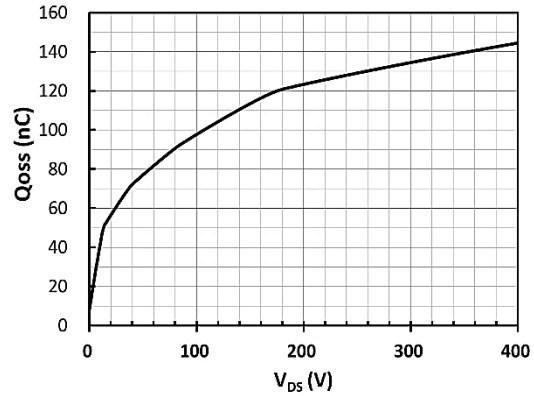
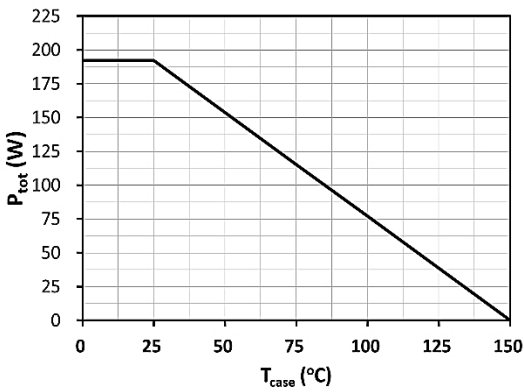
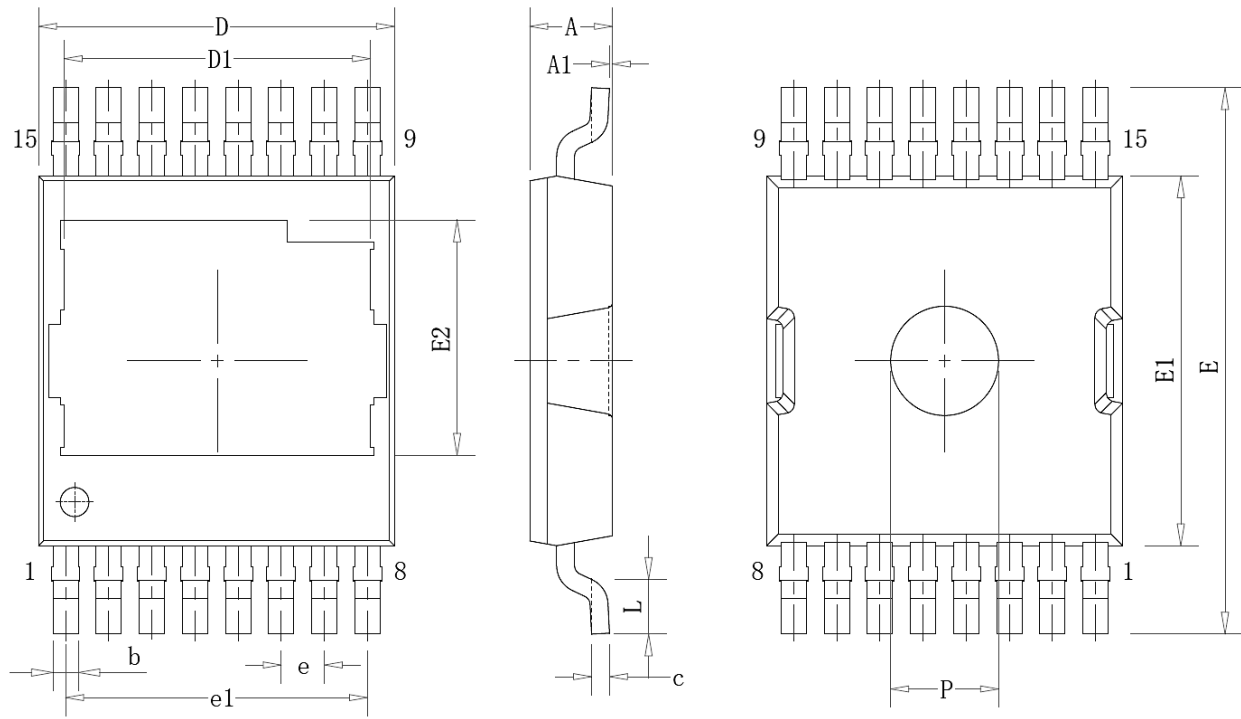


