

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

Description and Applications

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.

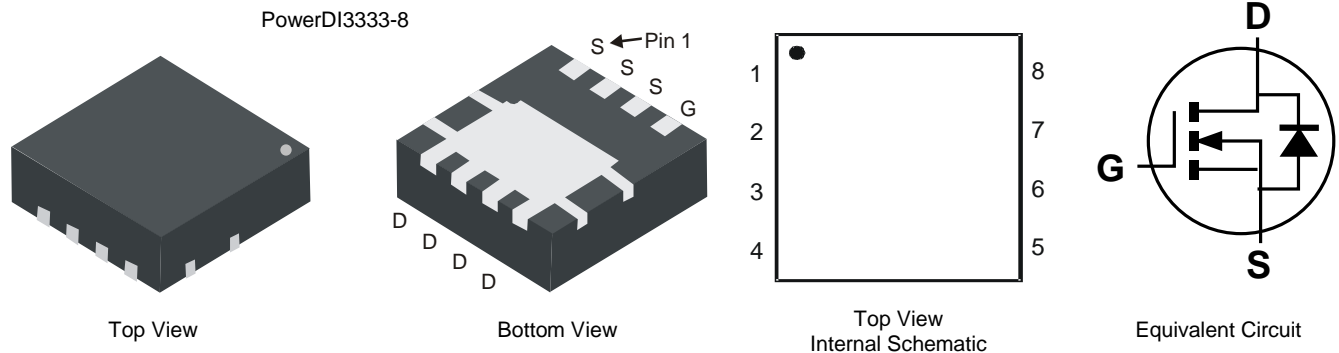
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- 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
- 100% UIS (Avalanche) Rated
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

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

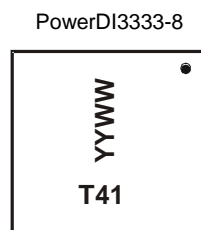


Ordering Information (Note 4)

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) 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



T41 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 16 = 2016)
 WW = Week Code (01 to 53)

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	I _D	T _C = +25°C T _C = +70°C	30 24	A
Continuous Drain Current (Note 5) V _{GS} = 10V		T _A = +25°C T _A = +70°C	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)	P _D	T _A = +25°C	2	W
Thermal Resistance, Junction to Ambient (Note 5)		R _{θJA}	62	°C/W
Total Power Dissipation (Note 5)	P _D	T _C = +25°C	15.6	W
Thermal Resistance, Junction to Case (Note 5)		R _{θJC}	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:
- R_{θJA} is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

