# PMR290UNE-VB Datasheet

## N-Channel 20 V (D-S) MOSFET

| PRODUCT SUMMARY | | | |
|---|---|---|---|
| $V_{DS}$ (V) | $R_{DS(on)}$ (Ω) | $I_D$ (A) [c] | $Q_g$ (TYP.) |
| 20 | 0.270 at $V_{GS}$ = 4.5 V | 0.85 | 1.4 nC |
| | 0.390 at $V_{GS}$ = 2.5 V | 0.70 | |

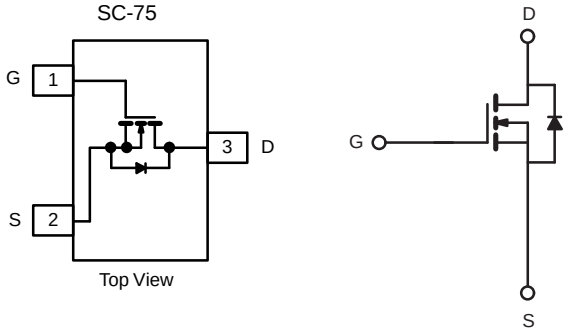
### FEATURES

- Trench power MOSFET
- 100 % $R_g$ tested

Pb-free
RoHS COMPLIANT
HALOGEN FREE

### APPLICATIONS

- Smart phones, tablet PC's
  - DC/DC converters
    - Boost converters
  - Load switch, OVP switch




| ABSOLUTE MAXIMUM RATINGS ($T_A$ = 25 °C, unless otherwise noted) | | | | |
|---|---|---|---|---|
| PARAMETER | | SYMBOL | LIMIT | UNIT |
| Drain-Source Voltage | | $V_{DS}$ | 20 | V |
| Gate-Source Voltage | | $V_{GS}$ | ± 12 | |
| Continuous Drain Current ($T_J$ = 150 °C) | $T_C$ = 25 °C | $I_D$ | 0.85 | A |
| | $T_C$ = 70 °C | | 0.65 | |
| | $T_A$ = 25 °C | | 0.7 [a, b] | |
| | $T_A$ = 70 °C | | 0.6 [a, b] | |
| Pulsed Drain Current (t = 300 µs) | | $I_{DM}$ | 6 | |
| Continuous Source-Drain Diode Current | $T_C$ = 25 °C | $I_S$ | 0.4 | |
| | $T_A$ = 25 °C | | 0.3 | |
| Maximum Power Dissipation | $T_C$ = 25 °C | $P_D$ | 0.5 | W |
| | $T_C$ = 70 °C | | 0.3 | |
| | $T_A$ = 25 °C | | 0.4 [a, b] | |
| | $T_A$ = 70 °C | | 0.3 [a, b] | |
| Operating Junction and Storage Temperature Range | | $T_J$, $T_{stg}$ | -55 to +150 | °C |
| Soldering Recommendations (Peak Temperature) | | | 260 | |

| THERMAL RESISTANCE RATINGS | | | | | |
|---|---|---|---|---|---|
| PARAMETER | | SYMBOL | TYP. | MAX. | UNIT |
| Maximum Junction-to-Ambient [a, d] | t ≤ 10 s | $R_{thJA}$ | 250 | 300 | °C/W |
| Maximum Junction-to-Foot (Drain) | Steady State | $R_{thJF}$ | 225 | 270 | |

**Notes**

a. Surface mounted on 1" x 1" FR4 board.
b. t = 10 s.
c. Based on $T_C$ = 25 °C.
d. Maximum under steady state conditions is 360 °C/W.

