

Description

The PSMDP03R4 uses split gate trench technology to provide excellent $R_{DS(on)}$ low gate charge. This device is suitable for power management and high efficiency applications at high switching frequencies applications.

MOSFET Product Summary

| $V_{DS}(V)$ | $R_{DS(on)}(m\Omega)$ | $I_D(A)$ |
|-------------|-----------------------|----------|
| 30 | 4.3@ $V_{GS} = 10V$ | 75 |
| | 6.0@ $V_{GS} = 4.5V$ | |

Feature

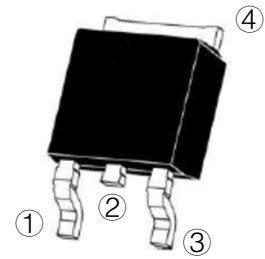
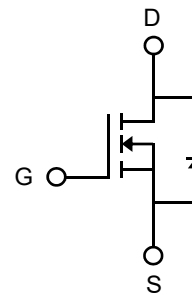
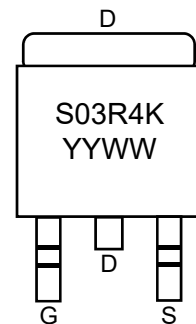
- Low $R_{DS(on)}$ - Ensures On-State Losses are Minimized
- Excellent $Q_{gd} \times R_{DS(on)}$ Product(FOM)
- Advanced Technology for DC-DC Converts
- Small Form Factor Thermally Efficient Package
Enables Higher Density End Products
- 100% UIS (Avalanche) Rated
- Lead-Free Finish ; RoHS Compliant
- Halogen and Antimony Free. "Green" Device

Applications

- PWM applications
- Load switch
- Power management
- DC-DC Converters
- Wireless Chargers

Absolute maximum rating@25°C

| Rating | Symbol | Value | Units |
|--|-----------------|-------------------|--------------|
| Drain-Source Voltage | V_{DS} | 30 | V |
| Gate-Source Voltage | V_{GS} | ± 20 | V |
| Drain Current-Continuous ¹⁾ | I_D | $T_C=25^\circ C$ | 75 |
| | | $T_C=100^\circ C$ | 47.9 |
| Pulsed Drain Current ²⁾ | I_{DM} | 300 | A |
| Total Power Dissipation | P_D | 75.8 | W |
| Avalanche Current ³⁾ | I_{AS} | 38 | A |
| Avalanche Energy ³⁾ | E_{AS} | 72.5 | mJ |
| Thermal Resistance , Junction-case ⁴⁾ | $R_{\theta JC}$ | 2.9 | $^\circ C/W$ |
| Thermal Resistance Junction-to-Ambient ⁵⁾ | $R_{\theta JA}$ | 4.3 | $^\circ C/W$ |
| Junction and Storage Temperature Range | T_J, T_{STG} | -55~+150 | $^\circ C$ |


TO-252 (Top View)

Circuit Diagram

Marking (Top View)

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Units |
|---|--------------|---|------|------|-----------|------------|
| Off Characteristics | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | $V_{GS} = 0V, I_D = 250\mu A$ | 30 | - | - | V |
| Zero Gate Voltage Drain Current | I_{DSS} | $V_{DS} = 30V, V_{GS} = 0V$ | - | - | 1.0 | μA |
| Gate-Body Leakage Current | I_{GSS} | $V_{GS} = \pm 20V, V_{DS} = 0V$ | - | - | ± 100 | nA |
| On Characteristics | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS} = V_{GS}, I_D = 250\mu A$ | 1.0 | 2.0 | 3.0 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS} = 10V, I_D = 5A$ | - | 4.3 | 5.3 | m Ω |
| | | $V_{GS} = 4.5V, I_D = 5A$ | - | 6.0 | 8.0 | |
| Dynamic Characteristics⁶⁾ | | | | | | |
| Input Capacitance | C_{iss} | $V_{DS} = 15V, V_{GS} = 0V,$ $f = 1.0MHz$ | - | 1066 | - | pF |
| Output Capacitance | C_{oss} | | - | 270 | - | |
| Reverse Transfer Capacitance | C_{rss} | | - | 31 | - | |
| Switching Characteristics⁶⁾ | | | | | | |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{dd} = 15V, V_{GEN} = 10V,$ $I_D = 20A, R_{GEN} = 10\Omega$ | - | 4.3 | - | ns |
| Turn-on Rise Time | t_r | | - | 5.3 | - | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 26.1 | - | |
| Turn-Off Fall Time | t_f | | - | 14.6 | - | |
| Total Gate Charge | Q_g | $V_{DS} = 15V, V_{GS} = 10V,$ $I_D = 20A$ | - | 14.6 | - | nC |
| Gate-Source Charge | Q_{gs} | | - | 3.0 | - | |
| Gate-Drain Charge | Q_{gd} | | - | 1.3 | - | |
| Gate Resistance | R_g | $V_{GS}=0V, V_{DS}=0V, f=1MHz$ | - | 4.3 | - | Ω |
| Drain-Source Diode Characteristics | | | | | | |
| Diode Forward Voltage | V_{SD} | $V_{GS} = 0V, I_S = 50A$ | - | 0.9 | 1.4 | V |
| Body Diode Reverse Recovery Time | t_{rr} | $I_F=10A, d_i/d_t=100A/\mu s$ | - | 12.5 | - | ns |
| Body Diode Reverse Recovery Charge | Q_{rr} | | - | 3.6 | - | nC |

