40V N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_C = +25°C
40V	11.5mΩ @ V_{GS} = 10V	30A
	17.8mΩ @ V_{GS} = 4.5V	24A

Features and Benefits

- 100% Unclamped Inductive Switching(UIS) Test in Production – Ensures More Reliable And Robust End Application
- Low $R_{DS(ON)}$ – Ensures On State Losses Are Minimized
- Excellent Q_{gd} x $R_{DS(ON)}$ Product (FOM)
- Advanced Technology for DC-DC Converters
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please contact us or your local Diodes representative. https://www.diodes.com/quality/product-definitions/**

Description and Applications

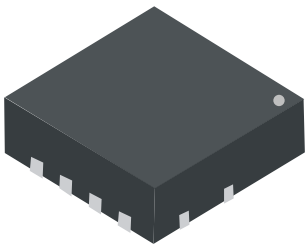
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

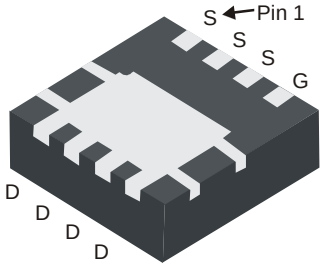
Mechanical Data

- 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 Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.008 grams (Approximate)

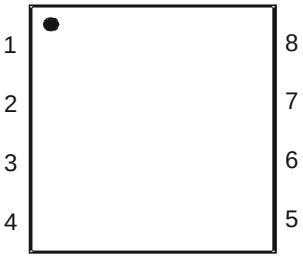
PowerDI3333-8



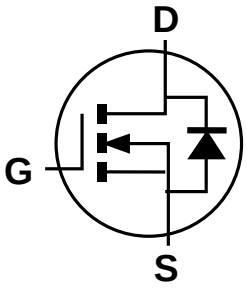
Top View



Bottom View



Top View



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT4011LFG-7	PowerDI3333-8	2,000/Tape & Reel
DMT4011LFG-13	PowerDI3333-8	3,000/Tape & Reel

Notes:
1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
2. See https://www.diodes.com/quality/lead-free/ 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 https://www.diodes.com/design/support/packaging/diodes-packaging/.

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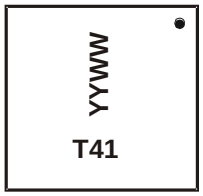
Marking Information

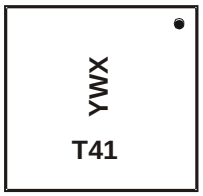
Site1:

PowerDI3333-8



T41 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 21 = 2021)
WW = Week Code (01 to 53)

Site2:



T41 = Product Type Marking Code
YWX = Date Code Marking
Y = Year (ex: 1 = 2021)
W = Week (ex: a = Week 27; z Represents Week 52 and 53)
X = Internal Code (ex: U = Monday)

Date Code Key

Year	2015	…	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Code	5	…	1	2	3	4	5	6	7	8	9	0

Week	1-26	27-52	53
Code	A-Z	a-z	z

Internal Code	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Code	T	U	V	W	X	Y	Z

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	40	V
Gate-Source Voltage		V_{GSS}	+20 -16	V
Continuous Drain Current (Note 5) V_{GS} = 10V	T_C = +25°C T_C = +70°C	I_D	30 24	A
Continuous Drain Current (Note 5) V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	10.8 8.6	A
Maximum Continuous Body Diode Forward Current (Note 5)		I_S	2.1	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	65	A
Avalanche Current, L=0.3mH		I_{AS}	11.9	A
Avalanche Energy, L=0.3mH		E_{AS}	21.4	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	62	°C/W
Total Power Dissipation (Note 5)	T_C = +25°C	P_D	15.6	W
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	40	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 32V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	100 -100	nA	V_{GS} = +20V, V_{DS} = 0V V_{GS} = -16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9.2	11.5	mΩ	V_{GS} = 10V, I_D = 20A
		—	13.4	17.8		V_{GS} = 4.5V, I_D = 20A
Diode Forward Voltage	V_{SD}	—	—	1.2	V	V_{GS} = 0V, I_S = 20A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	767	—	pF	V_{DS} = 20V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	238	—		
Reverse Transfer Capacitance	C_{rss}	—	30.6	—		
Gate Resistance	R_g	—	1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	7	—	nC	V_{DS} = 20V, I_D = 20A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	15.1	—		
Gate-Source Charge	Q_{gs}	—	2.1	—		
Gate-Drain Charge	Q_{gd}	—	3.2	—		
Turn-On Delay Time	$t_{D(ON)}$	—	3.5	—	ns	V_{DD} = 20V, V_{GS} = 10V, R_G = 1.6Ω, I_D = 20A
Turn-On Rise Time	t_R	—	5.8	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	9.6	—		
Turn-Off Fall Time	t_F	—	2	—		
Body Diode Reverse Recovery Time	t_{RR}	—	9.8	—	ns	I_F = 15A, di/dt = 400A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	5.1	—	nC	

