

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
-20V	9.5mΩ @ V _{GS} = -4.5V	-40A
	12.5mΩ @ V _{GS} = -2.5V	

Description

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.

Applications

- Load switches
- Power management functions

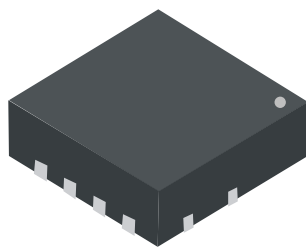
Features

- 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
- **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-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

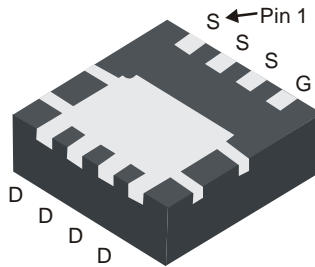
Mechanical Data

- Package: PowerDI[®]3333-8
- Package Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.008 grams (Approximate)

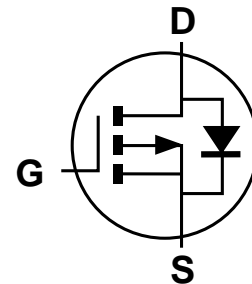
PowerDI3333-8



Top View



Bottom View



Equivalent Circuit

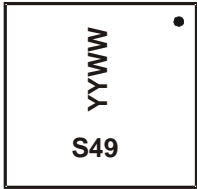
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2010UFG-7	PowerDI3333-8	2000	Tape & Reel
DMP2010UFG-13	PowerDI3333-8	3000	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/>.

Marking Information

Site1



S49 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 22 = 2022)
 WW = Week Code (01 to 53)

Site2



S49 = Product Type Marking Code
 Y = Year (ex: 2 = 2022)
 W = Week (ex: a = Week 27; z Represents Week 52 and 53)
 X = Internal Code (ex: U = Monday)

Date Code Key

Year	2015	...	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Code	5	...	2	3	4	5	6	7	8	9	0	1

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

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

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	-20	V
Gate-Source Voltage	V _{GSS}	±10	V
Continuous Drain Current, V _{GS} = -4.5V (Note 6)	I _D	T _A = +25°C T _C = +25°C (Note 10) -12.7 -40	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	-3	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)	I _{DM}	-80	A
Avalanche Current, L = 0.1mH (Note 7)	I _{AS}	-35	A
Avalanche Energy, L = 0.1mH (Note 7)	E _{AS}	64	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	136	°C/W
Total Power Dissipation (Note 6)	P _D	2.3	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	54	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	4	°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}	-20	—	—	V	V _{GS} = 0V, I _D = -1mA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	µA	V _{DS} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±8V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	-0.4	—	-1.2	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	—	9.5	mΩ	V _{GS} = -4.5V, I _D = -3.6A
		—	—	12.5		V _{GS} = -2.5V, I _D = -3.6A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -10A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	3350	—	pF	V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	C _{oss}	—	527	—		
Reverse Transfer Capacitance	C _{rss}	—	460	—		
Gate Resistance	R _G	—	10.7	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	50	—	nC	V _{DS} = -10V, I _D = -3.6A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	103	—		
Gate-Source Charge	Q _{gs}	—	6.0	—		
Gate-Drain Charge	Q _{gd}	—	14.4	—		
Turn-On Delay Time	t _{D(ON)}	—	9.7	—	ns	V _{DD} = -10V, V _{GS} = -4.5V, R _{GEN} = 4.7Ω, I _D = -3.6A
Turn-On Rise Time	t _R	—	30	—		
Turn-Off Delay Time	t _{D(OFF)}	—	235	—		
Turn-Off Fall Time	t _F	—	110	—		
Reverse Recovery Time	t _{RR}	—	64	—	ns	I _F = -3.6A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	60	—	nC	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