| **SPECIFICATIONS** ($T_J$ = 25 °C, unless otherwise noted) | | | | | | |
|---|---|---|---|---|---|---|
| **PARAMETER** | **SYMBOL** | **TEST CONDITIONS** | **MIN.** | **TYP.** | **MAX.** | **UNIT** |
| **Static** | | | | | | |
| Drain-Source Breakdown Voltage | $V_{DS}$ | $V_{GS}$ = 0 V, $I_D$ = 250 µA | 20 | - | - | V |
| $V_{DS}$ Temperature Coefficient | $\Delta V_{DS}/T_J$ | $I_D$ = 250 µA | - | 32 | - | mV/°C |
| $V_{GS(th)}$ Temperature Coefficient | $\Delta V_{GS(th)}/T_J$ | | - | -3 | - | |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 µA | 0.5 | - | 1.0 | V |
| Gate-Source Leakage | $I_{GSS}$ | $V_{DS}$ = 0 V, $V_{GS}$ = 4.5 V | - | - | 0.1 | µA |
| | | $V_{DS}$ = 0 V, $V_{GS}$ = ± 12 V | - | - | ± 20 | |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V | - | - | 0.1 | |
| | | $V_{DS}$ = 20 V, $V_{GS}$ = 0 V, $T_J$ = 55 °C | - | - | 10 | |
| On-State Drain Current [a] | $I_{D(on)}$ | $V_{DS}$ ≥ 5 V, $V_{GS}$ = 10 V | 2 | - | - | A |
| Drain-Source On-State Resistance [a] | $R_{DS(on)}$ | $V_{GS}$ = 4.5 V, $I_D$ = 1 A | - | 0.270 | - | Ω |
| | | $V_{GS}$ = 2.5 V, $I_D$ = 0.5 A | - | 0.390 | - | |
| Forward Transconductance [a] | $g_{fs}$ | $V_{DS}$ = 10 V, $I_D$ = 1.4 A | - | 5 | - | S |
| **Dynamic [b]** | | | | | | |
| Input Capacitance | $C_{iss}$ | $V_{DS}$ = 15 V, $V_{GS}$ = 0 V, f = 1 MHz | - | 105 | - | pF |
| Output Capacitance | $C_{oss}$ | | - | 23 | - | |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 11 | - | |
| Total Gate Charge | $Q_g$ | $V_{DS}$ = 15 V, $V_{GS}$ = 10 V, $I_D$ = 1.4 A | - | 2.7 | 4.1 | nC |
| | | $V_{DS}$ = 15 V, $V_{GS}$ = 4.5 V, $I_D$ = 1.4 A | - | 1.4 | 2.1 | |
| Gate-Source Charge | $Q_{gs}$ | | - | 0.3 | - | |
| Gate-Drain Charge | $Q_{gd}$ | | - | 0.5 | - | |
| Gate Resistance | $R_g$ | f = 1 MHz | 1.4 | 7 | 14 | Ω |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 15 V, $R_L$ = 13.6 Ω<br>$I_D$ ≅ 1.1 A, $V_{GEN}$ = 10 V, $R_g$ = 1 Ω | - | 2 | 4 | ns |
| Rise Time | $t_r$ | | - | 9 | 18 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 8 | 16 | |
| Fall Time | $t_f$ | | - | 8 | 16 | |
| Turn-On Delay Time | $t_{d(on)}$ | $V_{DD}$ = 15 V, $R_L$ = 13.6 Ω<br>$I_D$ ≅ 1.1 A, $V_{GEN}$ = 4.5 V, $R_g$ = 1 Ω | - | 8 | 16 | |
| Rise Time | $t_r$ | | - | 13 | 20 | |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 15 | 23 | |
| Fall Time | $t_f$ | | - | 6 | 12 | |
| **Drain-Source Body Diode Characteristics** | | | | | | |
| Continuous Source-Drain Diode Current | $I_S$ | $T_C$ = 25 °C | - | - | 0.4 | A |
| Pulse Diode Forward Current [a] | $I_{SM}$ | | - | - | 6 | |
| Body Diode Voltage | $V_{SD}$ | $I_F$ = 1.1 A | - | 0.8 | 1.2 | V |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$ = 1.1 A, dI/dt = 100 A/µs, $T_J$ = 25 °C | - | 8 | 16 | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | - | 3 | 6 | nC |
| Reverse Recovery Fall Time | $t_a$ | | - | 5 | - | ns |
| Reverse Recovery Rise Time | $t_b$ | | - | 3 | - | |

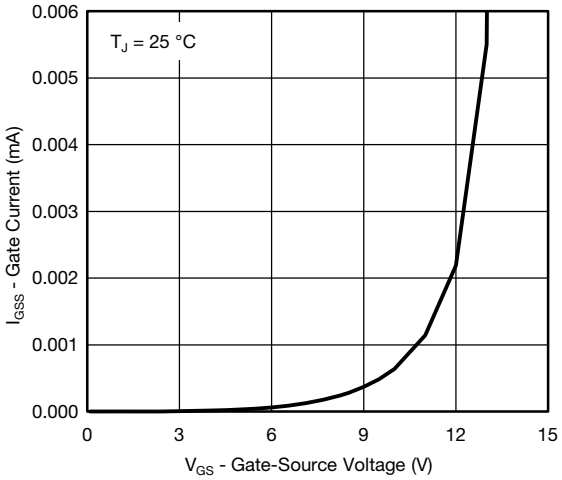
**Notes**

a. Pulse test; pulse width ≤ 300 µs, duty cycle ≤ 2 %.

