

## Product Summary

| $V_{(BR)DSS}$ | $R_{DS(ON)} \text{ MAX}$                  | $I_D$<br>$T_A = +25^\circ\text{C}$ |
|---------------|-------------------------------------------|------------------------------------|
| 40V           | $24\text{m}\Omega @ V_{GS} = 10\text{V}$  | 9.0A                               |
|               | $32\text{m}\Omega @ V_{GS} = 4.5\text{V}$ | 7.8A                               |

## Description

This new generation MOSFET has been 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

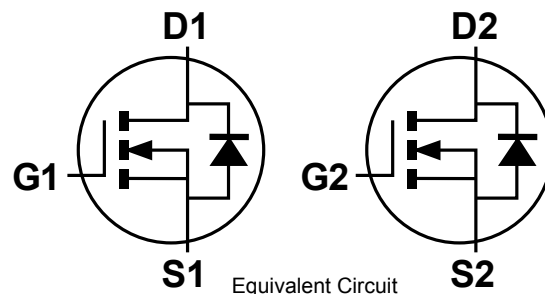
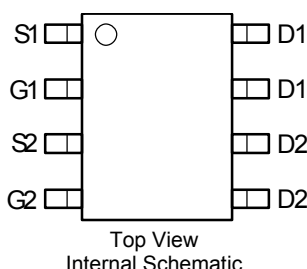
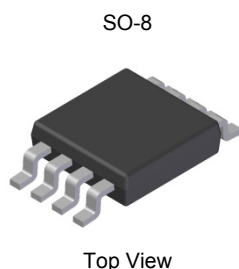
- Motor Control
- Backlighting
- Power Management Functions
- DC-DC Converters

## Features

- Low On-Resistance
- Low Input Capacitance
- 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 Indicator: See diagram below
- Terminals: Finish — Matte Tin annealed over Copper lead frame.  
Solderable per MIL-STD-202, Method 208 **(e3)**
- Weight: 0.074 grams (approximate)

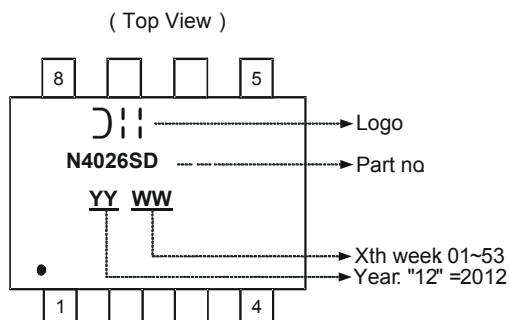


## Ordering Information (Note 4 & 5)

| Part Number    | Compliance | Case | Packaging         |
|----------------|------------|------|-------------------|
| DMN4026SSD-13  | Standard   | SO-8 | 2,500/Tape & Reel |
| DMN4026SSDQ-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 | Units |
|---------------------------------------------------------|--------------|------------------------|------------------|-------|-------|
| Drain-Source Voltage                                    |              |                        | V <sub>DSS</sub> | 40    | V     |
| Gate-Source Voltage                                     |              |                        | V <sub>GSS</sub> | ±20   | V     |
| Continuous Drain Current (Note 7) V <sub>GS</sub> = 10V | Steady State | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 7.0   | A     |
|                                                         |              | T <sub>A</sub> = +70°C |                  | 5.6   |       |
|                                                         | T<10s        | T <sub>A</sub> = +25°C | I <sub>D</sub>   | 9.0   | A     |
|                                                         |              | T <sub>A</sub> = +70°C |                  | 7.2   |       |
| Maximum Continuous Body Diode Forward Current (Note 7)  |              |                        | I <sub>S</sub>   | 2.5   | A     |
| Pulsed Drain Current (10µs pulse, duty cycle = 1%)      |              |                        | I <sub>DM</sub>  | 70    | A     |

**Thermal Characteristics**

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

| Characteristic                             | Symbol              | Min | Typ  | Max  | Unit | Test Condition                                                                             |
|--------------------------------------------|---------------------|-----|------|------|------|--------------------------------------------------------------------------------------------|
| <b>OFF CHARACTERISTICS (Note 8)</b>        |                     |     |      |      |      |                                                                                            |
| 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 (Note 8)</b>         |                     |     |      |      |      |                                                                                            |
| Gate Threshold Voltage                     | V <sub>GS(th)</sub> | 1   | —    | 3    | 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 (Note 9)</b>    |                     |     |      |      |      |                                                                                            |
| 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  | 20   | 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 | 43   |      |                                                                                            |
| Gate-Source Charge                         | Q <sub>gs</sub>     | —   | 3.0  | 7.5  |      |                                                                                            |
| Gate-Drain Charge                          | Q <sub>gd</sub>     | —   | 2.5  | 6    |      |                                                                                            |
| 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                                                       |

- 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.

