

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) \max}$ | I_D $T_A = 25^\circ\text{C}$ |
|---------------|--|-----------------------------------|
| -30V | 50m Ω @ $V_{GS} = -10\text{V}$ | -3.7A |
| | 60m Ω @ $V_{GS} = -4.5\text{V}$ | -3.3A |
| | 85m Ω @ $V_{GS} = -2.5\text{V}$ | -2.7A |

Description

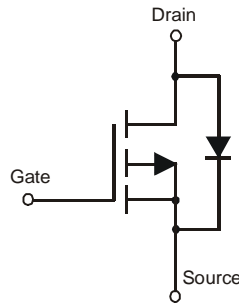
This new generation Small-Signal enhancement mode MOSFET features low on-resistance and fast switching, making it ideal for high efficiency power management applications.

Applications

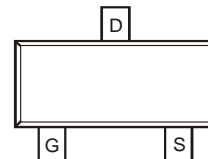
- Motor control
- Backlighting
- DC-DC Converters
- Power management functions



Top View



Equivalent Circuit



Top View

Features

- Low Input Capacitance
- Low On-Resistance
- Low Input/Output Leakage
- **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

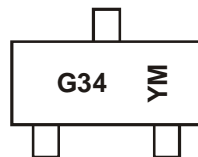
- Case: SC59
- Case Material: Molded Plastic "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram
- Weight: 0.008 grams (approximate)

Ordering Information (Note 4)

| Part Number | Case | Packaging |
|--------------|------|------------------|
| DMG3401LSN-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> 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>.

Marking Information



G34 = Product Type Marking Code
 YM = Date Code Marking
 Y = Year (ex: Y = 2011)
 M = Month (ex: 9 = September)

Date Code Key

| Year | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|------|------|------|------|------|------|------|------|
| Code | Y | Z | A | B | C | D | E |

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

| Characteristic | | | Symbol | Value | Units |
|--|--------------|---------------------------|-----------|----------|-------|
| Drain-Source Voltage | | | V_{DSS} | -30 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 12 | V |
| Continuous Drain Current (Note 5) $V_{GS} = -10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | -3.0 | A |
| | | $T_A = +70^\circ\text{C}$ | | -2.3 | |
| Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$ | Steady State | $T_A = +25^\circ\text{C}$ | I_D | -3.7 | A |
| | | $T_A = +70^\circ\text{C}$ | | -2.9 | |
| Pulsed Drain Current (10 μs pulse, duty cycle = 1%) | | | I_{DM} | -30 | A |
| Maximum Body Diode Continuous Current (Note 6) | | | I_S | -1.5 | A |

