

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D $T_A = +25^\circ C$ |
|---------------|---------------------------------|------------------------------|
| 150V | 310m Ω @ $V_{GS} = 10V$ | 2.0A |
| | 330m Ω @ $V_{GS} = 5.0V$ | 1.9A |

Description

This new generation 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
- Transformer Driving Switch
- DC-DC Converters
- Power Management Functions
- Uninterrupted Power Supply

Features

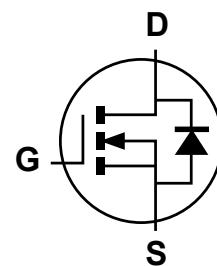
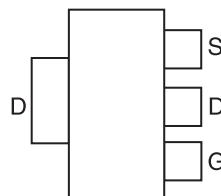
- 100% Unclamped Inductive Switch (UIS) Test in Production
- Fast Switching Speed
- Low On-Resistance
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

- Case: SOT223
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0 (Note 1)
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See Diagram Below
- Terminals: Finish - Matte Tin Annealed over Copper Leadframe; Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.112 grams (Approximate)



Top View

**Ordering Information** (Note 4)

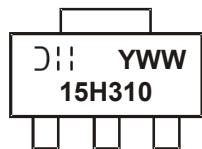
| Part Number | Compliance | Case | Packaging |
|----------------|------------|--------|---------------------|
| DMN15H310SE-13 | Standard | SOT223 | 2,500 / Tape & Reel |

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 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

SOT223



DII = Manufacturer's Marking
 15H310 = Marking Code
 YWW = Date Code Marking
 Y or \bar{Y} = Year (ex: 4 = 2014)
 WW = Week (01 - 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|--|---------------------------|----------|-------|
| Drain-Source Voltage | V_{DSS} | 150 | V |
| Gate-Source Voltage | V_{GSS} | ± 20 | V |
| Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$ | $T_A = +25^\circ\text{C}$ | I_D | 2.0 |
| | $T_A = +70^\circ\text{C}$ | | 1.6 |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | $T_C = +25^\circ\text{C}$ | I_D | 7.1 |
| | $T_C = +70^\circ\text{C}$ | | 5.6 |
| Maximum Body Diode Continuous Current | I_S | 10 | A |
| Avalanche Energy (Note 6) $L=26\text{mH}$ | E_{AS} | 2.5 | mJ |
| Avalanche Current (Note 6) $L=26\text{mH}$ | I_{AS} | 1.45 | A |
| Peak Diode Recovery dv/dt ($I_{SD} \leq 7.3\text{A}$, $di/dt \leq 300\text{A}/\mu\text{s}$) | dv/dt | 0.2 | V/ns |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Value | Units |
|--|-----------------|-------------|-------|
| Total Power Dissipation (Note 5) | P_D | 1.9 | W |
| | | 1.2 | |
| Thermal Resistance, Junction to Ambient (Note 5) | $R_{\theta JA}$ | 64 | °C/W |
| Total Power Dissipation (Note 5) | P_D | 23.5 | W |
| Thermal Resistance, Junction to Case (Note 5) | $R_{\theta JC}$ | 5.3 | °C/W |
| Operating and Storage Temperature Range | T_J, T_{STG} | -55 to +150 | °C |

