## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Unit |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_C$ = +25°C<br>$T_C$ = +70°C | $I_D$ | 43<br>34 | A |
| | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | 13.1<br>10.5 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | $I_{DM}$ | 90 | A |
| Avalanche Current (Notes 7) L = 0.1mH | | | $I_{AR}$ | 28 | A |
| Avalanche Energy (Notes 7) L = 0.1mH | | | $E_{AR}$ | 40 | mJ |

## Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | | $P_D$ | 1.6 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | $R_{\theta JA}$ | 78 | °C/W |
| | t<10s | | 31 | °C/W |
| Total Power Dissipation (Note 6) | | $P_D$ | 2.4 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 51 | °C/W |
| | t<10s | | 21 | °C/W |
| Thermal Resistance, Junction to Case (Note 6) | | $R_{\theta JC}$ | 4.7 | °C/W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

## Electrical Characteristics (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 8)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 30V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | — | 2.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | — | 8 | 9.5 | mΩ | $V_{GS}$ = 10V, $I_D$ = 18A |
| | | — | 10 | 11.5 | | $V_{GS}$ = 4.5V, $I_D$ = 16A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.75 | 1.0 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 9)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 2075 | — | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 190 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 138 | — | | |
| Gate resistance | $R_g$ | — | 2.4 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1.0MHz |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 16.1 | — | nC | $V_{DS}$ = 15V, $I_D$ = 18A |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 37 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 6.1 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 5.9 | — | | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 4.5 | — | ns | $V_{DS}$ = 15V, $V_{GS}$ = 10V, $R_L$ = 0.83Ω, $R_{GEN}$ = 3Ω, |
| Turn-On Rise Time | $t_r$ | — | 19.6 | — | | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 31 | — | | |
| Turn-Off Fall Time | $t_f$ | — | 10.7 | — | | |
| Reverse Recovery Time | $t_{rr}$ | — | 13.7 | — | ns | $I_F$=15A, di/dt=500A/µs |
| Reverse Recovery Charge | $Q_{rr}$ | — | 18.3 | — | nC | |

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
7. $I_{AS}$ and $E_{AS}$ rating are based on low frequency and duty cycles to keep $T_J$ = +25°C
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