Notes: 5. $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

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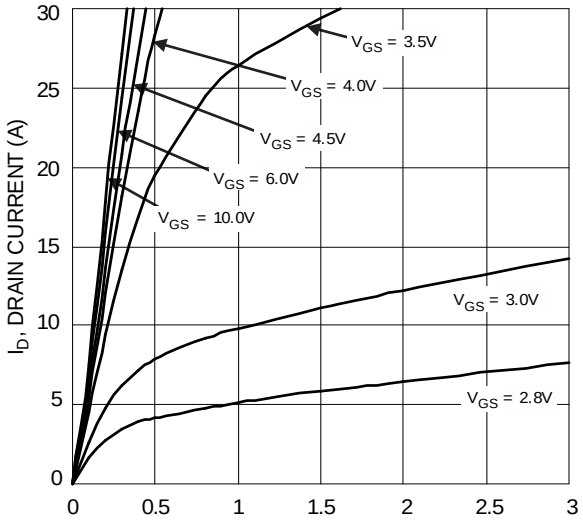

Figure 1 Typical Output Characteristics

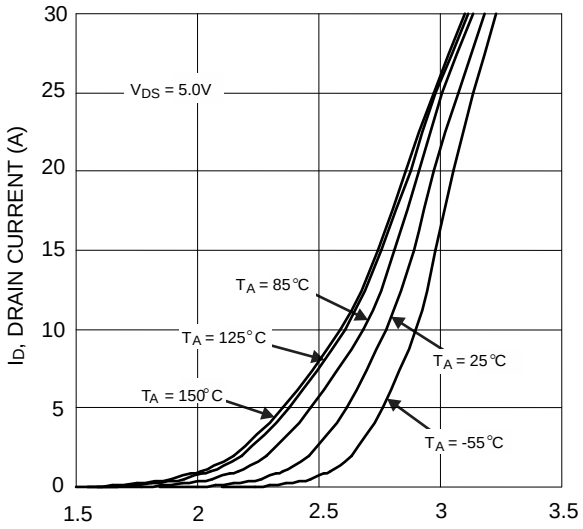

Figure 2 Typical Transfer Characteristics

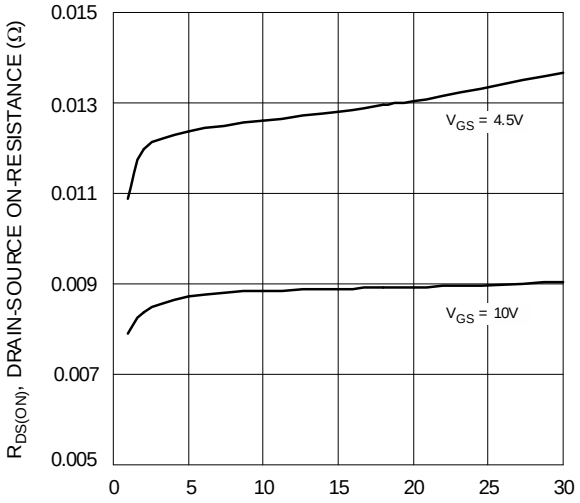

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

