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

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = +25°C<br>$T_A$ = +70°C | $I_D$ | 6.2<br>4.9 | A |
| Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%) | | | $I_{DM}$ | 44 | A |
| Maximum Body Diode Forward Current (Note 6) | | | $I_S$ | 1.5 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | $I_{AS}$ | 17.5 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | $E_{AS}$ | 15.2 | mJ |

## Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| Total Power Dissipation (Note 5) | $T_A$ = +25°C | $P_D$ | 0.9 | W |
| | $T_A$ = +70°C | | 0.6 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | $R_{\theta JA}$ | 144 | °C/W |
| | t<10s | | 103 | |
| Total Power Dissipation (Note 6) | $T_A$ = +25°C | $P_D$ | 1.3 | W |
| | $T_A$ = +70°C | | 0.8 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | $R_{\theta JA}$ | 97 | °C/W |
| | t<10s | | 70 | |
| Thermal Resistance, Junction to Case (Note 6) | | $R_{\theta JC}$ | 24 | |
| 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 | $V_{DS}$ = 24V, $V_{GS}$ = 0V |
| Gate-Body Leakage | $I_{GSS}$ | — | — | ±10 | µA | $V_{GS}$ = ±16V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 0.8 | — | 1.8 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | —<br>—<br>— | —<br>—<br>— | 25<br>28<br>68 | mΩ | $V_{GS}$ = 10V, $I_D$ = 4.0A<br>$V_{GS}$ = 4.5V, $I_D$ =3.5A<br>$V_{GS}$ = 2.5V, $I_D$ =2.5A |
| Source-Drain Diode Forward Voltage | $V_{SD}$ | — | — | 1.2 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 9)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 873 | — | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 121 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 67 | — | pF | |
| Gate Resistance | $R_g$ | — | 77 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 18.4 | — | nC | $V_{DS}$ = 15V, $I_D$ = 4A |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 8.3 | — | nC | |
| Gate-Source Charge | $Q_{gs}$ | — | 2.2 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 2.5 | — | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 17 | — | ns | $V_{DD}$ = 15V, $V_{GS}$ = 10V,<br>$R_L$ = 15Ω, $R_G$ = 6Ω |
| Turn-On Rise Time | $t_R$ | — | 18 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 231 | — | ns | |
| Turn-Off Fall Time | $t_F$ | — | 70 | — | ns | |

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.

