# AP2366A
## 30V N-Channel Enhancement Mode MOSFET

- **General Description**

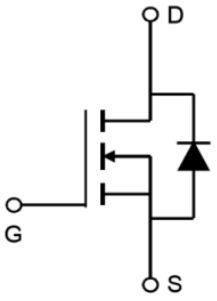
AP2366A combines advanced MOSFET technology with a low resistance package to provide extremely low $R_{DS(ON)}$. This device is most suitable to load-switch or PWM applications.

- **Applications**

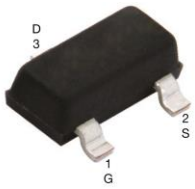
- DC/DC converter for portable devices
- Load switch

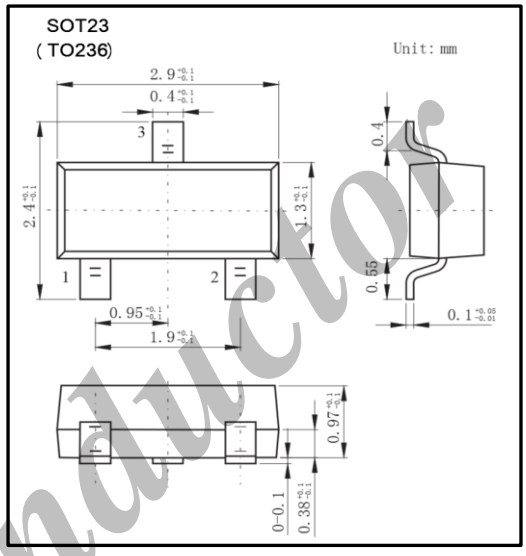
- **Product Summary**

| | |
|---|---|
| $V_{DS}$ | = 30V |
| $I_D$ ($V_{GS}$ = 10V) | = 5.8A |
| $R_{DS(ON)}$ (at $V_{GS}$ = 10V) | < 36mΩ |
| $R_{DS(ON)}$ (at $V_{GS}$ = 4.5V) | < 42mΩ |




Top View




Pb-Free

RoHS COMPLIANT

- **Absolute Maximum Ratings ($T_A$ = 25°C, unless noted)**

| Parameter | | Symbol | Rating | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DS}$ | 30 | V |
| Gate-Source Voltage | | $V_{GS}$ | ±20 | |
| Continuous Drain Current ($T_J$ = 150°C) | $T_C$ = 25°C | $I_D$ | 5.8 *a | A |
| | $T_C$ = 70°C | | 4.7 | |
| | $T_A$ = 25°C | | 4.5 *b, c | |
| | $T_A$ = 70°C | | 3.6 *b, c | |
| Pulsed Drain Current (t=300μs) | | $I_{DM}$ | 20 | |
| Continuous Source-Drain Diode Current | $T_C$ = 25°C | $I_S$ | 1.75 | |
| | $T_A$ = 25°C | | 1.04 *b, c | |
| Power Dissipation | $T_C$ = 25°C | $P_D$ | 2.1 | W |
| | $T_C$ = 70°C | | 1.3 | |
| | $T_A$ = 25°C | | 1.25 *b, c | |
| | $T_A$ = 70°C | | 0.8 *b, c | |
| Thermal Resistance. Junction-to-Ambient *b, d | | $R_{\theta JA}$ (t ≤ 5s) | 100 | °C/W |
| Thermal Resistance. Junction-to-Foot (Drain) | | $R_{\theta JF}$ (Steady State) | 60 | |
| Junction Temperature | | $T_J$ | 150 | °C |
| Storage Temperature Range | | $T_{STG}$ | -55 to 150 | |

Notes
*a Based on $T_C$ = 25°C
*b Surface mounted on 1" x 1" FR4 Board
*c t = 5s
*d Maximum under steady state conditions is 125℃/W

