

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D MAX T _C = +25°C
100V	8.5mΩ @ V _{GS} = 10V	55A
	12.5mΩ @ V _{GS} = 4.5V	45A

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

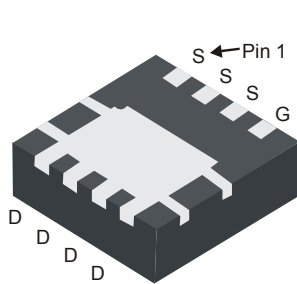
- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- Low R_{DS(ON)} – Ensures On State Losses are Minimized
- Excellent Q_{gd} × R_{DS(ON)} Product (FOM)
- Advanced Technology for DC/DC Converters
- 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% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- **Lead-Free Finish; 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](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

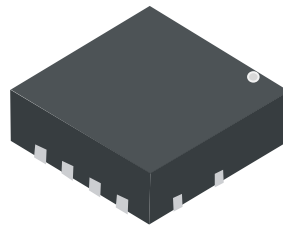
Mechanical Data

- 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 Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Lead-Frame. Solderable per MIL-STD-202, Method 208
- Weight: 0.034 grams (Approximate)

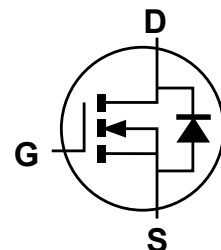


Bottom View

PowerDI3333-8



Top View



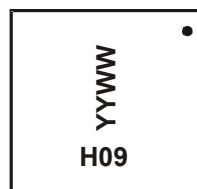
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMTH10H009LFG-7	PowerDI3333-8	2,000/Tape & Reel
DMTH10H009LFG-13	PowerDI3333-8	3,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 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



H09 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 20 = 2020)
 WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	100	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	$T_A = +25^\circ\text{C}$ $T_A = +100^\circ\text{C}$	I_D 14 10	A
	$T_C = +25^\circ\text{C}$ $T_C = +100^\circ\text{C}$	I_D 55 39	A
Maximum Continuous Body Diode Forward Current (Note 5)	I_S	30	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	220	A
Pulsed Body Diode Continuous Current (10 μs Pulse, Duty Cycle = 1%)	I_{SM}	220	A
Avalanche Current (L = 1mH)	I_{AS}	17	A
Avalanche Energy (L = 1mH)	E_{AS}	144.5	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$ P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	60	$^\circ\text{C/W}$
Total Power Dissipation	$T_C = +25^\circ\text{C}$ P_D	39	W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	3.8	$^\circ\text{C/W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	100	—	—	V	$V_{GS} = 0\text{V}, I_D = 1\text{mA}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$V_{DS} = 80\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.1	—	2.5	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	6.4	8.5	m Ω	$V_{GS} = 10\text{V}, I_D = 20\text{A}$
		—	8.2	12.5		$V_{GS} = 4.5\text{V}, I_D = 10\text{A}$
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	2361	—	pF	$V_{DS} = 50\text{V}, V_{GS} = 0\text{V}$ $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	611	—		
Reverse Transfer Capacitance	C_{rss}	—	16	—		
Gate Resistance	R_g	—	1.7	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge	Q_g	—	41	—	nC	$V_{DD} = 50\text{V}, I_D = 13\text{A},$ $V_{GS} = 10\text{V}$
Gate-Source Charge	Q_{gs}	—	7.3	—		
Gate-Drain Charge	Q_{gd}	—	9.3	—		
Turn-On Delay Time	$t_{D(ON)}$	—	7	—	ns	$V_{DD} = 50\text{V}, V_{GS} = 10\text{V},$ $I_D = 13\text{A}, R_g = 6\Omega$
Turn-On Rise Time	t_R	—	12	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	42	—		
Turn-Off Fall Time	t_F	—	24	—		
Reverse Recovery Time	t_{RR}	—	45	—	ns	$I_F = 13\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	68	—	nC	

- Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
6. Short duration pulse test used to minimize self-heating effect.
7. Guaranteed by design. Not subject to product testing.