Fig 9. Power Dissipation Derating, Ptot



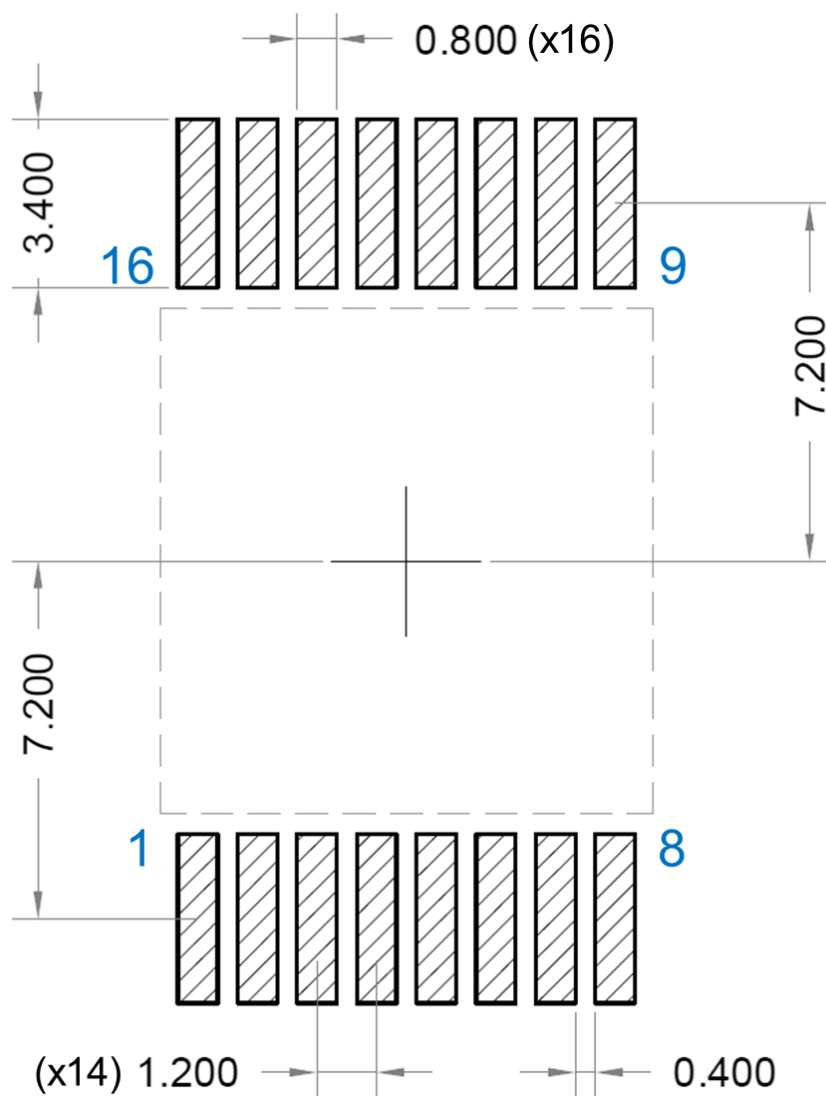
3- Package Outline Dimensions, GR-TOLT-GaN



