

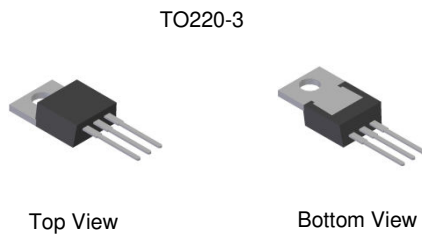
## Product Summary

| $BV_{DSS}$ | $R_{DS(ON) \max}$               | $I_D$<br>$T_C = +25^\circ C$<br>(Note 9) |
|------------|---------------------------------|--|
| 60V        | 3.65m $\Omega$ @ $V_{GS} = 10V$ | 100A                                     |

## Description and Applications

This new generation MOSFET features low on-resistance and fast switching, making it ideal for high-efficiency power management applications.

- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

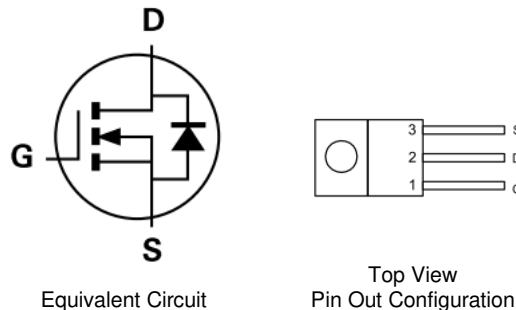


## Features

- 100% Unclamped Inductive Switching – Ensures More Reliable and Robust End Application
- Low Input Capacitance
- Low Input/Output Leakage
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

- Case: TO220-3
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Terminals: Matte Tin Finish Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 ③
- Terminal Connections: See Diagram Below
- Weight: 1.85 grams (Approximate)

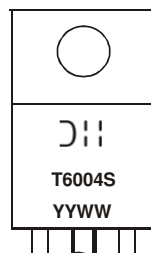


## Ordering Information (Note 4)

| Part Number | Case    | Packaging      |
|-------------|---------|----------------|
| DMT6004SCT  | TO220-3 | 50 pieces/tube |

- Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
  2. See [http://www.diodes.com/quality/lead\\_free.html](http://www.diodes.com/quality/lead_free.html) for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  4. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

## Marking Information



= Manufacturer's Marking  
 T6004S = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY or YY = Last Two Digits of Year (ex: 15 = 2015)  
 WW or WW = Week Code (01 to 53)

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

| Characteristic   | Symbol           | Value                           | Units |
|--|------------------|---------------------------------|-------|
| Drain-Source Voltage                                   | V <sub>DSS</sub> | 60                              | V     |
| Gate-Source Voltage                                    | V <sub>GSS</sub> | ±20                             | V     |
| Continuous Drain Current (Note 6)                      | I <sub>D</sub>   | T <sub>C</sub> = +25°C (Note 9) | 100   |
|  |                  | T <sub>C</sub> = +70°C          | 100   |
| Maximum Continuous Body Diode Forward Current (Note 6) | I <sub>S</sub>   | 100                             | A     |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)     | I <sub>DM</sub>  | 180                             | A     |
| Avalanche Current, L=0.2mH                             | I <sub>AS</sub>  | 45                              | A     |
| Avalanche Energy, L=0.2mH                              | E <sub>AS</sub>  | 200                             | mJ    |

