

Product Summary

| Device | V _{(BR)DSS} | R _{DS(on)} max | I _D max T _A = +25°C |
|--------|----------------------|------------------------------|--|
| Q1 | 60V | 1.7Ω @ V _{GS} = 10V | 500mA |
| | | 3Ω @ V _{GS} = 4.5V | 400mA |
| Q2 | -60V | 4Ω @ V _{GS} = -10V | -360mA |
| | | 6Ω @ V _{GS} = -4.5V | -310mA |

Features and Benefits

- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Ultra-Small Surface Mount Package
- **Totally Lead-Free & Fully RoHS compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **The DMG1029SVQ is suitable for automotive applications requiring specific change control; this part is AEC-Q101 qualified, PPAP capable, and manufactured in IATF 16949 certified facilities.**

<https://www.diodes.com/quality/product-definitions/>

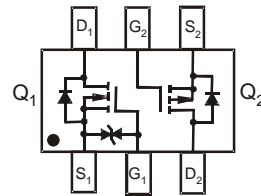
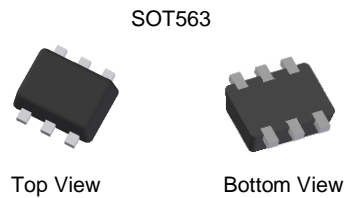
Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- General-purpose interfacing switches
- Power management functions
- Analog switches

Mechanical Data

- Package: SOT563
- Package 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: 0.027 grams (approximate)

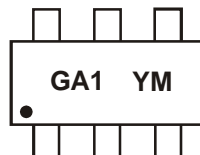


Ordering Information (Note 4)

| Part Number | Compliance | Package | Packing | |
|---------------|------------|---------|---------|-------------|
| | | | Qty. | Carrier |
| DMG1029SVQ-7 | Automotive | SOT563 | 3000 | Tape & Reel |
| DMG1029SVQ-7A | Automotive | SOT563 | 3000 | Tape & Reel |

- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> 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 <https://www.diodes.com/design/support/packaging/diodes-packaging/>

Marking Information



GA1 = Product Type Marking Code
 YM = Date Code Marking
 Y or \bar{Y} = Year (ex: J = 2022)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2009 | | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 | 2031 |
|------|------|-------|------|------|------|------|------|------|------|------|------|------|
| Code | W | | J | K | L | M | N | O | P | R | S | T |

| 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 N-CHANNEL – Q1 (@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 T _A = +70°C | I _D | 500 400 | mA |
| | t<10s | T _A = +25°C T _A = +70°C | I _D | 620 480 | mA |
| Maximum Body Diode Forward Current (Note 6) | | | I _S | 500 | mA |
| Pulsed Drain Current (Note 6) | | | I _{DM} | 1000 | mA |
| Pulsed Source Current (Note 6) | | | I _{SM} | 1000 | mA |

Maximum Ratings P-CHANNEL – Q2 (@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 T _A = +70°C | I _D | -360 -280 | mA |
| | t<10s | T _A = +25°C T _A = +70°C | I _D | -410 -320 | mA |
| Maximum Body Diode Forward Current (Note 6) | | | I _S | -360 | mA |
| Pulsed Drain Current (Note 6) | | | I _{DM} | -650 | mA |
| Pulsed Source Current (Note 6) | | | I _{SM} | -650 | mA |

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

| Characteristic | | Symbol | Value | Units |
|--|------------------------|-----------------------------------|-------------|-------|
| Total Power Dissipation (Note 5) | T _A = +25°C | P _D | 0.45 | W |
| | T _A = +70°C | | 0.28 | |
| Thermal Resistance, Junction to Ambient (Note 5) | Steady state | R _{θJA} | 281 | °C/W |
| | t<10s | | 210 | |
| Total Power Dissipation (Note 6) | T _A = +25°C | P _D | 1 | W |
| | T _A = +70°C | | 0.62 | |
| Thermal Resistance, Junction to Ambient (Note 6) | Steady state | R _{θJA} | 129 | °C/W |
| | t<10s | | 97 | |
| Operating and Storage Temperature Range | | T _J , T _{STG} | -55 to +150 | °C |

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.

