# PJF60R099

**600V/38A N-Channel Junction Power MOSFET**

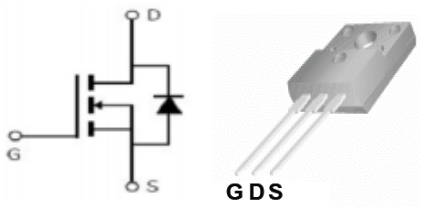
### Features

- New technology for high voltage device·
- Low on-resistance and low conduction losses
- Small package
- Ultra Low Gate Charge cause lower driving requirements
- 100% Avalanche Tested

| | | |
|---|---|---|
| BVDSS | 600 | V |
| ID | 38 | A |
| RDSON@VGS=10V | 79 | mΩ |

### Applications

- Power factor correction（PFC）
- Switched mode power supplies(SMPS)
- Uninterruptible Power Supply（UPS）




**TO-220F**

### Order Information

| Product | Package | Marking | Tube | Carton |
|---|---|---|---|---|
| PJF60R099 | TO-220F | PJF60R099 | 50PCS | 5000PCS |

### Absolute Maximum Ratings

| Symbol | Parameter | | Rating | Unit |
|---|---|---|---|---|
| **Common Ratings (TC=25°C Unless Otherwise Noted)** | | | | |
| $V_{(BR)DSS}$ | Drain-Source Breakdown Voltage | | 600 | V |
| $V_{GS}$ | Gate-Source Voltage | | ±30 | V |
| $T_J$ | Maximum Junction Temperature | | 150 | °C |
| $T_{STG}$ | Storage Temperature Range | | -55 to 150 | °C |
| $I_S$ | Diode Continuous Forward Current | TC =25°C | 38 | A |
| **Mounted on Large Heat Sink** | | | | |
| $E_{AS}$ | Single Pulse Avalanche Energy (Note1) | | 199 | mJ |
| $I_{DM}$ | Pulse Drain Current Tested (Sillicon Limit) (Note2) | TC =25°C | 96 | A |
| $I_D$ | Continuous Drain current | TC =25°C | 38 | A |
| $P_D$ | Maximum Power Dissipation | TC =25°C | 43 | W |
| $R_{\theta Jc}$ | Thermal Resistance Junction-to-Case (Note3) | | 2.9 | °C/W |

**600V/38A N-Channel Junction Power MOSFET**

| Symbol | Parameter | Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| **Static Electrical Characteristics @ TJ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{(BR)DSS}$ | Drain- Source Breakdown Voltage | VGS=0V ID=250μA | 600 | -- | -- | V |
| $I_{DSS}$ | Zero Gate Voltage Drain current | VDS=600V,VGS=0V | -- | -- | 1 | μA |
| $I_{GSS}$ | Gate-Body Leakage Current | VGS=±30V,VDS=0V | -- | -- | ±100 | nA |
| $V_{GS(TH)}$ | Gate Threshold Voltage | VDS=VGS,ID=250μA | 2.5 | -- | 4.5 | V |
| $R_{DS(ON)}$ | Drain-Source On-State Resistance (Note4) | VGS=10V, ID=19A | -- | 78 | 99 | mΩ |
| **Dynamic Electrical Characteristics @ $T_J$ = 25°C (unless otherwise stated)** (Note5) | | | | | | |
| $C_{iss}$ | Input Capacitance | VDS=400V, VGS=0V, F=1MHz | -- | 2270 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 58 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 2.7 | -- | pF |
| $Q_g$ | Total Gate Charge | VDS=400V, ID=10A, VGS=10V | -- | 52 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 12.7 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 22.4 | -- | nC |
| **Switching Characteristics** (Note5) | | | | | | |
| $t_{d(on)}$ | Turn-on Delay Time | VDD=400V, ID=19A, VGS=10V RG=10Ω | -- | 17 | -- | nS |
| $t_r$ | Turn-on Rise Time | | -- | 10 | -- | nS |
| $t_{d(off)}$ | Turn-off Delay Time | | -- | 86 | -- | nS |
| $t_f$ | Turn-off Fall Time | | -- | 11 | -- | nS |
| **Source- Drain Diode Characteristics@ TJ = 25°C (unless otherwise stated)** | | | | | | |
| $V_{SD}$ | Forward on voltage | IS=19A,VGS=0V | -- | -- | 1.2 | V |

Note:

1. Limited by TJmax, starting TJ = 25° C, RG = 25Ω, VD =50V, VGS =10V. Part not recommended for use above this value.
2. Repetitive Rating: Pulse width limited by maximum junction temperature.
3. Surface Mounted on FR4 Board, t ≤ 10 sec.
4. Pulse Test: pulse width ≤ 300 us, duty cycle ≤ 2%.
5. Guranteed by design, not subject to production testing.