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|-----------|------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 150 | — | — | V | $V_{GS} = 0\text{V}$, $I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 120\text{V}$, $V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}$, $V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(\text{th})}$ | 1 | 2.2 | 3 | V | $V_{DS} = V_{GS}$, $I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(\text{ON})}$ | — | 178 | 310 | mΩ | $V_{GS} = 10\text{V}$, $I_D = 1.5\text{A}$ |
| | | — | 190 | 330 | | $V_{GS} = 5.0\text{V}$, $I_D = 1.0\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | 0.76 | 1.2 | V | $V_{GS} = 0\text{V}$, $I_S = 1.7\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 6) | | | | | | |
| Input Capacitance | C_{iss} | — | 405 | — | pF | $V_{DS} = 25\text{V}$, $V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 40 | — | | |
| Reverse Transfer Capacitance | C_{rss} | — | 20 | — | | |
| Gate Resistance | R_G | — | 2.88 | — | Ω | $V_{DS} = 0\text{V}$, $V_{GS} = 0\text{V}$, $f = 1.0\text{MHz}$ |
| Total Gate Charge ($V_{GS} = 5.0\text{V}$) | Q_g | — | 4.6 | — | nC | $V_{DS} = 80\text{V}$, $I_D = 7.3\text{A}$ |
| Total Gate Charge ($V_{GS} = 10\text{V}$) | Q_g | — | 8.7 | — | | |
| Gate-Source Charge | Q_{gs} | — | 1.7 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 1.8 | — | | |
| Turn-On Delay Time | $t_{D(\text{on})}$ | — | 3.5 | — | | |
| Turn-On Rise Time | t_r | — | 7.8 | — | nS | $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $R_G = 25\Omega$, $I_D = 7.3\text{A}$ |
| Turn-Off Delay Time | $t_{D(\text{off})}$ | — | 22 | — | | |
| Turn-Off Fall Time | t_f | — | 11 | — | | |
| Reverse Recovery Time | t_{rr} | — | 38 | — | ns | $I_F = 7.3\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |
| Reverse Recovery Charge | Q_{rr} | — | 53 | — | nC | $I_F = 7.3\text{A}$, $di/dt = 100\text{A}/\mu\text{s}$ |

Notes:

5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
6. Guaranteed by design. Not subject to product testing.
7. Short duration pulse test used to minimize self-heating effect.

