
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = +25^\circ C$
40V	7.5m Ω @ $V_{GS} = 10V$	14.4A
	10m Ω @ $V_{GS} = 4.5V$	12.5A

Description and Applications

This 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.

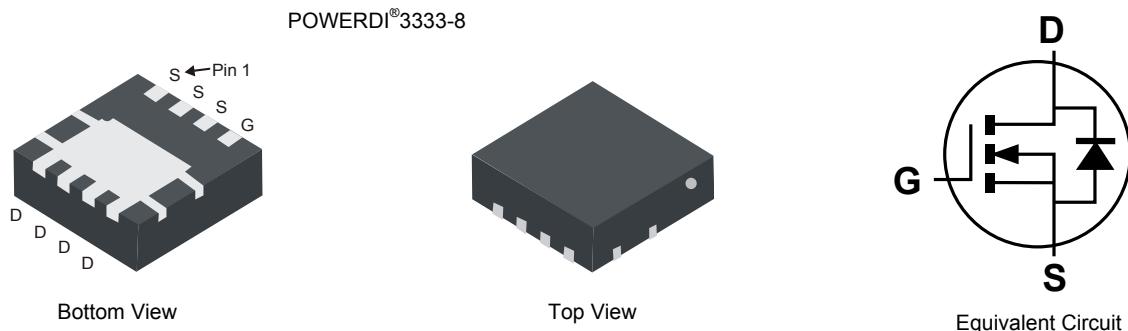
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- Low RDS(ON) – ensures on state losses are minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- **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: POWERDI®3333-8
- 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
- Terminals: Finish — Matte Tin annealed over Copper leadframe.
Solderable per MIL-STD-202, Method 208 **(e3)**
- Weight: 0.072 grams (approximate)



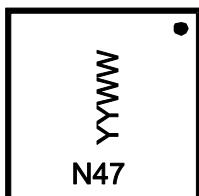
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN4008LFG-7	POWERDI [®] 3333-8	2000/Tape & Reel
DMN4008LFG-13	POWERDI [®] 3333-8	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/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



N47= Product Type Marking Code
YYWW = Date Code Marking
YY = Last digit of year (ex: 13 = 2013)
WW = Week code (01 ~ 53)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	40	V
Gate-Source Voltage			V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	14.4 11.6	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	19.2 15.4	A
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)			I_{DM}	90	A
Maximum Continuous Body Diode Forward Current (Note 6)			I_S	3	A
Avalanche Current, $L = 0.1\text{mH}$			I_{AS}	38	A
Avalanche Energy, $L = 0.1\text{mH}$			E_{AS}	75	mJ

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

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	119	°C/W
	$t < 10\text{s}$	66	
Total Power Dissipation (Note 6)	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	53	°C/W
	$t < 10\text{s}$	30	
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	6.1	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°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}	40	—	—	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	μA	$V_{DS} = 40\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	5.5	7.5	mΩ	$V_{GS} = 10\text{V}, I_D = 10\text{A}$
		—	7	10		$V_{GS} = 4.5\text{V}, I_D = 8\text{A}$
		—	—	20		$V_{GS} = 3.3\text{V}, I_D = 6\text{A}$
Diode Forward Voltage	V_{SD}	—	0.7	1.1	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	3537	—	pF	$V_{DS} = 20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	257	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	215	—	pF	
Gate Resistance	R_g	—	0.9	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = 4.5\text{V}$)	Q_g	—	34	—	nC	$V_{DS} = 20\text{V}, I_D = 10\text{A}$
Total Gate Charge ($V_{GS} = 10\text{V}$)	Q_g	—	74	—	nC	
Gate-Source Charge	Q_{qs}	—	10.2	—	nC	
Gate-Drain Charge	Q_{qd}	—	12.5	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	8.2	—	ns	
Turn-On Rise Time	t_r	—	14.1	—	ns	$V_{GS} = 10\text{V}, V_{DS} = 20\text{V}, R_G = 6\Omega, I_D = 10\text{A}$
Turn-Off Delay Time	$t_{D(\text{off})}$	—	69.7	—	ns	
Turn-Off Fall Time	t_f	—	24.4	—	ns	
Body Diode Reverse Recovery Time	t_{rr}	—	18.5	—	nS	$I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{rr}	—	12.0	—	nC	