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## Typical Characteristics

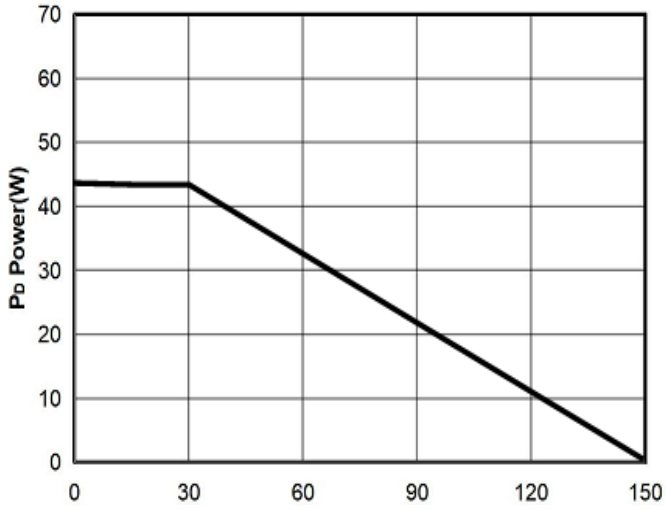


Figure1：$T_J$ Junction Temperature（°C）

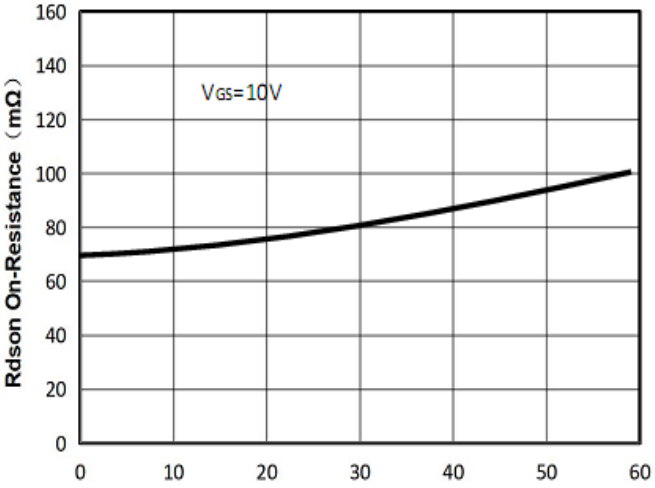


Figure2：$I_D$ Drain Current（A）

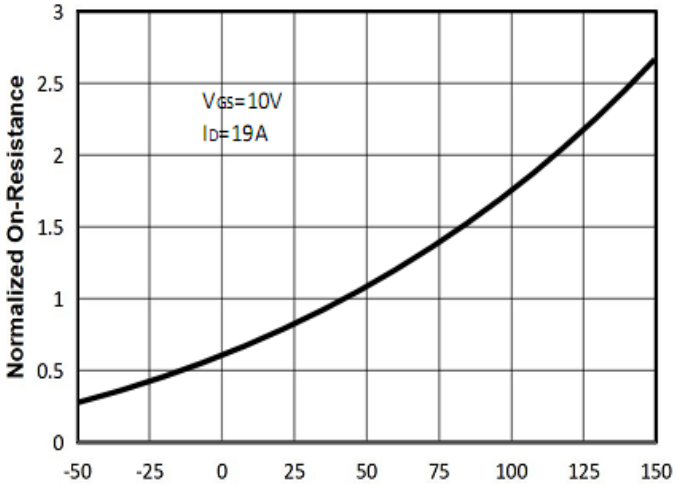


Figure3：$T_J$ Junction Temperature（°C）

