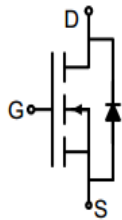
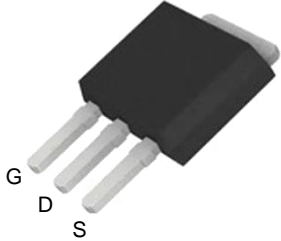


N-Channel Enhancement Mode Power MOSFET

| | | | |
|---|----------------|--|------------------|
| <p>Description</p> <p>The G50N03J uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge. It can be used in a wide variety of applications.</p> <p>General Features</p> <ul style="list-style-type: none"> ● V_{DS} 30V ● I_D (at $V_{GS} = 10V$) 65A ● $R_{DS(ON)}$ (at $V_{GS} = 10V$) < 7mΩ ● $R_{DS(ON)}$ (at $V_{GS} = 4.5V$) < 12mΩ ● 100% Avalanche Tested ● RoHS Compliant <p>Application</p> <ul style="list-style-type: none"> ● Power switch ● DC/DC converters | |  <p>Schematic diagram</p>  <p>TO-251</p> | |
| Device | Package | Marking | Packaging |
| G50N03J | TO-251 | G50N03 | 75pcs/Tube |

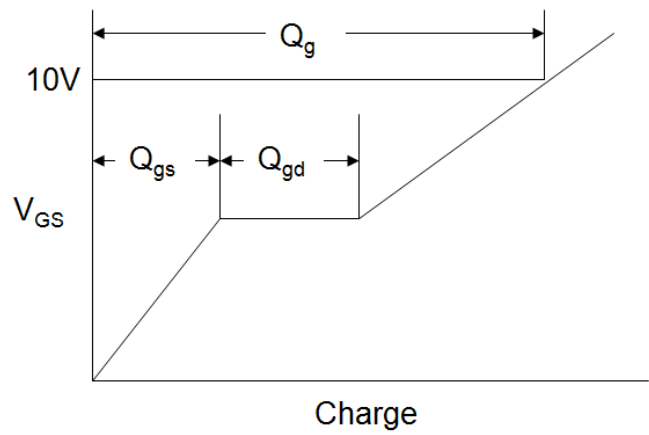
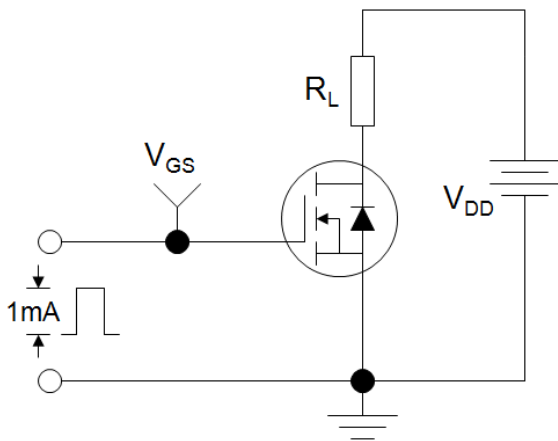
| Absolute Maximum Ratings $T_C = 25^\circ C$, unless otherwise noted | | | |
|--|----------------|------------|------|
| Parameter | Symbol | Value | Unit |
| Drain-Source Voltage | V_{DS} | 30 | V |
| Continuous Drain Current | I_D | 65 | A |
| Pulsed Drain Current (note1) | I_{DM} | 260 | A |
| Gate-Source Voltage | V_{GS} | ±20 | V |
| Power Dissipation | P_D | 48 | W |
| Single pulse avalanche energy (note3) | E_{AS} | 43 | mJ |
| Operating Junction and Storage Temperature Range | T_J, T_{stg} | -55 To 150 | °C |
| Thermal Resistance | | | |
| Parameter | Symbol | Value | Unit |
| Thermal Resistance, Junction-to-Case | R_{thJC} | 2.59 | °C/W |