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 thermal bias to bottom layer 1inch square copper plate
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

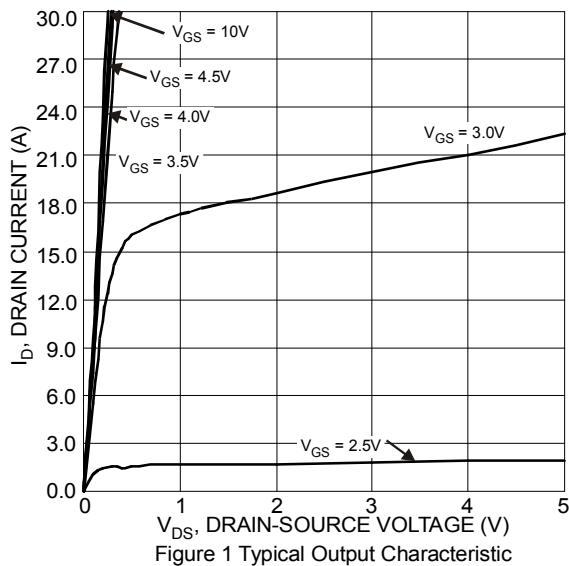


Figure 1 Typical Output Characteristic

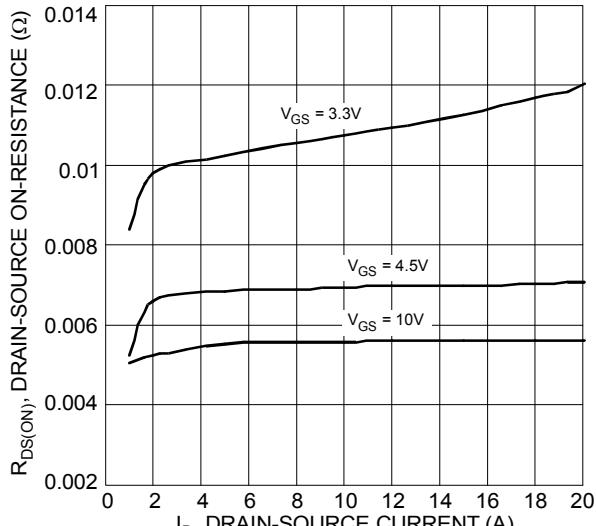
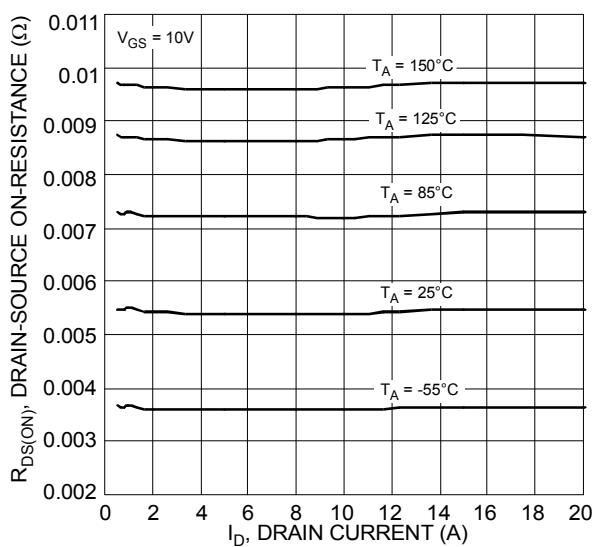
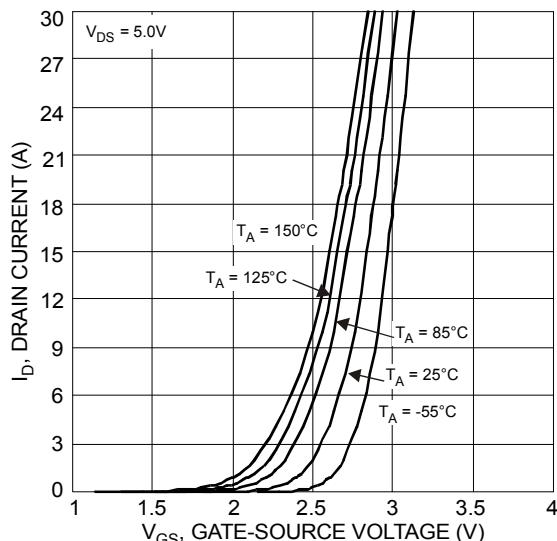
Figure 3 Typical On-Resistance vs.
Drain Current and Gate VoltageFigure 5 Typical On-Resistance vs.
Drain Current and Temperature