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. This single-pulse measurement was taken under the following condition [$L=100\mu H, V_{GS}=10V, V_{DS}=15V$]while it's value is limited by $T_{J_Max}=150^\circ C$.
4. Device mounted on infinite heatsink.
5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Guaranteed by design, not subject to production.

Typical Characteristics

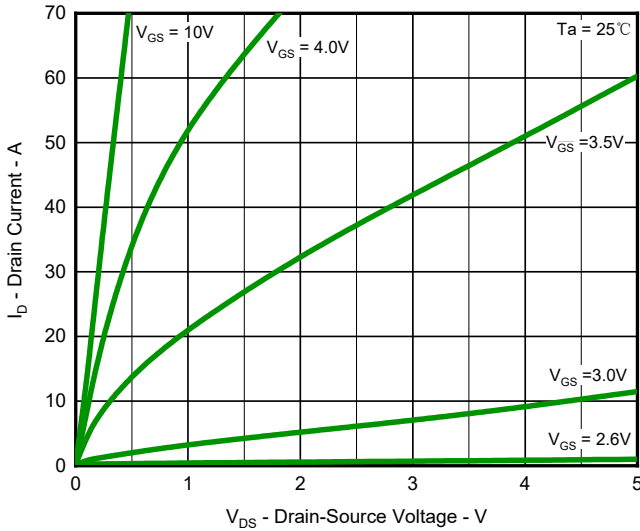


Fig.1 Output Characteristics

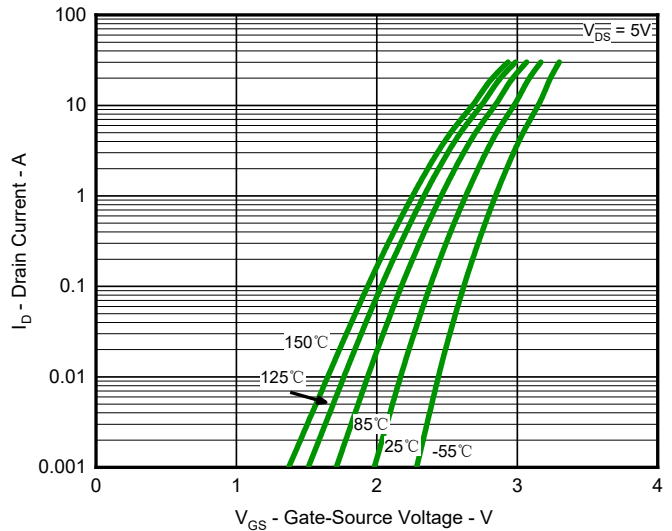


