

Product Summary

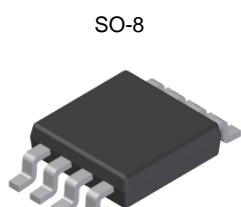
| Device | $V_{(BR)DSS}$ | $R_{DS(ON)}$ max | I_D max $T_A = +25^\circ C$ |
|--------|---------------|---------------------------------|----------------------------------|
| Q1 | 30V | 27m Ω @ $V_{GS} = 10V$ | 7.2A |
| | | 35m Ω @ $V_{GS} = 4.5V$ | 6.0A |
| Q2 | -30V | 25m Ω @ $V_{GS} = -10V$ | -7.6A |
| | | 41m Ω @ $V_{GS} = -4.5V$ | -6.2A |

Description

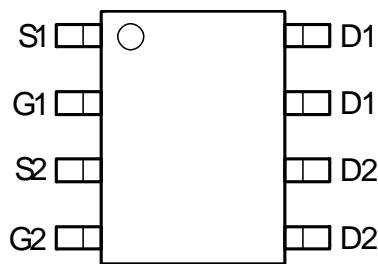
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

Applications

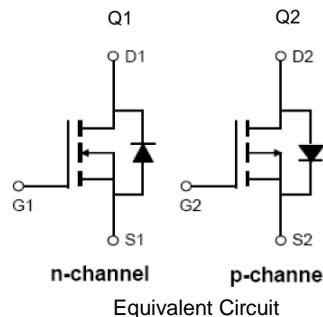
- DC-DC Converters
- Power Management Functions
- Backlighting



Top View



Top View Pin Configuration



Equivalent Circuit

Ordering Information (Note 5)

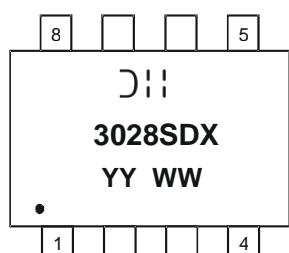
| Part Number | Case | Packaging |
|-----------------|------|-------------------|
| DMC3028LSDXQ-13 | SO-8 | 2,500/Tape & Reel |

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. Automotive products are AEC-Q101 qualified and are PPAP capable. Automotive, AEC-Q101 and standard products are electrically and thermally the same, except where specified. For more information, please refer to http://www.diodes.com/quality/product_grade_definitions/.
5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

SO-8



○II = Manufacturer's Marking
3028SDX = Product Type Marking Code
YYWW = Date Code Marking
YY = Year (ex: 13 = 2013)
WW = Week (01 - 53)

Maximum Ratings – Q1 and Q2 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | | Symbol | Q1 | Q2 | Units |
|--|------------------|--|-----------|------------|--------------|-------|
| Drain-Source Voltage | | | V_{DSS} | 30 | -30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | ± 20 | V |
| Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 5.5 4.1 | -5.8 -4.3 | A |
| | $t < 10\text{s}$ | $T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ | I_D | 7.2 5.7 | -7.6 -6.1 | A |
| Maximum Body Diode Forward Current (Note 6) | | | I_S | 2.2 | -2.2 | A |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | | | I_{DM} | 40 | -30 | A |

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | | Symbol | Value | Units |
|--|---------------------------|-----------------|-------------|---------------------------|
| Total Power Dissipation (Note 6) | $T_A = +25^\circ\text{C}$ | P_D | 1.2 | W |
| | $T_A = +70^\circ\text{C}$ | | 0.75 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady State | $R_{\theta JA}$ | 108 | $^\circ\text{C}/\text{W}$ |
| | $t < 10\text{s}$ | | 65 | |
| Total Power Dissipation (Note 7) | $T_A = +25^\circ\text{C}$ | P_D | 1.5 | W |
| | $T_A = +70^\circ\text{C}$ | | 0.95 | |
| Thermal Resistance, Junction to Ambient (Note 7) | Steady State | $R_{\theta JA}$ | 85 | $^\circ\text{C}/\text{W}$ |
| | $t < 10\text{s}$ | | 50 | |
| Thermal Resistance, Junction to Case (Note 7) | $R_{\theta JC}$ | | 14.5 | |
| Operating and Storage Temperature Range | T_J, T_{STG} | | -55 to +150 | °C |

