



30V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

| V _{(BR)DSS} | R _{DS(ON) MAX} | Package | I _D T _A = +25°C |
|----------------------|-------------------------------|---------|--|
| 30V | $40m\Omega @ V_{GS} = 10V$ | SC59 | 5.1A |
| 30 V | $50m\Omega$ @ $V_{GS} = 4.5V$ | 3039 | 4.3A |

Description

This new generation MOSFET has been designed to minimize the onstate resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

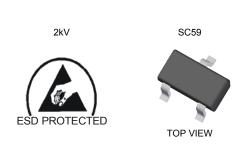
- Load Switch
- DC-DC Converters
- Power Management Functions

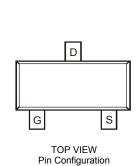
Features

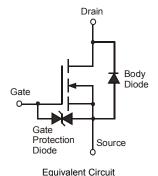
- Low On-Resistance
- FSD Protected Gate
- Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

- Case: SC59
- Case Material Molded Plastic. UL Flammability Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals: Finish Matte Tin Solderable per MIL-STD-202, Method 208 (e3)
- Terminal Connections: See Diagram
- Weight: 0.014 grams (approximate)
- •







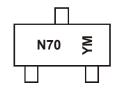
Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|------|------------------|
| DMN3070SSN-7 | SC59 | 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



N70 = Product Type Marking Code YM = Date Code Marking Y = Year ex: Z = 2012 M = Month ex: 9 = September

Date Code Key

| Code X Y Z A B C D E | Year | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|----------------------|------|------|------|------|------|------|------|------|------|
| | Code | X | Y | Z | Α | В | С | D | Е |

| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|-------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Code | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 0 | 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 = 10V | I _D | 4.2 3.3 | А | |
| Continuous Drain Current (Note 6) V _{GS} = 10V | l _D | 5.1 4 | А | |
| Continuous Drain Current (Note 6) V = 4.5V | I _D | 3.7 2.8 | А | |
| Continuous Drain Current (Note 6) V _{GS} = 4.5V | I _D | 4.3 3.3 | А | |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%) | I _{DM} | 60 | Α | |
| Maximum Body Diode Forward Current (Note 6) | | Is | 2 | Α |

Thermal Characteristics

| Characteristic | Symbol | Value | Units | |
|--|------------------------|-----------------|-------|------|
| Total Power Dissipation (Note 5) | T _A = +25°C | Pn | 0.78 | W |
| Total Power Dissipation (Note 5) | $T_A = +70^{\circ}C$ | PD | 0.5 | VV |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | В | 160 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 5) | t<10s | $R_{\theta JA}$ | 115 | °C/W |
| Total Power Dissipation (Note 6) | Б | 1.3 | W | |
| Total Power Dissipation (Note 6) | $T_A = +70^{\circ}C$ | P_{D} | 0.8 | VV |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | Б | 96 | °C/W |
| Thermal Resistance, Junction to Ambient (Note 6) | $R_{\theta JA}$ | 68 | °C/W | |
| Thermal Resistance, Junction to Case (Note 6) | $R_{\theta JC}$ | 18 | °C/W | |
| Operating and Storage Temperature Range | $T_{J_i}T_{STG}$ | -55 to +150 | °C | |

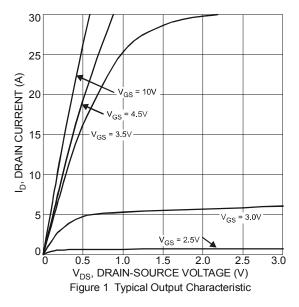
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

