

Description

The PSJMTOF65R280 is a high voltage MOSFET and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and have a high rugged avalanche characteristics. This power MOSFET is usually used at high speed switching applications in power supplies, PWM motor controls, high efficient DC to DC converters and bridge circuits.

MOSFET Product Summary

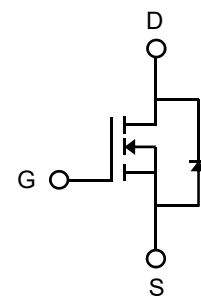
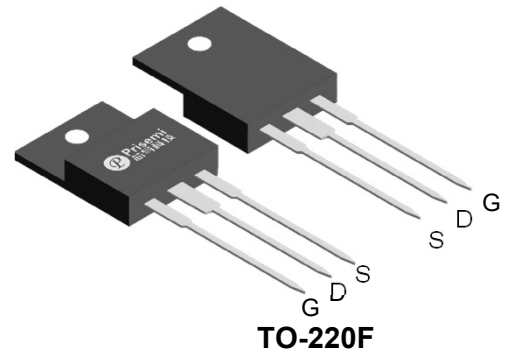
| $V_{DS}(V)$ | $R_{DS(on)}(m\Omega)(Typ)$ | $I_D(A)$ |
|-------------|----------------------------|----------|
| 650 | 234@ $V_{GS} = 10V$ | 15 |

Feature

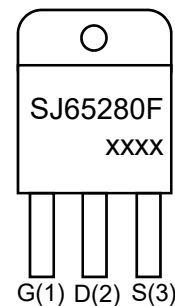
- Fast Switching Capability
- Lead free product is acquired.
- Avalanche Energy Tested

Applications

- PWM applications
- Load Switch
- Power Management
- DC-DC Converters



Circuit Diagram



Marking (Top View)

Absolute maximum rating@25°C

| Rating | | Symbol | Value | Units |
|--|-------------------|-----------------|----------|--------------|
| Drain-Source Voltage | | V_{DS} | 650 | V |
| Gate-Source Voltage | | V_{GS} | ± 30 | V |
| Drain Current-Continuous ¹⁾ | $T_C=25^\circ C$ | I_D | 15 | A |
| | $T_C=100^\circ C$ | | 9.0 | |
| Pulsed Drain Current ²⁾ | | I_{DM} | 45 | A |
| Total Power Dissipation ³⁾ | | P_D | 134 | W |
| Avalanche Current ⁴⁾ | | I_{AS} | 3.3 | A |
| Avalanche Energy ⁴⁾ | | E_{AS} | 444 | mJ |
| Thermal Resistance , Junction-to-Case ⁶⁾ | | $R_{\theta JC}$ | 0.94 | $^\circ C/W$ |
| Thermal Resistance , Junction-to-Ambient ⁵⁾ | | $R_{\theta JA}$ | 45.2 | $^\circ C/W$ |
| Junction and Storage Temperature Range | | T_J, T_{STG} | -55~+150 | $^\circ C$ |

Electrical characteristics per line@25°C (unless otherwise specified)

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|--------------|---|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 650 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 650V, V_{GS} = 0V$ | - | - | 1.0 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS} = \pm 30V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 2.5 | 3.0 | 3.5 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 8A$ | - | 234 | 280 | m Ω |
| Dynamic Characteristics⁷⁾ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 100V, V_{GS} = 0V,$ $f = 1.0MHz$ | - | 800 | - | pF |
| Output Capacitance | C_{oss} | | - | 34 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 1.2 | - | |
| Switching Characteristics⁷⁾ | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DS} = 380V, V_{GS} = 10V,$ $I_D = 8A, R_G = 2.3\Omega$ | - | 13 | - | ns |
| Turn-on Rise Time | t_r | | - | 7.4 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 28.8 | - | |
| Turn-Off Fall Time | t_f | | - | 5.1 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 480V, V_{GS} = 10V,$ $I_D = 15A$ | - | 18.8 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 2.6 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 3.6 | - | |
| Gate Resistance | R_g | $f=1MHz$, Open Drain | - | 3.3 | - | Ω |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS} = 0V, I_S = 8A$ | - | 0.85 | 1.2 | V |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F = 7.5A, V_R = 200V,$ $dI_F/dt = 100A/\mu s$ | - | 219 | - | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | | - | 2.2 | - | μC |
| Peak Reverse Recovery Current | I_{rrm} | | - | 19.7 | - | A |

Notes:

1. Computed continuous current assumes the condition of T_{J_Max} while the actual continuous current depends on the thermal & electro-mechanical application board design.
2. Repetitive Rating: Pulse width limited by maximum junction temperature($T_{J_Max}=150^\circ C$).
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. This single-pulse measurement was taken under the following condition [$L=79.9mH, V_{GS}=10V, V_{DS}=100V$]while it's value is limited by $T_{J_Max}=150^\circ C$.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on infinite heatsink.
7. Guaranteed by design, not subject to production.