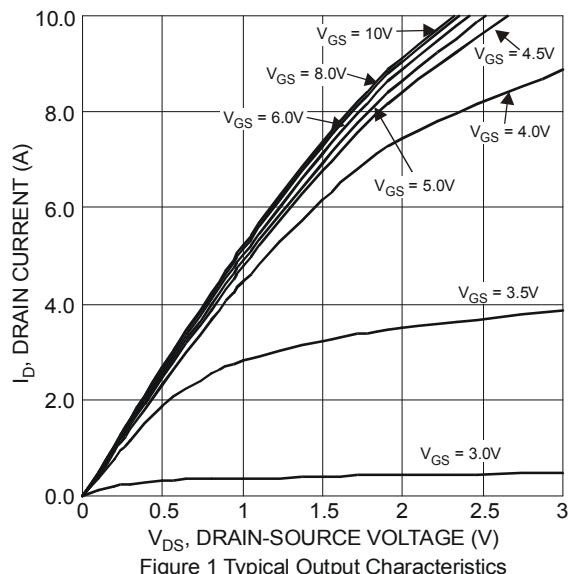


Figure 1 Typical Output Characteristics

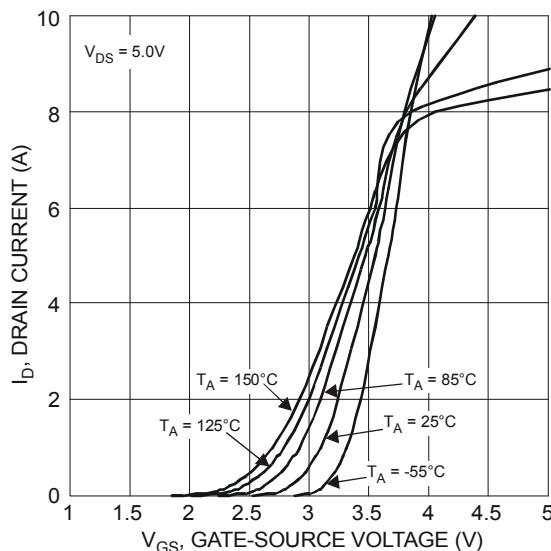


Figure 2 Typical Transfer Characteristics

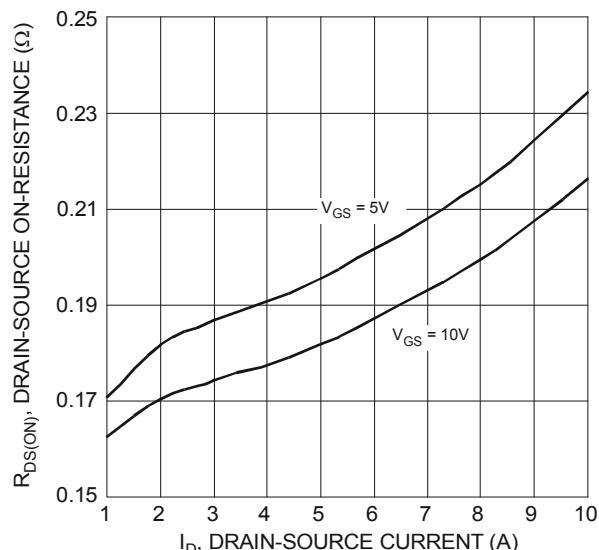


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

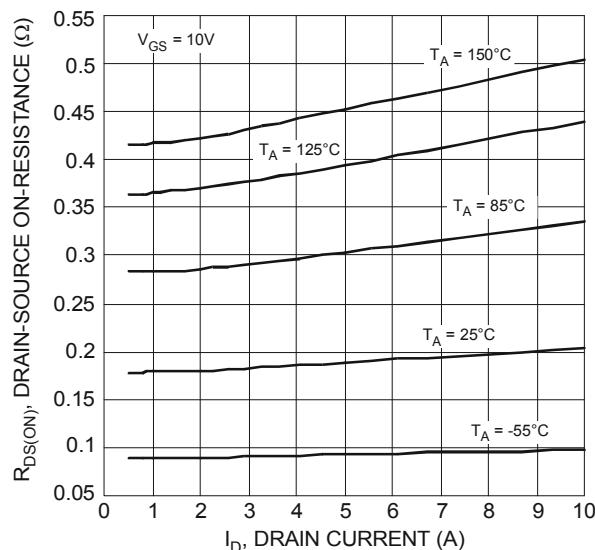