**Thermal Characteristics**

| Characteristic                                   | Symbol                            | Value       | Units |
|--|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5)                 | P <sub>D</sub>                    | 2.3         | W     |
| Thermal Resistance, Junction to Ambient (Note 5) | R <sub>θJA</sub>                  | 52.8        | °C/W  |
| Total Power Dissipation (Note 6)                 | P <sub>D</sub>                    | 113         | W     |
| Thermal Resistance, Junction to Case (Note 6)    | R <sub>θJC</sub>                  | 1.1         | °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>   | 60  | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA  |
| Zero Gate Voltage Drain Current         | I <sub>DSS</sub>    | —   | —    | 1    | µA   | V <sub>DS</sub> = 48V, 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> | 2   | —    | 4    | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                |
| Static Drain-Source On-Resistance       | R <sub>DS(ON)</sub> | —   | 3.1  | 3.65 | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 100A  |
| Diode Forward Voltage                   | V <sub>SD</sub>     | —   | —    | 1.3  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 100A   |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b> |                     |     |      |      |      |   |
| Input Capacitance                       | C <sub>iss</sub>    | —   | 4556 | —    | pF   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V, f = 1MHz                                     |
| Output Capacitance                      | C <sub>oss</sub>    | —   | 1383 | —    |      |   |
| Reverse Transfer Capacitance            | C <sub>rss</sub>    | —   | 105  | —    |      |   |
| Gate Resistance                         | R <sub>G</sub>      | —   | 0.7  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz                                      |
| Total Gate Charge                       | Q <sub>g</sub>      | —   | 95.4 | —    | nC   | V <sub>DD</sub> = 30V, I <sub>D</sub> = 90A, V <sub>GS</sub> = 10V                        |
| Gate-Source Charge                      | Q <sub>gs</sub>     | —   | 21.6 | —    |      |   |
| Gate-Drain Charge                       | Q <sub>gd</sub>     | —   | 20.4 | —    |      |   |
| Turn-On Delay Time                      | t <sub>D(ON)</sub>  | —   | 14.3 | —    | ns   | V <sub>DD</sub> = 30V, V <sub>GS</sub> = 10V, I <sub>D</sub> = 90A, R <sub>G</sub> = 3.5Ω |
| Turn-On Rise Time                       | t <sub>R</sub>      | —   | 99.1 | —    |      |   |
| Turn-Off Delay Time                     | t <sub>D(OFF)</sub> | —   | 40   | —    |      |   |
| Turn-Off Fall Time                      | t <sub>F</sub>      | —   | 17.6 | —    |      |   |
| Reverse Recovery Time                   | t <sub>RR</sub>     | —   | 50.5 | —    | ns   | I <sub>F</sub> = 48A, di/dt = 100A/µs   |
| Reverse Recovery Charge                 | Q <sub>RR</sub>     | —   | 80.8 | —    | nC   |   |

- Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  6. Device mounted on infinite heat sink.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.
  9. Package limited.

