

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> max	I <sub>D</sub> max T <sub>C</sub> = +25°C
40V	11.5mΩ @ V <sub>GS</sub> = 10V	30A
	17.8mΩ @ V <sub>GS</sub> = 4.5V	24A

## Features and Benefits

- Low R<sub>DS(ON)</sub> – Ensures On State Losses Are Minimized
- Excellent Q<sub>gd</sub> x R<sub>DS(ON)</sub> 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)**

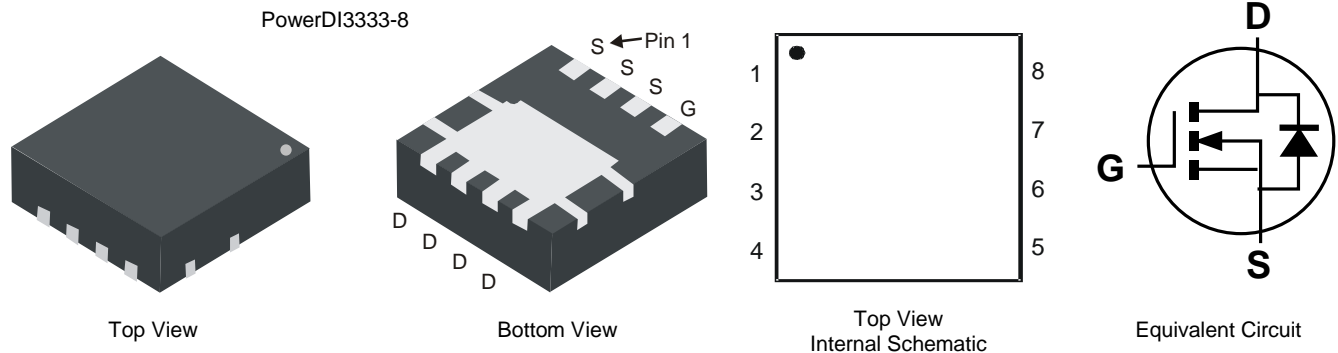
## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) and yet maintain superior switching performance, making it ideal for high-efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

## 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)

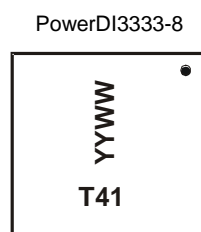


## Ordering Information (Note 4)

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](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<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V <sub>DSS</sub>	40	V	
Gate-Source Voltage	V <sub>GSS</sub>	+20 -16	V	
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V	I <sub>D</sub>	T <sub>C</sub> = +25°C T <sub>C</sub> = +70°C	30 24	A
Continuous Drain Current (Note 5) V <sub>GS</sub> = 10V		T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	10.8 8.6	A
Maximum Continuous Body Diode Forward Current (Note 5)	I <sub>S</sub>	2.1	A	
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	65	A	
Avalanche Current, L=0.3mH	I <sub>AS</sub>	11.9	A	
Avalanche Energy, L=0.3mH	E <sub>AS</sub>	21.4	mJ	

**Thermal Characteristics**

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>A</sub> = +25°C	2	W
Thermal Resistance, Junction to Ambient (Note 5)		R <sub>θJA</sub>	62	°C/W
Total Power Dissipation (Note 5)	P <sub>D</sub>	T <sub>C</sub> = +25°C	15.6	W
Thermal Resistance, Junction to Case (Note 5)		R <sub>θJC</sub>	8	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C	

