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DMN6070SFCL

60V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------|--|
| 60V | 85 mΩ @ $V_{GS} = 10\text{V}$ | 3.0A |
| | 120 mΩ @ $V_{GS} = 4\text{V}$ | 2.5A |

Description

This new generation 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

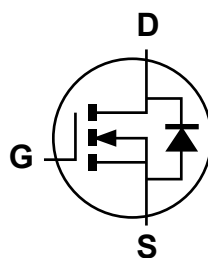
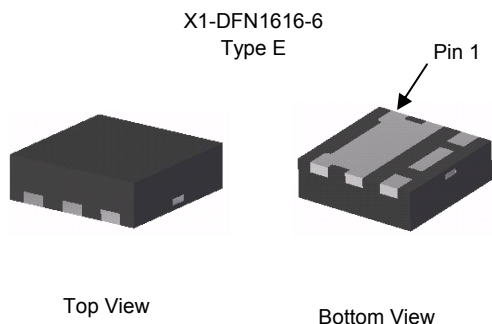
- Power Management Functions
- Analog Switch

Features and Benefits

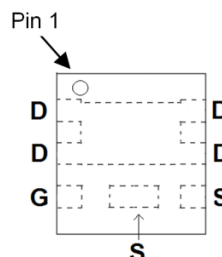
- Typical off board profile of 0.5mm - ideally suited for thin applications
- Low $R_{DS(ON)}$ – minimizes conduction losses
- PCB footprint of 2.56mm²
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**
- Qualified to AEC-Q101 standards for High Reliability**

Mechanical Data

- Case: X1-DFN1616-6 Type E
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Lead Free Plating (NiPdAu Finish over Copper leadframe)
- Terminals: Solderable per MIL-STD-202, Method 208 (e4)
- Weight: 0.04 grams (approximate)



Device Symbol



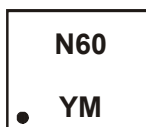
Top View
Pin-Out

Ordering Information (Note 4)

| Product | Reel size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|--------------------|-----------------|-------------------|
| DMN6070SFCL-7 | 7 | 8 | 3,000 |

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>

Marking Information



N60 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: A = 2013)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|
| Code | Y | Z | A | B | C | D | E |

| 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} | 60 | V |
| Gate-Source Voltage | | | V _{GSS} | ±20 | V |
| Continuous Drain Current (Note 6) V _{GS} = 10V | Steady State | T _A = +25°C | I _D | 3.0 | A |
| | | T _A = +70°C | | 2.5 | |
| Pulsed Drain Current (10μs pulse, Duty cycle = 1%) | | | I _{DM} | 10 | A |

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

| Characteristic | | Symbol | Value | Units |
|---|----------|-----------------------------------|-------------|-------|
| Total Power Dissipation | (Note 5) | P _D | 0.6 | W |
| | (Note 6) | | 1.8 | |
| Thermal Resistance, Junction to Ambient | (Note 5) | R _{θJA} | 200 | °C/W |
| | (Note 6) | | 67 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

Electrical Characteristics N-CHANNEL (@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} | 60 | — | — | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current T _J = +25°C | I _{DSS} | — | — | 1.0 | μA | V _{DS} = 60V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±16V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1 | — | 3 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 67 | 85 | mΩ | V _{GS} = 10V, I _D = 1.5A |
| | | | 74 | 120 | | V _{GS} = 4V, I _D = 0.5A |
| Forward Transfer Admittance | Y _{fs} | — | 2.6 | — | S | V _{DS} = 5V, I _D = 1.5A |
| Diode Forward Voltage | V _{SD} | — | 0.7 | 1.2 | V | V _{GS} = 0V, I _S = 3A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 606 | — | pF | V _{DS} = 20V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 32.6 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 24.6 | — | pF | |
| Gate Resistance | R _g | — | 1.5 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 10V) | Q _g | — | 12.3 | — | nC | V _{DS} = 30V, I _D = 3A |
| Total Gate Charge (V _{GS} = 4.5V) | Q _g | — | 5.6 | — | nC | |
| Gate-Source Charge | Q _{gs} | — | 1.7 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 1.9 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 3.5 | — | ns | V _{GS} = 10V, V _{DS} = 30V, R _G = 20Ω, R _L = 50Ω |
| Turn-On Rise Time | t _r | — | 4.1 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 35 | — | ns | |
| Turn-Off Fall Time | t _f | — | 11 | — | 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 thermal vias to bottom layer 1inch square copper plate
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.



