## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on)}$ max | $I_D$ max $T_A$ = +25°C |
|---|---|---|
| 30V | 28mΩ @ $V_{GS}$ = 10V | 5.8A |
| | 42mΩ @ $V_{GS}$ = 4.5V | 4.8A |
| | 82mΩ @ $V_{GS}$ = 3V | 2.0A |

## Description

This MOSFET has been 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

- Battery Charging
- Power Management Functions
- DC-DC Converters
- Portable Power Adaptors

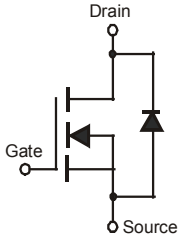
## Features and Benefits

- Low On-Resistance
- 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)**
- **The DMN3404LQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**
  **https://www.diodes.com/quality/product-definitions/**

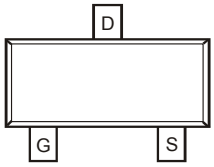
## Mechanical Data

- Case: SOT23 (Standard)
- 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)

Top View




Internal Schematic



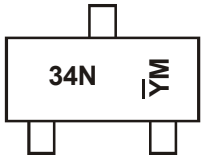

Top View

## Ordering Information (Note 4)

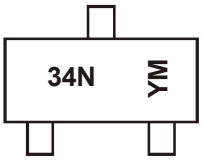
| Part Number | Compliance | Case | Packaging |
|---|---|---|---|
| DMN3404L-7 | Standard | SOT23 (Standard) | 3000/Tape & Reel |
| DMN3404LQ-7 | Automotive | SOT23 (Standard) | 3000/Tape & Reel |

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.
5. For packaging details, go to Diodes website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

## Marking Information




Chengdu A/T Site




Shanghai A/T Site

34N = Product Type Marking Code
YM = Date Code Marking for SAT (Shanghai Assembly/Test site)
$\overline{Y}\overline{M}$ = Date Code Marking for CAT (Chengdu Assembly/Test site)
Y or $\overline{Y}$ = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | …… | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | W | …… | I | J | K | L | M | N | O | P | R | S |

| 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 (Notes 6, 7) | | | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | | | $V_{GSS}$ | ±20 | V |
| Continuous Drain Current (Note 6) $V_{GS}$ = 10V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 4.6<br>4.2<br>3.0 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 10V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 6.2<br>5.8<br>4.0 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 4.5V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 5.2<br>4.8<br>3.2 | A |
| Continuous Drain Current (Note 7) $V_{GS}$ = 3V | Steady State | $T_A$ = -40°C<br>$T_A$ = +25°C<br>$T_A$ = +85°C | $I_D$ | 2.2<br>2.0<br>1.0 | A |
| Pulsed Drain Current | | | $I_{DM}$ | 30 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation (Note 6) | $P_D$ | 0.72 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C | $R_{\theta JA}$ | 173 | °C/W |
| Power Dissipation (Note 7) | $P_D$ | 1.4 | W |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C | $R_{\theta JA}$ | 90 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