- **Electrical Characteristics (25°C, unless noted)**

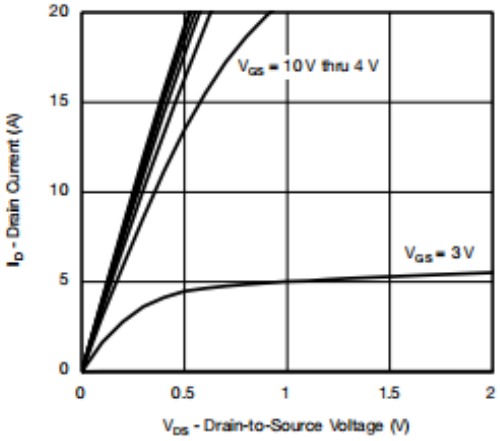
| Parameter | Symbol | Test Conditions | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $V_{DSS}$ | $I_D$=250μA, $V_{GS}$=0V | 30 | | | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=30V, $V_{GS}$=0V | | | 1 | μA |
| | | $V_{DS}$=30V, $V_{GS}$=0V, $T_J$=55°C | | | 10 | |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{DS}$=0V, $V_{GS}$=±20V | | | ±100 | nA |
| Gate-Source Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$= $V_{GS}$, $I_D$=250μA | 1.2 | | 2.5 | V |
| On-state Drain Current *e | $I_{D(ON)}$ | $V_{DS}$≤ 5V, $V_{GS}$=10V | 20 | | | A |
| Static Drain-Source On-Resistance *e | $R_{DS(ON)}$ | $V_{GS}$=10V, $I_D$=4.5A | | | 36 | mΩ |
| | | $V_{GS}$=4.5V, $I_D$=4.2A | | | 42 | |
| Forward Transconductance *e | $g_{FS}$ | $V_{DS}$=15V, $I_D$=4.5A | | 13 | | S |
| Diode Forward Voltage | $V_{SD}$ | $I_S$=3.6A, $V_{GS}$=0V | | | 1.2 | V |
| Input Capacitance | $C_{iss}$ | $V_{GS}$=0V, $V_{DS}$=15V, f=1MHz | | 335 | | pF |
| Output Capacitance | $C_{oss}$ | | | 78 | | |
| Reverse Transfer Capacitance | $C_{rss}$ | | | 30 | | |
| Total Gate Charge | $Q_g$ | $V_{GS}$=10V, $V_{DS}$=15V, $I_D$=4.5A | | 6.4 | 10 | nC |
| Total Gate Charge | $Q_g$ | $V_{GS}$=4.5V, $V_{DS}$=15V, $I_D$=4.5A | | 3.2 | 5 | |
| Gate Source Charge | $Q_{gs}$ | | | 1.1 | | |
| Gate Drain Charge | $Q_{gd}$ | | | 1.3 | | |
| Gate Resistance | $R_g$ | $V_{GS}$=0V, $V_{DS}$=0V, f=1MHz | 0.7 | | 7 | Ω |
| Turn-On Delay Time | $t_{D(on)}$ | $V_{DD}$=15V, $R_L$=4.2Ω, $I_D$=3.5A, $V_{GEN}$=4.5V, $R_g$=1Ω | | 32 | 48 | ns |
| Turn-On Rise Time | $t_r$ | | | 48 | 71 | |
| Turn-Off Delay Time | $t_{D(off)}$ | | | 18 | 27 | |
| Turn-Off Fall Time | $t_f$ | | | 20 | 30 | |
| Turn-On Delay Time | $t_{D(on)}$ | $V_{DD}$=15V, $R_L$=4.2Ω, $I_D$=3.6A, $V_{GEN}$=10V, $R_g$=1Ω | | 5 | 10 | ns |
| Turn-On Rise Time | $t_r$ | | | 12 | 20 | |
| Turn-Off Delay Time | $t_{D(off)}$ | | | 14 | 21 | |
| Turn-Off Fall Time | $t_f$ | | | 8 | 16 | |
| Body Diode Reverse Recovery Time | $t_{rr}$ | $I_F$=3.6A, $d_I/d_t$=100A/μs, $T_J$=25°C | | 12 | 18 | ns |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | | | 5 | 10 | nC |
| Reverse Recovery Fall Time | $t_a$ | | | 7 | | ns |
| Reverse Recovery Rise Time | $t_b$ | | | 5 | | |
| Continuous Source-Drain Diode Current | $I_S$ | $T_C$=25°C | | | 1.75 | A |
| Pulse Diode Forward Current | $I_{SM}$ | | | | 20 | |
| Body Diode Voltage | $V_{SD}$ | $I_S$=3.6A, $V_{GS}$=0V | | | 1.2 | V |