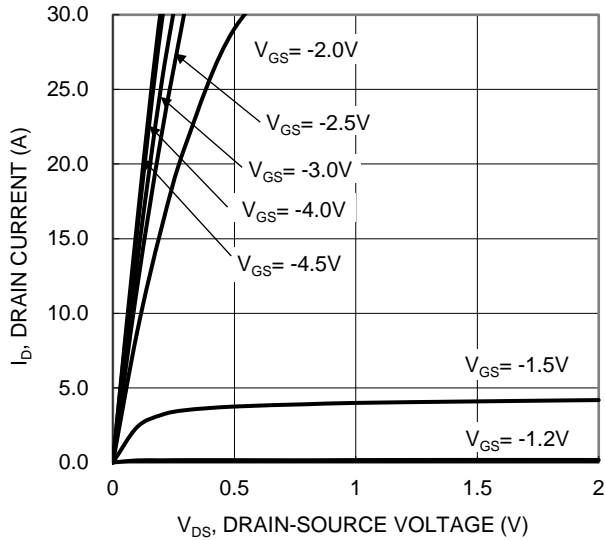


Figure 1. Typical Output Characteristic

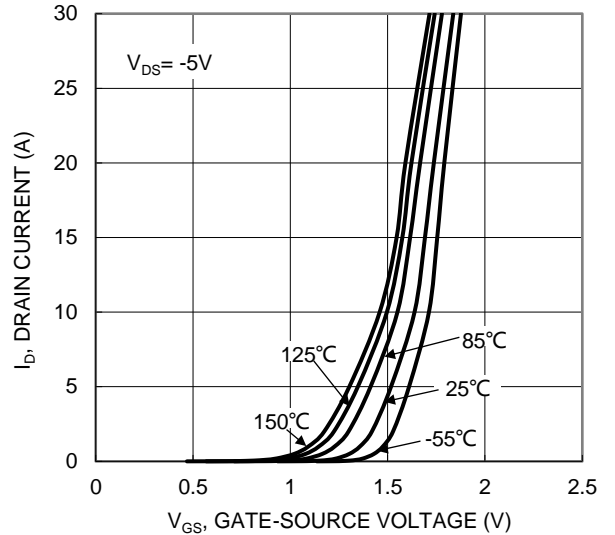


Figure 2. Typical Transfer Characteristic

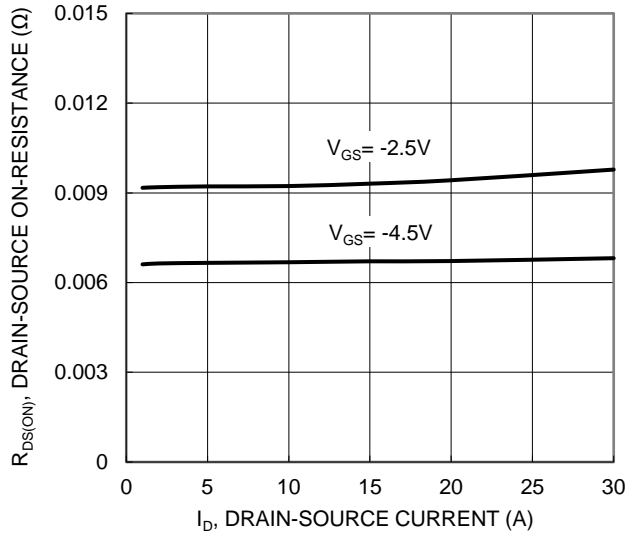


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

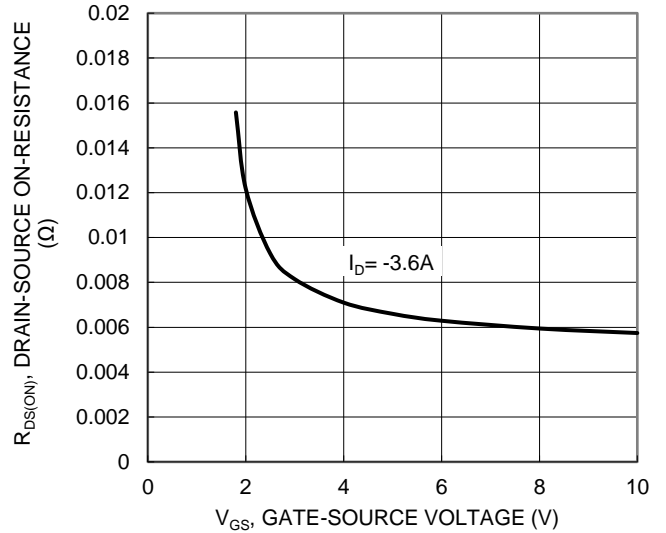


