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

| Characteristic | | | Symbol | Value | Units |
|---|---|---|---|---|---|
| Drain-Source Voltage | | | $V_{DSS}$ | -40 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current, $V_{GS}$ = -10V | Steady State | $T_A$ = +25°C (Note 6)<br>$T_A$ = +70°C (Note 6)<br>$T_A$ = +25°C (Note 5) | $I_D$ | -6.4<br>-5.1<br>-4.6 | A |
| Maximum Body Diode Forward Current (Note 6) | | | $I_S$ | -5.2 | A |
| Pulsed Drain Current (Note 7) | | | $I_{DM}$ | -21 | A |
| Pulsed Source Current (Note 7) | | | $I_{SM}$ | -21 | A |

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

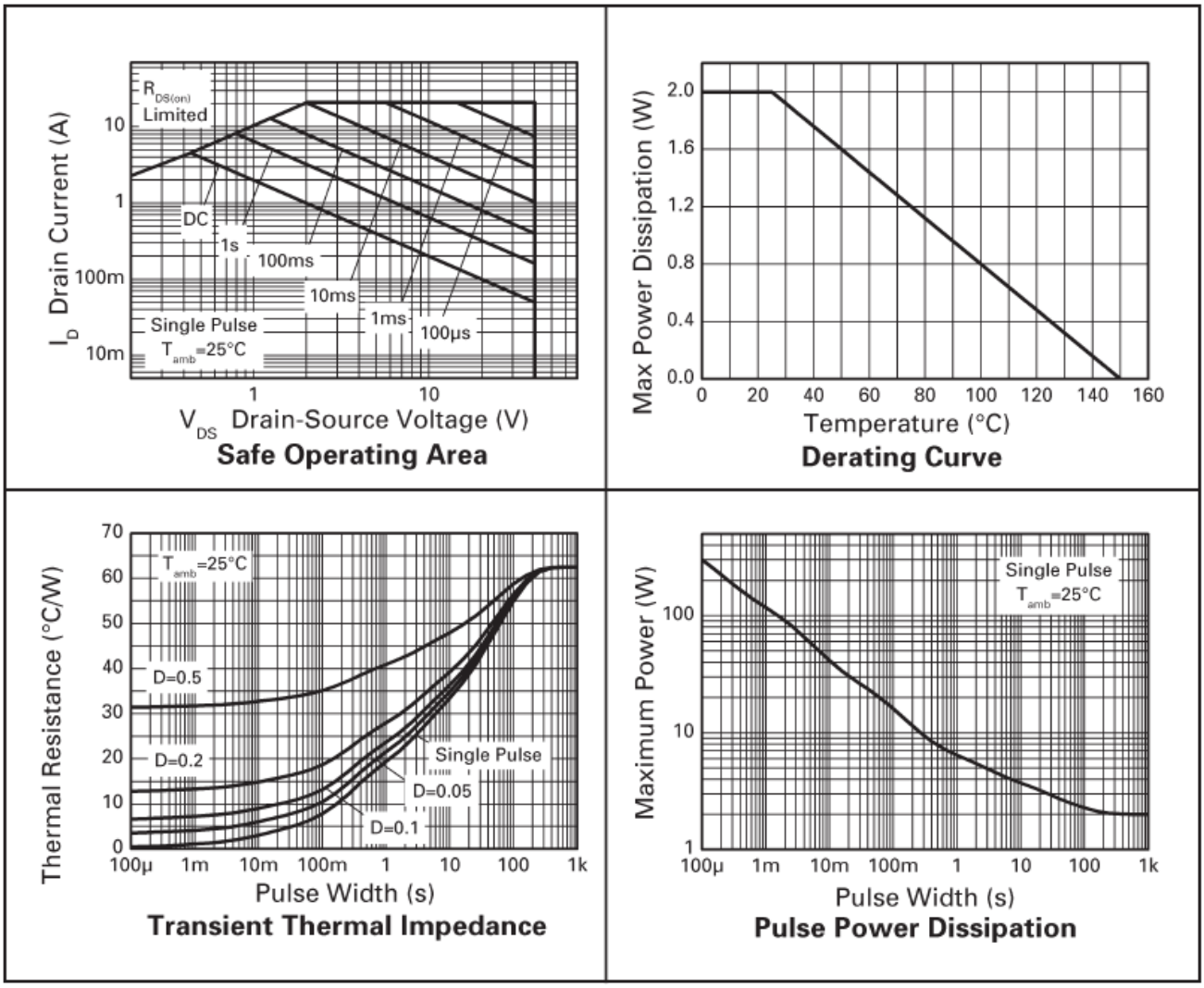
| Characteristic | | Symbol | Value | Units |
|---|---|---|---|---|
| Total Power Dissipation<br>Linear Derating Factor | $T_A$ = +25°C (Note 5) | $P_D$ | 2.0<br>16 | W<br>mW/°C |
| Total Power Dissipation<br>Linear Derating Factor | $T_A$ = +25°C (Note 6) | $P_D$ | 3.9<br>31 | W<br>mW/°C |
| Thermal Resistance, Junction to Ambient | Steady state (Note 5) | $R_{\theta JA}$ | 62.5 | °C/W |
| | Steady state (Note 6) | | 32 | °C/W |
| Operating and Storage Temperature Range | | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

