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**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**

**Product Summary**

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ max}$      | $I_D \text{ max}$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|--|
| 30V           | 0.4Ω @ $V_{GS} = 10\text{V}$  | 0.65A  |
|               | 0.7Ω @ $V_{GS} = 4.5\text{V}$ | 0.52A  |

**Description**

This MOSFET is designed to minimize the on-state resistance ( $R_{DS(ON)}$ ) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

**Applications**

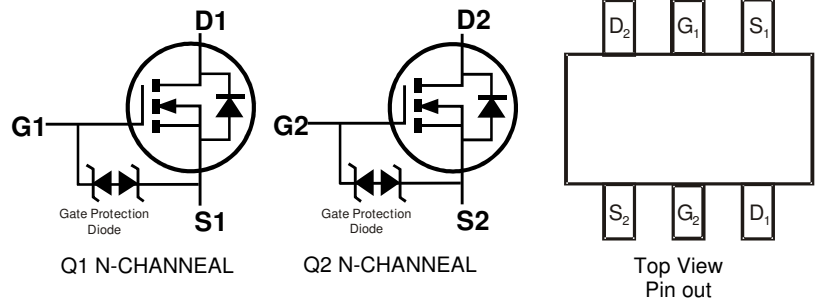
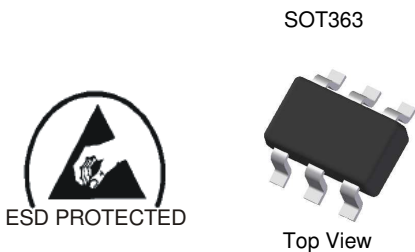
- Motor Control
- Power Management Functions
- DC-DC Converters
- Backlighting

**Features and Benefits**

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- ESD Protected Gate
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

**Mechanical Data**

- Case: SOT363
- Case Material: Molded Plastic, "Green" Molding Compound.  
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Alloy42 Leadframe.  
Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.006 grams (Approximate)

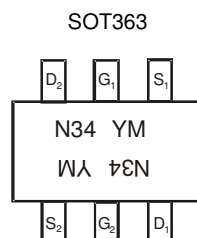


**Ordering Information** (Note 4)

| Part Number   | Case   | Packaging           |
|---------------|--------|---------------------|
| DMN32D4SDW-7  | SOT363 | 3,000K/Tape & Reel  |
| DMN32D4SDW-13 | SOT363 | 10,000K/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
  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**



N34 = Product Type Marking Code  
YM = Date Code Marking  
Y or Y = Year (ex: B = 2014)  
M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
|------|------|------|------|------|------|------|------|
| Code | B    | C    | D    | E    | F    | G    | H    |

| 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> | 30           | V     |
| Gate-Source Voltage                                     |              |  | V <sub>GSS</sub> | ±20          | V     |
| Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = 25°C<br>T <sub>A</sub> = 70°C | I <sub>D</sub>   | 0.65<br>0.50 | A     |
| Maximum Continuous Body Diode Forward Current (Note 6)  |              |  | I <sub>S</sub>   | 0.4          | A     |
| Pulsed Drain Current (10μs pulse, duty cycle = 1%)      |              |  | I <sub>DM</sub>  | 4            | A     |