Typical Characteristics

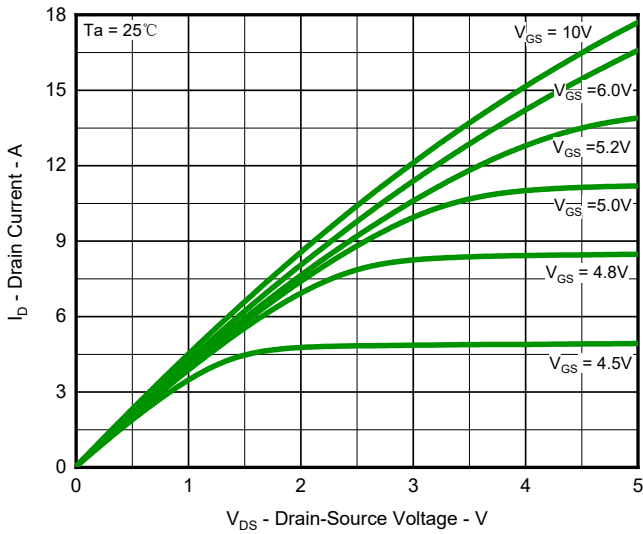


Fig.1 Output Characteristics

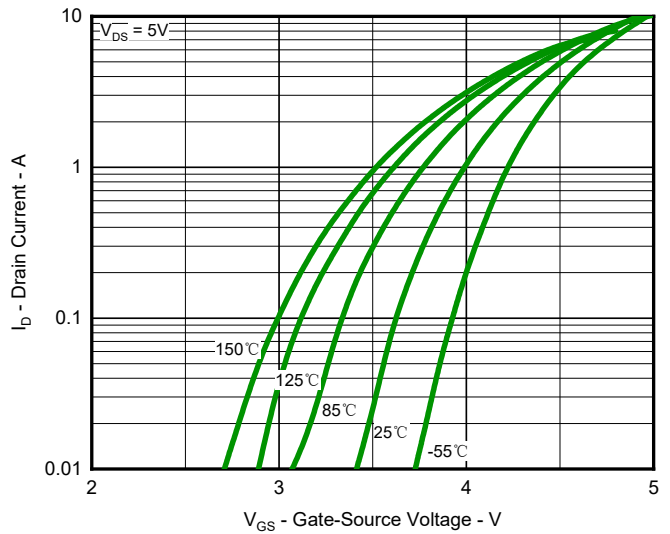


Fig.2 Typical Transfer Characteristic

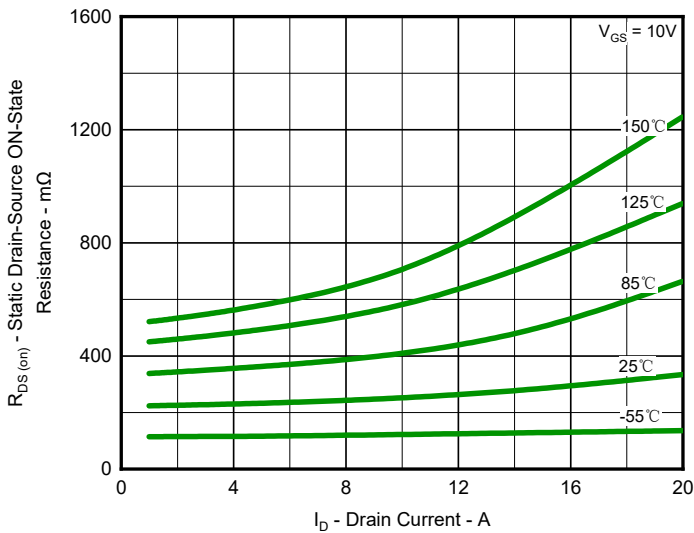


