

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                    |              |                                                  | Symbol           | Value       | Unit |
|-----------------------------------|--------------|--------------------------------------------------|------------------|-------------|------|
| Drain-Source Voltage              |              |                                                  | V <sub>DSS</sub> | 30          | V    |
| Gate-Source Voltage               |              |                                                  | V <sub>GSS</sub> | ±25         | V    |
| Continuous Drain Current (Note 5) | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +85°C | I <sub>D</sub>   | 10.0<br>6.5 | A    |
| Pulsed Drain Current (Note 6)     |              |                                                  | I <sub>DM</sub>  | 48          | A    |

**Thermal Characteristics**

| Characteristic                                                  | Symbol                            | Value       | Unit |
|-----------------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 5)                                      | P <sub>D</sub>                    | 1.71        | W    |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = +25°C | R <sub>θJA</sub>                  | 72.9        | °C/W |
| Operating and Storage Temperature Range                         | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C   |

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                         | Symbol              | Min | Typ   | Max  | Unit | Test Condition                                                                                                  |
|--------------------------------------------------------|---------------------|-----|-------|------|------|-----------------------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 7)</b>                    |                     |     |       |      |      |                                                                                                                 |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | 30  | -     | -    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250μA                                                                    |
| Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C | I <sub>DSS</sub>    | -   | -     | 1.0  | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V                                                                     |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | -   | -     | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                                    |
| <b>ON CHARACTERISTICS (Note 7)</b>                     |                     |     |       |      |      |                                                                                                                 |
| Gate Threshold Voltage                                 | V <sub>GS(th)</sub> | 0.8 | -     | 1.6  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA                                                      |
| Static Drain-Source On-Resistance                      | R <sub>DS(on)</sub> | -   | 12    | 17   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 9A                                                                      |
|                                                        |                     |     | 16    | 24   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 7A                                                                     |
| Forward Transfer Admittance                            | Y <sub>fs</sub>     | -   | 10    | -    | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 9A                                                                      |
| Diode Forward Voltage                                  | V <sub>SD</sub>     | -   | 0.7   | 1.0  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A                                                                       |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>                |                     |     |       |      |      |                                                                                                                 |
| Input Capacitance                                      | C <sub>iss</sub>    | -   | 798   | -    | pF   | V <sub>DS</sub> = 10V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                                      |
| Output Capacitance                                     | C <sub>oss</sub>    | -   | 128   | -    | pF   |                                                                                                                 |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | -   | 122   | -    | pF   |                                                                                                                 |
| Gate Resistance                                        | R <sub>g</sub>      | -   | 1.37  | -    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                                            |
| Total Gate Charge                                      | Q <sub>g</sub>      | -   | 8.7   | -    | nC   | V <sub>GS</sub> = 5V, V <sub>DS</sub> = 15V,<br>I <sub>D</sub> = 9A                                             |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | -   | 1.7   | -    | nC   |                                                                                                                 |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | -   | 2.4   | -    | nC   |                                                                                                                 |
| Turn-On Delay Time                                     | t <sub>D(on)</sub>  | -   | 5.03  | -    | ns   | V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V,<br>R <sub>L</sub> = 15Ω, R <sub>G</sub> = 6Ω, I <sub>D</sub> = 1A |
| Turn-On Rise Time                                      | t <sub>r</sub>      | -   | 4.50  | -    | ns   |                                                                                                                 |
| Turn-Off Delay Time                                    | t <sub>D(off)</sub> | -   | 26.33 | -    | ns   |                                                                                                                 |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | -   | 8.55  | -    | ns   |                                                                                                                 |

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Repetitive rating, pulse width limited by junction temperature.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to production testing.

