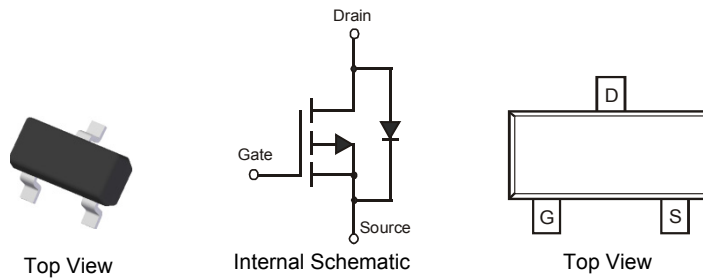


## Features

- Low On-Resistance
  - 60mΩ @  $V_{GS} = -4.5V$
  - 90mΩ @  $V_{GS} = -2.5V$
  - 113mΩ @  $V_{GS} = -1.8V$
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 Standards for High Reliability**
- PPAP Capable (Note 4)**

## Mechanical Data

- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish — Matte Tin annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 **(e3)**
- Terminals Connections: See Diagram Below
- Weight: 0.008 grams (approximate)

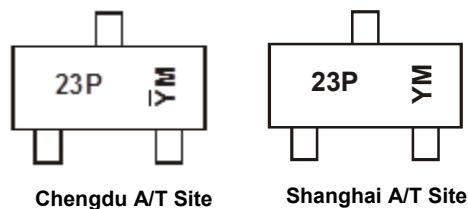


## Ordering Information (Note 4&5)

| Part Number | Qualification | Case  | Packaging        |
|-------------|---------------|-------|------------------|
| DMP2305U-7  | Standard      | SOT23 | 3000/Tape & Reel |
| DMP2305UQ-7 | Automotive    | SOT23 | 3000/Tape & Reel |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  - 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.
  - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to [http://www.diodes.com/quality/product\\_grade\\_definitions/](http://www.diodes.com/quality/product_grade_definitions/)
  - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

## Marking Information



23P = Product Type Marking Code  
 YM = Date Code Marking for SAT (Shanghai Assembly/ Test site)  
 YM = Date Code Marking for CAT (Chengdu Assembly/ Test site)  
 Y or Y = Year (ex: A = 2013)  
 M = Month (ex: 9 = September)

### Date Code Key

| Year | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|------|------|------|------|------|------|------|------|
| Code | W    | X    | Y    | Z    | A    | B    | C    |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code  | 1   | 2   | 3   | 4   | 5   | 6   | 7   | 8   | 9   | O   | N   | D   |

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

| Characteristic                    |              |                        | Symbol           | Value | Units |
|-----------------------------------|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage              |              |                        | V <sub>DSS</sub> | -20   | V     |
| Gate-Source Voltage               |              |                        | V <sub>GSS</sub> | ±8    | V     |
| Continuous Drain Current (Note 6) | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | -4.2  | A     |
|                                   |              | T <sub>A</sub> = +70°C |                  | -3.4  |       |
| Pulsed Drain Current (Note 7)     |              |                        | I <sub>DM</sub>  | -10   | A     |