Figure 2 Typical Transfer Characteristics

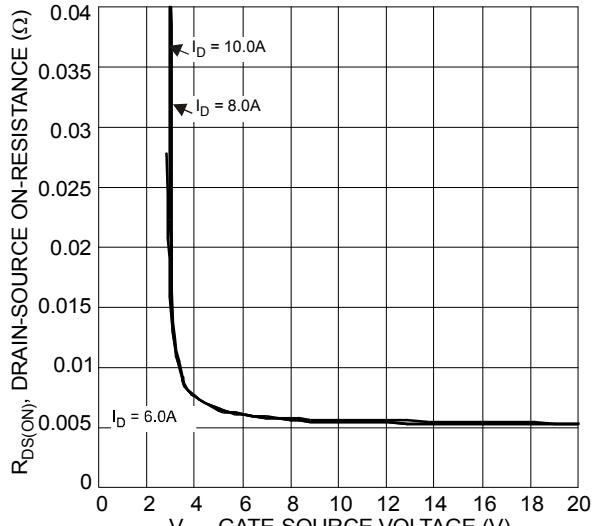


Figure 4 Typical Transfer Characteristics

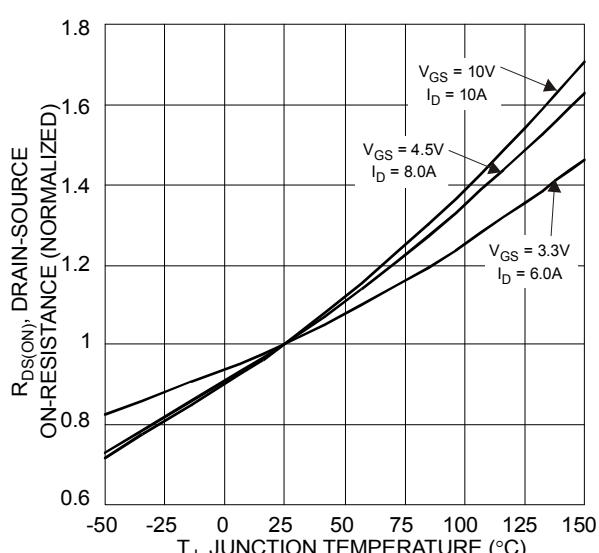
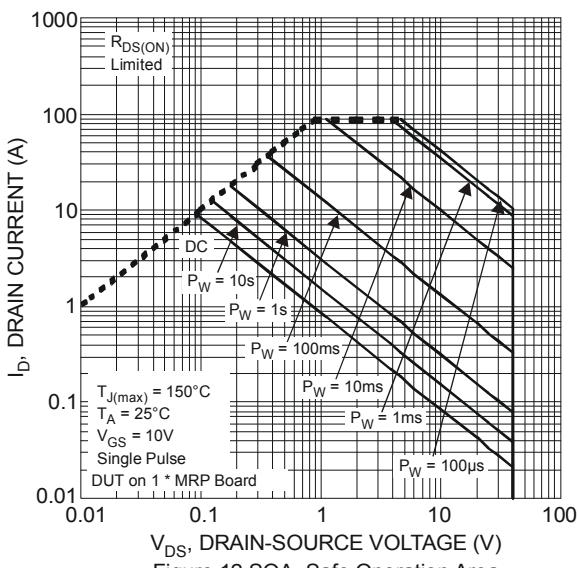