Fig.2 Typical Transfer Characteristic

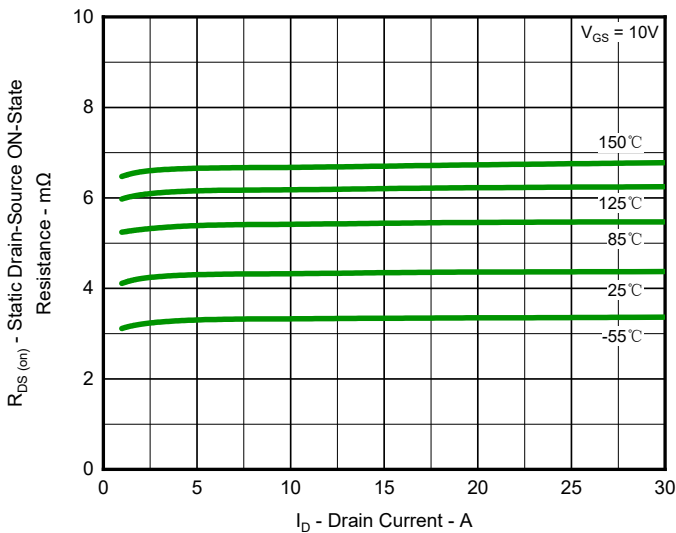


Fig.3 Typical On-Resistance vs Drain Current and Temperature

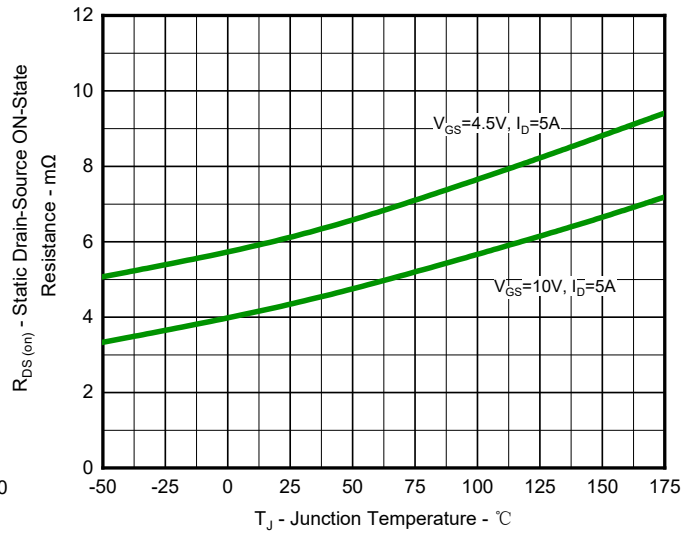


Fig.4 On-Resistance Variation with Temperature

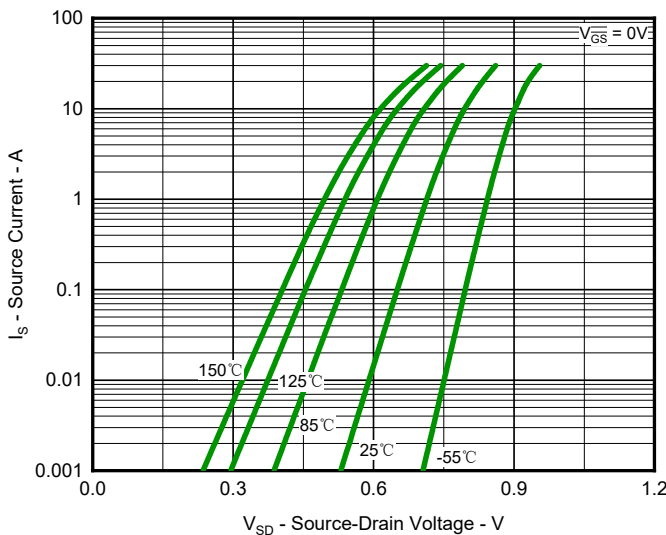