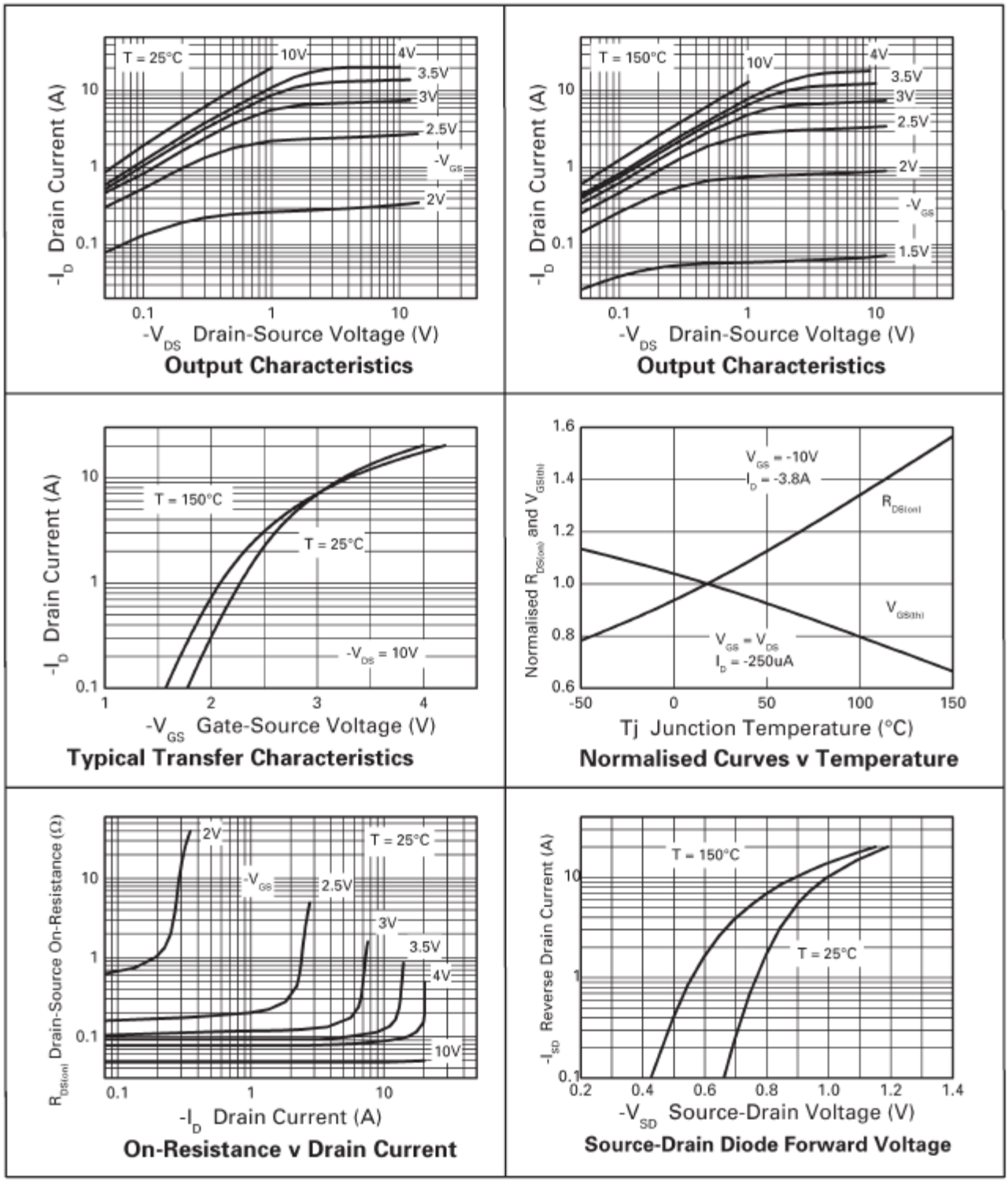
| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 9)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | -40 | — | — | V | $V_{GS}$ = 0V, $I_D$ = -250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | -1.0 | µA | $V_{DS}$ = -40V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 9)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -1.0 | — | — | V | $V_{DS}$ = $V_{GS}$, $I_D$ = -250µA |
| Static Drain-Source On-Resistance (Note 8) | $R_{DS(ON)}$ | — | — | 60 | mΩ | $V_{GS}$ = -10V, $I_D$ = -3.8A |
| | | — | — | 100 | | $V_{GS}$ = -4.5V, $I_D$ = -2.9A |
| Diode Forward Voltage (Note 8) | $V_{SD}$ | — | -0.85 | -1.2 | V | $V_{GS}$ = 0V, $I_S$ = -3.4A |
| Forward Transconductance (Notes 8 & 10) | $g_{fs}$ | — | 8.85 | — | S | $V_{DS}$ = -15V, $I_D$ = -3.8A |