**Thermal Characteristics**

| Characteristic                                                 | Symbol                            | Value       | Unit |
|----------------------------------------------------------------|-----------------------------------|-------------|------|
| Power Dissipation (Note 6)                                     | P <sub>D</sub>                    | 1.4         | W    |
| Thermal Resistance, Junction to Ambient @T <sub>A</sub> = 25°C | R <sub>θJA</sub>                  | 90          | °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 8)</b>                    |                     |      |      |      |      |                                                                                                                   |
| Drain-Source Breakdown Voltage                         | BV <sub>DSS</sub>   | -20  | —    | —    | 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> = -20V, V <sub>GS</sub> = 0V                                                                      |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —    | —    | ±100 | nA   | V <sub>GS</sub> = ±8V, V <sub>DS</sub> = 0V                                                                       |
| <b>ON CHARACTERISTICS (Note 8)</b>                     |                     |      |      |      |      |                                                                                                                   |
| Gate Threshold Voltage                                 | V <sub>GS(th)</sub> | -0.5 | -    | -0.9 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                                       |
| Static Drain-Source On-Resistance                      | R <sub>DS(on)</sub> | —    | 45   | 60   | mΩ   | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4.2A                                                                   |
|                                                        |                     |      | 60   | 90   |      | V <sub>GS</sub> = -2.5V, I <sub>D</sub> = -3.4A                                                                   |
|                                                        |                     |      | 87   | 113  |      | V <sub>GS</sub> = -1.8V, I <sub>D</sub> = -2.0A                                                                   |
| Forward Transfer Admittance                            | Y <sub>fs</sub>     | —    | 9    | —    | S    | V <sub>DS</sub> = -5V, I <sub>D</sub> = -4A                                                                       |
| <b>DYNAMIC CHARACTERISTICS (Note 9)</b>                |                     |      |      |      |      |                                                                                                                   |
| Input Capacitance                                      | C <sub>iss</sub>    | —    | 727  | —    | pF   | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                                        |
| Output Capacitance                                     | C <sub>oss</sub>    | —    | 69   | —    | pF   |                                                                                                                   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —    | 64   | —    | pF   |                                                                                                                   |
| Gate Resistance                                        | R <sub>G</sub>      | —    | 23   | —    | Ω    | V <sub>GS</sub> = 0V, V <sub>DS</sub> = 0V, f = 1.0MHz                                                            |
| <b>SWITCHING CHARACTERISTICS</b>                       |                     |      |      |      |      |                                                                                                                   |
| Total Gate Charge                                      | Q <sub>g</sub>      | —    | 7.6  | —    | nC   | V <sub>GS</sub> = -4.5V, V <sub>DS</sub> = -4V, I <sub>D</sub> = -3.5A                                            |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —    | 1.4  | —    | nC   |                                                                                                                   |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —    | 1.2  | —    | nC   |                                                                                                                   |
| Turn-On Delay Time                                     | t <sub>D(on)</sub>  | —    | 14.0 | —    | ns   | V <sub>DS</sub> = -4V, V <sub>GS</sub> = -4.5V,<br>R <sub>L</sub> = 4Ω, R <sub>G</sub> = 6Ω, I <sub>D</sub> = -1A |
| Turn-On Rise Time                                      | t <sub>r</sub>      | —    | 13.0 | —    | ns   |                                                                                                                   |
| Turn-Off Delay Time                                    | t <sub>D(off)</sub> | —    | 53.8 | —    | ns   |                                                                                                                   |
| Turn-Off Fall Time                                     | t <sub>f</sub>      | —    | 23.2 | —    | ns   |                                                                                                                   |

- Notes:
6. Device mounted on FR-4 PCB with 2oz. Copper and test pulse width t ≤ 10s.
  7. Repetitive rating, pulse width limited by junction temperature.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to production testing.

