# N-CHANNEL ENHANCEMENT MODE FIELD EFFECT TRANSISTOR

## Product Summary

| $BV_{DSS}$ | $R_{DS(ON)}$ | Package | $I_D$ max $T_A$ = +25°C |
|---|---|---|---|
| 30V | 52mΩ @ $V_{GS}$ = 10V | SOT323 | 4A |
| | 65mΩ @ $V_{GS}$ = 4.5V | | |
| | 85mΩ @ $V_{GS}$ = 2.5V | | |

## Features

- Low On-Resistance
- Low Gate Threshold Voltage
- 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)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Applications

- DC-DC Converters
- Power Management Functions
- Battery Operated Systems and Solid-State Relays

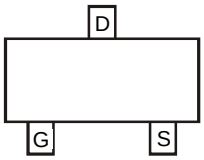
## Mechanical Data

- Case: SOT323
- 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 Alloy 42 Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Terminal Connections: See Diagram
- Weight: 0.006 grams (Approximate)

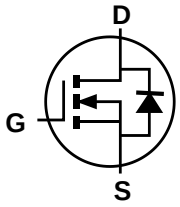
SOT323



Top View




Pin Configuration
Top View



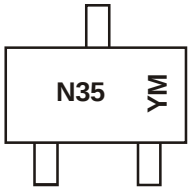

Equivalent Circuit

## Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---|---|---|
| DMN3065LW-7 | SOT323 | 3000/Tape & Reel |
| DMN3065LW-13 | SOT323 | 10000/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




N35 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: G = 2019)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 |
|---|---|---|---|---|---|---|---|---|---|
| Code | F | G | H | I | J | K | L | M | N |

| 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 |


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## Maximum Ratings (@$T_A$ = +25°C, unless otherwise specified.)

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Drain Source Voltage | $V_{DSS}$ | 30 | V |
| Gate-Source Voltage | $V_{GSS}$ | ±12 | V |
| Drain Current (Note 5) | $I_D$ | 4 | A |
| Body-Diode Continuous Current (Note 5) | $I_S$ | 1 | A |

## Thermal Characteristics

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation (Note 5) | $P_D$ | 770 | mW |
| Thermal Resistance, Junction to Ambient @$T_A$ = +25°C (Note 5) | $R_{\theta JA}$ | 162 | °C/W |
| 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 6)** | | | | | | |
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | 30 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250µA |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | — | — | 1 | µA | $V_{DS}$ = 30V, $V_{GS}$ = 0V |
| Gate-Body Leakage | $I_{GSS}$ | — | — | ±100 | nA | $V_{GS}$ = ±12V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 6)** | | | | | | |
| Gate Threshold Voltage | $V_{GS(TH)}$ | 0.5 | — | 1.5 | V | $V_{DS}$ = $V_{GS}$, $I_D$ = 250µA |
| Static Drain-Source On-Resistance | $R_{DS(ON)}$ | —<br>— | —<br>—<br>— | 52<br>65<br>85 | mΩ | $V_{GS}$ = 10V, $I_D$ = 4A<br>$V_{GS}$ = 4.5V, $I_D$ = 3A<br>$V_{GS}$ = 2.5V, $I_D$ = 2A |
| Source-Drain Diode Forward Voltage | $V_{SD}$ | — | — | 1.2 | V | $V_{GS}$ = 0V, $I_S$ = 2.0A |
| **DYNAMIC CHARACTERISTICS (Note 7)** | | | | | | |
| Input Capacitance | $C_{iss}$ | — | 465 | — | pF | $V_{DS}$ = 15V, $V_{GS}$ = 0V, f = 1.0MHz |
| Output Capacitance | $C_{oss}$ | — | 49.5 | — | pF | |
| Reverse Transfer Capacitance | $C_{rss}$ | — | 43.8 | — | pF | |
| Gate Resistance | $R_g$ | — | 2.3 | — | Ω | $V_{DS}$ = 0V, $V_{GS}$ = 0V, f = 1MHz |
| Total Gate Charge ($V_{GS}$ = 10V) | $Q_g$ | — | 11.7 | — | nC | $V_{DS}$ = 15V, $I_D$ = 4A |
| Total Gate Charge ($V_{GS}$ = 4.5V) | $Q_g$ | — | 5.5 | — | nC | $V_{DS}$ = 15V, $I_D$ = 4A |
| Gate-Source Charge | $Q_{gs}$ | — | 1.1 | — | nC | |
| Gate-Drain Charge | $Q_{gd}$ | — | 1.8 | — | nC | |
| Turn-On Delay Time | $t_{D(ON)}$ | — | 1.9 | — | ns | $V_{DD}$ = 15V, $V_{GEN}$ = 10V, $R_{GEN}$ = 3Ω, $R_L$ = 3.75Ω |
| Turn-On Rise Time | $t_R$ | — | 1.6 | — | ns | |
| Turn-Off Delay Time | $t_{D(OFF)}$ | — | 10.3 | — | ns | |
| Turn-Off Fall Time | $t_F$ | — | 2.0 | — | ns | |