**Electrical Characteristics** (T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 6)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	40	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 1mA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1	μA	V <sub>DS</sub> = 32V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	100 -100	nA	V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V V <sub>GS</sub> = -16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 6)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1	-	3	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	-	9.2	11.5	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 20A
		-	13.4	17.8		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 20A
Diode Forward Voltage	V <sub>SD</sub>	-	-	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 20A
<b>DYNAMIC CHARACTERISTICS (Note 7)</b>						
Input Capacitance	C <sub>iss</sub>	-	767	-	pF	V <sub>DS</sub> = 20V, V <sub>GS</sub> = 0V, f = 1MHz
Output Capacitance	C <sub>oss</sub>	-	238	-		
Reverse Transfer Capacitance	C <sub>rss</sub>	-	30.6	-		
Gate Resistance	R <sub>g</sub>	-	1	-	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	-	7	-	nC	V <sub>DS</sub> = 20V, I <sub>D</sub> = 20A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	-	15.1	-		
Gate-Source Charge	Q <sub>gs</sub>	-	2.1	-		
Gate-Drain Charge	Q <sub>gd</sub>	-	3.2	-		
Turn-On Delay Time	t <sub>D(ON)</sub>	-	3.5	-	ns	V <sub>DD</sub> = 20V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 1.6Ω, I <sub>D</sub> = 20A
Turn-On Rise Time	t <sub>R</sub>	-	5.8	-		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	-	9.6	-		
Turn-Off Fall Time	t <sub>F</sub>	-	2	-		
Body Diode Reverse Recovery Time	t <sub>RR</sub>	-	9.8	-	ns	I <sub>F</sub> = 15A, di/dt = 400A/μs
Body Diode Reverse Recovery Charge	Q <sub>RR</sub>	-	5.1	-	nC	

- Notes:
- R<sub>θJA</sub> is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper pad layout. R<sub>θJC</sub> is guaranteed by design while R<sub>θJA</sub> 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.