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

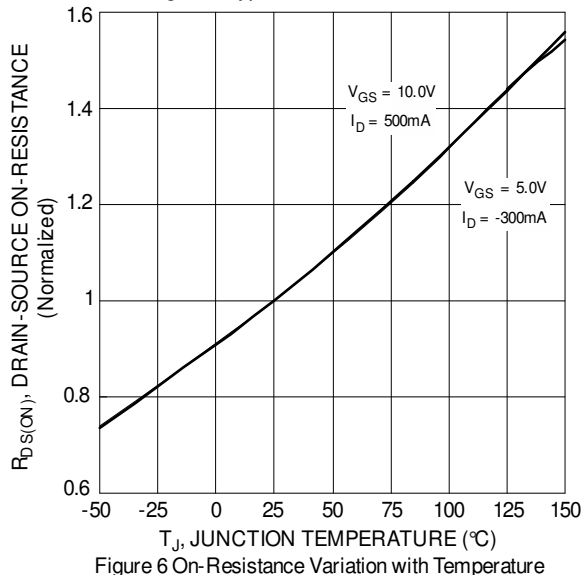
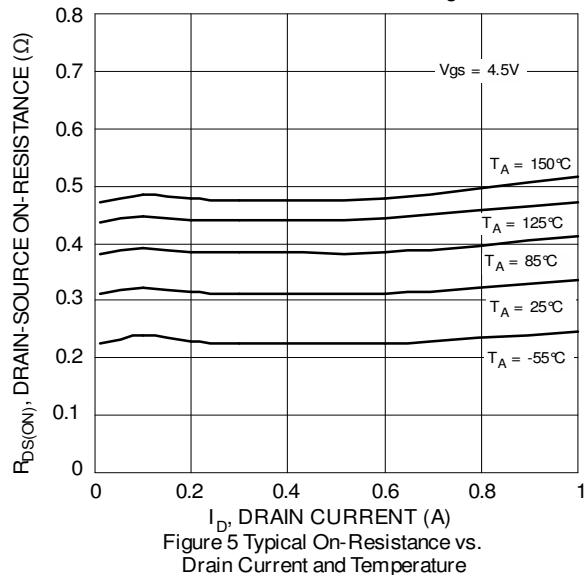
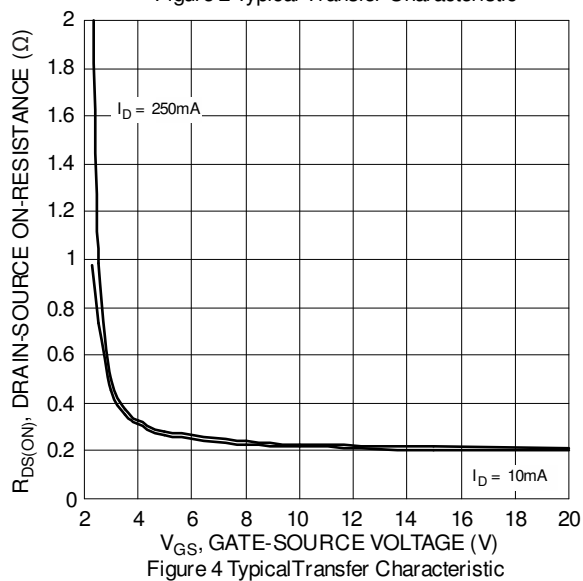
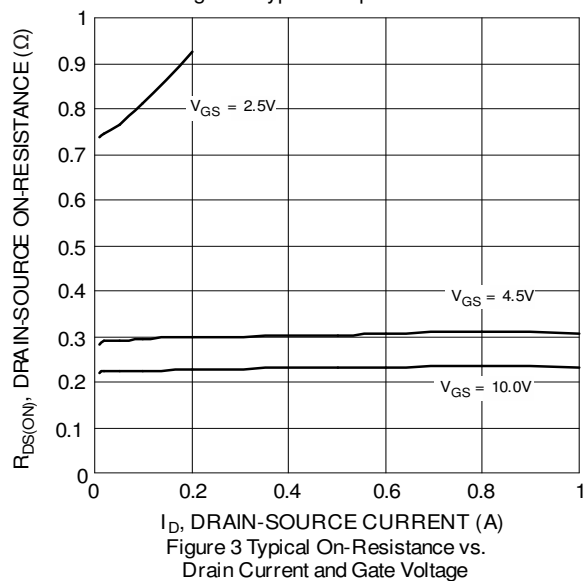
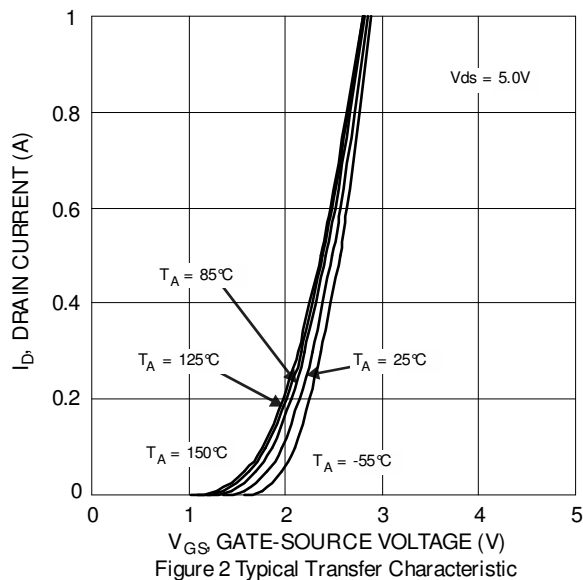
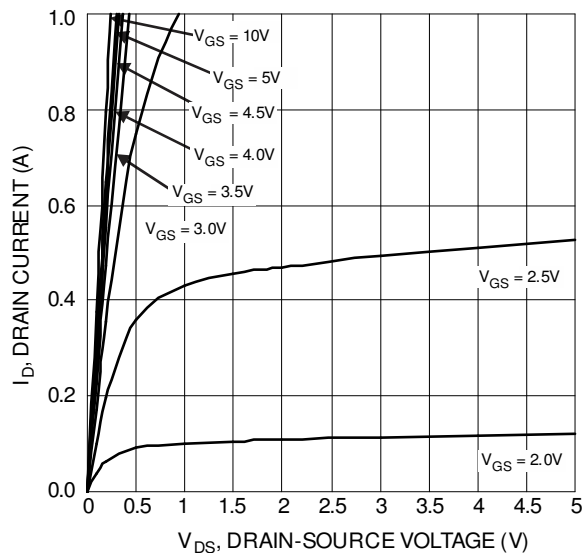
| Characteristic                                   |              | Symbol                            | Value      | Units |
|--|--------------|-----------------------------------|------------|-------|
| Total Power Dissipation (Note 5)                 |              | P <sub>D</sub>                    | 0.29       | W     |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | R <sub>θJA</sub>                  | 420        | °C/W  |
| Total Power Dissipation (Note 6)                 |              | P <sub>D</sub>                    | 0.35       | W     |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | R <sub>θJA</sub>                  | 360        | °C/W  |
| Thermal Resistance, Junction to Case             |              | R <sub>θJC</sub>                  | 128        | °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            | I <sub>DSS</sub>    | -   | -    | 1   | μA   | V <sub>DS</sub> = 30V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | -   | -    | ±10 | μA   | 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> | -   | 0.2  | 0.4 | Ω    | V <sub>GS</sub> = 10V, I <sub>D</sub> = 0.25A   |
|  |                     | -   | 0.3  | 0.7 |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 0.25A  |
|  |                     | -   | 0.4  | 1.0 |      | V <sub>GS</sub> = 4.0V, I <sub>D</sub> = 0.25A  |
|  |                     | -   | 0.9  | -   |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 0.01A  |
