

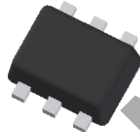
**DUAL N-CHANNEL ENHANCEMENT MODE MOSFET**

## Features

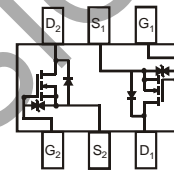
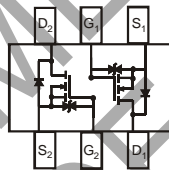
- Dual N-Channel MOSFET
- Low On-Resistance
- Very Low Gate Threshold Voltage, 1.0V Max
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Ultra-Small Surface-Mount Package
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **ESD Protected up to 2kV**
- This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability.  
<https://www.diodes.com/quality/product-definitions/>
- An automotive-compliant part is available under separate datasheet ([DMN5L06VKQ](#))

## 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: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.006 grams (Approximate)



SOT563  
Top View



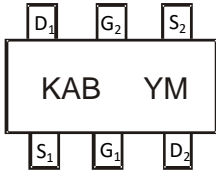
## Ordering Information (Note 4)

| Orderable Part Number | Package | Packing |             |
|-----------------------|---------|---------|-------------|
|                       |         | Qty.    | Carrier     |
| DMN5L06VK-7           | SOT563  | 3,000   | Tape & Reel |
| DMN5L06VK-7A          | SOT563  | 3,000   | Tape & Reel |
| DMN5L06VK-13          | SOT563  | 10,000  | Tape & Reel |
| DMN5L06VK-13A         | SOT563  | 10,000  | Tape & Reel |
| DMN5L06VAK-7          | SOT563  | 3,000   | Tape & Reel |
| DMN5L06VAK-7A         | SOT563  | 3,000   | Tape & Reel |
| DMN5L06VAK-13         | SOT563  | 10,000  | Tape & Reel |
| DMN5L06VAK-13A        | SOT563  | 10,000  | Tape & Reel |
| DMN5010VAK-7          | SOT563  | 3,000   | Tape & Reel |
| DMN5010VAK-7A         | SOT563  | 3,000   | Tape & Reel |
| DMN5010VAK-13         | SOT563  | 10,000  | Tape & Reel |
| DMN5010VAK-13A        | SOT563  | 10,000  | Tape & Reel |

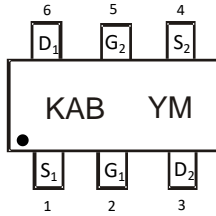
- Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
  3. 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** (Notes 5 & 6)

**DMN5L06VK-7/-13 (Note 5)**

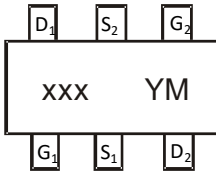


**DMN5L06VK-7A/-13A (Note 6)**

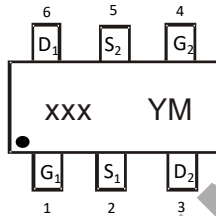


KAB= DMN5L06VK Product Type  
Marking Code  
YM= Date Code Marking  
Y = Year (ex: L = 2024)  
M = Month (ex: 9 = September)

**DMN5L06VAK-7/-13 (Note 5)  
DMN5010VAK-7/-13 (Note 5)**



**DMN5L06VAK-7A/-13A (Note 6)  
DMN5010VAK-7A/-13A (Note 6)**



xxx = Product Type Marking Code:  
KAE or KAE or KAC  
YM= Date Code Marking  
Y = Year (ex: L = 2024)  
M = Month (ex: 9 = September)