| **DYNAMIC CHARACTERISTICS (Note 10)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 1,007 | — | pF | $V_{DS}$ = -20V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 130 | — | | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 85 | — | | |
| Total Gate Charge ($V_{GS}$ = -5.0V) | $Q_g$ | — | 13.6 | — | nC | $V_{DS}$ = -20V, $I_D$ = -3.8A, |
| Total Gate Charge ($V_{GS}$ = -10V) | $Q_g$ | — | 26.1 | — | | |
| Gate-Source Charge | $Q_{gs}$ | — | 2.8 | — | | |
| Gate-Drain Charge | $Q_{gd}$ | — | 4.8 | — | | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 2.33 | — | nS | $V_{GS}$ = -10V, $V_{DD}$ = -20V, $R_G$ = 6.0Ω,<br>$I_D$= -1.0A |
| Turn-On Rise Time | $t_r$ | — | 8.84 | — | | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 29.18 | — | | |
| Turn-Off Fall Time | $t_f$ | — | 12.54 | — | | |
| Body Diode Reverse Recovery Time | $t_{rr}$ | — | 27.2 | — | nS | $I_F$ = -3A, dI/dt = 100A/µs |
| Body Diode Reverse Recovery Charge | $Q_{rr}$ | — | 25.4 | — | nC | |