Fig.3 Typical On-Resistance vs Drain Current and Temperature

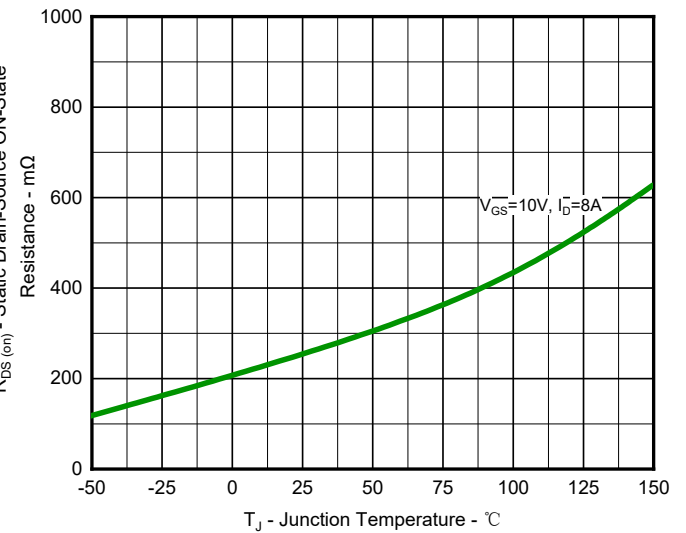


Fig.4 On-Resistance Variation with Temperature

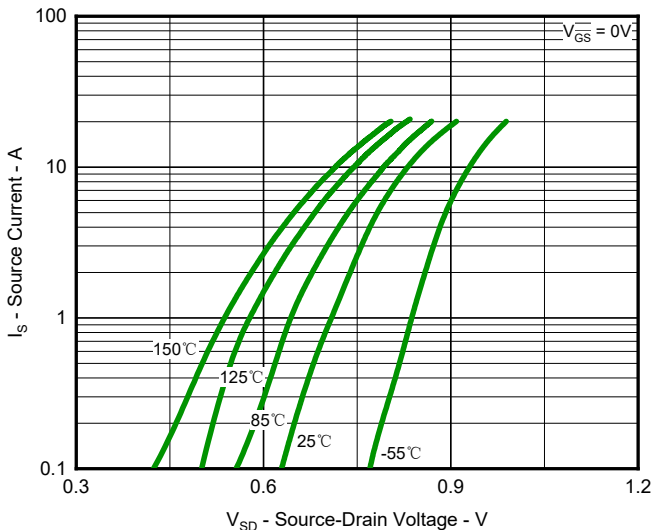