## 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 $T_J$ = +25°C | $I_{DSS}$ | — | — | 1.0 | μA | $V_{DS}$ = 30V, $V_{GS}$ = 0V |
| Gate-Source Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±20V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 8)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | 1.0 | 1.5 | 2.0 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250μA |
| Static Drain-Source On-Resistance $T_J$ = -40°C (Note 9) | $R_{DS(on)}$ | — | 23 | 27 | — | $V_{GS}$ = 4.5V, $I_D$ = 4.8A |
| | | — | 57 | 74 | — | $V_{GS}$=3V, $I_D$ =2A |
| Static Drain-Source On-Resistance $T_J$ = +25°C | $R_{DS(on)}$ | — | 24 | 28 | mΩ | $V_{GS}$ = 10V, $I_D$ = 5.8A |
| | | — | 33 | 42 | | $V_{GS}$ = 4.5V, $I_D$ = 4.8A |
| | | — | 63 | 82 | | $V_{GS}$=3V, $I_D$ =2A |
| Static Drain-Source On-Resistance $T_J$ = +85°C (Note 9) | $R_{DS(on)}$ | — | 71 | 95 | mΩ | $V_{GS}$=3V, $I_D$ =2A |
| Forward Transfer Admittance | $\|Y_{fs}\|$ | — | 10 | — | S | $V_{DS}$ = 5V, $I_D$ = 5.8A |
| Diode Forward Voltage | $V_{SD}$ | — | 0.75 | 1.0 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 10)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 498 | — | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 52 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 45 | — | pF | |
| Gate Resistance | $R_g$ | — | 1.75 | 2.8 | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = 3V) | $Q_g$ | — | 3.8 | 5.3 | nC | $V_{GS}$ = 3V, $V_{DS}$ = 15V, $I_D$ = 1A |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 5.3 | 7.5 | nC | $V_{GS}$ = 10V/4.5V, $V_{DS}$ = 15V, $I_D$ = 5.8A |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 11.3 | 16 | nC | |
| Gate-Source Charge | $Q_{gs}$ | — | 1.4 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 2.1 | — | nC | |
| Turn-On Delay Time | $t_{D(on)}$ | — | 3.41 | 10 | ns | $V_{DD}$ = 15V, $V_{GS}$ = 10V, $R_L$ = 2.6Ω, $R_G$ = 3Ω |
| Turn-On Rise Time | $t_r$ | — | 6.18 | 13 | ns | |
| Turn-Off Delay Time | $t_{D(off)}$ | — | 13.92 | 28 | ns | |
| Turn-Off Fall Time | $t_f$ | — | 2.84 | 10 | ns | |

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design and 25°C data. Not subject to production testing
10. Guaranteed by design. Not subject to production testing.