|  |                     | -   | -    | -   |      | V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.23A  |
| Diode Forward Voltage                      | V <sub>SD</sub>     | -   | 0.8  | 1.2 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 0.23A  |
| <b>DYNAMIC CHARACTERISTICS (Note 8)</b>    |                     |     |      |     |      |   |
| Input Capacitance                          | C <sub>iss</sub>    | -   | 50   | -   | pF   | V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V,<br>f = 1.0MHz                                    |
| Output Capacitance                         | C <sub>oss</sub>    | -   | 10   | -   | pF   |   |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | -   | 6.8  | -   | pF   |   |
| Gate Resistance                            | R <sub>g</sub>      | -   | 114  | -   | Ω    | V <sub>DS</sub> = V <sub>GS</sub> = 0V, f = 1.0MHz  |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | -   | 0.6  | -   | nC   | V <sub>DS</sub> = 10V,<br>I <sub>D</sub> = 250mA  |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | -   | 1.3  | -   | nC   |   |
| Gate-Source Charge                         | Q <sub>gs</sub>     | -   | 0.2  | -   | nC   |   |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | -   | 0.1  | -   | nC   |   |
| Turn-On Delay Time                         | t <sub>D(on)</sub>  | -   | 2.8  | -   | ns   | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 30V,<br>I <sub>D</sub> = 100mA, R <sub>G</sub> = 10Ω |
| Turn-On Rise Time                          | t <sub>r</sub>      | -   | 3.2  | -   | ns   |   |
| Turn-Off Delay Time                        | t <sub>D(off)</sub> | -   | 26.3 | -   | ns   |   |
| Turn-Off Fall Time                         | t <sub>f</sub>      | -   | 22.8 | -   | ns   |   |