Fig.5 Diode Forward Voltage vs. Current

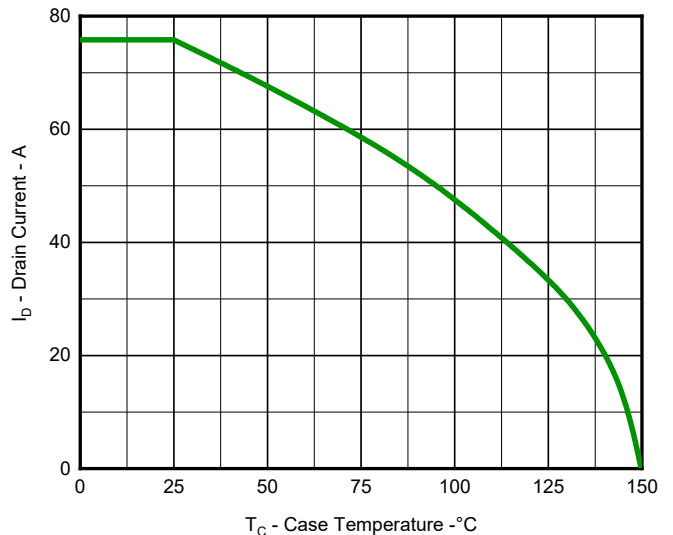


Fig.6 Maximum Drain Current vs. Case Temperature

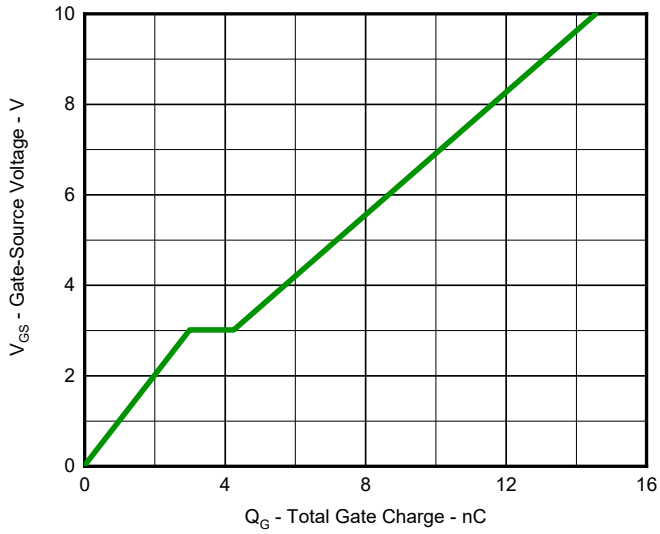


Fig.7 Gate Charge Characteristics

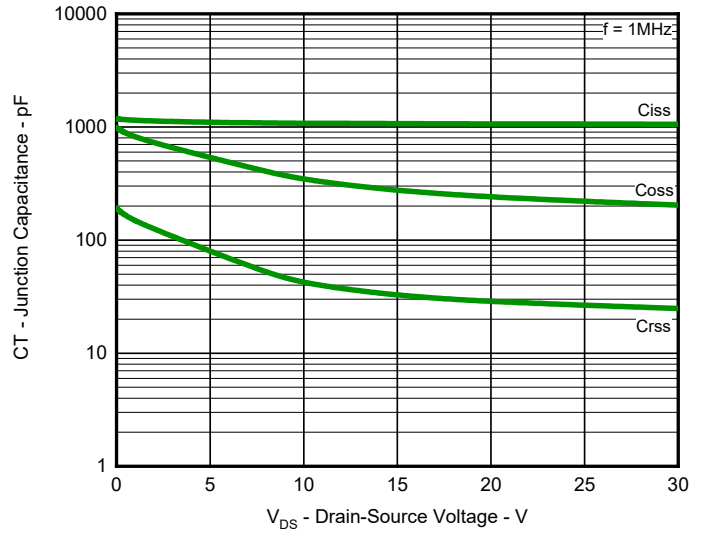