Figure 4. Typical Transfer Characteristic

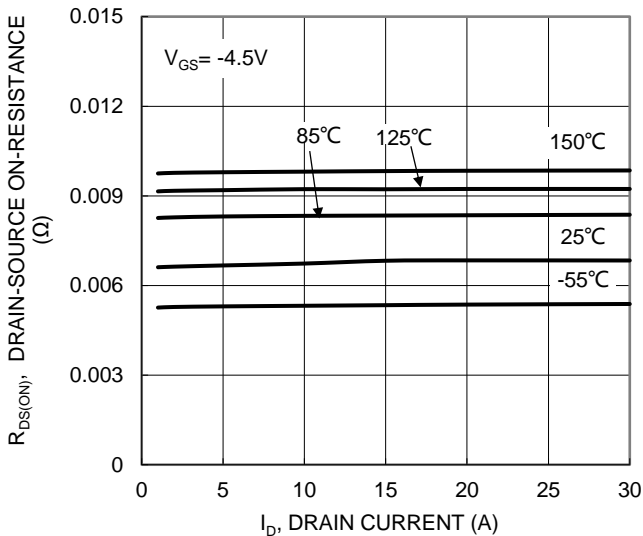


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

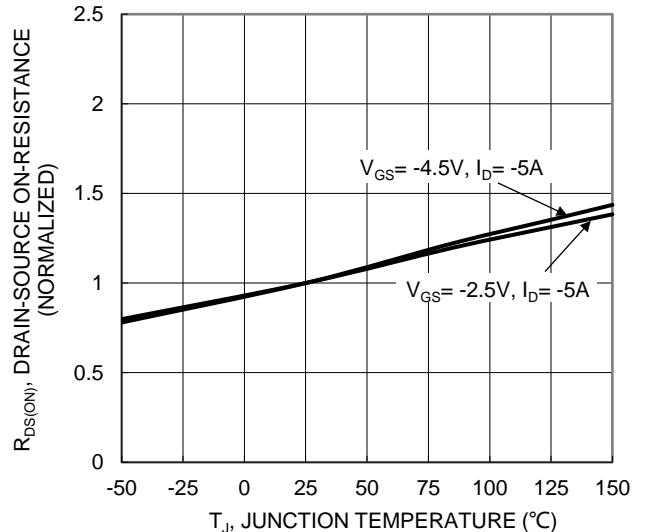


Figure 6. On-Resistance Variation with Junction Temperature

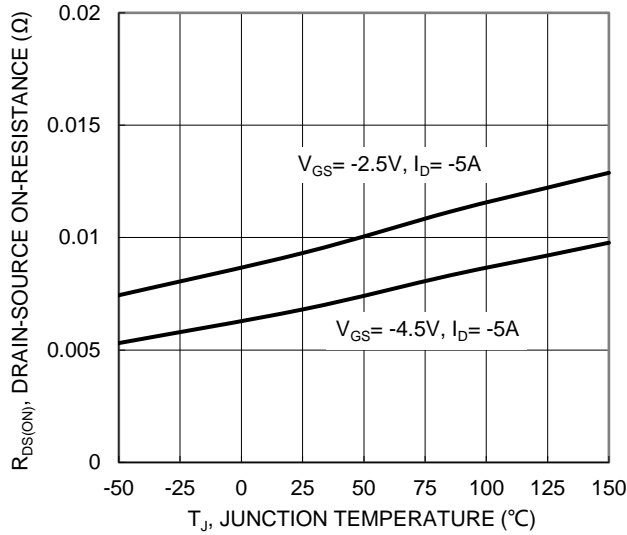


Figure 7. On-Resistance Variation with Junction Temperature

