

## Product Summary

| Device | V <sub>(BR)DSS</sub> | R <sub>DS(on)</sub> max        | I <sub>D</sub><br>T <sub>A</sub> = +25°C |
|--------|----------------------|--------------------------------|------------------------------------------|
| Q2     | 40V                  | 24mΩ @ V <sub>GS</sub> = 10V   | 9.0A                                     |
|        |                      | 32mΩ @ V <sub>GS</sub> = 4.5V  | 7.8A                                     |
| Q1     | -40V                 | 45mΩ @ V <sub>GS</sub> = -10V  | -6.5A                                    |
|        |                      | 55mΩ @ V <sub>GS</sub> = -4.5V | -5.9A                                    |

## Description

This new generation MOSFET has been designed to minimize the on-state resistance (R<sub>DS(on)</sub>) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

## Applications

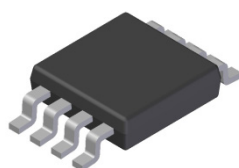
- DC-DC Converters
- Power Management Functions
- Backlighting

## Features and Benefits

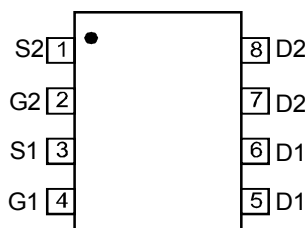
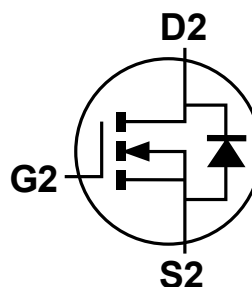
- Low Input Capacitance
- Low On-Resistance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

## Mechanical Data

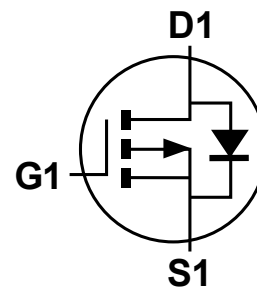
- Case: SO-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Terminals: Finish – Tin Finish annealed over Copper leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.074 grams (approximate)



Top View


 TOP VIEW  
Internal Schematic


N-Channel MOSFET



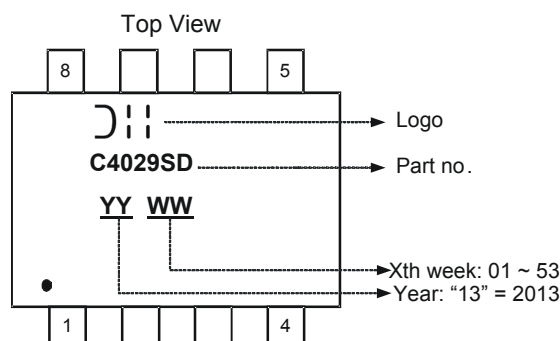
P-Channel MOSFET

## Ordering Information (Note 4 & 5)

| Part Number    | Compliance | Case | Packaging         |
|----------------|------------|------|-------------------|
| DMC4029SSD-13  | Standard   | SO-8 | 2,500/Tape & Reel |
| DMC4029SSDQ-13 | Automotive | 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](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/](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



**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                          |              |                                                  | Symbol           | Value_Q2   | Value_Q1     | Units |
|---------------------------------------------------------|--------------|--------------------------------------------------|------------------|------------|--------------|-------|
| Drain-Source Voltage                                    |              |                                                  | V <sub>DSS</sub> | 40         | -40          | V     |
| Gate-Source Voltage                                     |              |                                                  | V <sub>GSS</sub> | ±20        | ±20          | V     |
| Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 7.0<br>5.6 | -5.1<br>-4.1 | A     |
|                                                         | t < 10s      | T <sub>A</sub> = +25°C<br>T <sub>A</sub> = +70°C | I <sub>D</sub>   | 9.0<br>7.2 | -6.5<br>-5.2 | A     |
| Maximum Body Diode Forward Current (Note 7)             |              |                                                  | I <sub>S</sub>   | 2.5        | -2.5         | A     |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)      |              |                                                  | I <sub>DM</sub>  | 70         | -40          | A     |

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                                   |                        | Symbol                            | Value       | Units |
|--------------------------------------------------|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 6)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 1.3         | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 0.8         |       |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state           | R <sub>θJA</sub>                  | 98          | °C/W  |
|                                                  | t < 10s                |                                   | 59          |       |
| Total Power Dissipation (Note 7)                 | T <sub>A</sub> = +25°C | P <sub>D</sub>                    | 1.8         | W     |
|                                                  | T <sub>A</sub> = +70°C |                                   | 1.1         |       |
| Thermal Resistance, Junction to Ambient (Note 7) | Steady state           | R <sub>θJA</sub>                  | 71          | °C/W  |
|                                                  | t < 10s                |                                   | 43          |       |
| Thermal Resistance, Junction to Case (Note 7)    |                        | R <sub>θJC</sub>                  | 11.8        |       |
| Operating and Storage Temperature Range          |                        | T <sub>J</sub> , T <sub>STG</sub> | -55 to +150 | °C    |