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

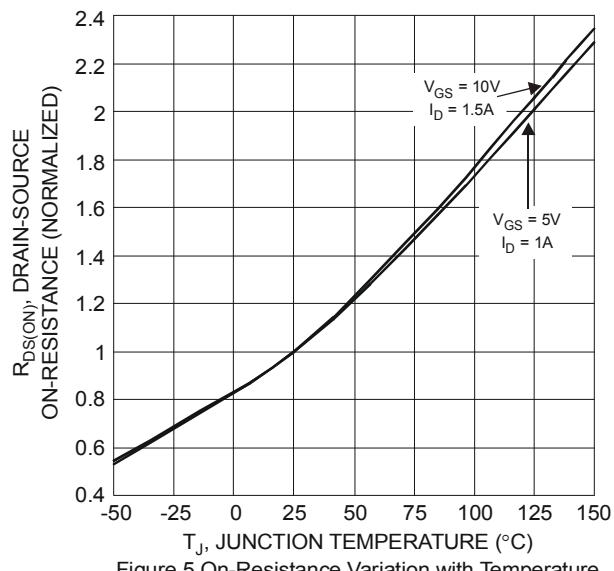


Figure 5 On-Resistance Variation with Temperature

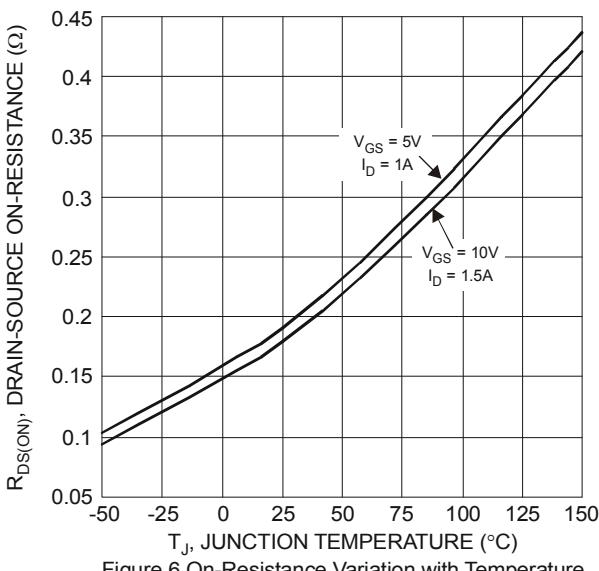


Figure 6 On-Resistance Variation with Temperature

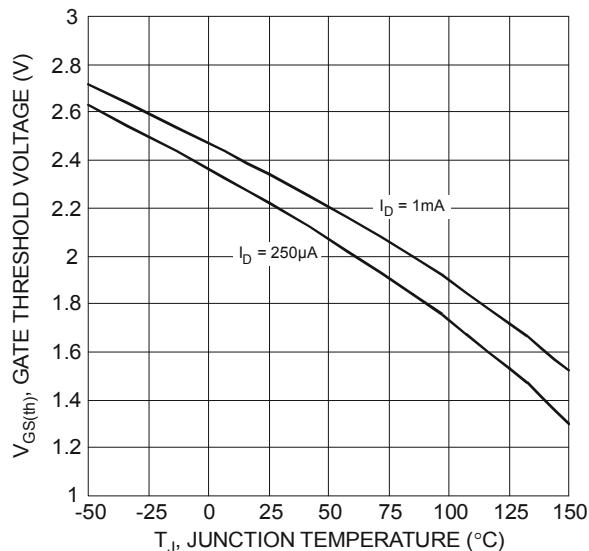


Figure 7 Gate Threshold Variation vs. Ambient Temperature