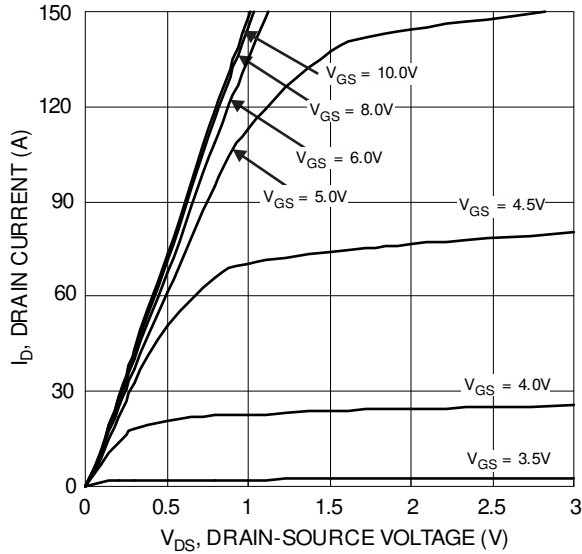


Figure 1 Typical Output Characteristic

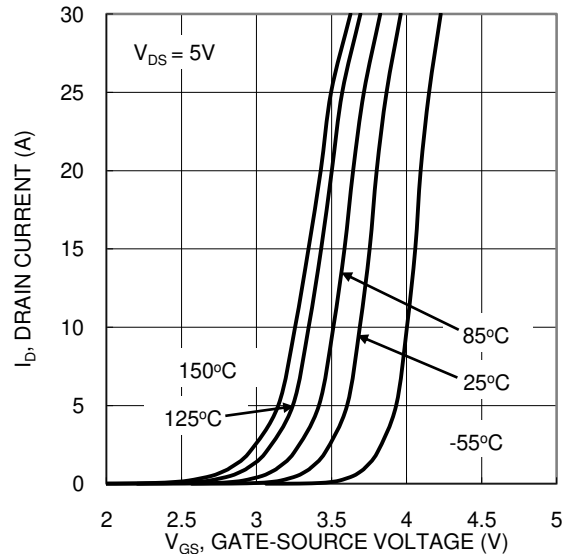


Figure 2 Typical Transfer Characteristic

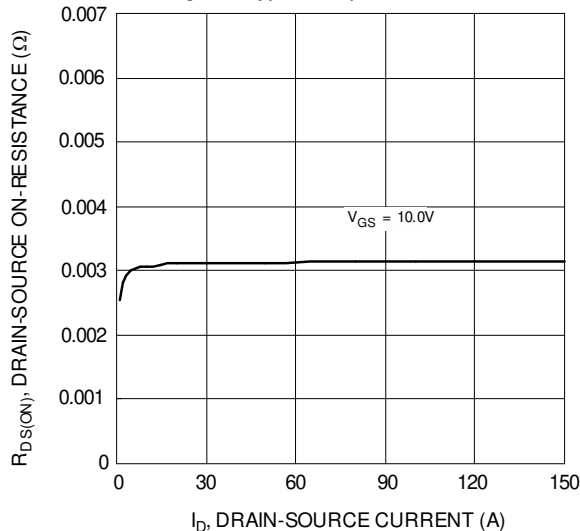


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

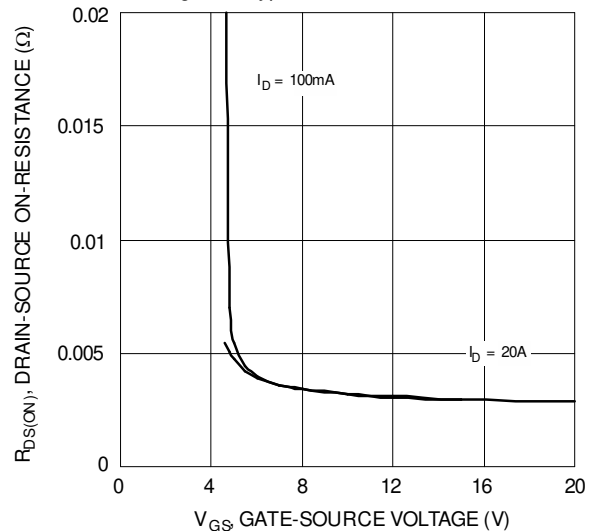


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

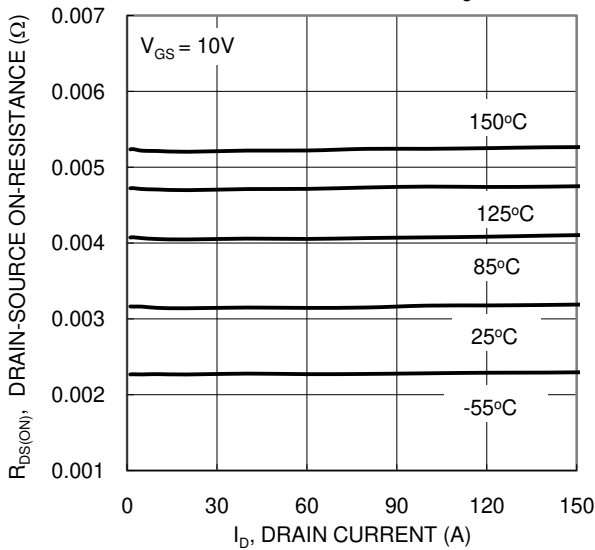


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

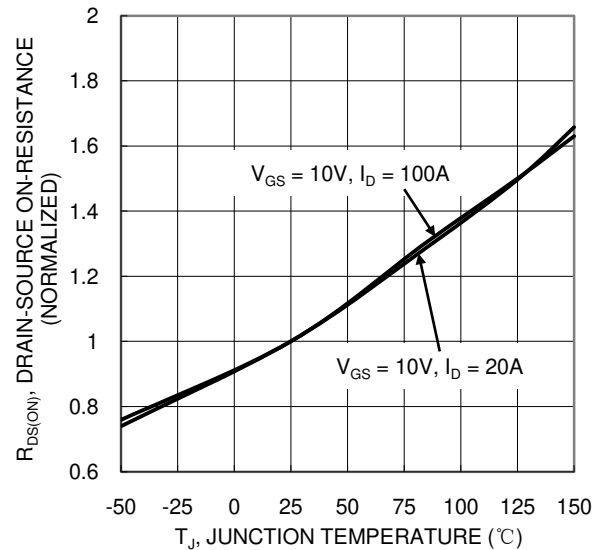


Figure 6 On-Resistance Variation with Temperature