Fig.5 Diode Forward Voltage vs. Current

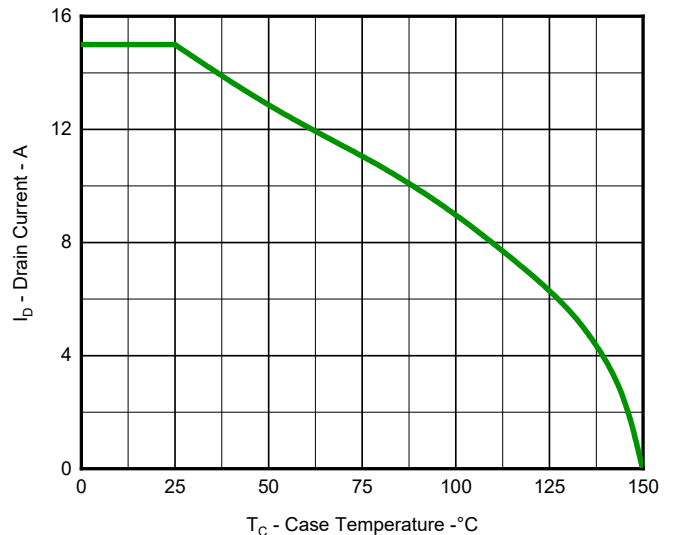


Fig.6 Maximum Drain Current vs. Case Temperature

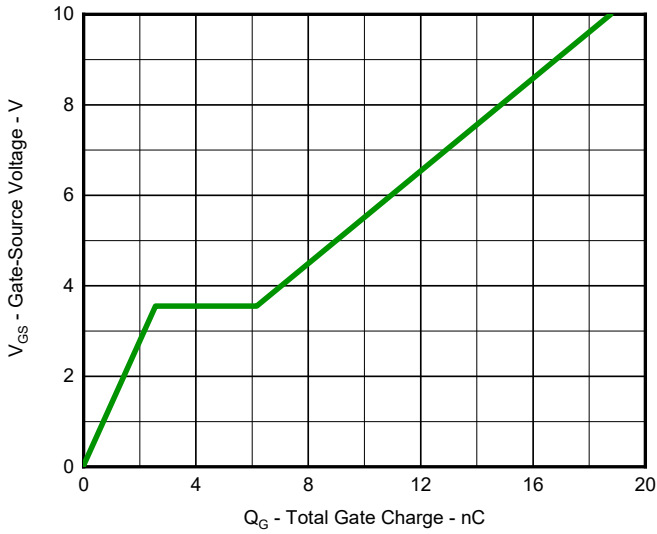


Fig.7 Gate Charge Characteristics

