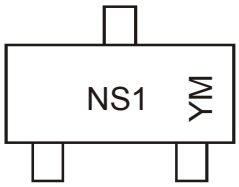
## Marking Information




NS1 = Product Type Marking Code
YM = Date Code Marking
Y = Year (ex: I = 2021)
M = Month (ex: 9 = September)

Date Code Key

| Year | 2007 | …… | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Code | U | …… | I | J | K | L | M | N | O | P | R | S |

| 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 | Unit |
|---|---|---|---|---|
| Drain-Source Voltage | | $V_{DSS}$ | 20 | V |
| Gate-Source Voltage | Continuous | $V_{GSS}$ | ± 8 | V |
| Drain Current | Continuous<br>Pulsed | $I_D$ | 1.2<br>4.0 | A |

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

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Total Power Dissipation | $P_d$ | 500 | mW |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 250 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -55 to +150 | °C |

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

| Characteristic | | Symbol | Min | Typ | Max | Unit | Test Condition |
|---|---|---|---|---|---|---|---|
| **OFF CHARACTERISTICS (Note 5)** | | | | | | | |
| Drain-Source Breakdown Voltage | | $BV_{DSS}$ | 20 | — | — | V | $V_{GS}$ = 0V, $I_D$ = 250μA |
| Zero Gate Voltage Drain Current | @ $T_J$ = +25°C | $I_{DSS}$ | — | — | 10 | μA | $V_{DS}$ = 20V, $V_{GS}$ = 0V |
| Gate-Body Leakage | | $I_{GSS}$ | — | — | ± 10 | μA | $V_{GS}$ = ± 8V, $V_{DS}$ = 0V |
| **ON CHARACTERISTICS (Note 5)** | | | | | | | |
| Gate Threshold Voltage | | $V_{GS(th)}$ | 0.5 | — | 1.2 | V | $V_{DS}$ = 10V, $I_D$ = 1.0mA |
| Static Drain-Source On-Resistance | | $R_{DS(on)}$ | — | — | 0.10<br>0.14<br>0.25 | Ω | $V_{GS}$ = 4.5V, $I_D$ = 0.5A<br>$V_{GS}$ = 2.5V, $I_D$ = 0.5A<br>$V_{GS}$ = 1.5V, $I_D$ = 0.1A |
| Diode Forward Voltage | | $V_{SD}$ | — | 0.8 | 1.1 | V | $V_{GS}$ = 0V, $I_S$ = 1A |
| **DYNAMIC CHARACTERISTICS (Note 6)** | | | | | | | |
| Input Capacitance | | $C_{iss}$ | — | 220 | — | pF | $V_{DS}$ = 10V, $V_{GS}$ = 0V<br>f = 1.0MHz |
| Output Capacitance | | $C_{oss}$ | — | 120 | — | pF | |
| Reverse Transfer Capacitance | | $C_{rss}$ | — | 45 | — | pF | |
| **SWITCHING CHARACTERISTICS (Note 6)** | | | | | | | |
| Turn-On Delay Time | | $t_{D(on)}$ | — | 10 | — | ns | $V_{DD}$ = 5V, $I_D$ = 0.5A,<br>$V_{GS}$ = 10V, $R_{GEN}$ = 50Ω |
| Turn-Off Delay Time | | $t_{D(off)}$ | — | 75 | — | ns | |
| Turn-On Rise Time | | $t_R$ | — | 15 | — | ns | |
| Turn-Off Fall Time | | $t_F$ | — | 65 | — | ns | |

Notes: 5. Short duration pulse test used to minimize self-heating effect.
6. Guaranteed by design. Not subject to product testing.