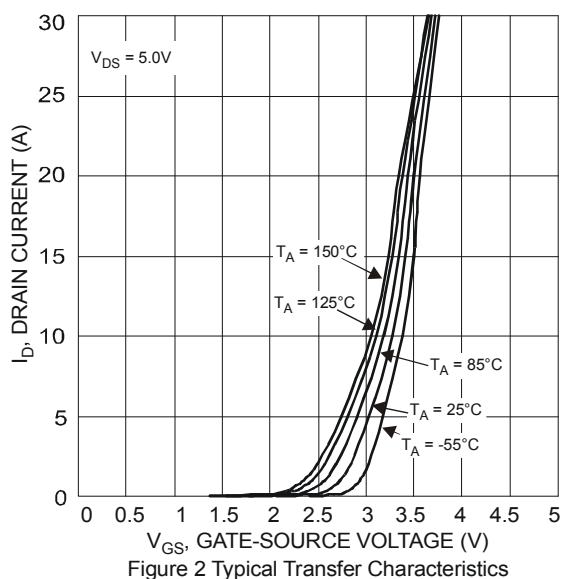
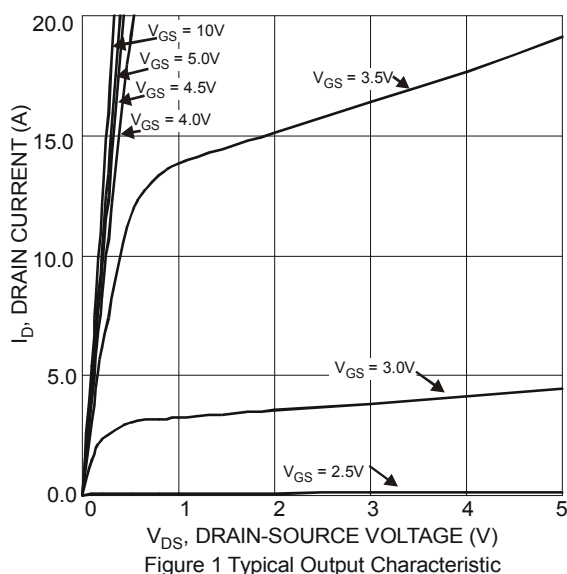
**Electrical Characteristics N-Channel Q2** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                             | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                             |
|--------------------------------------------|---------------------|-----|------|------|------|--------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b> (Note 8)        |                     |     |      |      |      |                                                                                            |
| Drain-Source Breakdown Voltage             | BV <sub>DSS</sub>   | 40  | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA                                               |
| Zero Gate Voltage Drain Current            | I <sub>DSS</sub>    | —   | —    | 1    | µA   | V <sub>DS</sub> = 40V, V <sub>GS</sub> = 0V                                                |
| Gate-Source Leakage                        | I <sub>GSS</sub>    | —   | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                               |
| <b>ON CHARACTERISTICS</b> (Note 8)         |                     |     |      |      |      |                                                                                            |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub> | 1.0 | —    | 3.0  | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA                                 |
| Static Drain-Source On-Resistance          | R <sub>DS(on)</sub> | —   | 15   | 24   | mΩ   | V <sub>GS</sub> = 10V, I <sub>D</sub> = 6A                                                 |
|                                            |                     | —   | 20   | 32   |      | V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 5A                                                |
| Diode Forward Voltage                      | V <sub>SD</sub>     | —   | 0.7  | 1.0  | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 1.0A                                                |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 9)    |                     |     |      |      |      |                                                                                            |
| Input Capacitance                          | C <sub>iss</sub>    | —   | 1060 | —    | pF   | V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, f = 1.0MHz                                    |
| Output Capacitance                         | C <sub>oss</sub>    | —   | 84   | —    |      |                                                                                            |
| Reverse Transfer Capacitance               | C <sub>rss</sub>    | —   | 58   | —    |      |                                                                                            |
| Gate Resistance                            | R <sub>G</sub>      | —   | 1.6  | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                     |
| Total Gate Charge (V <sub>GS</sub> = 4.5V) | Q <sub>g</sub>      | —   | 8.8  | —    | nC   | V <sub>DS</sub> = 20V, I <sub>D</sub> = 8A                                                 |
| Total Gate Charge (V <sub>GS</sub> = 10V)  | Q <sub>g</sub>      | —   | 19.1 | —    |      |                                                                                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 3.0  | —    |      |                                                                                            |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 2.5  | —    |      |                                                                                            |
| Turn-On Delay Time                         | t <sub>D(on)</sub>  | —   | 5.3  | —    | nS   | V <sub>DD</sub> = 25V, R <sub>L</sub> = 2.5Ω<br>V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω |
| Turn-On Rise Time                          | t <sub>r</sub>      | —   | 7.1  | —    |      |                                                                                            |
| Turn-Off Delay Time                        | t <sub>D(off)</sub> | —   | 15.1 | —    |      |                                                                                            |
| Turn-Off Fall Time                         | t <sub>f</sub>      | —   | 4.8  | —    |      |                                                                                            |
| Body Diode Reverse Recovery Time           | t <sub>rr</sub>     | —   | 10.5 | —    | nS   | I <sub>F</sub> = 8A, di/dt = 100A/µs                                                       |
| Body Diode Reverse Recovery Charge         | Q <sub>rr</sub>     | —   | 4.15 | —    | nC   | I <sub>F</sub> = 8A, di/dt = 100A/µs                                                       |

