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[DMN3018SFG-7](#)

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DMN3018SFG

30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ\text{C}$ |
|---------------|---------------------------------------|--|
| 30V | 21m Ω @ $V_{GS} = 10\text{V}$ | 8.5A |
| | 35m Ω @ $V_{GS} = 4.5\text{V}$ | 6.6A |

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

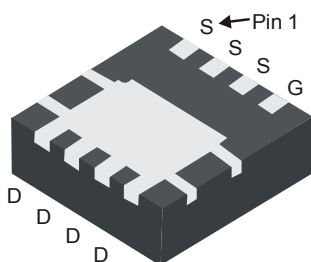
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

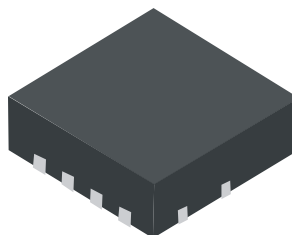
- Low $R_{DS(ON)}$ – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- **ESD Protected Gate**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 standards for High Reliability**

Mechanical Data

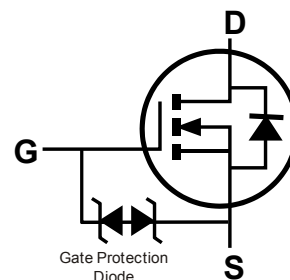
- Case: POWERDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See diagram
- Terminals: Finish — Matte Tin annealed over Copper leadframe Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (approximate)



Bottom View



Top View



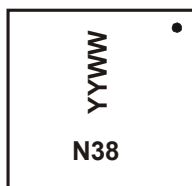
Top View
Internal Schematic

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|---------------|-----------------------------|------------------|
| DMN3018SFG-7 | POWERDI [®] 3333-8 | 2000/Tape & Reel |
| DMN3018SFG-13 | POWERDI [®] 3333-8 | 3000/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



N38 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last digit of year (ex: 11 = 2011)
 WW = Week code (01 ~ 53)

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} | ±25 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C T _A = +70°C | I _D | 8.5 6.8 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | 11.3 9.1 | A |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | Steady State | T _A = +25°C T _A = +70°C | I _D | 6.6 5.3 | A |
| | t < 10s | T _A = +25°C T _A = +70°C | I _D | 8.7 7.0 | A |
| Maximum Continuous Body Diode Forward Current (Note 4) | | | I _S | 2.5 | A |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | | | I _{DM} | 60 | A |
| Avalanche Current (Note 7) L = 0.1mH | | | I _{AS} | 18 | A |
| Avalanche Energy (Note 7) L = 0.1mH | | | E _{AS} | 16 | mJ |

Thermal Characteristics

| Characteristic | | | Symbol | Value | Units |
|--|--------------|--|-----------------------------------|------------|-------|
| Total Power Dissipation (Note 5) | | | P _D | 1.0 | W |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady State | | R _{θJA} | 126 | °C/W |
| | t < 10s | | | 71 | |
| Total Power Dissipation (Note 6) | | | P _D | 2.2 | W |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | | R _{θJA} | 56 | °C/W |
| | t < 10s | | | 31 | |
| Thermal Resistance, Junction to Case | | | R _{θJC} | 7.0 | |
| 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 7) | | | | | | |
| 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-Source Leakage | I _{GSS} | — | — | ±10 | µA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1 | 1.7 | 2.1 | V | V _{DS} = V _{GS} , I _D = 250µA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 16 | 21 | mΩ | V _{GS} = 10V, I _D = 10A |
| | | — | 21 | 35 | | V _{GS} = 4.5V, I _D = 8.5A |
| Diode Forward Voltage | V _{SD} | 0.5 | — | 1.2 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 697 | — | pF | V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 97 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 67 | — | pF | |
| Gate resistance | R _g | — | 1.47 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 6.0 | — | nC | V _{GS} = 10V, V _{DS} = 15V, I _D = 9A |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 13.2 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 2.2 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 1.8 | — | nC | V _{DD} = 15V, V _{GS} = 10V, R _L = 15Ω, I _D = 1A, R _G = 6Ω |
| Turn-On Delay Time | t _{D(on)} | — | 4.3 | — | ns | |
| Turn-On Rise Time | t _r | — | 4.4 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 20.1 | — | ns | I _F = 9A, di/dt = 500A/µs |
| Turn-Off Fall Time | t _f | — | 4.1 | — | ns | |
| Reverse Recovery Time | T _{rr} | — | 7.3 | — | ns | I _F = 9A, di/dt = 500A/µs |
| Reverse Recovery Charge | Q _{rr} | — | 7.9 | — | nC | |

- Notes: 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate
 7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.