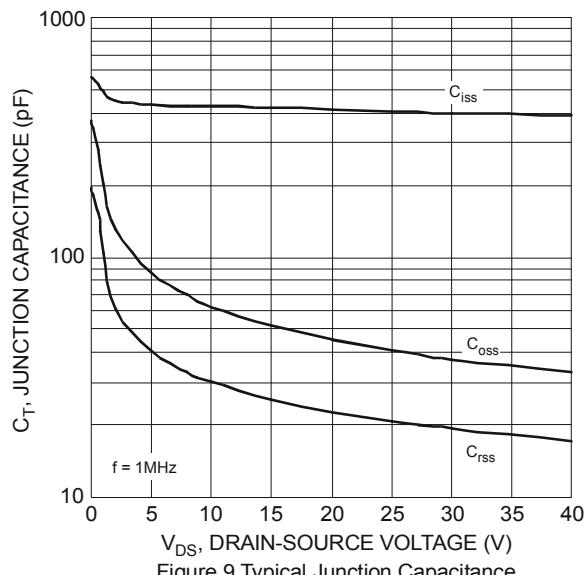


Figure 9 Typical Junction Capacitance

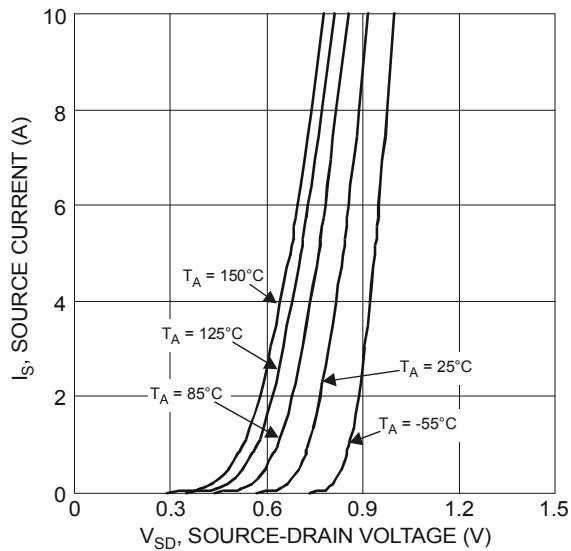


Figure 8 Diode Forward Voltage vs. Current

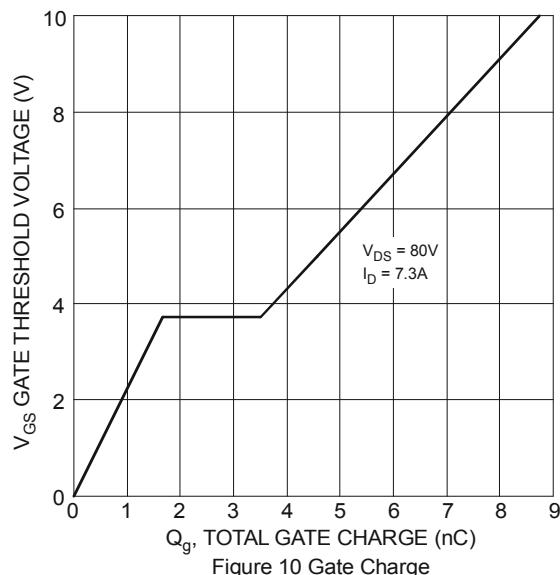


Figure 10 Gate Charge

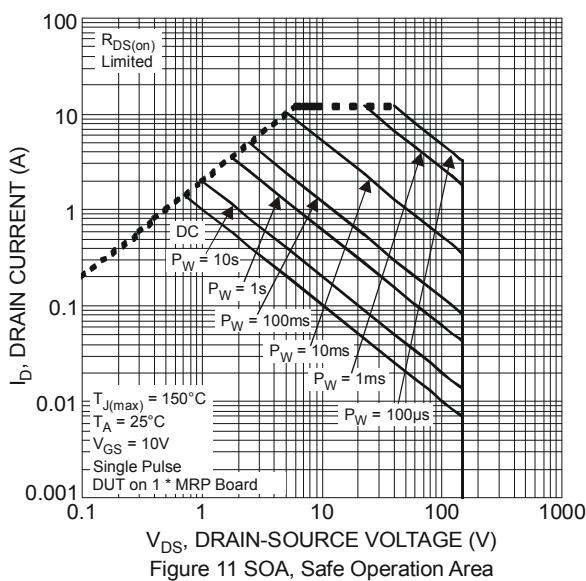


Figure 11 SOA, Safe Operation Area

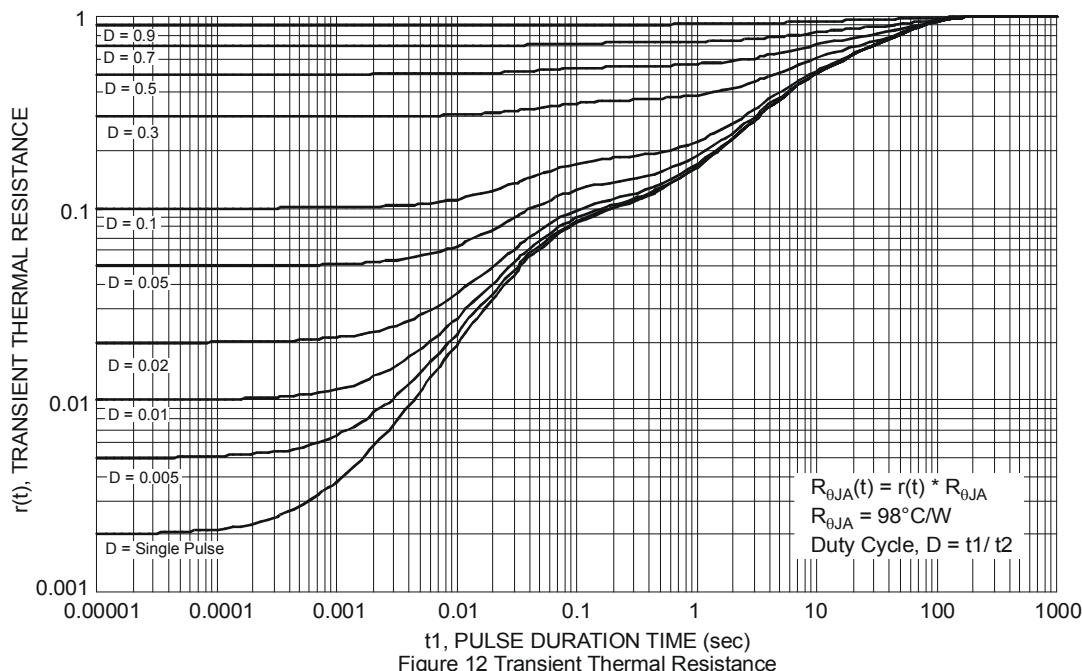