**Electrical Characteristics P-Channel Q1** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

| Characteristic                              | Symbol              | Min  | Typ  | Max  | Unit | Test Condition                                                                                 |
|---------------------------------------------|---------------------|------|------|------|------|------------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS</b> (Note 8)         |                     |      |      |      |      |                                                                                                |
| Drain-Source Breakdown Voltage              | BV <sub>DSS</sub>   | -40  | —    | —    | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA                                                  |
| Zero Gate Voltage Drain Current             | I <sub>DSS</sub>    | —    | —    | -1   | μA   | V <sub>DS</sub> = -40V, V <sub>GS</sub> = 0V                                                   |
| Gate-Source Leakage                         | I <sub>GSS</sub>    | —    | —    | ±100 | nA   | V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V                                                   |
| <b>ON CHARACTERISTICS</b> (Note 8)          |                     |      |      |      |      |                                                                                                |
| Gate Threshold Voltage                      | V <sub>GS(th)</sub> | -1.0 | —    | -3.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -250μA                                    |
| Static Drain-Source On-Resistance           | R <sub>DS(ON)</sub> | —    | 33   | 45   | mΩ   | V <sub>GS</sub> = -10V, I <sub>D</sub> = -5A                                                   |
|                                             |                     | —    | 40   | 55   |      | V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -4A                                                  |
| Diode Forward Voltage                       | V <sub>SD</sub>     | —    | -0.7 | -1.0 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = -1.0A                                                   |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 9)     |                     |      |      |      |      |                                                                                                |
| Input Capacitance                           | C <sub>iss</sub>    | —    | 1154 | —    | pF   | V <sub>DS</sub> = -20V, V <sub>GS</sub> = 0V<br>f = 1.0MHz                                     |
| Output Capacitance                          | C <sub>oss</sub>    | —    | 84   | —    |      |                                                                                                |
| Reverse Transfer Capacitance                | C <sub>rss</sub>    | —    | 66   | —    |      |                                                                                                |
| Gate Resistance                             | R <sub>G</sub>      | —    | 12.6 | —    | Ω    | V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz                                         |
| Total Gate Charge (V <sub>GS</sub> = -4.5V) | Q <sub>g</sub>      | —    | 10.6 | —    | nC   | V <sub>DS</sub> = -20V, I <sub>D</sub> = -4.9A                                                 |
| Total Gate Charge (V <sub>GS</sub> = -10V)  | Q <sub>g</sub>      | —    | 21.5 | —    |      |                                                                                                |
| Gate-Source Charge                          | Q <sub>gs</sub>     | —    | 2.2  | —    |      |                                                                                                |
| Gate-Drain Charge                           | Q <sub>gd</sub>     | —    | 3.3  | —    |      |                                                                                                |
| Turn-On Delay Time                          | t <sub>D(on)</sub>  | —    | 8.7  | —    | nS   | V <sub>DS</sub> = -20V, I <sub>D</sub> = -3.9A<br>V <sub>GS</sub> = -4.5V, R <sub>G</sub> = 1Ω |
| Turn-On Rise Time                           | t <sub>r</sub>      | —    | 19.6 | —    |      |                                                                                                |
| Turn-Off Delay Time                         | t <sub>D(off)</sub> | —    | 34.9 | —    |      |                                                                                                |
| Turn-Off Fall Time                          | t <sub>f</sub>      | —    | 25.5 | —    |      |                                                                                                |
| Body Diode Reverse Recovery Time            | t <sub>rr</sub>     | —    | 9.61 | —    | nS   | I <sub>S</sub> = -3.9A, dI/dt = 100A/μs                                                        |
| Body Diode Reverse Recovery Charge          | Q <sub>rr</sub>     | —    | 3.3  | —    | nC   | I <sub>S</sub> = -3.9A, dI/dt = 100A/μs                                                        |