Fig.8 Typical Junction Capacitance

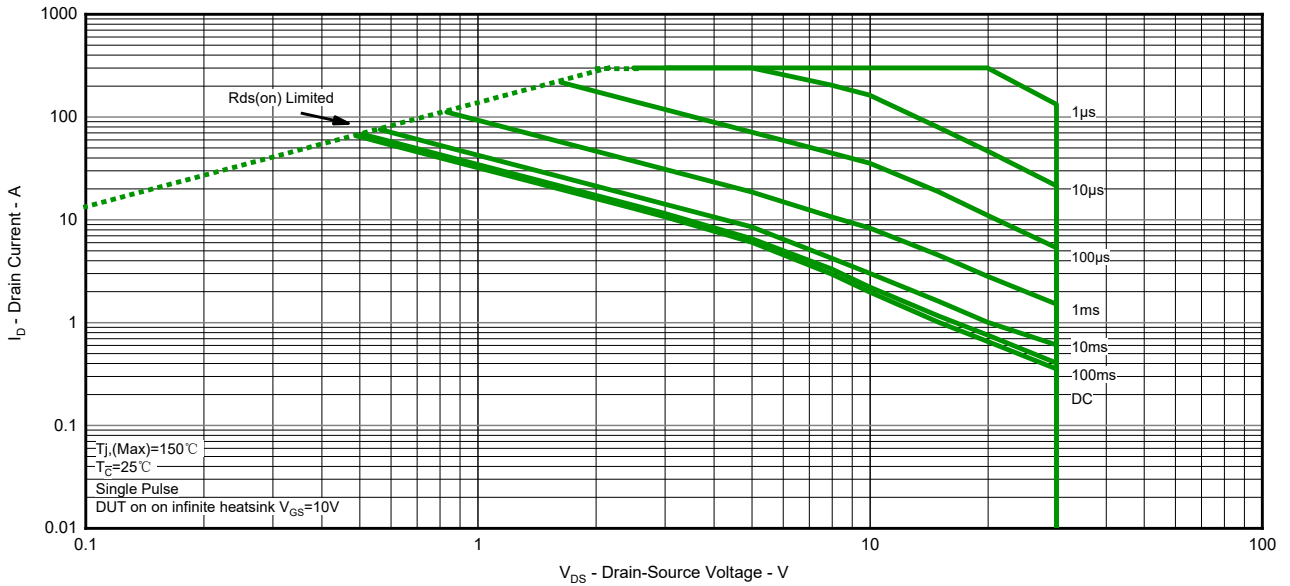


Fig.9 Safe Operation Area

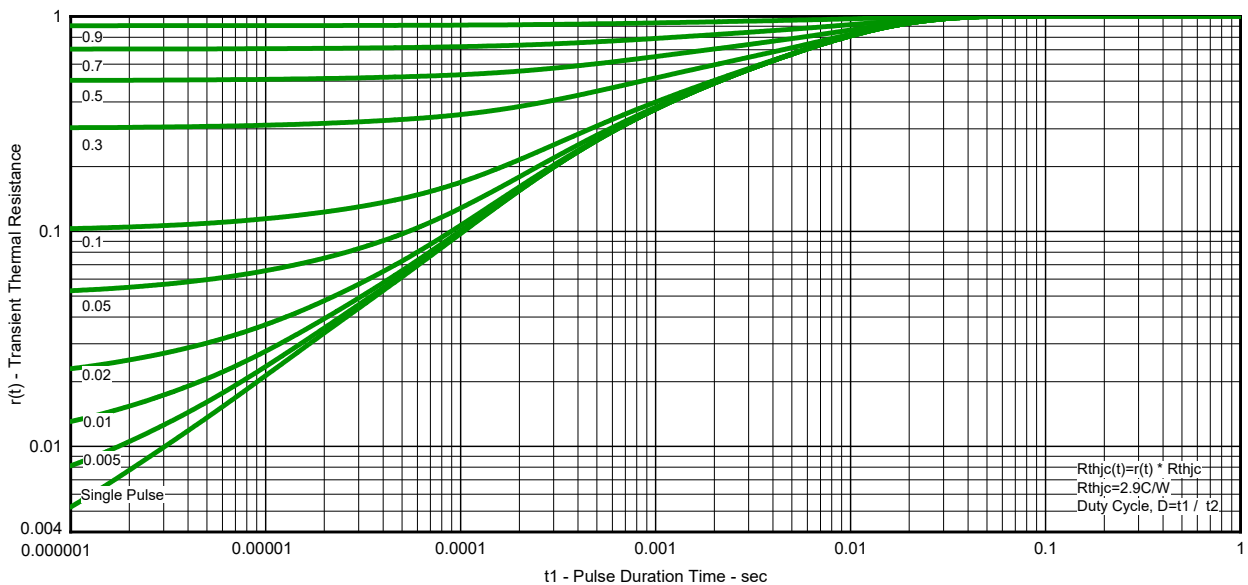
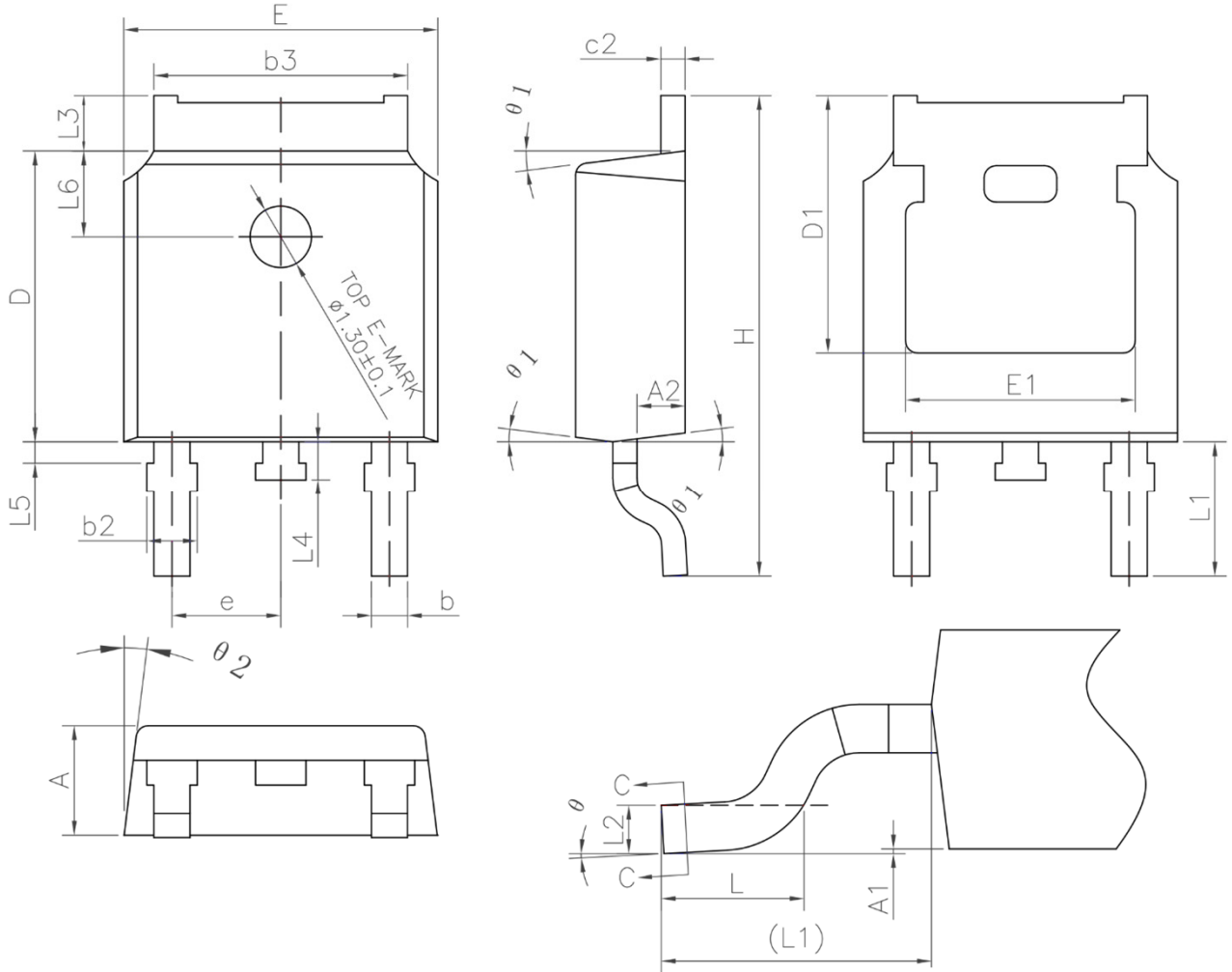


Fig.10 Transient Thermal Resistance

Product Dimension (TO-252)



