Lead-free Green

N-CHANNEL ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$	I_D T_C = +25°C
30V	8.5mΩ @ V_{GS} = 10V	30A
	10.5mΩ @ V_{GS} = 4.5V	25A

Features

- 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
- 100% UIS (Avalanche) rated
- 100% Rg tested
- **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**

Description

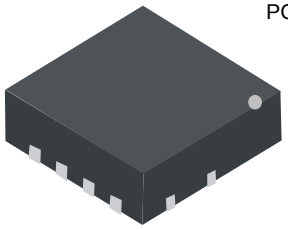
This new generation MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

Applications

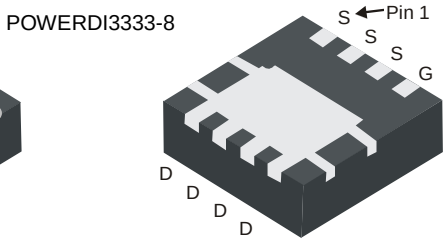
- Backlighting
- DC-DC Converters
- Power Management Functions

Mechanical Data

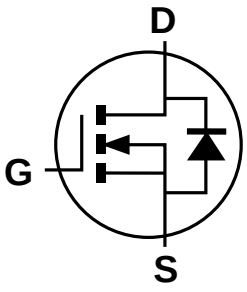
- Case: POWERDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound; UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (Approximate)



Top View



Bottom View



Equivalent Circuit

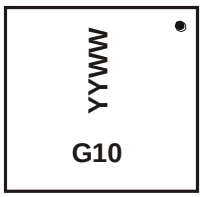
Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN3010LFG-7	Standard	POWERDI3333-8	2,000/Tape & Reel
DMN3010LFG-13	Standard	POWERDI3333-8	3,000/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

PowerDI3333-8



G10 = Product Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 15 for 2015)
WW = Week Code (01 – 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V_{DSS}	30	V
Gate-Source Voltage			V_{GSS}	±20	V
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	11 8.5	A
	t<10s	T_A = +25°C T_A = +70°C	I_D	14 11	A
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_C = +25°C T_C = +100°C	I_D	30 20	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I_{DM}	90	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	12.7	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	8.1	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)		P_D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	137	°C/W
	t < 10s		90	°C/W
Total Power Dissipation (Note 6)		P_D	2.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	52	°C/W
	t < 10s		35	°C/W
Total Power Dissipation (Note 6)	T_C = +25°C	P_D	26	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	4.8	°C/W
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}	30	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	—	—	1	µA	V_{DS} = 30V, V_{GS} = 0V
Zero Gate Voltage Drain Current T_J = +150°C (Note 9)		—	—	100	µA	
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(th)}$	1.0	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.5	8.5	mΩ	V_{GS} = 10V, I_D = 18A
		—	8	10.5		V_{GS} = 4.5V, I_D = 16A
Diode Forward Voltage	V_{SD}	—	0.75	1.0	V	V_{GS} = 0V, I_S = 1A
On State Drain Current (Note 9)	$I_{D(ON)}$	10	—	—	A	V_{DS} ≦5V, V_{GS} = 4.5V
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	2,075	4,150	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	190	380		
Reverse Transfer Capacitance	C_{rss}	—	138	276		
Gate Resistance	R_g	—	2.4	5	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	16.1	32	nC	V_{DS} = 15V, I_D = 18A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	37	74		
Gate-Source Charge	Q_{gs}	—	6.1	12		
Gate-Drain Charge	Q_{gd}	—	5.9	12		
Turn-On Delay Time	$t_{D(on)}$	—	4.5	10	ns	V_{DS} = 15V, V_{GS} = 10V, R_L = 0.83Ω, R_{GEN} = 3Ω,
Turn-On Rise Time	t_r	—	19.6	35		
Turn-Off Delay Time	$t_{D(off)}$	—	31	50		
Turn-Off Fall Time	t_f	—	10.7	21		
Reverse Recovery Time	t_{rr}	—	13.7	27	ns	I_F=15A, di/dt=500A/µs
Reverse Recovery Charge	Q_{rr}	—	18.3	37	nC	

Notes:
5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal vias to bottom layer 1-inch square copper plate.
7. UIS in production with L = 1mH, TJ = +25°C.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to production testing.

