Lead-free Green

DMN2022UNS

DUAL N-CHANNEL ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	I_D max $T_A = +25°C$
20V	10.8mΩ @ V_{GS} = 4.5V	10.7A
	14.5mΩ @ V_{GS} = 2.5V	9.3A
	17.0mΩ @ V_{GS} = 1.8V	8.6A

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

- Power Management Functions
- Load Switch

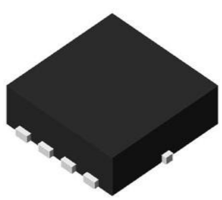
Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Complementary Pair MOSFET
- **ESD Protected Up to 2kV**
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

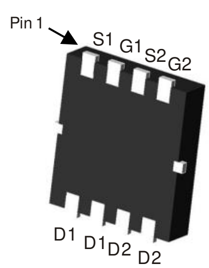
Mechanical Data

- 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
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.0065 grams (Approximate)

POWERDI®3333-8

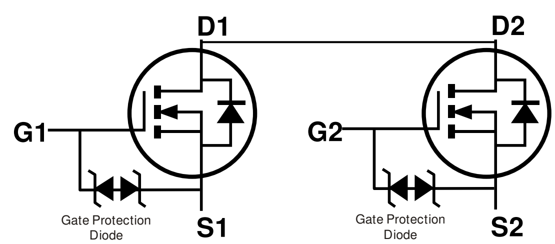


Top View



Bottom View

ESD PROTECTED



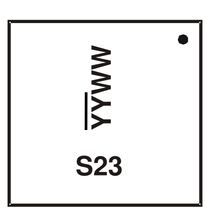
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN2022UNS-7	POWERDI®3333-8	2000/Tape & Reel
DMN2022UNS-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 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



S23 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 15 = 2015)
WW = Week Code (01 to 53)

NEW PRODUCT

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V_{DSS}	20	V
Gate-Source Voltage			V_{GSS}	±10	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	10.7 8.6	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	13.9 11.1	A
Maximum Body Diode Forward Current (Note 6)			I_S	2	A
Pulsed Drain Current (10µs pulse, Duty cycle = 1%)			I_{DM}	60	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	17.1	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	14.7	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	107	°C/W
	t<10s		64	
Total Power Dissipation (Note 6)		P_D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	67	°C/W
	t<10s		40	
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 8)						
Drain-Source Breakdown Voltage	BV_{DSS}	20	—	—	V	V_{GS} = 0V, I_D = 250μA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	μA	V_{DS} = 20V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	μA	V_{GS} = ±10V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.4	—	1	V	V_{DS} = V_{GS}, I_D = 250μA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9.0	10.8	mΩ	V_{GS} = 4.5V, I_D = 4A
		—	9.2	11.2		V_{GS} = 4.0V, I_D = 4A
		—	9.8	13.0		V_{GS} = 3.1V, I_D = 4A
		—	10.5	14.5		V_{GS} = 2.5V, I_D = 4A
		—	13.9	17.0		V_{GS} = 1.8V, I_D = 4A
Diode Forward Voltage	V_{SD}	—	0.7	1.1	V	V_{GS} = 0V, I_S = 5A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	1870	—	pF	V_{DS} = 10V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	320	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	160	—	pF	
Gate Resistance	R_g	—	96	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge	Q_g	—	20.3	—	nC	V_{GS} = 4.5V, V_{DS} = 10V, I_D = 6.5A
Gate-Source Charge	Q_{gs}	—	2.8	—	nC	
Gate-Drain Charge	Q_{gd}	—	3.6	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	62	—	ns	V_{GS} = 4.5V, V_{DS} = 10V, R_G = 6Ω, R_L = 1.0Ω
Turn-On Rise Time	t_R	—	101	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	596	—	ns	
Turn-Off Fall Time	t_F	—	224	—	ns	
Reverse Recovery Time	t_{RR}	—	150	—	ns	I_F = 4A, di/dt = 100A/μs
Reverse Recovery Charge	Q_{RR}	—	135	—	nC	I_F = 4A, di/dt = 100A/μs

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
7. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
8 .Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