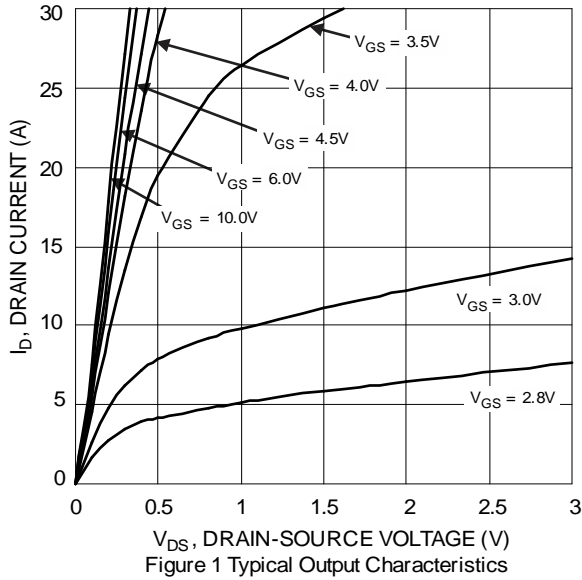


Figure 1 Typical Output Characteristics

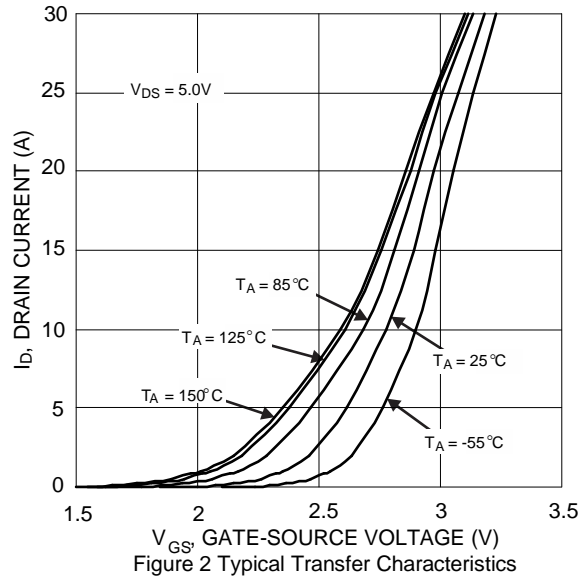


Figure 2 Typical Transfer Characteristics

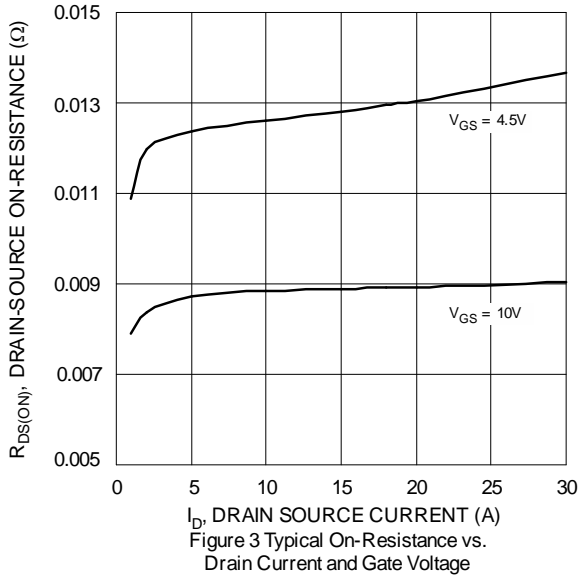


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

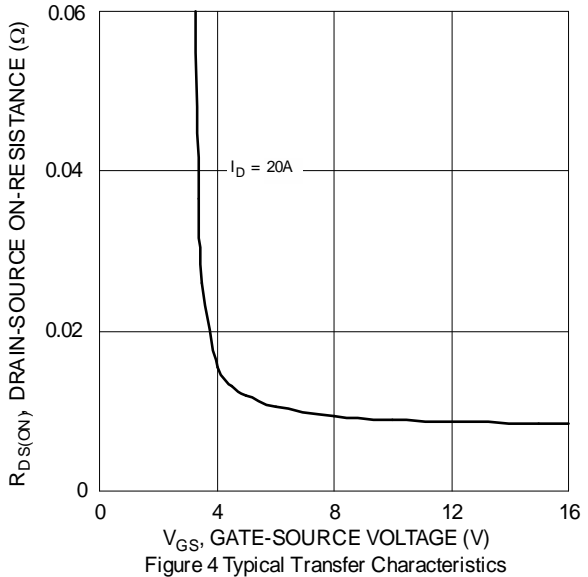


Figure 4 Typical Transfer Characteristics