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to production testing.


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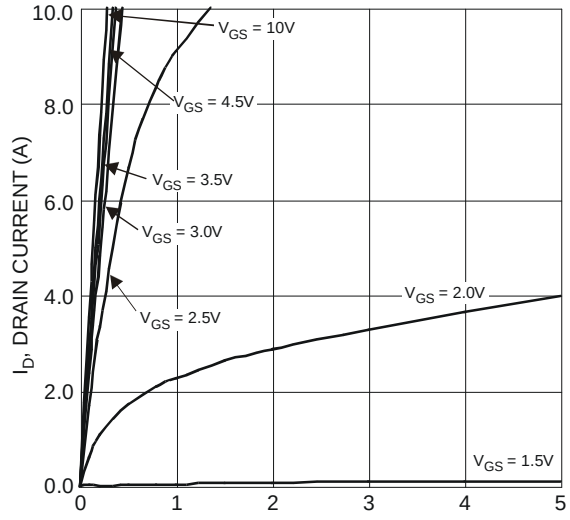



Figure 1 Typical Output Characteristics

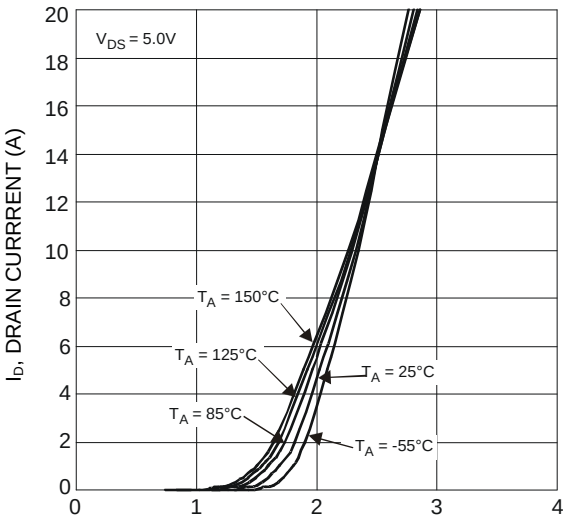



Figure 2 Typical Transfer Characteristics

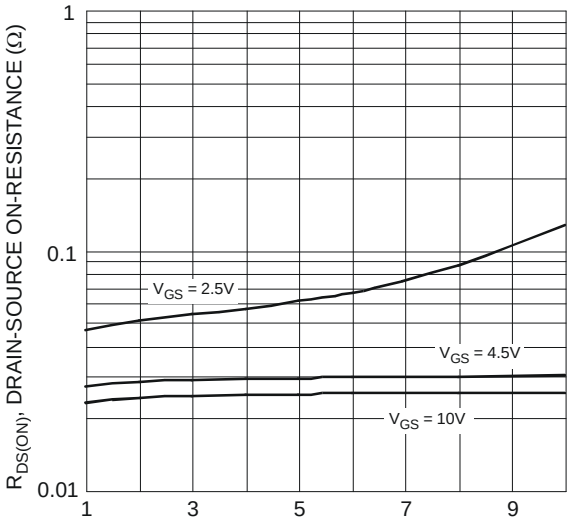



Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