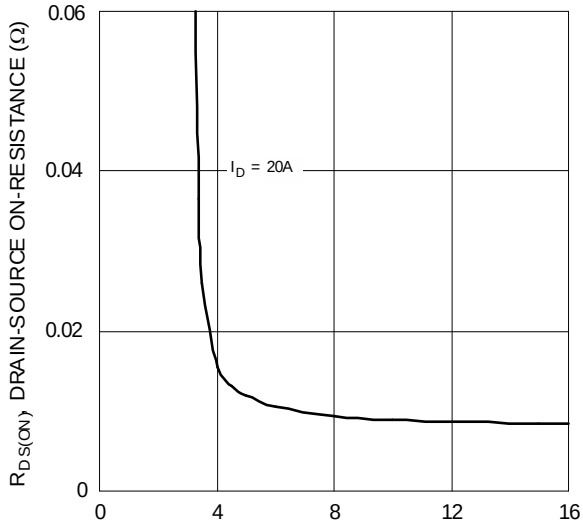

Figure 4 Typical Transfer Characteristics

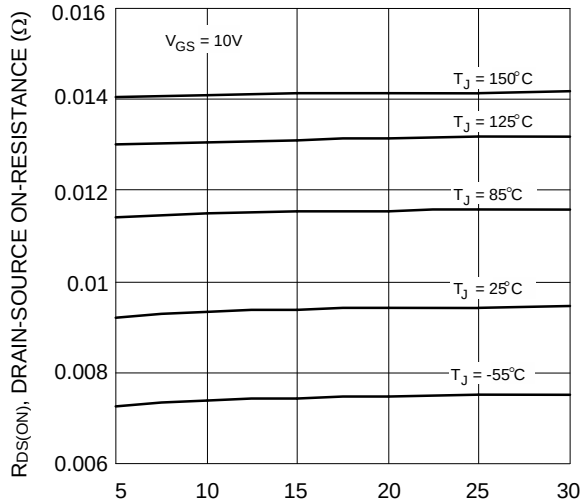

Figure 5 Typical On-Resistance vs. Drain Current and Junction Temperature

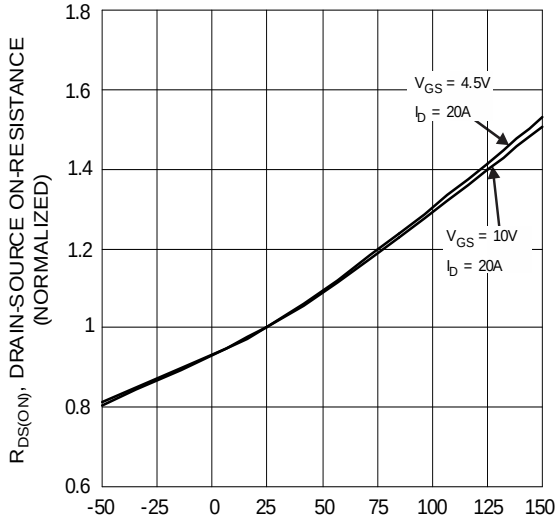

Figure 6 On-Resistance Variation with Junction Temperature

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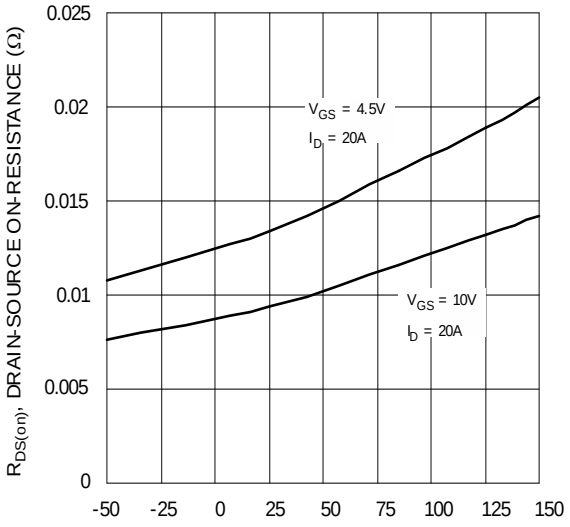