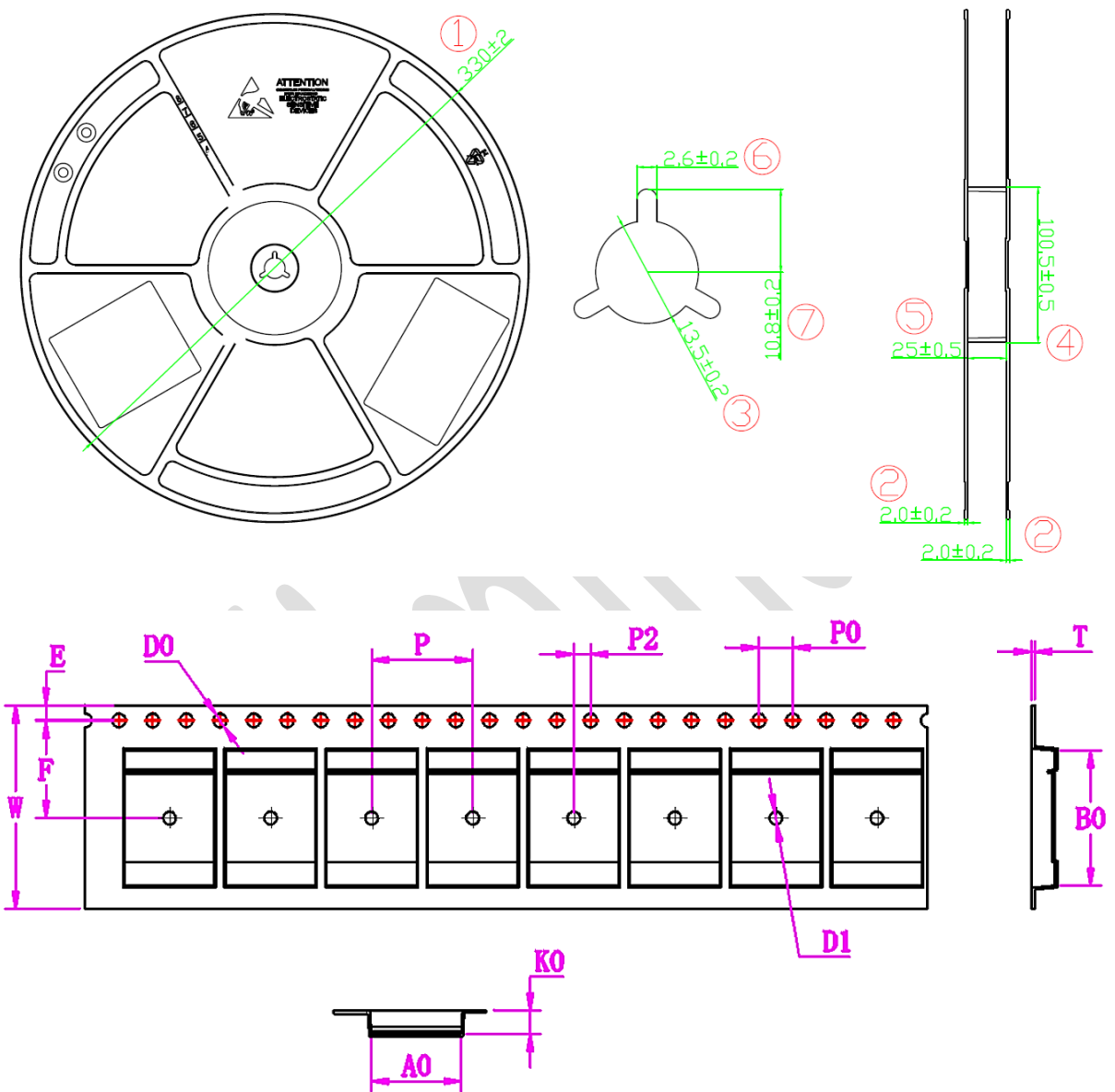
➤ **Table 4 Dimension of GR-TOLT-GaN**

| 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 | | | | |
| | | | | | | | |

