

Product Summary

| $V_{(BR)DSS}$ | $R_{DS(on) \max}$ | $I_D \max$ $T_A = +25^\circ\text{C}$ (Notes 6) |
|---------------|--|--|
| -40V | 25m Ω @ $V_{GS} = -10\text{V}$ | -7.2A |
| | 45m Ω @ $V_{GS} = -4.5\text{V}$ | -5.4A |

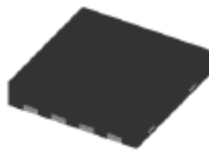
Description

This MOSFET has been designed to minimize the on-state resistance and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

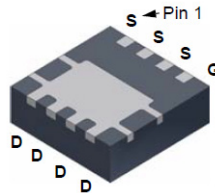
Applications

- Motor Control
- Backlighting
- DC-DC Converters
- Printer Equipment

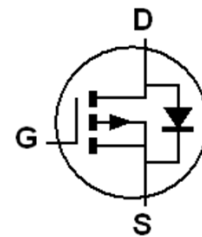
POWERDI3333-8



Top View



Bottom View



Device symbol

Features

- Low $R_{DS(on)}$ – Minimizes conduction losses
- Fast switching speed – Minimizes switching losses
- **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

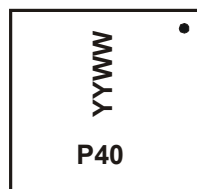
- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections: See diagram below
- Terminals: Finish - Matte Tin annealed over Copper lead frame. Solderable per MIL-STD-202, Method 208 ⁽³⁾
- Weight: 0.0172 grams (approximate)

Ordering Information (Note 4)

| Product | Marking | Reel Size (inches) | Tape Width (mm) | Quantity per Reel |
|---------------|---------|--------------------|-----------------|-------------------|
| DMP4025SFG-7 | P40 | 7 | 8 | 2,000 |
| DMP4025SFG-13 | P40 | 13 | 8 | 3,000 |

- 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 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/products/packages.html>.

Marking Information



P40 = Product marking code
YYWW = Date Code Marking
YY = Year (ex: 12 = 2012)
WW = Week (01 - 53)

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

| Characteristic | | | Symbol | Value | Units |
|--------------------------|-----------------------|-------------------------------------|-----------|----------|-------|
| Drain-Source Voltage | | | V_{DSS} | -40 | V |
| Gate-Source Voltage | | | V_{GSS} | ± 20 | |
| Continuous Drain Current | $V_{GS} = 10\text{V}$ | (Notes 6) | I_D | -7.2 | A |
| | | $T_A = +70^\circ\text{C}$ (Notes 6) | | -5.77 | |
| | | (Notes 5) | | -4.65 | |
| Pulsed Drain Current | $V_{GS} = 10\text{V}$ | (Notes 7) | I_{DM} | -26 | |

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

| Characteristic | | Symbol | Value | Unit |
|---|----------|-----------------|-------------|--------------------|
| Power Dissipation | (Note 5) | P_D | 0.81 | W |
| Linear Derating Factor | (Note 6) | | 1.95 | |
| Thermal Resistance, Junction to Ambient | (Note 5) | $R_{\theta JA}$ | 155 | $^\circ\text{C/W}$ |
| | (Note 6) | | 64 | |
| Operating and Storage Temperature Range | | T_J, T_{STG} | -55 to +150 | $^\circ\text{C}$ |

- Notes:
- 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout
 - 6. For a device surface mounted on 25mm x 25mm FR4 PCB with 2oz copper, in still air conditions;
 - 7. Same as note (6), except the device is pulsed with $D = 0.02$ and pulse width 300 μs .