Figure 7 On-Resistance Variation with Junction Temperature

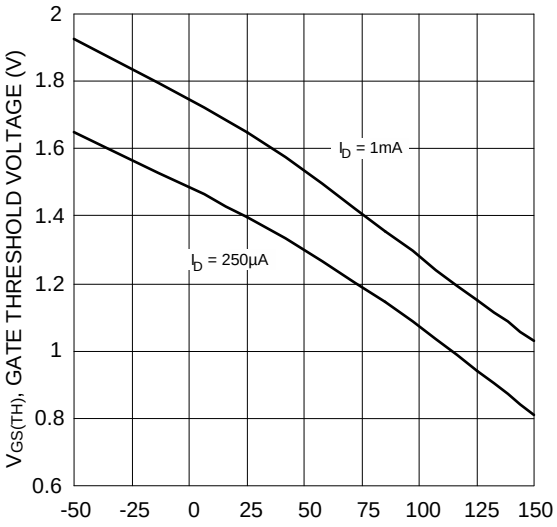

Figure 8 Gate Threshold Variation vs. Junction Temperature

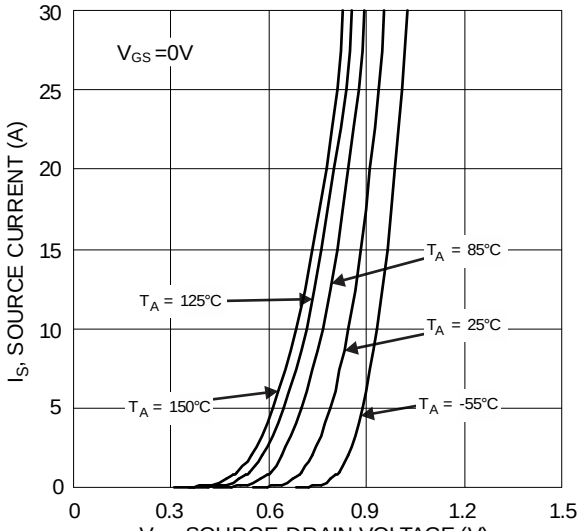

Figure 9 Diode Forward Voltage vs. Current

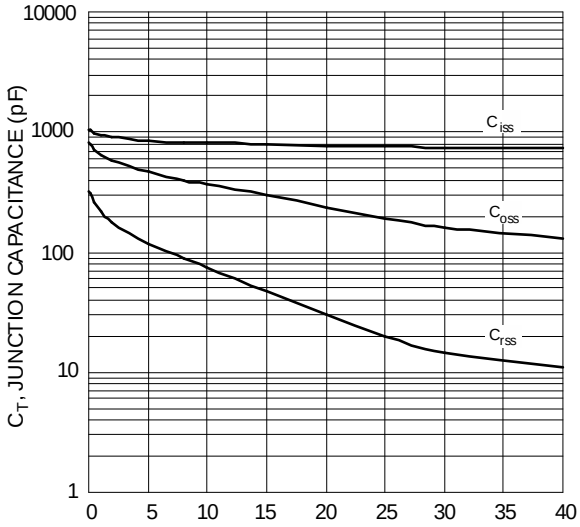

Figure 10 Typical Junction Capacitance

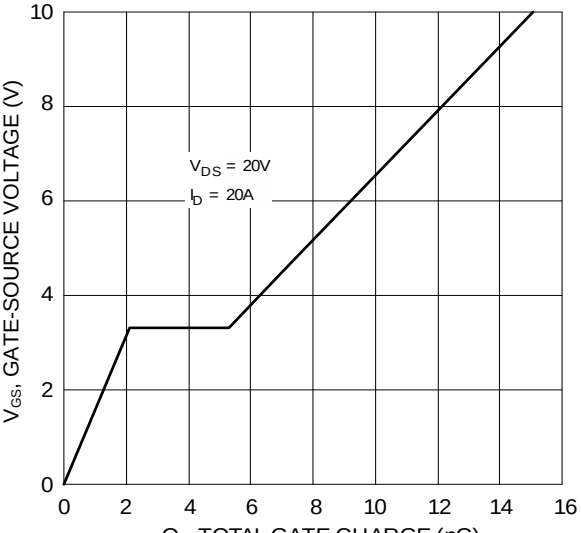

Figure 11 Gate Charge

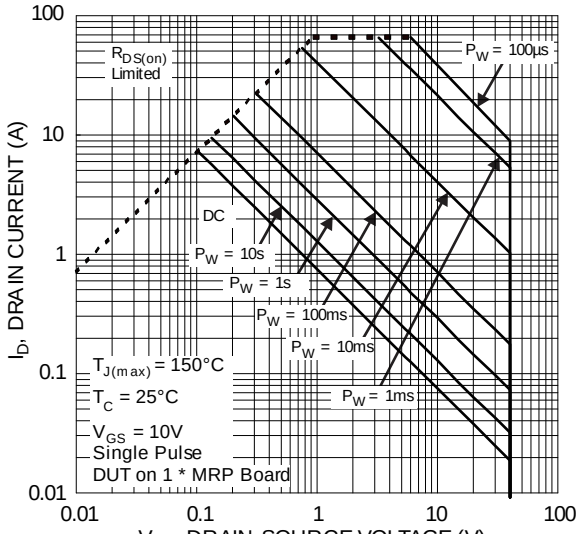

Figure 12 SOA, Safe Operation Area

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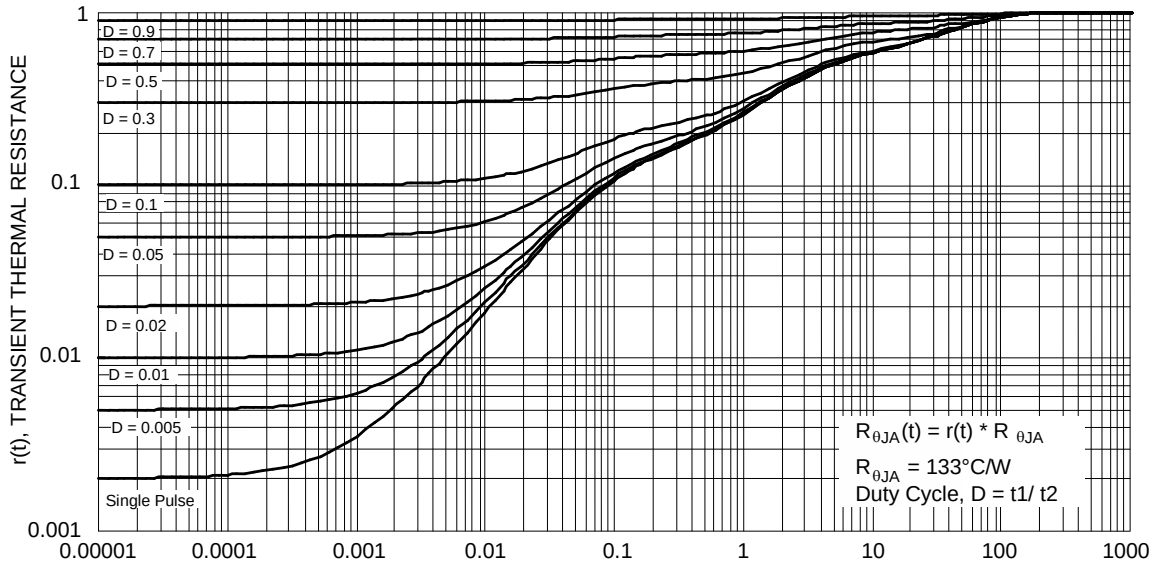

Figure 13 Transient Thermal Resistance