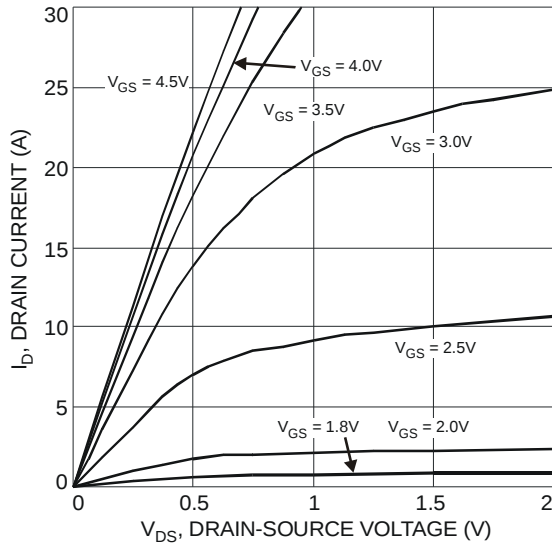


Fig. 1 Typical Output Characteristics

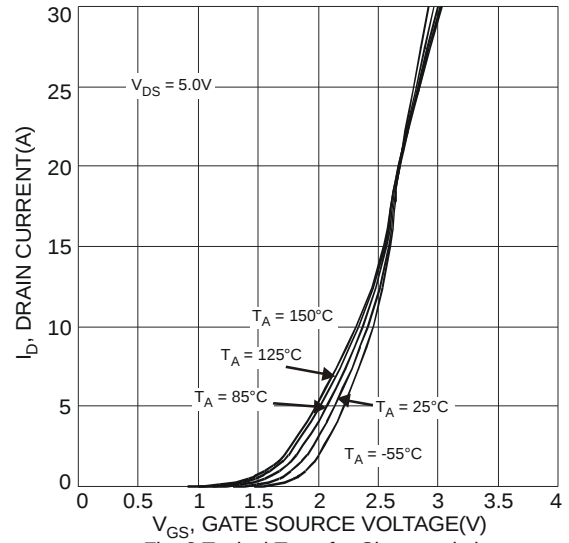


Fig. 2 Typical Transfer Characteristics

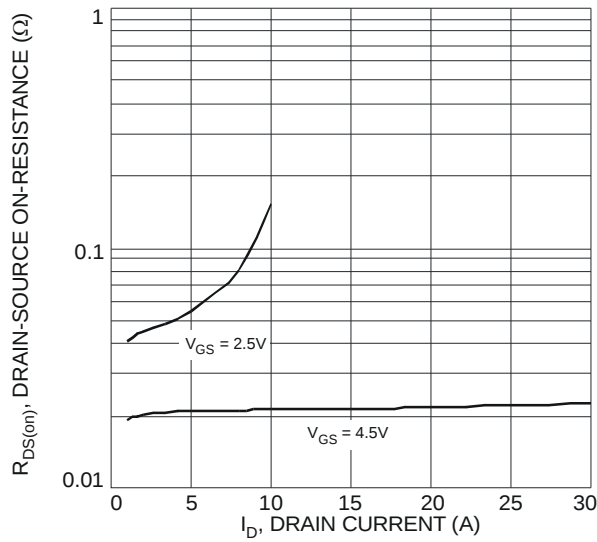


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

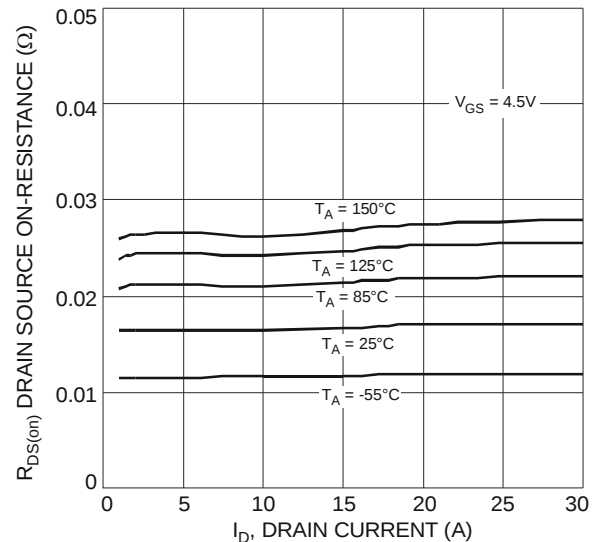


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