Thermal Characteristics

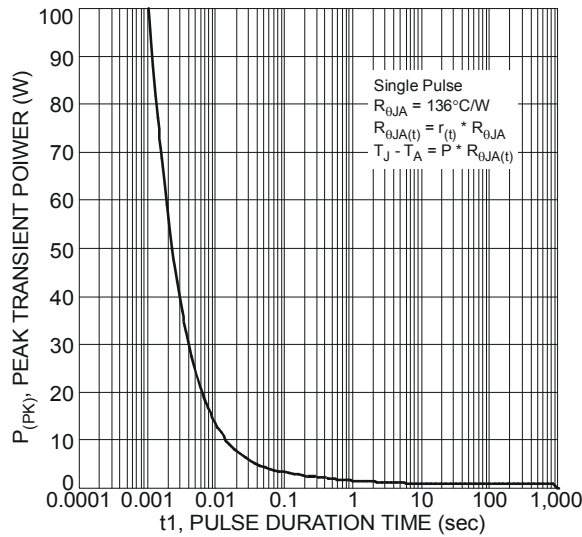


Figure 1 Single Pulse Maximum Power Dissipation

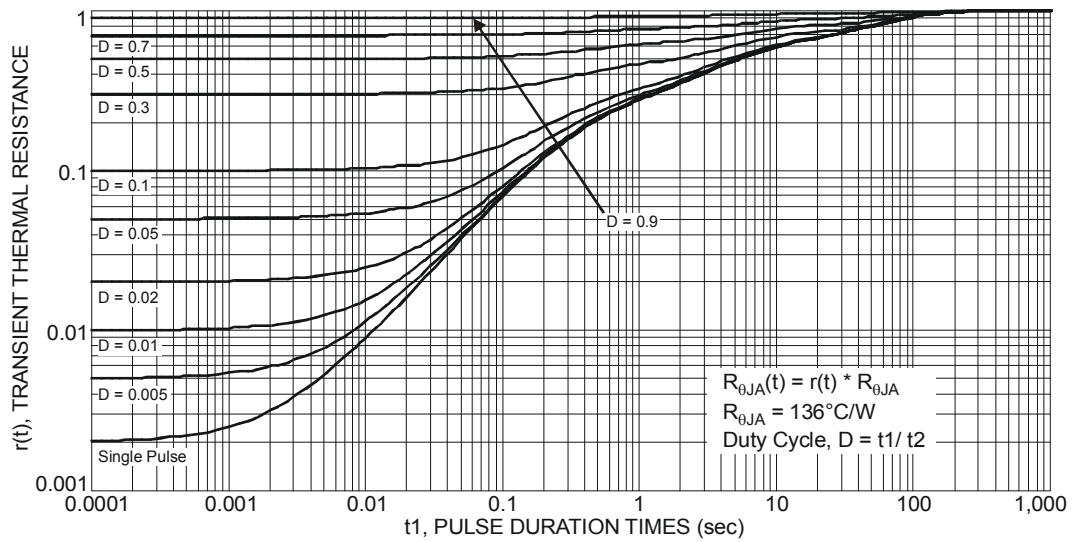


Figure 2 Transient Thermal Resistance

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

| Characteristic | Symbol | Min | Typ | Max | Unit | Test Condition |
|--|---------------------|------|------|------|------|---|
| OFF CHARACTERISTICS | | | | | | |
| Drain-Source Breakdown Voltage | BV _{DSS} | -40 | — | — | V | I _D = -250μA, V _{GS} = 0V |
| Zero Gate Voltage Drain Current | I _{DSS} | — | — | -1.0 | μA | V _{DS} = -40V, V _{GS} = 0V |
| Gate-Source Leakage | I _{GSS} | — | — | ±100 | nA | V _{GS} = ±20V, V _{DS} = 0V |
| ON CHARACTERISTICS | | | | | | |
| Gate Threshold Voltage | V _{GS(th)} | -0.8 | -1.3 | -1.8 | V | I _D = -250μA, V _{DS} = V _{GS} |
| Static Drain-Source On-Resistance (Note 8) | R _{DS(on)} | — | 18 | 25 | mΩ | V _{GS} = -10V, I _D = -3A |
| | | | 30 | 45 | | V _{GS} = -4.5V, I _D = -3A |
| Forward Transconductance (Notes 8 & 9) | g _{fs} | — | 16.6 | — | S | V _{DS} = -5V, I _D = -3A |
| Diode Forward Voltage (Note 8) | V _{SD} | — | -0.7 | -1.0 | V | I _S = -1A, V _{GS} = 0V |
| DYNAMIC CHARACTERISTICS (Note 9) | | | | | | |
| Input Capacitance | C _{iSS} | — | 1643 | — | pF | V _{DS} = -20V, V _{GS} = 0V f = 1MHz |
| Output Capacitance | C _{oss} | — | 179 | — | | |
| Reverse Transfer Capacitance | C _{rSS} | — | 128 | — | | |
| Gate Resistance | R _g | — | 6.43 | — | Ω | V _{DS} = 0V, V _{GS} = 0V, f = 1MHz |
| Total Gate Charge (Note 10) | Q _g | — | 14.0 | — | nC | V _{GS} = -4.5V V _{DS} = -20V I _D = -3A |
| Total Gate Charge (Note 10) | Q _g | — | 33.7 | — | | |
| Gate-Source Charge (Note 10) | Q _{gs} | — | 5.5 | — | | |
| Gate-Drain Charge (Note 10) | Q _{gd} | — | 7.3 | — | | |
| Turn-On Delay Time (Note 10) | t _{D(on)} | — | 6.9 | — | ns | V _{DD} = -20V, V _{GS} = -10V I _D = -3A |
| Turn-On Rise Time (Note 10) | t _r | — | 14.7 | — | | |
| Turn-Off Delay Time (Note 10) | t _{D(off)} | — | 53.7 | — | | |
| Turn-Off Fall Time (Note 10) | t _f | — | 30.9 | — | | |

- Notes:
 8. Measured under pulsed conditions. Pulse width ≤ 300μs; duty cycle ≤ 2%
 9. For design aid only, not subject to production testing.
 10. Switching characteristics are independent of operating junction temperatures.