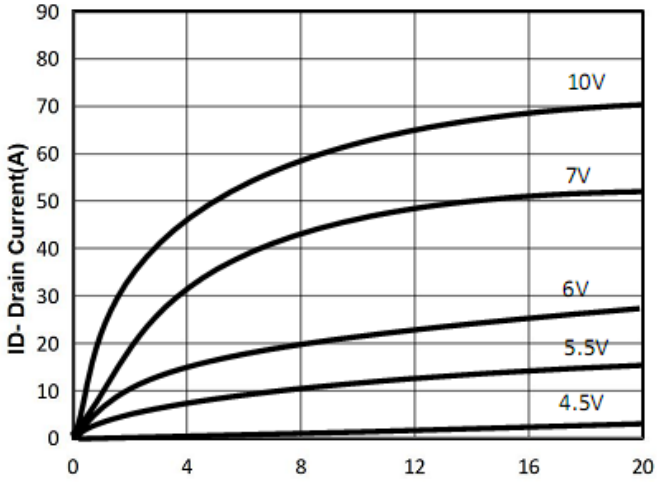


Figure4：$V_{DS}$ Drain-Source Voltage（V）

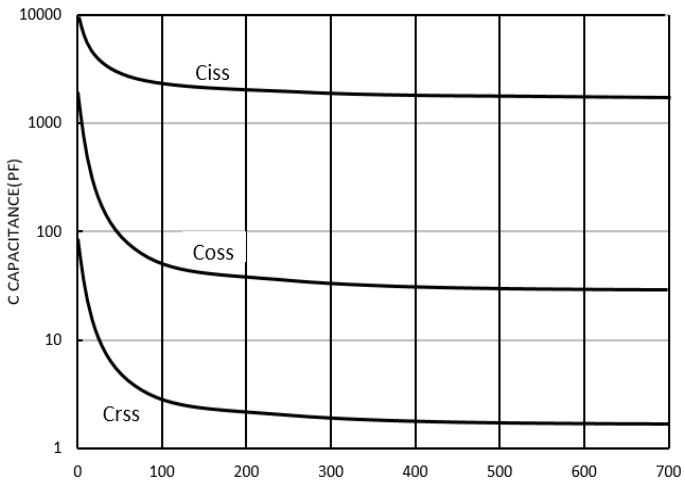


Figure5：$V_{DS}$ Drain-Source Voltage（V）

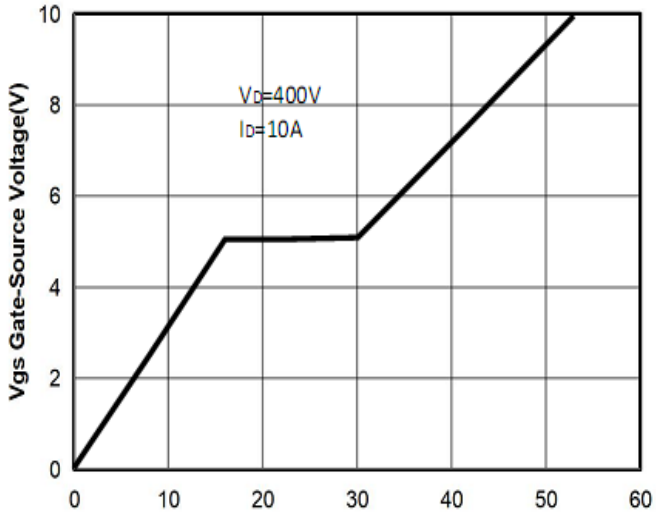


Figure6：Qg Gate Charge（nC）

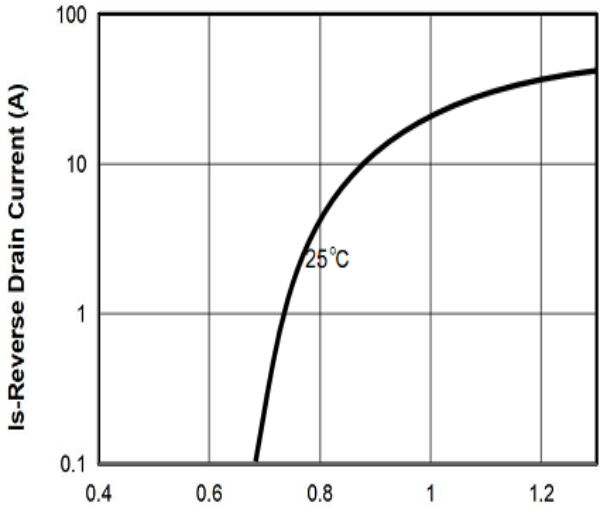


Figure7：Vsd Source-Drain Voltage（V）