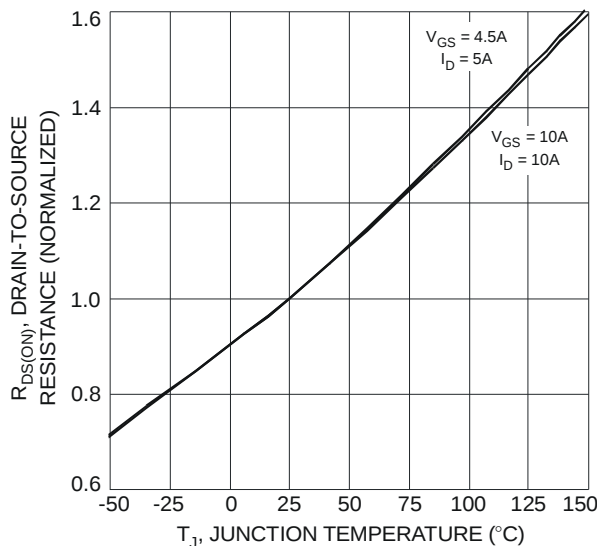


Fig. 5 On-Resistance Variation with Temperature

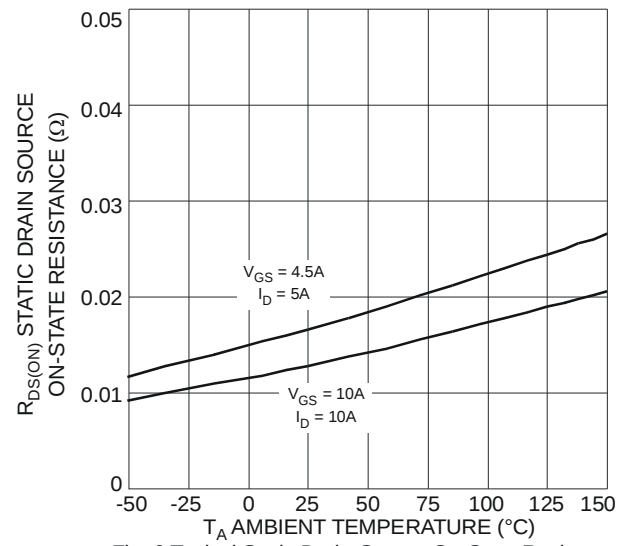


Fig. 6 Typical Static Drain-Source On-State Resistance vs. Ambient Temperature

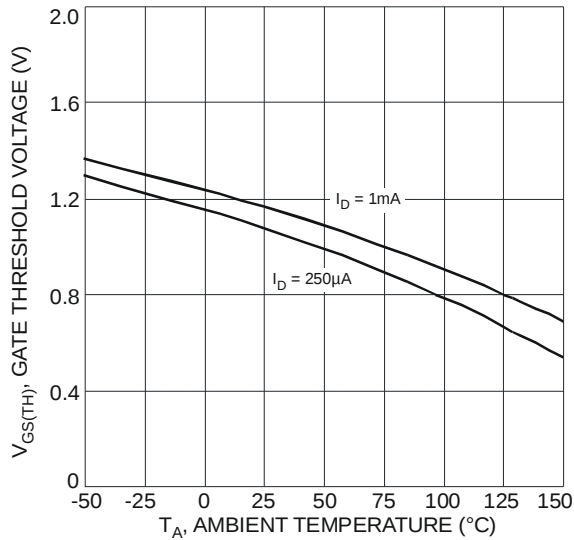


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

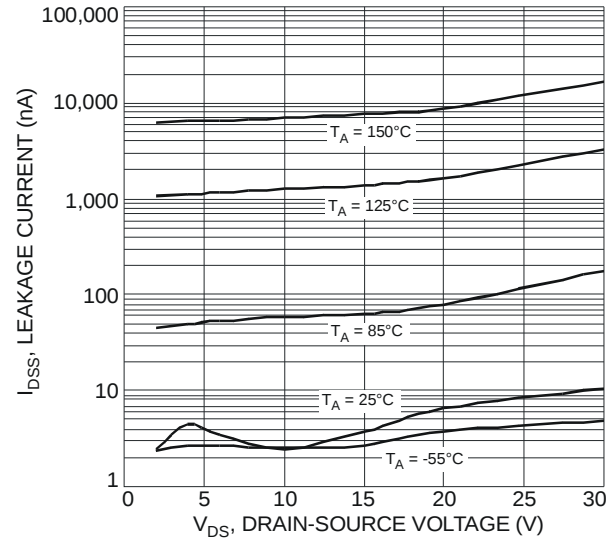