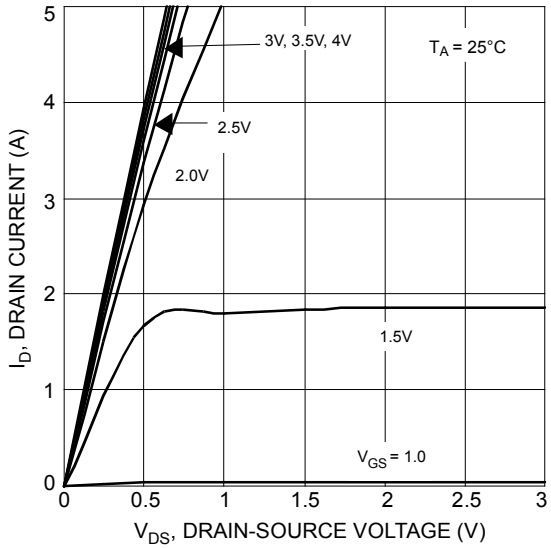


Fig. 1 Typical Output Characteristics

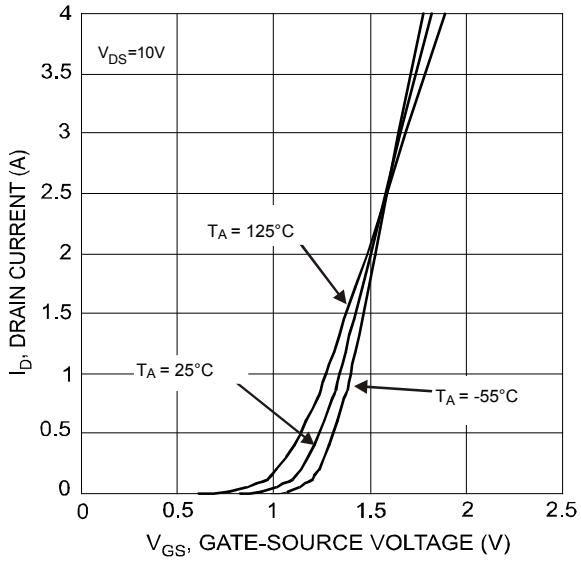


Fig. 2 Typical Transfer Characteristics

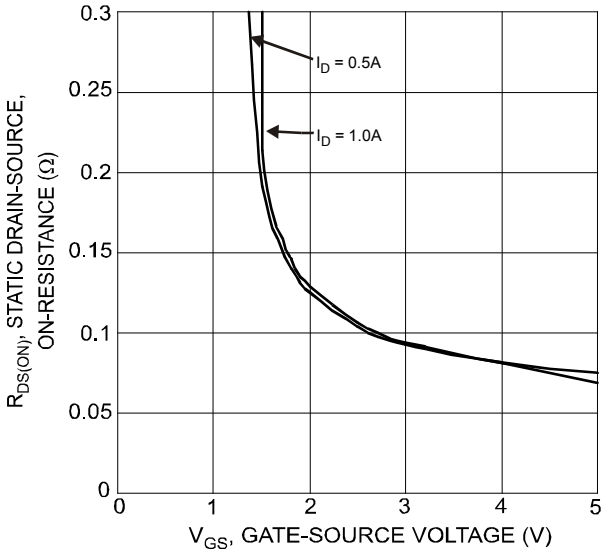


Fig. 3 On-Resistance vs. Gate Voltage

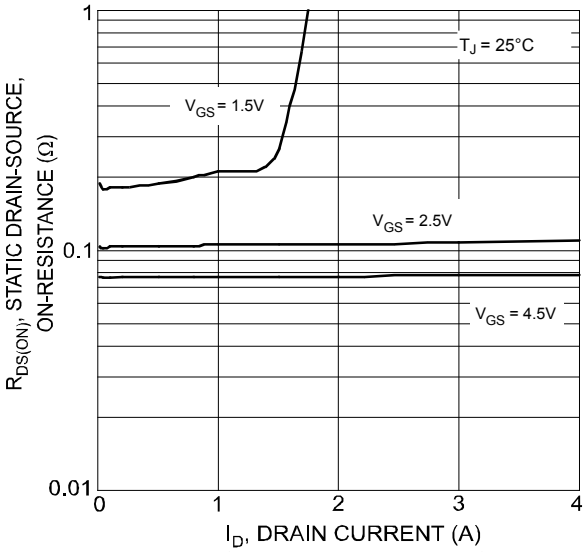


Fig. 4 On-Resistance vs. Drain Current

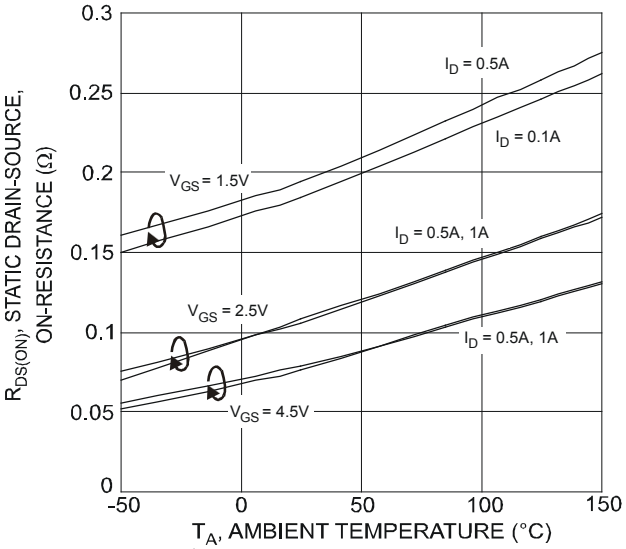



Fig. 5 On-Resistance Variation with Temperature

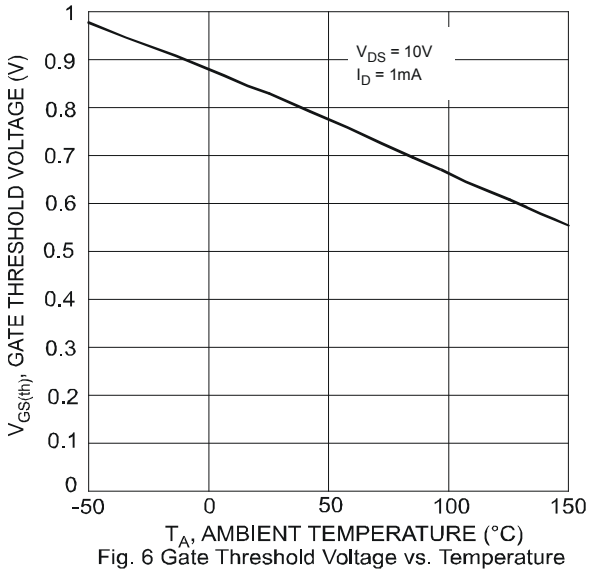



Fig. 6 Gate Threshold Voltage vs. Temperature

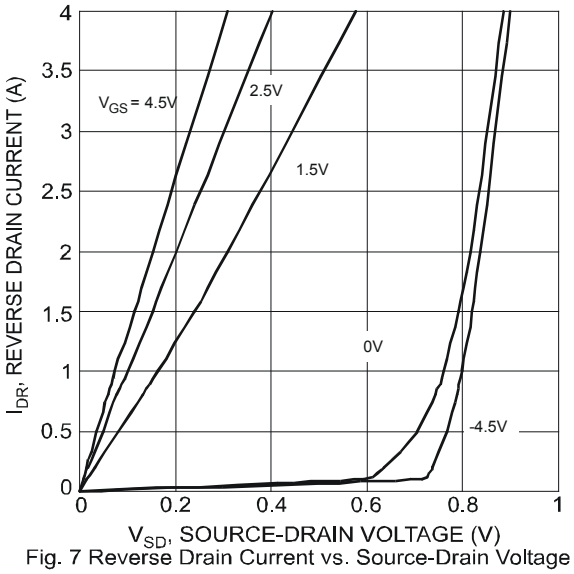



Fig. 7 Reverse Drain Current vs. Source-Drain Voltage

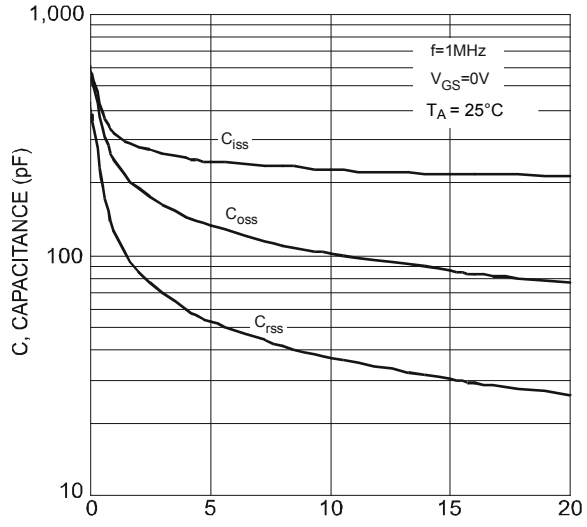
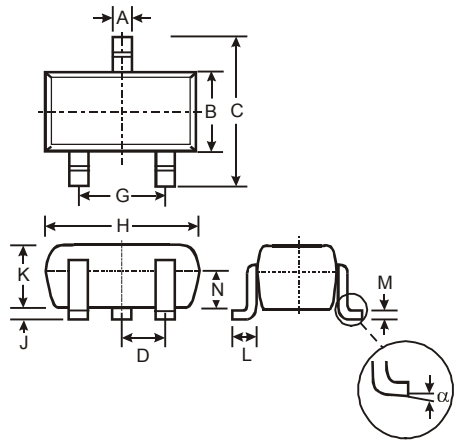



Fig. 8 Typical Junction Capacitance

## Package Outline Dimensions

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