- 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 Q2**


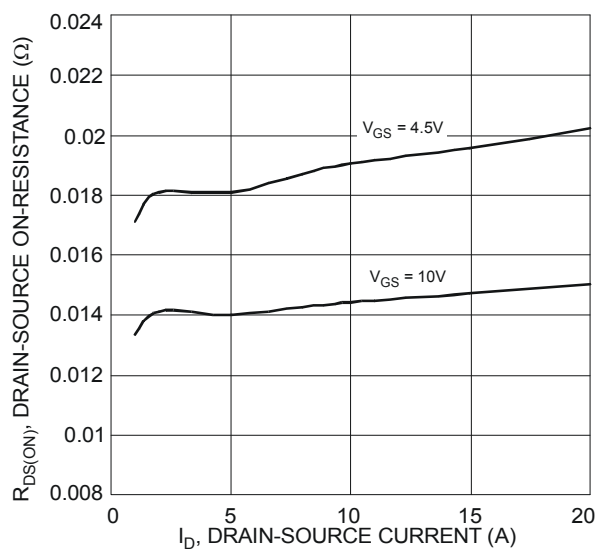


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

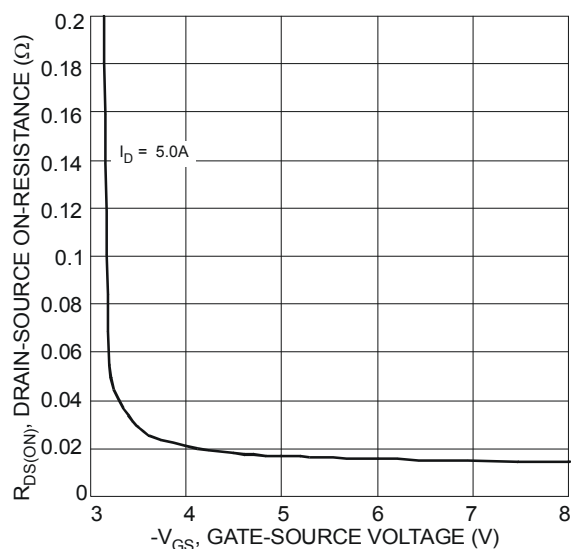


Figure 4 Typical Transfer Characteristic

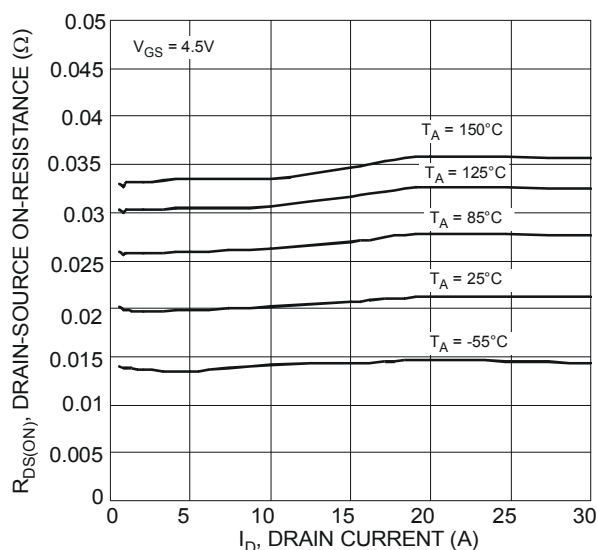


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

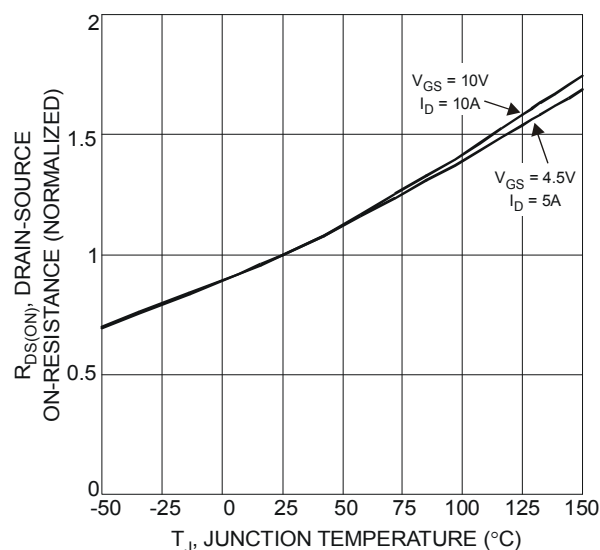


Figure 6 On-Resistance Variation with Temperature