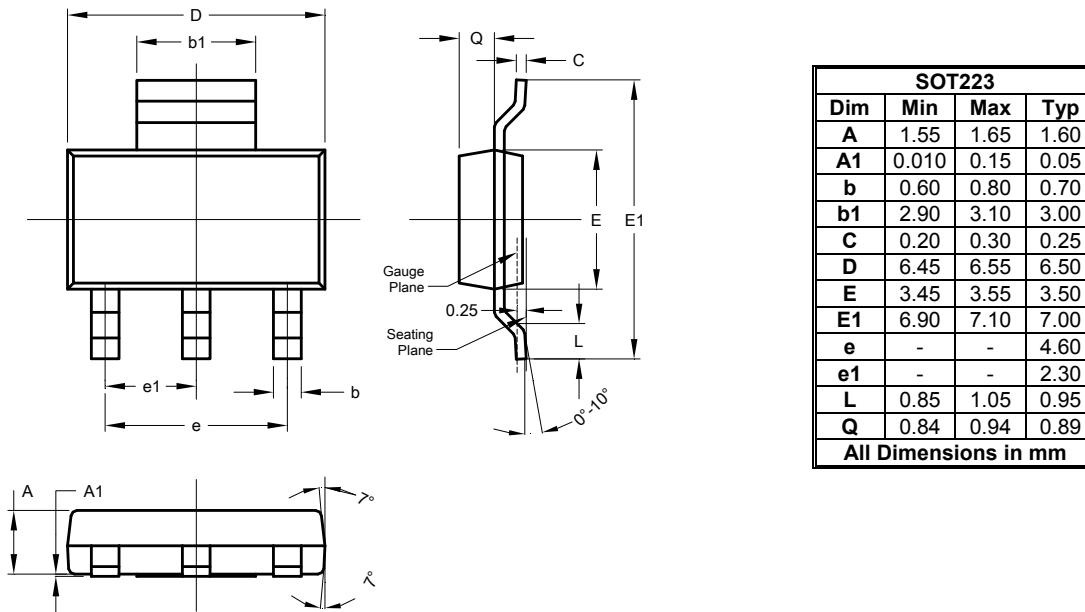


Figure 12 Transient Thermal Resistance

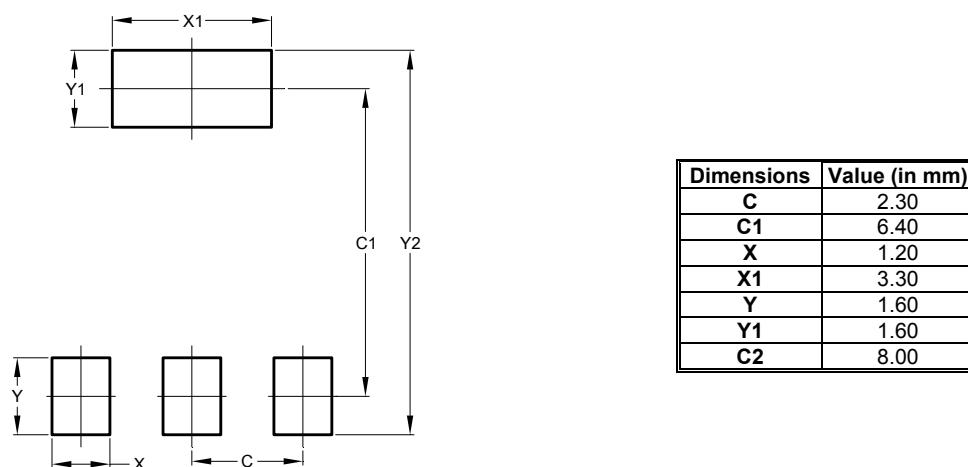
Package Outline Dimensions

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



Suggested Pad Layout

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.



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