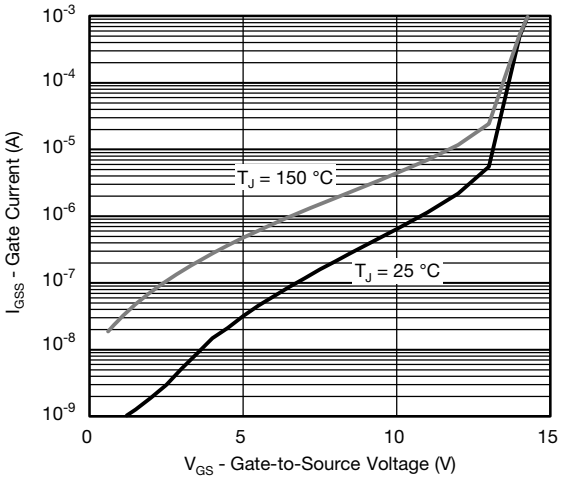
b. Guaranteed by design, not subject to production testing.

*Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of the specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.*

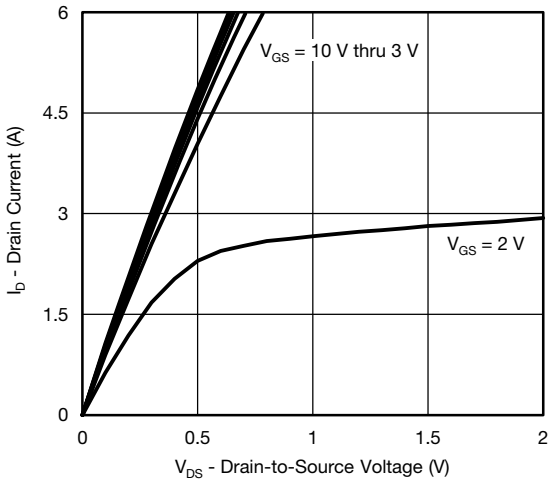
## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