Thermal Characteristics

| Characteristic | | Symbol | Value | Units |
|---|----------|-----------------|-------------|--------------------|
| Total Power Dissipation | (Note 5) | P_D | 0.8 | W |
| | (Note 6) | | 1.2 | |
| | (Note 5) | | 159 | |
| Thermal Resistance, Junction to Ambient | (Note 6) | $R_{\theta JA}$ | 105 | $^\circ\text{C/W}$ |
| | (Note 5) | | 36 | |
| Thermal Resistance, Junction to Case | (Note 6) | $R_{\theta JC}$ | 36 | $^\circ\text{C/W}$ |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|--------------|------|------|-----------|---------------|---|
| OFF CHARACTERISTICS (Note 7) | | | | | | |
| Drain-Source Breakdown Voltage | BV_{DSS} | -30 | - | - | V | $V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$ |
| Zero Gate Voltage Drain Current $T_J = 25^\circ\text{C}$ | I_{DSS} | - | - | -1.0 | μA | $V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$ |
| Gate-Body Leakage | I_{GSS} | - | - | ± 100 | nA | $V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$ |
| ON CHARACTERISTICS (Note 7) | | | | | | |
| Gate Threshold Voltage | $V_{GS(th)}$ | -0.5 | -1.0 | -1.3 | V | $V_{DS} = V_{GS}, I_D = -250\mu\text{A}$ |
| Static Drain-Source On-Resistance | $R_{DS(on)}$ | - | 41 | 50 | m Ω | $V_{GS} = -10\text{V}, I_D = -4\text{A}$ |
| | | - | 47 | 60 | | $V_{GS} = -4.5\text{V}, I_D = -3.5\text{A}$ |
| | | - | 60 | 85 | | $V_{GS} = -2.5\text{V}, I_D = -2.5\text{A}$ |
| | | - | - | - | | $V_{GS} = -2.5\text{V}, I_D = -2.5\text{A}$ |
| Forward Transfer Admittance | $ Y_{fs} $ | - | 12 | - | S | $V_{DS} = -5\text{V}, I_D = -4\text{A}$ |
| Diode Forward Voltage | V_{SD} | - | -0.8 | -1.0 | V | $V_{GS} = 0\text{V}, I_S = -1\text{A}$ |
| DYNAMIC CHARACTERISTICS (Note 8) | | | | | | |
| Input Capacitance | C_{iss} | - | 1326 | - | pF | $V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$ |
| Output Capacitance | C_{oss} | - | 103 | - | | |
| Reverse Transfer Capacitance | C_{rss} | - | 71 | - | | |
| Gate Resistance | R_g | - | 7.3 | - | 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 | - | 11.6 | - | nC | $V_{DD} = -15\text{V}, I_D = -4\text{A}$ |
| Total Gate Charge ($V_{GS} = -10\text{V}$) | Q_g | - | 25.1 | - | | |
| Gate-Source Charge | Q_{gs} | - | 2 | - | | |
| Gate-Drain Charge | Q_{gd} | - | 1.7 | - | | |
| Turn-On Delay Time | $t_{D(on)}$ | - | 8 | - | nS | $V_{DS} = -15\text{V}, V_{GS} = -10\text{V}, R_{GEN} = 6\Omega, R_L = 3.75\Omega$ |
| Turn-On Rise Time | t_r | - | 13 | - | | |
| Turn-Off Delay Time | $t_{D(off)}$ | - | 71 | - | | |
| Turn-Off Fall Time | t_f | - | 38 | - | | |