**Date Code Key**

|              |             |            |             |             |             |             |             |             |             |             |             |             |
|--------------|-------------|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Year</b>  | <b>2006</b> | -          | <b>2024</b> | <b>2025</b> | <b>2026</b> | <b>2027</b> | <b>2028</b> | <b>2029</b> | <b>2030</b> | <b>2031</b> | <b>2032</b> | <b>2033</b> |
| <b>Code</b>  | T           | -          | L           | M           | N           | P           | R           | S           | T           | U           | V           | W           |
| <b>Month</b> | <b>Jan</b>  | <b>Feb</b> | <b>Mar</b>  | <b>Apr</b>  | <b>May</b>  | <b>Jun</b>  | <b>Jul</b>  | <b>Aug</b>  | <b>Sep</b>  | <b>Oct</b>  | <b>Nov</b>  | <b>Dec</b>  |
| <b>Code</b>  | 1           | 2          | 3           | 4           | 5           | 6           | 7           | 8           | 9           | O           | N           | D           |

Notes: 5. Package is non-polarized. Parts may be on reel in orientation illustrated, 180° rotated, or mixed (both ways).  
6. Part number with suffix 7A and 13A designates devices marked with a Pin 1 indicator. There is no other difference between both devices.

NOT RECOMMENDED FOR NEW DESIGN

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

| Characteristic                             | Symbol           | Value           | Unit   |
|--|------------------|-----------------|--------|
| Drain Source Voltage                       | V <sub>DSS</sub> | 50              | V      |
| Drain-Gate Voltage R <sub>GS</sub> ≤ 1.0MΩ | V <sub>DGR</sub> | 50              | V      |
| Gate-Source Voltage                        | V <sub>GSS</sub> | Continuous      | ±20    |
|  |                  | Pulsed          | ±40    |
| Drain Current (Note 7)                     | Continuous       | I <sub>D</sub>  | 280 mA |
|  | Pulsed           | I <sub>DM</sub> | 1.5 A  |

### Thermal Characteristics

| Characteristic                                   | Symbol                            | Value       | Unit |
|--|-----------------------------------|-------------|------|
| Total Power Dissipation (Note 7)                 | P <sub>D</sub>                    | 250         | mW   |
| Thermal Resistance, Junction to Ambient (Note 7) | R <sub>θJA</sub>                  | 500         | °C/W |
| 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</b> (Note 8)  |                     |      |     |     |      |  |
| Drain-Source Breakdown Voltage   | BV <sub>DSS</sub>   | 50   | —   | —   | V    | V <sub>GS</sub> = 0V, I <sub>D</sub> = 10μA                |
| Zero Gate Voltage Drain Current @ T <sub>C</sub> = +25°C                                   | I <sub>DSS</sub>    | —    | —   | 60  | nA   | V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V                |
| Gate-Body Leakage  | I <sub>GSS</sub>    | —    | —   | 1   | μA   | V <sub>GS</sub> = ±12V, V <sub>DS</sub> = 0V               |
|  |                     | —    | —   | 500 | nA   | V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V               |
|  |                     | —    | —   | 50  | nA   | V <sub>GS</sub> = ±5V, V <sub>DS</sub> = 0V                |
| <b>ON CHARACTERISTICS</b> (Note 8)   |                     |      |     |     |      |  |
| Gate Threshold Voltage @T <sub>J</sub> = +25°C<br>@T <sub>J</sub> = +0°C to +85°C (Note 9) | V <sub>GS(TH)</sub> | 0.49 | —   | 1.0 | V    | V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA |
|  |                     | 0.30 | —   | 1.2 |      |  |
| Static Drain-Source On-Resistance  | R <sub>DS(ON)</sub> | —    | —   | 3.0 | Ω    | V <sub>GS</sub> = 1.8V, I <sub>D</sub> = 50mA              |
|  |                     | —    | —   | 2.5 |      | V <sub>GS</sub> = 2.5V, I <sub>D</sub> = 50mA              |
|  |                     | —    | —   | 2.0 |      | V <sub>GS</sub> = 5.0V, I <sub>D</sub> = 50mA              |
| On-State Drain Current   | I <sub>D(ON)</sub>  | 0.5  | 1.4 | —   | A    | V <sub>GS</sub> = 10V, V <sub>DS</sub> = 7.5V              |
| Forward Transconductance   | Y <sub>fs</sub>     | 200  | —   | —   | mS   | V <sub>DS</sub> = 10V, I <sub>D</sub> = 0.2A               |
| Source-Drain Diode Forward Voltage   | V <sub>SD</sub>     | 0.5  | —   | 1.4 | V    | V <sub>GS</sub> = 0V, I <sub>S</sub> = 115mA               |
| <b>DYNAMIC CHARACTERISTICS</b> (Note 9)  |                     |      |     |     |      |  |
| Input Capacitance  | C <sub>iss</sub>    | —    | —   | 50  | pF   | V <sub>DS</sub> = 25V, V <sub>GS</sub> = 0V<br>f = 1.0MHz  |
| Output Capacitance   | C <sub>oss</sub>    | —    | —   | 25  | pF   |  |
| Reverse Transfer Capacitance   | C <sub>rss</sub>    | —    | —   | 5.0 | pF   |  |