| Specifications $T_J = 25^\circ\text{C}$, unless otherwise noted | | | | | | |
|--|---------------|--|-------|------|-----------|------------|
| Parameter | Symbol | Test Conditions | Value | | | Unit |
| | | | Min. | Typ. | Max. | |
| Static Parameters | | | | | | |
| Drain-Source Breakdown Voltage | $V_{(BR)DSS}$ | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | -- | -- | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | -- | -- | 1 | μA |
| Gate-Source Leakage | I_{GSS} | $V_{GS} = \pm 20V$ | -- | -- | ± 100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1 | 1.45 | 2.5 | V |
| Drain-Source On-Resistance | $R_{DS(on)}$ | $V_{GS} = 10V, I_D = 20A$ | -- | 5.0 | 7 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 15A$ | -- | 7.2 | 12 | |
| Forward Transconductance | g_{FS} | $V_{DS}=5V, I_D=20A$ | -- | 33 | -- | S |
| Dynamic Parameters | | | | | | |
| Input Capacitance | C_{iss} | $V_{GS} = 0V,$ $V_{DS} = 15V,$ $f = 1.0MHz$ | -- | 1255 | -- | pF |
| Output Capacitance | C_{oss} | | -- | 232 | -- | |
| Reverse Transfer Capacitance | C_{rss} | | -- | 185 | -- | |
| Total Gate Charge | Q_g | $V_{DD} = 10V,$ $I_D = 20A,$ $V_{GS} = 10V$ | -- | 16.6 | -- | nC |
| Gate-Source Charge | Q_{gs} | | -- | 3.6 | -- | |
| Gate-Drain Charge | Q_{gd} | | -- | 3 | -- | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD} = 15V,$ $I_D = 20A,$ $R_G = 1.8\Omega$ | -- | 10 | -- | ns |
| Turn-on Rise Time | t_r | | -- | 8 | -- | |
| Turn-off Delay Time | $t_{d(off)}$ | | -- | 30 | -- | |
| Turn-off Fall Time | t_f | | -- | 5 | -- | |
| Drain-Source Body Diode Characteristics | | | | | | |
| Continuous Body Diode Current | I_S | $T_C = 25^\circ\text{C}$ | -- | -- | 65 | A |
| Body Diode Voltage | V_{SD} | $T_J = 25^\circ\text{C}, I_{SD} = 30A, V_{GS} = 0V$ | -- | -- | 1.2 | V |

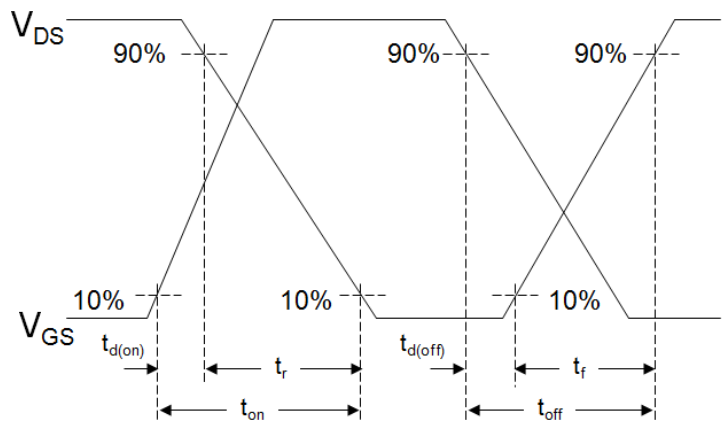
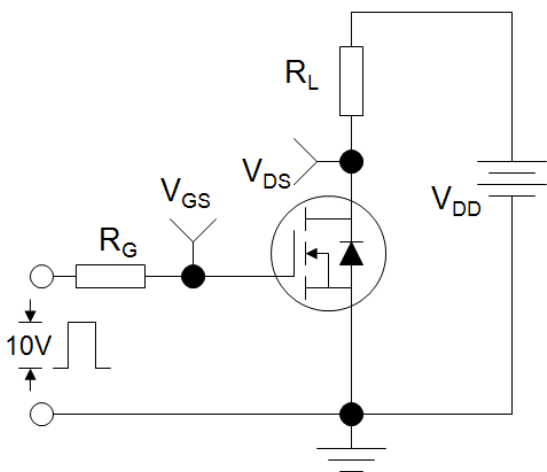
Notes

1. Repetitive Rating: Pulse width limited by maximum junction temperature
2. Identical low side and high side switch with identical R_G
3. EAS condition : $T_J=25^\circ\text{C}$, $V_{DD}=30V, V_{GS}=10V, L=0.5mH, R_g=25\Omega$