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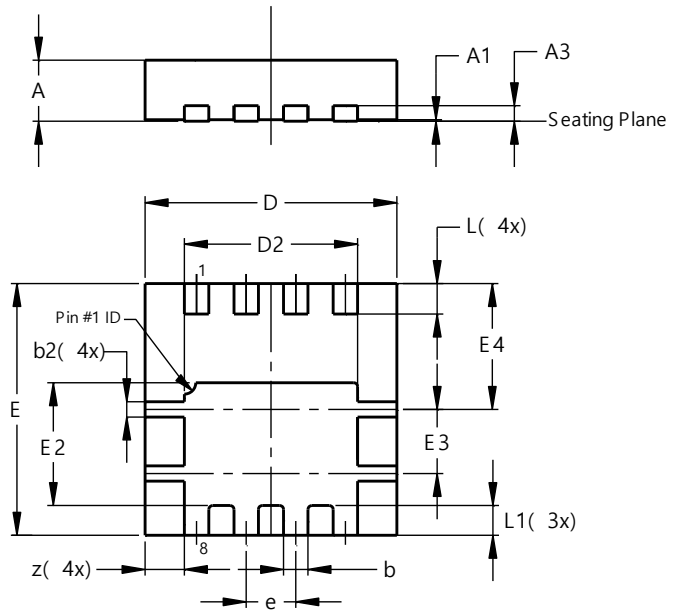
Package Outline Dimensions

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI3333-8

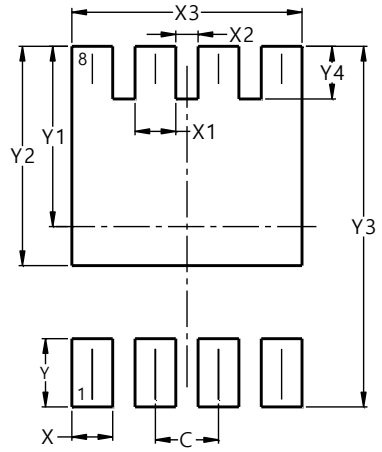


PowerDI3333-8			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	–	–	0.65
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
All Dimensions in mm			

Suggested Pad Layout

Please see http://www.diodes.com/package-outlines.html for the latest version.

PowerDI3333-8



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
Y4	0.540

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