NEW PRODUCT

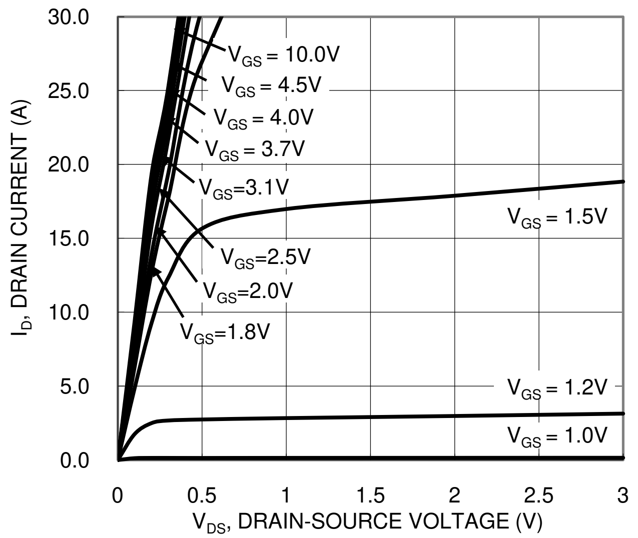


Figure 1. Typical Output Characteristic

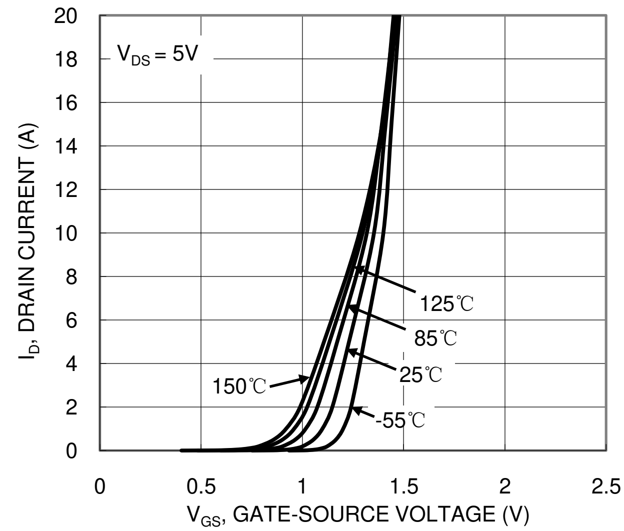


Figure 2. Typical Transfer Characteristic

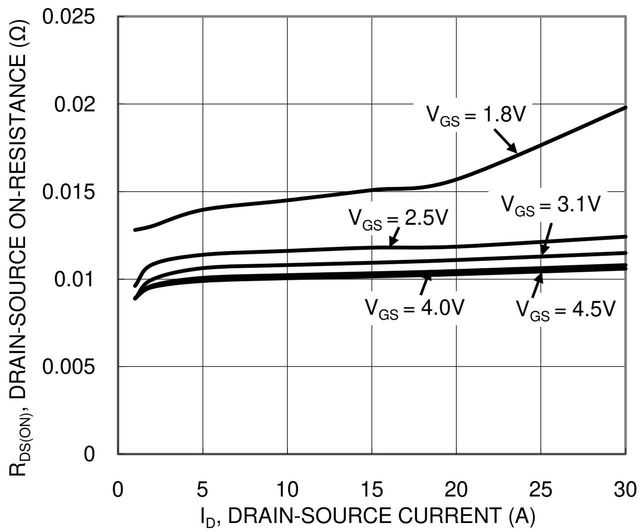


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

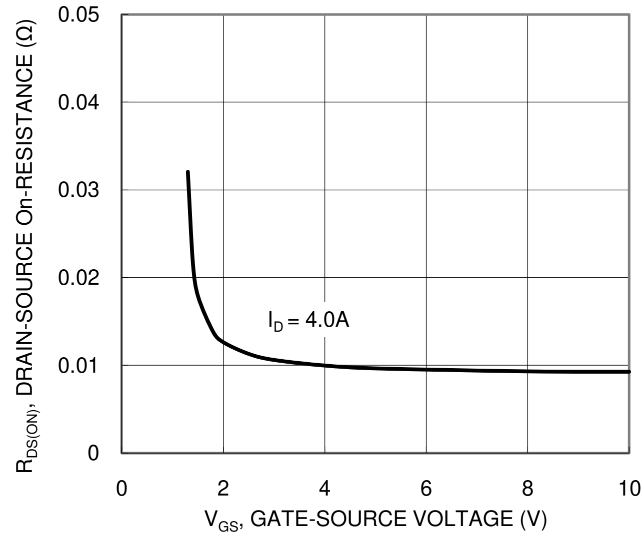


Figure 4. Typical Transfer Characteristic

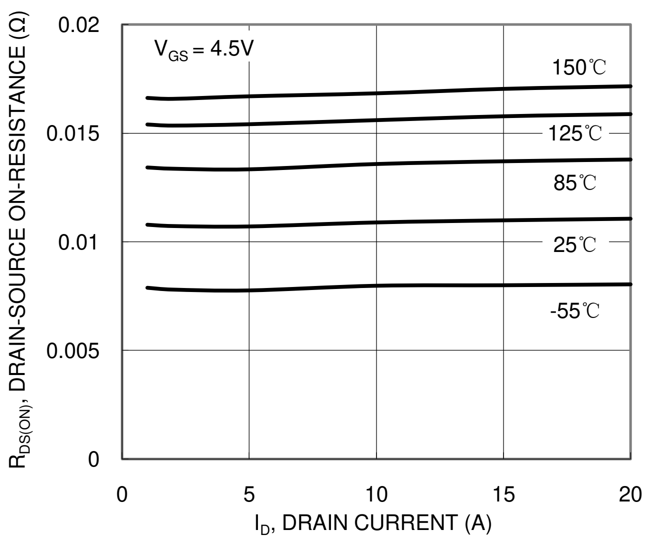