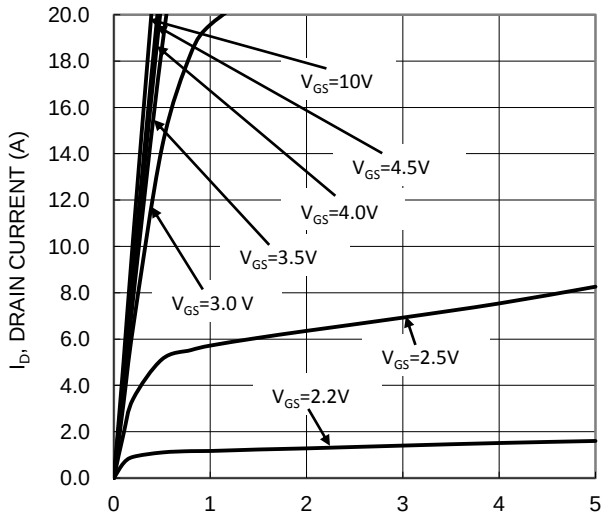



Figure 1 Typical Output Characteristic

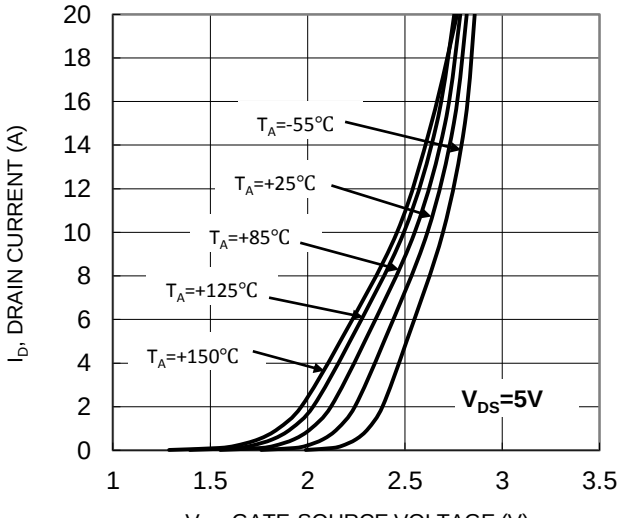



Figure 2 Typical Transfer Characteristic

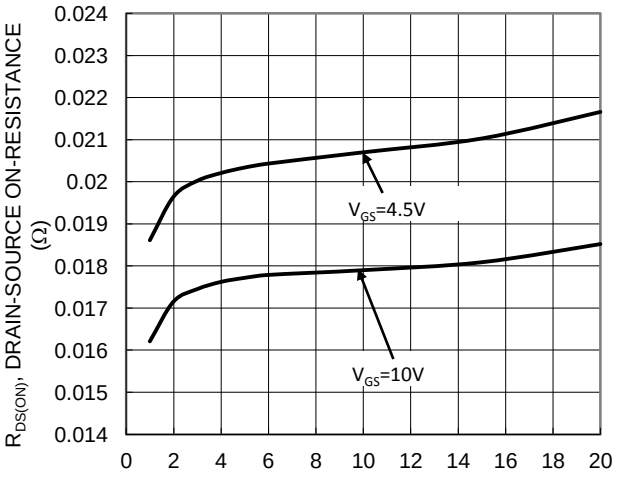



Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

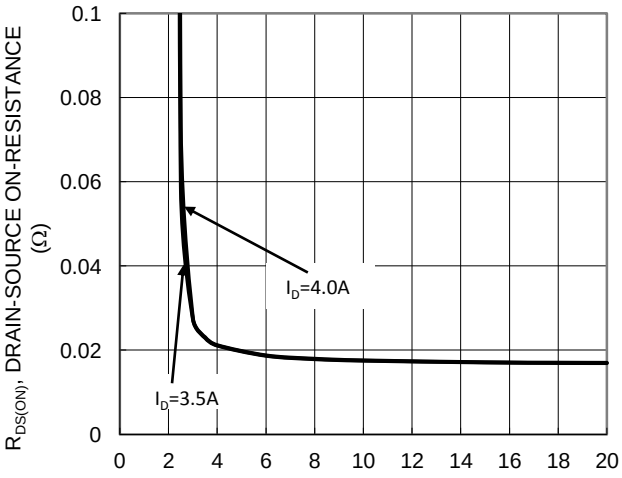



Figure 4 Typical Transfer Characteristic

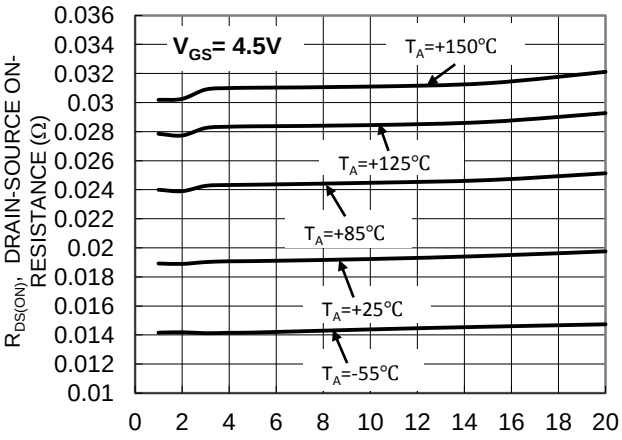



Figure 5 Typical On-Resistance vs Drain Current and Temperature

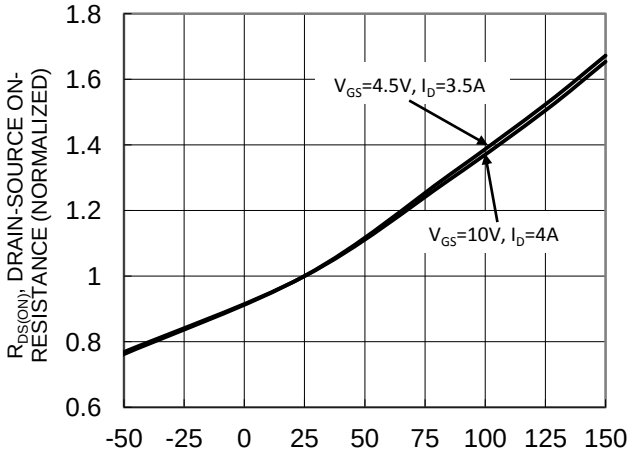