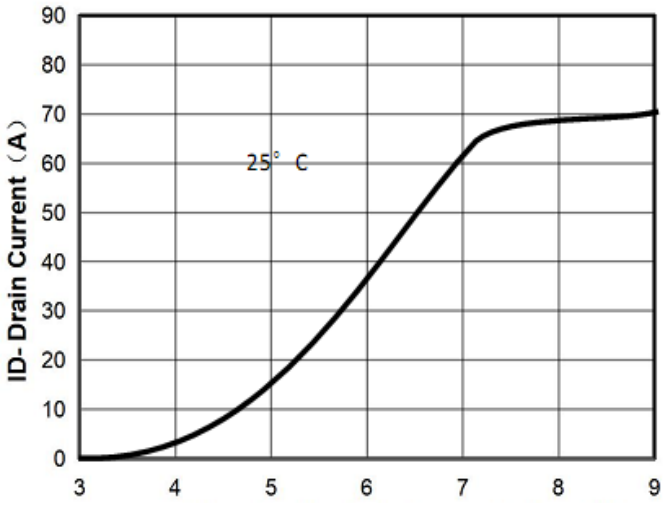


Figure8：Vgs Gate-Source Voltage（V）

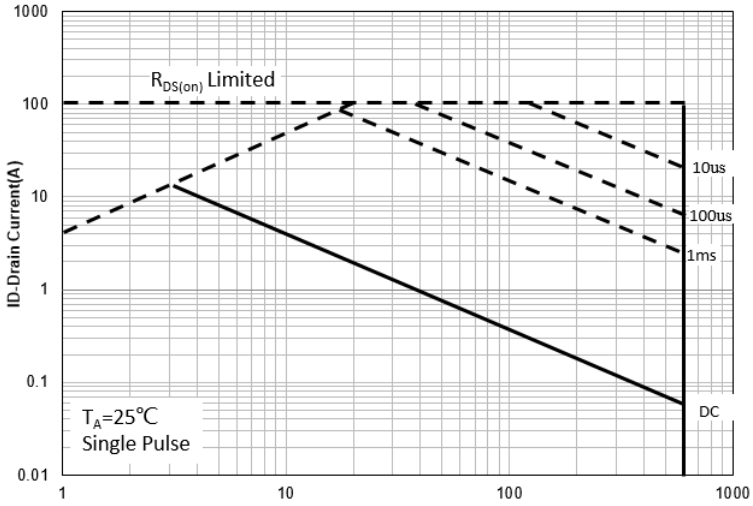


Figure9：VDS Drain -Source Voltage（V）

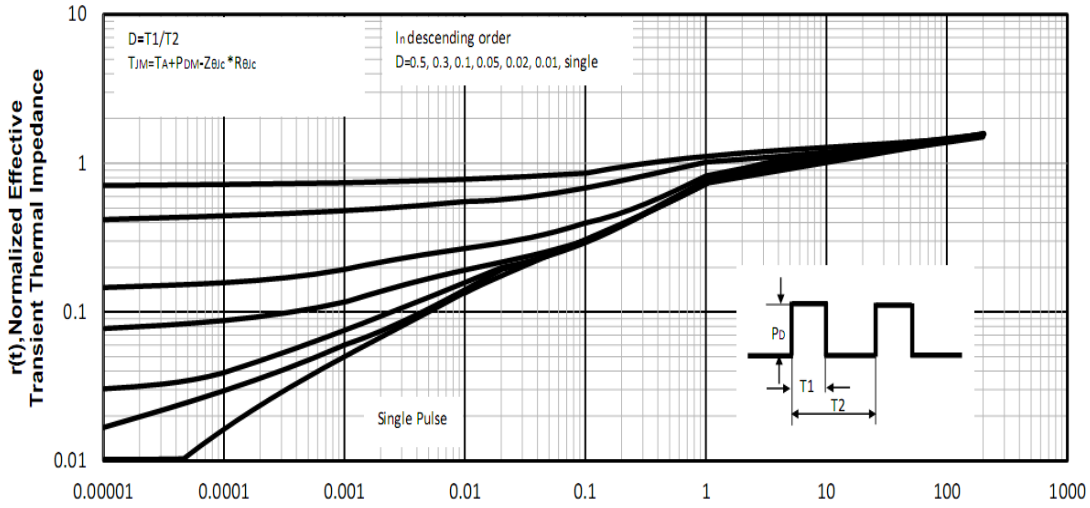


Figure10：Square Wave Pulse Duration（sec）

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**Test Circuit and Waveform:**