- Notes:
7. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  8. Short duration pulse test used to minimize self-heating effect.
  9. Guaranteed by design. Not subject to product testing.

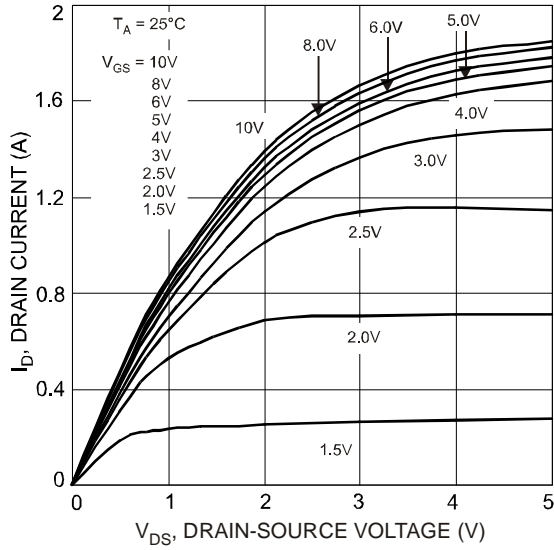


Fig. 1 Typical Output Characteristics

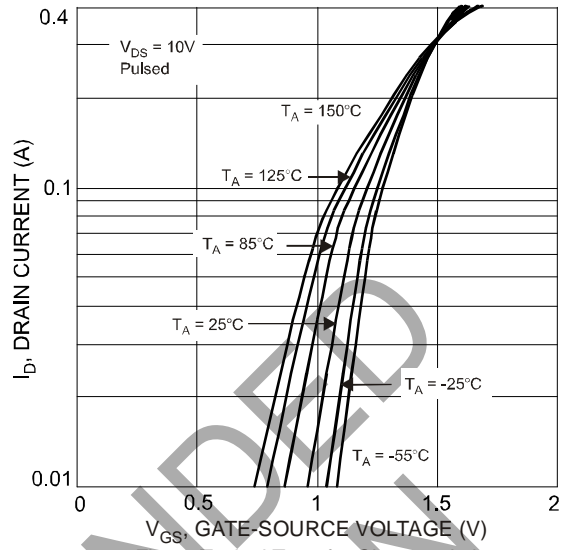


Fig. 2 Typical Transfer Characteristics

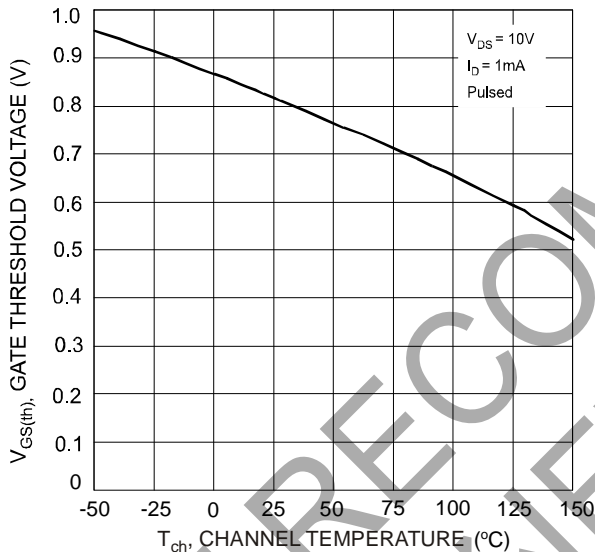