Typical Characteristics

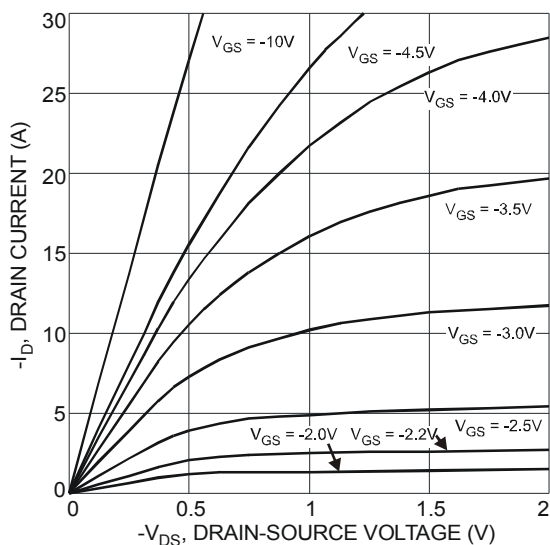


Figure 3 Typical Output Characteristic

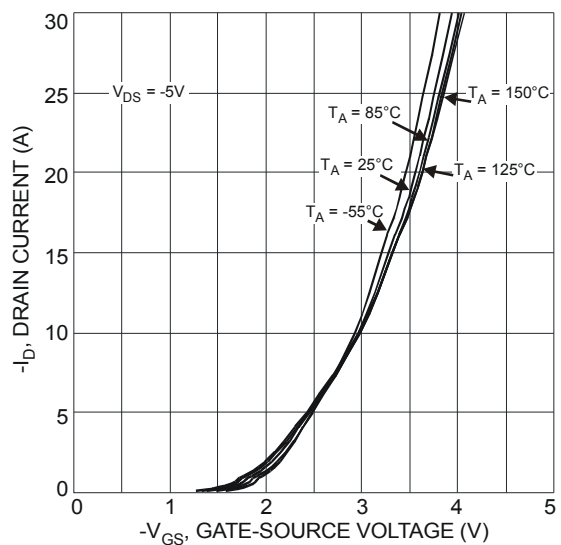


Figure 4 Typical Transfer Characteristic

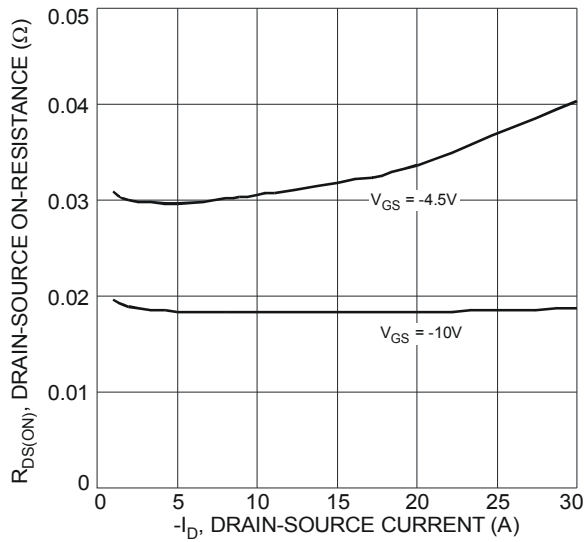


Figure 5 Typical On-Resistance vs. Drain Current and Gate Voltage

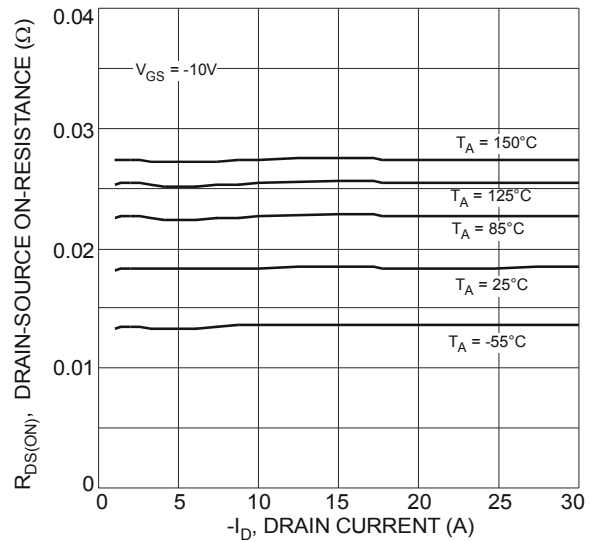


Figure 6 Typical On-Resistance vs. Drain Current and Temperature

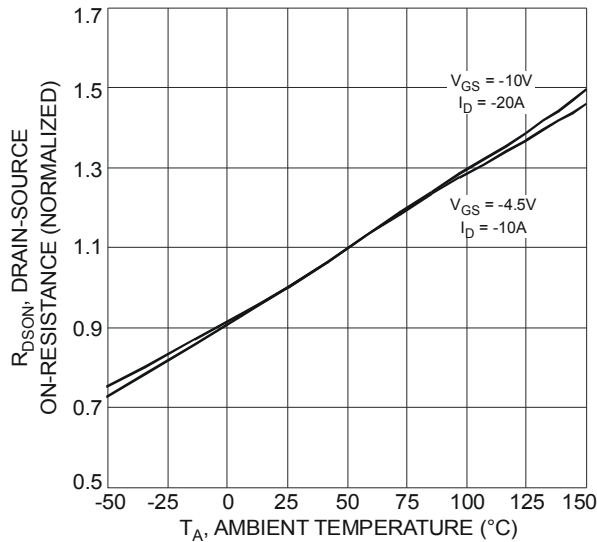


Figure 7 On-Resistance Variation with Temperature

