

**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**
**Product Summary**

| BV <sub>DSS</sub> | R <sub>DS(ON)</sub> Max       | I <sub>D</sub> Max<br>T <sub>A</sub> = +25°C |
|-------------------|-------------------------------|--|
| 20V               | 0.48Ω @ V <sub>GS</sub> = 5V  | 1.33A  |
|                   | 0.7Ω @ V <sub>GS</sub> = 2.5V | 1.2A   |

**Description**

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

**Applications**

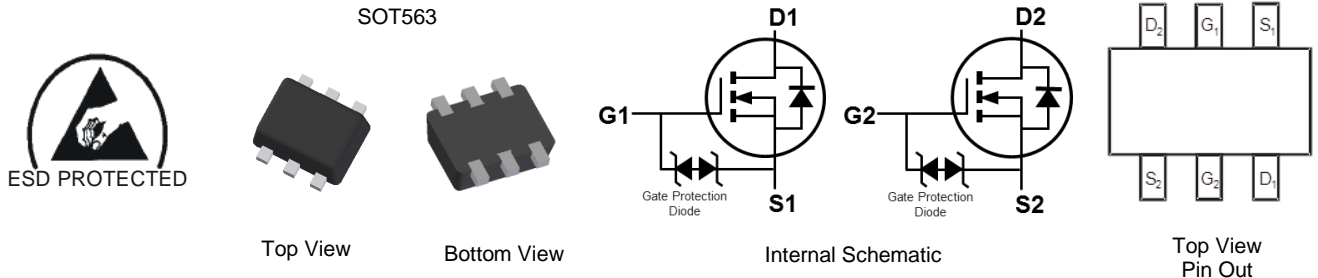
- Power Management Functions
- Battery Operated Systems and Solid-State Relays
- Load Switch

**Features and Benefits**

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q101, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative.**
- <https://www.diodes.com/quality/product-definitions/>

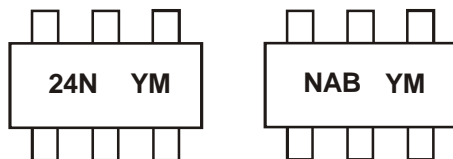
**Mechanical Data**

- Case: SOT563
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.003 grams (Approximate)


**Ordering Information (Note 4)**

| Part Number  | Case   | Packaging          |
|--------------|--------|--------------------|
| DMN2400UV-7  | SOT563 | 3,000/Tape & Reel  |
| DMN2400UV-13 | SOT563 | 10,000/Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

**Marking Information**


24N and NAB = Marking Code  
 YM = Date Code Marking  
 Y = Year (ex: G = 2019)  
 M = Month (ex: 9 = September)

**Date Code Key**

| Year | 2009 | ~ | 2019 | 2020 | 2021 | 2022 | 2023 |
|------|------|---|------|------|------|------|------|
| Code | W    | ~ | G    | H    | I    | J    | K    |

| 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 | Unit |
|-----------------------------------|--------------|------------------------|------------------|-------|------|
| Drain-Source Voltage              |              |                        | V <sub>DSS</sub> | 20    | V    |
| Gate-Source Voltage               |              |                        | V <sub>GSS</sub> | ±12   | V    |
| Continuous Drain Current (Note 5) | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 1.33  | A    |
|                                   |              | T <sub>A</sub> = +85°C |                  | 0.84  |      |
| Pulsed Drain Current              |              |                        | I <sub>DM</sub>  | 3     | A    |

