

**100V N-CHANNEL ENHANCEMENT MODE MOSFET
 POWERDI®**
Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
100V	110mΩ @ $V_{GS} = 10\text{V}$	3.8 A
	122mΩ @ $V_{GS} = 6.0\text{V}$	3.6 A

Description

This MOSFET is 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

- Power Management Functions
- DC-DC Converters

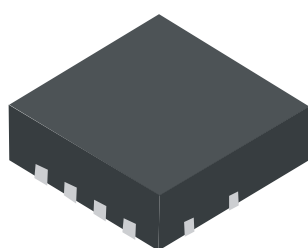
Features and Benefits

- Low $R_{DS(ON)}$ – 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**

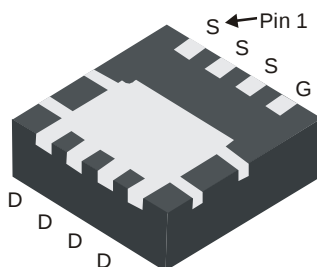
Mechanical Data

- Case: POWERDI3333-8
- 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: 0.008 grams (approximate)

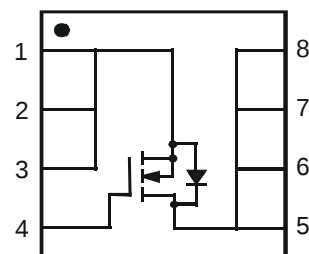
POWERDI3333-8



Top View



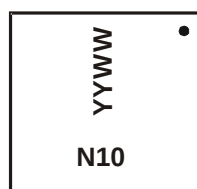
Bottom View


 Top View
 Internal Schematic

Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN10H120SFG-7	Standard	POWERDI3333-8	2000/Tape & Reel
DMN10H120SFG-13	Standard	POWERDI3333-8	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information


N10 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last digit of year (ex: 13 = 2013)
 WW = Week code (01 ~ 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V _{DS}	100	V
Gate-Source Voltage			V _{GS}	±20	V
Continuous Drain Current (Note 6) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	3.8 3.0	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	5.3 4.2	A
Continuous Drain Current (Note 6) V _{GS} = 6V	Steady State	T _A = +25°C T _A = +70°C	I _D	3.6 2.9	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	5.0 4.0	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	20	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.0	W
	T _A = +70°C		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R _{θJA}	131	°C/W
	t < 10s		76	
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.4	W
	T _A = +70°C		1.5	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R _{θJA}	52	°C/W
	t < 10s		27	
Thermal Resistance, Junction to Case (Note 6)		R _{θJC}	6.9	
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	100	-	-	V	V _{GS} = 0V, I _D = 250 µA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1.0	µA	V _{DS} = 80V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(th)}	1.5	2.0	3.0	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(on)}	-	68	110	mΩ	V _{GS} = 10V, I _D = 3.3A
		-	75	122		V _{GS} = 6.0V, I _D = 3.0A
Forward Transfer Admittance	Y _{fs}	-	13	-	S	V _{DS} = 10V, I _D = 3.3A
Diode Forward Voltage	V _{SD}	-	0.78	-	V	V _{GS} = 0V, I _S = 3.2A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	-	549	-	pF	V _{DS} = 50V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	-	41.1	-	pF	
Reverse Transfer Capacitance	C _{rss}	-	19.0	-	pF	
Gate Resistance	R _g	-	1.6	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge V _{GS} = 10V	Q _g	-	10.6	-	nC	
Total Gate Charge V _{GS} = 4.5V	Q _g	-	5.2	-	nC	
Gate-Source Charge	Q _{gs}	-	2.3	-	nC	
Gate-Drain Charge	Q _{gd}	-	2.6	-	nC	V _{GS} = 10V, V _{DS} = 50V, R _G = 6.0Ω, I _D = 3.3A
Turn-On Delay Time	t _{D(on)}	-	3.8	-	ns	
Turn-On Rise Time	t _r	-	1.8	-	ns	
Turn-Off Delay Time	t _{D(off)}	-	11.5	-	ns	
Turn-Off Fall Time	t _f	-	2.5	-	ns	