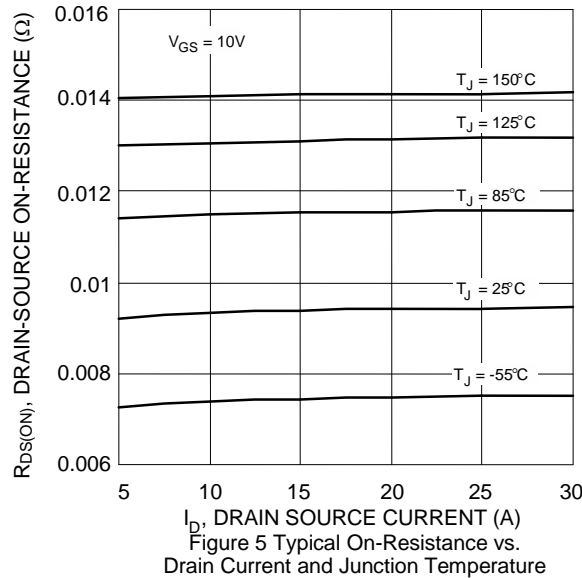


Figure 5 Typical On-Resistance vs. Drain Current and Junction Temperature

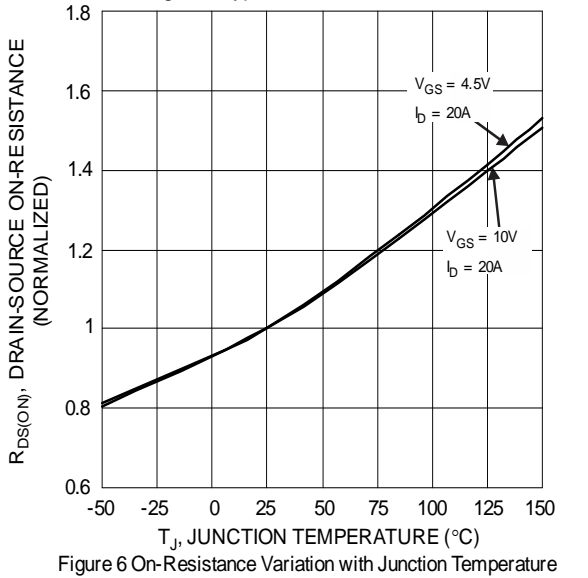


Figure 6 On-Resistance Variation with Junction Temperature

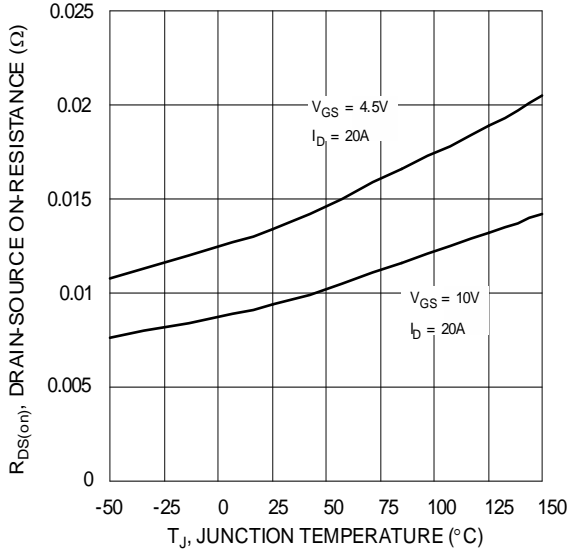


Figure 7 On-Resistance Variation with Junction Temperature

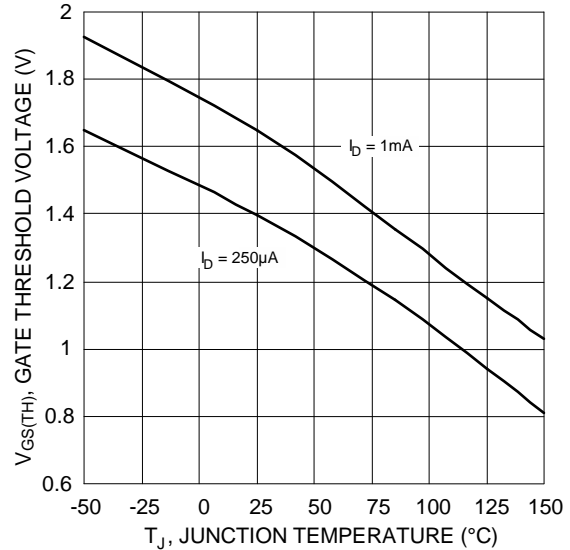