Electrical Characteristics – Q1 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|-----|------|-----------|------------------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | 30 | — | — | V | $V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | 1 | μA | $V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Source Leakage | I_{GS} | — | — | ± 100 | nA | $V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | $V_{GS(\text{th})}$ | 1 | — | 3 | V | $V_{DS} = V_{GS}, I_D = 250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(\text{ON})}$ | — | 19 | 27 | $\text{m}\Omega$ | $V_{GS} = 10\text{V}, I_D = 6\text{A}$ |
| | | — | 22 | 35 | | $V_{GS} = 4.5\text{V}, I_D = 5\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | 0.7 | 1.2 | V | $V_{GS} = 0\text{V}, I_S = 1.3\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C_{iss} | — | 641 | — | pF | $V_{DS} = 15\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 66 | — | | |
| Reverse Transfer Capacitance | C_{rss} | — | 51 | — | | |
| Gate Resistance | R_G | — | 2.2 | — | Ω | $V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Total Gate Charge ($V_{GS} = 4.5\text{V}$) | Q_g | — | 6 | — | nC | $V_{DS} = 15\text{V}, I_D = 10\text{A}$ |
| Total Gate Charge ($V_{GS} = 10\text{V}$) | Q_g | — | 13.2 | — | | |
| Gate-Source Charge | Q_{gs} | — | 1.7 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 2.2 | — | | |
| Turn-On Delay Time | $t_{D(\text{on})}$ | — | 3.3 | — | nS | $V_{GS} = 10\text{V}, V_{DD} = 15\text{V}, R_G = 6\Omega, I_D = 1\text{A}$ |
| Turn-On Rise Time | t_r | — | 4.4 | — | | |
| Turn-Off Delay Time | $t_{D(\text{off})}$ | — | 22.3 | — | | |
| Turn-Off Fall Time | t_f | — | 5.3 | — | | |

Electrical Characteristics – Q2 (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|-----------------------------------|-----|------|-----------|------------------|--|
| OFF CHARACTERISTICS (Note 8) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -30 | — | — | V | $\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current | I_{DSS} | — | — | -1 | μA | $\text{V}_{\text{DS}} = -24\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$ |
| Gate-Source Leakage | I_{GSS} | — | — | ± 100 | nA | $\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 8) | | | | | | |
| Gate Threshold Voltage | $\text{V}_{\text{GS}(\text{th})}$ | -1 | — | -3 | V | $\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $\text{R}_{\text{DS}(\text{ON})}$ | — | 21 | 25 | $\text{m}\Omega$ | $\text{V}_{\text{GS}} = -10\text{V}$, $\text{I}_D = -6\text{A}$ |
| | | — | 29 | 41 | | $\text{V}_{\text{GS}} = -4.5\text{V}$, $\text{I}_D = -5\text{A}$ |
| Diode Forward Voltage | V_{SD} | — | -0.7 | -1.2 | V | $\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_S = -1.3\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C_{iss} | — | 1241 | — | pF | $\text{V}_{\text{DS}} = -15\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$ $f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | — | 146 | — | | |
| Reverse Transfer Capacitance | C_{rss} | — | 110 | — | | |
| Gate Resistance | R_G | — | 14.8 | — | Ω | $\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1.0\text{MHz}$ |
| Total Gate Charge ($\text{V}_{\text{GS}} = -4.5\text{V}$) | Q_g | — | 10.9 | — | nC | $\text{V}_{\text{DS}} = -15\text{V}$, $\text{I}_D = -7\text{A}$ |
| Total Gate Charge ($\text{V}_{\text{GS}} = -10\text{V}$) | Q_g | — | 22 | — | | |
| Gate-Source Charge | Q_{gs} | — | 3.5 | — | | |
| Gate-Drain Charge | Q_{gd} | — | 4.7 | — | | |
| Turn-On Delay Time | $\text{t}_{\text{D}(\text{on})}$ | — | 9.7 | — | nS | $\text{V}_{\text{GS}} = -10\text{V}$, $\text{V}_{\text{DD}} = -15\text{V}$, $\text{R}_{\text{GEN}} = 6\Omega$, $\text{I}_D = -7\text{A}$ |
| Turn-On Rise Time | t_r | — | 17.1 | — | | |
| Turn-Off Delay Time | $\text{t}_{\text{D}(\text{off})}$ | — | 60.5 | — | | |
| Turn-Off Fall Time | t_f | — | 40.4 | — | | |