Note
*e Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%

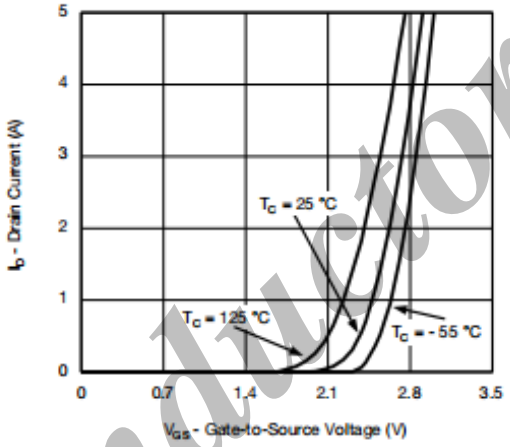
- **Ordering Information**

| Ordering Part Number | Package | MOQ |
|---|---|---|
| AP2366A | SOT23 (TO236) | 3,000 pcs / reel |

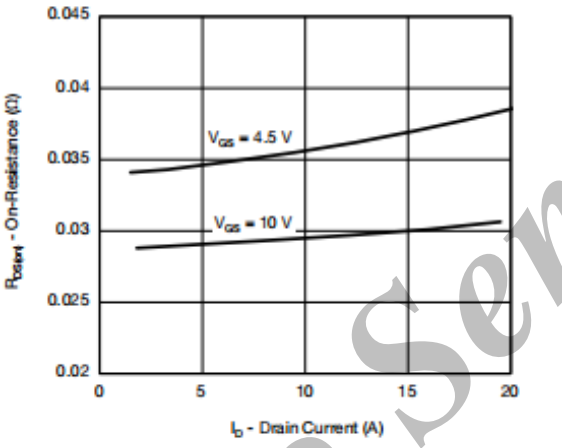
- **Typical Characteristics (25℃, unless noted)**