Fig. 8 Typical Drain-Source Leakage Current vs Voltage

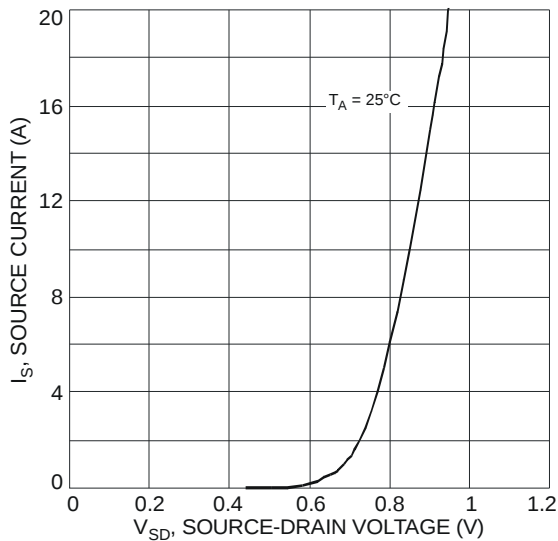


Fig. 9 Diode Forward Voltage vs. Current

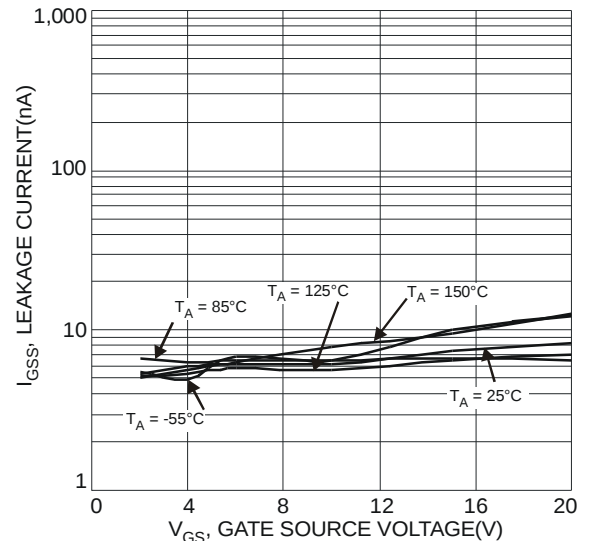


Fig. 10 Gate-Source Leakage Current vs. Voltage

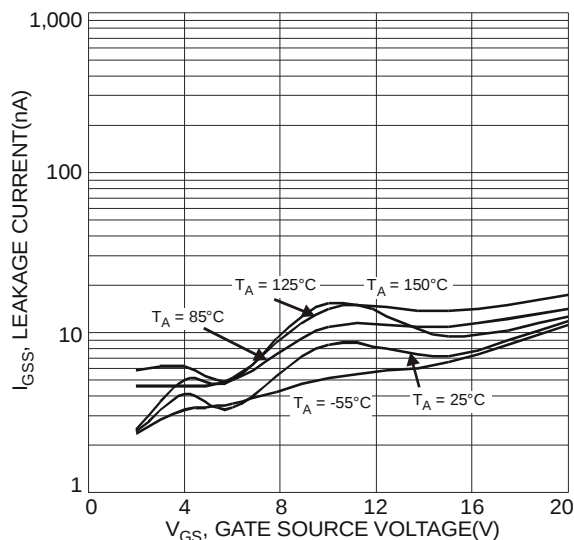


Fig. 11 Gate-Source Leakage Current vs. Voltage

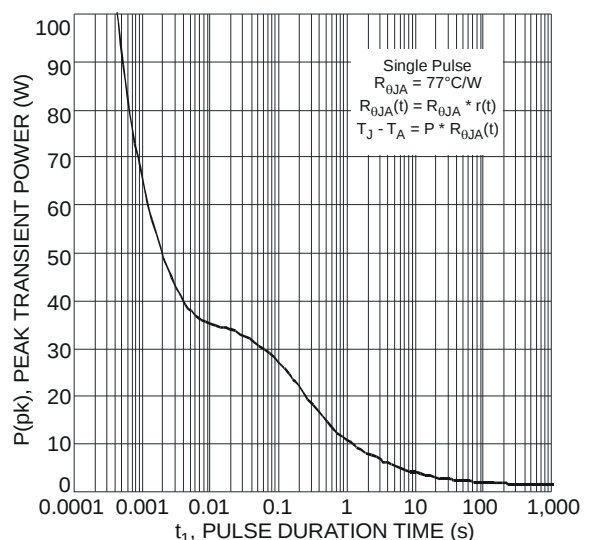