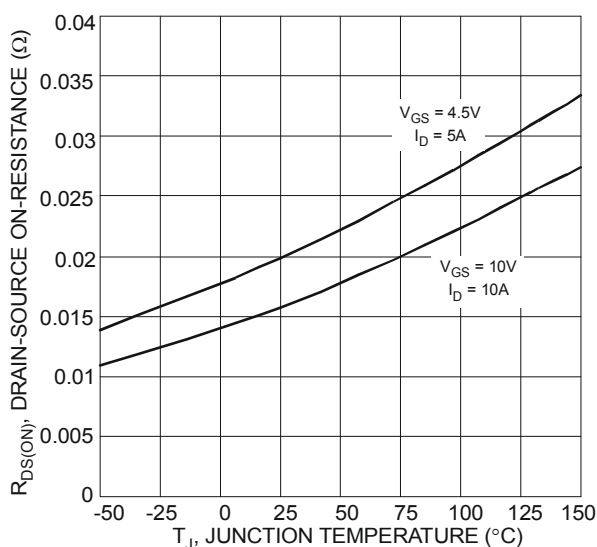


Figure 7 On-Resistance Variation with Temperature

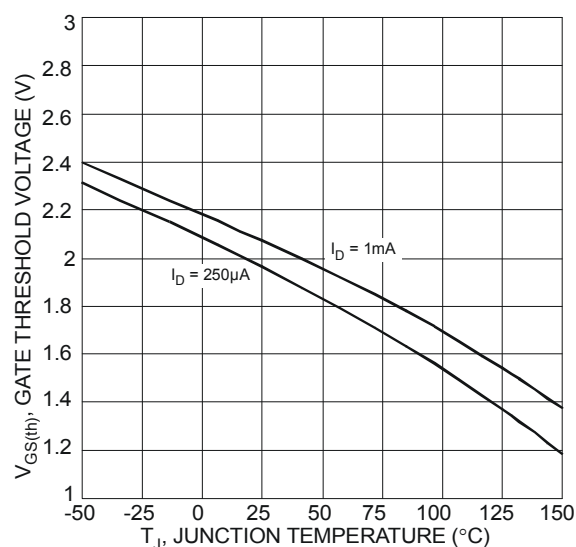


Figure 8 Gate Threshold Variation vs. Ambient Temperature

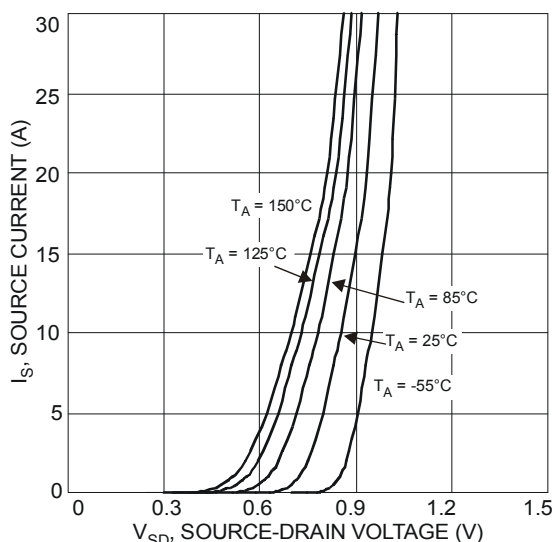


Figure 9 Diode Forward Voltage vs. Current

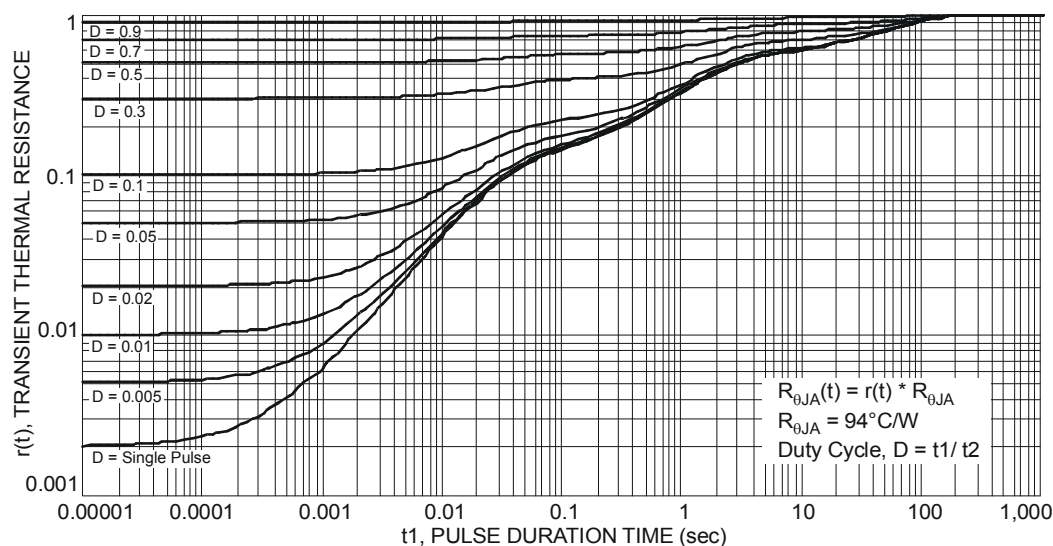


Figure 10 Transient Thermal Resistance

## P-Channel Q1

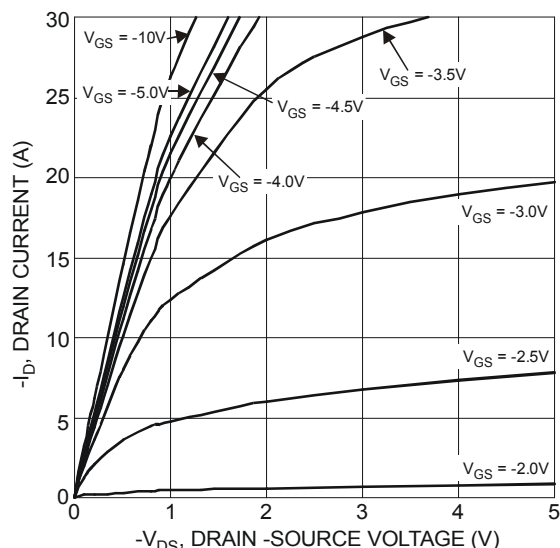


Figure 1 Typical Output Characteristics