Recommended PCB Soldering Footprint, GR-TOLT

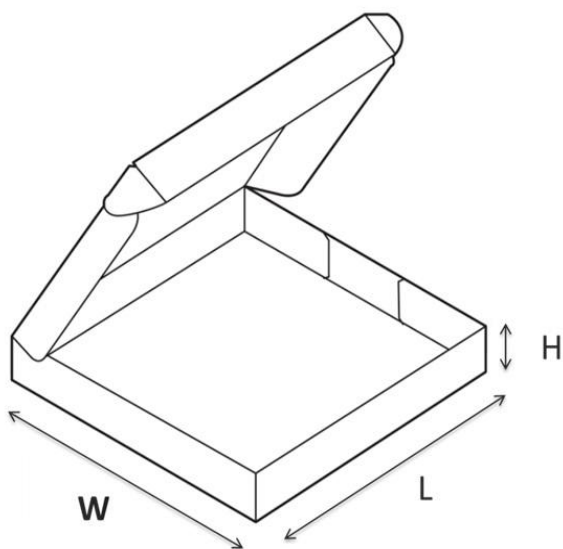


4- Tape Reel & Package Information



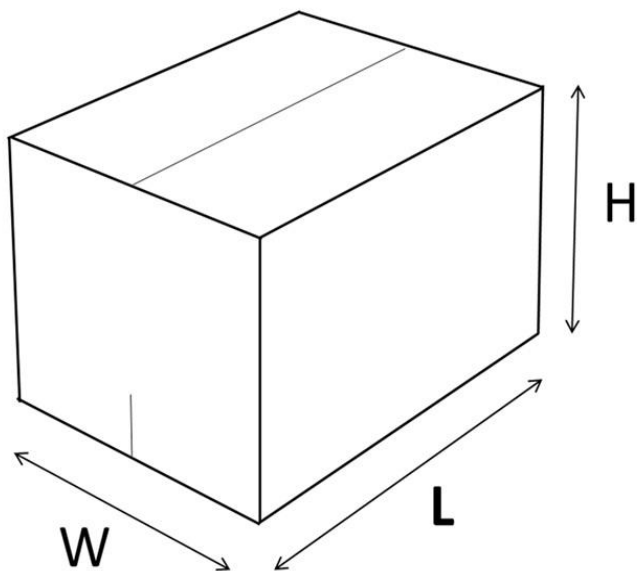
| | | | | | | | |
|--------|----------|----------|----------|---------|-----------|----------|---------|
| Symbol | A0 | B0 | K0 | D0 | D1 | P | P0 |
| Spec. | 10.3±0.1 | 15.6±0.1 | 2.9±0.1 | 1.5±0.1 | 1.6±0.1 | 12.0±0.1 | 4.0±0.1 |
| Symbol | W | E | F | P2 | T | - | 10*P0 |
| Spec. | 24.0±0.3 | 1.75±0.1 | 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 | Nov 28, 2023 | Initial version |
| 02 | August 22, 2025 | Electrical characteristics, Curve and Package information revised |
| 03 | April 16, 2026 | Electrical characteristics revised |

DISCLAIMER

Except for the written expressed warranties, MGT does not implicitly, by assumption or whatever else, warrant, undertake, promise any other warranty or guaranty for any MGT product. All information and technical specifications made available by MGT are for guidance only and we reserve the right to change or modify them without prior notice. Unless expressly stated in writing by MGT, we reject any guarantees, obligations, or warranties. All MGT products with the technical specifications described are suitable for use in certain applications. Operating, production, storage and environmental conditions can have a massive influence on the parameters mentioned in the data sheets, which cause the performance to vary over time. It is subject to the user's duty of care to design and validate his products in such a way that appropriate measures are taken, such as protective circuits or redundant systems to ensure the safety standards required in the application. MGT components are not designed or rated for *use in life support, rescue, safety critical, military, or aerospace applications where failure or malfunction could result in property or environmental damage, serious injury or death*. In the aforementioned cases, please contact us before using MGT products. In principle, we reserve all rights and MGT's general terms and conditions apply. You can find them on our website www.mgt.co.com