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

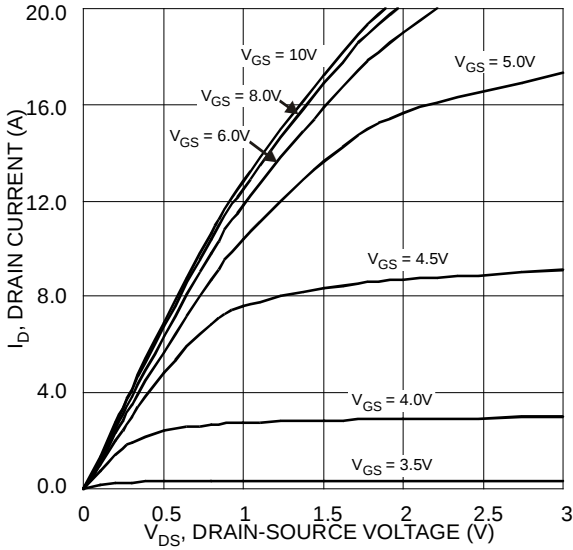


Figure 1 Typical Output Characteristic

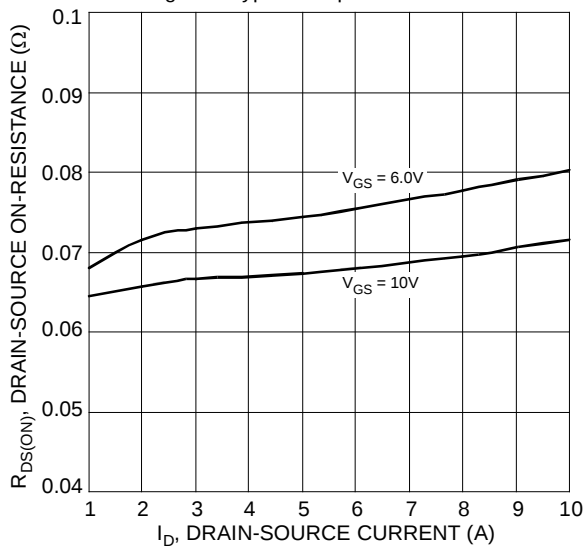


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

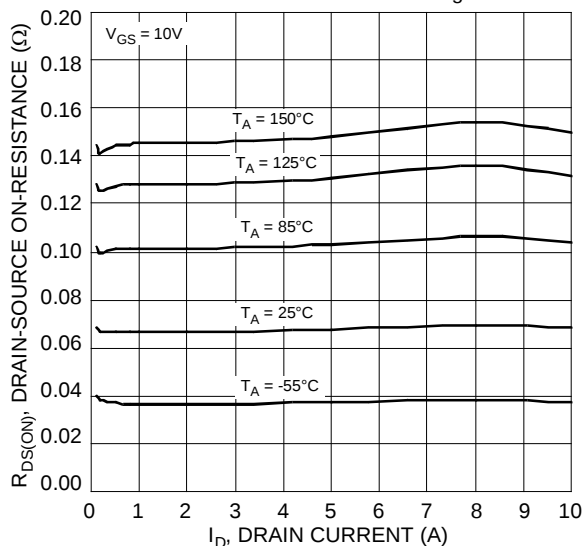