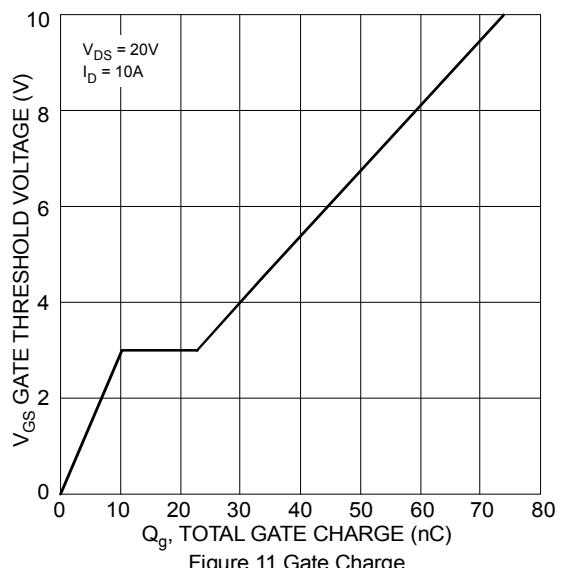
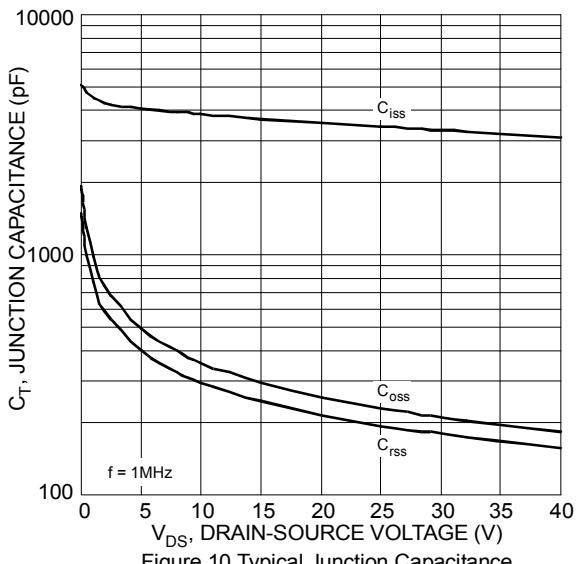
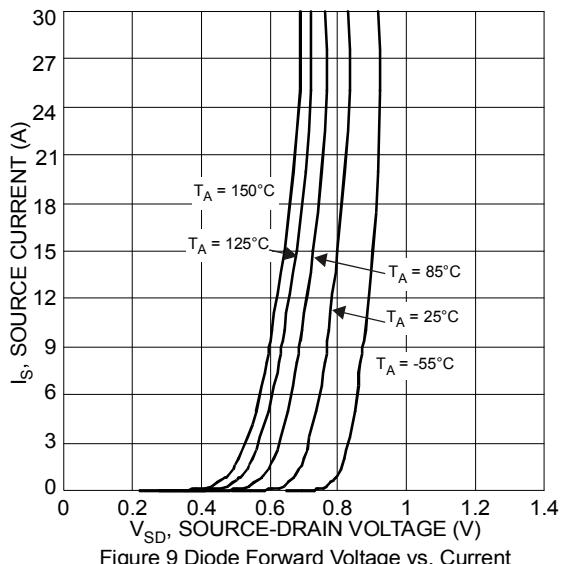
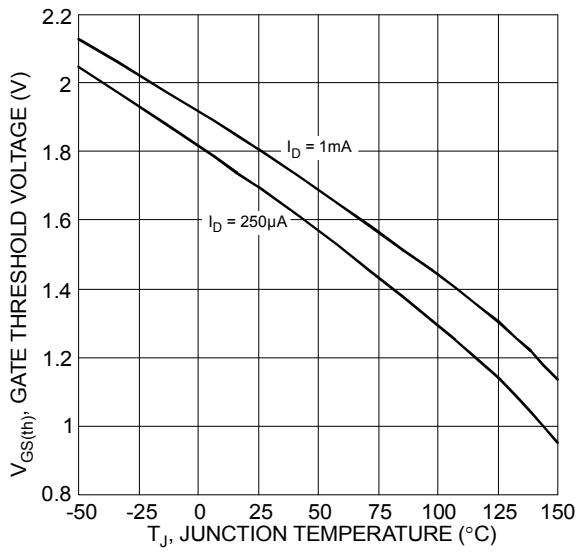
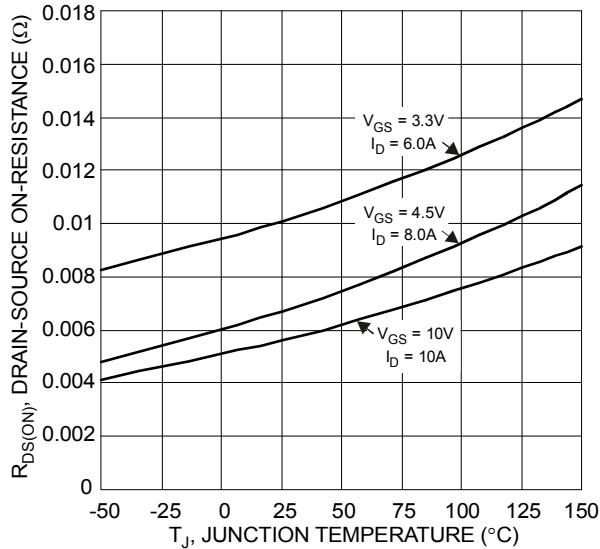