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 1inch square copper plate.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

N-Channel – Q1

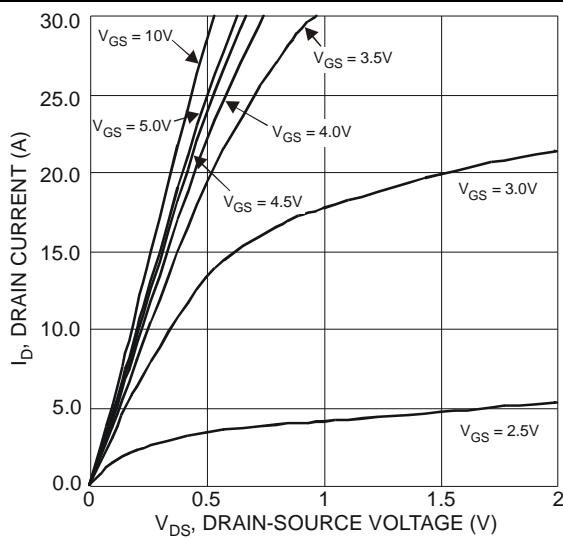


Figure 1 Typical Output Characteristic

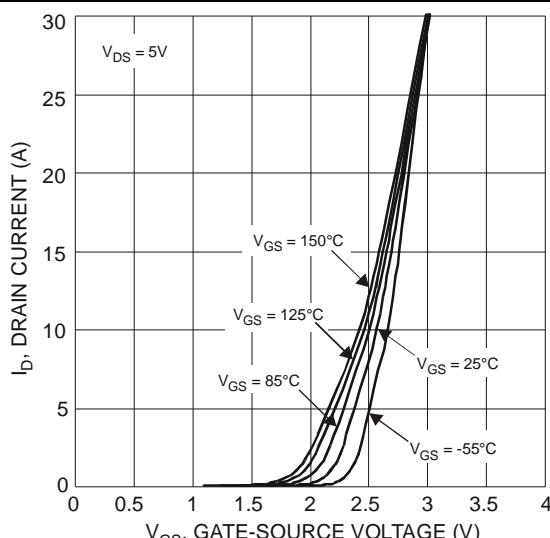


Figure 2 Typical Transfer Characteristic

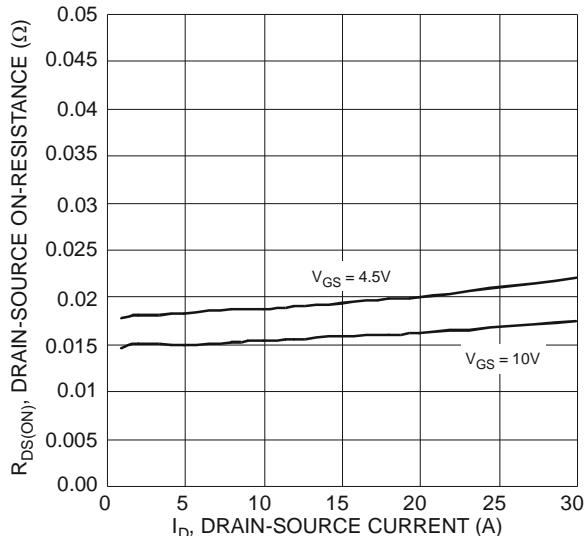


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