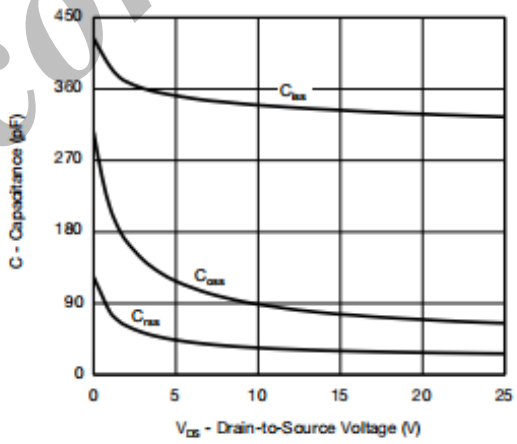

Output Characteristics



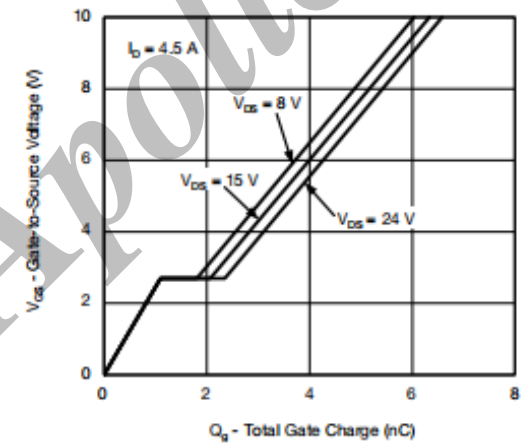

Transfer Characteristics



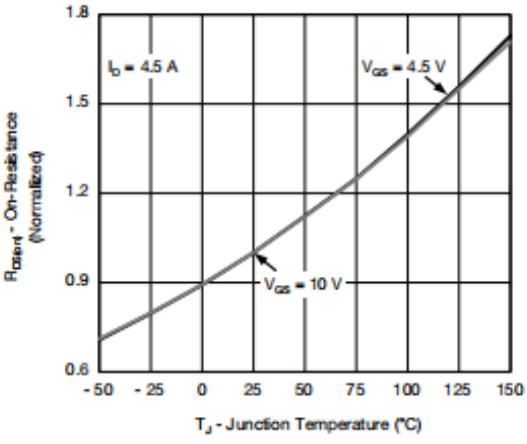

On-Resistance vs. Drain Current and Gate Voltage




Capacitance

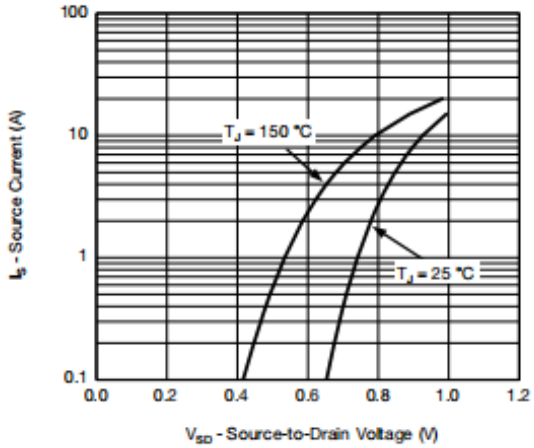



Gate Charge

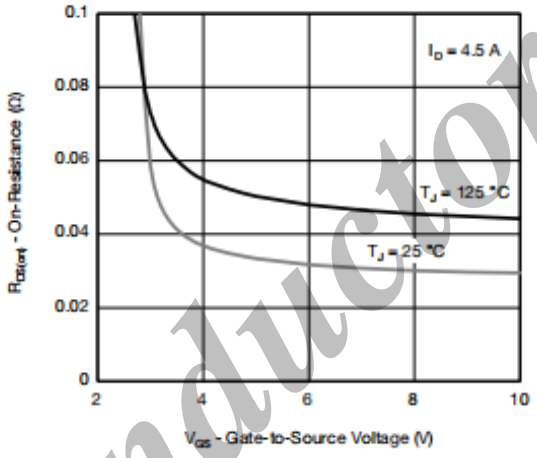



On-Resistance vs. Junction Temperature

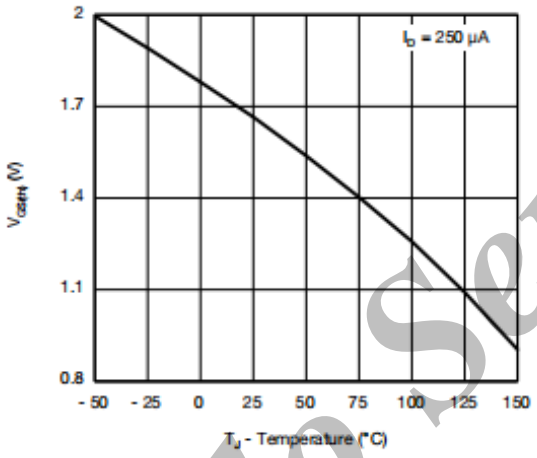
- **Typical Characteristics (25℃, unless noted)**