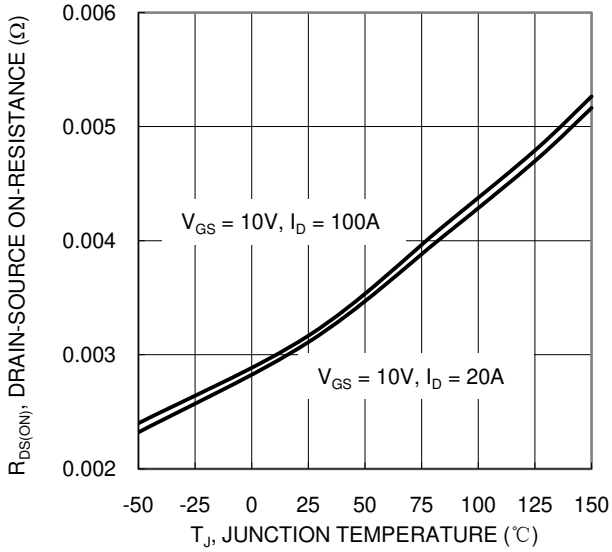


Figure 7 On-Resistance Variation with Temperature

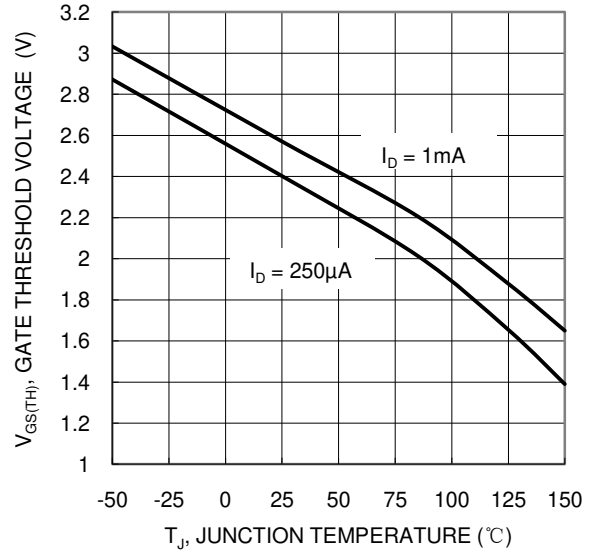


Figure 8 Gate Threshold Variation vs. Temperature

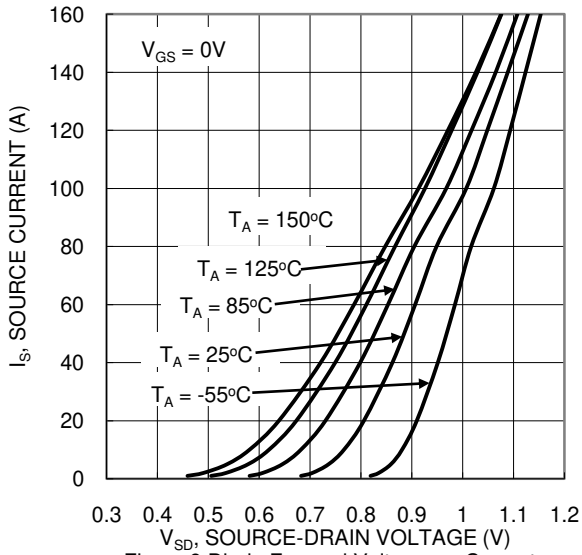


Figure 9 Diode Forward Voltage vs. Current

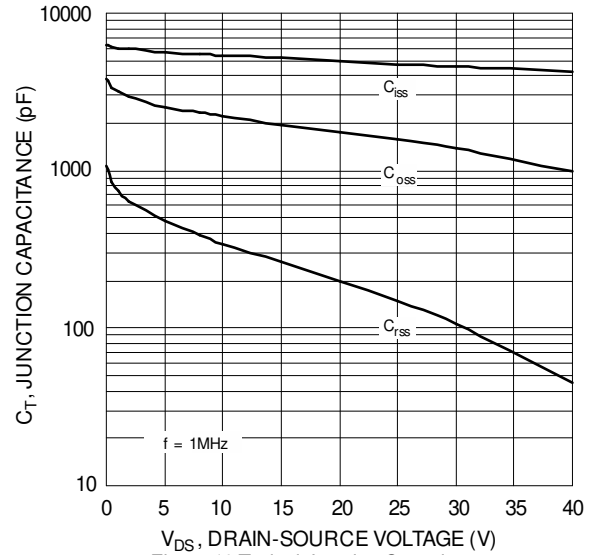


Figure 10 Typical Junction Capacitance

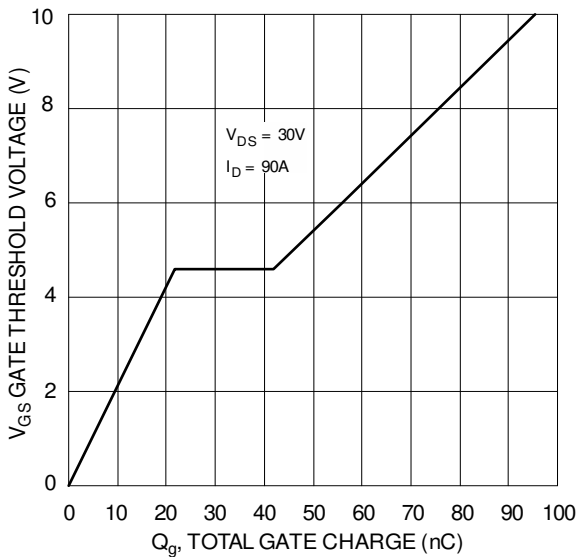


Figure 11 Gate Charge

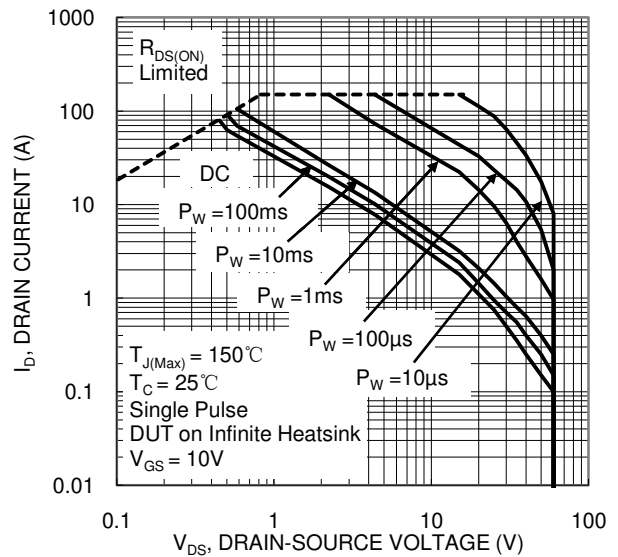
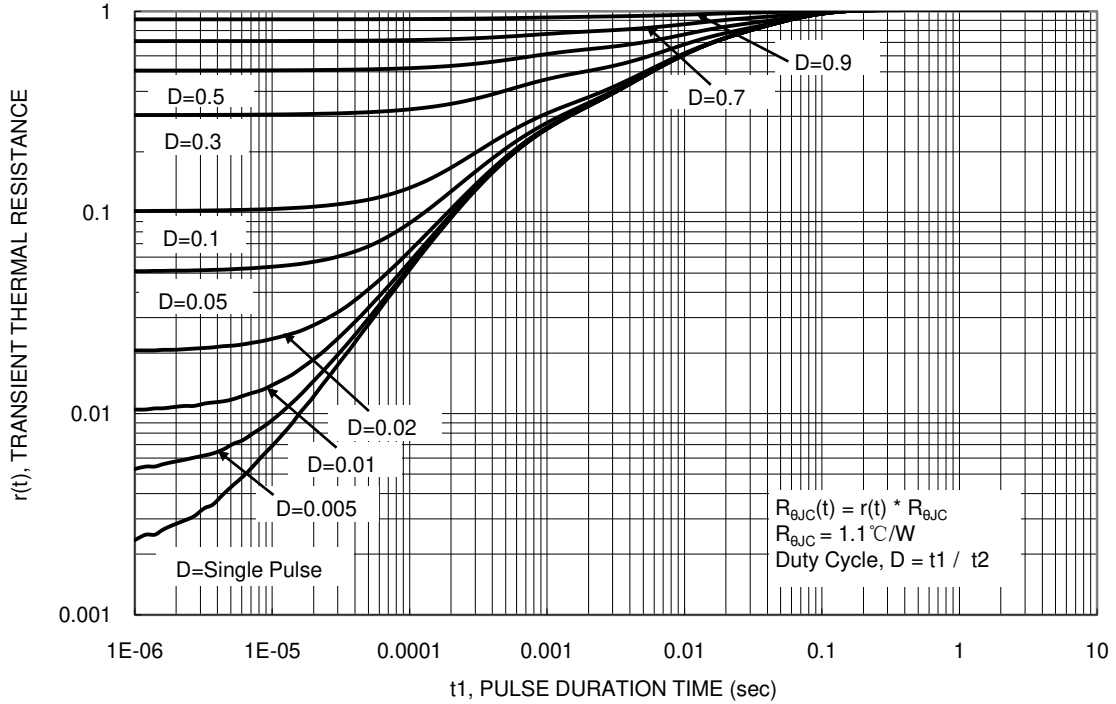