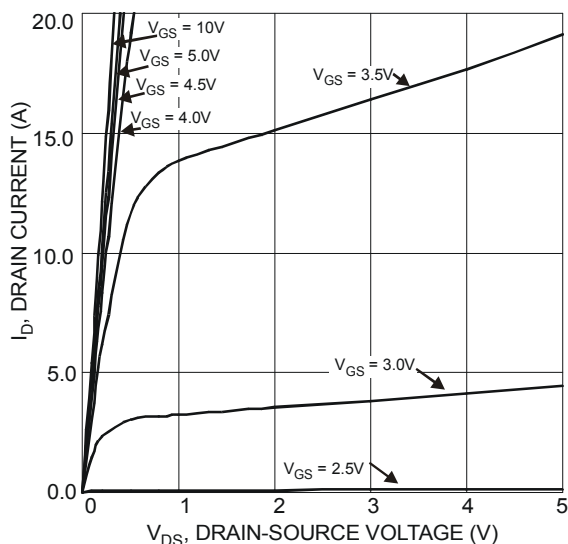


Figure 1 Typical Output Characteristic

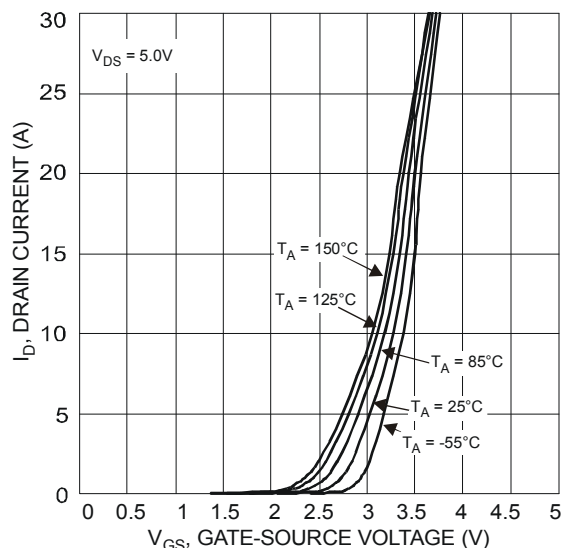


Figure 2 Typical Transfer Characteristics

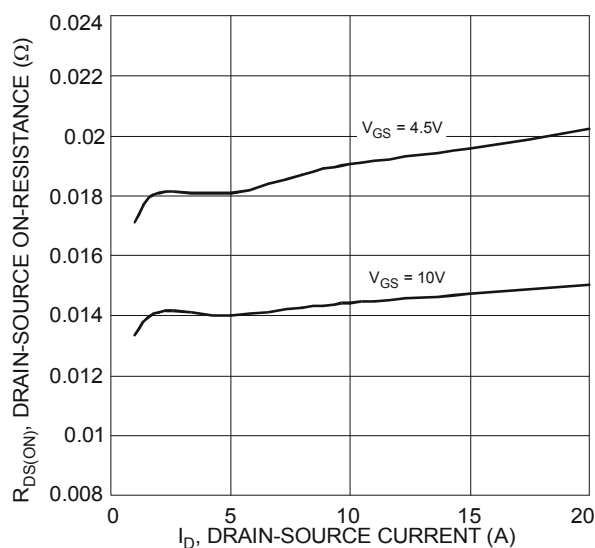


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

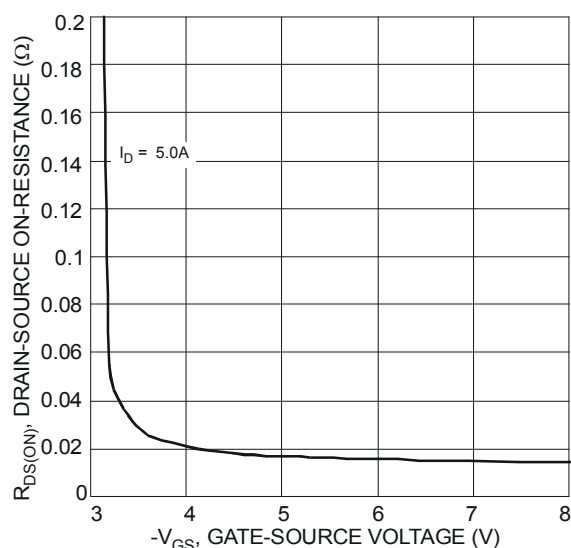


Figure 4 Typical Transfer Characteristic