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to production testing

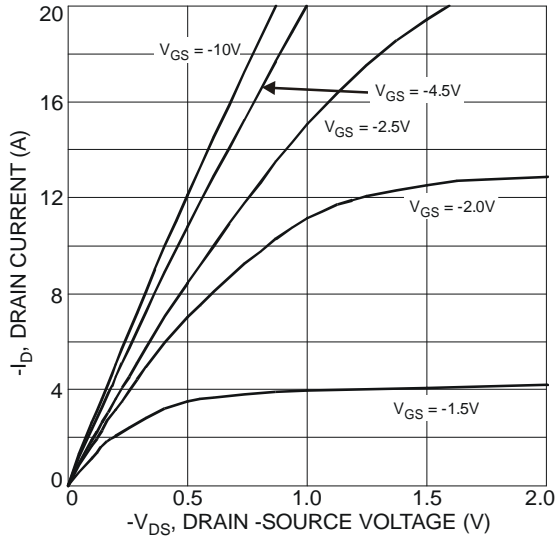


Figure 1 Typical Output Characteristics

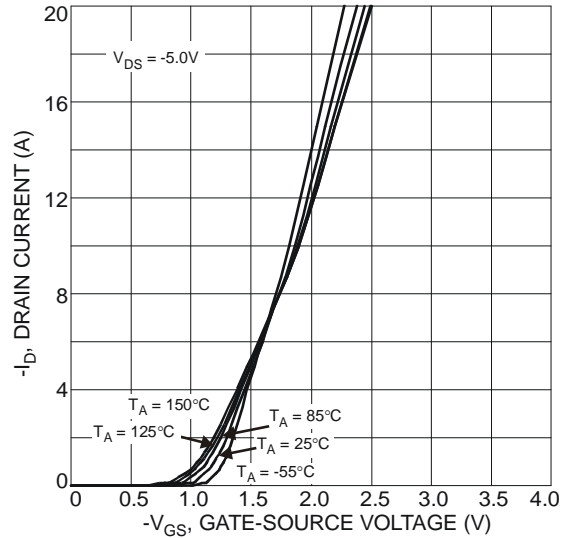


Figure 2 Typical Transfer Characteristics

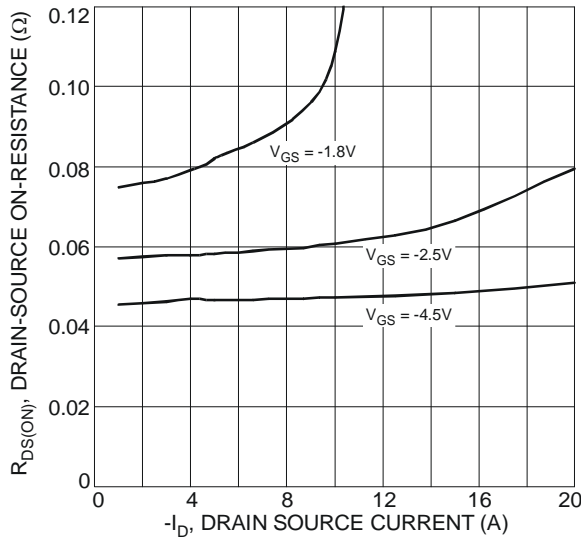


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

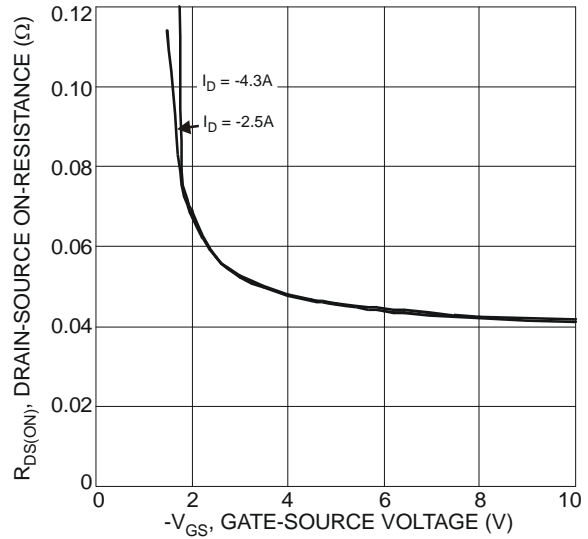


Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

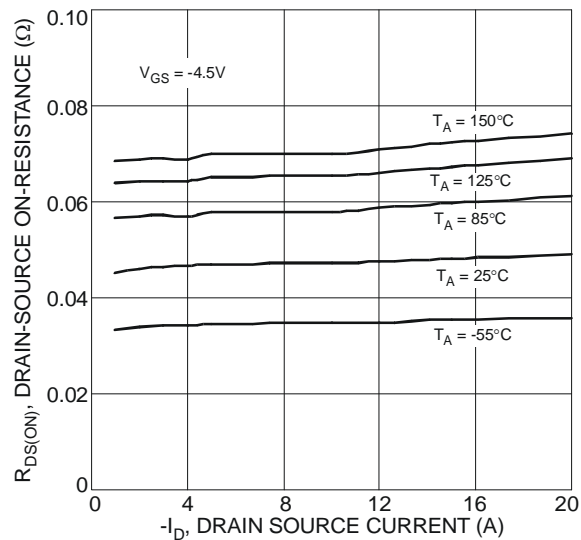