Figure 6 On-Resistance Variation with Temperature



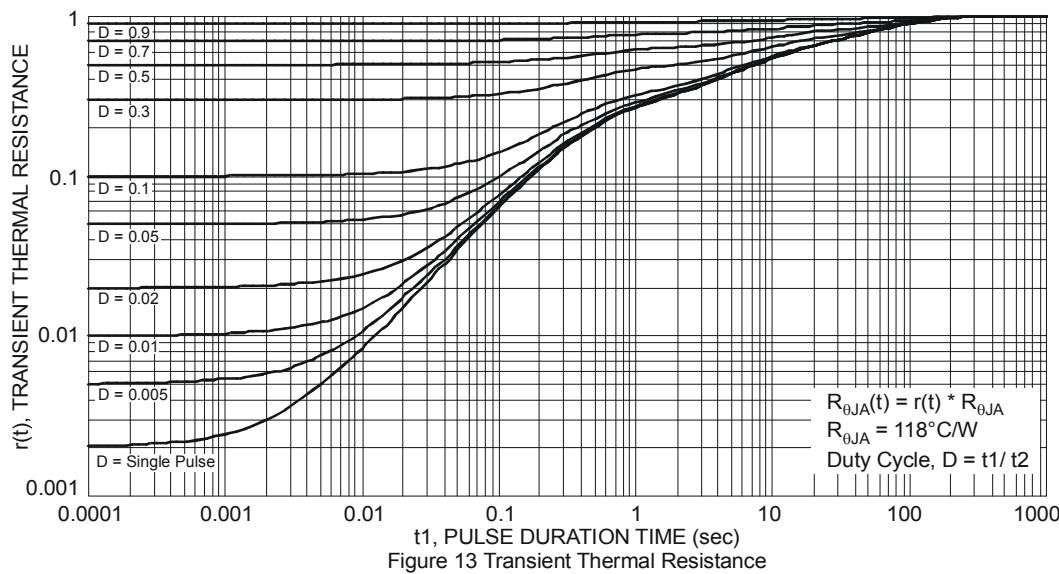
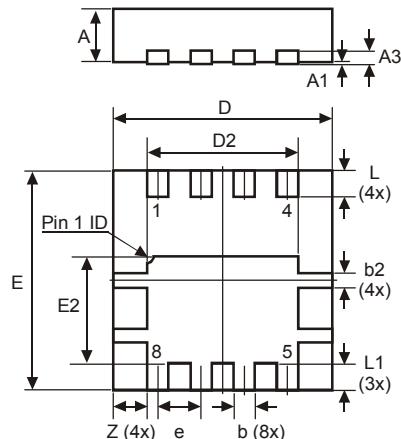


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

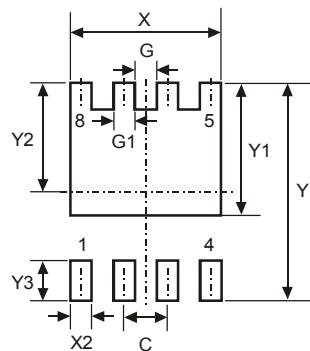
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



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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