- Notes:
5. Device mounted on FR-4 PCB, with minimum recommended pad layout.
  6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2oz. Copper, single sided.
  7. Short duration pulse test used to minimize self-heating effect.
  8. Guaranteed by design. Not subject to product testing.





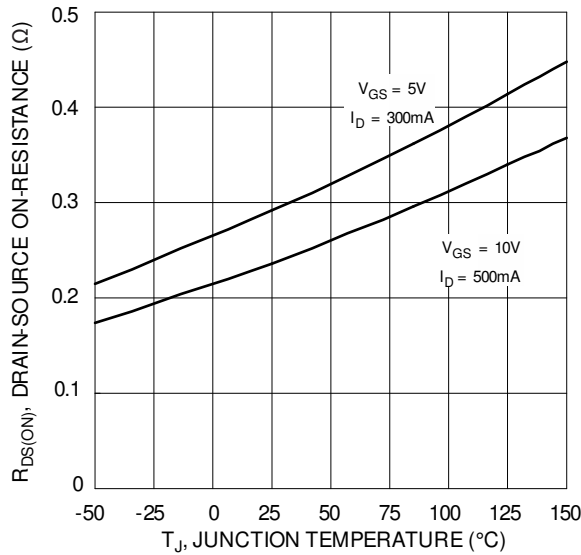


Figure 7 On-Resistance Variation with Temperature

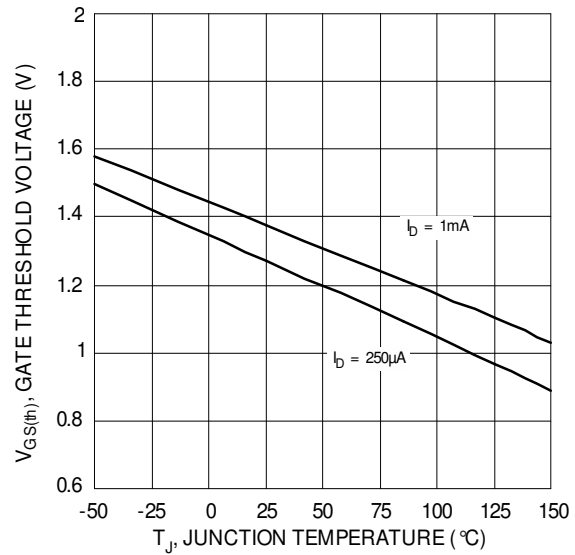


Figure 8 Gate Threshold Variation vs. Ambient Temperature

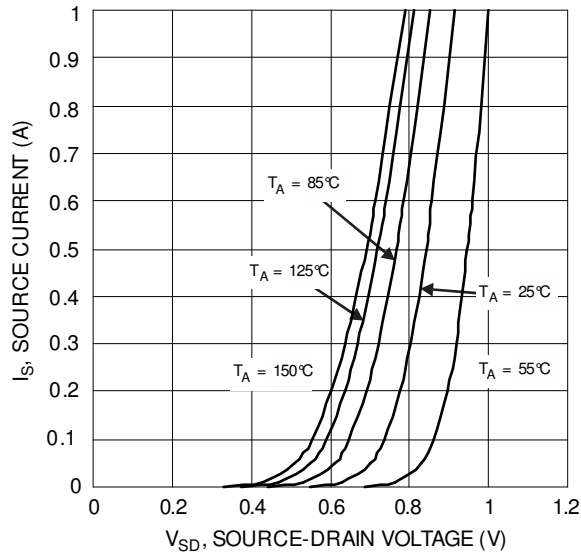


Figure 9 Diode Forward Voltage vs. Current

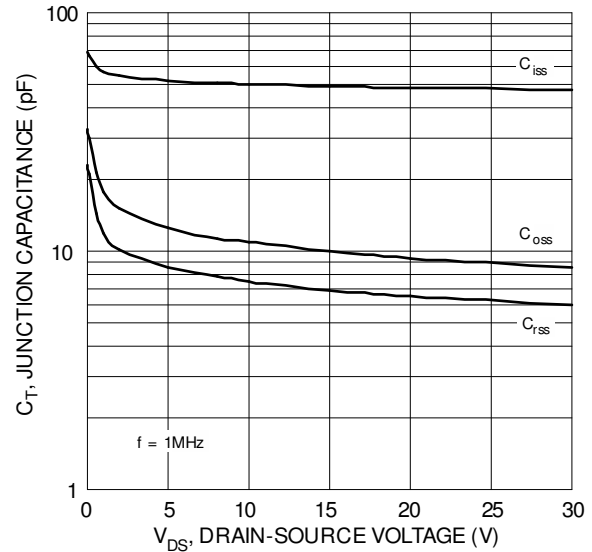


Figure 10 Typical Junction Capacitance