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

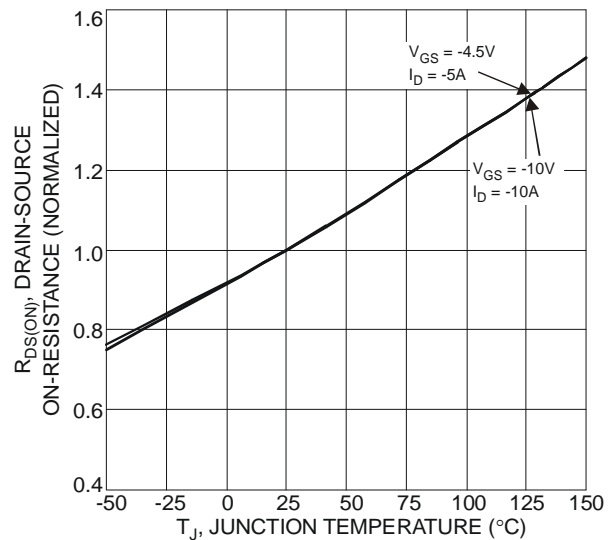


Figure 6 On-Resistance Variation with Temperature

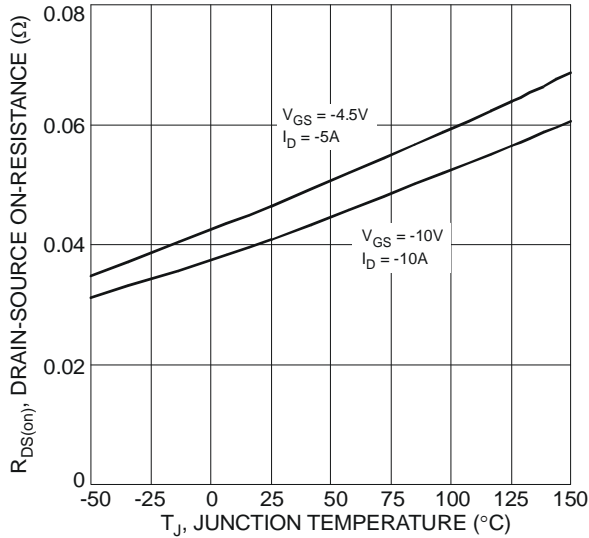


Figure 7 On-Resistance Variation with Temperature

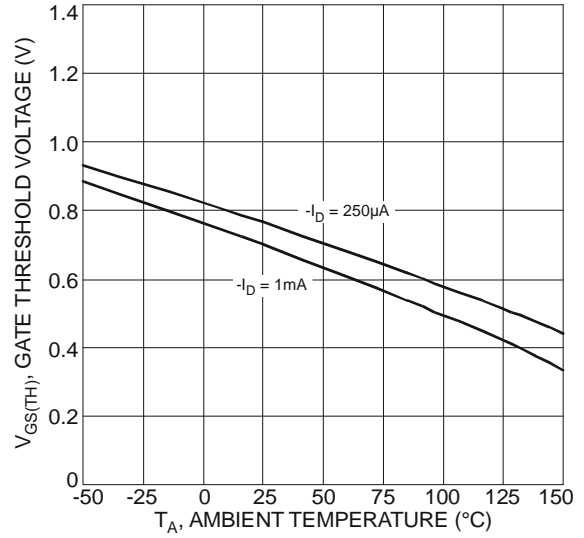


Figure 8 Gate Threshold Variation vs. Ambient Temperature

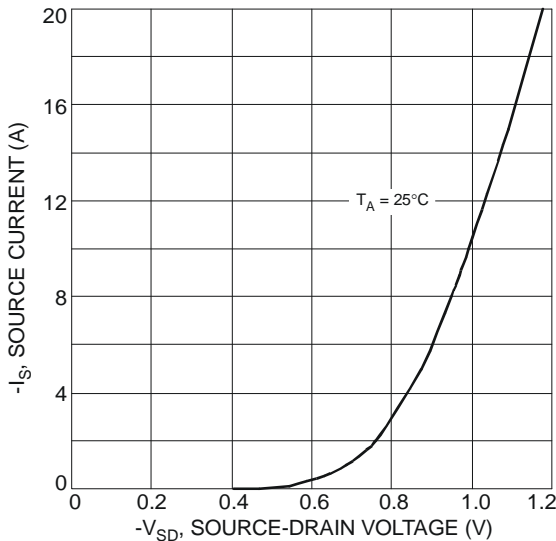


Figure 9 Diode Forward Voltage vs. Current