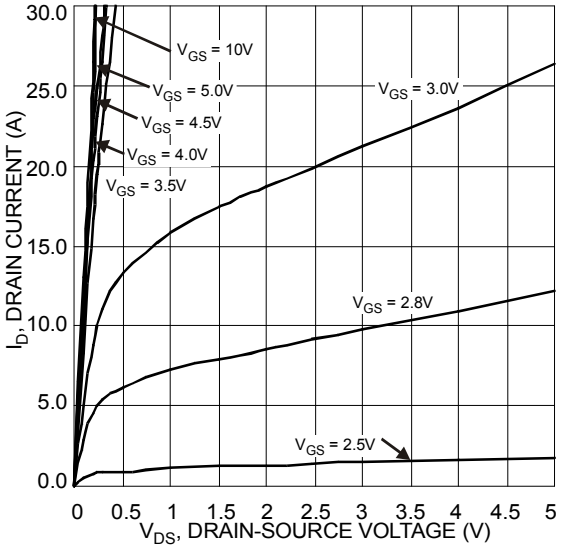



Figure 1 Typical Output Characteristic

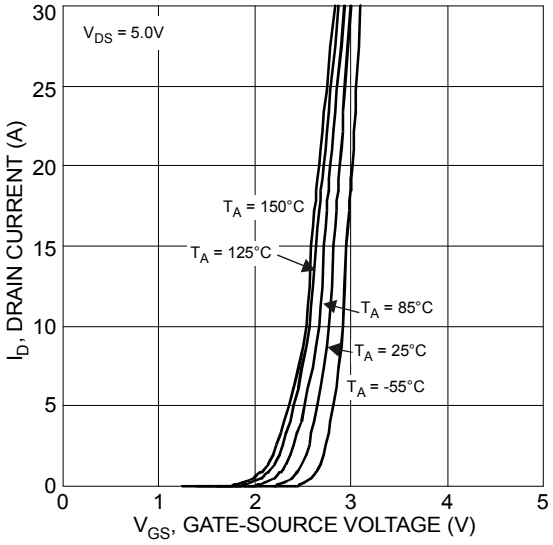



Figure 2 Typical Transfer Characteristics

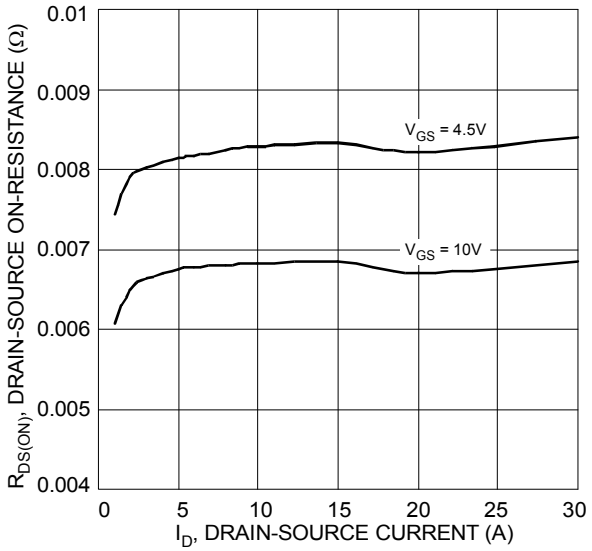



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

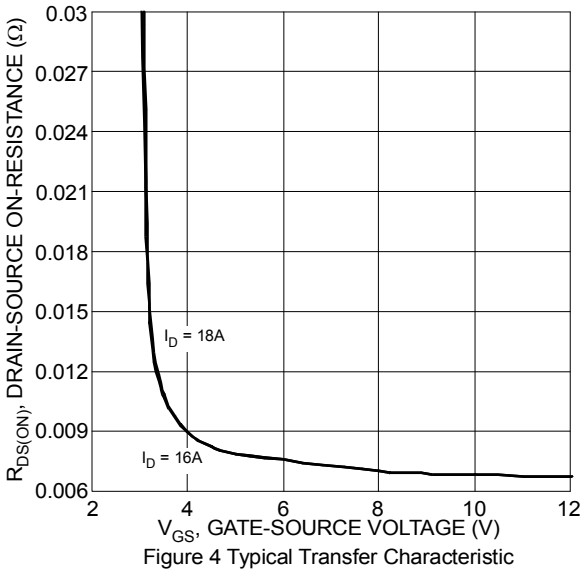



Figure 4 Typical Transfer Characteristic

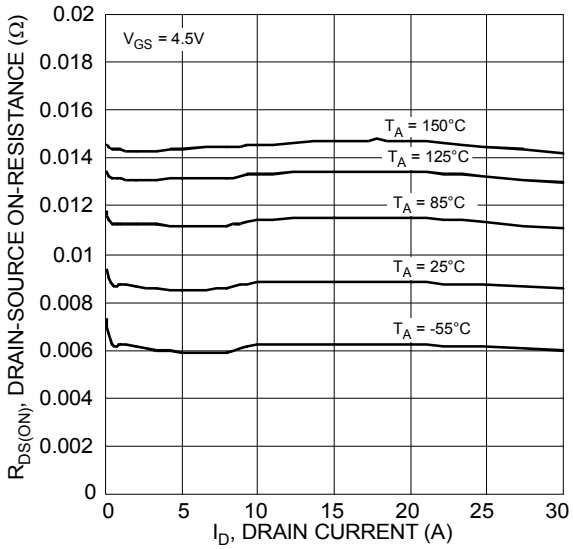



Figure 5 Typical On-Resistance vs. Drain Current and Temperature

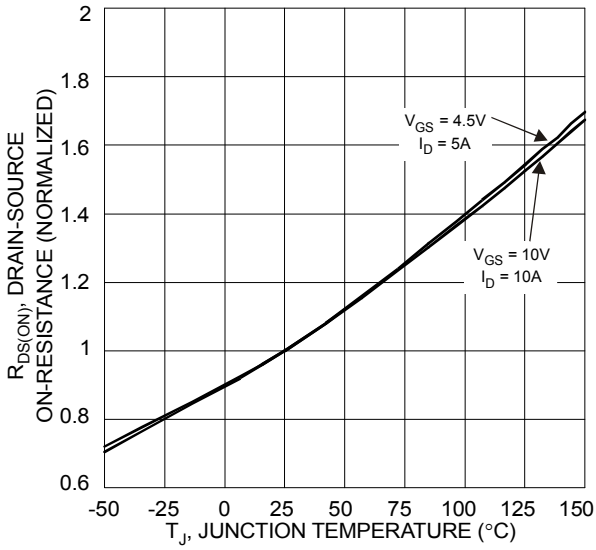



Figure 6 On-Resistance Variation with Temperature

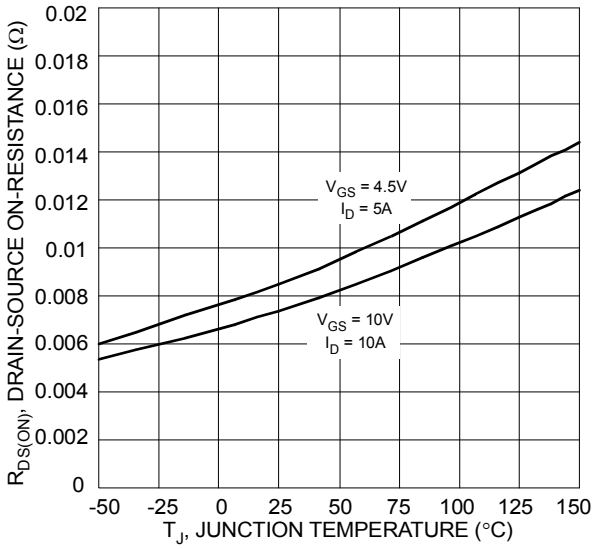



Figure 7 On-Resistance Variation with Temperature

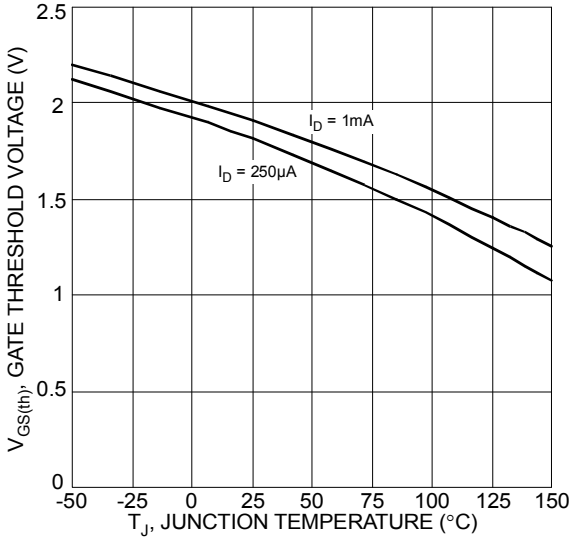