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

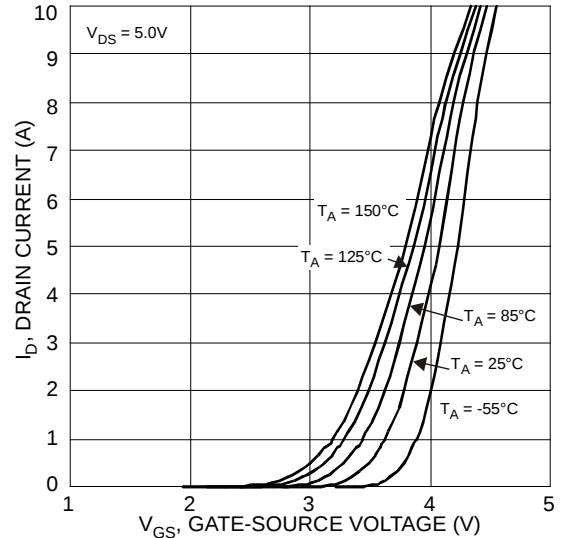


Figure 2 Typical Transfer Characteristics

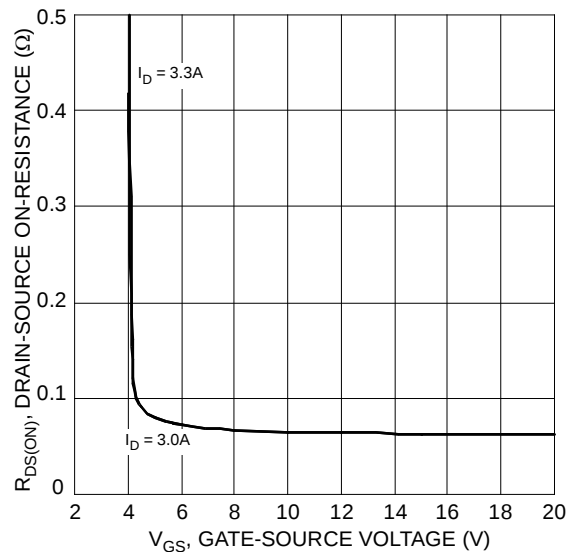


Figure 4 Typical Transfer Characteristics

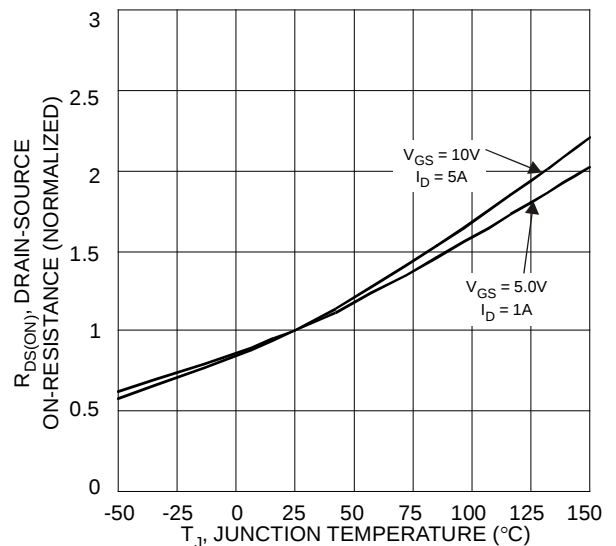