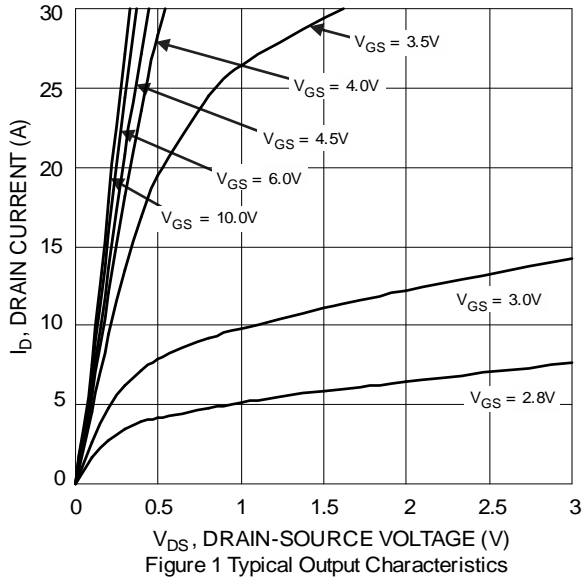


Figure 1 Typical Output Characteristics

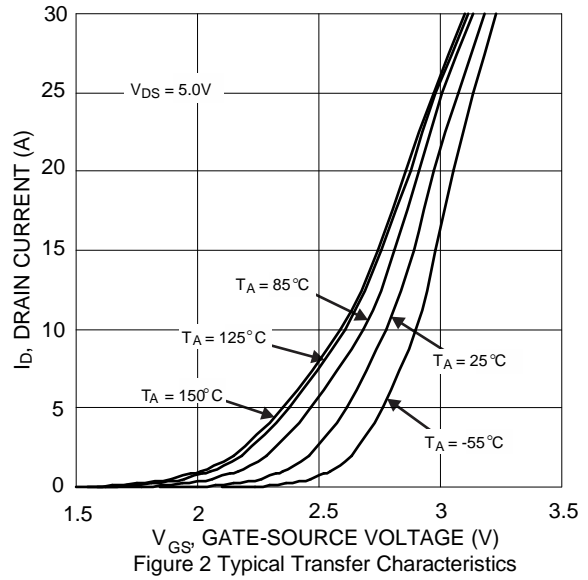


Figure 2 Typical Transfer Characteristics

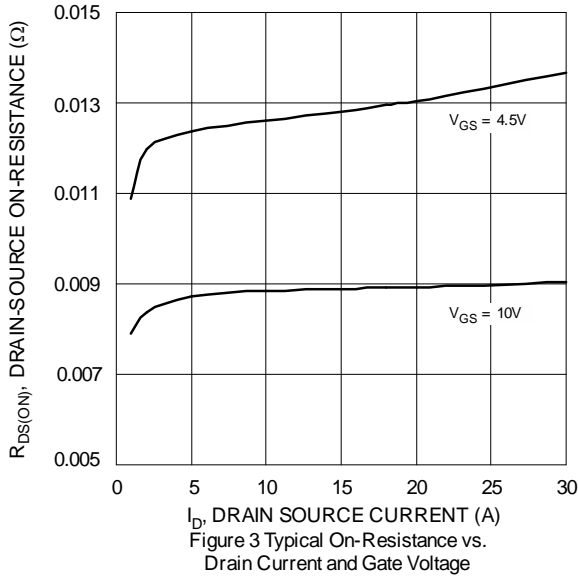


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

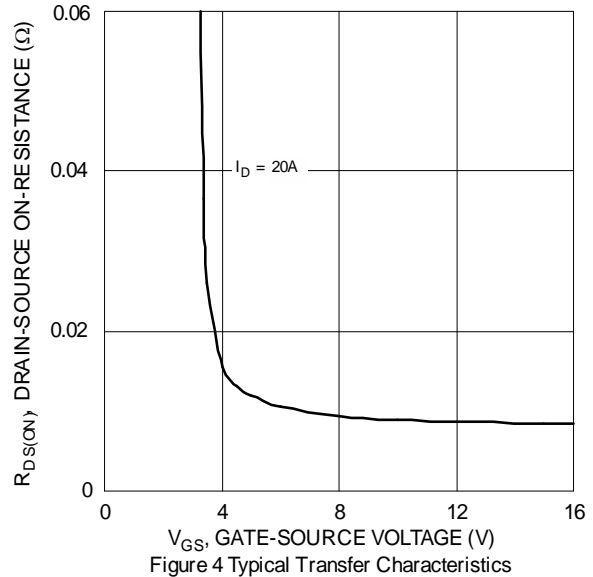


Figure 4 Typical Transfer Characteristics