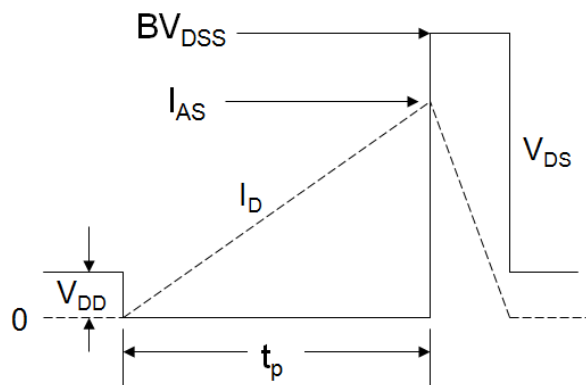
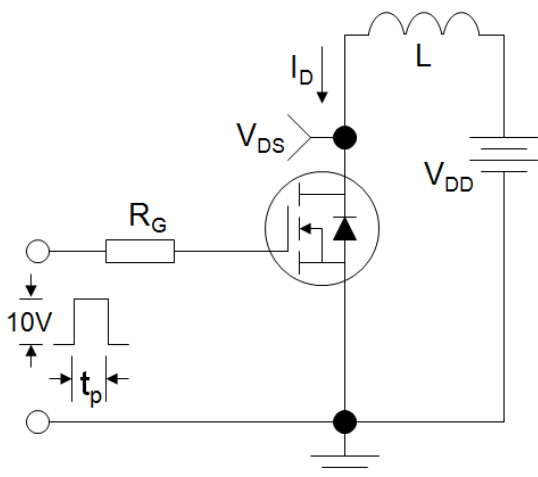
Gate Charge Test Circuit