**SC59**

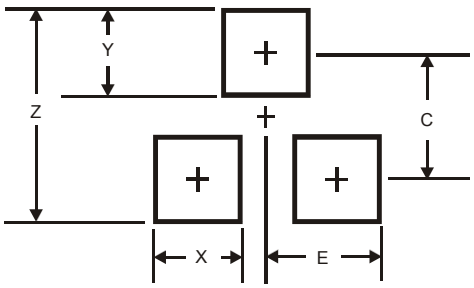



| SC59 | | | |
|---|---|---|---|
| **Dim** | **Min** | **Max** | **Typ** |
| **A** | 0.35 | 0.50 | 0.38 |
| **B** | 1.50 | 1.70 | 1.60 |
| **C** | 2.70 | 3.00 | 2.80 |
| **D** | - | - | 0.95 |
| **G** | - | - | 1.90 |
| **H** | 2.90 | 3.10 | 3.00 |
| **J** | 0.013 | 0.10 | 0.05 |
| **K** | 1.00 | 1.30 | 1.10 |
| **L** | 0.35 | 0.55 | 0.40 |
| **M** | 0.10 | 0.20 | 0.15 |
| **N** | 0.70 | 0.80 | 0.75 |
| □ | 0° | 8° | - |
| **All Dimensions in mm** | | | |

## Suggested Pad Layout

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

**SC59**




| Dimensions | SC59 |
|---|---|
| **Z** | 3.4 |
| **X** | 0.8 |
| **Y** | 1.0 |
| **C** | 2.4 |
| **E** | 1.35 |

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