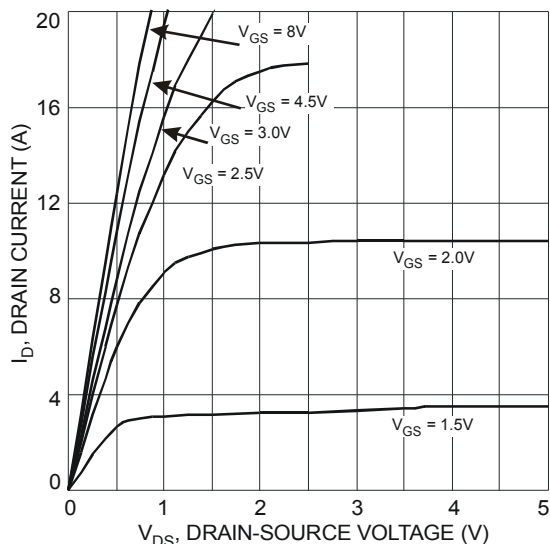


Fig. 1 Typical Output Characteristic

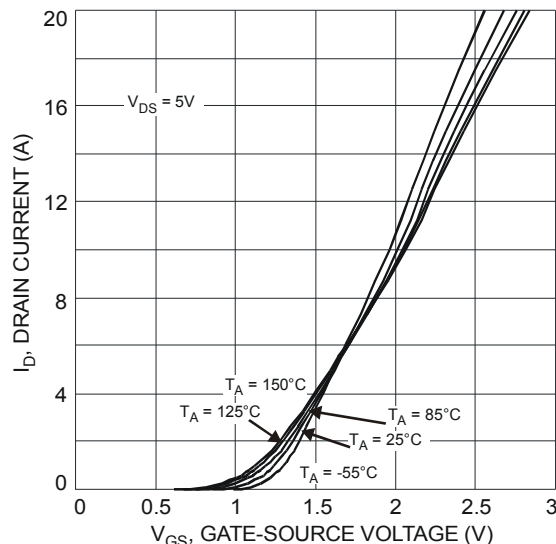


Fig. 2 Typical Transfer Characteristic

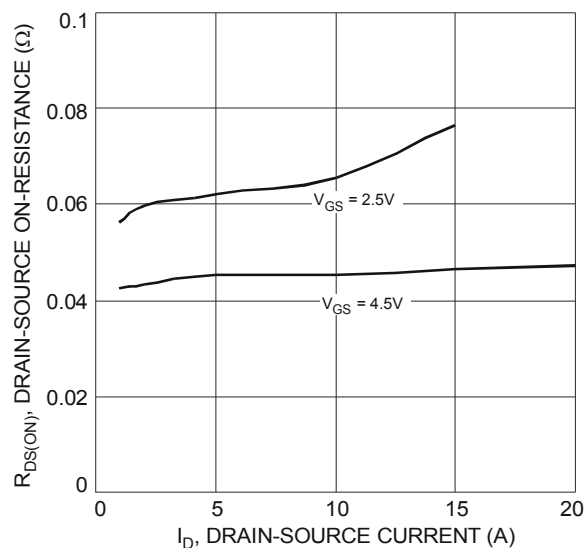


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

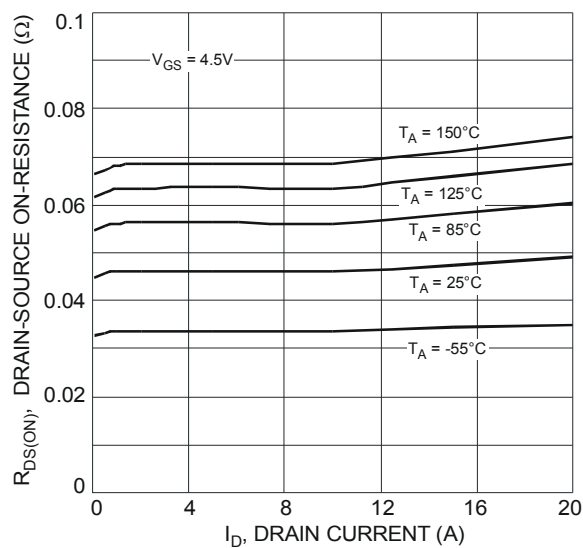


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

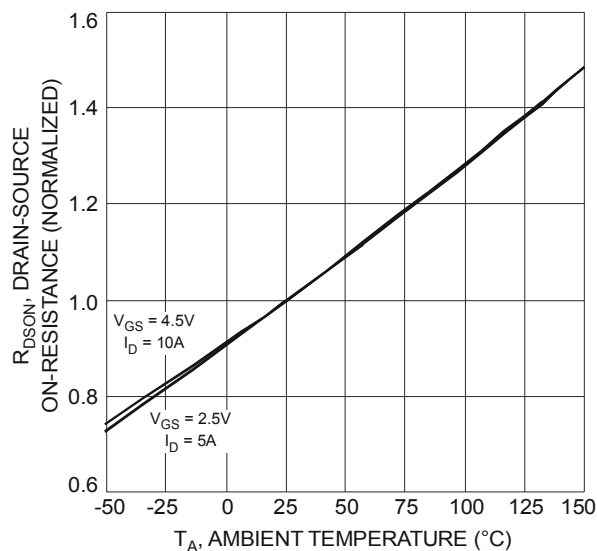


Fig. 5 On-Resistance Variation with Temperature