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

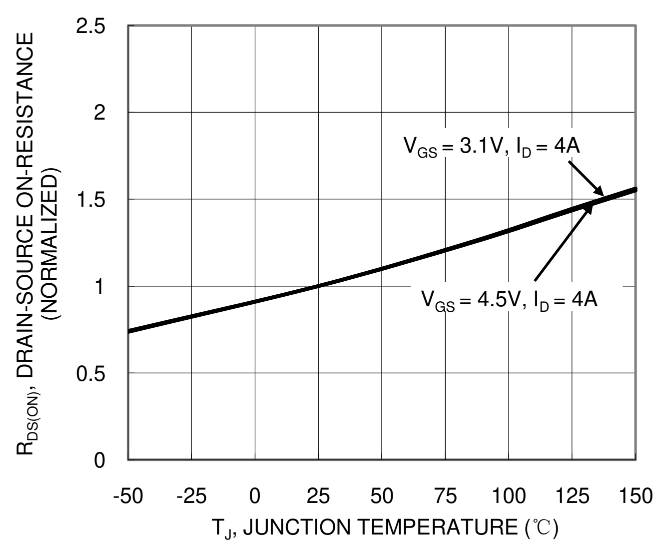


Figure 6. On-Resistance Variation with Junction Temperature

NEW PRODUCT

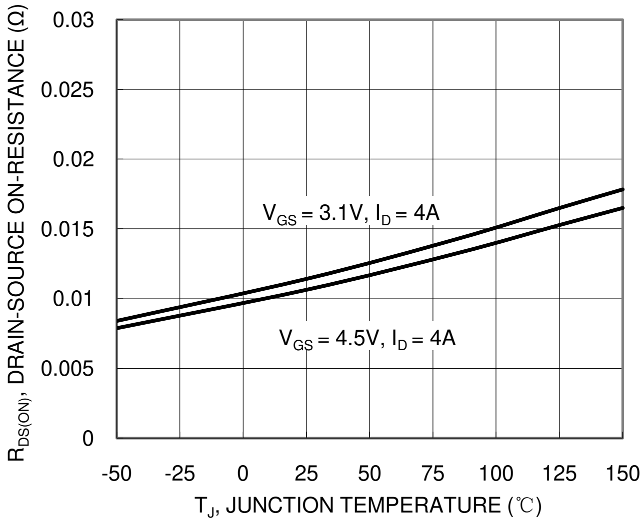


Figure 7. On-Resistance Variation with Junction Temperature

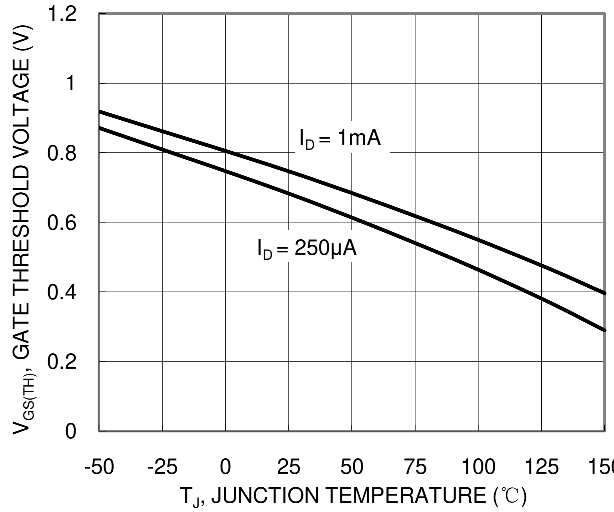


Figure 8. Gate Threshold Variation vs. Junction Temperature

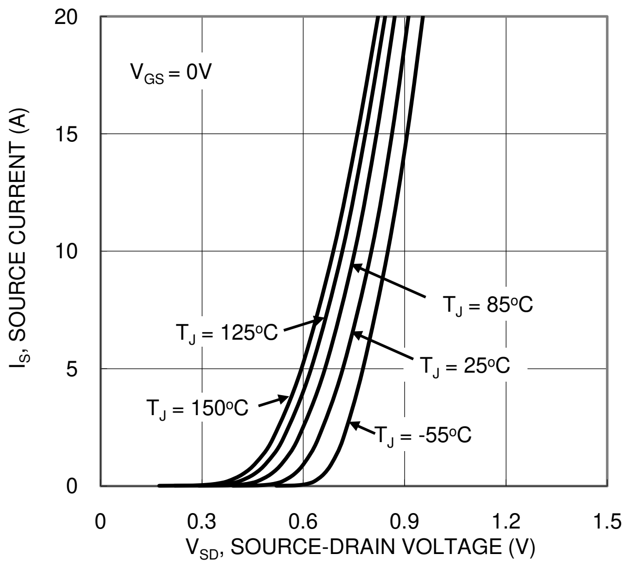


Figure 9. Diode Forward Voltage vs. Current