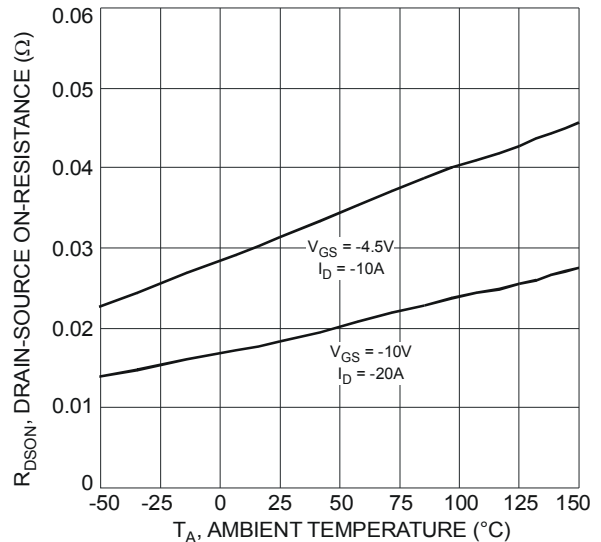


Figure 8 On-Resistance Variation with Temperature

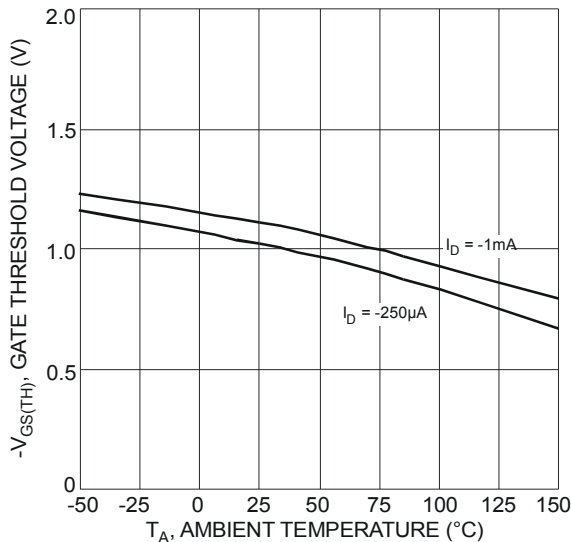


Figure 9 Gate Threshold Variation vs. Ambient Temperature

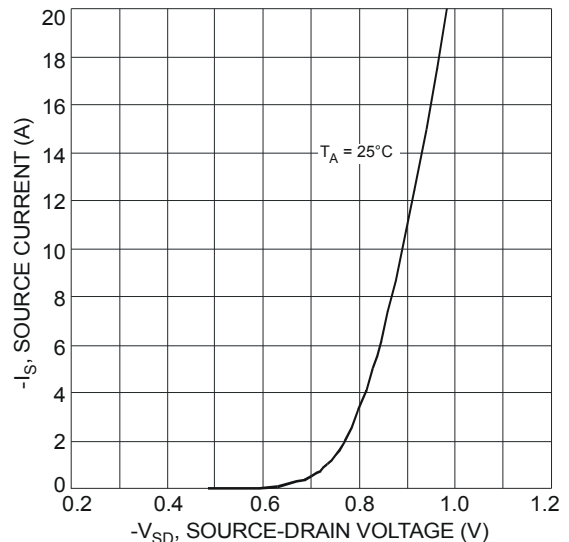


Figure 10 Diode Forward Voltage vs. Current

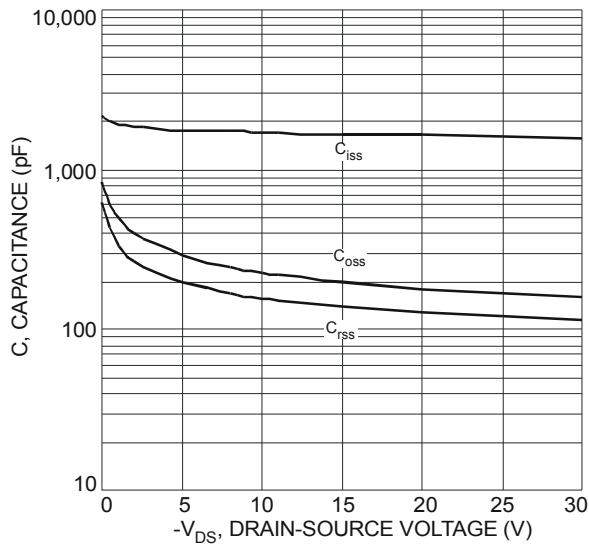


Figure 11 Typical Total Capacitance

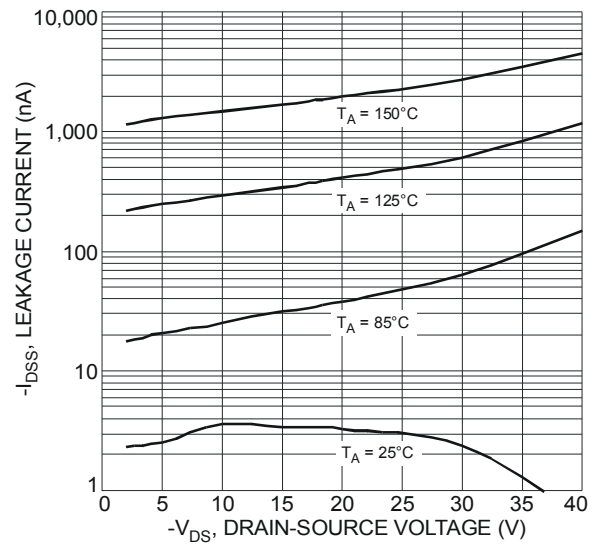


Figure 12 Typical Leakage Current vs. Drain-Source Voltage