Figure 8 Gate Threshold Variation vs. Junction Temperature

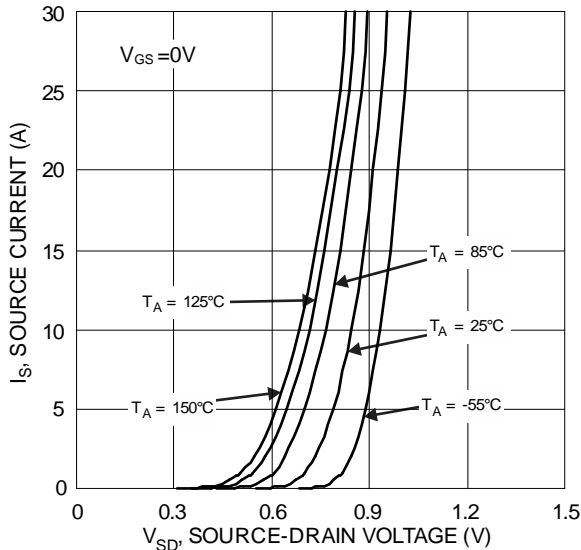


Figure 9 Diode Forward Voltage vs. Current

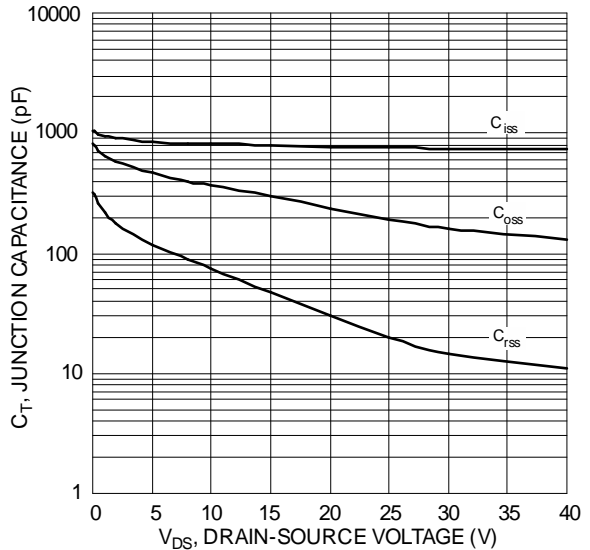


Figure 10 Typical Junction Capacitance

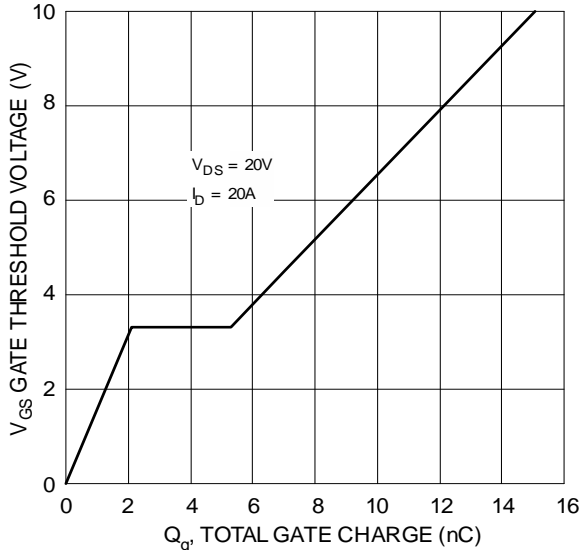


Figure 11 Gate Charge

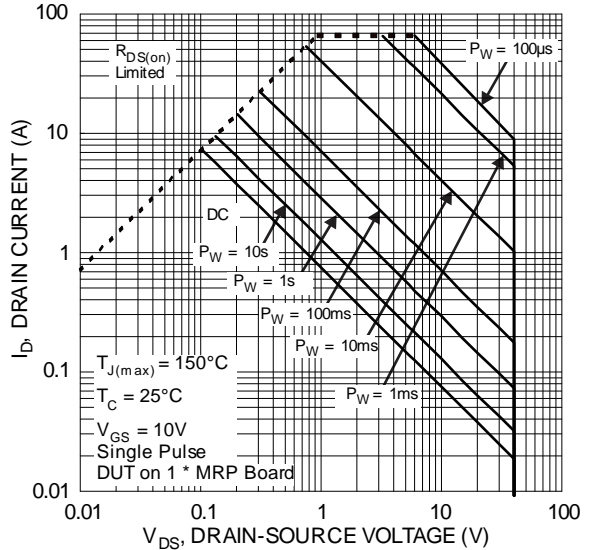
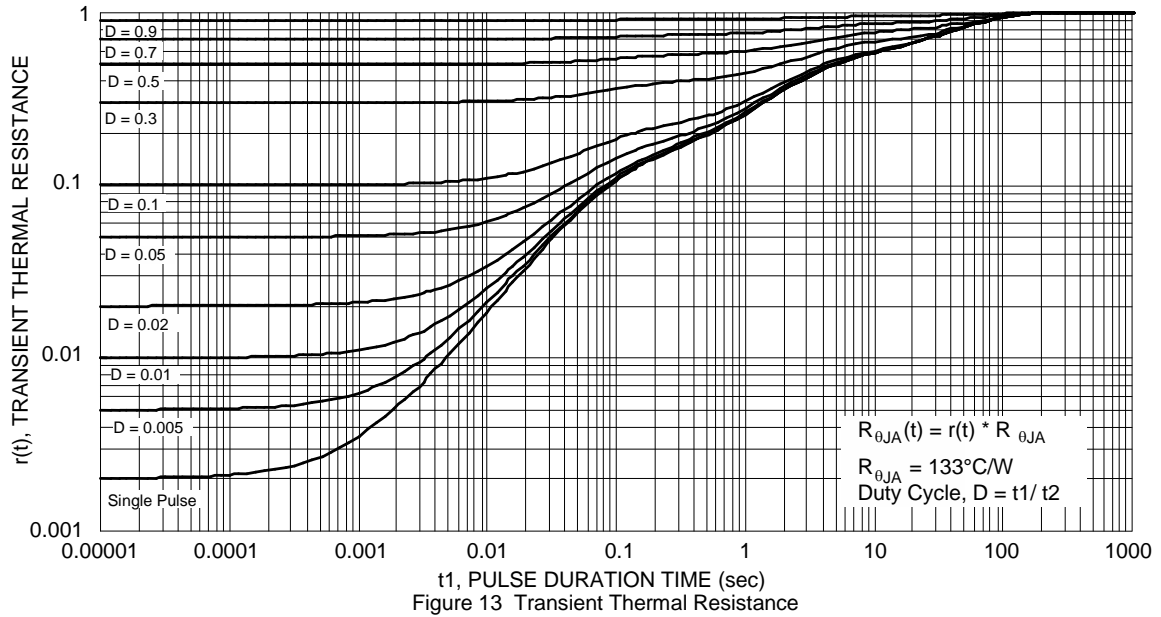