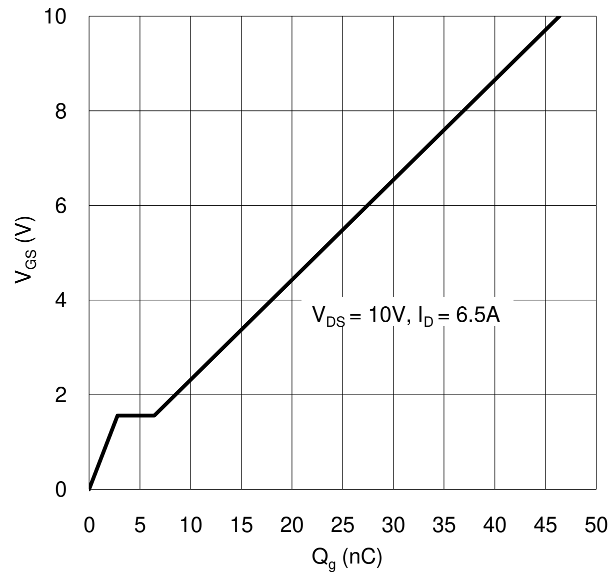


Figure 10. Gate Charge

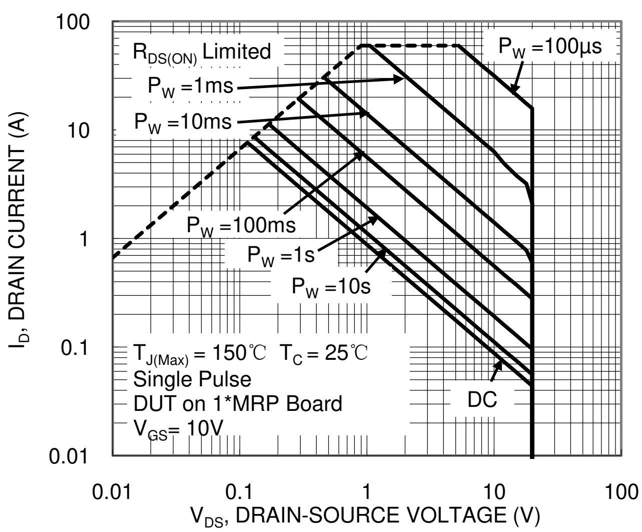


Figure 11. SOA, Safe Operation Area

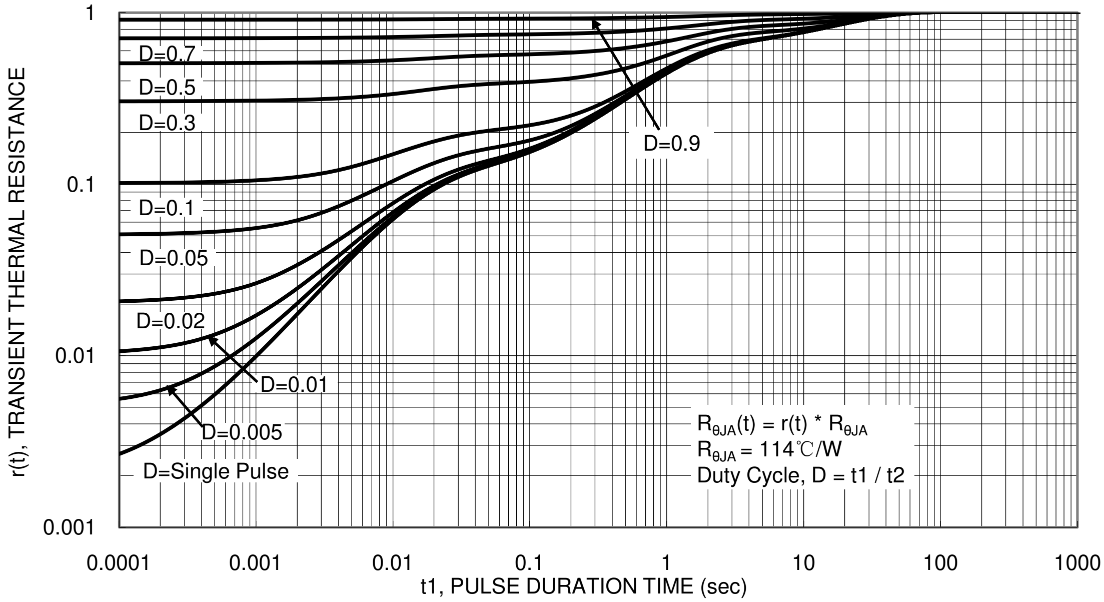
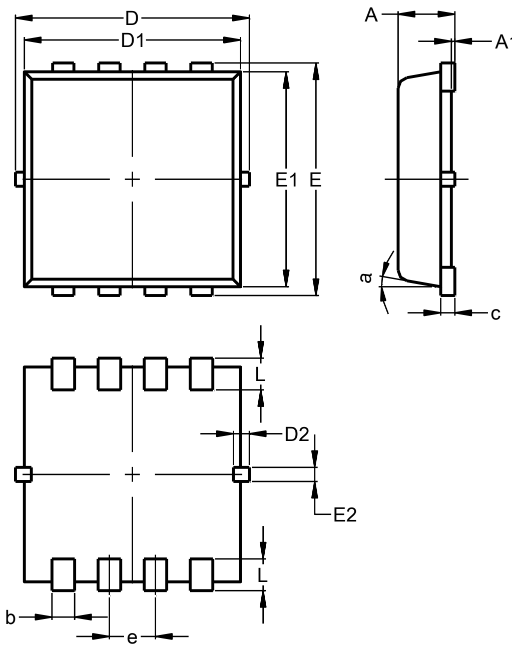


Figure 12. Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI®3333-8 (Type UXB)

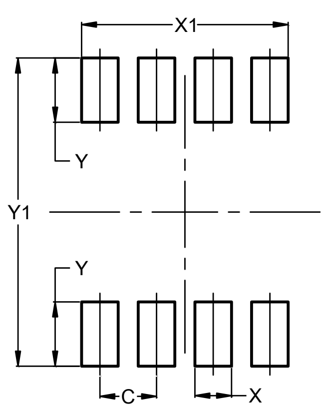


POWERDI®3333-8 (Type UXB)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.10	0.35	0.23
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	0.10	0.30	0.20
e	–	–	0.65
L	0.35	0.55	0.45
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

Please see AP02001 at http://www.diodes.com/datasheets/ap02001.pdf for the latest version.

POWERDI®3333-8 (Type UXB)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	2.370
Y	0.730
Y1	3.500

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