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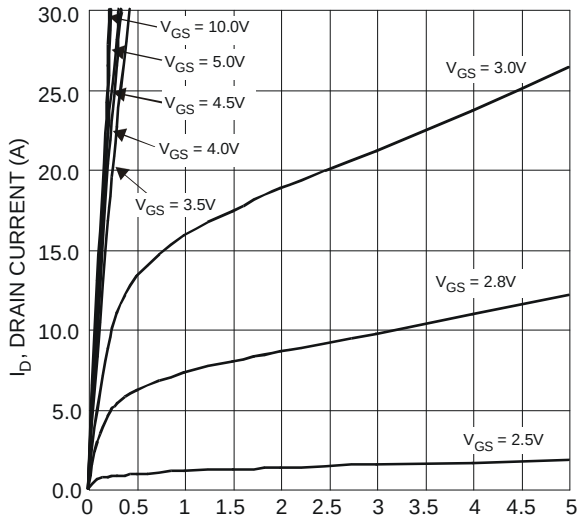

Figure 1 Typical Output Characteristics

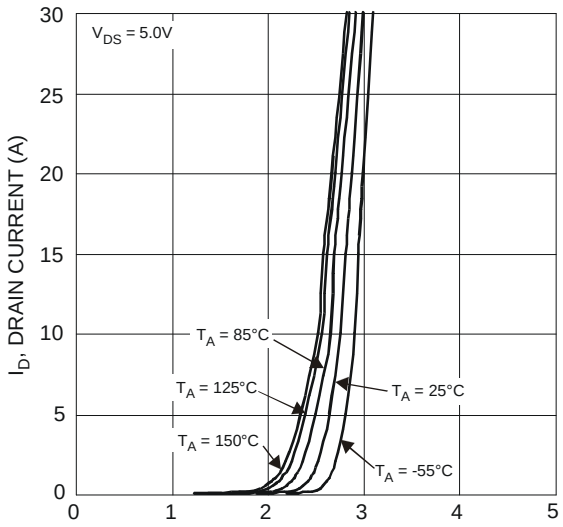

Figure 2 Typical Transfer Characteristics

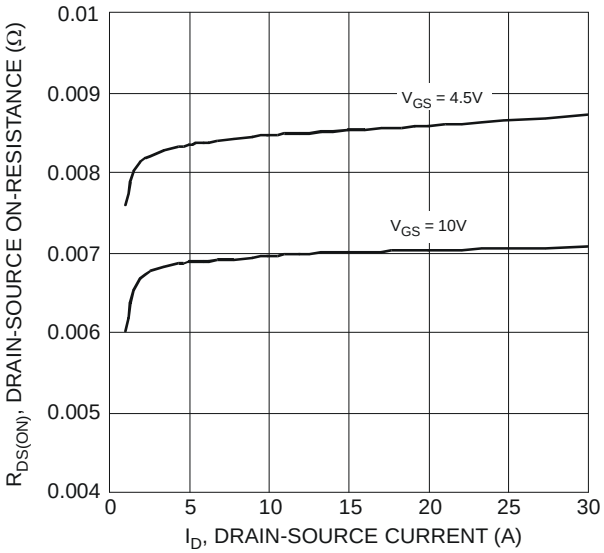

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

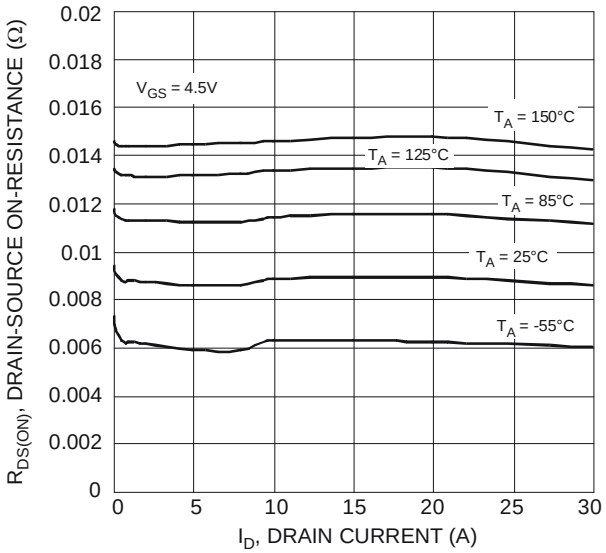

Figure 4 Typical On-Resistance vs. Drain Current and Temperature