Electrical Characteristics N-CHANNEL – Q1 (@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 _C = +25°C | I _{DSS} | — | — | 10 | nA | V _{DS} = 50V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±50 | nA | V _{GS} = ±5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | 1.0 | — | 2.5 | V | V _{DS} = V _{GS} , I _D = 250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 1.3 | 1.7 | Ω | V _{GS} = 10V, I _D = 500mA |
| | | — | 1.5 | 3 | | V _{GS} = 4.5V, I _D = 200mA |
| Forward Transfer Admittance | Y _{fs} | 80 | — | — | mS | V _{DS} = 10V, I _D = 200mA |
| Diode Forward Voltage | V _{SD} | — | — | 1.4 | V | V _{GS} = 0V, I _S = 115mA |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 30 | — | pF | V _{DS} = 25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 4.2 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.9 | — | pF | |
| Total Gate Charge | Q _g | — | 0.3 | — | nC | V _{GS} = 4.5V, V _{DS} = 10V, I _D = 250mA |
| Gate-Source Charge | Q _{gs} | — | 0.2 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 0.08 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 3.9 | — | ns | V _{DD} = 30V, V _{GS} = 10V, R _G = 25Ω, I _D = 200mA |
| Turn-On Rise Time | t _r | — | 3.4 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 15.7 | — | ns | |
| Turn-Off Fall Time | t _f | — | 9.9 | — | ns | |

Electrical Characteristics P-CHANNEL – Q2 (@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 _C = +25°C | I _{DSS} | — | — | -25 | nA | V _{DS} = -50V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±5V, V _{DS} = 0V |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -1 | — | -3.0 | V | V _{DS} = V _{GS} , I _D = -250μA |
| Static Drain-Source On-Resistance | R _{DS(on)} | — | 2.7 | 4 | Ω | V _{GS} = -10V, I _D = -500mA |
| | | — | 3.2 | 6 | | V _{GS} = -4.5V, I _D = -200mA |
| Forward Transfer Admittance | Y _{fs} | 50 | — | — | mS | V _{DS} = -25V, I _D = -100mA |
| Diode Forward Voltage | V _{SD} | — | — | -1.4 | V | V _{GS} = 0V, I _S = -115mA |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C _{iss} | — | 25 | — | pF | V _{DS} = -25V, V _{GS} = 0V, f = 1.0MHz |
| Output Capacitance | C _{oss} | — | 4.7 | — | pF | |
| Reverse Transfer Capacitance | C _{rss} | — | 2.7 | — | pF | |
| Total Gate Charge | Q _g | — | 0.28 | — | nC | V _{GS} = -4.5V, V _{DS} = -10V, I _D = -500mA |
| Gate-Source Charge | Q _{gs} | — | 0.14 | — | nC | |
| Gate-Drain Charge | Q _{gd} | — | 0.08 | — | nC | |
| Turn-On Delay Time | t _{D(on)} | — | 5.5 | — | ns | V _{DD} = -30V, V _{GS} = -10V, R _G = 50Ω, I _D = -270mA |
| Turn-On Rise Time | t _r | — | 7.9 | — | ns | |
| Turn-Off Delay Time | t _{D(off)} | — | 10.6 | — | ns | |
| Turn-Off Fall Time | t _f | — | 11.6 | — | ns | |