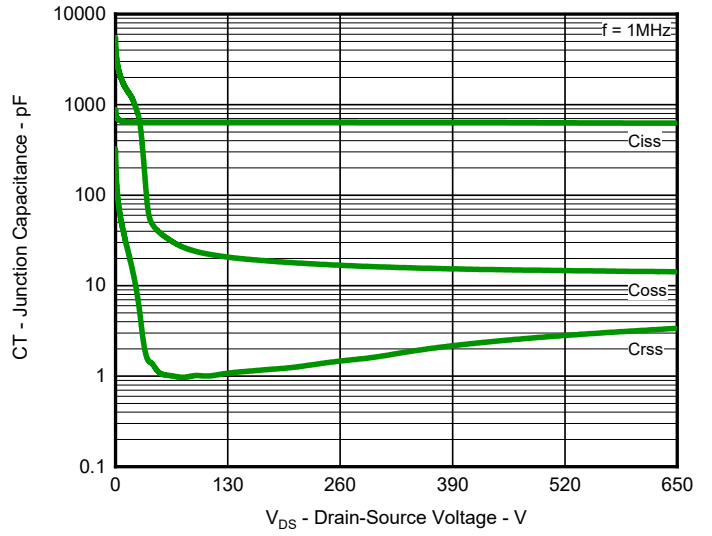


Fig.8 Typical Junction Capacitance

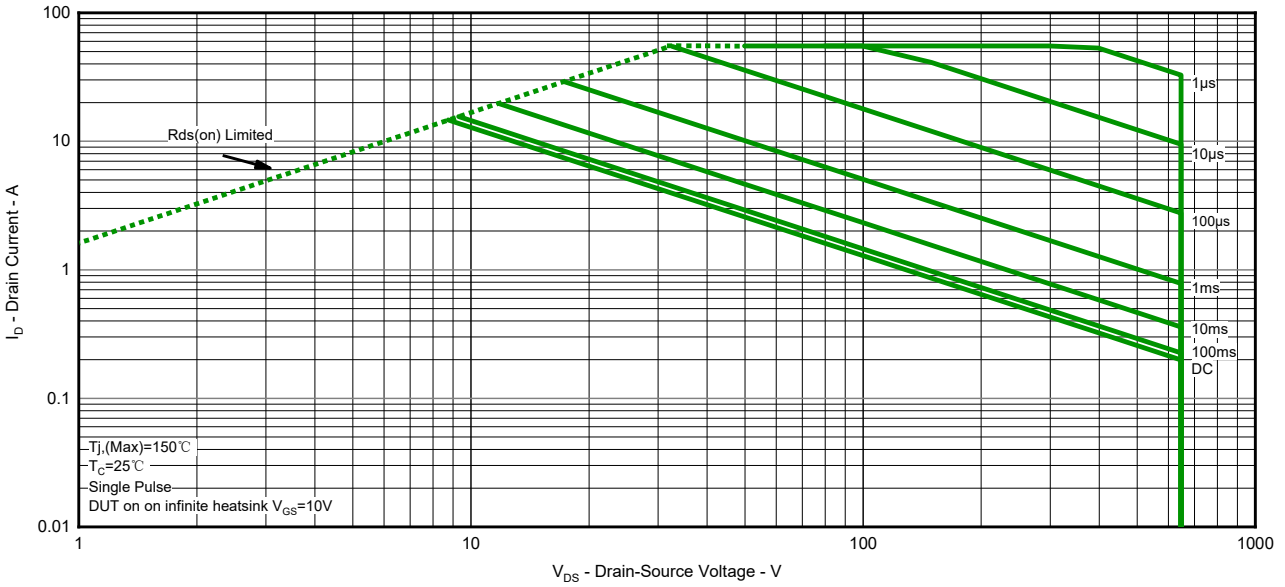


Fig.9 Safe Operation Area

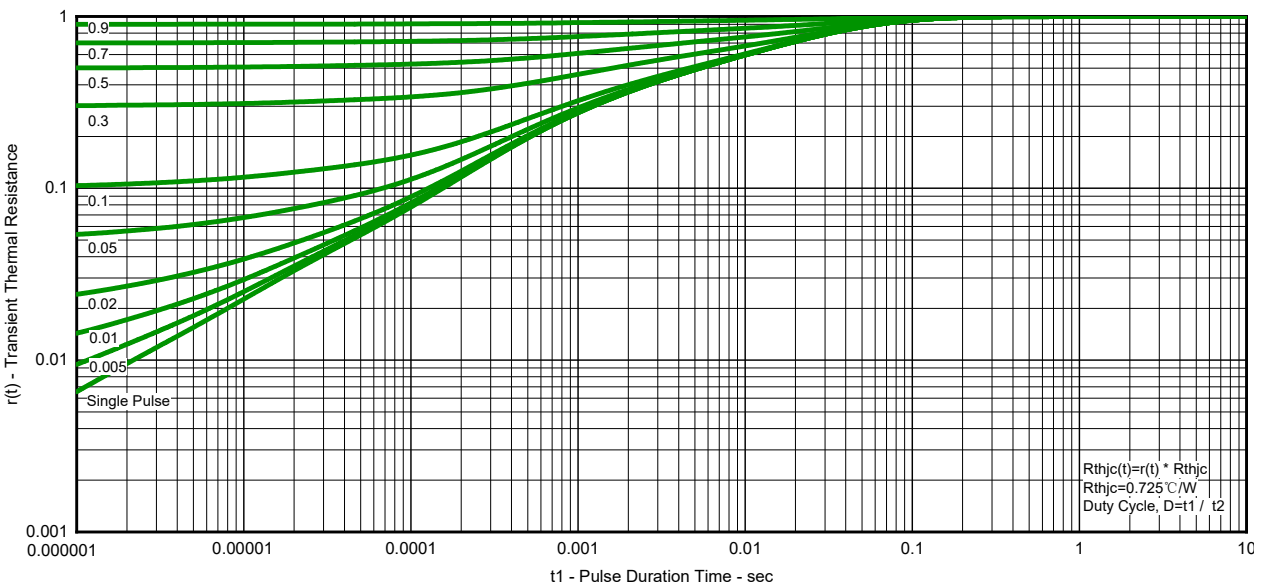
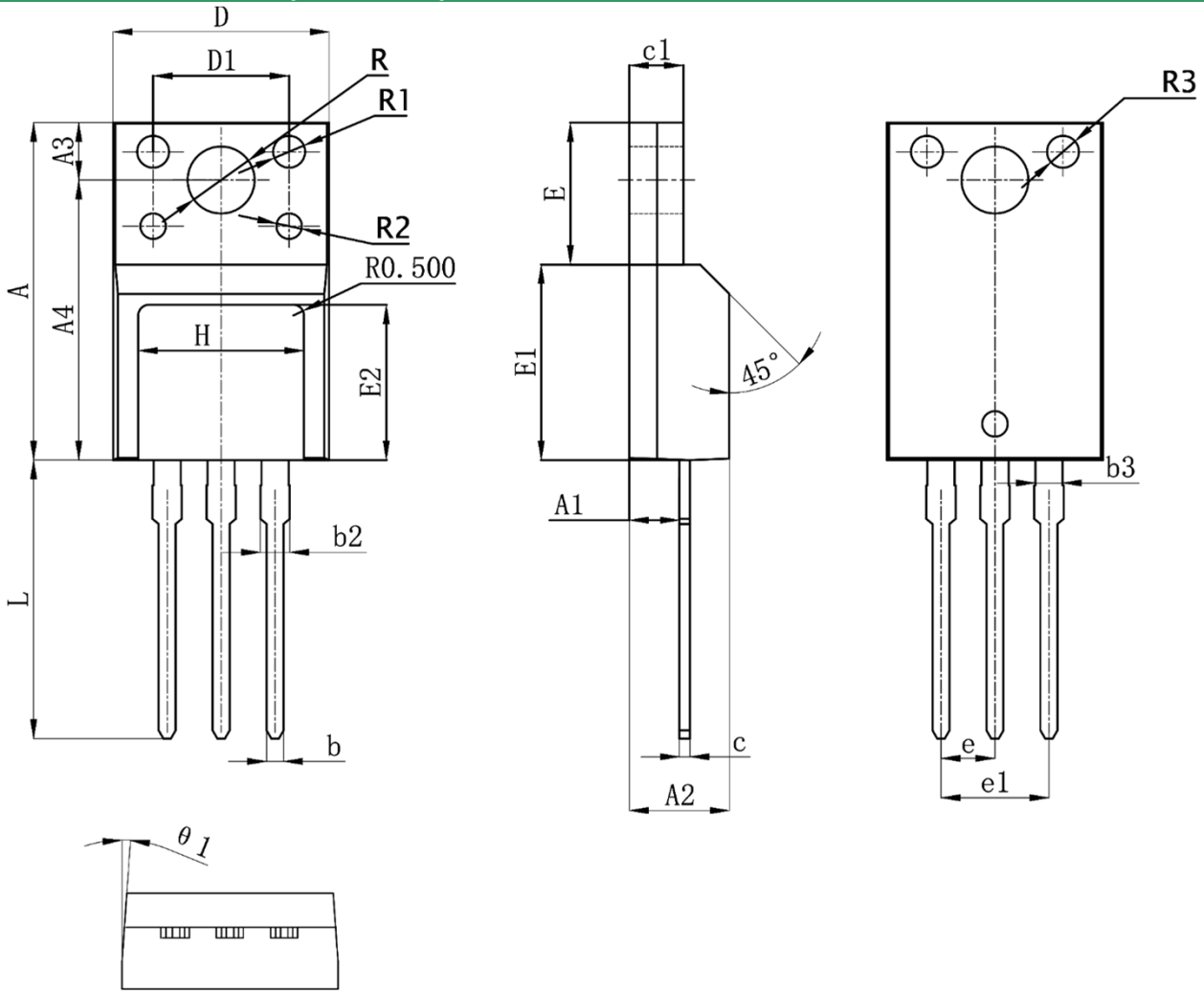