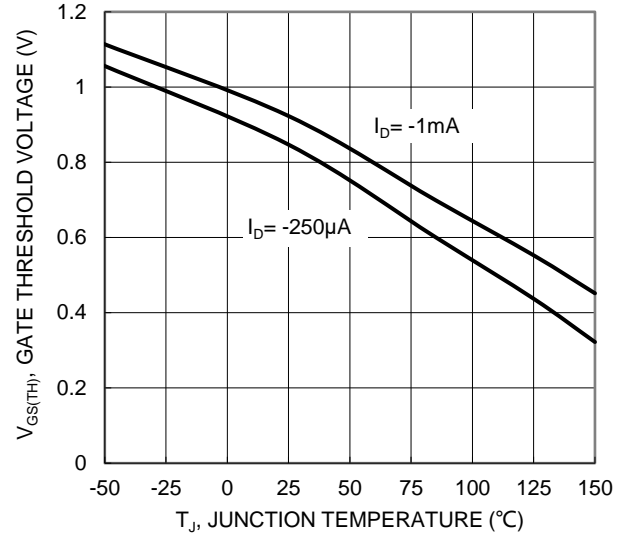


Figure 8. Gate Threshold Variation vs. Junction Temperature

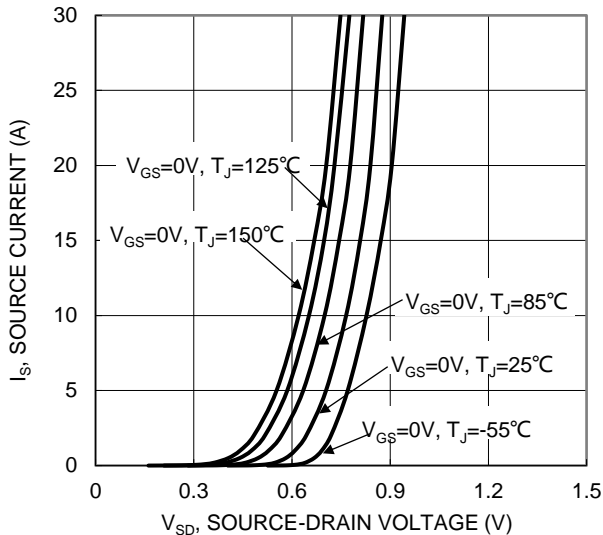


Figure 9. Diode Forward Voltage vs. Current

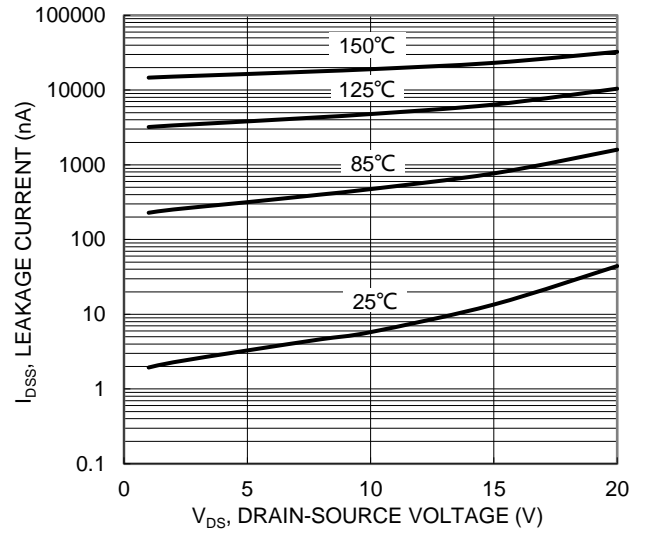


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

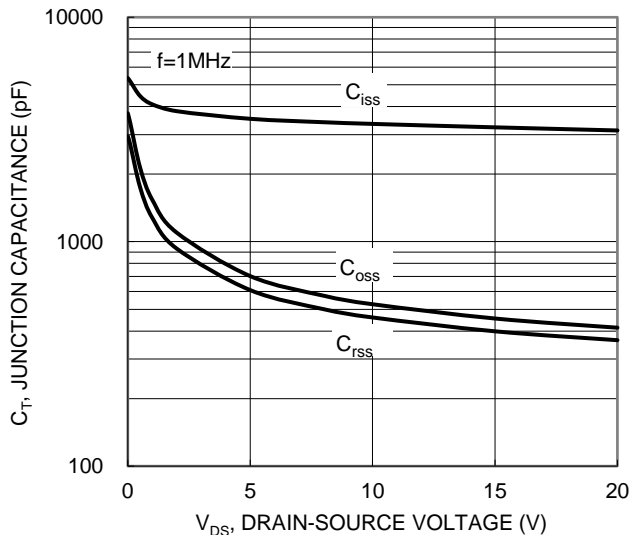