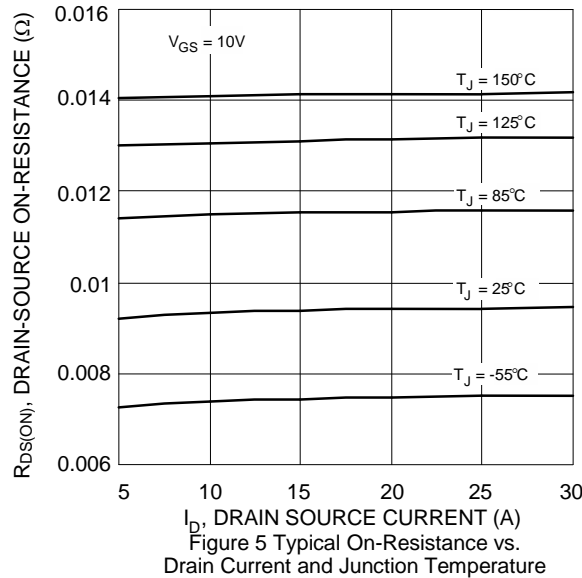


Figure 5 Typical On-Resistance vs. Drain Current and Junction Temperature

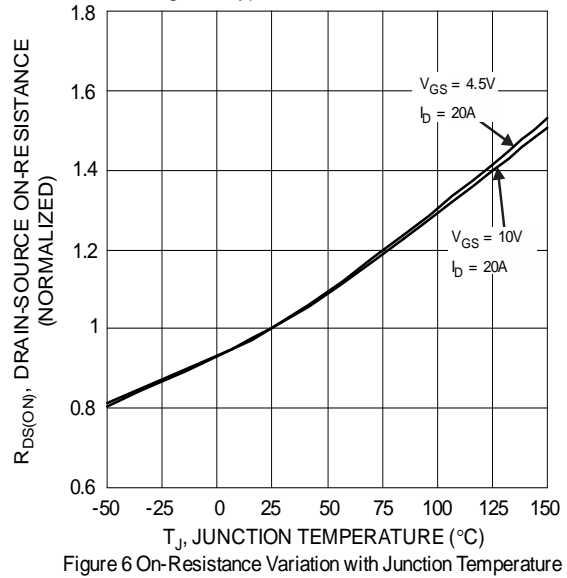


Figure 6 On-Resistance Variation with Junction Temperature

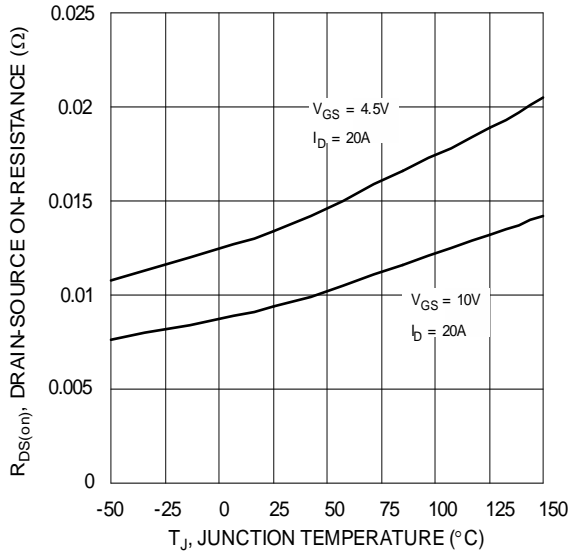


Figure 7 On-Resistance Variation with Junction Temperature

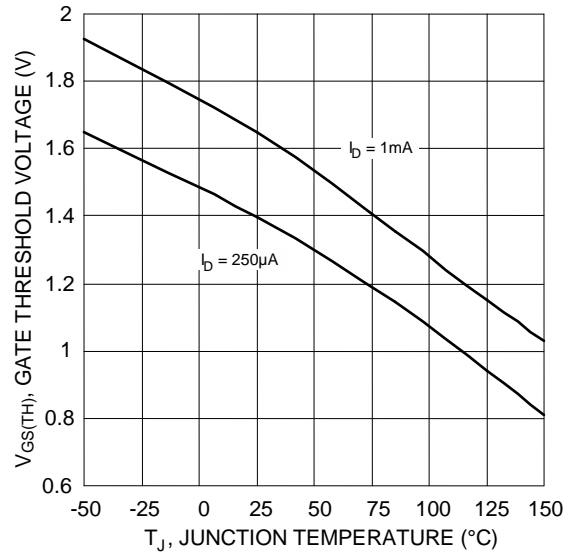