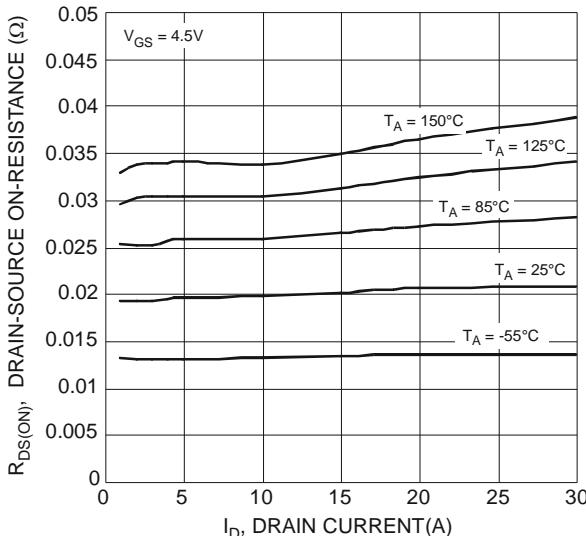


Figure 4 Typical On-Resistance vs.
Drain Current and Temperature

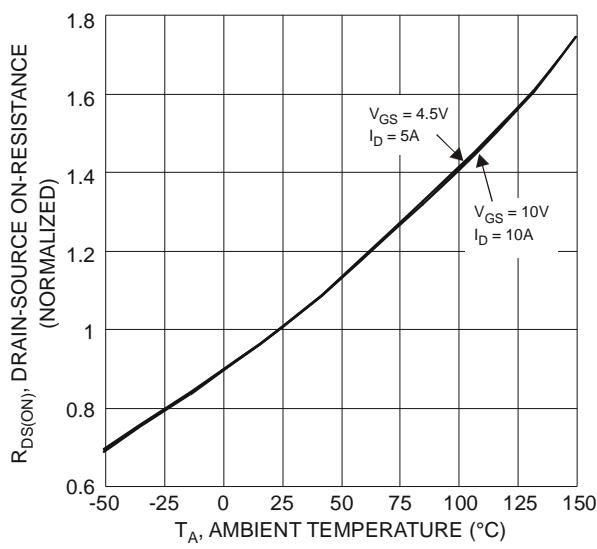


Figure 5 On-Resistance Variation with Temperature

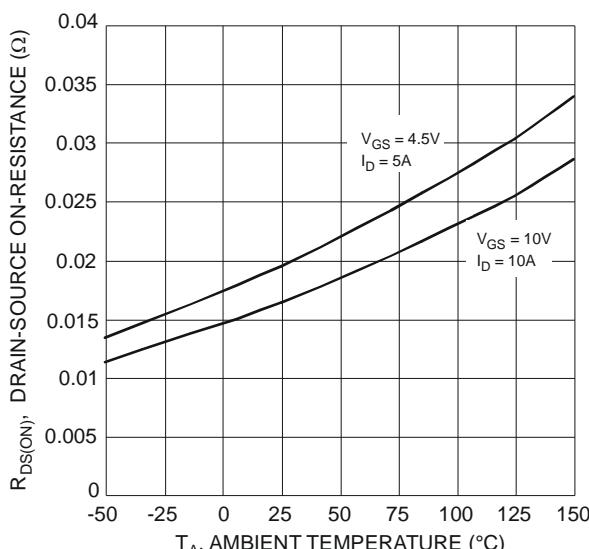


Figure 6 On-Resistance Variation with Temperature

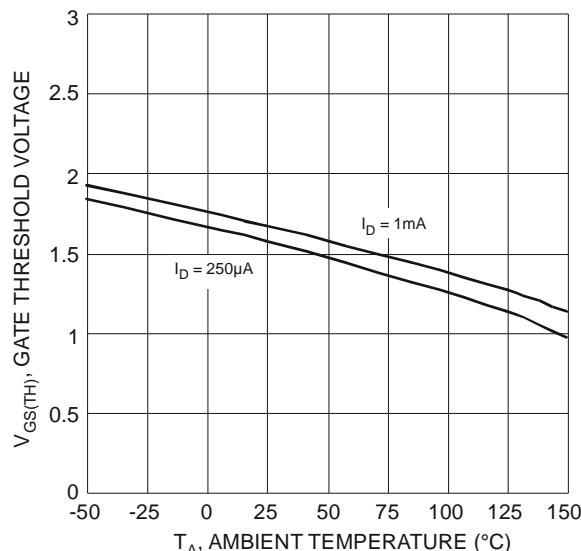


Figure 7 Gate Threshold Variation vs. Ambient Temperature

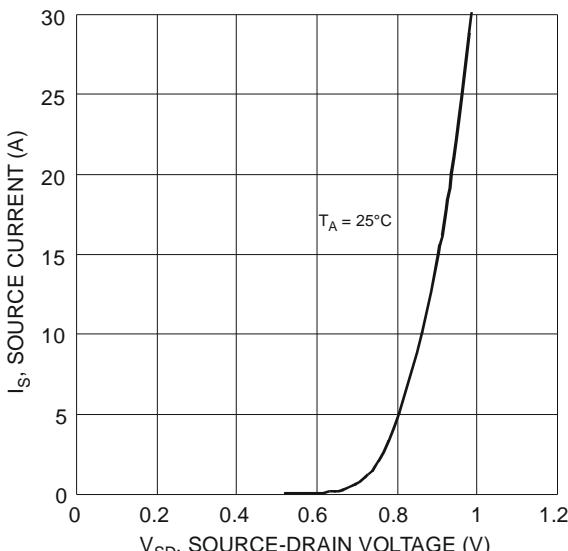