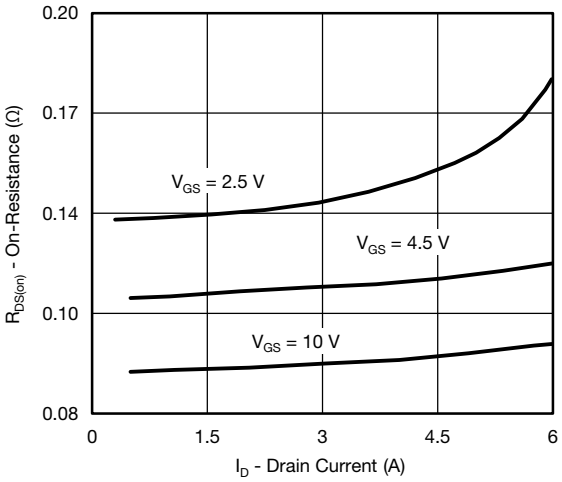

**Gate Source Voltage vs. Gate Current**



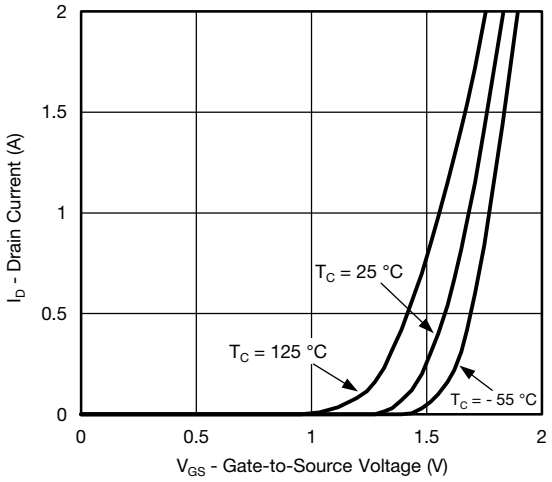

**Gate Source Voltage vs. Gate Current**



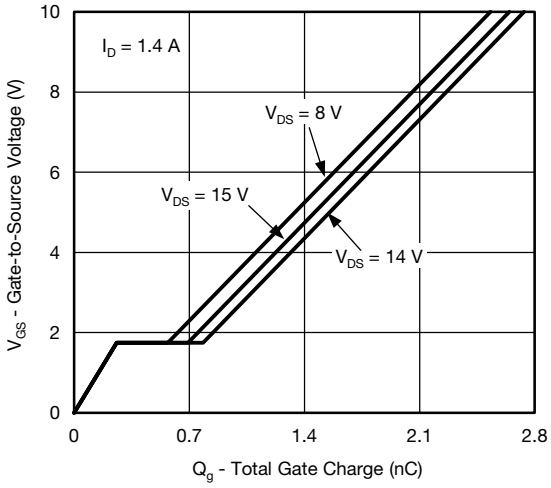

**Output Characteristics**




**On-Resistance vs. Drain Current**

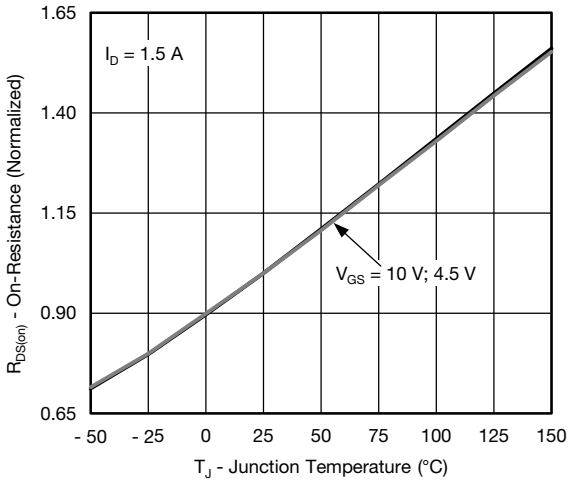



**Transfer Characteristics**

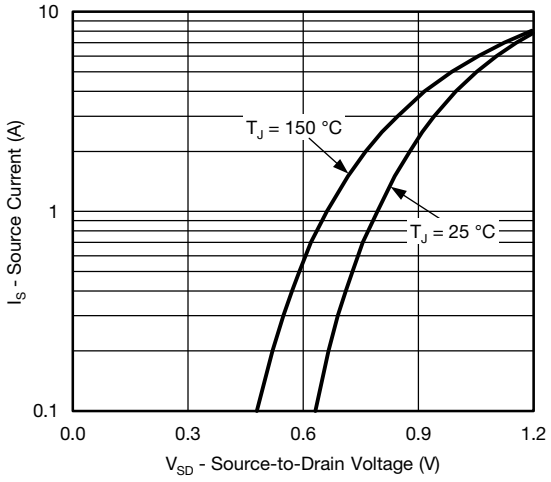



**Gate Charge**

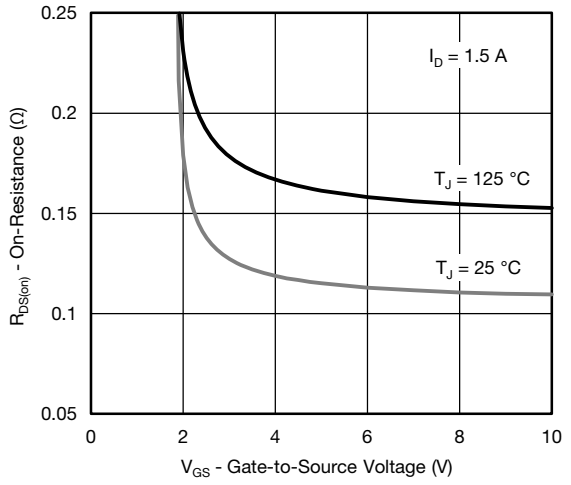
## TYPICAL CHARACTERISTICS (25 °C, unless otherwise noted)



