

N-CHANNEL ENHANCEMENT MODE MOSFET
Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ | I_D $T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|------------------------------------|
| 30V | 25mΩ @ $V_{GS} = 10\text{V}$ | 6.2A |
| | 28mΩ @ $V_{GS} = 4.5\text{V}$ | 5.8A |

Description and Applications

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.

- Load Switch
- DC-DC Converters
- Power Management Functions

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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

Mechanical Data

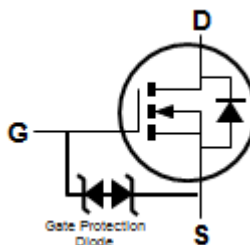
- Case: SOT23
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Terminal Connections: See Diagram ③
- Weight: 0.009 grams (Approximate)



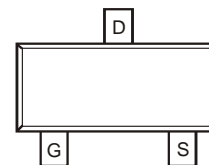
SOT23



Top View



Equivalent Circuit



Top View

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|-------------|-------|--------------------|
| DMN3023L-7 | SOT23 | 3,000/Tape & Reel |
| DMN3023L-13 | SOT23 | 10,000/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 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


3N7 = Product Type Marking Code
 Y or \bar{Y} = Year (ex: B = 2014)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 |
|------|------|------|------|------|------|------|------|------|------|------|------|
| Code | B | C | D | E | F | G | H | I | J | K | L |

| 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_A = +25°C, unless otherwise specified.)

| Characteristic | | | Symbol | Value | Units |
|---|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage | | | V _{DSS} | 30 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C | I _D | 6.2 | A |
| | | T _A = +70°C | | 4.9 | |
| Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%) | | | I _{DM} | 44 | A |
| Maximum Body Diode Forward Current (Note 6) | | | I _S | 1.5 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | I _{AS} | 17.5 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | E _{AS} | 15.2 | mJ |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|--|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5) | T _A = +25°C | P _D | 0.9 | W |
| | T _A = +70°C | | 0.6 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | R _{θJA} | 144 | °C/W |
| | t < 10s | | 103 | |
| Total Power Dissipation (Note 6) | T _A = +25°C | P _D | 1.3 | W |
| | T _A = +70°C | | 0.8 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | R _{θJA} | 97 | °C/W |
| | t < 10s | | 70 | |
| Thermal Resistance, Junction to Case (Note 6) | | R _{θJC} | 24 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|-----|------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | — | — | V | V _{GS} = 0V, I _D = 250µA |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | 1 | µA | V _{DS} = 24V, V _{GS} = 0V |
| Gate-Body Leakage | I _{GSS} | — | — | ±10 | µA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | V _{GS(TH)} | 0.8 | — | 1.8 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(ON)} | — | — | 25 | mΩ | V _{GS} = 10V, I _D = 4.0A |
| | | — | — | 28 | | V _{GS} = 4.5V, I _D = 3.5A |
| | | — | — | 68 | | V _{GS} = 2.5V, I _D = 2.5A |
| Source-Drain Diode Forward Voltage | V _{SD} | — | — | 1.2 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iss} | — | 873 | — | pF | V _{DS} = 15V, V _{GS} = 0V f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 121 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 67 | — | pF | |
| Gate Resistance | R _g | — | 77 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 18.4 | — | nC | V _{DS} = 15V, I _D = 4A |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 8.3 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 2.2 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 2.5 | — | nC | |
| Turn-On Delay Time | t _{D(ON)} | — | 17 | — | ns | V _{DD} = 15V, V _{GS} = 10V, R _L = 15Ω, R _G = 6Ω |
| Turn-On Rise Time | t _r | — | 18 | — | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | — | 231 | — | ns | |
| Turn-Off Fall Time | t _f | — | 70 | — | ns | |