Figure 8 Diode Forward Voltage vs. Current

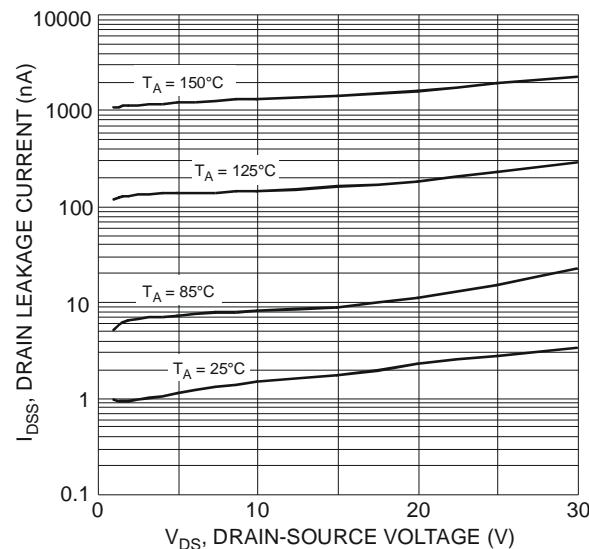


Figure 9 Typical Drain-Source Leakage Current vs. Voltage

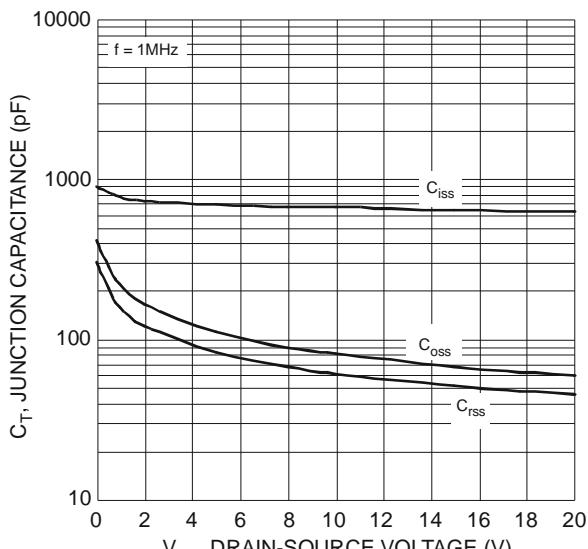


Figure 10 Typical Junction Capacitance

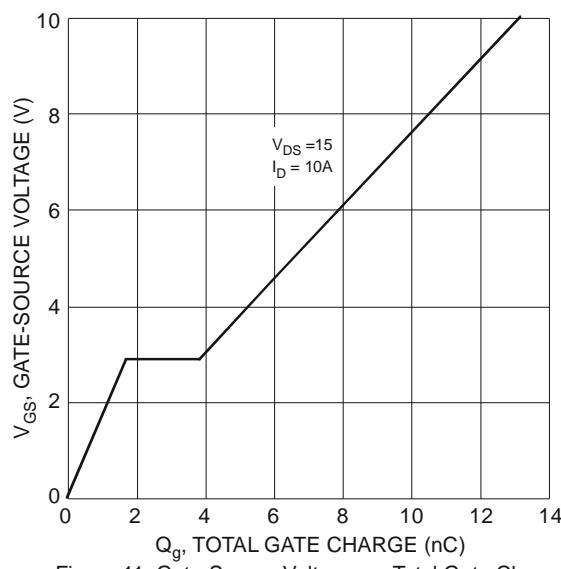


Figure 11 Gate-Source Voltage vs. Total Gate Charge

P-Channel – Q2

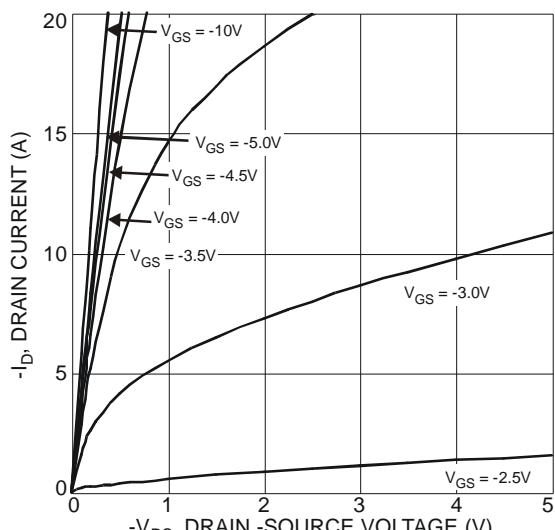


Figure 1 Typical Output Characteristics