Figure 8 Gate Threshold Variation vs. Junction Temperature

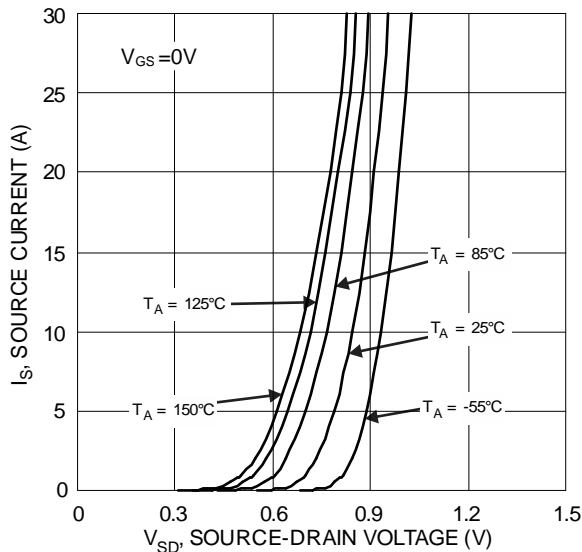


Figure 9 Diode Forward Voltage vs. Current

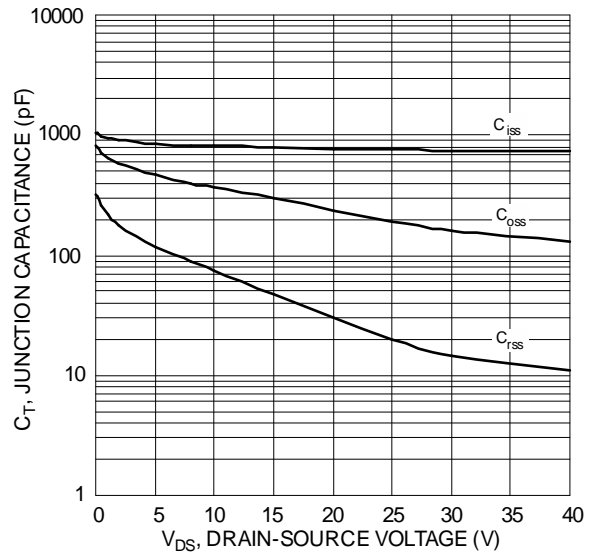


Figure 10 Typical Junction Capacitance

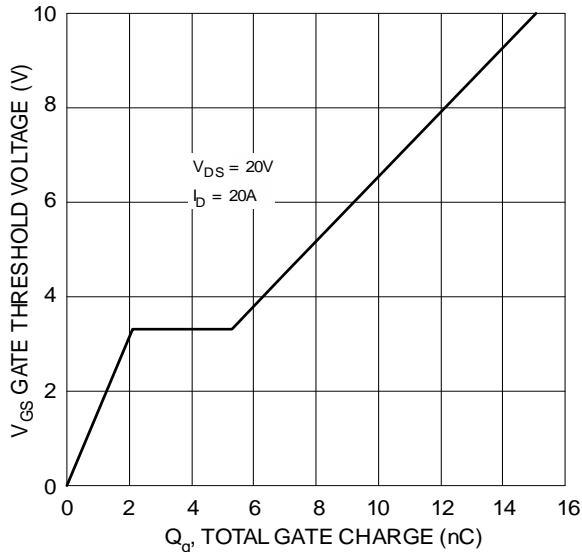


Figure 11 Gate Charge

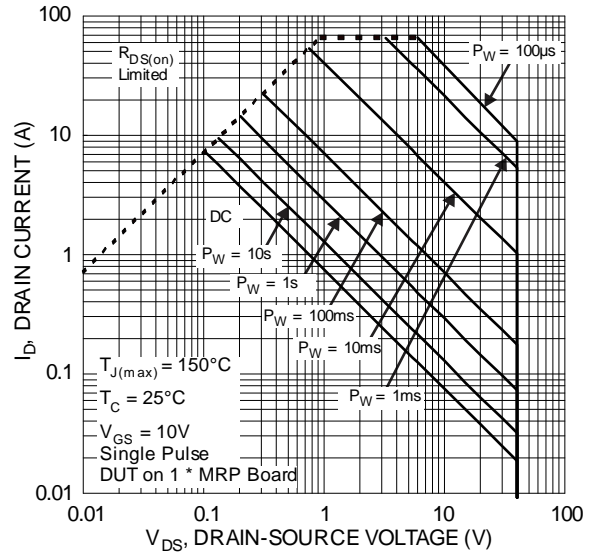
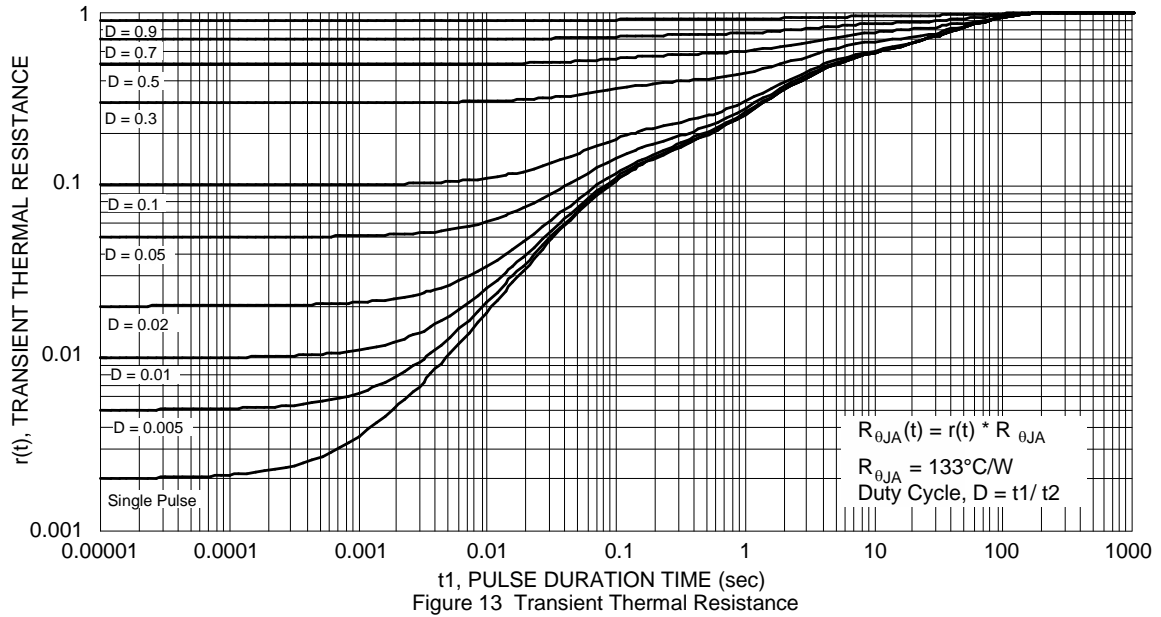