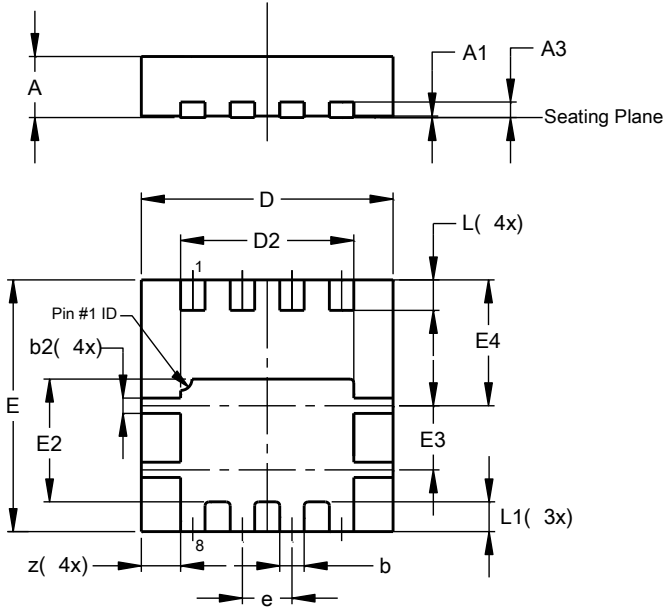
Figure 12 SOA, Safe Operation Area



## Package Outline Dimensions

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

### PowerDI3333-8

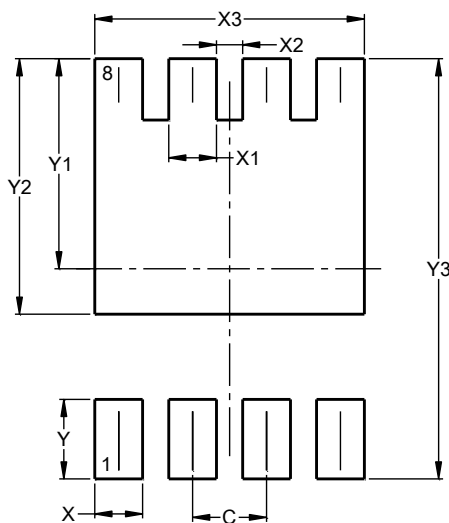


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

## 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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