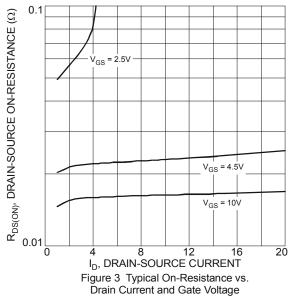
| Characteristic | Symbol | Min | Тур | Max | Unit | Test Condition |
|--|---------------------|-----|--|-----|------|--|
| OFF CHARACTERISTICS (Note 7) | | | | I. | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | 30 | _ | _ | V | V _{GS} = 0V, I _D = 250μA |
| Zero Gate Voltage Drain Current | I _{DSS} | _ | _ | 1 | μA | V _{DS} =24V, V _{GS} = 0V |
| Gate-Body Leakage | I _{GSS} | _ | _ | ±10 | μA | $V_{GS} = \pm 20V, V_{DS} = 0V$ |
| ON CHARACTERISTICS (Note 7) | | | <u>. </u> | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.1 | _ | 2.1 | V | $V_{DS} = V_{GS}, I_{D} = 250 \mu A$ |
| Ot ii D. i. Oassaa Oa Baaistaa | | _ | 24 | 40 | | V _{GS} = 10V, I _D = 4.2A |
| Static Drain-Source On-Resistance | R _{DS(ON)} | _ | 30 | 50 | mΩ | V _{GS} = 4.5V, I _D = 2A |
| Forward Transfer Admittance | IY _{fs} I | _ | 2.7 | _ | S | V _{DS} = 5V, I _D =4.2A |
| Diode Forward Voltage | V _{SD} | _ | 0.75 | 1.0 | V | V _{GS} = 0V, I _S = 1A |
| DYNAMIC CHARACTERISTICS (Note 8) | | | <u>, </u> | | I | |
| Input Capacitance | C _{iss} | _ | 697 | _ | pF | |
| Output Capacitance | C _{oss} | _ | 97 | _ | pF | $V_{DS} = 15V, V_{GS} = 0V$ |
| Reverse Transfer Capacitance | C _{rss} | _ | 67 | _ | pF | f = 1.0MHz |
| Gate Resistance | R _g | _ | 1.47 | _ | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (V _{GS} = 4.5V) | Q_g | _ | 6 | _ | | , == . |
| Total Gate Charge (V _{GS} = 10V) | Q_g | _ | 13.2 | _ | nC | V - 15V I 0A |
| Gate-Source Charge | Q_{gs} | _ | 2.2 | _ | 110 | $V_{DS} = 15V, I_D = 9A$ |
| Gate-Drain Charge | Q_{gd} | _ | 1.8 | _ | | |
| Turn-On Delay Time | t _{D(ON)} | _ | 4.3 | _ | ns | |
| Turn-Off Delay Time | t _{D(OFF)} | | 4.4 | _ | ns | V_{DD} =15V, V_{GEN} =10V, R_{GEN} =6 Ω , |
| Turn-On Rise Time | t _r | _ | 20.1 | _ | ns | R _L =15Ω |
| Turn-Off Fall Time | t _f | _ | 4.1 | _ | ns | 1 |
| Reverse Recovery Time | t _{rr} | _ | 7.3 | _ | Ns | IF = 9A, di/dt = 500A/μs |
| Reverse Recovery Charge | Q _{rr} | _ | 7.9 | _ | nC | IF = 9A, di/dt = 500A/µs |

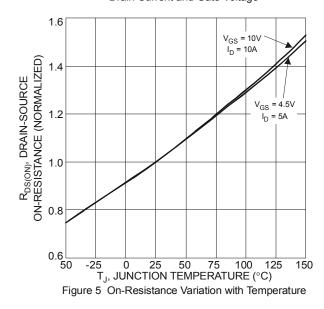
Notes:

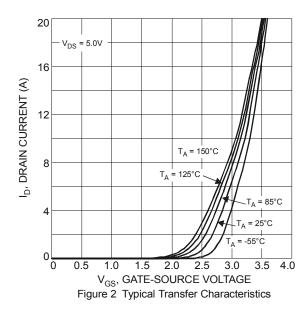
- 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided. The power dissipation P_D is based on t<10s $R_{\theta JA}$.
- 6. Device mounted on 1" x 1" FR-4 PCB with high coverage 2 oz. Copper, single sided. The power dissipation P_D is based on t<10s R_{BJA} .
- 7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to production testing.