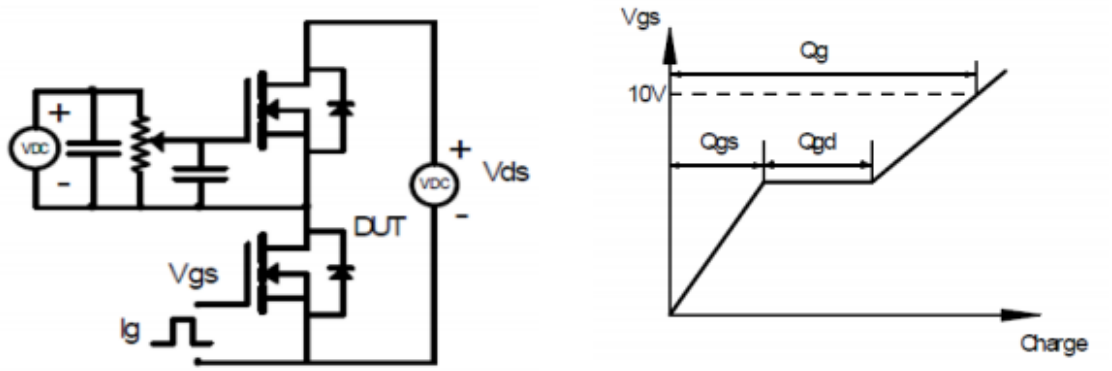


**Figure A Gate Charge Test Circuit &Waveforms**

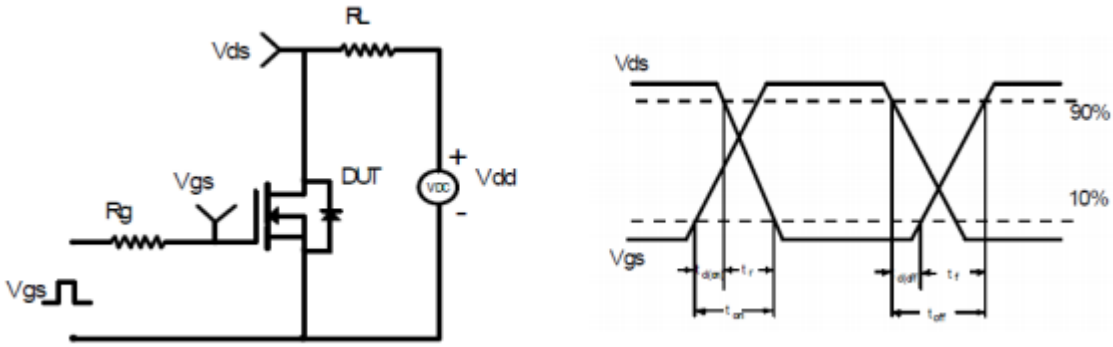


**Figure B Switching Test Circuit & Waveforms**

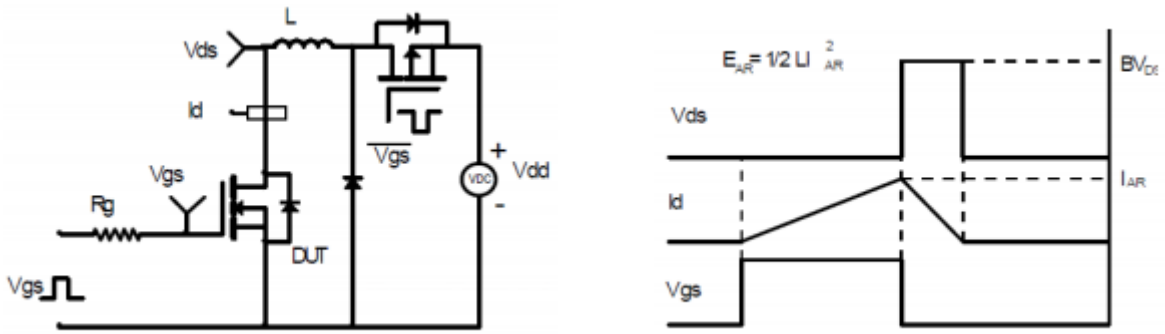


**Figure C Unclamped Inductive Switching Circuit & Waveforms**

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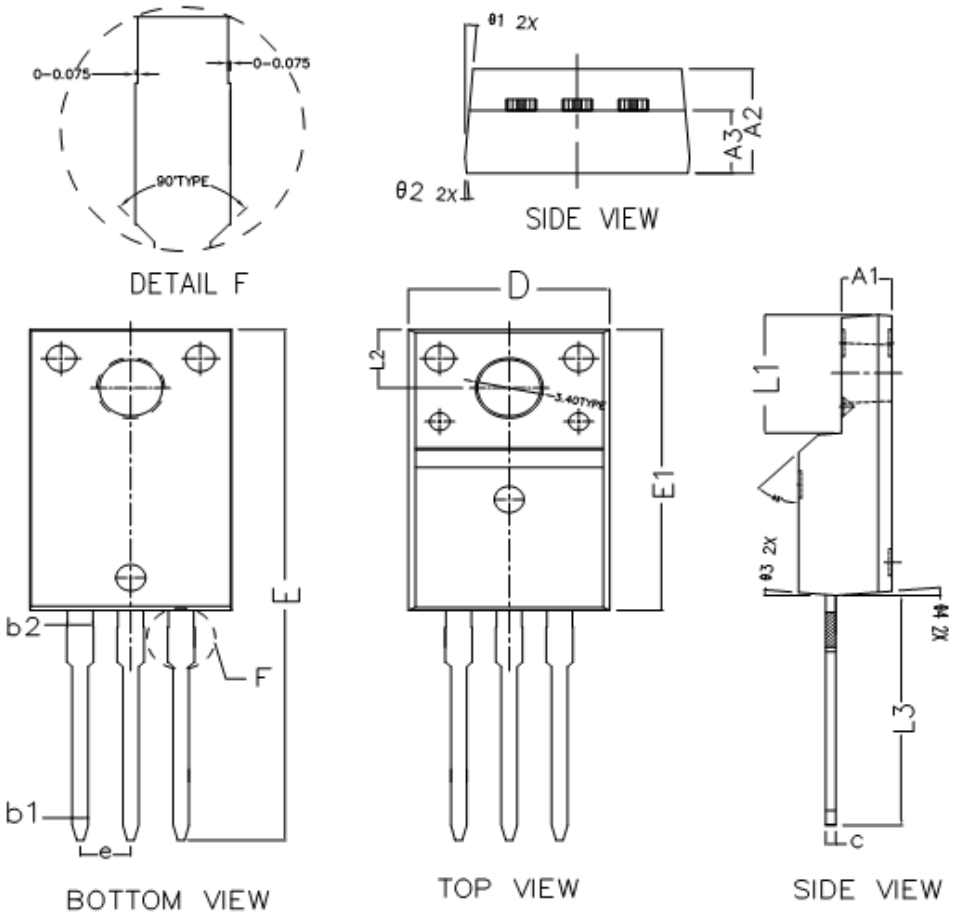
**TO-220F Package Outline Dimensions (Units: mm)**




| COMMON DIMENSIONS (UNITS OF MEASURE IS mm) | | | |
|---|---|---|---|
| | MIN | NORMAL | MAX |
| A1 | 2.440 | 2.540 | 2.640 |
| A2 | 4.600 | 4.700 | 4.800 |
| A3 | 2.730 | 2.830 | 2.930 |
| b1 | 0.750 | 0.800 | 0.850 |
| b2 | 1.230 | 1.280 | 1.330 |
| c | 0.450 | 0.500 | 0.550 |
| D | 10.060 | 10.160 | 10.260 |
| E | 28.650 | 28.850 | 29.050 |
| E1 | 15.770 | 15.870 | 15.970 |
| e | 2.54TYPE | | |
| L1 | 6.68REF | | |
| L2 | 3.30REF | | |
| L3 | 12.830 | 12.980 | 13.130 |
| θ1 | 5° TYPE | | |
| θ2 | 5° TYPE | | |
| θ3 | 5° TYPE | | |
| θ4 | 5° TYPE | | |