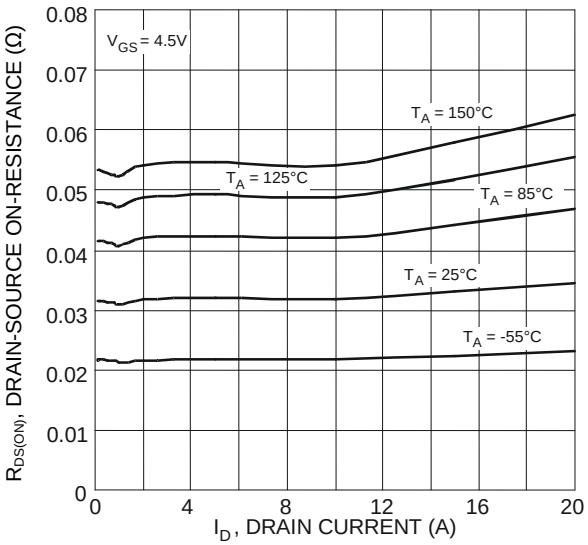



Figure 4 Typical On-Resistance vs. Drain Current and Temperature

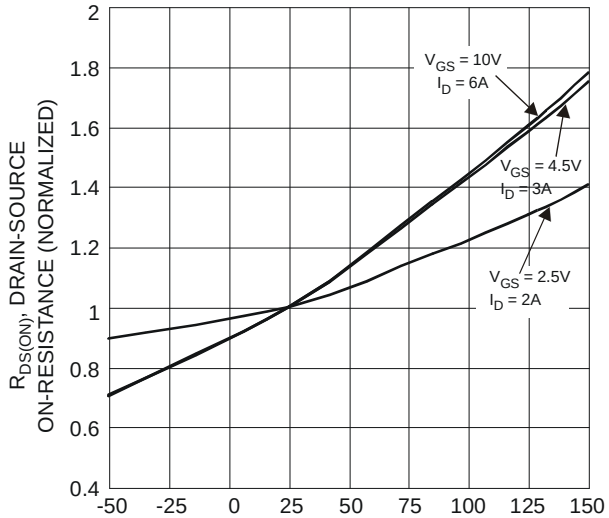



Figure 5 On-Resistance Variation with Temperature

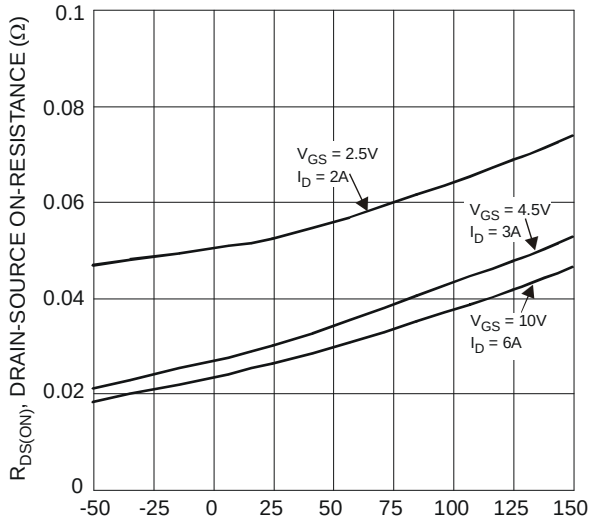



Figure 6 On-Resistance Variation with Temperature


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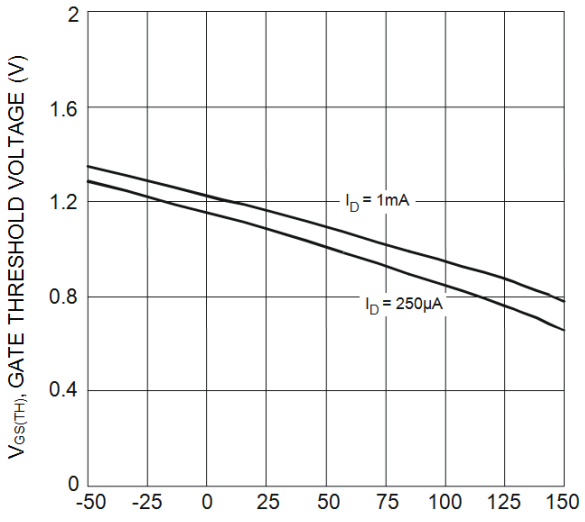