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

N-CHANNEL - Q1

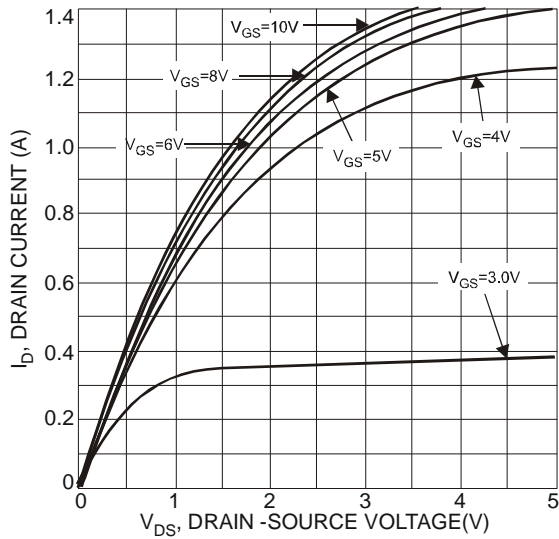


Fig. 1 Typical Output Characteristics

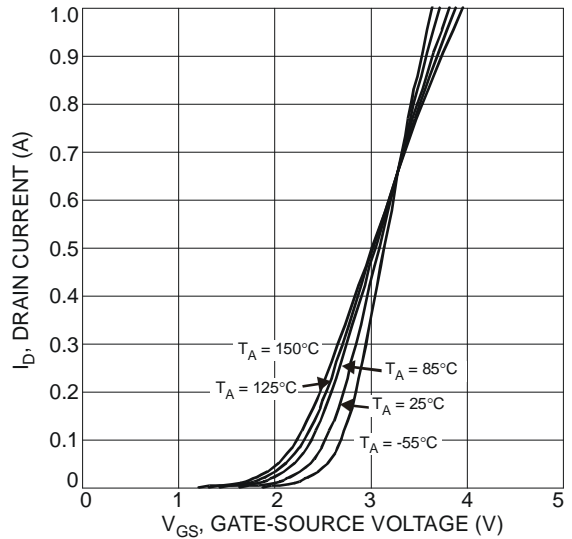


Fig. 2 Typical Transfer Characteristics

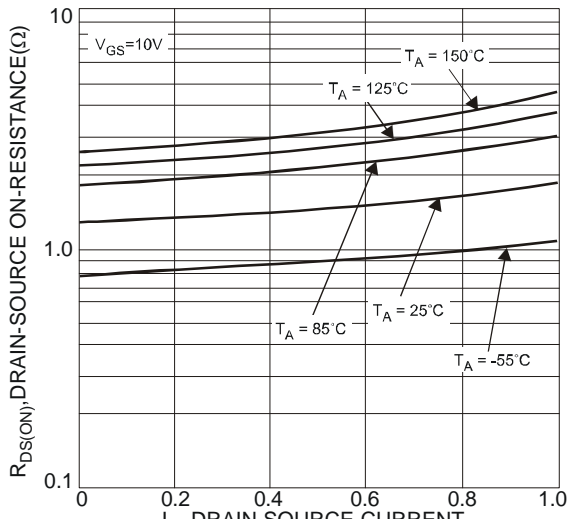


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