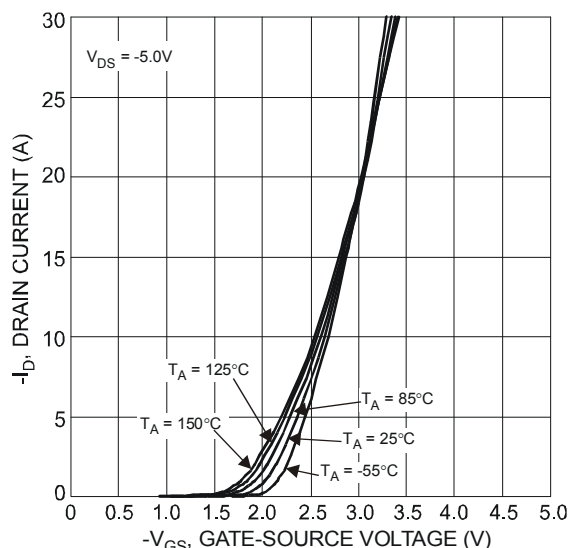


Figure 2 Typical Transfer Characteristics

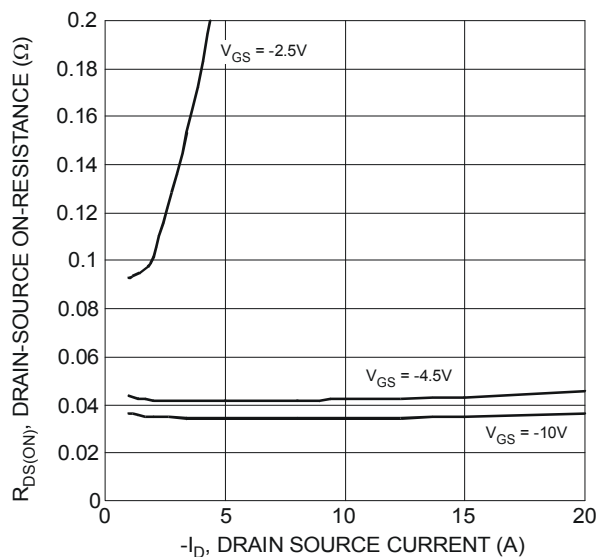


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

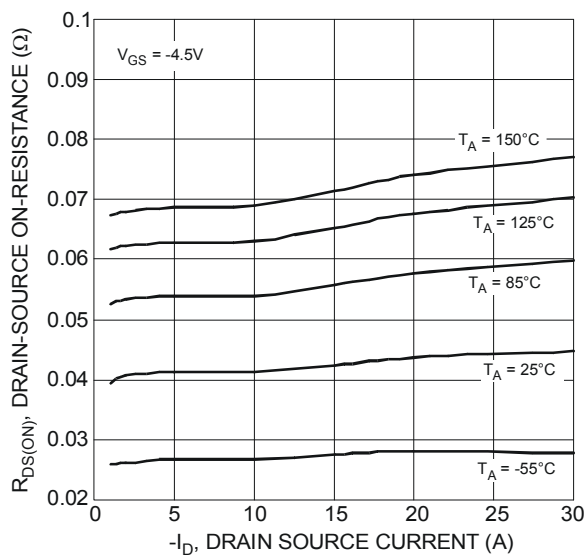


Figure 4 Typical On-Resistance vs. Drain Current and Temperature

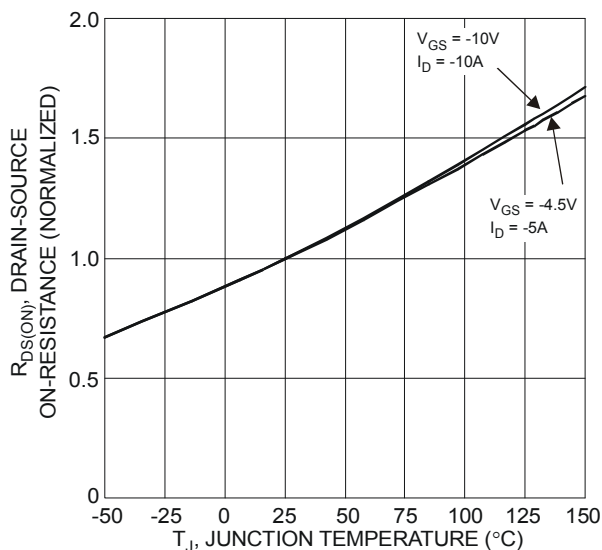


Figure 5 On-Resistance Variation with Temperature

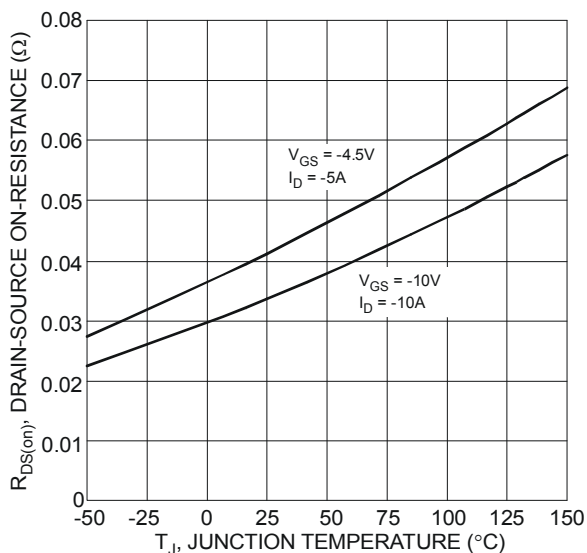


Figure 6 On-Resistance Variation with Temperature