Figure 6 On-Resistance Variation with Temperature

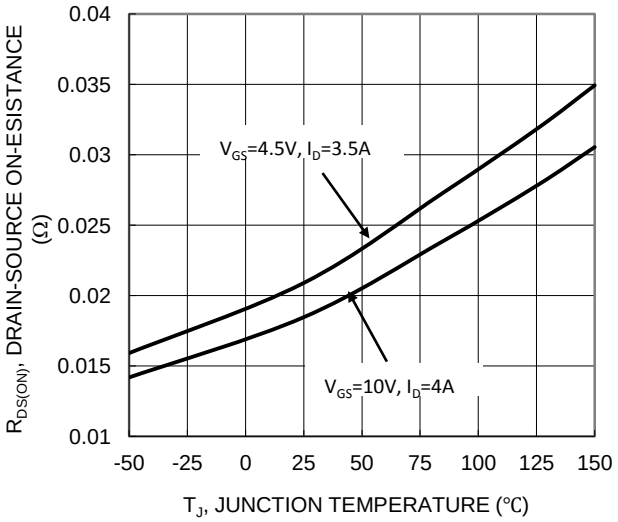



Figure 7 On-Resistance Variation with Temperature

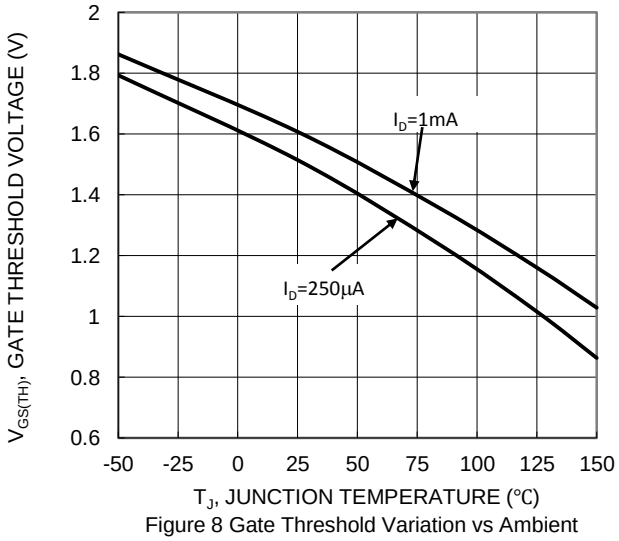



Figure 8 Gate Threshold Variation vs Ambient Temperature

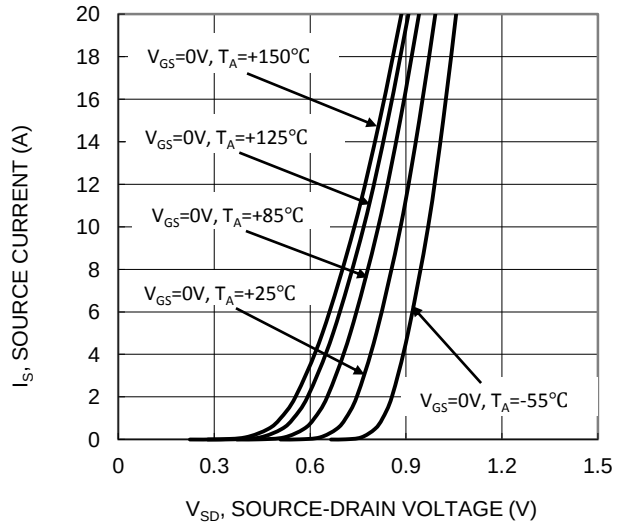



Figure 9 Diode Forward Voltage vs. Current

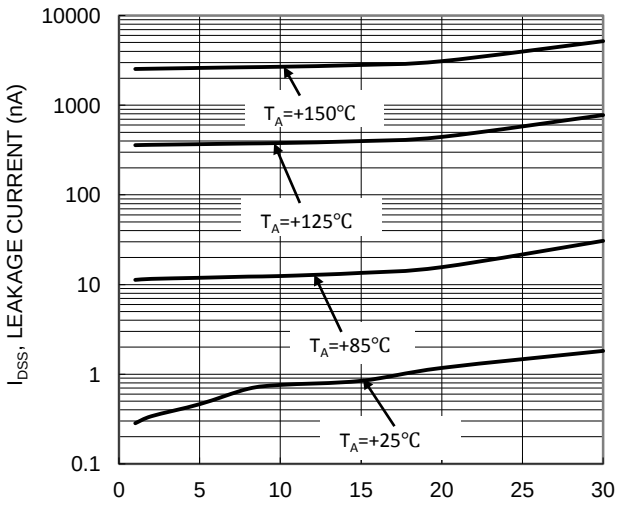



Figure 10 Typical Drain-Source Leakge Current vs Voltage

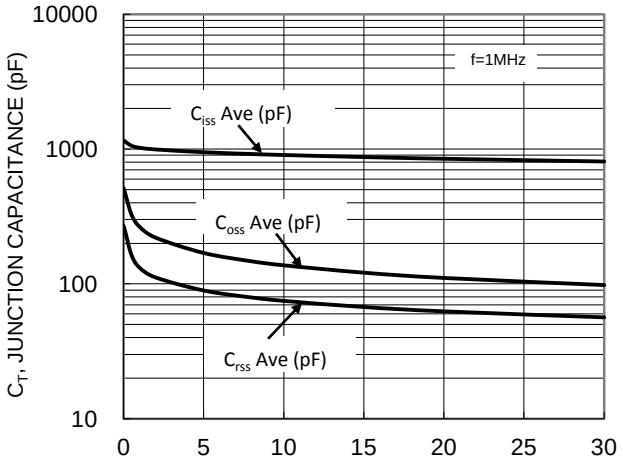



Figure 11 Typical Junction Capacitance