Figure 7 Gate Threshold Variation vs. Junction Temperature

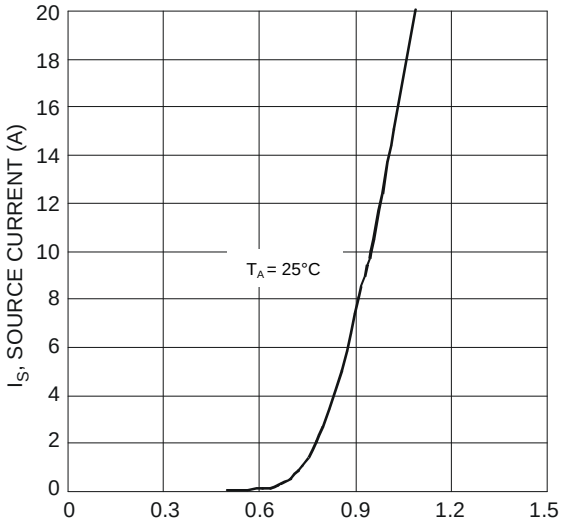



Figure 8 Diode Forward Voltage vs. Current

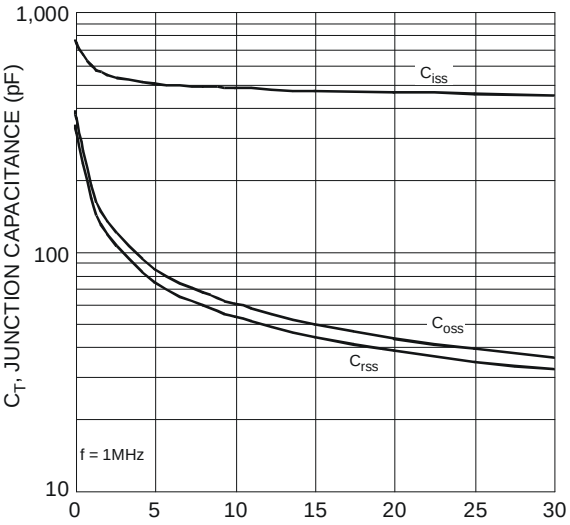



Figure 9 Typical Junction Capacitance

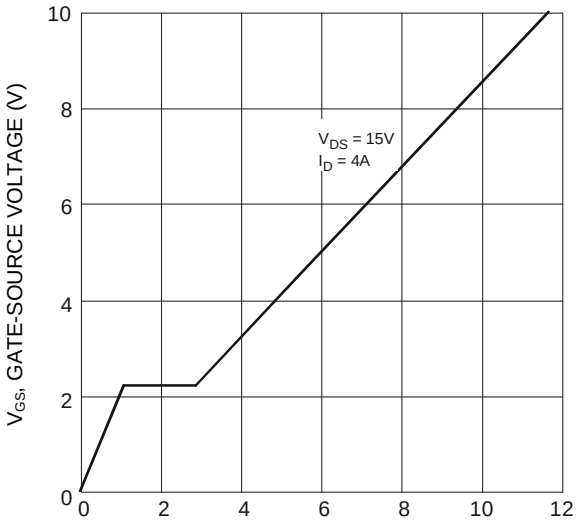



Figure 10 Gate Charge

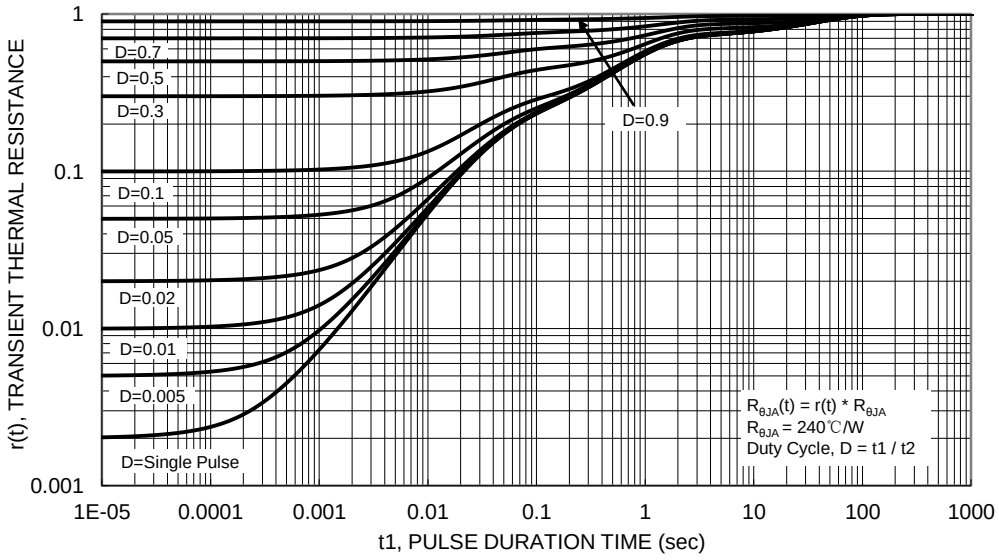


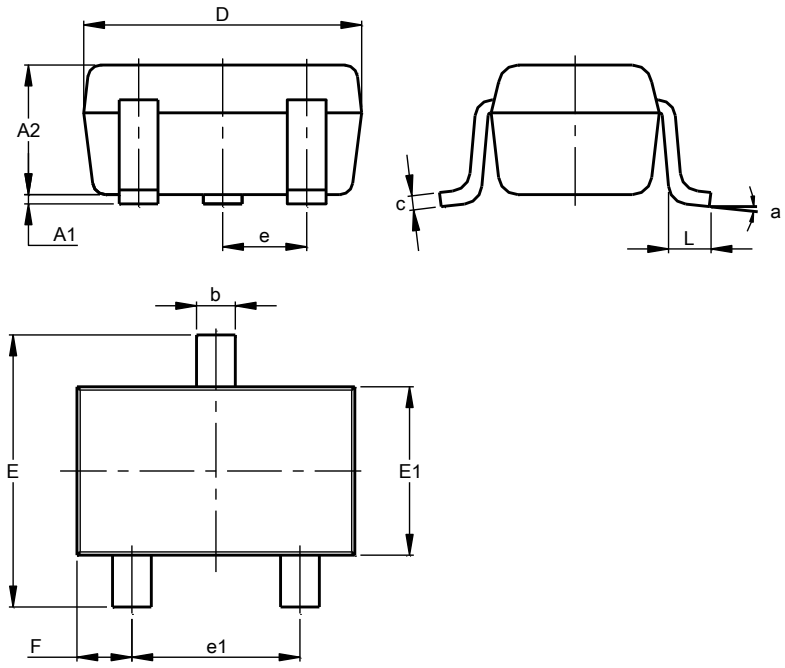

Figure 11. Transient Thermal Resistance


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## Package Outline Dimensions

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

**SOT323**

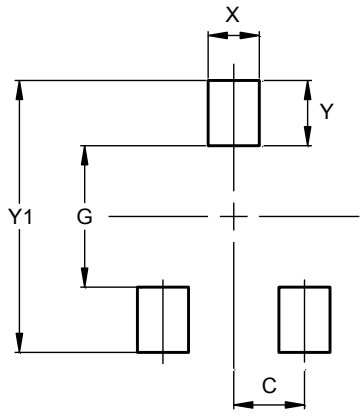



| SOT323 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A1** | 0.00 | 0.10 | 0.05 |
| **A2** | 0.90 | 1.00 | 0.95 |
| **b** | 0.25 | 0.40 | 0.30 |
| **c** | 0.10 | 0.18 | 0.11 |
| **D** | 1.80 | 2.20 | 2.15 |
| **E** | 2.00 | 2.20 | 2.10 |
| **E1** | 1.15 | 1.35 | 1.30 |
| **e** | 0.650 BSC | | |
| **e1** | 1.20 | 1.40 | 1.30 |
| **F** | 0.375 | 0.475 | 0.425 |
| **L** | 0.25 | 0.40 | 0.30 |
| **a** | 0° | 8° | -- |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SOT323**




| Dimensions | Value (in mm) |
|---|---|
| **C** | 0.650 |
| **G** | 1.300 |
| **X** | 0.470 |
| **Y** | 0.600 |
| **Y1** | 2.500 |


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