Switch Time Test Circuit



EAS Test Circuit



Typical Characteristics $T_J = 25^{\circ}\text{C}$, unless otherwise noted

Figure 1. Output Characteristics

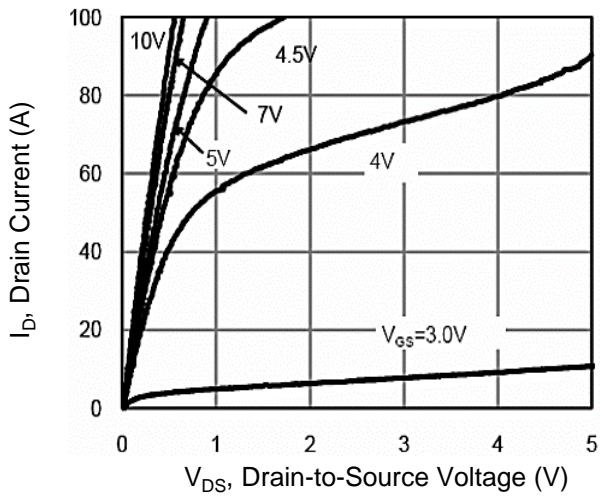


Figure 2. Transfer Characteristics

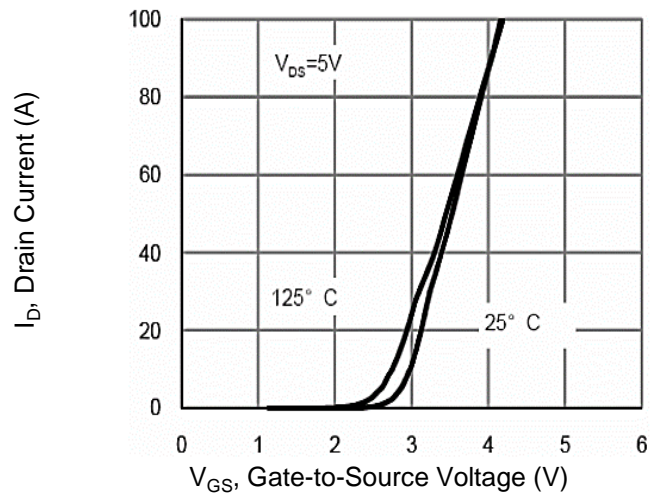


Figure 3. Gate Charge

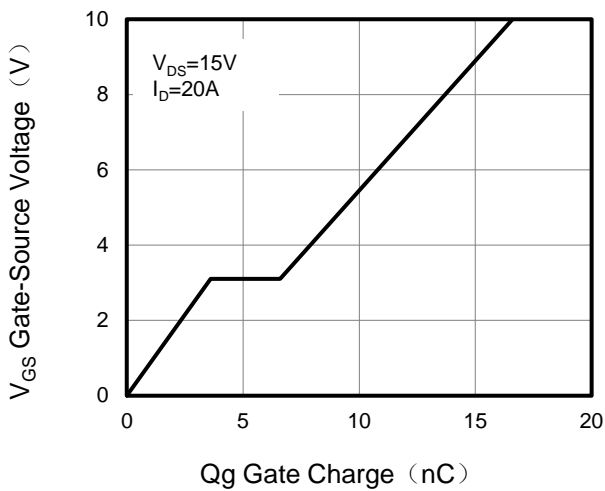


Figure 4. Drain Source On Resistance

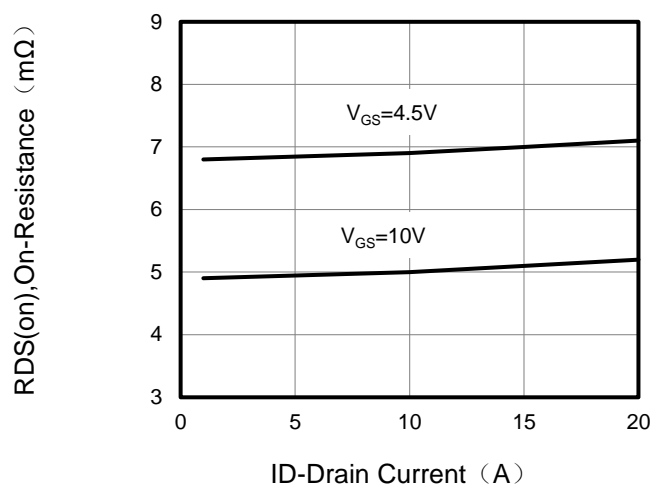


Figure 5. Capacitance

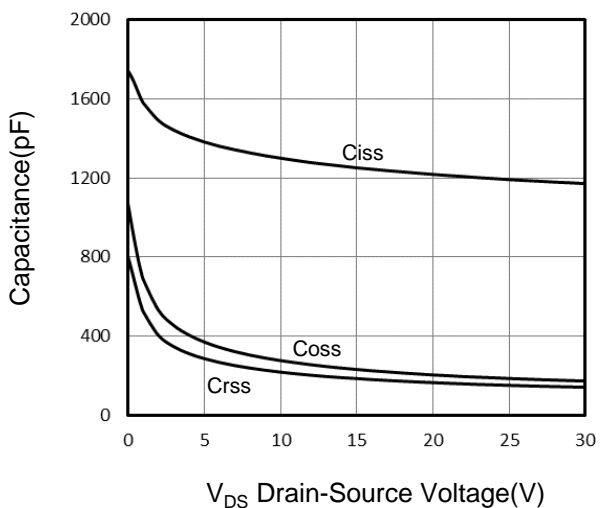
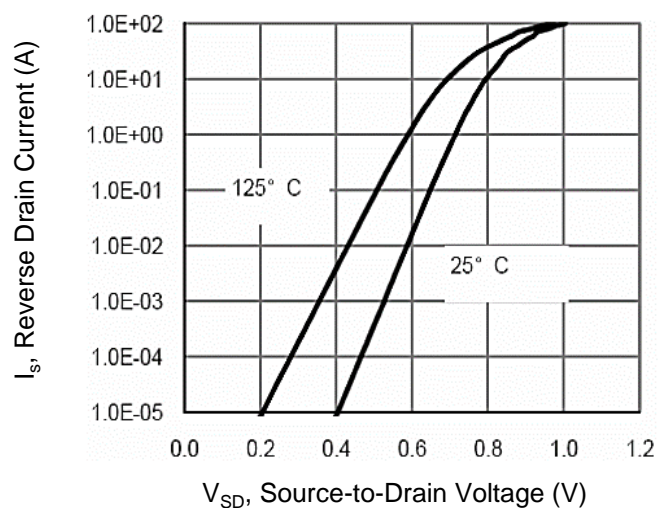