Figure 11. Typical Junction Capacitance

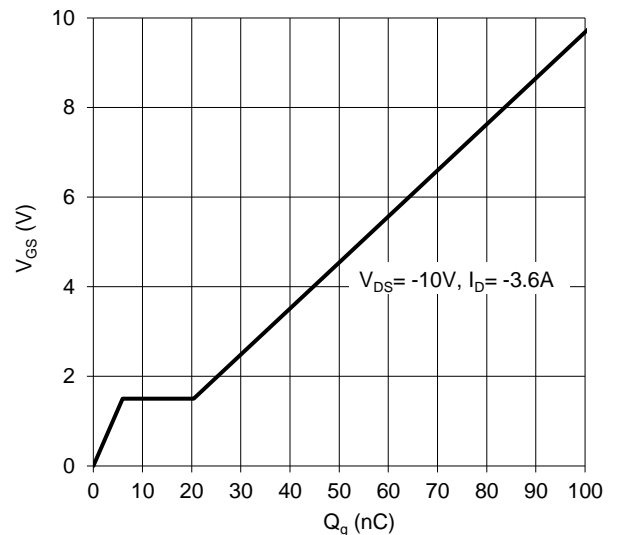


Figure 12. Gate Charge

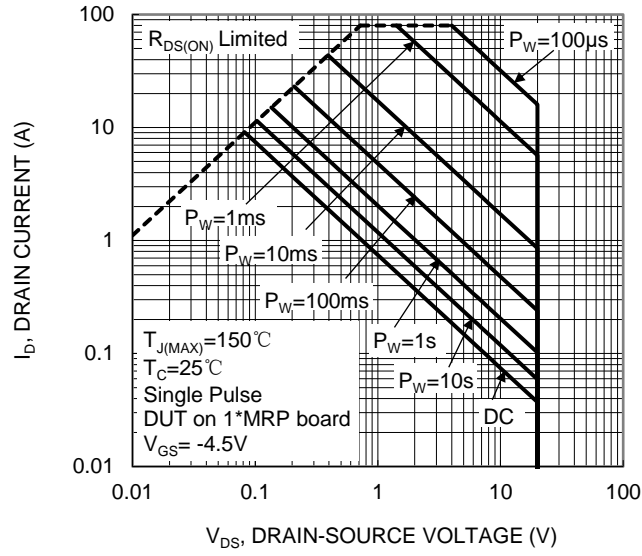


Figure 13. SOA, Safe Operation Area

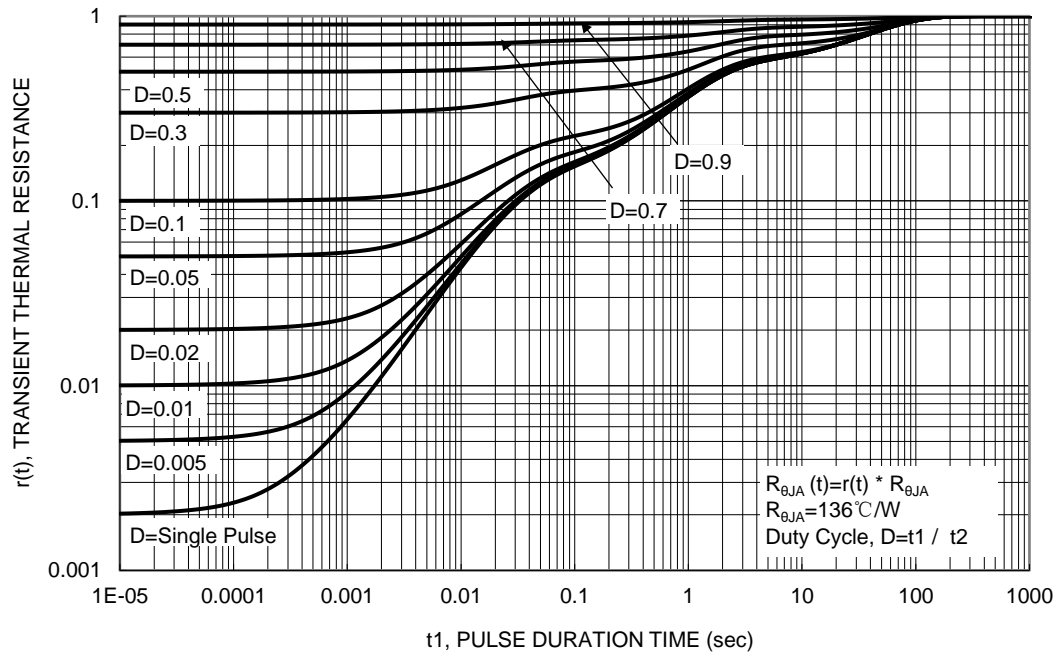
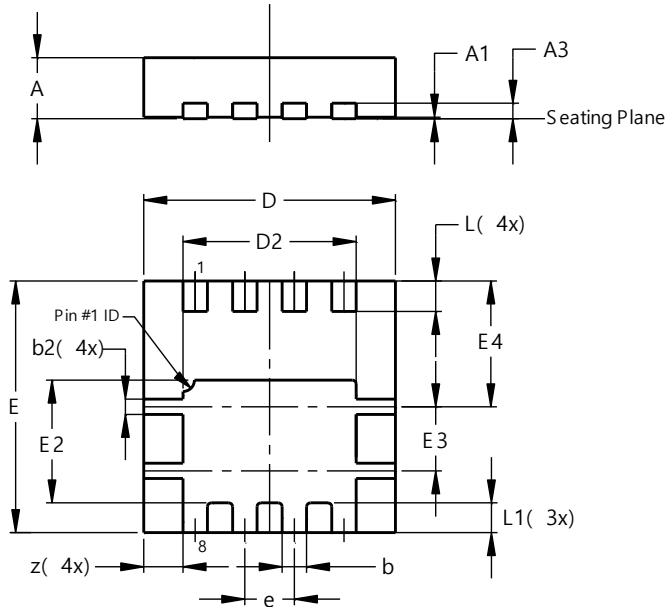


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

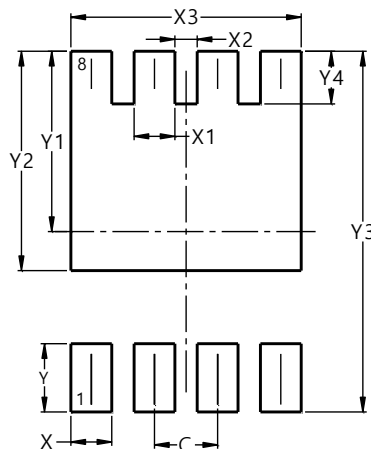


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

Suggested Pad Layout

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

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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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