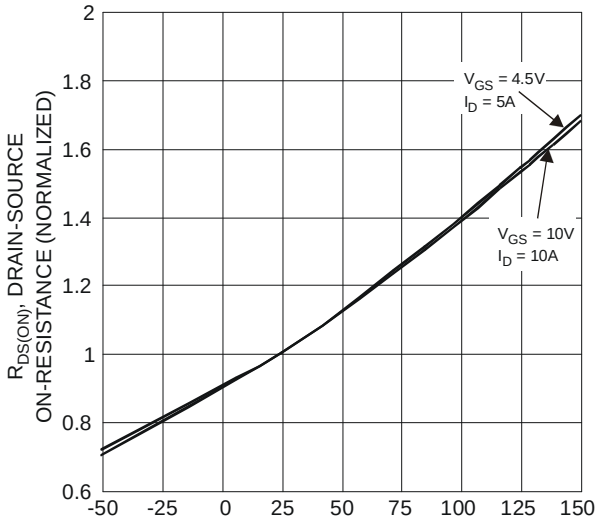

Figure 5 On-Resistance Variation with Temperature

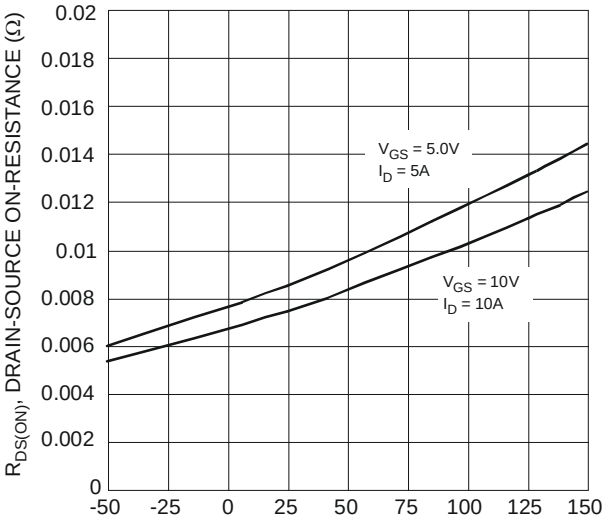

Figure 6 On-Resistance Variation with Temperature

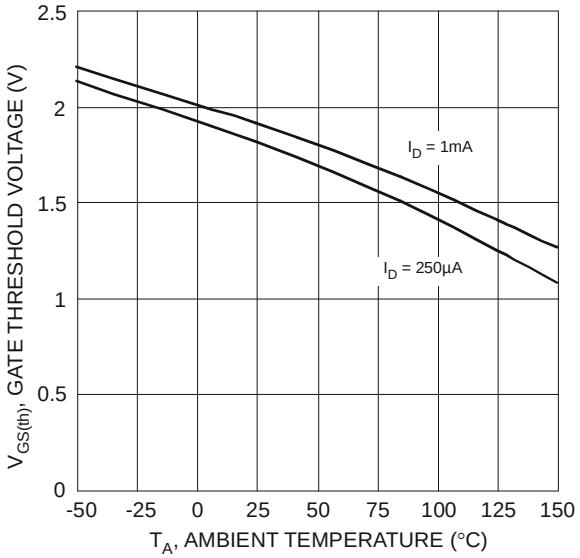

Figure 7 Gate Threshold Variation vs. Ambient Temperature

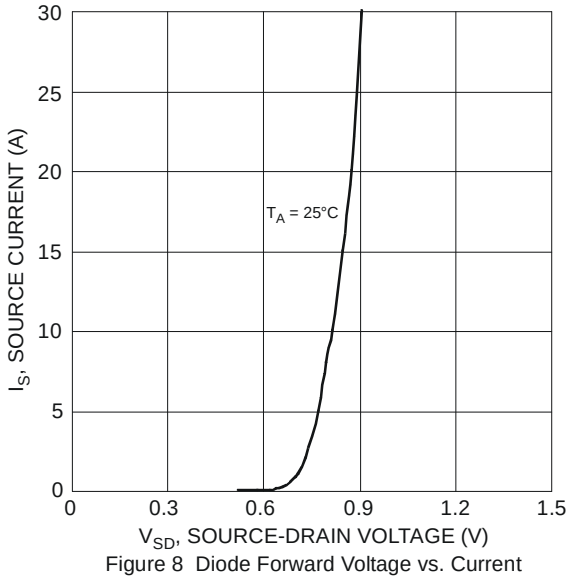

Figure 8 Diode Forward Voltage vs. Current

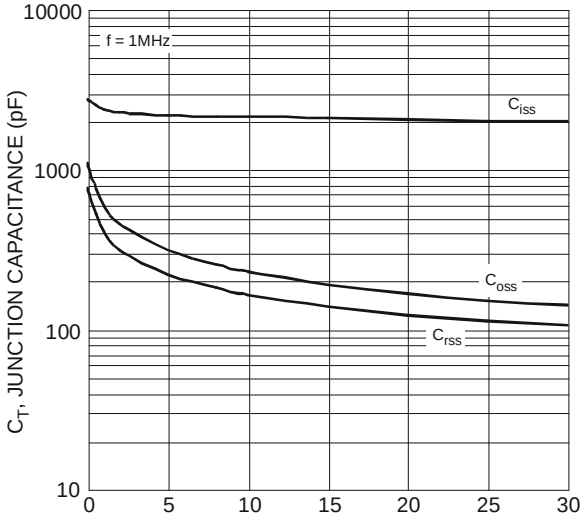

Figure 9 Typical Junction Capacitance