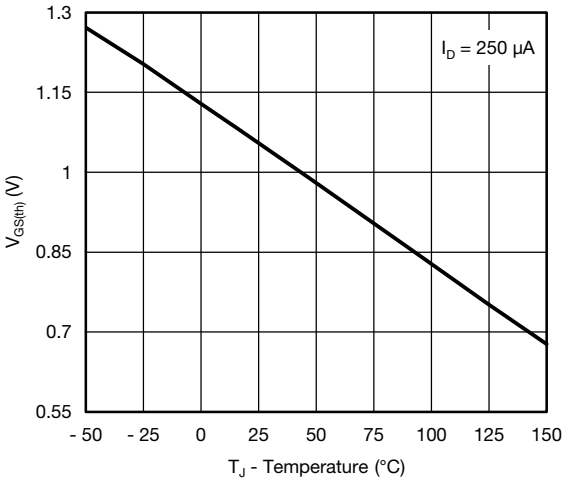

**On-Resistance vs. Junction Temperature**



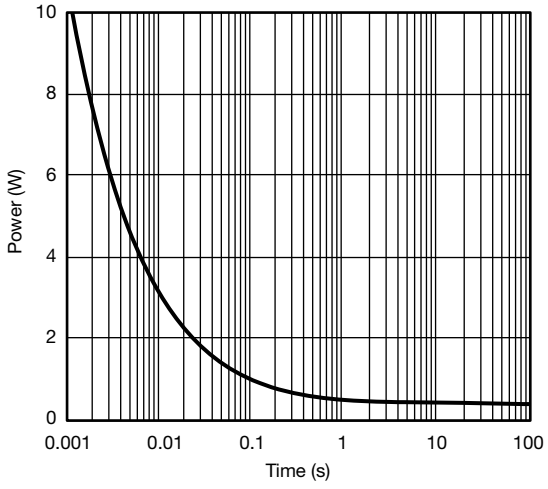

**Source-Drain Diode Forward Voltage**



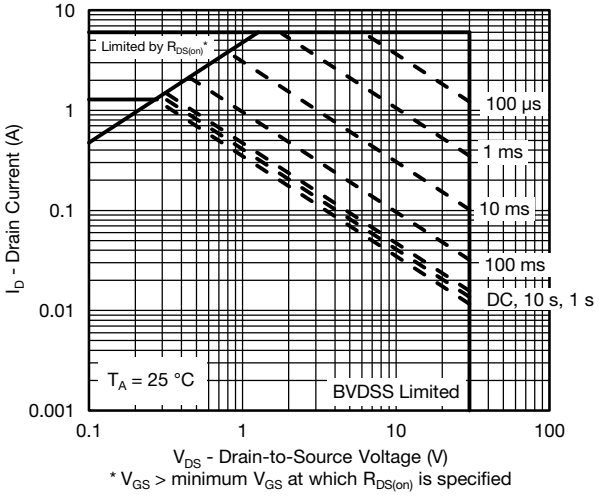

**On-Resistance vs. Gate-to-Source Voltage**




**Threshold Voltage**

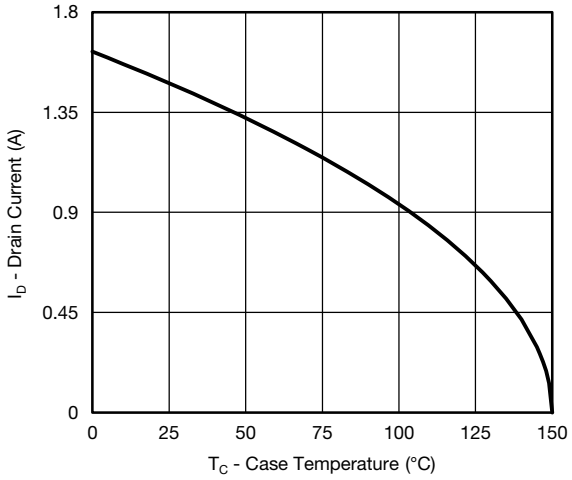



**Single Pulse Power, Junction-to-Ambient**

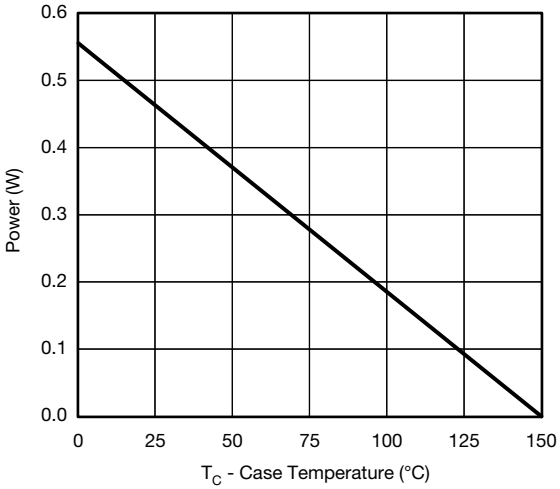



**Safe Operating Area, Junction-to-Ambient**

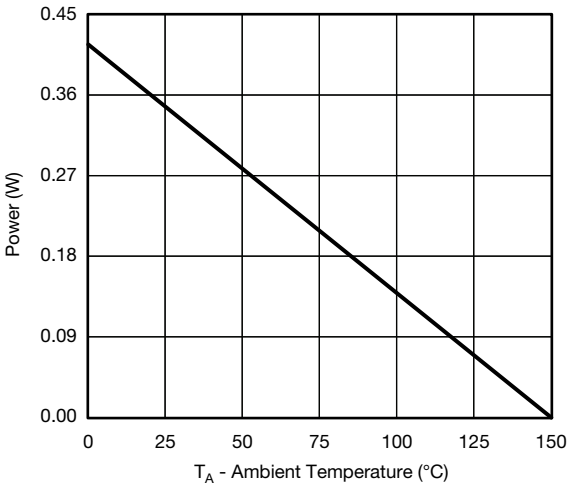
**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)