Notes:
5. For a device surface mounted on 25mm x 25mm FR4 PCB with high coverage of single sided 1oz copper, in still air conditions.
6. For a device surface mounted on FR4 PCB measured at t ≤10 secs.
7. Repetitive rating 25mm x 25mm FR4 PCB, D = 0.05, pulse width limited by maximum junction temperature.
8. Measured under pulsed conditions. Width≤300µs. Duty cycle ≤ 2%.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

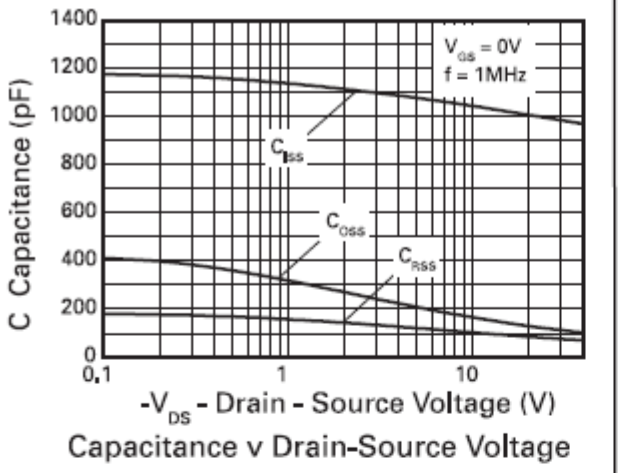
## Typical Characteristics



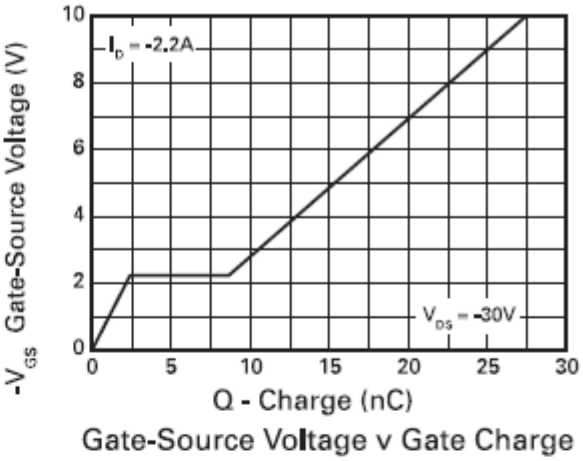
## Typical Characteristics (continued)



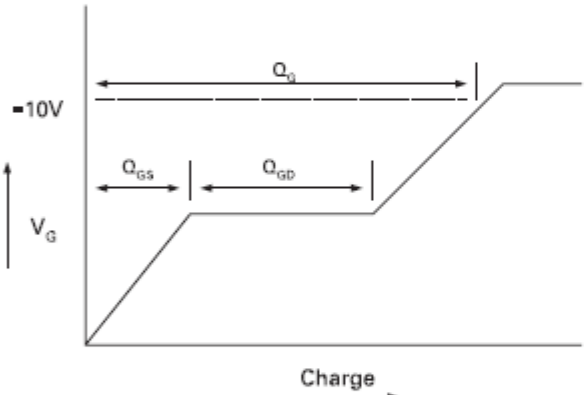
## Typical Characteristics (continued)