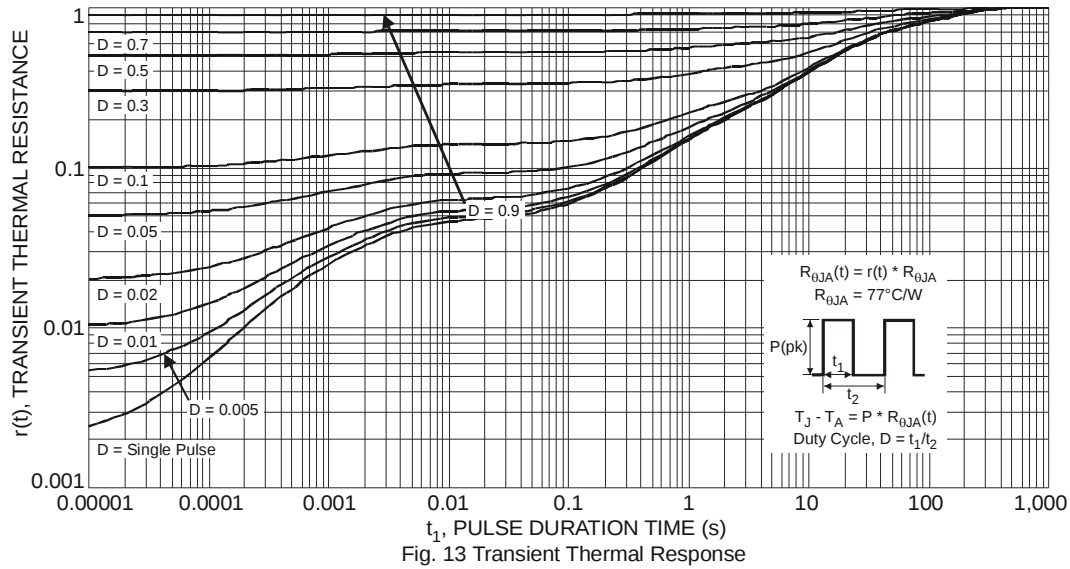
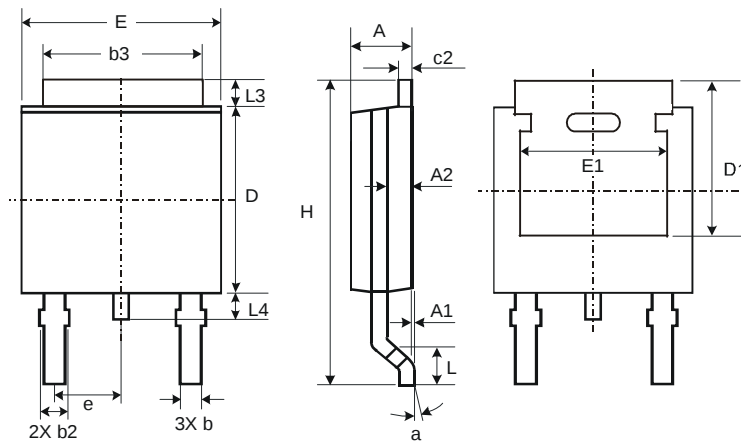


Fig. 12 Single Pulse Maximum Power Dissipation



## Package Outline Dimensions

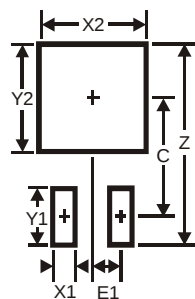
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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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