**Current Derating***



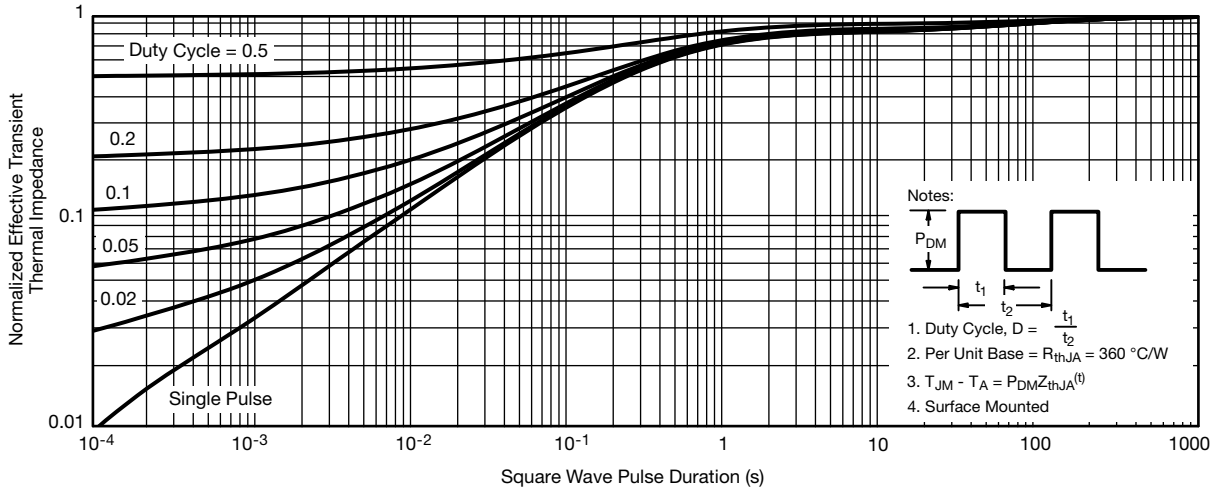

**Power, Junction-to-Case**



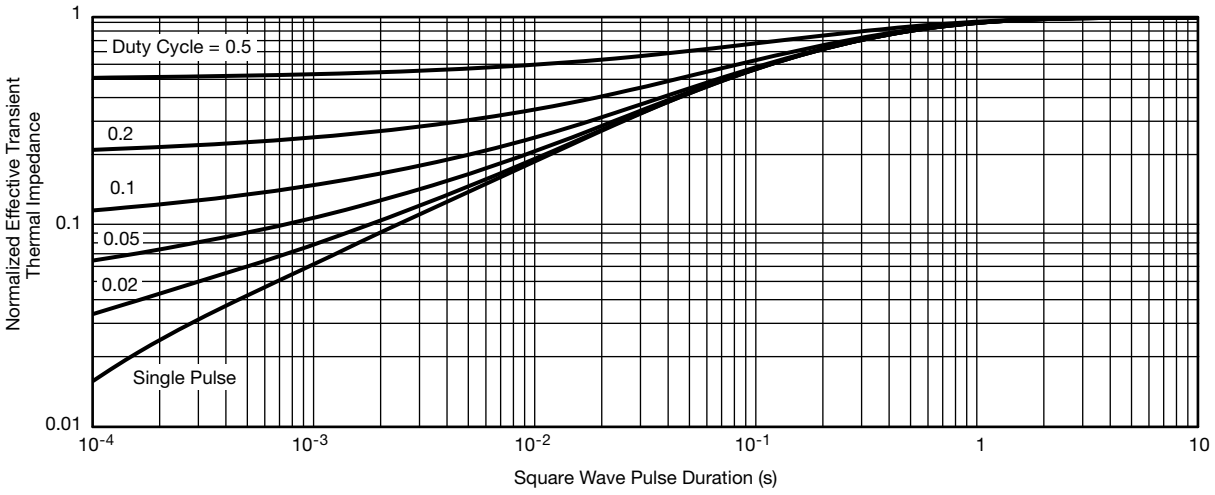

**Power, Junction-to-Ambient**

* The power dissipation $P_D$ is based on $T_{J\ (max.)}$ = 150 °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