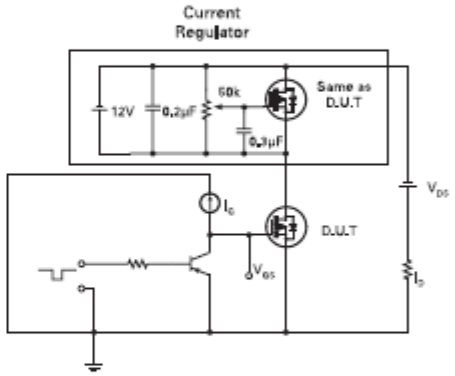

Capacitance v Drain-Source Voltage



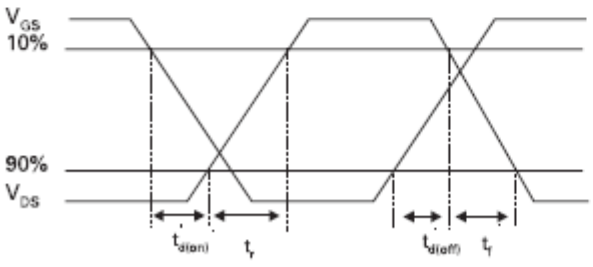

Gate-Source Voltage v Gate Charge



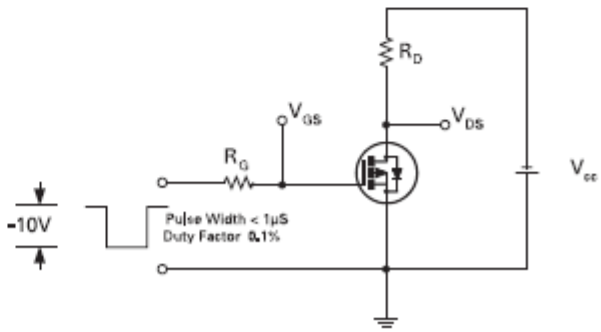

Basic Gate Charge Waveform




Gate Charge Test Circuit



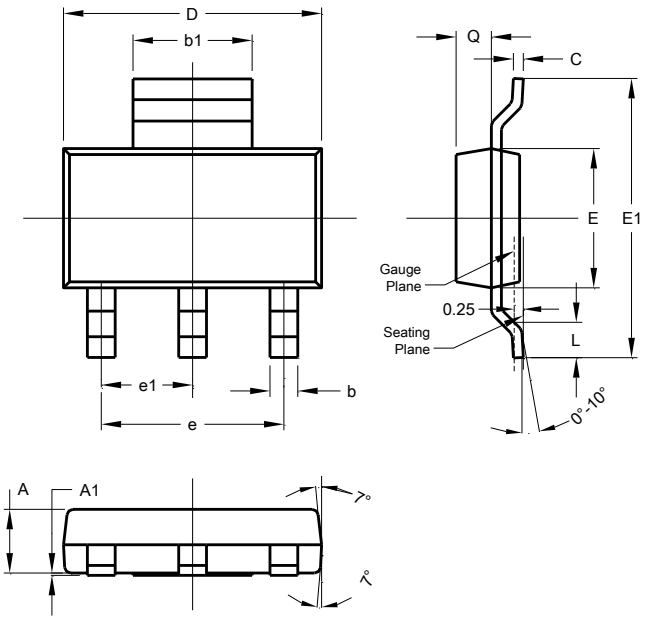

Switching Time Waveforms




Switching Time Test Circuit

## Package Outline Dimensions

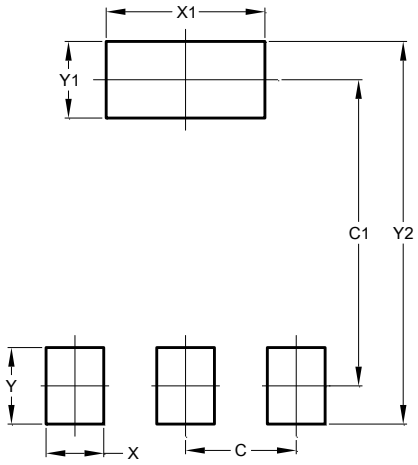
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for the latest version.




| SOT223 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 1.55 | 1.65 | 1.60 |
| **A1** | 0.010 | 0.15 | 0.05 |
| **b** | 0.60 | 0.80 | 0.70 |
| **b1** | 2.90 | 3.10 | 3.00 |
| **C** | 0.20 | 0.30 | 0.25 |
| **D** | 6.45 | 6.55 | 6.50 |
| **E** | 3.45 | 3.55 | 3.50 |
| **E1** | 6.90 | 7.10 | 7.00 |
| **e** | - | - | 4.60 |
| **e1** | - | - | 2.30 |
| **L** | 0.85 | 1.05 | 0.95 |
| **Q** | 0.84 | 0.94 | 0.89 |
| **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) |
|---|---|
| **C** | 2.30 |
| **C1** | 6.40 |
| **X** | 1.20 |
| **X1** | 3.30 |
| **Y** | 1.60 |
| **Y1** | 1.60 |
| **Y2** | 8.00 |

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