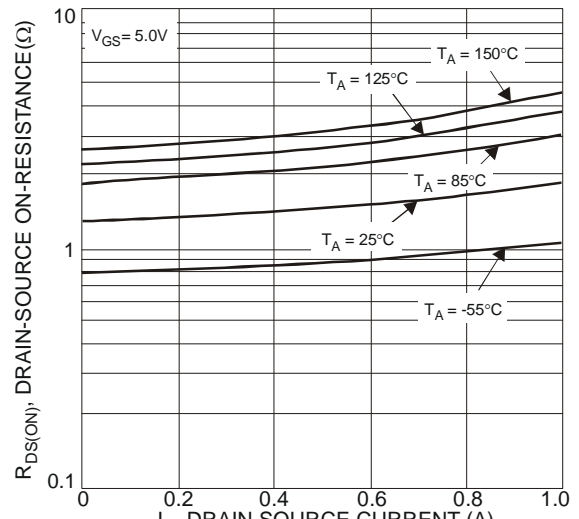


Fig. 4 Typical On-Resistance vs. Drain Current and Temperature

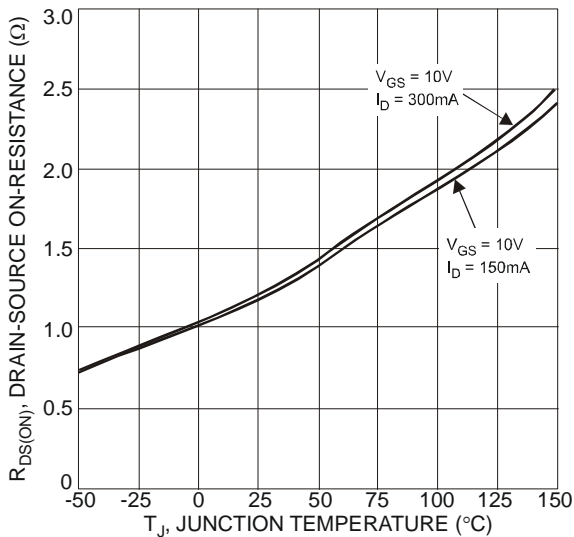


Fig. 5 On-Resistance Variation with Temperature

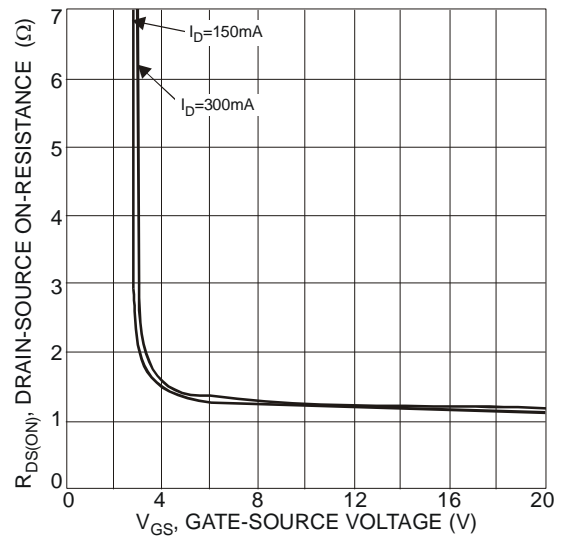
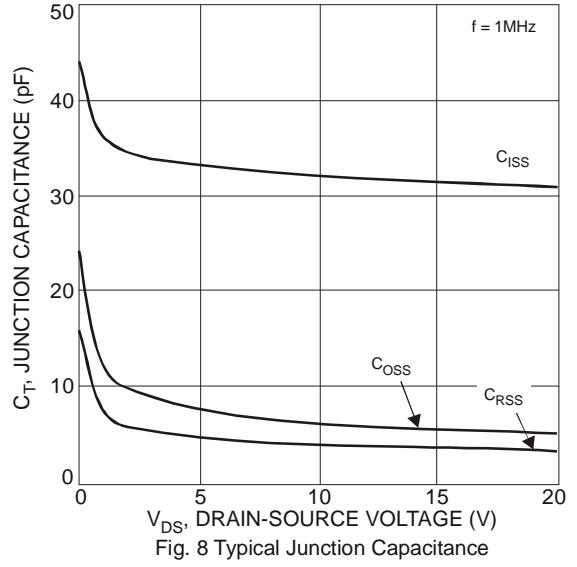
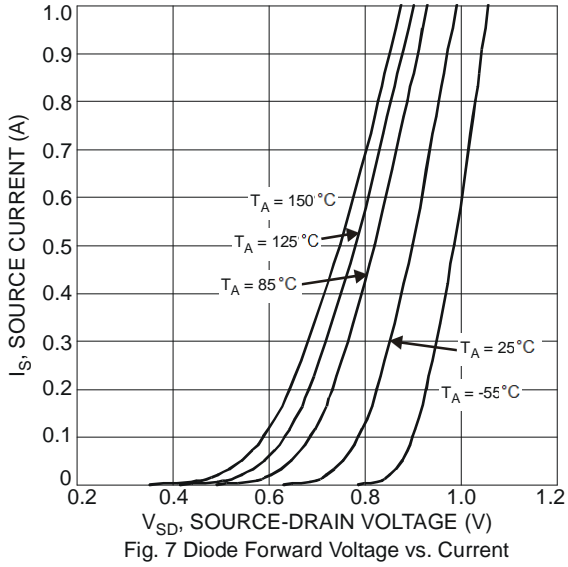