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

| Characteristic                          | Symbol                            | Value       | Unit |
|---|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 5)        | P <sub>D</sub>                    | 530         | mW   |
| Thermal Resistance, Junction to Ambient | R <sub>θJA</sub>                  | 233.8       | °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 6)</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>    | —   | —     | 100  | nA   | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V   |
| Gate-Source Leakage                                    | I <sub>GSS</sub>    | —   | —     | ±1.0 | μA   | V <sub>GS</sub> = ±4.5V, V <sub>DS</sub> = 0V   |
|  |                     | —   | —     | ±50  |      | V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V  |
| <b>ON CHARACTERISTICS (Note 6)</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> | —   | 0.3   | 0.48 | Ω    | V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 200mA  |
|  |                     | —   | 0.35  | 0.5  |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 600mA  |
|  |                     | —   | 0.45  | 0.7  |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 500mA  |
|  |                     | —   | 0.55  | 0.9  |      | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 350mA  |
|  |                     | —   | 0.65  | 1.5  |      | V <sub>GS</sub> = 1.5V, I <sub>D</sub> = 50mA   |
| Forward Transfer Admittance                            | Y <sub>fs</sub>     | —   | 1.4   | —    | S    | V <sub>DS</sub> = 10V, I <sub>D</sub> = 400mA   |
| Diode Forward Voltage (Note 6)                         | V <sub>SD</sub>     | —   | 0.7   | 1.2  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 150mA, f = 1.0MHz  |
| <b>DYNAMIC CHARACTERISTICS (Note 7)</b>                |                     |     |       |      |      |   |
| Input Capacitance                                      | C <sub>iss</sub>    | —   | 36.0  | —    | pF   | V <sub>DS</sub> = 16V, V <sub>GS</sub> = 0V, f = 1.0MHz   |
| Output Capacitance                                     | C <sub>oss</sub>    | —   | 5.7   | —    | pF   |   |
| Reverse Transfer Capacitance                           | C <sub>rss</sub>    | —   | 4.2   | —    | pF   |   |
| Gate Resistance  | R <sub>g</sub>      | —   | 68    | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V  |
| Total Gate Charge                                      | Q <sub>g</sub>      | —   | 0.5   | —    | nC   | V <sub>GS</sub> = 4.5V, V <sub>DS</sub> = 10V, I <sub>D</sub> = 250mA   |
| Gate-Source Charge                                     | Q <sub>gs</sub>     | —   | 0.07  | —    | nC   |   |
| Gate-Drain Charge                                      | Q <sub>gd</sub>     | —   | 0.1   | —    | nC   |   |
| Turn-On Delay Time                                     | t <sub>D(ON)</sub>  | —   | 4.06  | —    | ns   | V <sub>DD</sub> = 10V, V <sub>GS</sub> = 4.5V, R <sub>L</sub> = 47Ω, R <sub>G</sub> = 10Ω, I <sub>D</sub> = 200mA |
| Turn-On Rise Time                                      | t <sub>R</sub>      | —   | 7.28  | —    | ns   |   |
| Turn-Off Delay Time                                    | t <sub>D(OFF)</sub> | —   | 13.74 | —    | ns   |   |
| Turn-Off Fall Time                                     | t <sub>F</sub>      | —   | 10.54 | —    | ns   |   |

- Notes:
- Device soldered onto FR-4 PCB, minimum recommended soldering pad dimensions (25.4mm x 25.4mm x 1.6mm, 2oz Cu pad: 0.18mm<sup>2</sup> x 6).
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