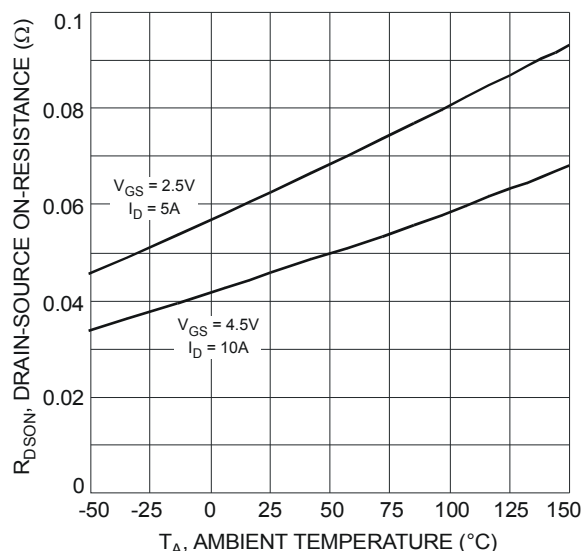


Fig. 6 On-Resistance Variation with Temperature

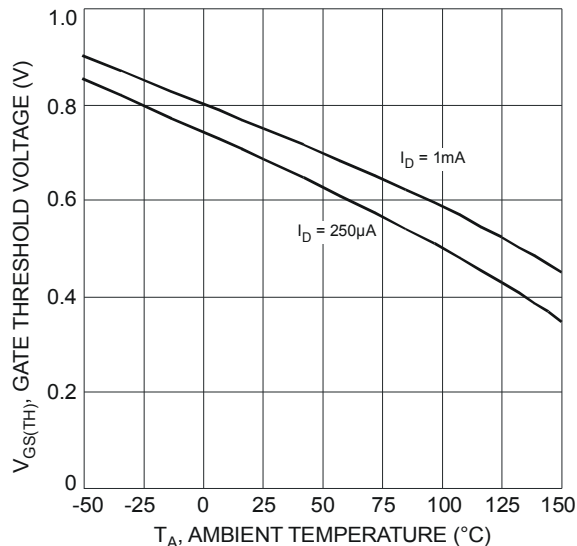


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

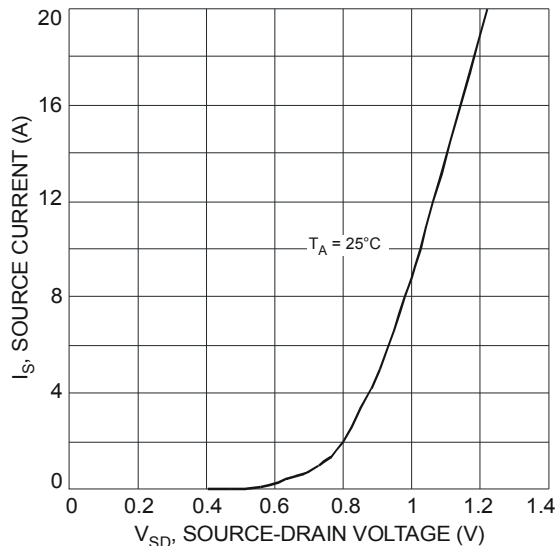


Fig. 8 Diode Forward Voltage vs. Current

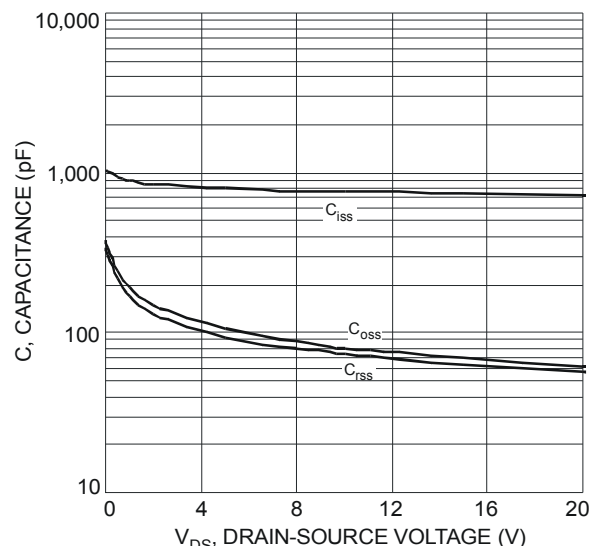


Fig. 9 Typical Total Capacitance

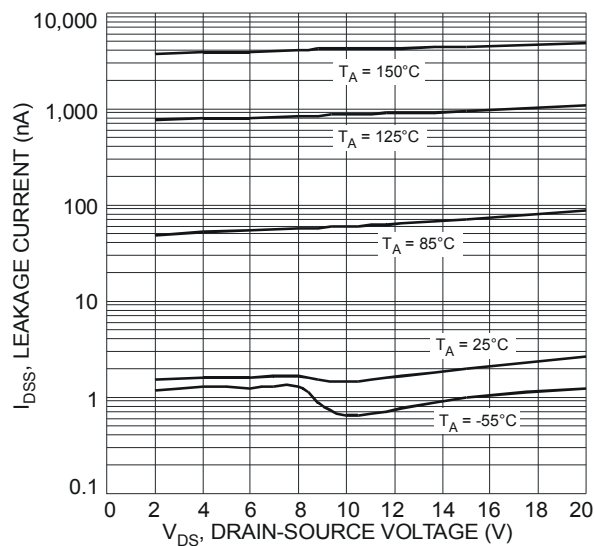


Fig. 10 Typical Leakage Current vs. Drain-Source Voltage