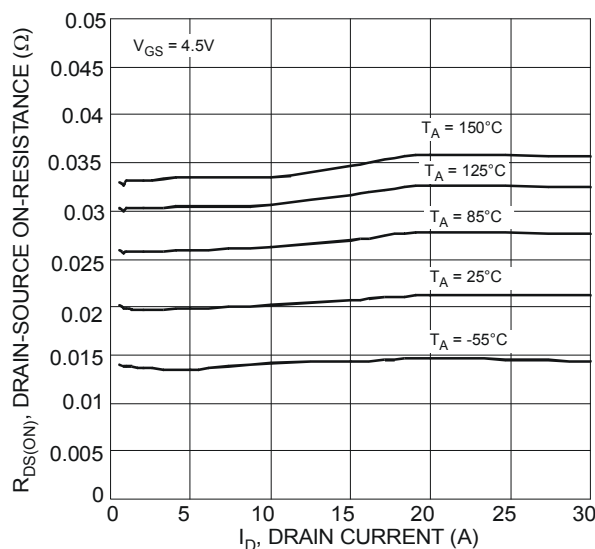


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

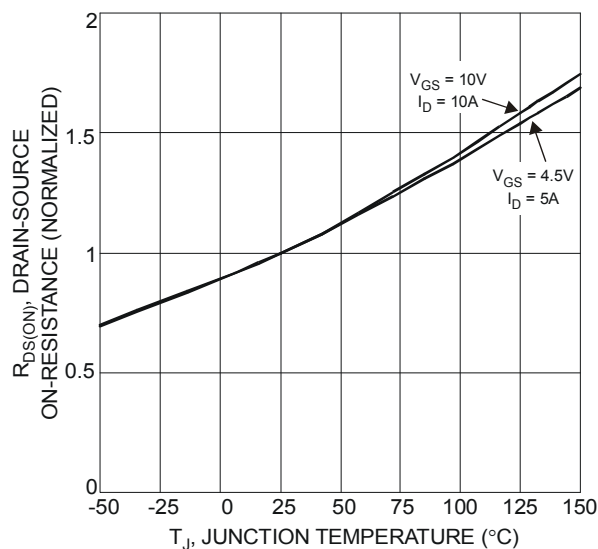
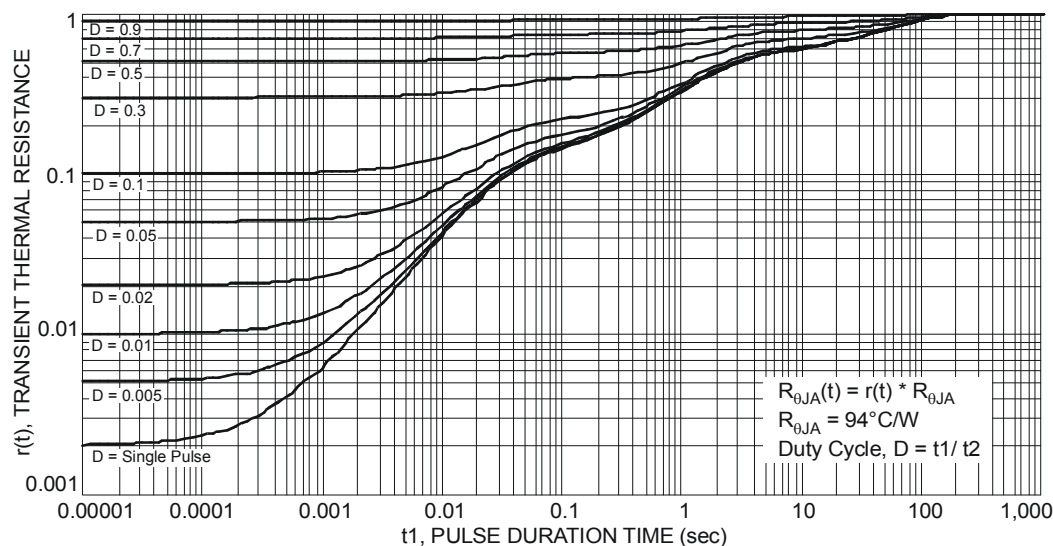
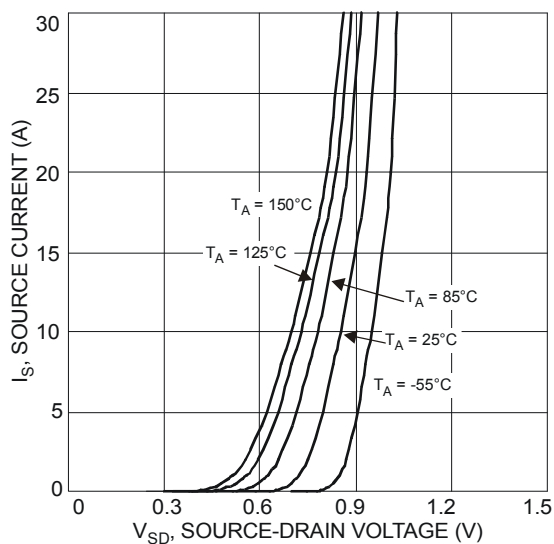
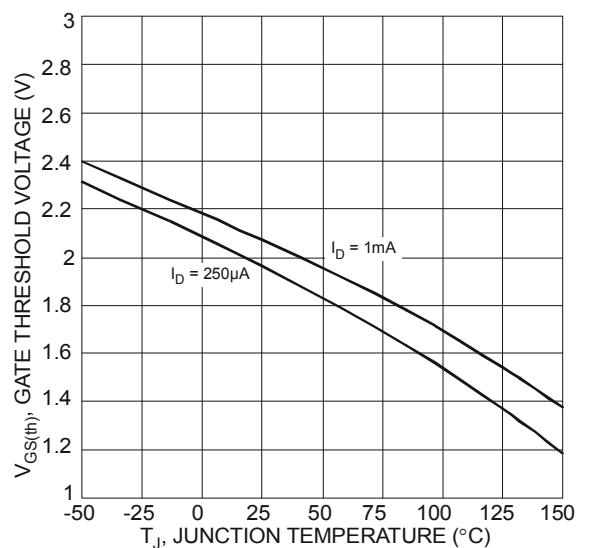
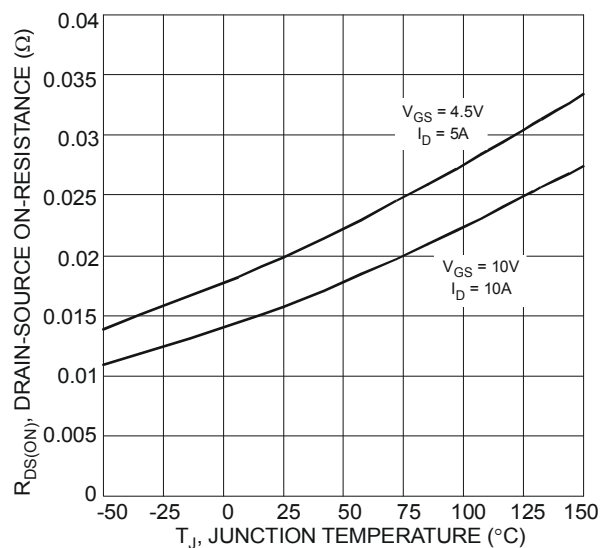
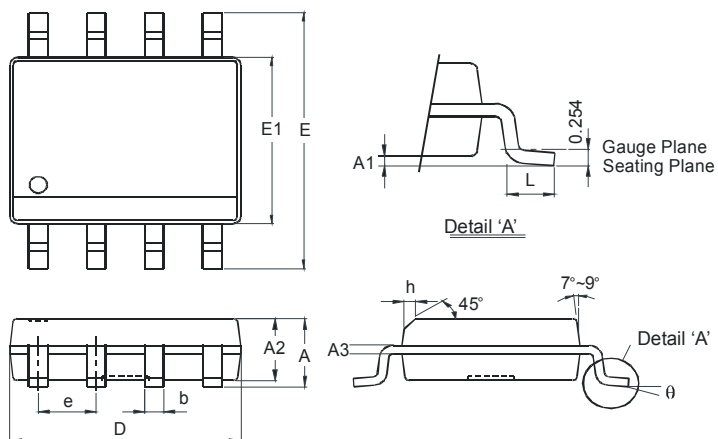