Figure 8 Gate Threshold Variation vs. Ambient Temperature

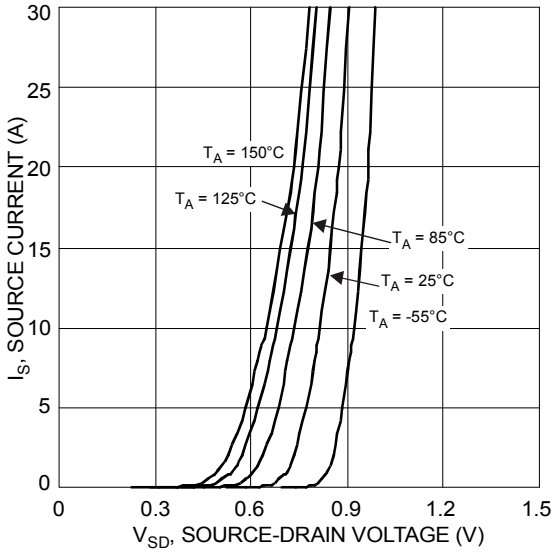



Figure 9 Diode Forward Voltage vs. Current

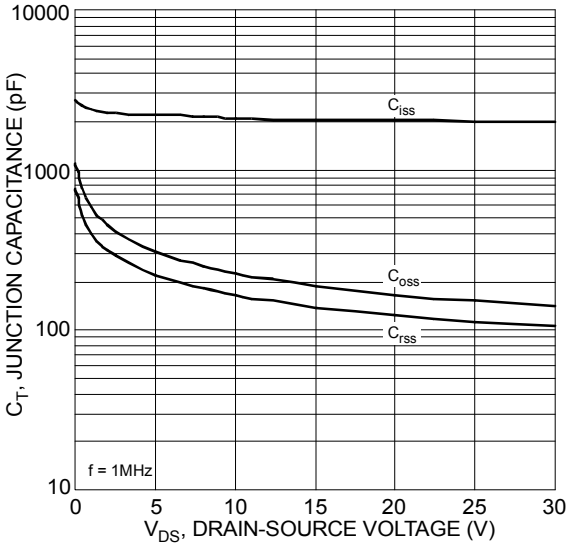



Figure 10 Typical Junction Capacitance

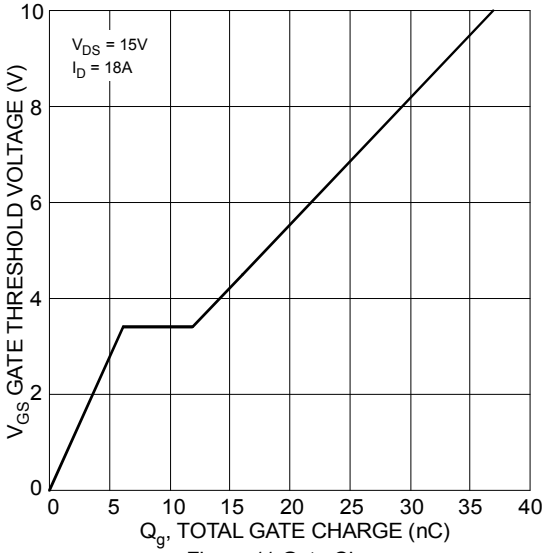



Figure 11 Gate Charge

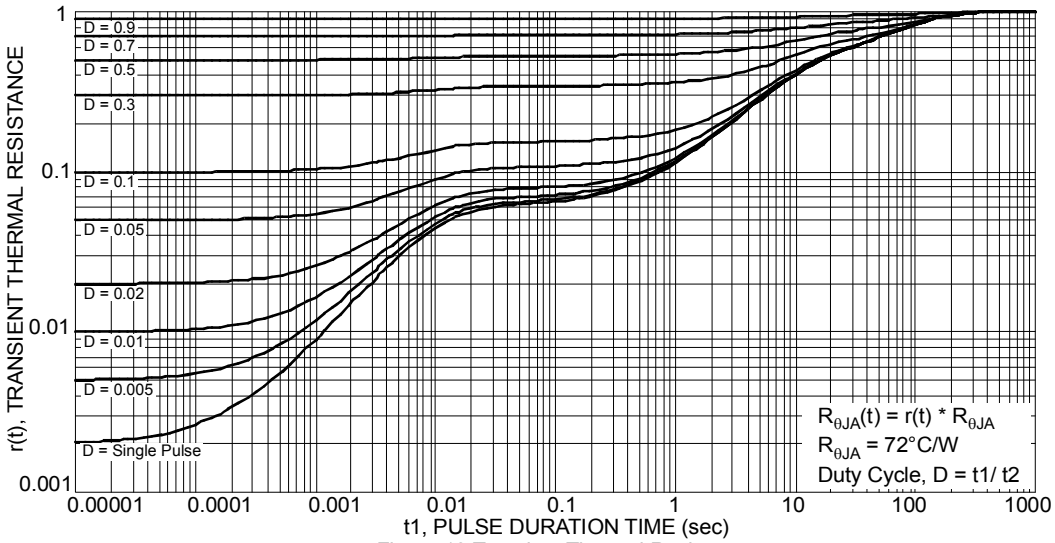
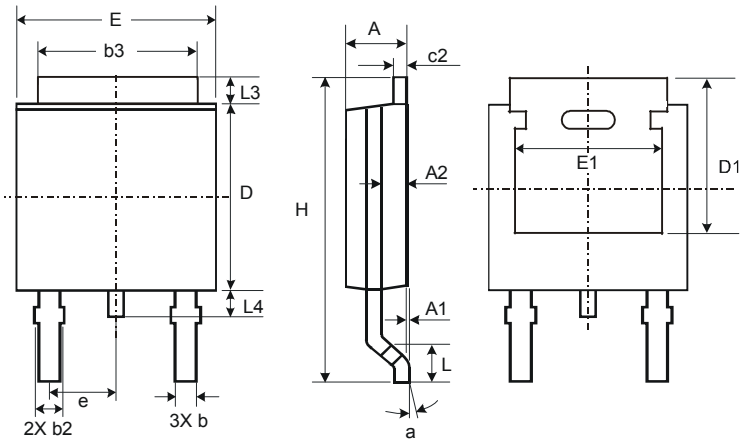



Figure 12 Transient Thermal Resistance

## Package Outline Dimensions

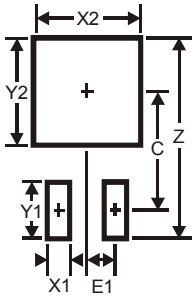
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.




| TO252 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 2.19 | 2.39 | 2.29 |
| **A1** | 0.00 | 0.13 | 0.08 |
| **A2** | 0.97 | 1.17 | 1.07 |
| **b** | 0.64 | 0.88 | 0.783 |
| **b2** | 0.76 | 1.14 | 0.95 |
| **b3** | 5.21 | 5.46 | 5.33 |
| **c2** | 0.45 | 0.58 | 0.531 |
| **D** | 6.00 | 6.20 | 6.10 |
| **D1** | 5.21 | – | – |
| **e** | – | – | 2.286 |
| **E** | 6.45 | 6.70 | 6.58 |
| **E1** | 4.32 | – | – |
| **H** | 9.40 | 10.41 | 9.91 |
| **L** | 1.40 | 1.78 | 1.59 |
| **L3** | 0.88 | 1.27 | 1.08 |
| **L4** | 0.64 | 1.02 | 0.83 |
| **a** | 0° | 10° | – |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.




| Dimensions | Value (in mm) |
|---|---|
| **Z** | 11.6 |
| **X1** | 1.5 |
| **X2** | 7.0 |
| **Y1** | 2.5 |
| **Y2** | 7.0 |
| **C** | 6.9 |
| **E1** | 2.3 |

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