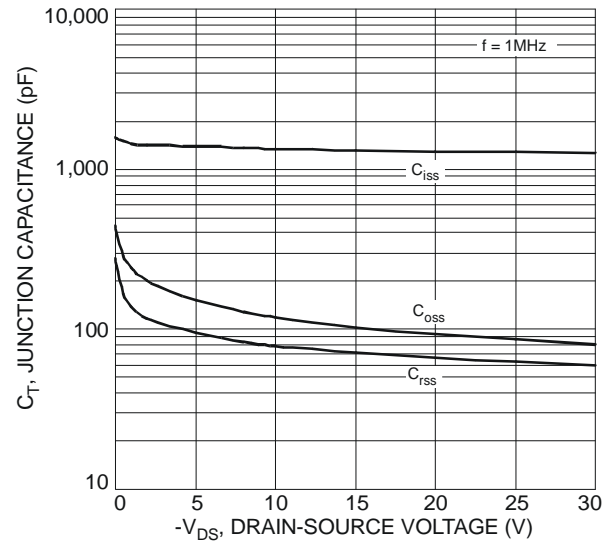


Figure 10 Typical Junction Capacitance

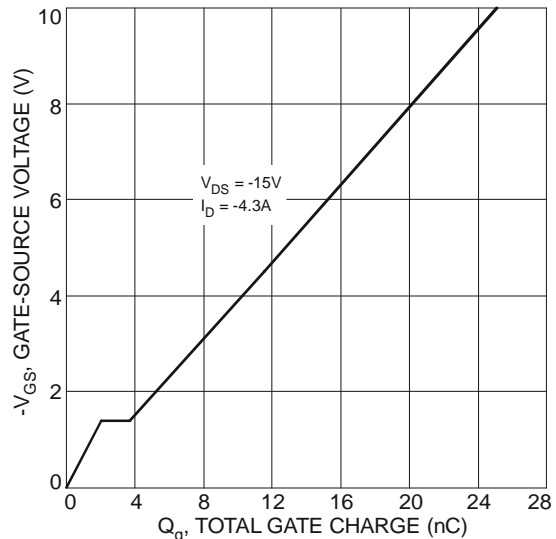


Figure 11 Gate-Charge Characteristics

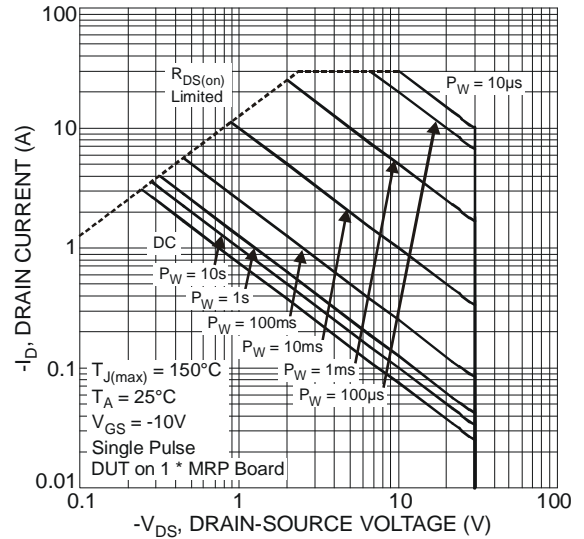


Figure 12 SOA, Safe Operation Area

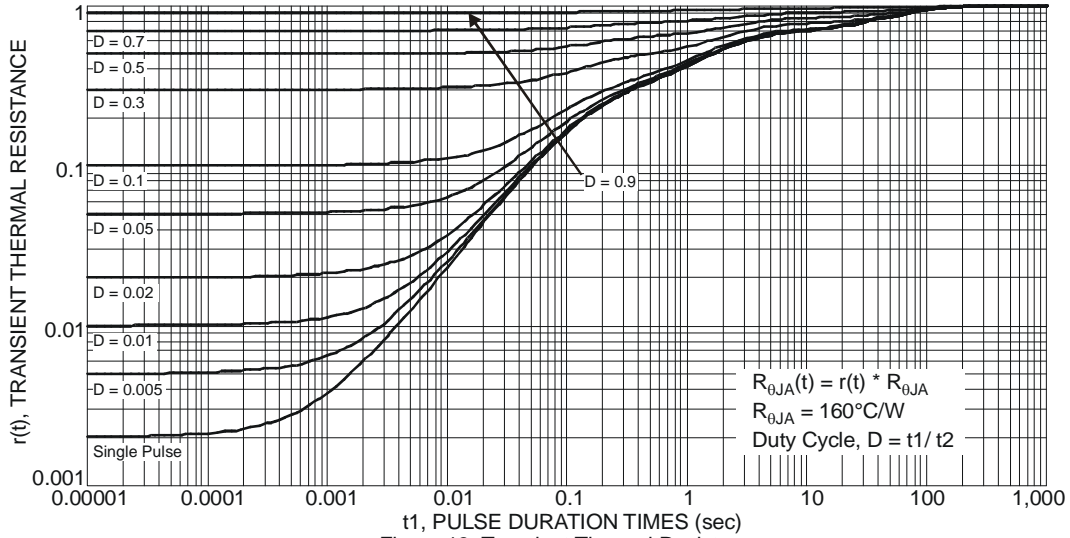
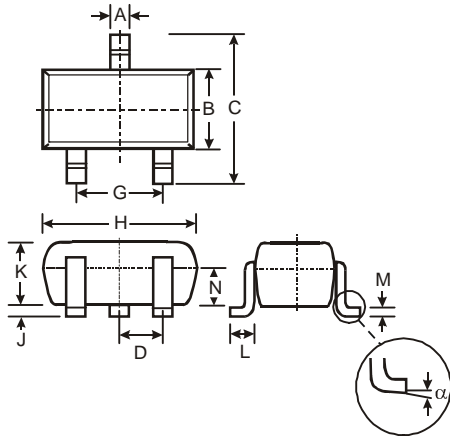


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

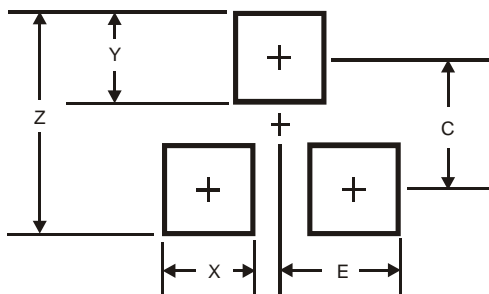


| SC59 | | | |
|------|-------|------|------|
| Dim | Min | Max | Typ |
| A | 0.35 | 0.50 | 0.38 |
| B | 1.50 | 1.70 | 1.60 |
| C | 2.70 | 3.00 | 2.80 |
| D | - | - | 0.95 |
| G | - | - | 1.90 |
| H | 2.90 | 3.10 | 3.00 |
| J | 0.013 | 0.10 | 0.05 |
| K | 1.00 | 1.30 | 1.10 |
| L | 0.35 | 0.55 | 0.40 |
| M | 0.10 | 0.20 | 0.15 |
| N | 0.70 | 0.80 | 0.75 |
| 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 |
| X | 0.8 |
| Y | 1.0 |
| C | 2.4 |
| E | 1.35 |

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