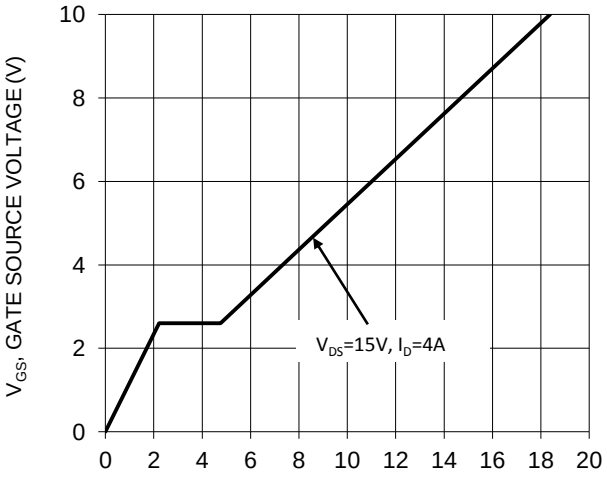



Figure 12 Gate Charge

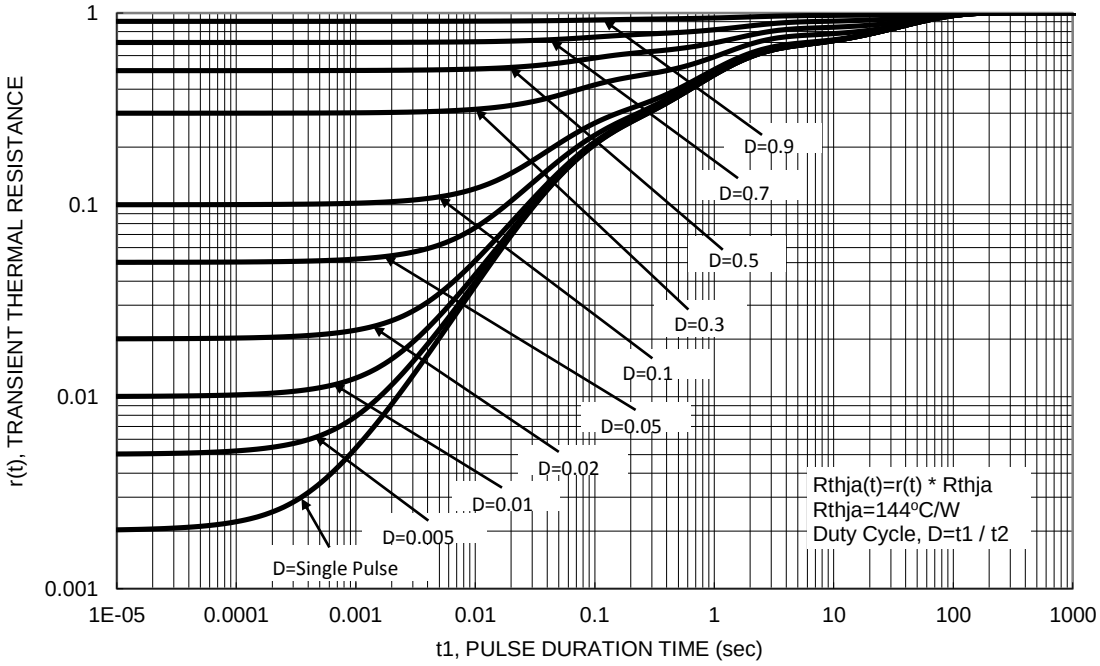



Figure 13 Transient Thermal Resistance

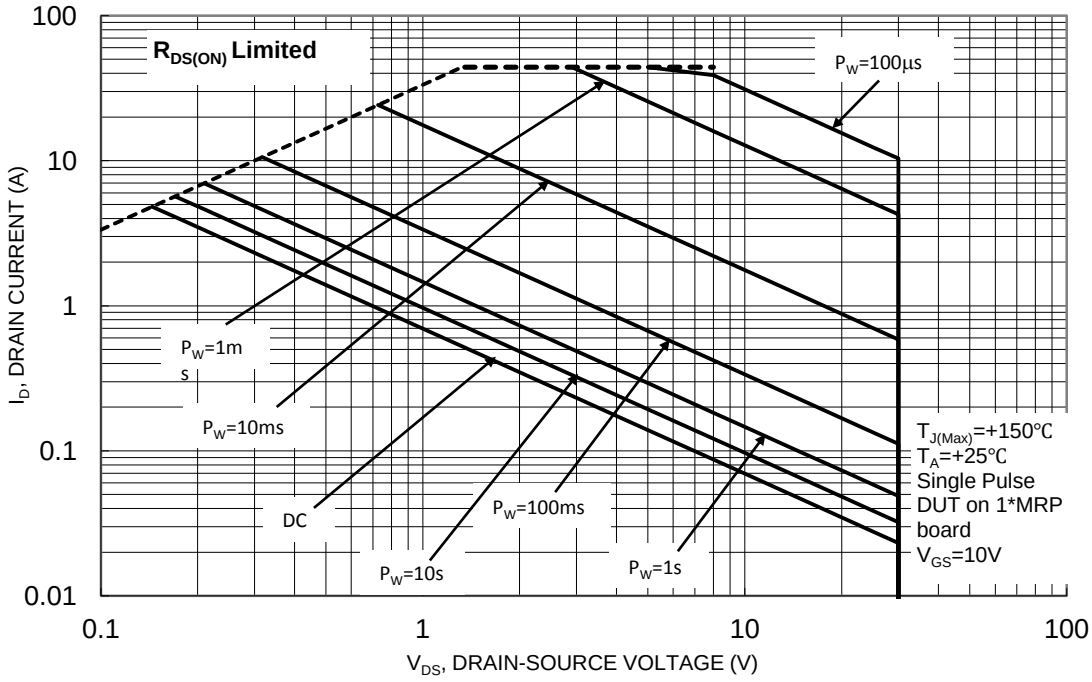
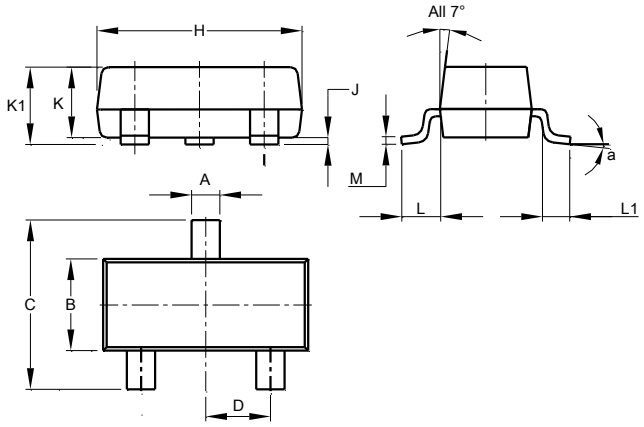



Figure 14 SOA Safe Operation Area

## Package Outline Dimensions

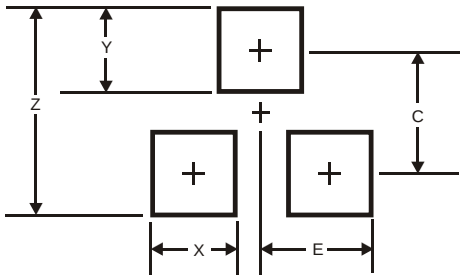
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| SOT23 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.37 | 0.51 | 0.40 |
| **B** | 1.20 | 1.40 | 1.30 |
| **C** | 2.30 | 2.50 | 2.40 |
| **D** | 0.89 | 1.03 | 0.915 |
| **F** | 0.45 | 0.60 | 0.535 |
| **G** | 1.78 | 2.05 | 1.83 |
| **H** | 2.80 | 3.00 | 2.90 |
| **J** | 0.013 | 0.10 | 0.05 |
| **K** | 0.890 | 1.00 | 0.975 |
| **K1** | 0.903 | 1.10 | 1.025 |
| **L** | 0.45 | 0.61 | 0.55 |
| **L1** | 0.25 | 0.55 | 0.40 |
| **M** | 0.085 | 0.150 | 0.110 |
| **a** | 8° | | |
| **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** | 2.9 |
| **X** | 0.8 |
| **Y** | 0.9 |
| **C** | 2.0 |
| **E** | 1.35 |

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