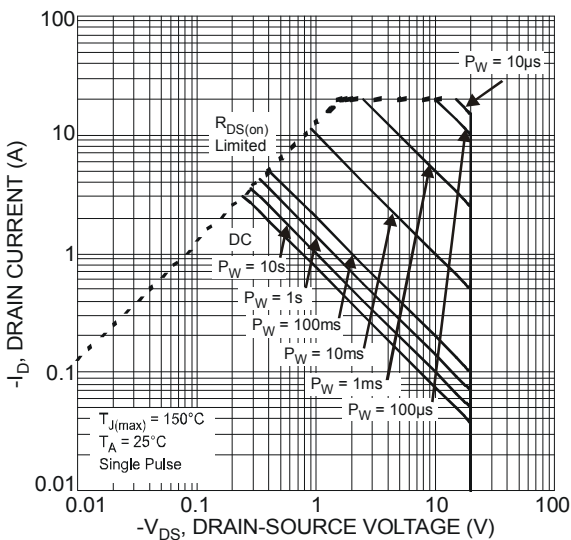
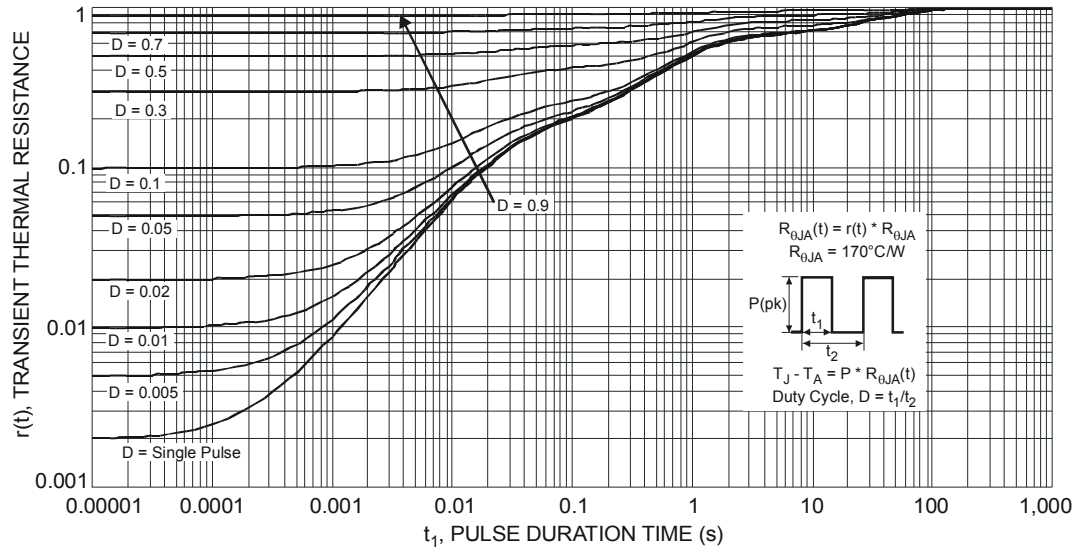
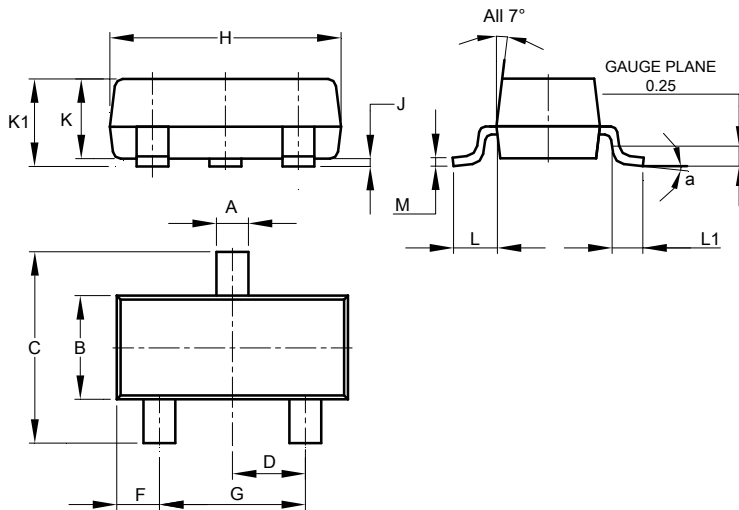


Fig. 11 SOA, Safe Operation Area



## Package Outline Dimensions

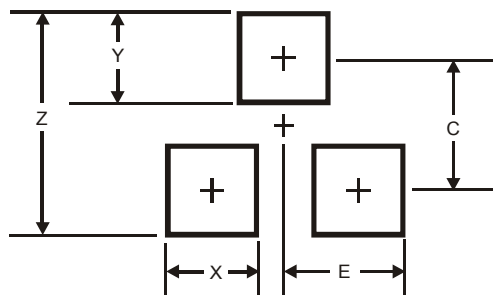
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 |
| α                    | 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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