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

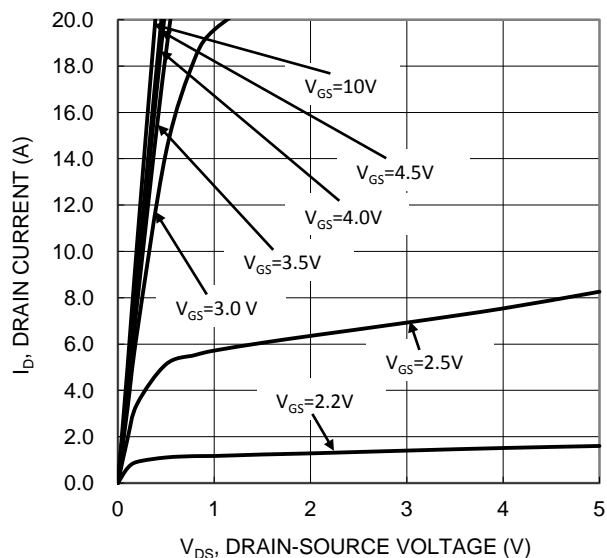


Figure 1 Typical Output Characteristic

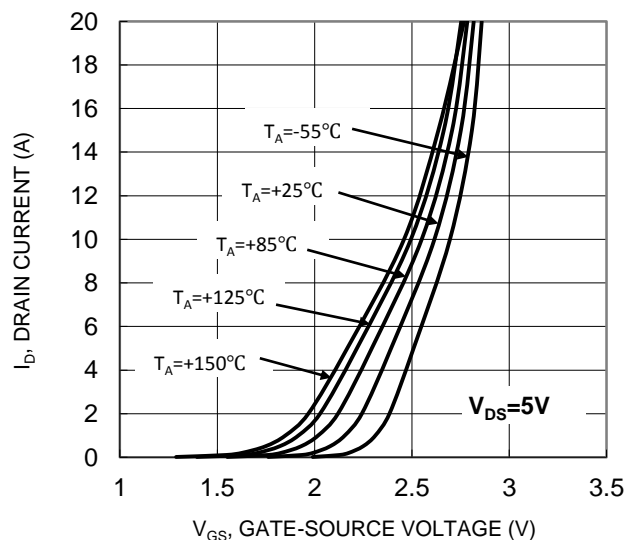


Figure 2 Typical Transfer Characteristic