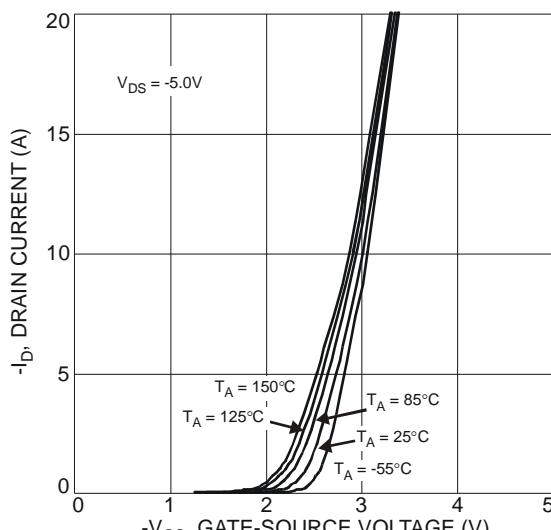


Figure 2 Typical Transfer Characteristics

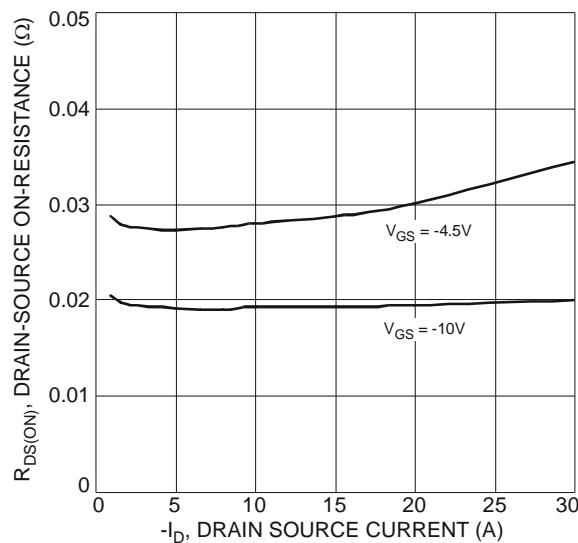


Figure 3 Typical On-Resistance vs.
Drain Current and Gate Voltage

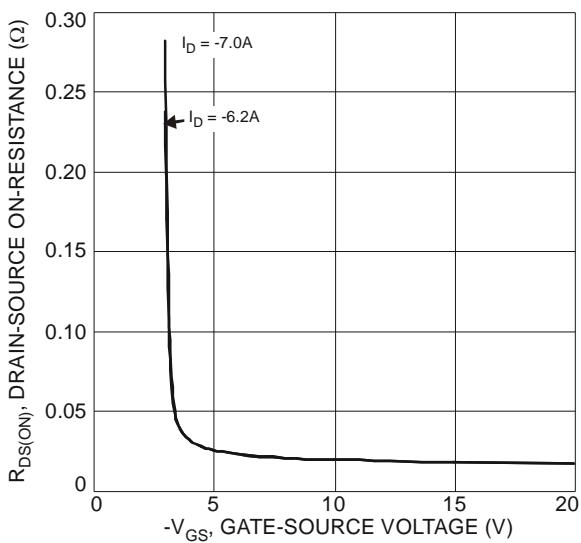


Figure 4 Typical Drain-Source On-Resistance
vs. Gate-Source Voltage

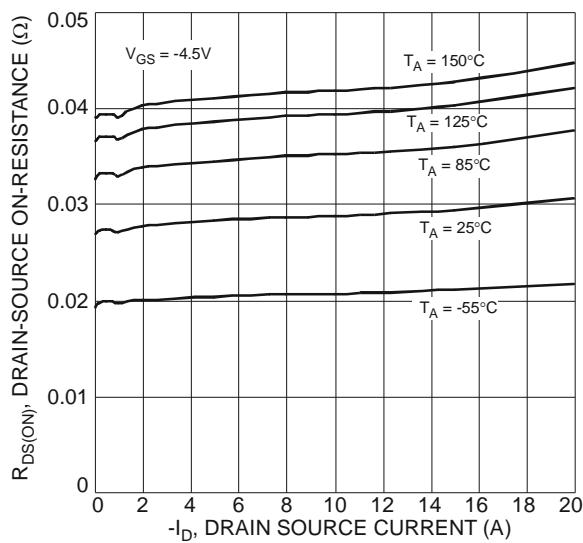


Figure 5 Typical On-Resistance vs.
Drain Current and Temperature