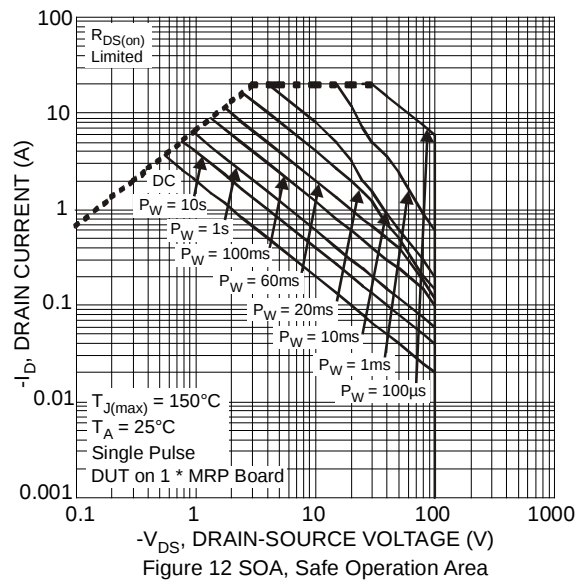
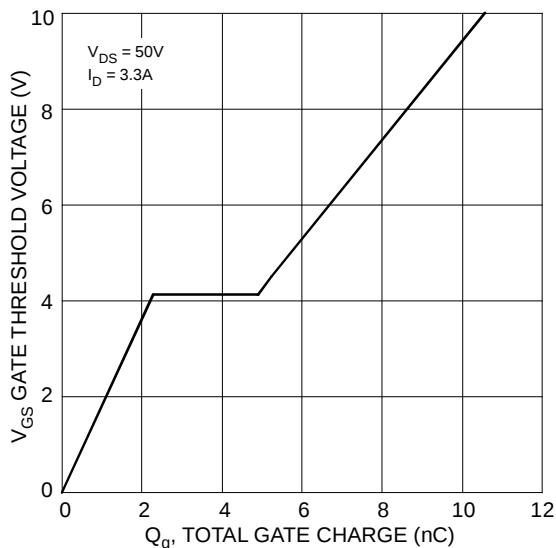
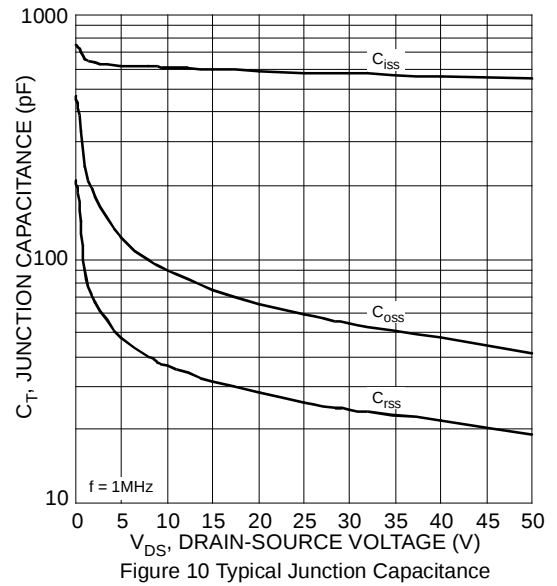
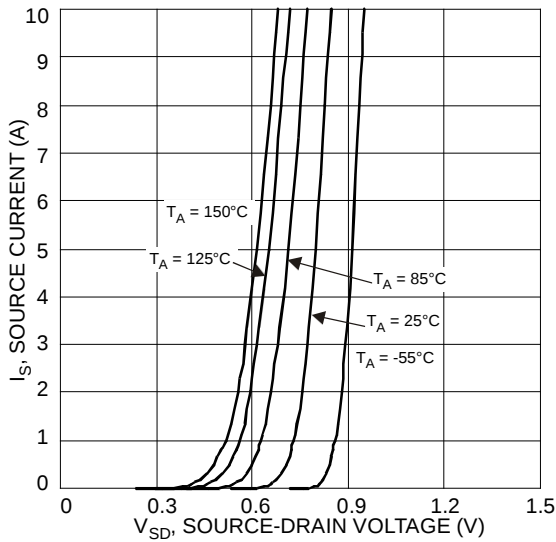
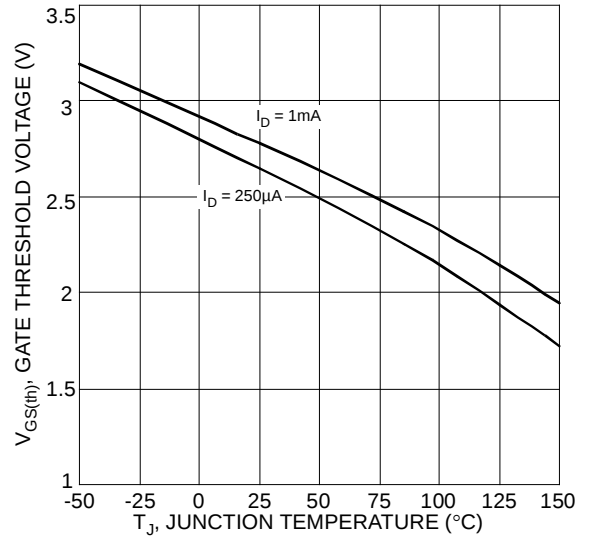
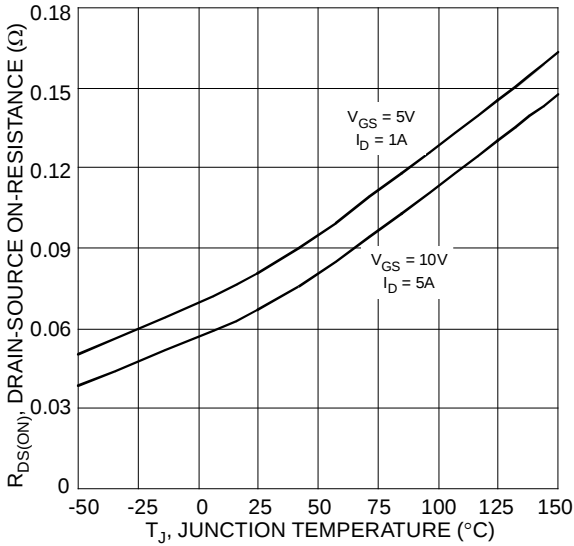