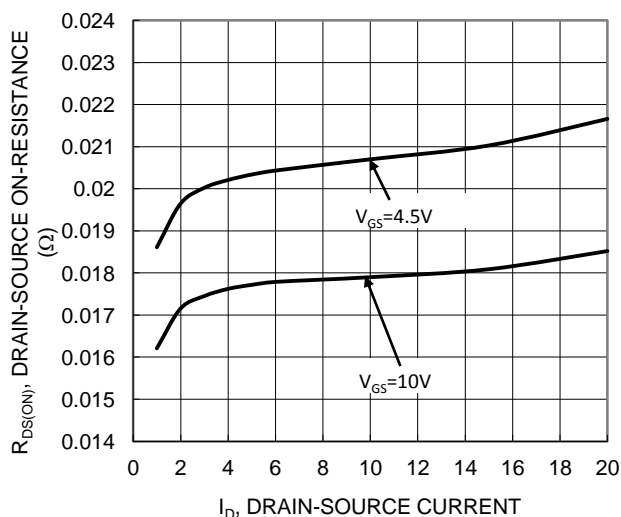


Figure 3 Typical On-Resistance vs Drain Current and Gate Voltage

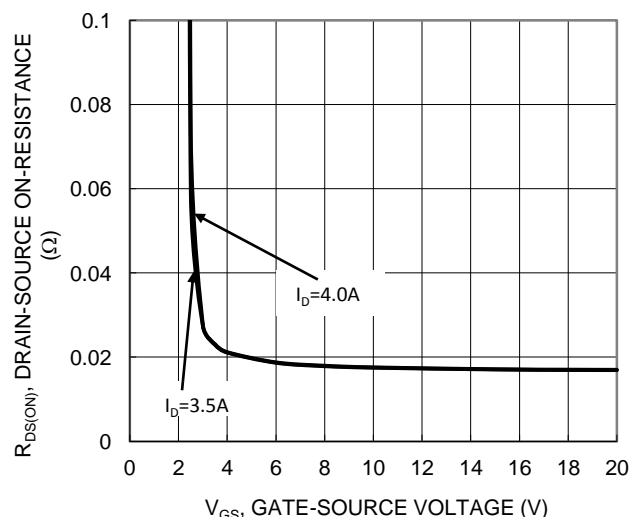


Figure 4 Typical Transfer Characteristic

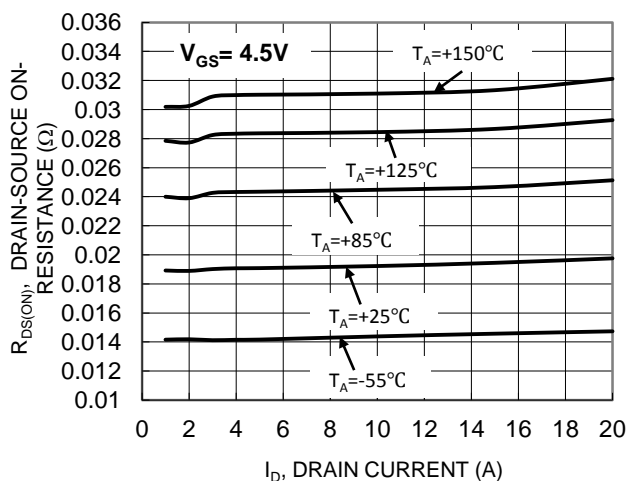