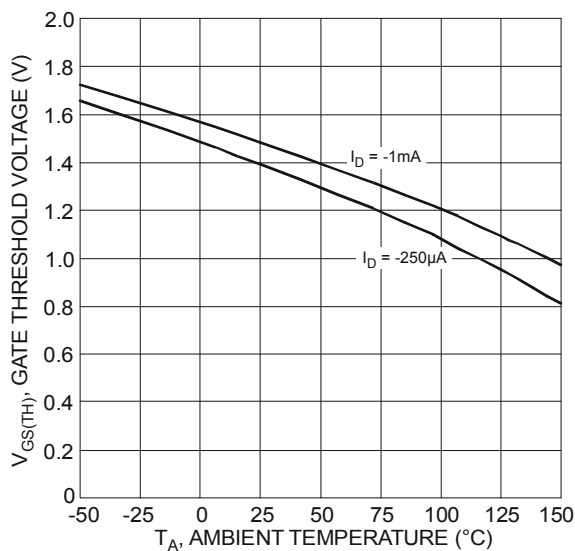


Figure 7 Gate Threshold Variation vs. Ambient Temperature

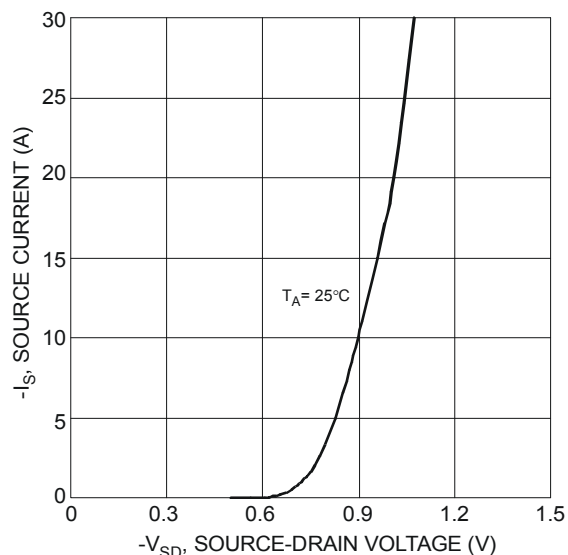
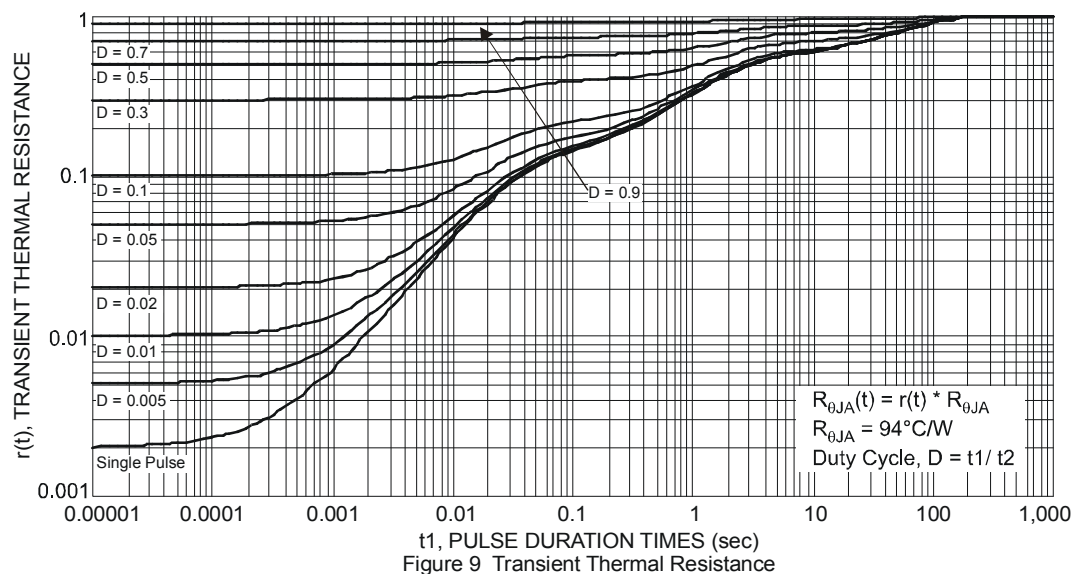
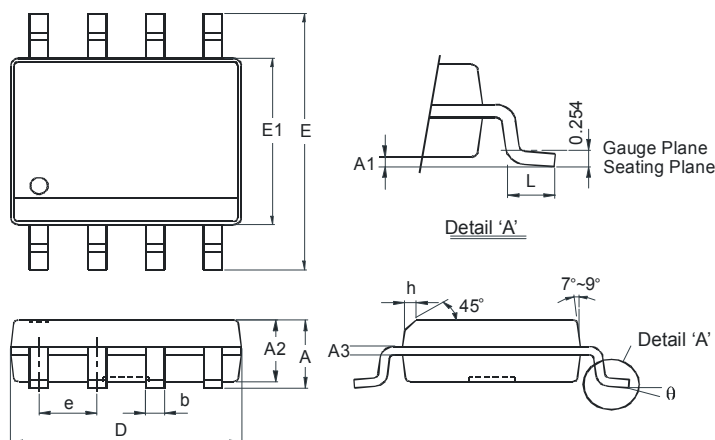


Figure 8 Diode Forward Voltage vs. Current



## Package Outline Dimensions

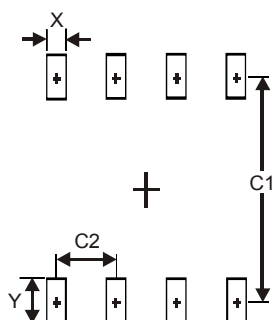
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| 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 latest version.



| Dimensions | Value (in mm) |
|------------|---------------|
| X          | 0.60          |
| Y          | 1.55          |
| C1         | 5.4           |
| C2         | 1.27          |

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Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

<http://moschip.ru/get-element>

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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