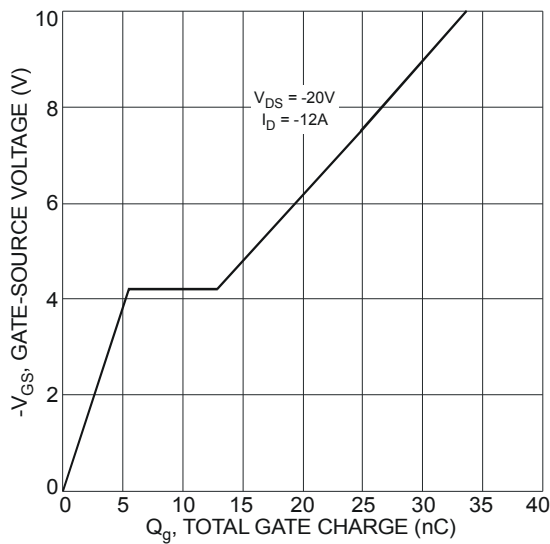
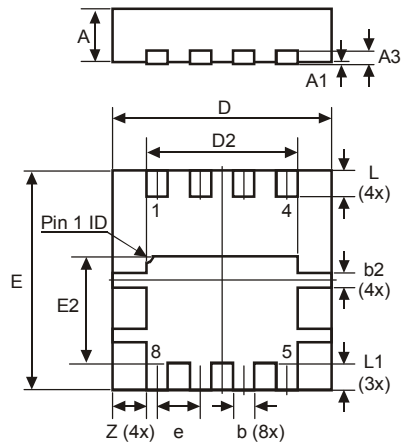


Figure 13 Gate-Charge Characteristics

Package Outline Dimensions

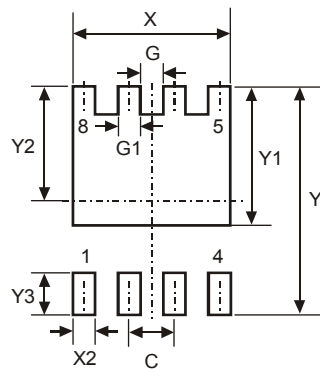
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



| POWERDI [®] 3333-8 | | | |
|-----------------------------|------|------|-------|
| Dim | Min | Max | Typ |
| D | 3.25 | 3.35 | 3.30 |
| E | 3.25 | 3.35 | 3.30 |
| D2 | 2.22 | 2.32 | 2.27 |
| E2 | 1.56 | 1.66 | 1.61 |
| A | 0.75 | 0.85 | 0.80 |
| A1 | 0 | 0.05 | 0.02 |
| A3 | - | - | 0.203 |
| b | 0.27 | 0.37 | 0.32 |
| b2 | - | - | 0.20 |
| L | 0.35 | 0.45 | 0.40 |
| L1 | - | - | 0.39 |
| e | - | - | 0.65 |
| Z | - | - | 0.515 |
| 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) |
|------------|---------------|
| C | 0.650 |
| G | 0.230 |
| G1 | 0.420 |
| Y | 3.700 |
| Y1 | 2.250 |
| Y2 | 1.850 |
| Y3 | 0.700 |
| X | 2.370 |
| X2 | 0.420 |

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