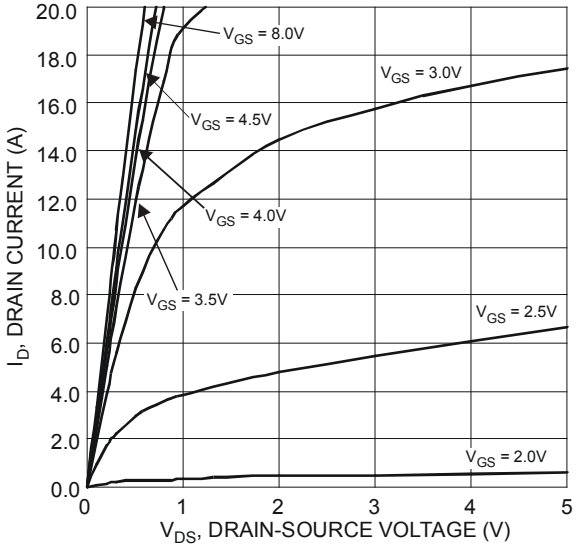


Figure 1 Typical Output Characteristics

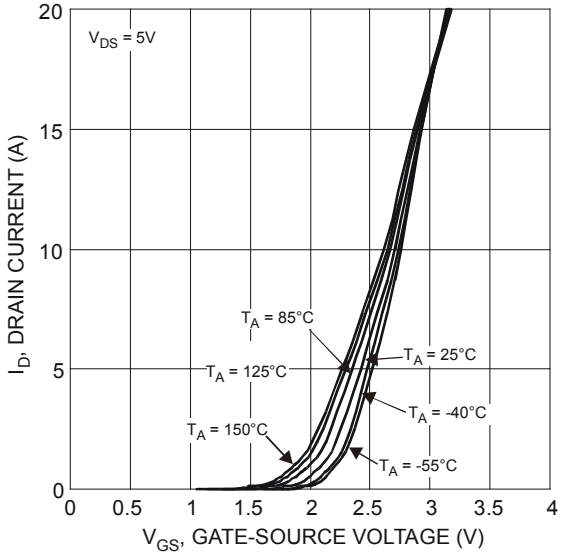


Figure 2 Typical Transfer Characteristics

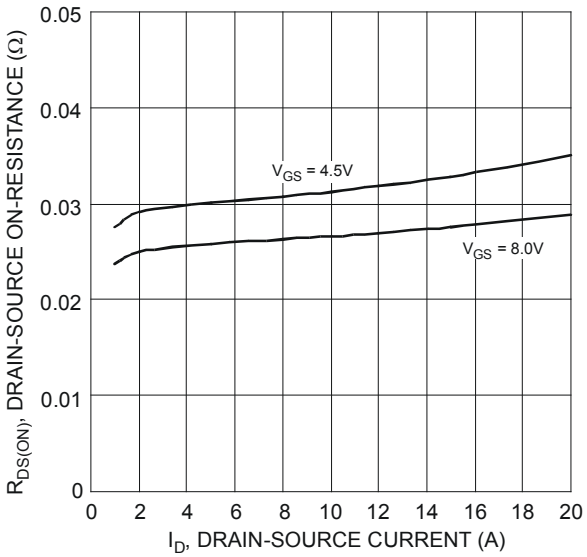



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

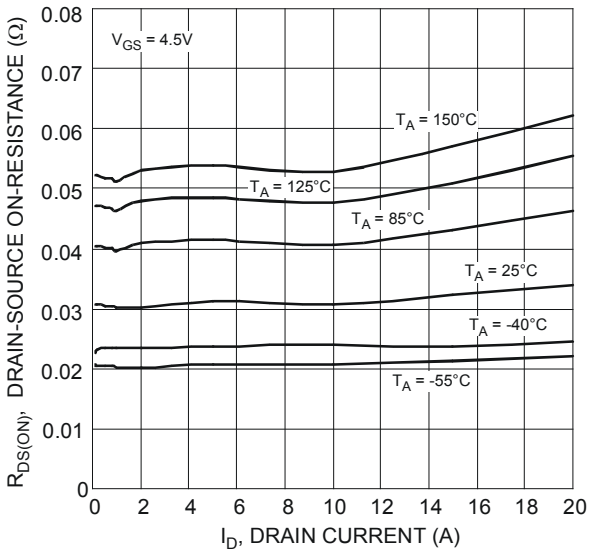