DMN6070SFCL

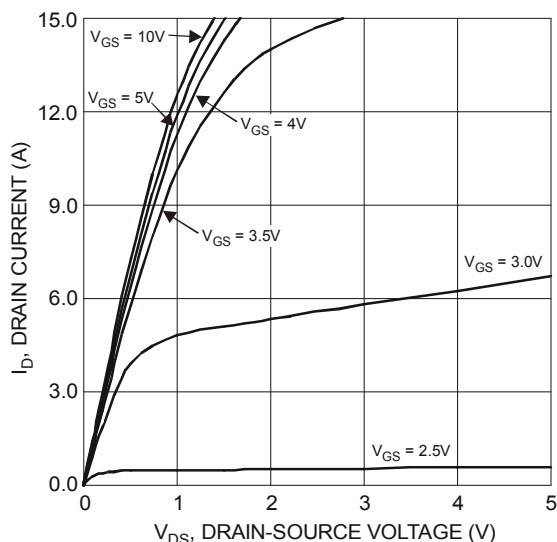


Figure 1 Typical Output Characteristics

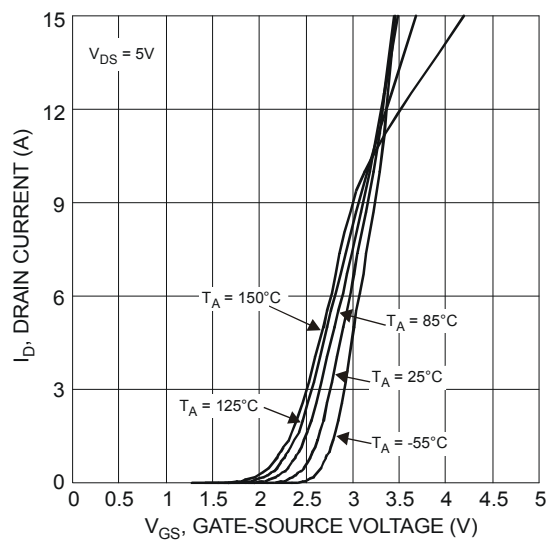


Figure 2 Typical Transfer Characteristics

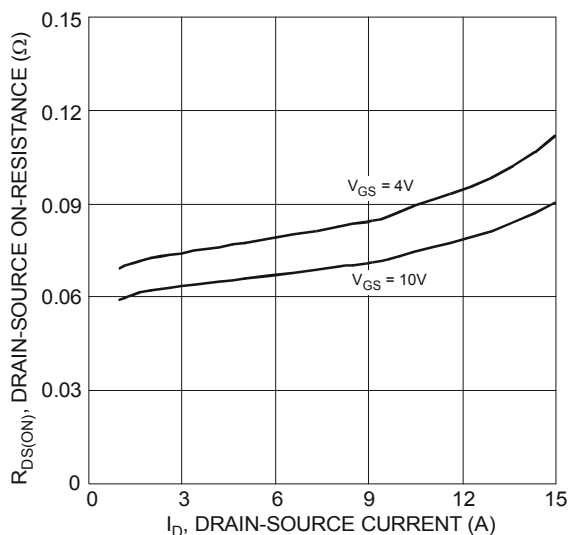


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

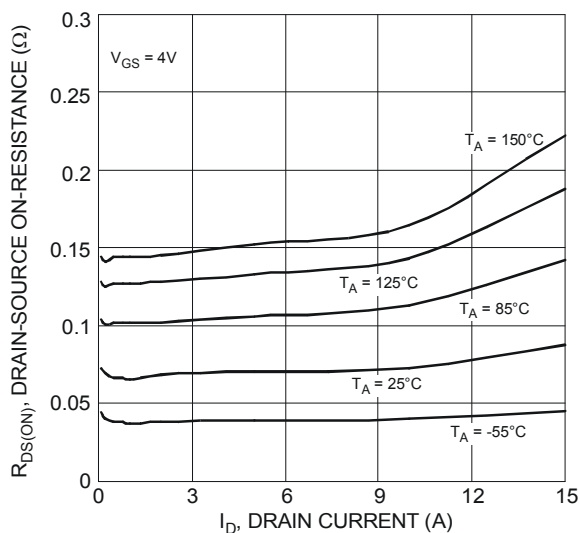


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

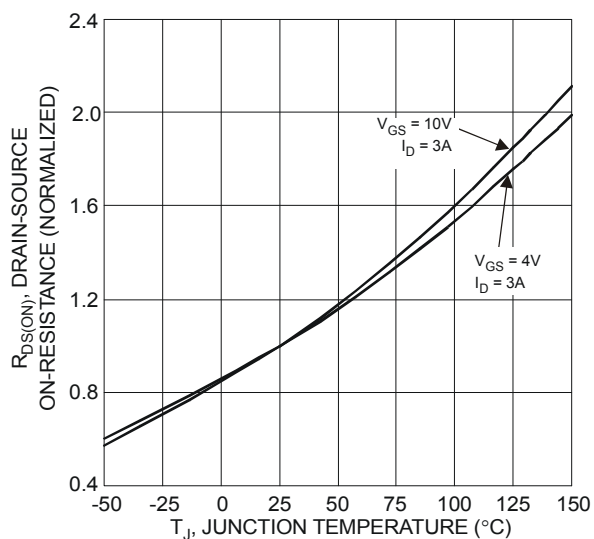


Figure 5 On-Resistance Variation with Temperature

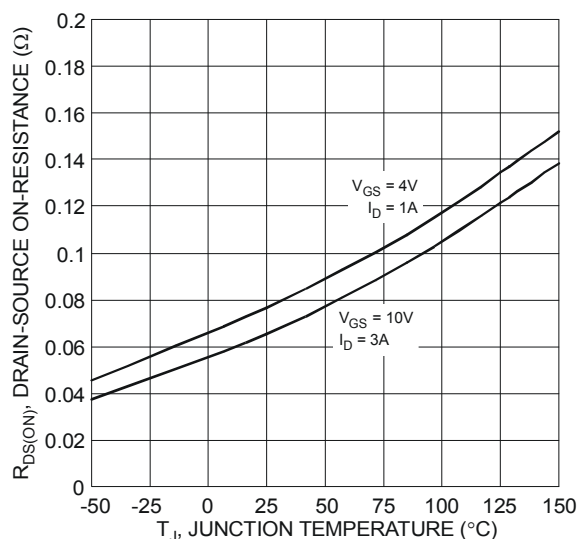


Figure 6 On-Resistance Variation with Temperature

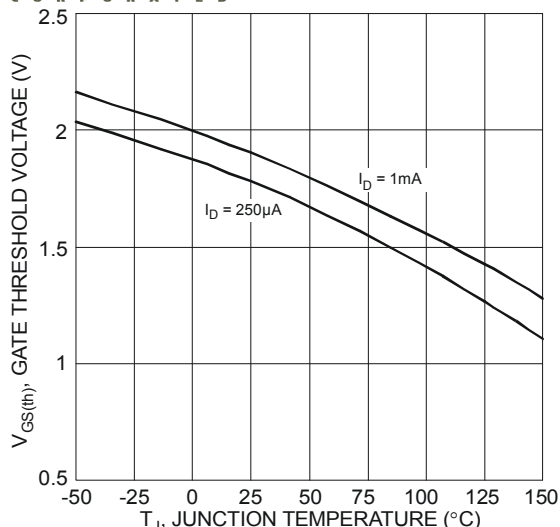