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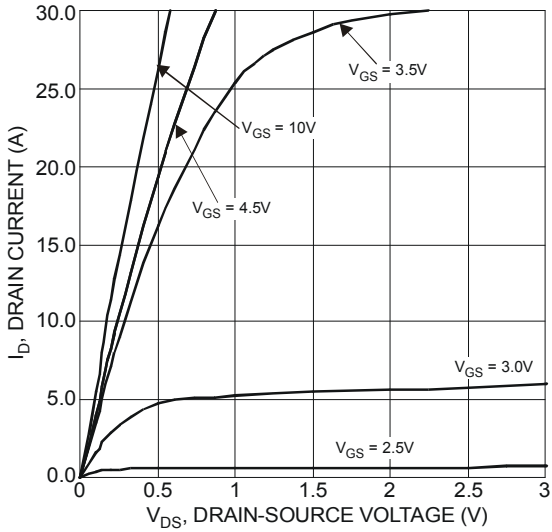


Figure 1 Typical Output Characteristics

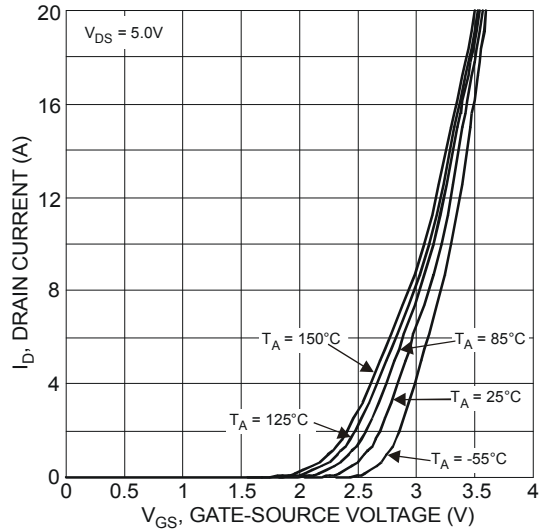


Figure 2 Typical Transfer Characteristics

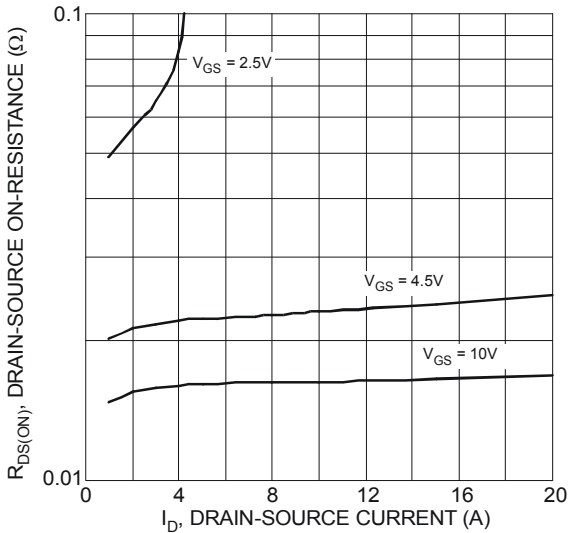


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

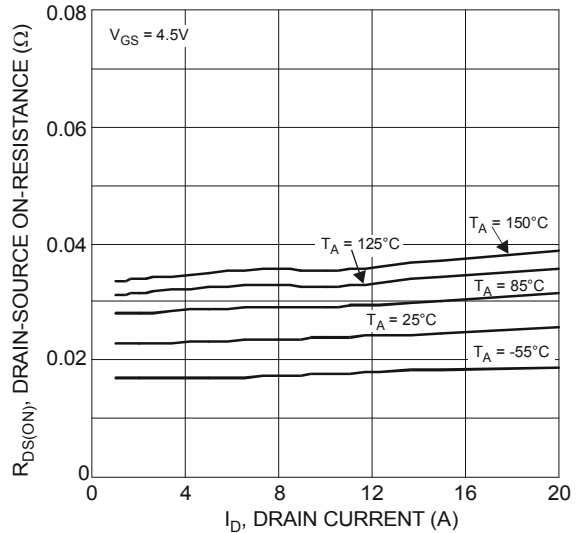