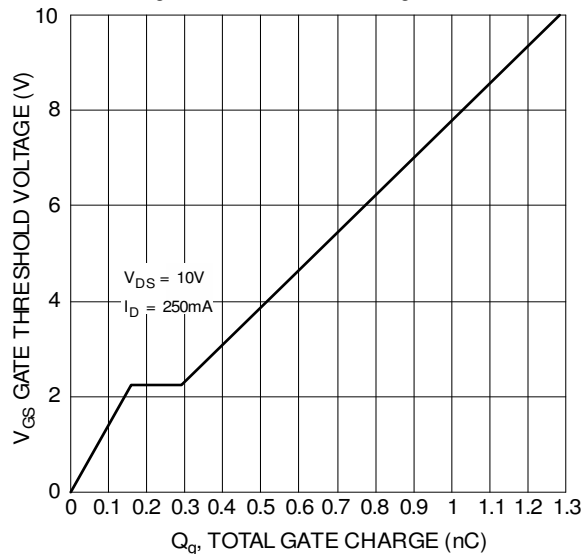


Figure 11 Gate Charge

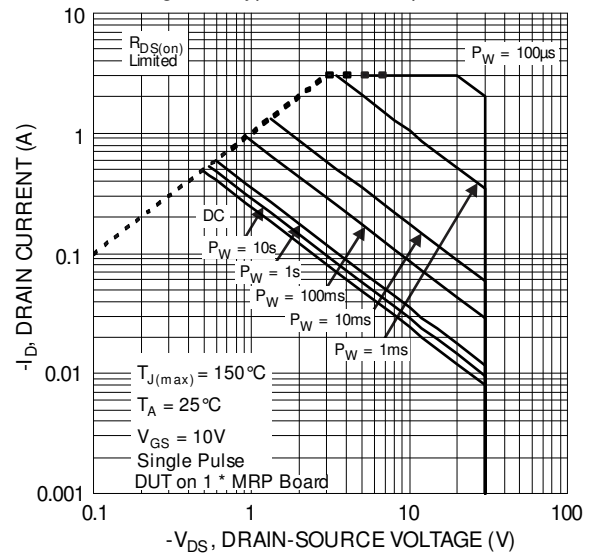
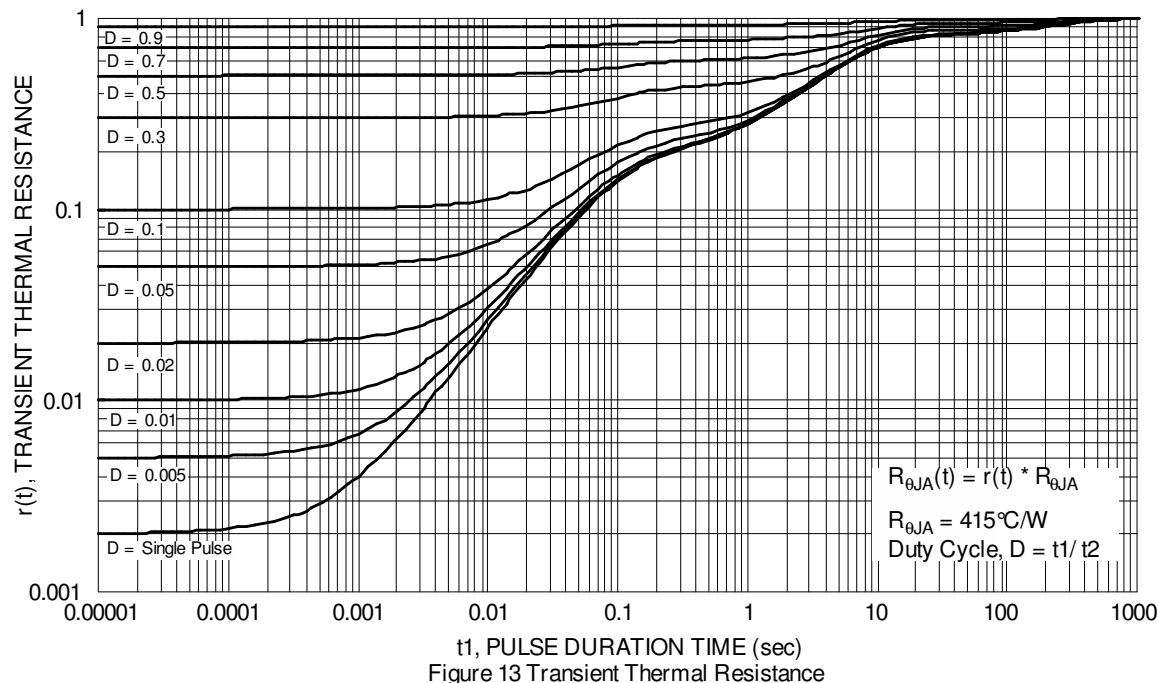
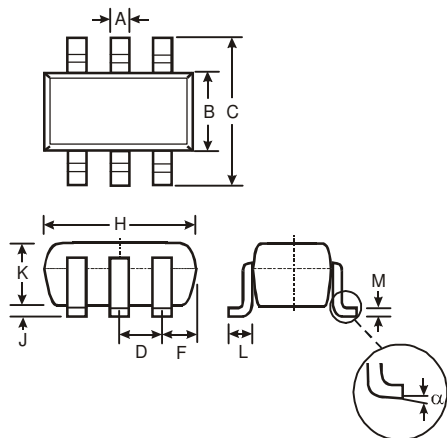


Figure 12 SOA, Safe Operation Area



## Package Outline Dimensions

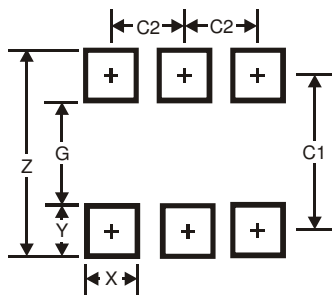
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| SOT363               |          |      |       |
|----------------------|----------|------|-------|
| Dim                  | Min      | Max  | Typ   |
| A                    | 0.10     | 0.30 | 0.25  |
| B                    | 1.15     | 1.35 | 1.30  |
| C                    | 2.00     | 2.20 | 2.10  |
| D                    | 0.65 Typ |      |       |
| F                    | 0.40     | 0.45 | 0.425 |
| H                    | 1.80     | 2.20 | 2.15  |
| J                    | 0        | 0.10 | 0.05  |
| K                    | 0.90     | 1.00 | 1.00  |
| L                    | 0.25     | 0.40 | 0.30  |
| M                    | 0.10     | 0.22 | 0.11  |
| α                    | 0°       | 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          | 2.5           |
| G          | 1.3           |
| X          | 0.42          |
| Y          | 0.6           |
| C1         | 1.9           |
| C2         | 0.65          |

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