Fig. 3 Gate Threshold Voltage vs. Channel Temperature

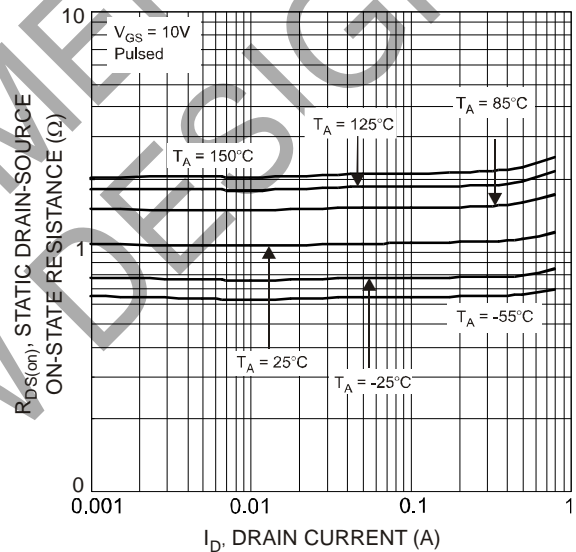


Fig. 4 Static Drain-Source On-Resistance vs. Drain Current

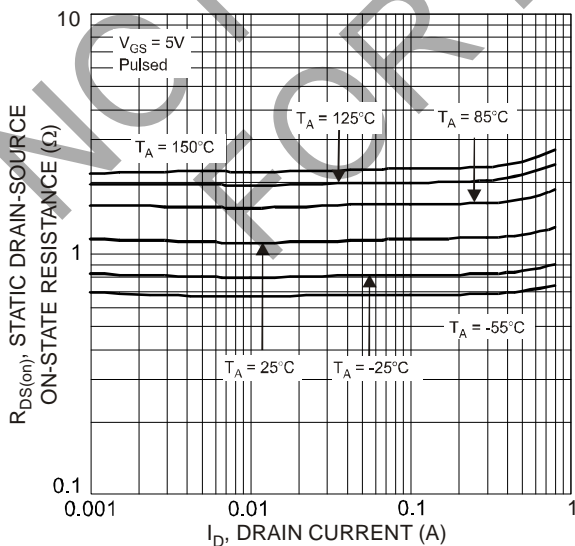


Fig. 5 Static Drain-Source On-Resistance vs. Drain Current

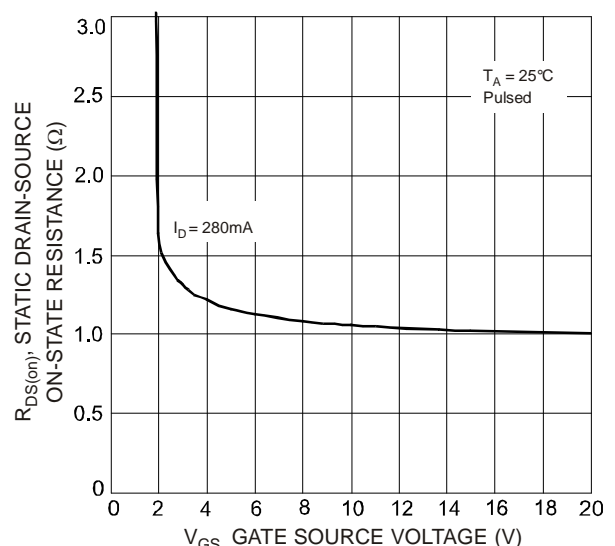


Fig. 6 Static Drain-Source On-Resistance vs. Gate-Source Voltage

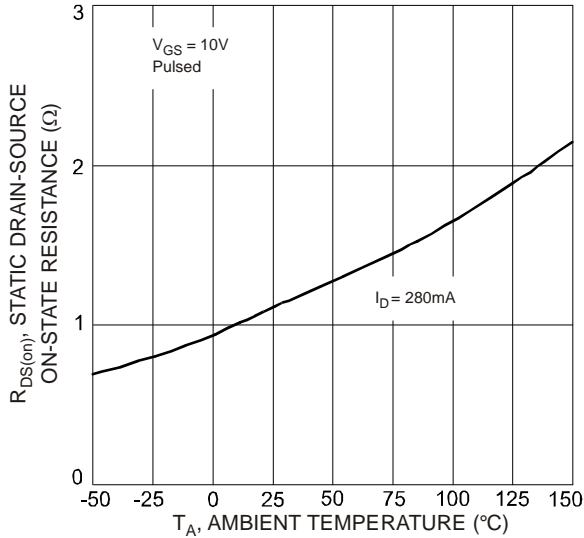