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

N-CHANNEL – Q1 (continued)



P-CHANNEL - Q2

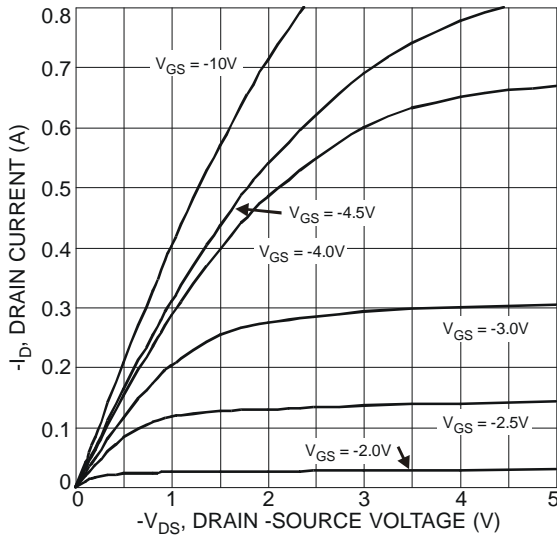


Fig. 9 Typical Output Characteristics

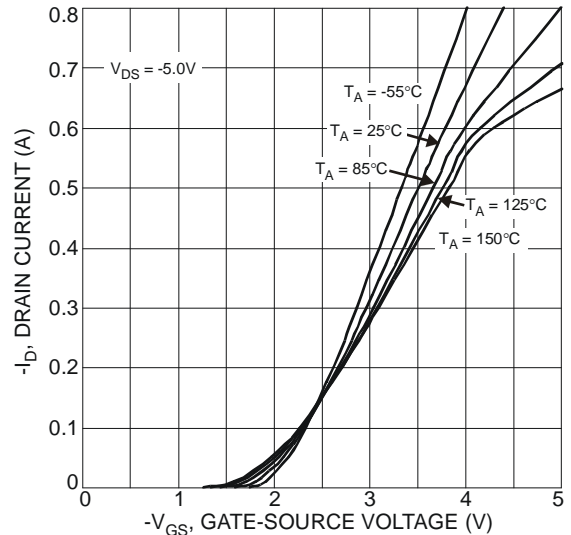


Fig. 10 Typical Transfer Characteristics

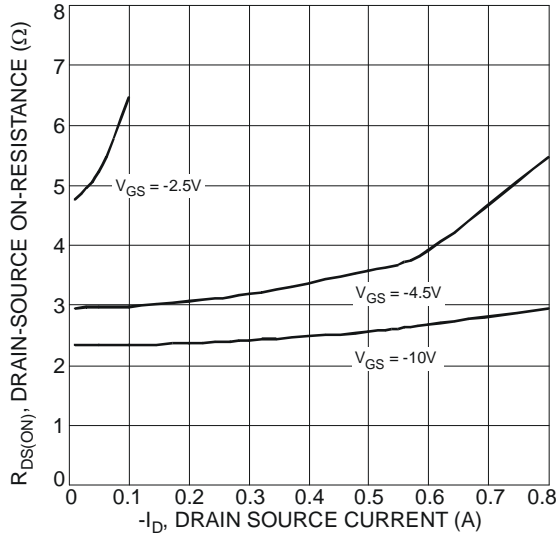


Fig. 11 Typical On-Resistance vs. Drain Current and Gate Voltage