Figure 7 Gate Threshold Variation vs. Ambient Temperature

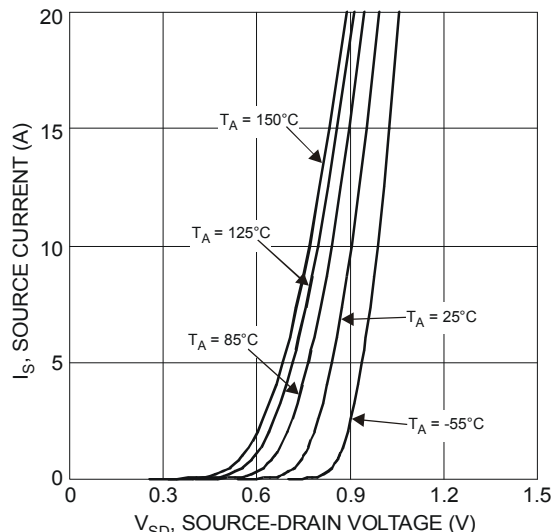


Figure 8 Diode Forward Voltage vs. Current

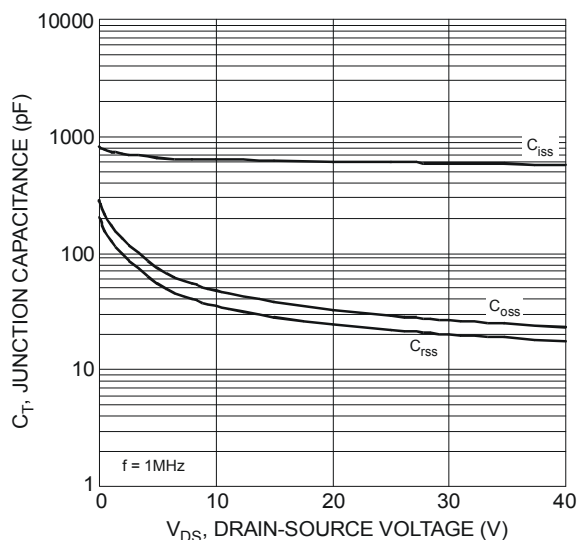


Figure 9 Typical Junction Capacitance

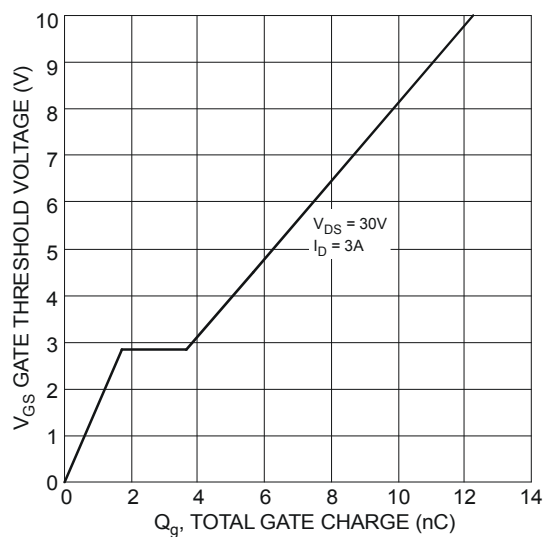
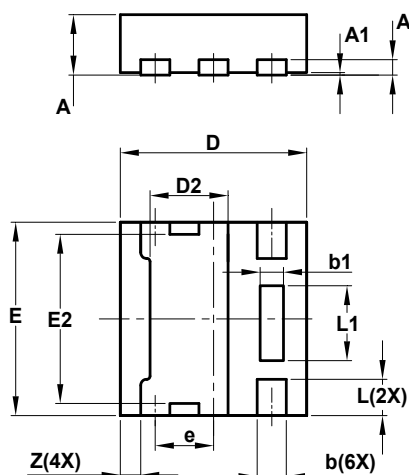


Figure 10 Gate Charge

Package Outline Dimensions

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

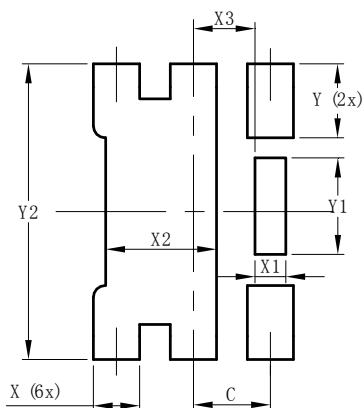


| X1-DFN1616-6 Type E | | | |
|------------------------|------|------|-------|
| Dim | Min | Max | Typ |
| A | 0.47 | 0.53 | 0.50 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | — | — | 0.13 |
| b | 0.20 | 0.30 | 0.25 |
| b1 | 0.10 | 0.30 | 0.20 |
| D | 1.55 | 1.65 | 1.60 |
| D2 | 0.57 | 0.77 | 0.67 |
| E | 1.55 | 1.65 | 1.60 |
| E2 | 1.30 | 1.50 | 1.40 |
| e | — | — | 0.50 |
| L | 0.25 | 0.35 | 0.30 |
| L1 | 0.52 | 0.72 | 0.62 |
| Z | — | — | 0.175 |

All Dimensions in mm

Suggested Pad Layout

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



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.500 |
| X | 0.300 |
| X1 | 0.200 |
| X2 | 0.720 |
| X3 | 0.400 |
| Y | 0.475 |
| Y1 | 0.620 |
| Y2 | 1.900 |

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