Fig. 7 Static Drain-Source On-State Resistance vs. Ambient Temperature

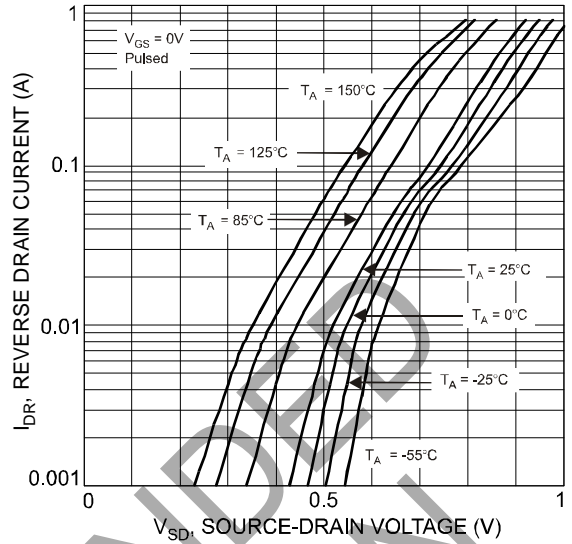


Fig. 8 Reverse Drain Current vs. Source-Drain Voltage

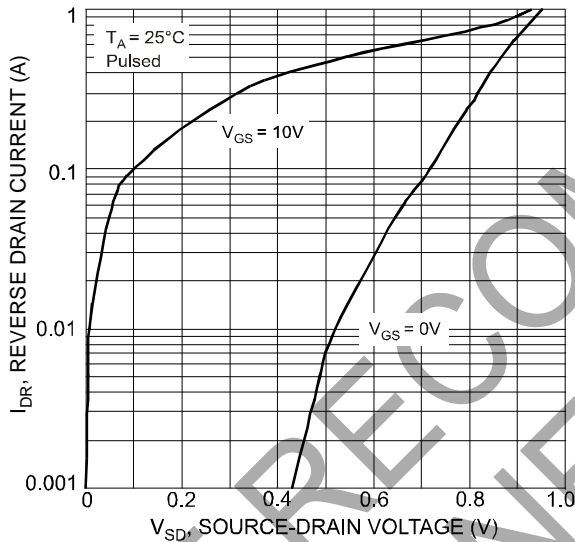


Fig. 9 Reverse Drain Current vs. Source-Drain Voltage

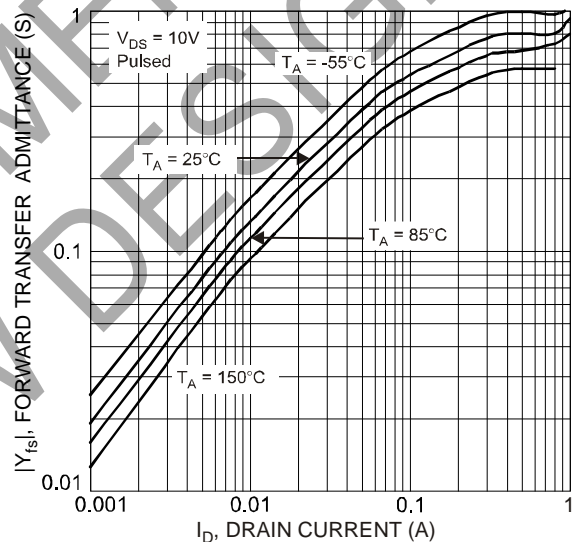


Fig. 10 Forward Transfer Admittance vs. Drain Current

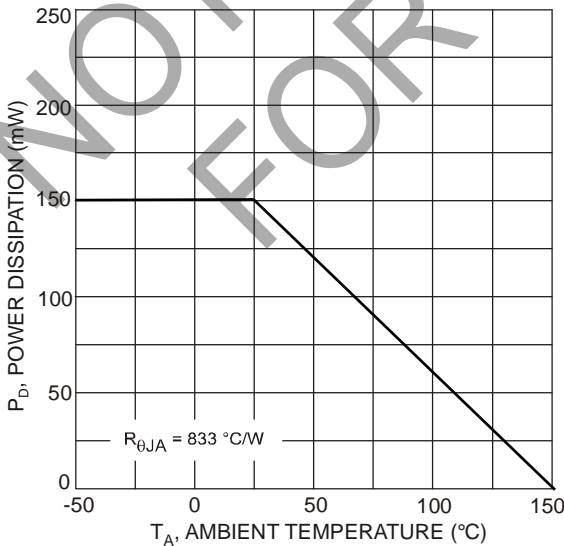