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

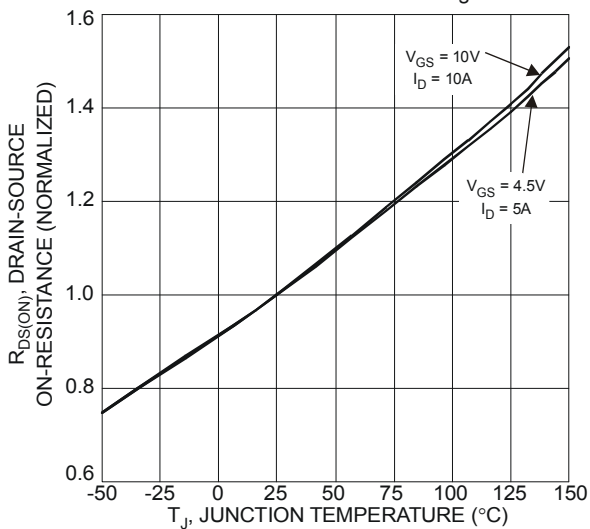


Figure 5 On-Resistance Variation with Temperature

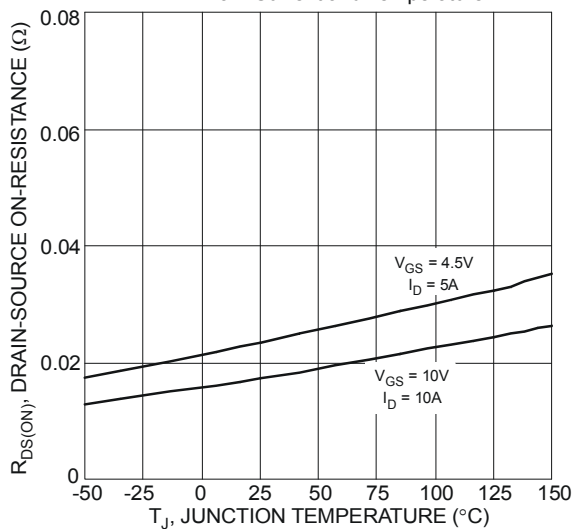


Figure 6 On-Resistance Variation with Temperature



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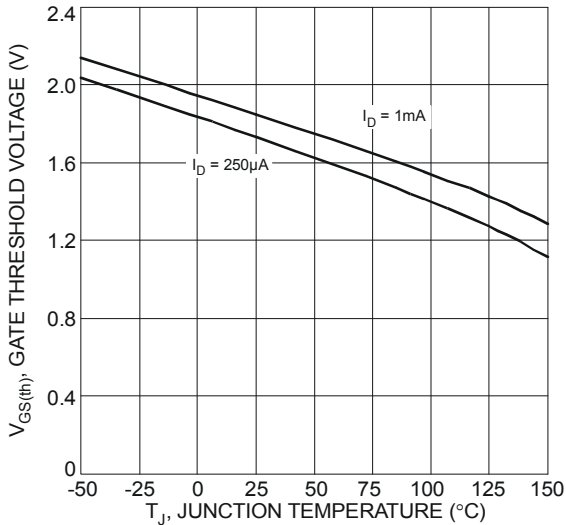