Figure 5 Typical On-Resistance vs Drain Current and Temperature

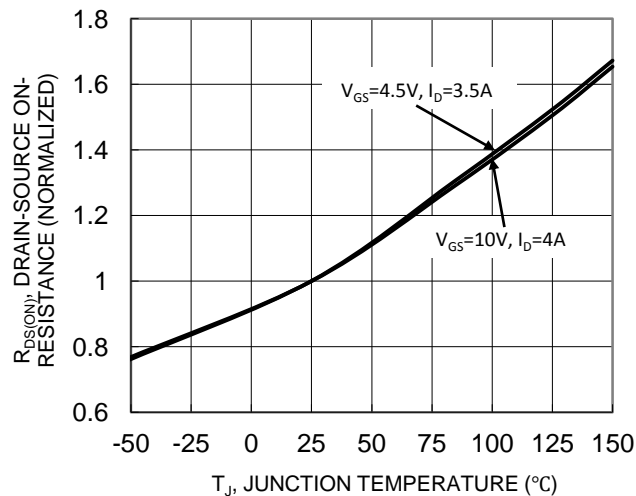
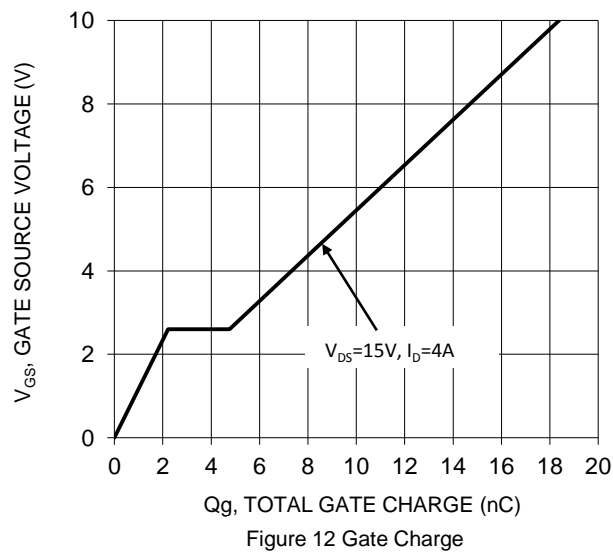
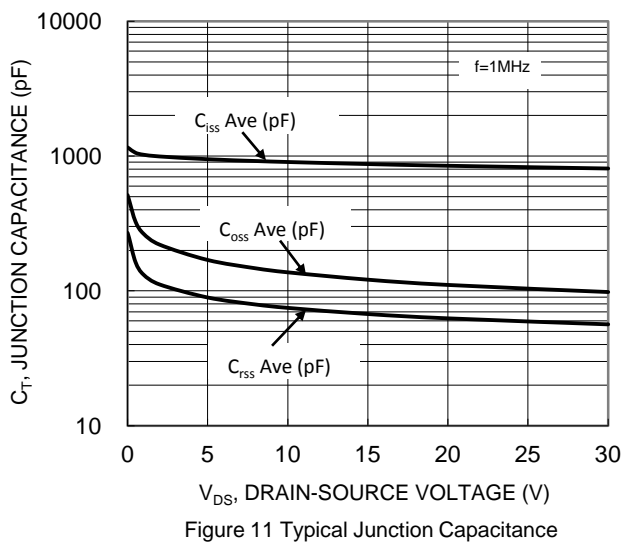
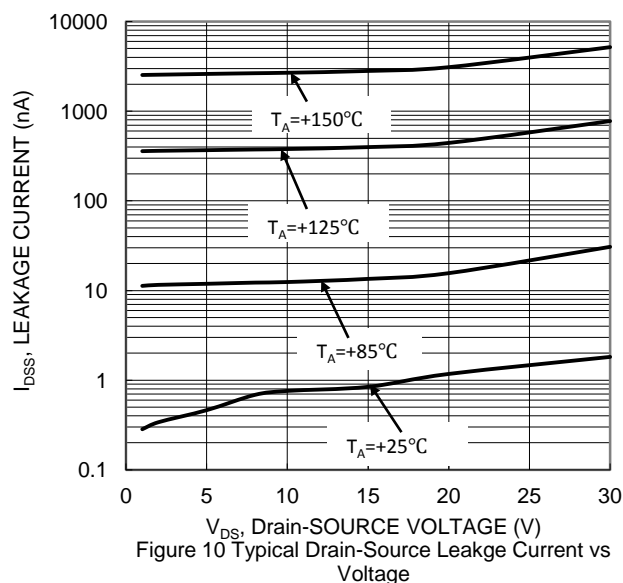