Figure 6 On-Resistance Variation with Temperature



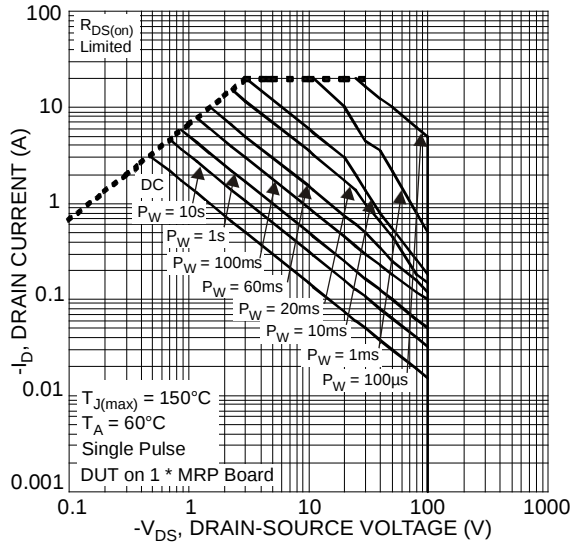


Figure 13 SOA, Safe Operation Area

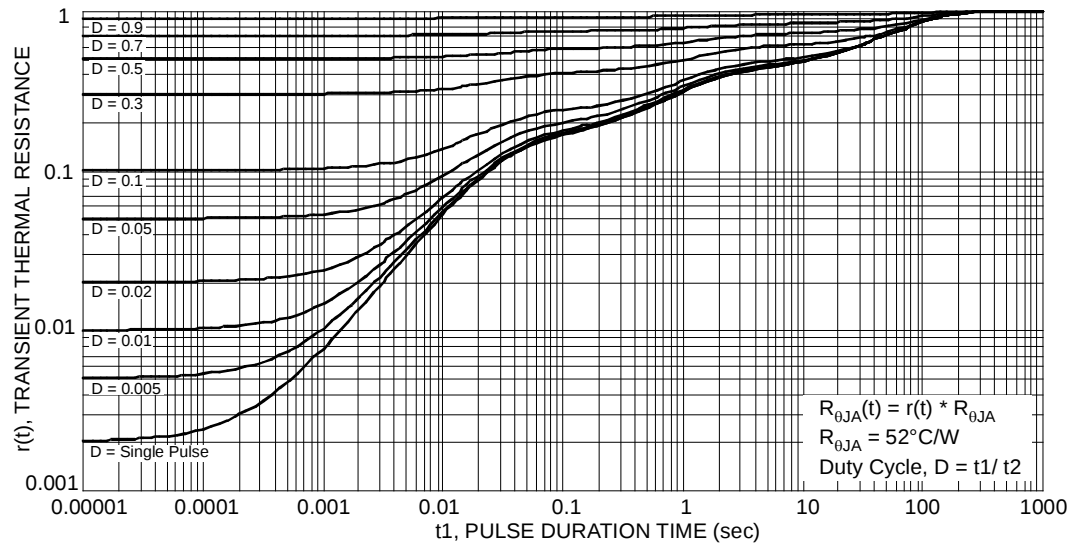
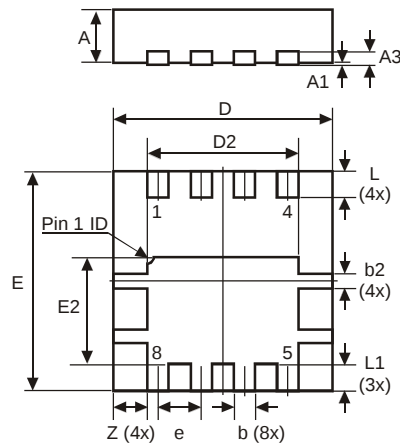


Figure 14 Transient Thermal Resistance

Package Outline Dimensions

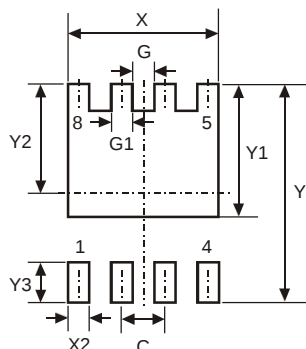
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI3333-8			
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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