Figure 6. Source-Drain Diode Forward



Typical Characteristics $T_J = 25^\circ\text{C}$, unless otherwise noted

Figure 7. Drain-Source On-Resistance

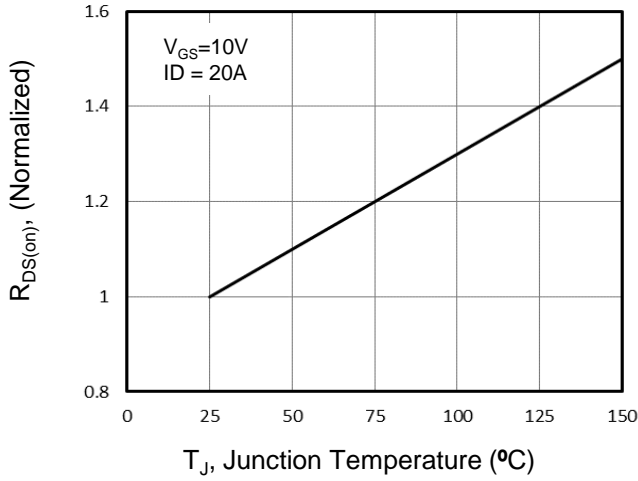


Figure 8. Safe Operation Area

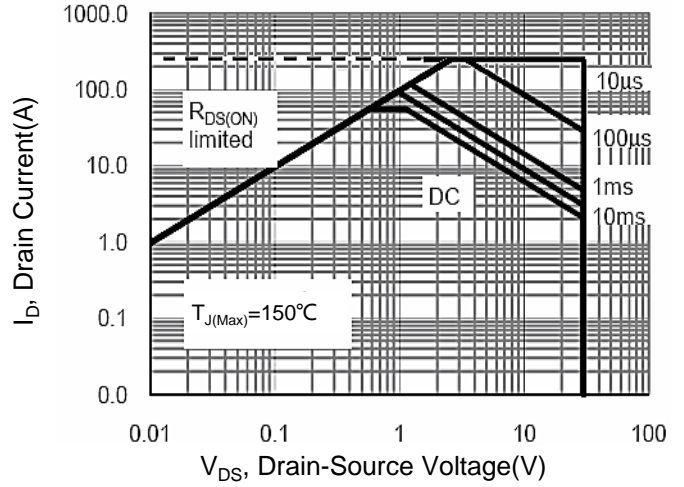
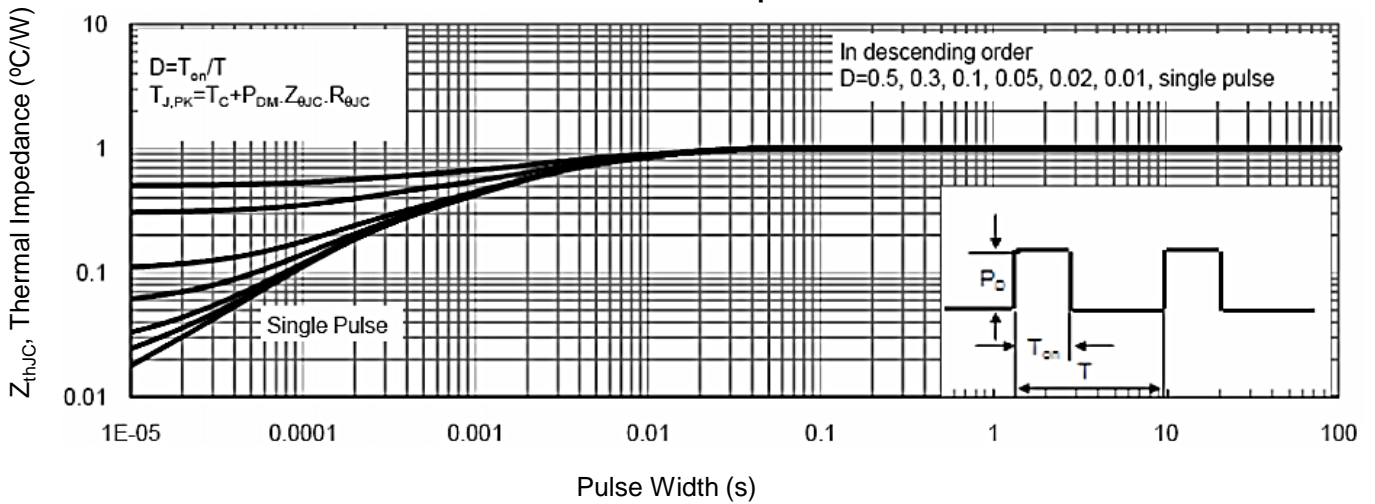
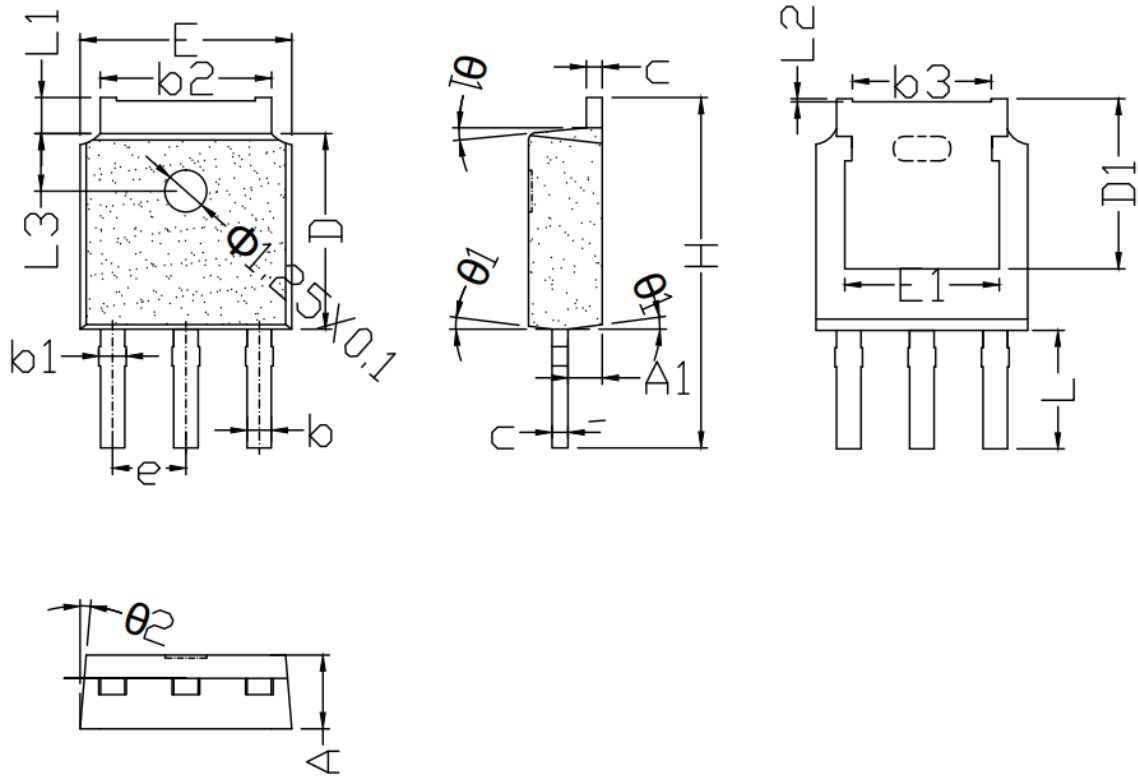


Figure 9. Normalized Maximum Transient Thermal Impedance



TO-251 Package information



COMMON DIMENSIONS

| SYMBOL | mm | | |
|--------|----------|-------|-------|
| | MIN | NOM | MAX |
| *A | 2.20 | 2.30 | 2.38 |
| *A1 | 0.90 | 1.00 | 1.10 |
| *b | 0.72 | 0.78 | 0.85 |
| *b1 | 0.78 | 0.85 | 0.90 |
| b2 | 5.23 | 5.33 | 5.46 |
| b3 | 4.27 | 4.32 | 4.37 |
| *c | 0.47 | 0.52 | 0.55 |
| *D | 6.00 | 6.10 | 6.20 |
| D1 | 5.40REF | | |
| *E | 6.50 | 6.60 | 6.70 |
| E1 | 4.70 | 4.83 | 4.92 |
| *e | 2.286BSC | | |
| *H | 9.90 | 10.10 | 10.20 |
| *L | 3.60 | 3.70 | 3.80 |
| L1 | 0.90 | — | 1.20 |
| L2 | 0.02 | 0.04 | 0.08 |
| L3 | 1.70 | 1.80 | 1.90 |
| 01 | ± | F° | 9° |
| 02 | ± | F° | 9° |