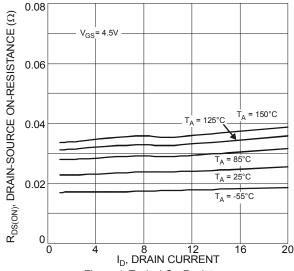
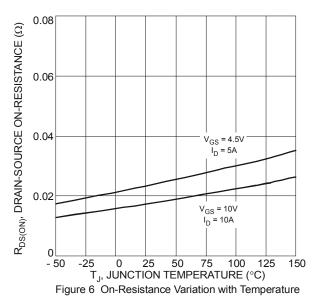


Figure 4 Typical On-Resistance vs. Drain Current and Temperature





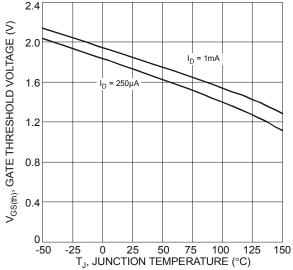


Figure 7 Gate Threshold Variation vs. Ambient Temperature

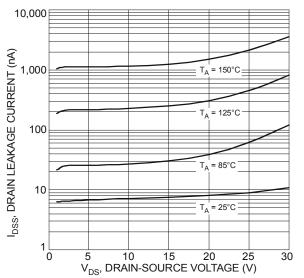
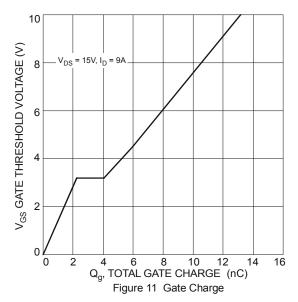
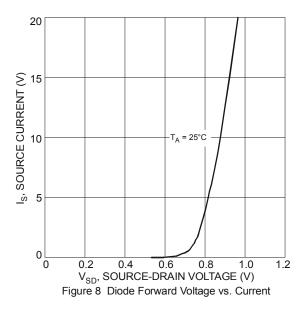
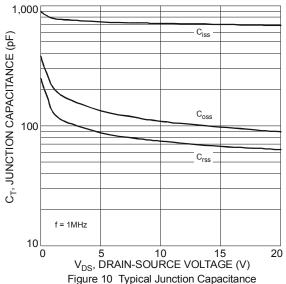


Figure 9 Typical Drain-Source Leakage Current vs. Voltage



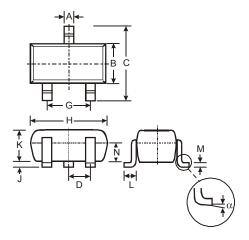






Package Outline Dimensions

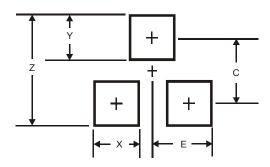
Please see AP02002 at http://www.diodes.com/datasheets/ap02002.pdf for latest version.



| SC59 | | | | | | |
|----------------------|-------|------|------|--|--|--|
| Dim | Min | Max | Тур | | | |
| Α | 0.35 | 0.50 | 0.38 | | | |
| В | 1.50 | 1.70 | 1.60 | | | |
| C | 2.70 | 3.00 | 2.80 | | | |
| D | - | - | 0.95 | | | |
| G | - | - | 1.90 | | | |
| Н | 2.90 | 3.10 | 3.00 | | | |
| J | 0.013 | 0.10 | 0.05 | | | |
| K | 1.00 | 1.30 | 1.10 | | | |
| L | 0.35 | 0.55 | 0.40 | | | |
| M | 0.10 | 0.20 | 0.15 | | | |
| N | 0.70 | 0.80 | 0.75 | | | |
| α | 0° | 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 | 3.4 |
| Х | 0.8 |
| Υ | 1.0 |
| С | 2.4 |
| E | 1.35 |



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