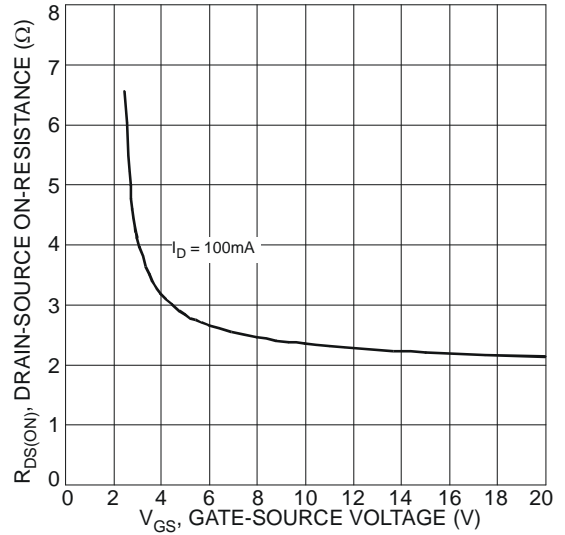


Fig. 12 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

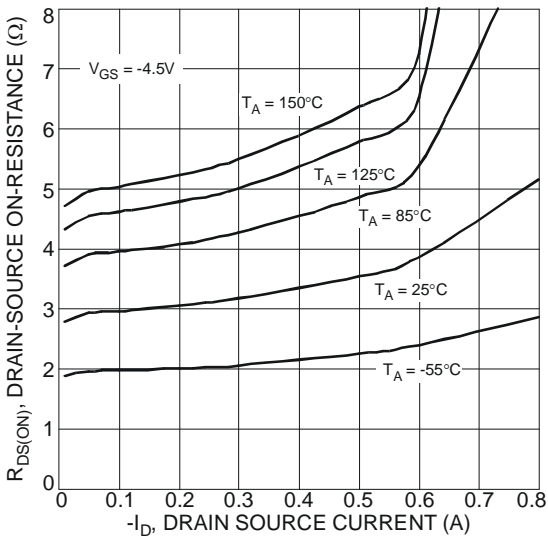


Fig. 13 Typical On-Resistance vs. Drain Current and Temperature

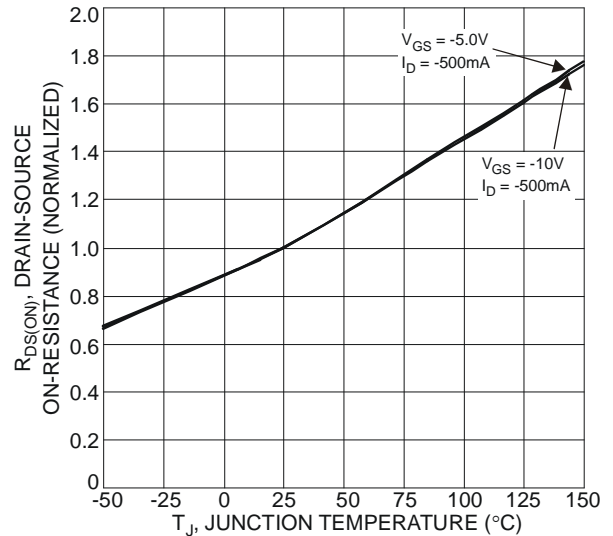


Fig. 14 On-Resistance Variation with Temperature

P-CHANNEL – Q2 (continued)