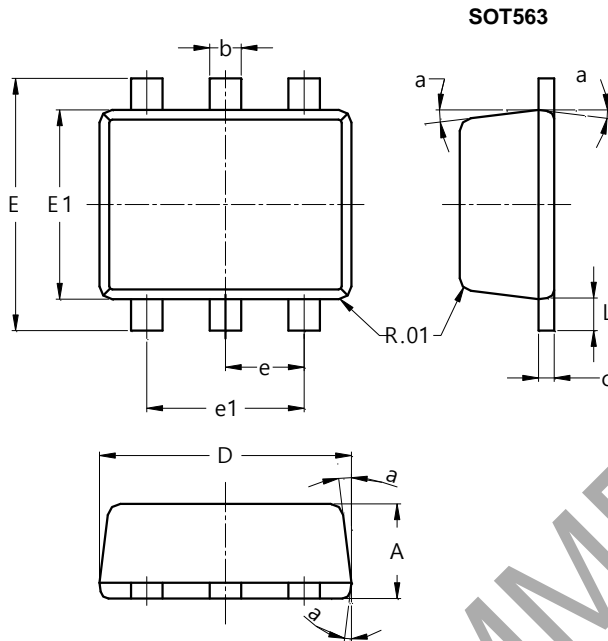


Fig. 11 Derating Curve - Total

## Package Outline Dimensions

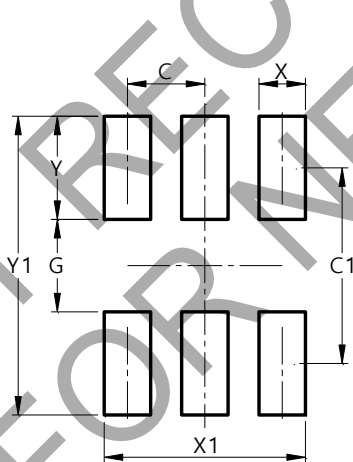
Please see <http://www.diodes.com/package-outlines.html> for the latest version.



| 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.



| 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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