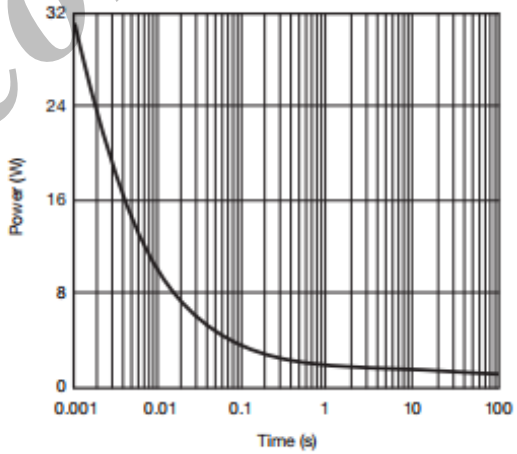

**Source-Drain Diode Forward Voltage**



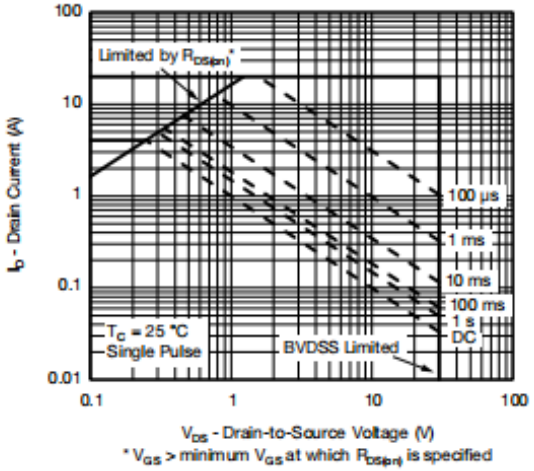

**On-Resistance vs. Gate-to-Source Voltage**



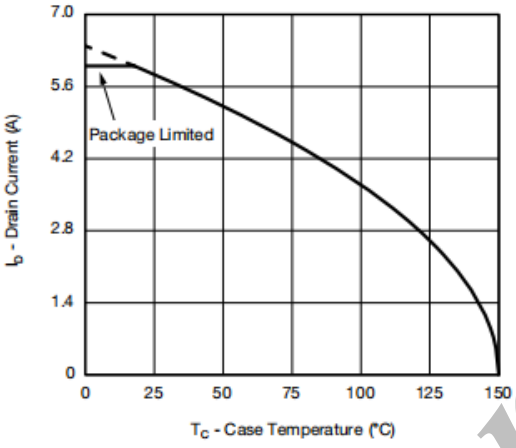

**Threshold Voltage**



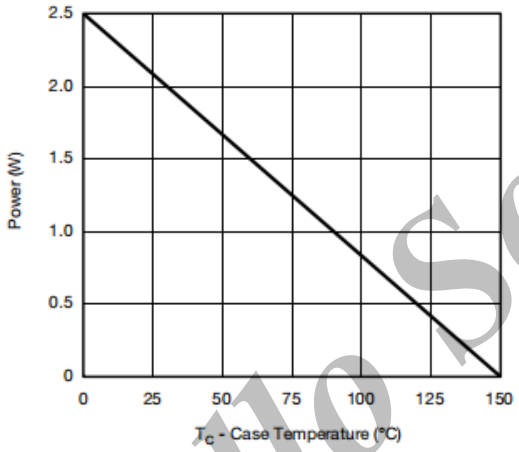

**Single Pulse Power (Junction-to-Ambient)**



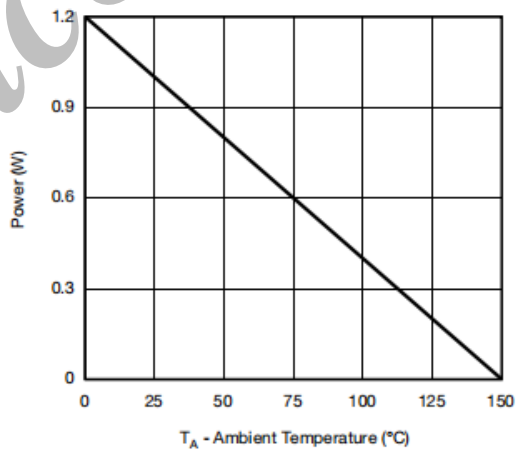
- **Typical Characteristics (25℃, unless noted)**