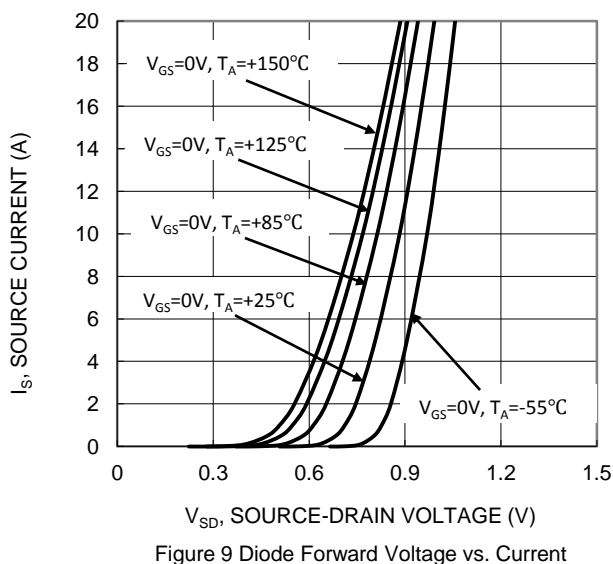
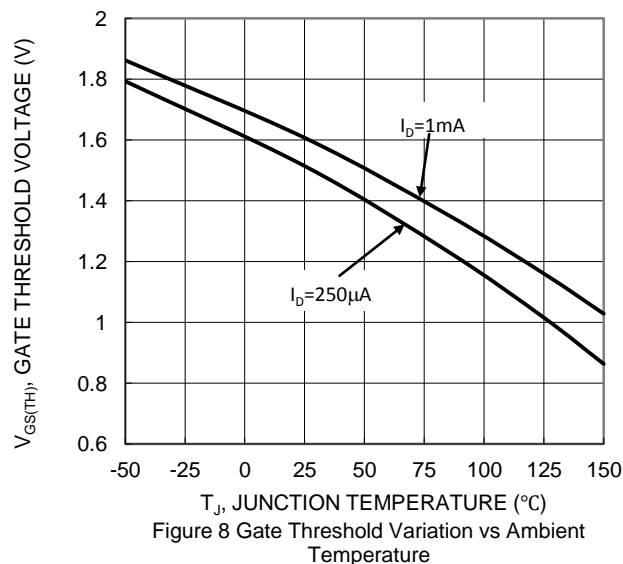
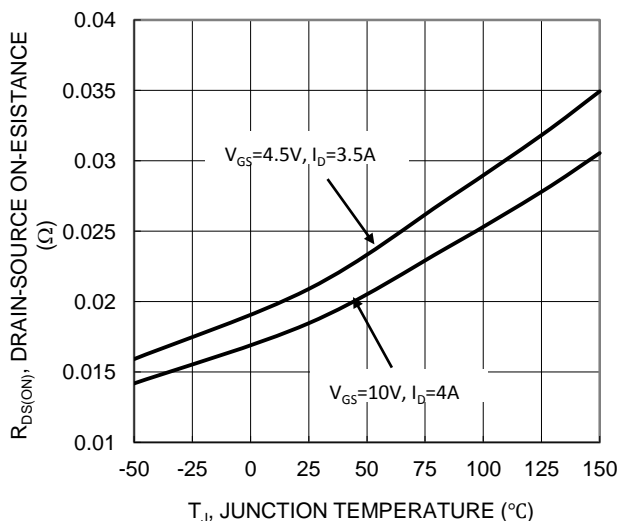
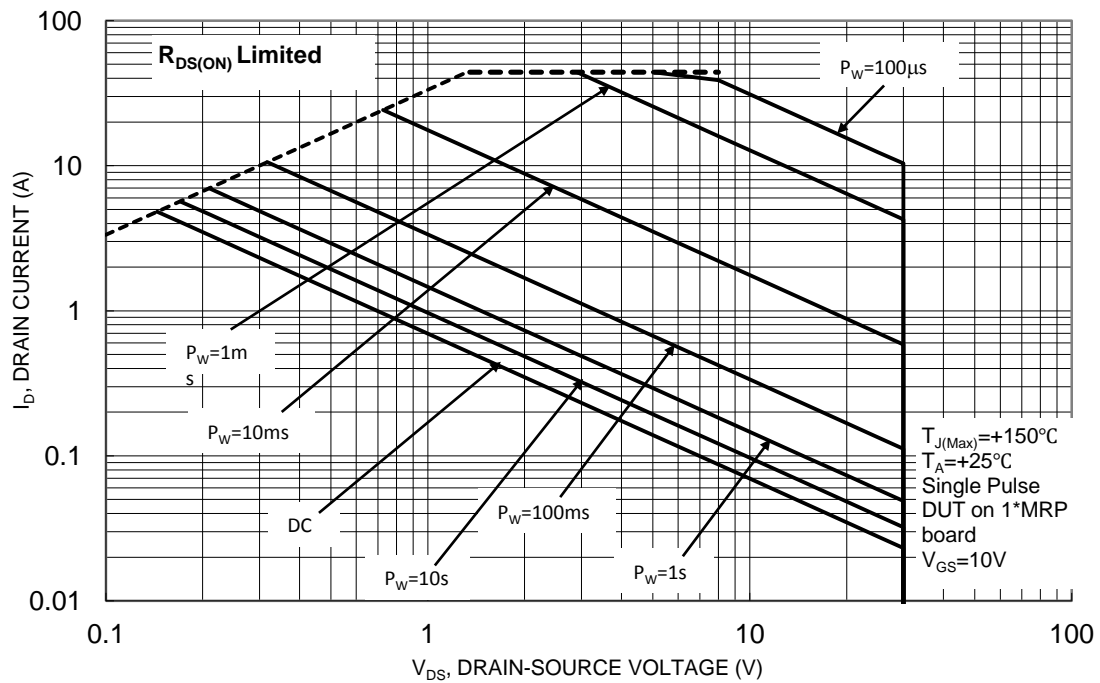
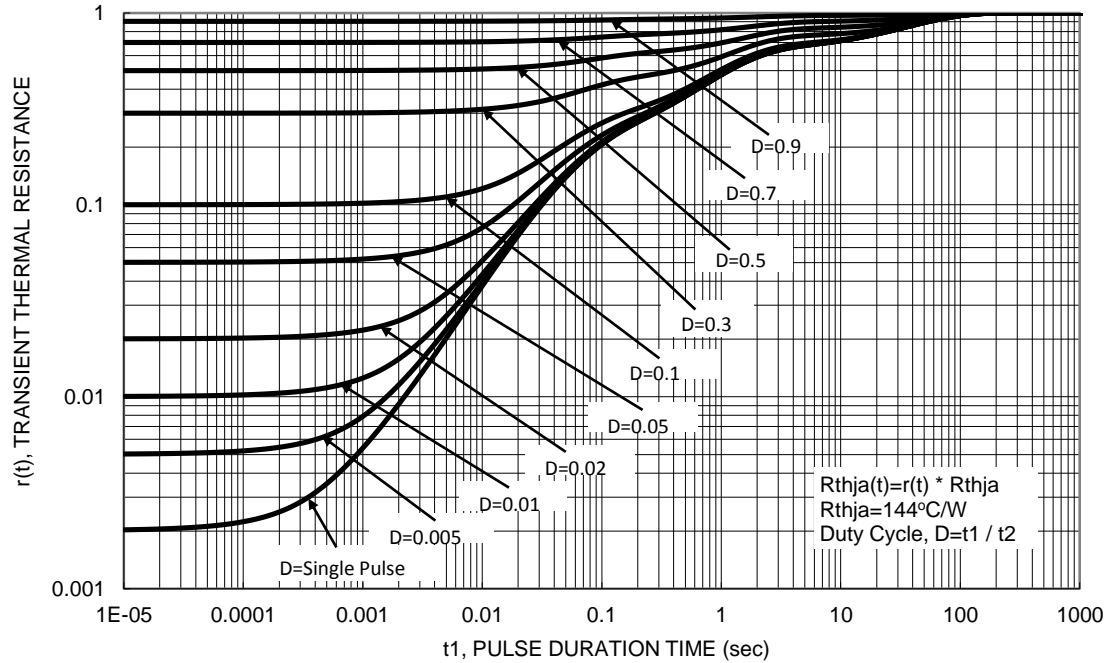