Fig.10 Transient Thermal Resistance

Product Dimension (TO-220F)



| Dim | Millimeters | | Inches | | Dim | Millimeters | | Inches | |
|-----|-------------|-------|-----------|-------|---------|-------------|-------|------------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 15.67 | 16.07 | 0.617 | 0.633 | E | 6.48 | 6.88 | 0.255 | 0.271 |
| A1 | 2.15 | 2.55 | 0.085 | 0.100 | E1 | 8.99 | 9.39 | 0.354 | 0.370 |
| A2 | 4.50 | 4.90 | 0.177 | 0.193 | E2 | 7.10 | 7.50 | 0.280 | 0.295 |
| A3 | 3.10 | 3.50 | 0.122 | 0.138 | e | 2.54 BSC | | 0.100 BSC | |
| A4 | 12.27 | 12.87 | 0.483 | 0.507 | e1 | 5.08 BSC | | 0.200 BSC | |
| b | 0.77 | 0.83 | 0.030 | 0.033 | L | 13.14 | 13.54 | 0.517 | 0.533 |
| b2 | 1.20 | 1.40 | 0.047 | 0.055 | R | 3.10 | 3.50 | 0.122 | 0.138 |
| b3 | 1.20 BSC | | 0.047 BSC | | R1 | 1.50 Ref. | | 0.059 Ref. | |
| c | 0.40 | 0.60 | 0.016 | 0.024 | R2 | 1.20 Ref. | | 0.047 Ref. | |
| c1 | 2.44 | 2.64 | 0.096 | 0.104 | R3 | 1.50 Ref. | | 0.059 Ref. | |
| D | 9.86 | 10.46 | 0.388 | 0.412 | H | 7.60 | 8.00 | 0.299 | 0.315 |
| D1 | 6.90 | 7.10 | 0.272 | 0.280 | theta 1 | 4° | 5° | 4° | 5° |


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