Figure 4 Typical On-Resistance vs. Drain Current and Temperature

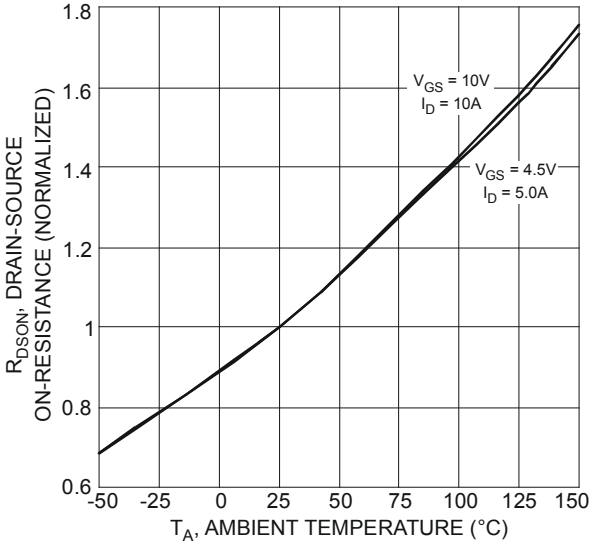



Figure 5 On-Resistance Variation with Temperature

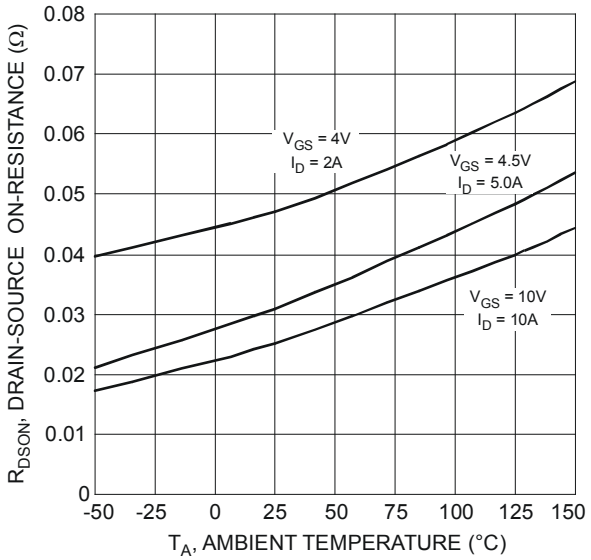



Figure 6 On-Resistance Variation with Temperature

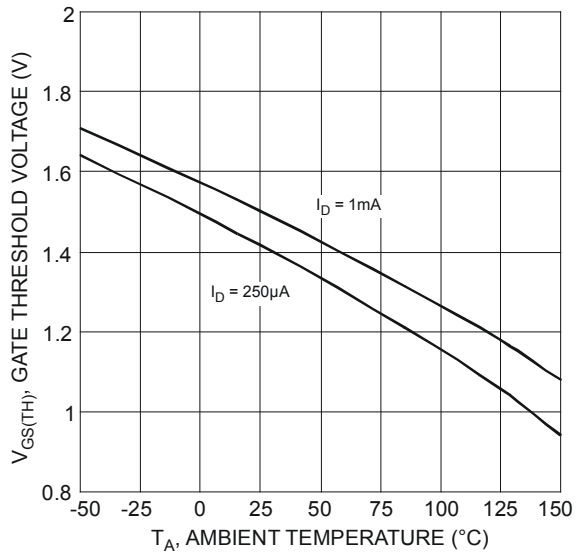



Figure 7 Gate Threshold Variation vs. Ambient Temperature