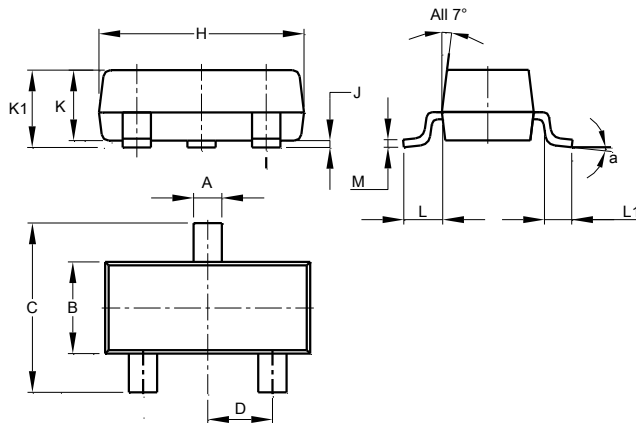
Figure 6 On-Resistance Variation with Temperature





Package Outline Dimensions

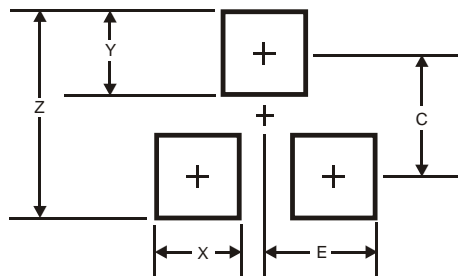
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for the latest version.



| 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 |
| a | 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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