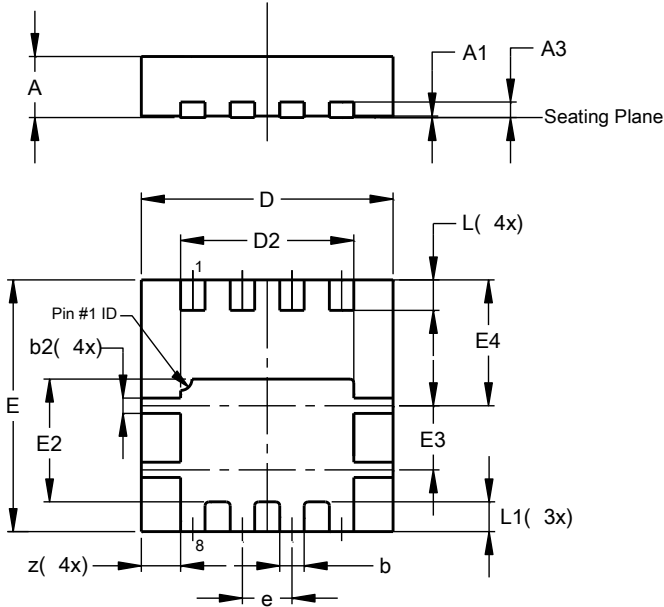
Figure 12 SOA, Safe Operation Area



Package Outline Dimensions

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

PowerDI3333-8

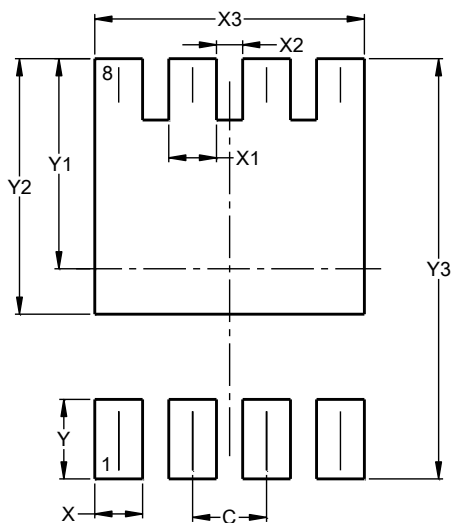


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

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

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