**Current Derating** [a]




**Power Derating, Junction-to-Foot**

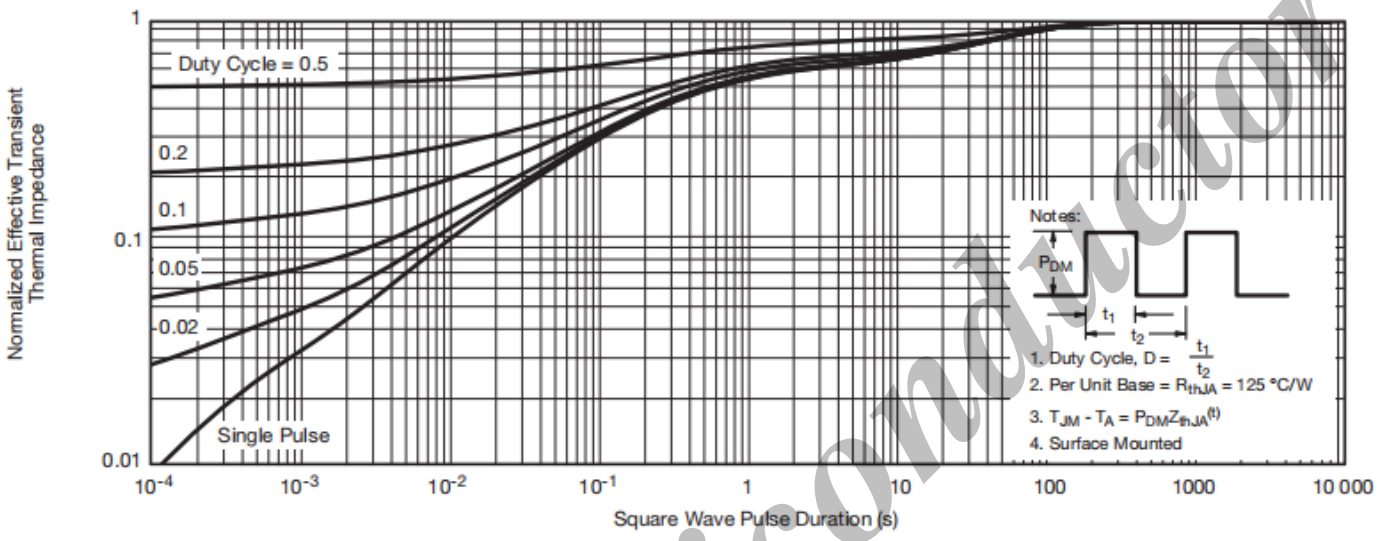



**Power Derating, Junction-to-Ambient**

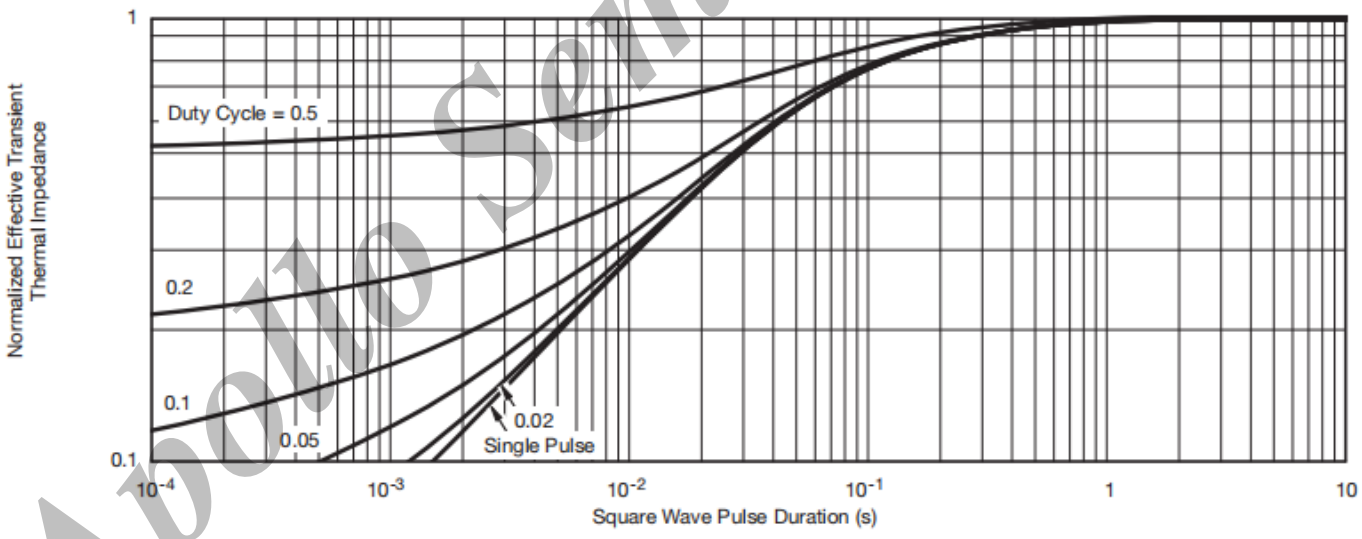
**Note**

a. 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℃, unless noted)**




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




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

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