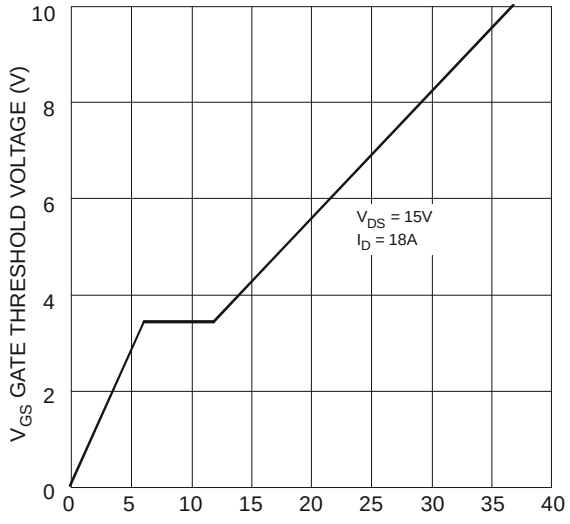

Figure 10 Gate Charge

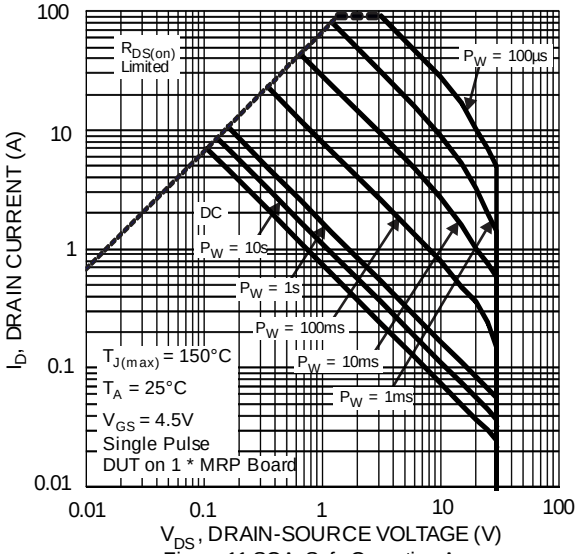

Figure 11 SOA, Safe Operation Area

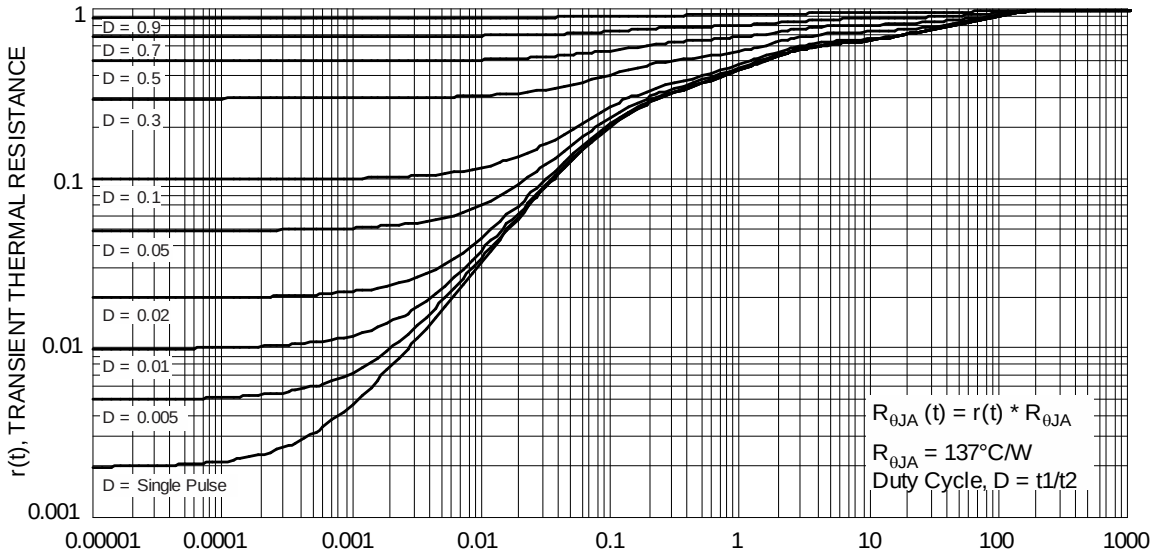

Figure 12 Transient Thermal Resistance

Package Outline Dimensions

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

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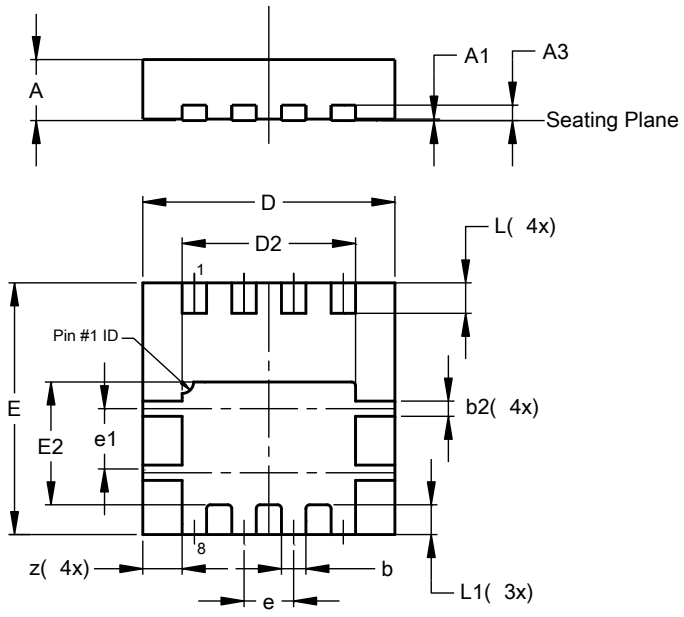
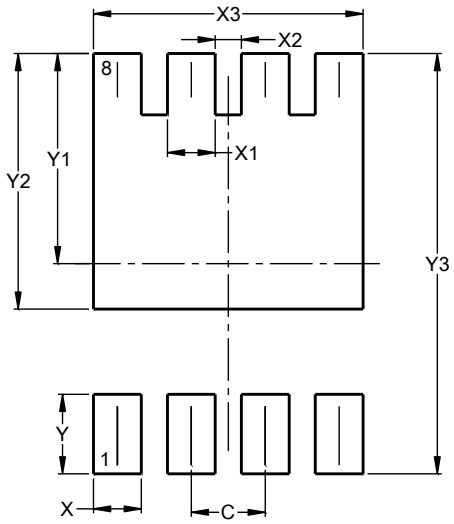


POWERDI®3333-8			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	–	–	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
e	–	–	0.65
e1	0.79	0.89	0.84
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
All Dimensions in mm			

Suggested Pad Layout

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

POWERDI®3333-8



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700

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