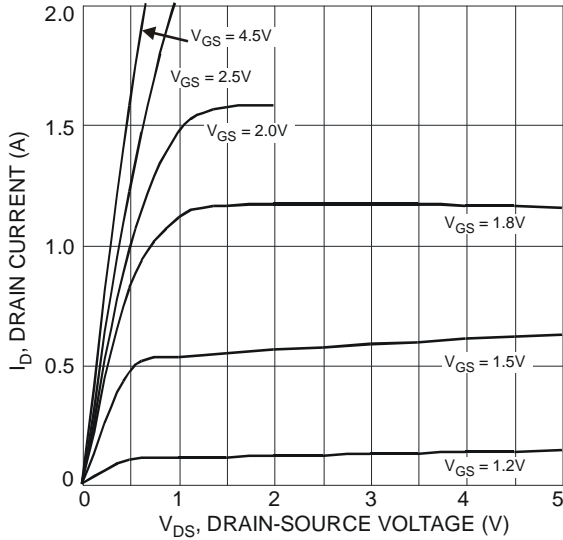


Fig. 1 Typical Output Characteristics

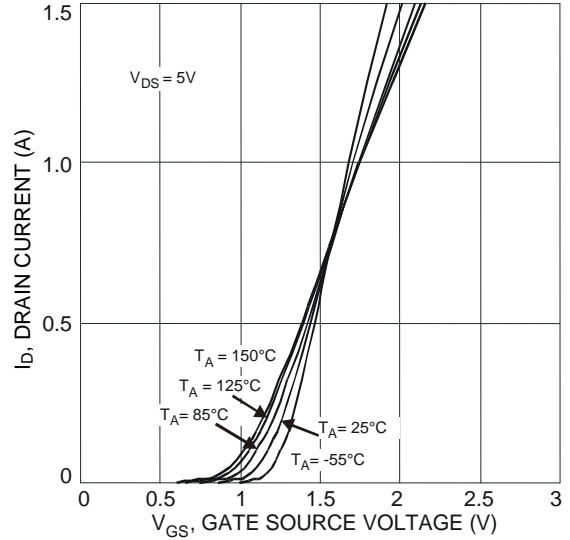


Fig. 2 Typical Transfer Characteristics

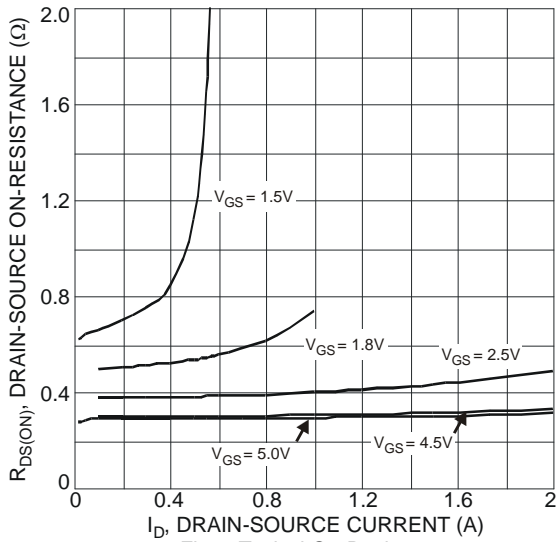


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

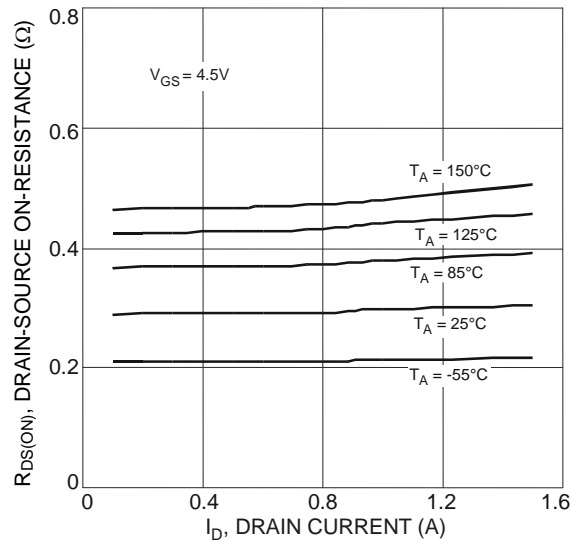


Fig. 4 Typical Drain-Source On-Resistance vs. Drain Current and Temperature

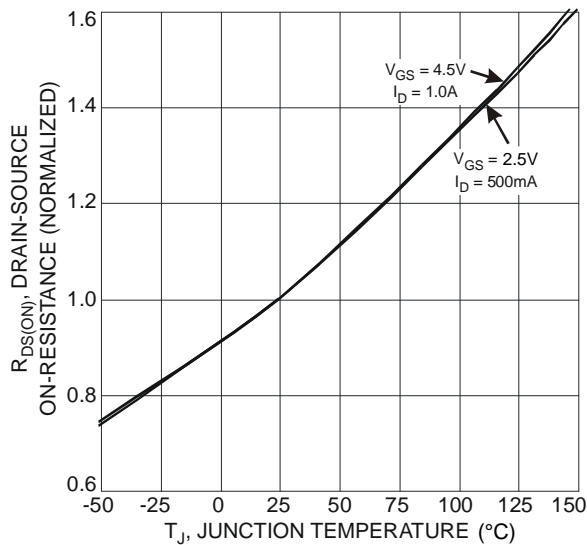


Fig. 5 On-Resistance Variation with Temperature

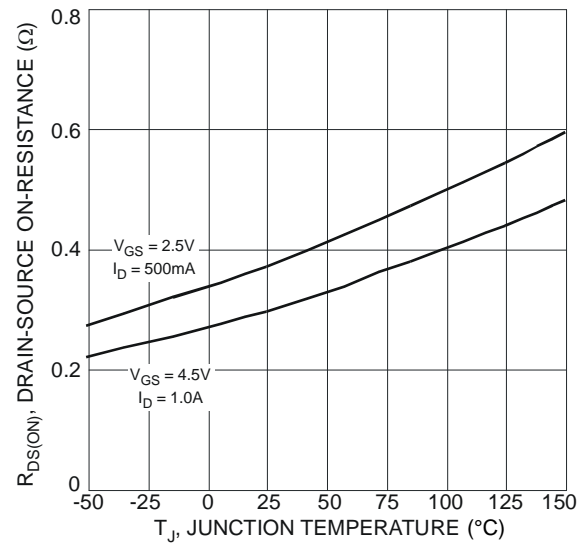


Fig. 6 On-Resistance Variation with Temperature