**TYPICAL CHARACTERISTICS** (25 °C, unless otherwise noted)

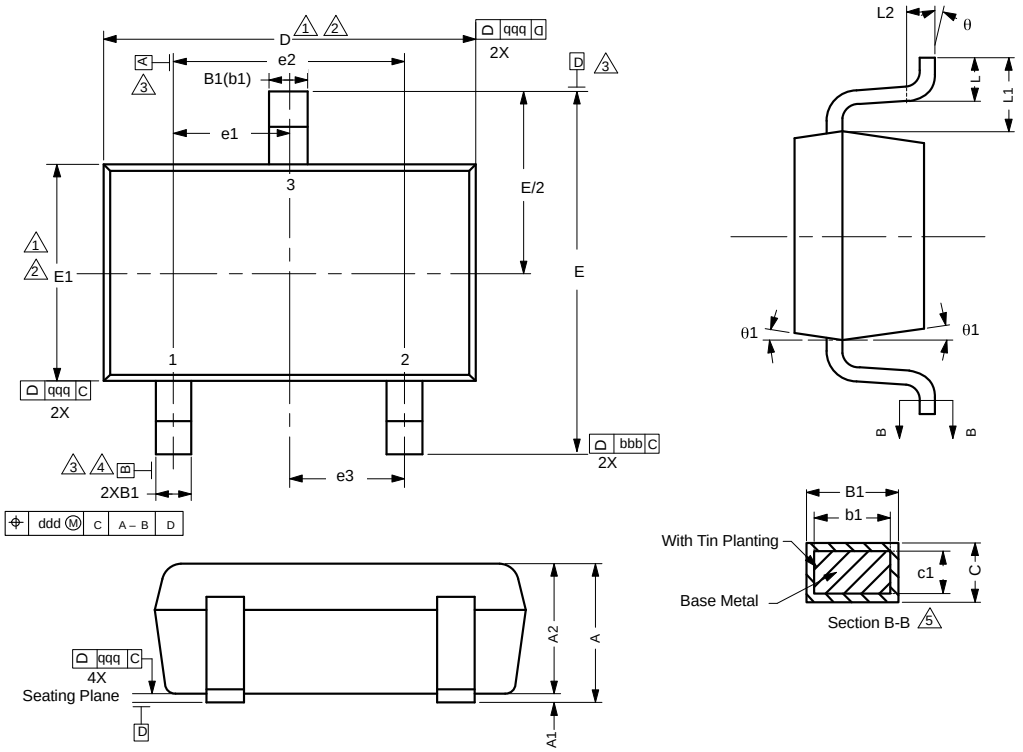



**Normalized Thermal Transient Impedance, Junction-to-Ambient**




**Normalized Thermal Transient Impedance, Junction-to-Foot**

# SC-75A: 3 Leads




**Notes**

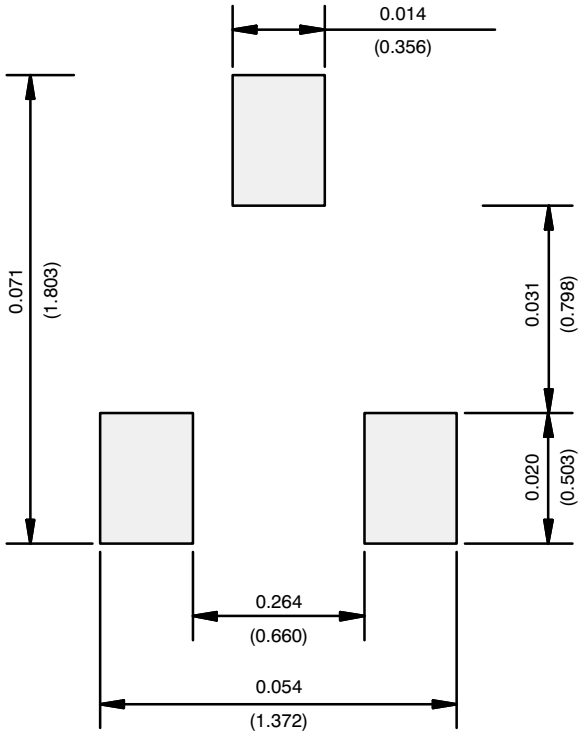
Dimensions in millimeters will govern.

1. Dimension D does not include mold flash, protrusions or gate burrs. Mold flash protrusions or gate burrs shall not exceed 0.10 mm per end. Dimension E1 does not include Interlead flash or protrusion. Interlead flash or protrusion shall not exceed 0.10 mm per side.
2. Dimensions D and E1 are determined at the outmost extremes of the plastic body exclusive of mold flash, tie bar burrs, gate burrs and interelead flash, but including any mismatch between the top and bottom of the plastic body.
3. Datums A, B and D to be determined 0.10 mm from the lead tip.
4. Terminal positions are shown for reference only.
5. These dimensions apply to the flat section of the lead between 0.08 mm and 0.15 mm from the lead tip.

| DIMENSIONS | TOLERANCES |
|---|---|
| aaa | 0.10 |
| bbb | 0.10 |
| ccc | 0.10 |
| ddd | 0.10 |

| DIM. | MILLIMETERS | | | NOTE |