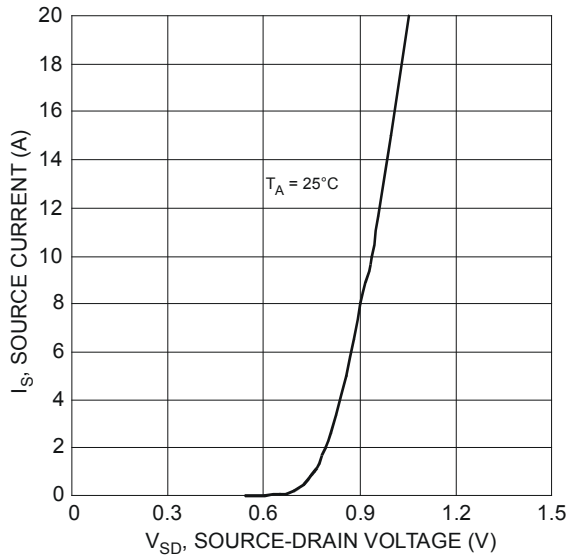



Figure 8 Diode Forward Voltage vs. Current

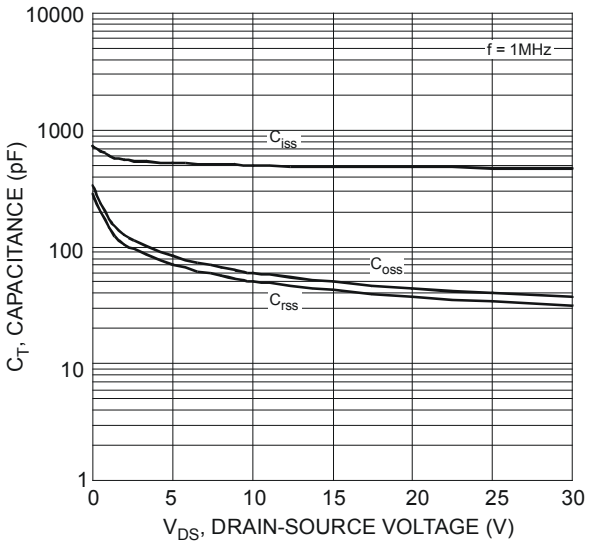



Figure 9 Typical Total Capacitance

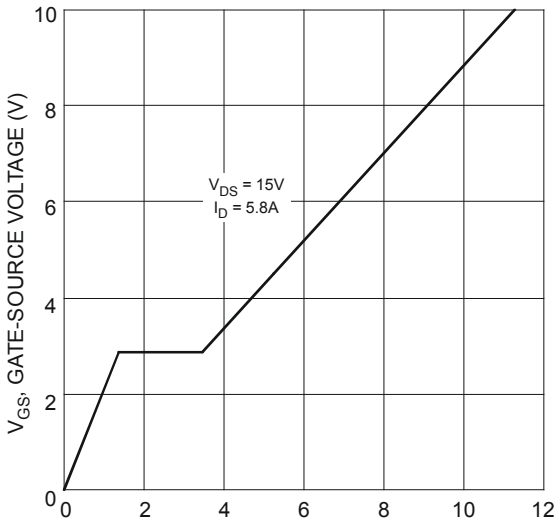



Figure 10 Gate-Charge Characteristics

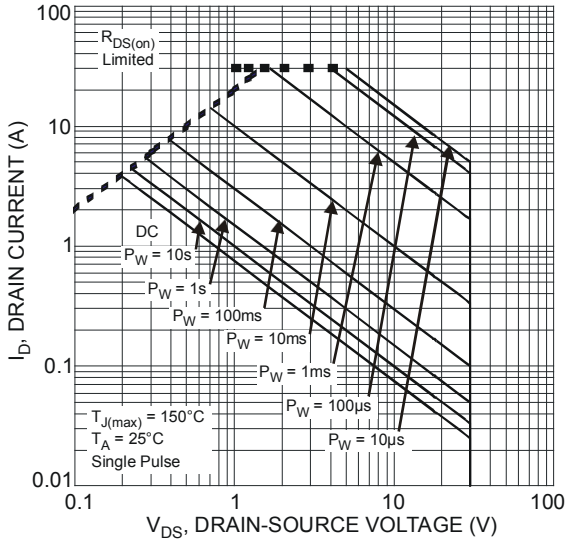



Figure 11 Safe Operation Area

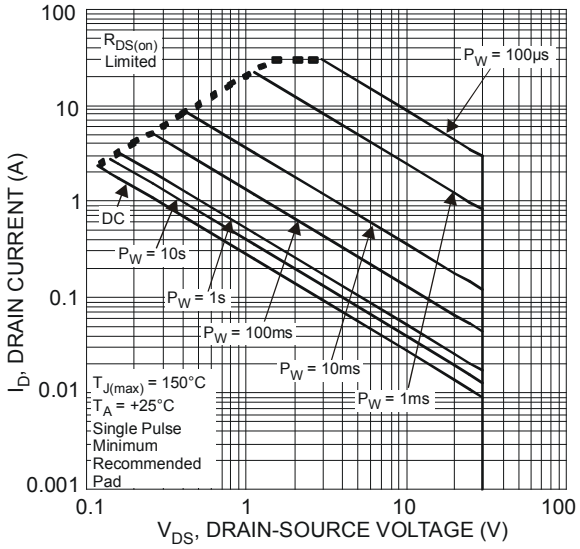