Figure 7 Gate Threshold Variation vs. Ambient Temperature

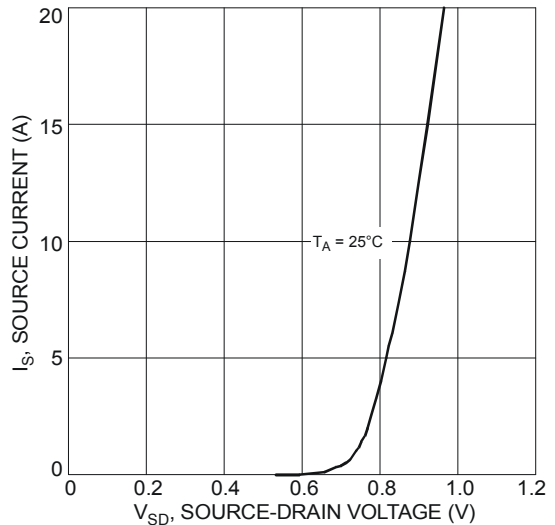


Figure 8 Diode Forward Voltage vs. Current

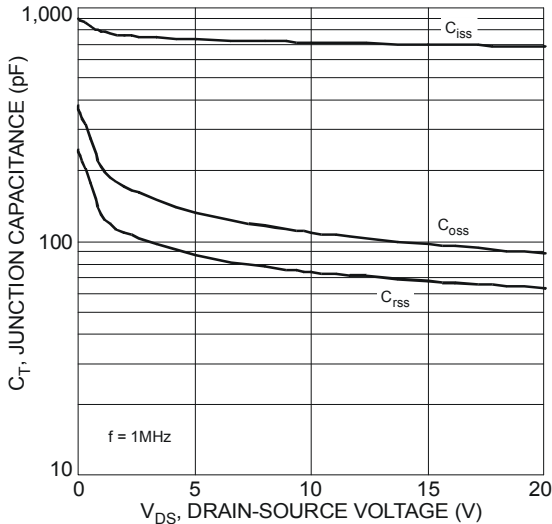


Figure 9 Typical Junction Capacitance

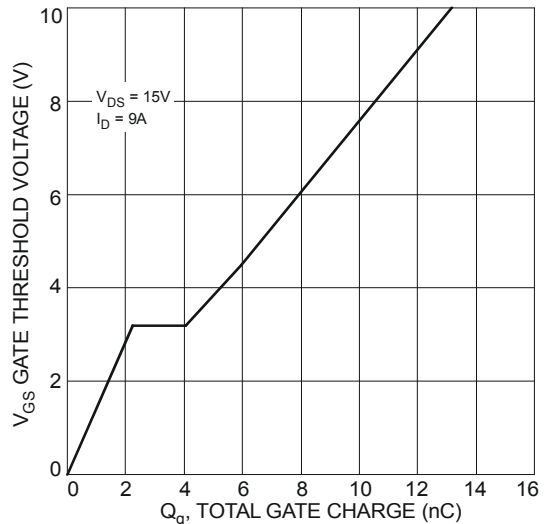


Figure 10 Gate Charge

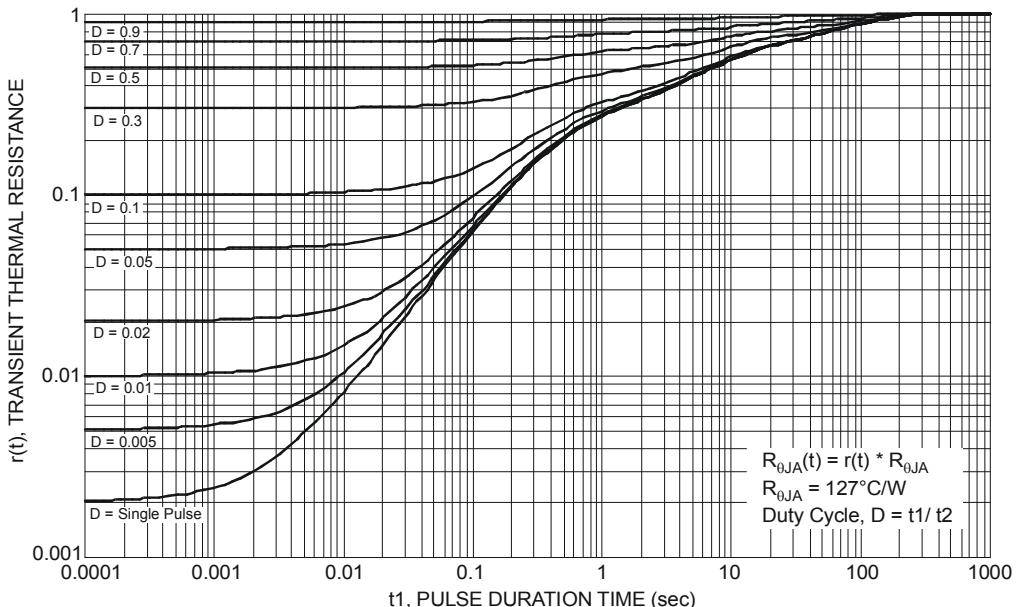
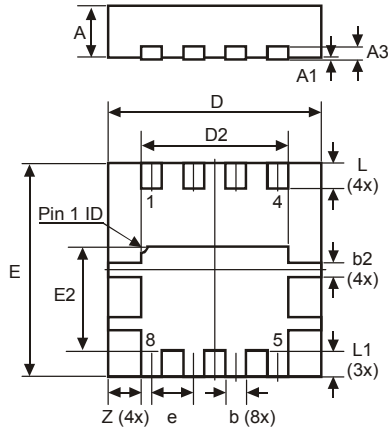


Figure 11 Transient Thermal Resistance

$R_{\theta JA}(t) = r(t) * R_{\theta JA}$
 $R_{\theta JA} = 127^{\circ}\text{C/W}$
 Duty Cycle, $D = t1 / t2$

Package Outline Dimensions

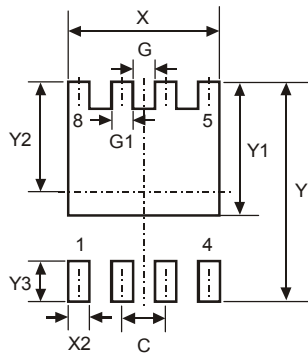
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| POWERDI® 3333-8 | | | |
|----------------------|------|------|-------|
| Dim | Min | Max | Typ |
| D | 3.25 | 3.35 | 3.30 |
| E | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E2 | 1.56 | 1.66 | 1.61 |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | - | - | 0.20 |
| L | 0.35 | 0.45 | 0.40 |
| L1 | - | - | 0.39 |
| e | - | - | 0.65 |
| Z | - | - | 0.515 |
| 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) |
|------------|---------------|
| C | 0.650 |
| G | 0.230 |
| G1 | 0.420 |
| Y | 3.700 |
| Y1 | 2.250 |
| Y2 | 1.850 |
| Y3 | 0.700 |
| X | 2.370 |
| X2 | 0.420 |

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