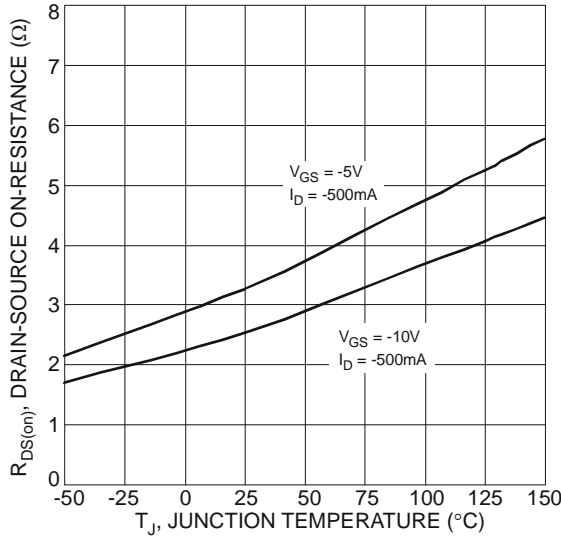


Fig. 15 On-Resistance Variation with Temperature

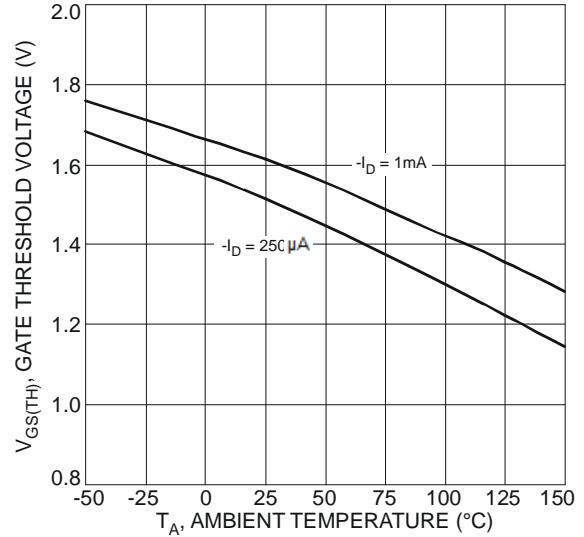


Fig. 16 Gate Threshold Variation vs. Ambient Temperature

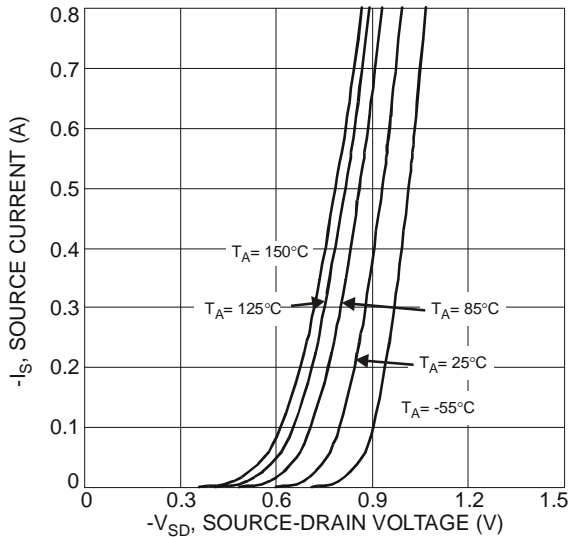


Fig. 17 Diode Forward Voltage vs. Current

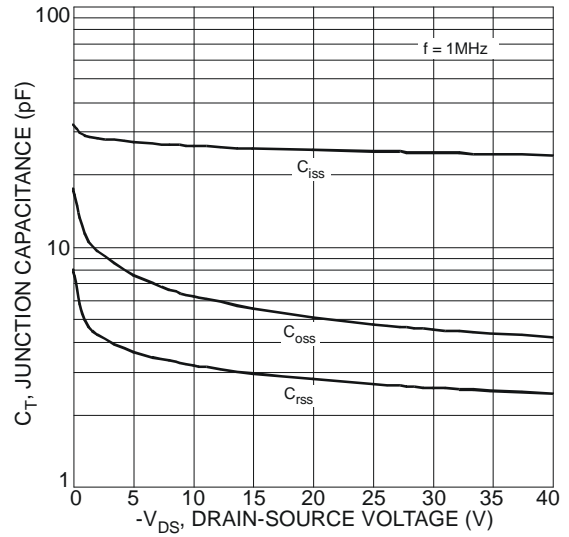


Fig. 18 Typical Junction Capacitance

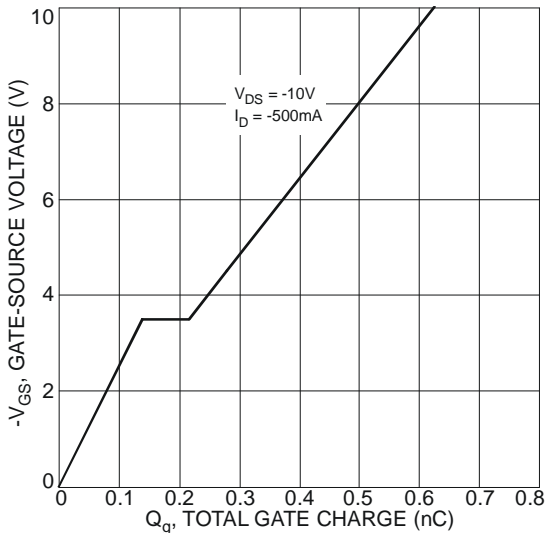
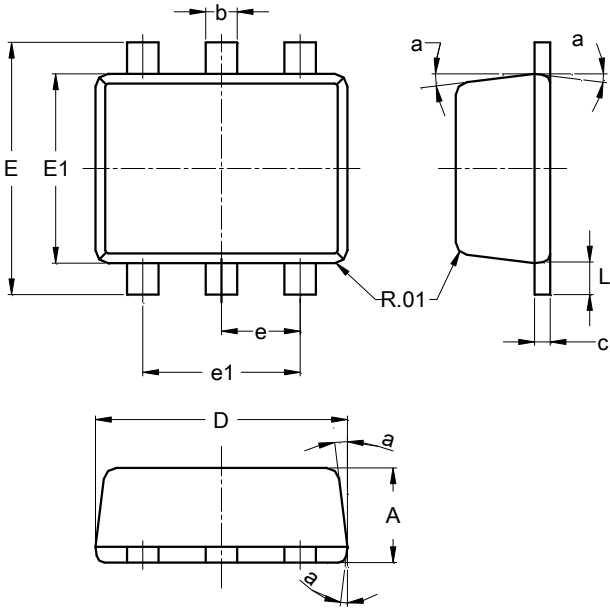


Fig. 19 Gate-Charge Characteristics

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT563



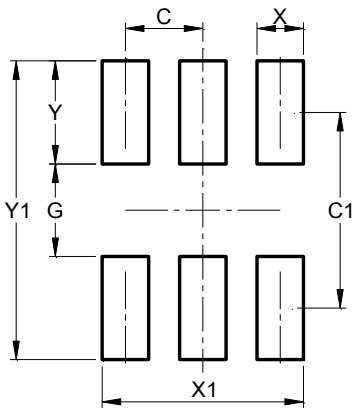
| SOT563 | | | |
|--------|------|------|------|
| Dim | Min | Max | Typ |
| A | 0.55 | 0.60 | -- |
| b | 0.15 | 0.30 | 0.20 |
| c | 0.10 | 0.18 | 0.11 |
| D | 1.50 | 1.70 | 1.60 |
| E | 1.55 | 1.70 | 1.60 |
| E1 | 1.10 | 1.25 | 1.20 |
| e | -- | -- | 0.50 |
| e1 | 0.90 | 1.10 | 1.00 |
| L | 0.10 | 0.30 | 0.20 |
| a | 8° | 9° | 7° |

All Dimensions in mm

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT563



| Dimensions | Value (in mm) |
|------------|---------------|
| C | 0.500 |
| C1 | 1.270 |
| G | 0.600 |
| X | 0.300 |
| X1 | 1.300 |
| Y | 0.670 |
| Y1 | 1.940 |

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