|---|---|---|---|---|
| | MIN. | NOM. | MAX. | |
| A | - | - | 0.80 | |
| $A_1$ | 0.00 | - | 0.10 | |
| $A_2$ | 0.65 | 0.70 | 0.80 | |
| $B_1$ | 0.19 | - | 0.24 | 5 |
| $b_1$ | 0.17 | - | 0.21 | |
| c | 0.13 | - | 0.15 | 5 |
| $c_1$ | 0.10 | - | 0.12 | 5 |
| D | 1.48 | 1.575 | 1.68 | 1, 2 |
| E | 1.50 | 1.60 | 1.70 | |
| $E_1$ | 0.66 | 0.76 | 0.86 | 1, 2 |
| $e_1$ | 0.50 BSC | | | |
| $e_2$ | 1.00 BSC | | | |
| $e_3$ | 0.50 BSC | | | |
| L | 0.15 | 0.205 | 0.30 | |
| $L_1$ | 0.40 ref. | | | |
| $L_2$ | 0.15 BSC | | | |
| θ | 0° | - | 8° | |
| $θ_1$ | 4° | - | 10° | |

## RECOMMENDED MINIMUM PADS FOR SC-75A: 3-Lead




Recommended Minimum Pads
Dimensions in Inches/(mm)

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Üretici parça numarasını yazın; stok ve fiyatı hemen görün.

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Entegreden kapasitöre tüm elektronik komponent kategorileri.

**Kategorilere göz atın**

### Üreticiler

Aradığınız üreticinin ürünlerini tek sayfada inceleyin.

**Üreticileri görün**

### Toplu alım ve teklif

Listede olmayan ya da yüksek adetli parçalar için teklif isteyin.

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