| Dim | Millimeters | | Inches | | Dim | Millimeters | | Inches | |
|-----|-------------|------|--------|-------|-----|-------------|-------|------------|-------|
| | Min | Max | Min | Max | | Min | Max | Min | Max |
| A | 2.20 | 2.38 | 0.087 | 0.094 | e | 2.186 | 2.386 | 0.086 | 0.094 |
| A1 | 0.00 | 0.10 | 0.000 | 0.004 | H | 9.80 | 10.40 | 0.386 | 0.409 |
| A2 | 0.90 | 1.10 | 0.035 | 0.043 | L | 1.40 | 1.70 | 0.055 | 0.067 |
| b | 0.72 | 0.82 | 0.028 | 0.032 | L1 | 2.90 Ref. | | 0.114 Ref. | |
| b2 | 0.72 | 0.90 | 0.028 | 0.035 | L2 | 0.508 BSC. | | 0.020 BSC. | |
| b3 | 5.13 | 5.46 | 0.202 | 0.215 | L3 | 0.90 | 1.25 | 0.035 | 0.049 |
| c | 0.47 | 0.60 | 0.019 | 0.024 | L4 | 0.60 | 1.00 | 0.024 | 0.039 |
| c2 | 0.47 | 0.60 | 0.019 | 0.024 | L5 | 0.15 | 0.75 | 0.006 | 0.030 |
| D | 6.00 | 6.20 | 0.236 | 0.244 | L6 | 1.80 Ref. | | 0.071 Ref. | |
| D1 | 5.25 | - | 0.207 | - | θ | 0° | 8° | 0° | 8° |
| E | 6.50 | 6.70 | 0.256 | 0.264 | θ1 | 5° | 9° | 5° | 9° |
| E1 | 4.70 | - | 0.185 | - | θ2 | 5° | 9° | 5° | 9° |

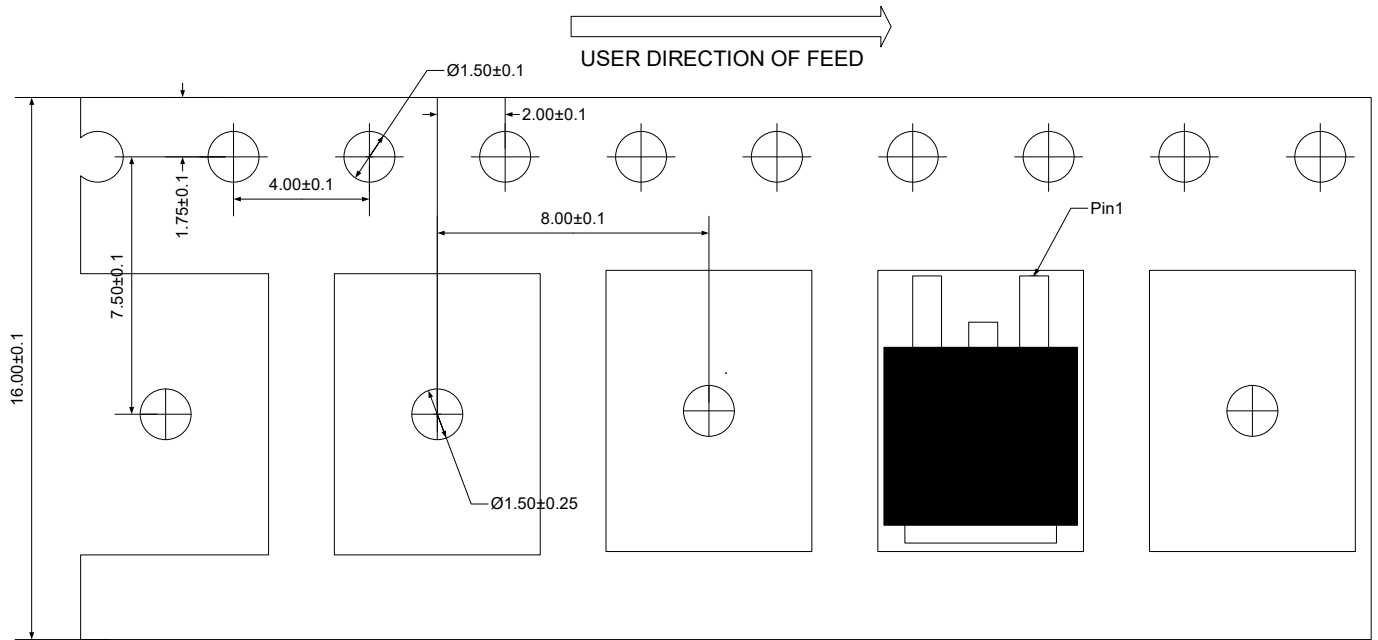
N-Channel MOSFET

PSMDP03R4

Ordering Information

| Device | Package | Reel | Shipping |
|-----------|---------|------|--------------------|
| PSMDP03R4 | TO-252 | 13" | 2500 / Tape & Reel |

Load With Information



Unit:mm

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