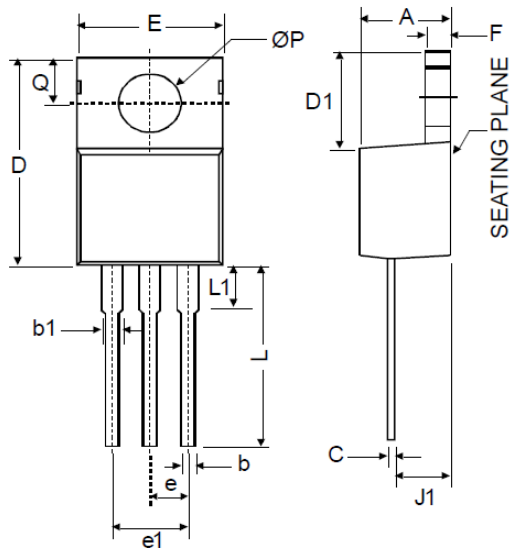
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

TO220-3



| TO220-3                     |       |       |
|-----------------------------|-------|-------|
| Dim                         | Min   | Max   |
| A                           | 3.55  | 4.85  |
| b                           | 0.51  | 1.14  |
| b1                          | 1.14  | 1.78  |
| C                           | 0.31  | 1.14  |
| D                           | 14.20 | 16.50 |
| D1                          | 5.84  | 6.86  |
| E                           | 9.70  | 10.70 |
| e                           | 2.79  | 2.99  |
| e1                          | 4.83  | 5.33  |
| F                           | 0.51  | 1.40  |
| J1                          | 2.03  | 2.92  |
| L                           | 12.72 | 14.72 |
| L1                          | 3.66  | 6.35  |
| P                           | 3.53  | 4.09  |
| Q                           | 2.54  | 3.43  |
| <b>All Dimensions in mm</b> |       |       |

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