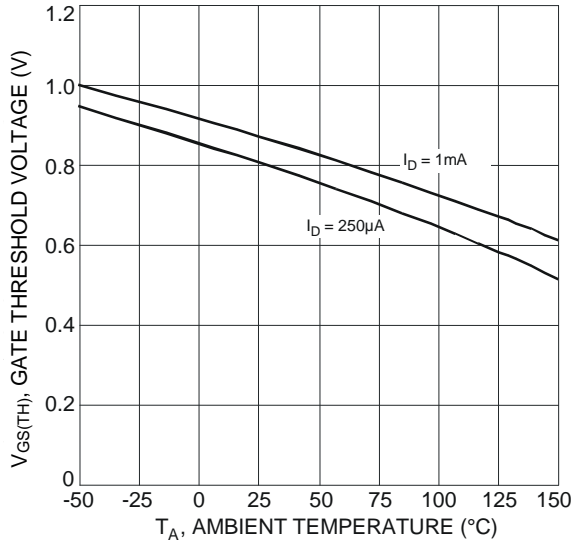


Fig. 7 Gate Threshold Variation vs. Ambient Temperature

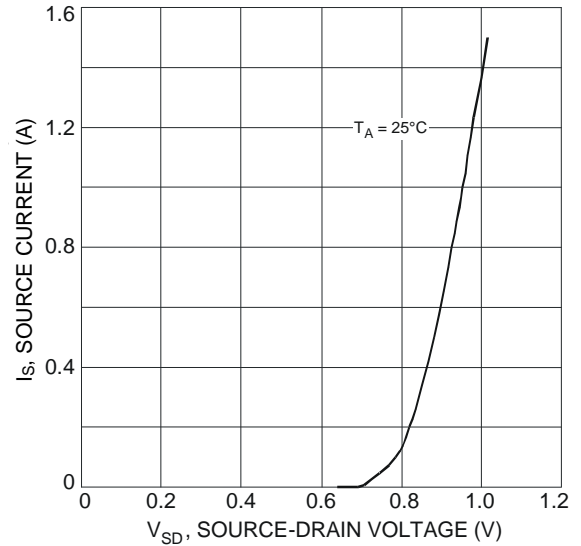


Fig. 8 Diode Forward Voltage vs. Current

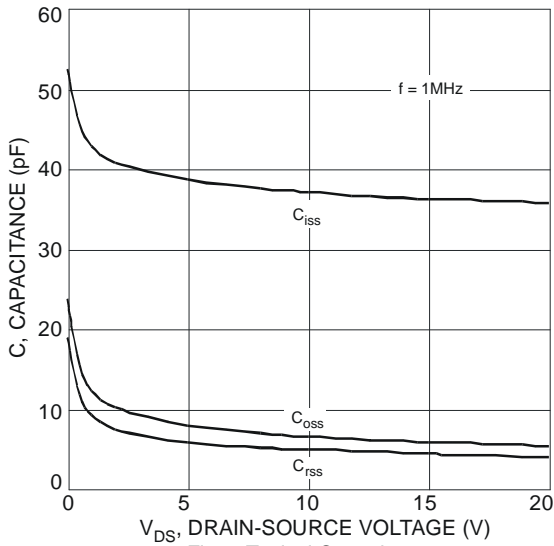


Fig. 9 Typical Capacitance

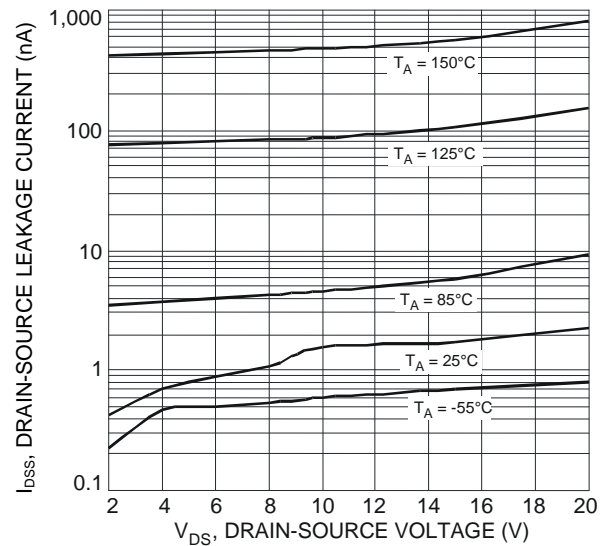


Fig. 10 Typical Drain-Source Leakage Current vs. Drain-Source Voltage

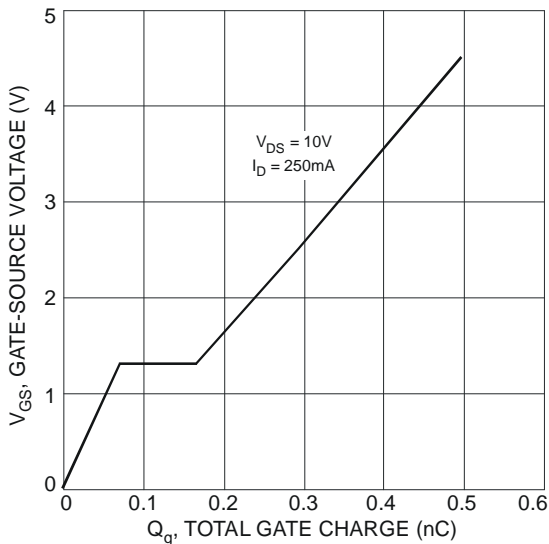


Fig. 11 Gate-Charge Characteristics

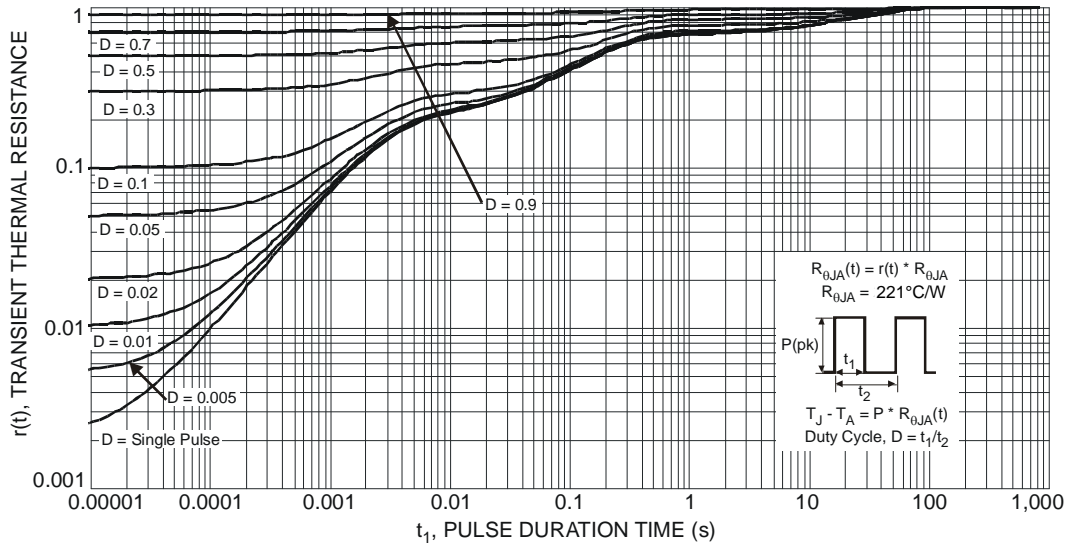
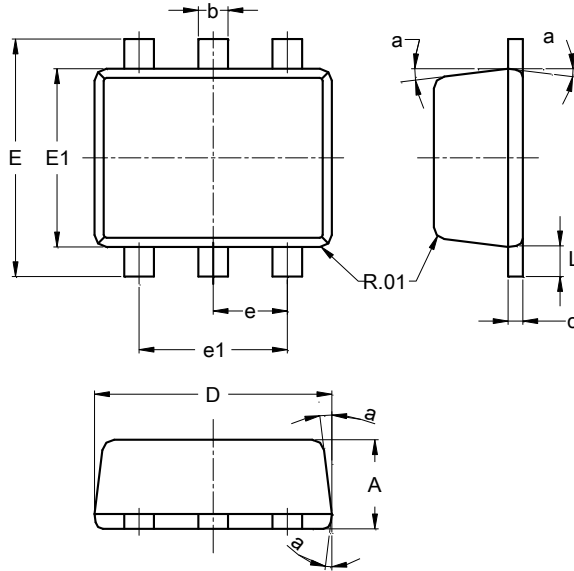


Fig. 12 Transient Thermal Response