Figure 6 On-Resistance Variation with Temperature



## Package Outline Dimensions

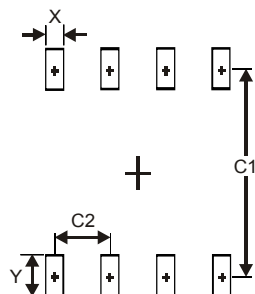
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| SO-8                 |          |      |
|----------------------|----------|------|
| Dim                  | Min      | Max  |
| <b>A</b>             | -        | 1.75 |
| <b>A1</b>            | 0.10     | 0.20 |
| <b>A2</b>            | 1.30     | 1.50 |
| <b>A3</b>            | 0.15     | 0.25 |
| <b>b</b>             | 0.3      | 0.5  |
| <b>D</b>             | 4.85     | 4.95 |
| <b>E</b>             | 5.90     | 6.10 |
| <b>E1</b>            | 3.85     | 3.95 |
| <b>e</b>             | 1.27 Typ |      |
| <b>h</b>             | -        | 0.35 |
| <b>L</b>             | 0.62     | 0.82 |
| <b>θ</b>             | 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) |
|------------|---------------|
| <b>X</b>   | 0.60          |
| <b>Y</b>   | 1.55          |
| <b>C1</b>  | 5.4           |
| <b>C2</b>  | 1.27          |

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