Figure 12 Safe Operation Area

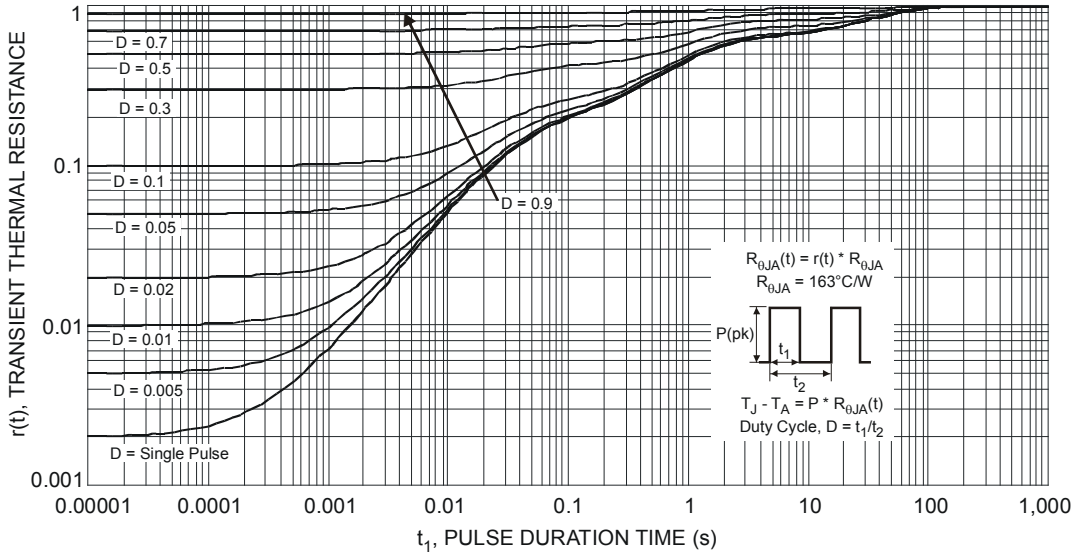
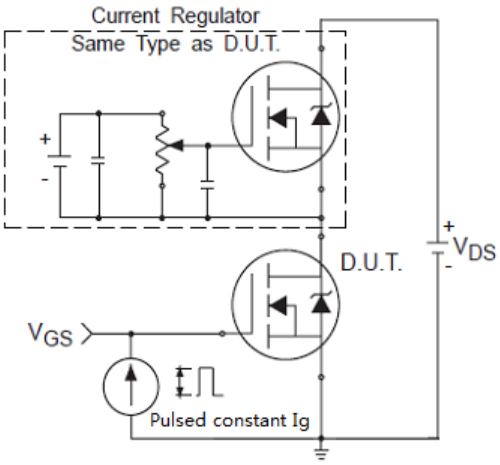
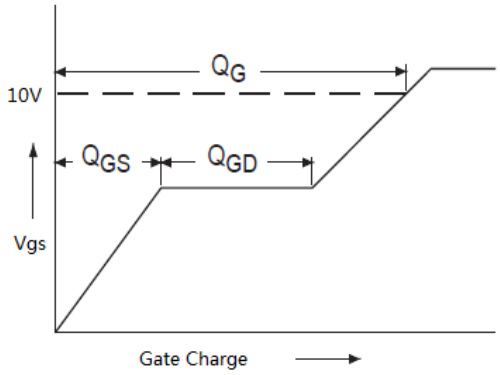


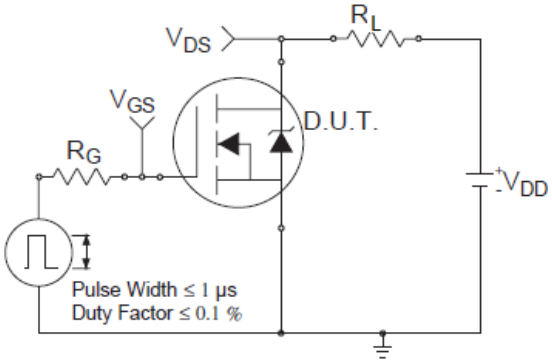

Figure 13 Transient Thermal Response

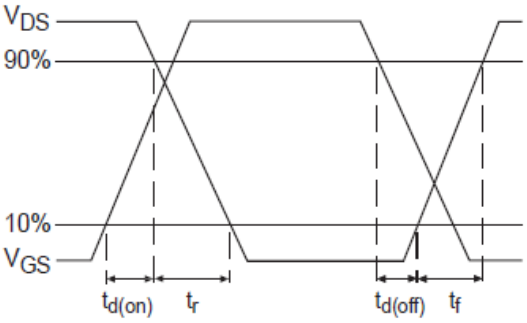
## Gate Charge Test Circuit and Waveform