**Package Outline Dimensions**

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

**SOT563**

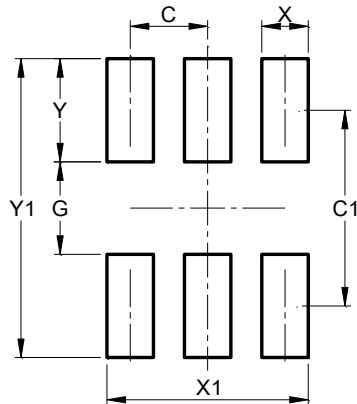


| SOT563               |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.55 | 0.60 | 0.60 |
| b                    | 0.15 | 0.30 | 0.20 |
| c                    | 0.10 | 0.18 | 0.11 |
| D                    | 1.50 | 1.70 | 1.60 |
| E                    | 1.55 | 1.70 | 1.60 |
| E1                   | 1.10 | 1.25 | 1.20 |
| e                    | --   | --   | 0.50 |
| e1                   | 0.90 | 1.10 | 1.00 |
| L                    | 0.10 | 0.30 | 0.20 |
| a                    | 8°   | 9°   | 7°   |
| All Dimensions in mm |      |      |      |

**Suggested Pad Layout**

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

**SOT563**



| Dimensions | Value (in mm) |
|------------|---------------|
| C          | 0.500         |
| C1         | 1.270         |
| G          | 0.600         |
| X          | 0.300         |
| X1         | 1.300         |
| Y          | 0.670         |
| Y1         | 1.940         |

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