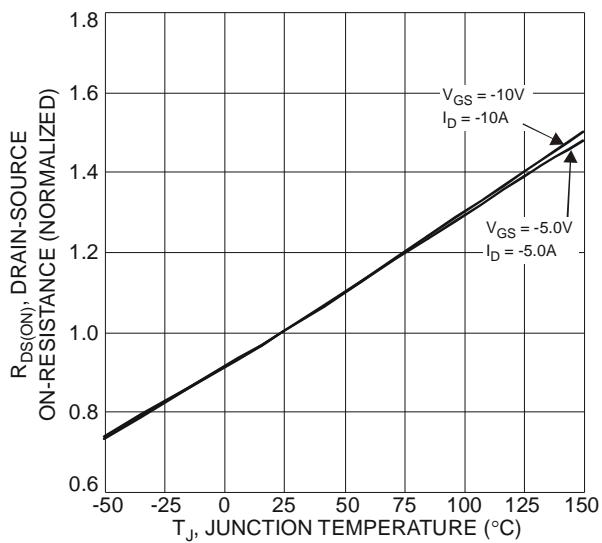
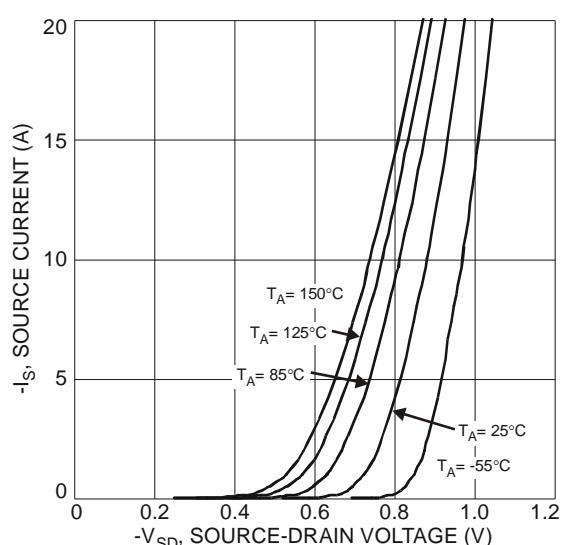
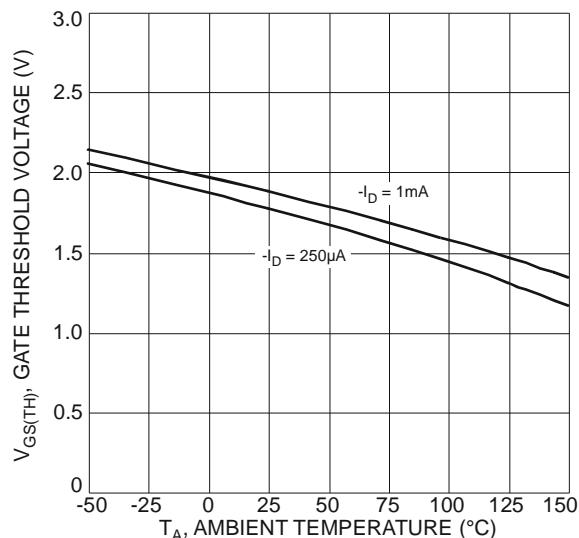
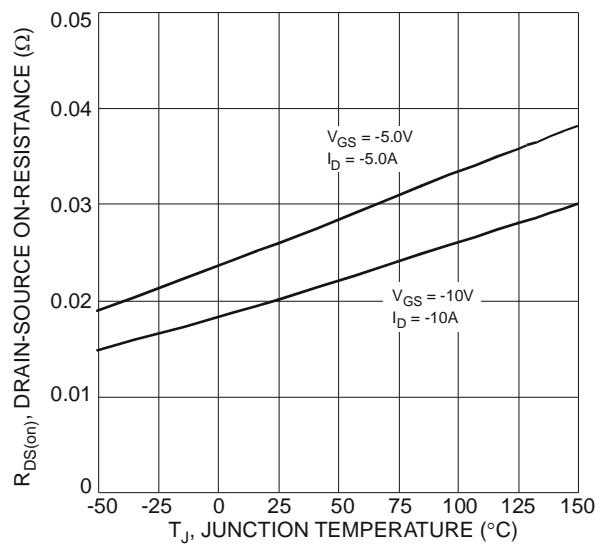
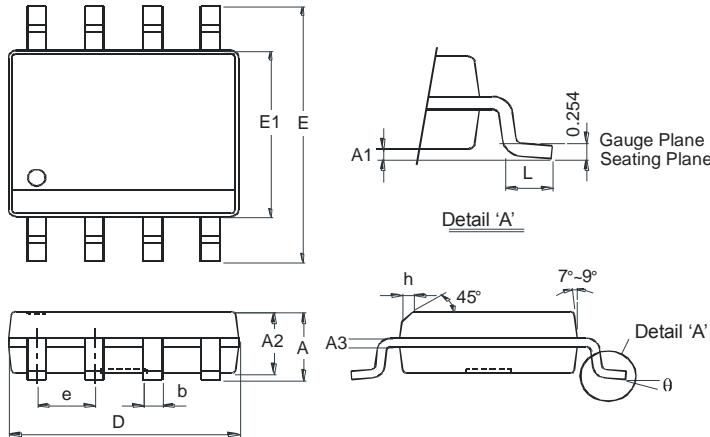


Figure 6 On-Resistance Variation with Temperature



Package Outline Dimensions

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

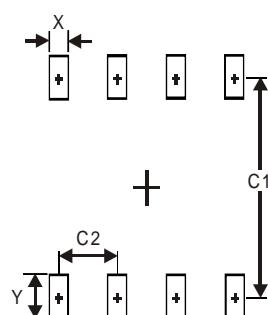


| SO-8 | | |
|-----------|----------|------|
| Dim | Min | Max |
| A | - | 1.75 |
| A1 | 0.10 | 0.20 |
| A2 | 1.30 | 1.50 |
| A3 | 0.15 | 0.25 |
| b | 0.3 | 0.5 |
| D | 4.85 | 4.95 |
| E | 5.90 | 6.10 |
| E1 | 3.85 | 3.95 |
| e | 1.27 Typ | |
| h | - | 0.35 |
| L | 0.62 | 0.82 |
| θ | 0° | 8° |

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) |
|------------|---------------|
| X | 0.60 |
| Y | 1.55 |
| C1 | 5.4 |
| C2 | 1.27 |

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