## Switching Test Circuit and Waveform

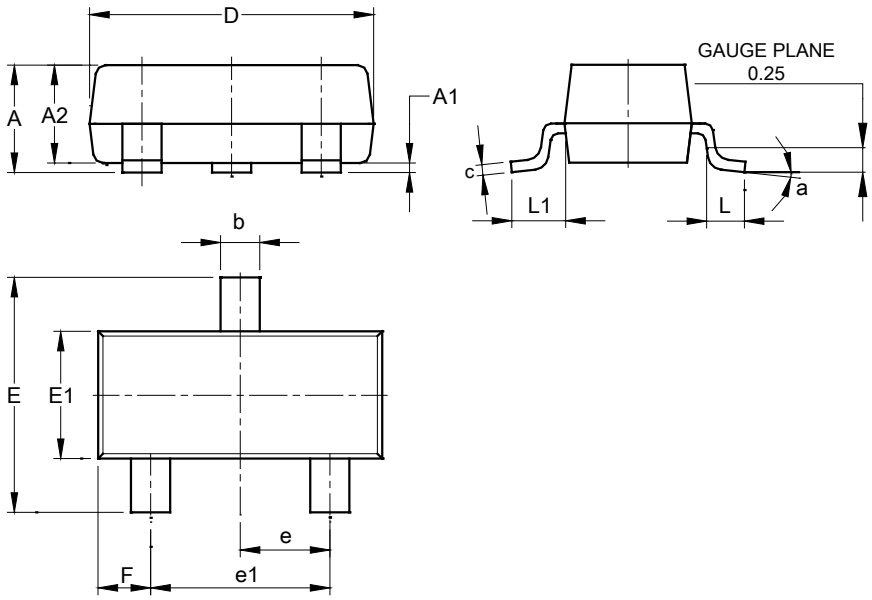


## Package Outline Dimensions

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

**SOT23 (Standard)**

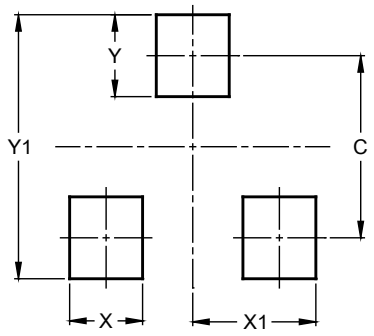



| SOT23 (Standard) | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.90 | 1.15 | 1.025 |
| **A1** | 0.00 | 0.10 | 0.05 |
| **A2** | 0.85 | 1.10 | 0.975 |
| **b** | 0.30 | 0.51 | 0.40 |
| **c** | 0.080 | 0.202 | 0.11 |
| **D** | 2.80 | 3.00 | 2.90 |
| **E** | 2.25 | 2.55 | 2.40 |
| **E1** | 1.20 | 1.40 | 1.30 |
| **e** | 0.89 | 1.03 | 0.915 |
| **e1** | 1.78 | 2.05 | 1.83 |
| **F** | 0.40 | 0.60 | 0.535 |
| **L1** | 0.45 | 0.61 | 0.55 |
| **L** | 0.25 | 0.55 | 0.40 |
| **a** | 0° | 8° | -- |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SOT23 (Standard)**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 2.0 |
| **X** | 0.8 |
| **X1** | 1.35 |
| **Y** | 0.9 |
| **Y1** | 2.9 |

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