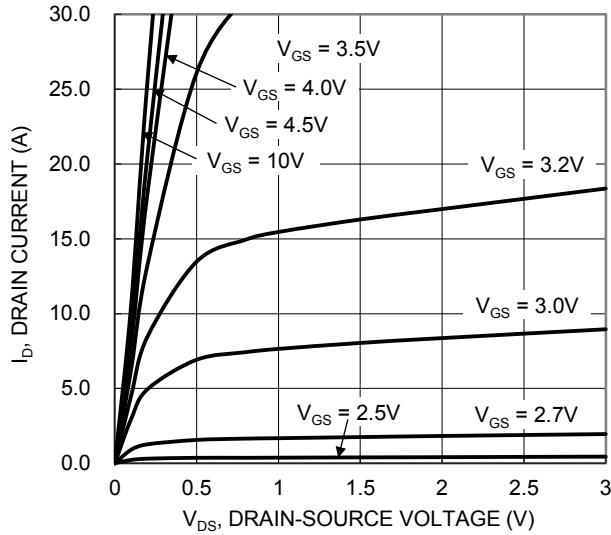


Figure 1. Typical Output Characteristic

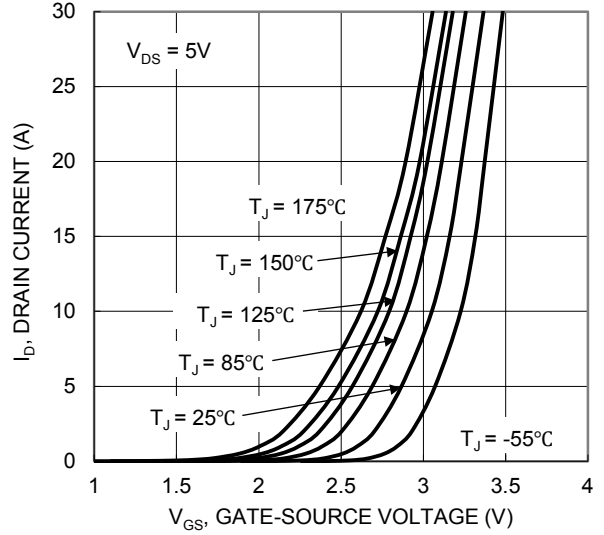


Figure 2. Typical Transfer Characteristic

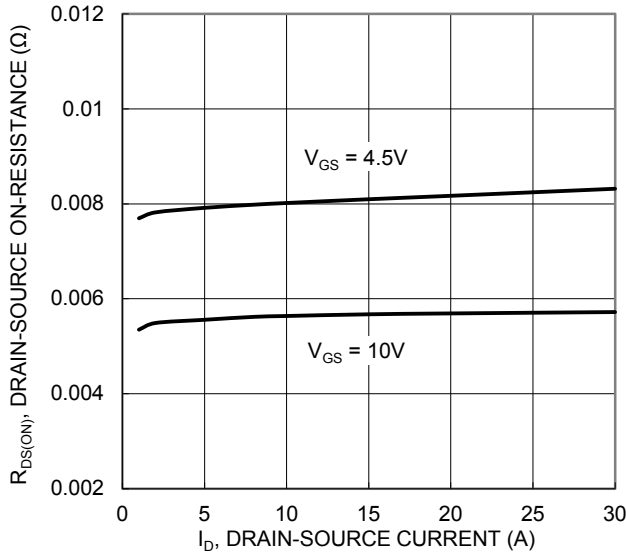


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

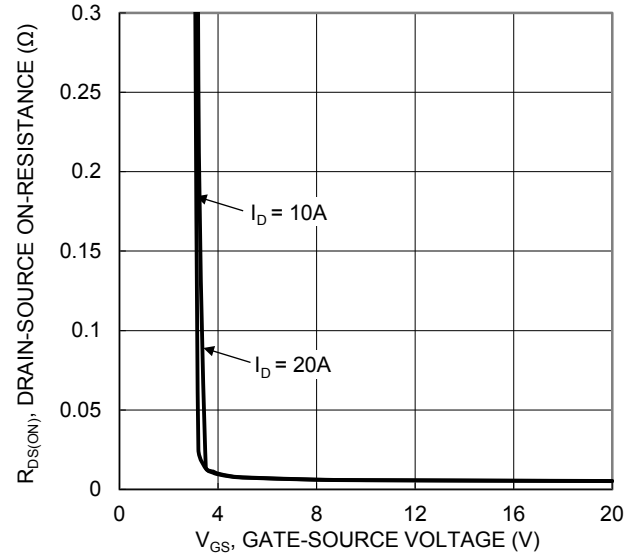


Figure 4. Typical Transfer Characteristic

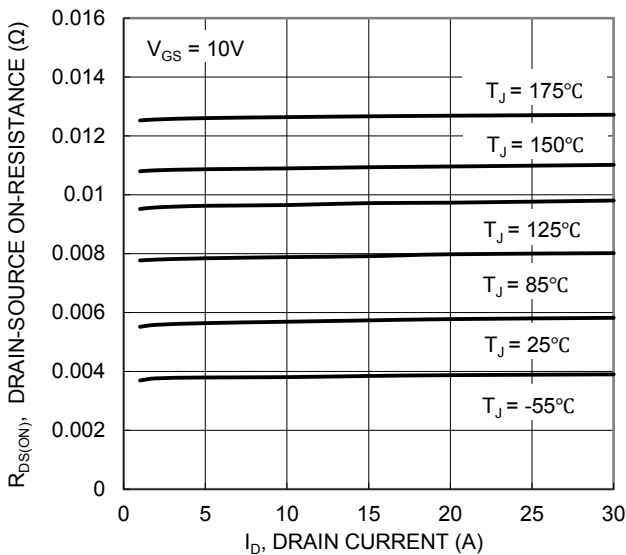


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

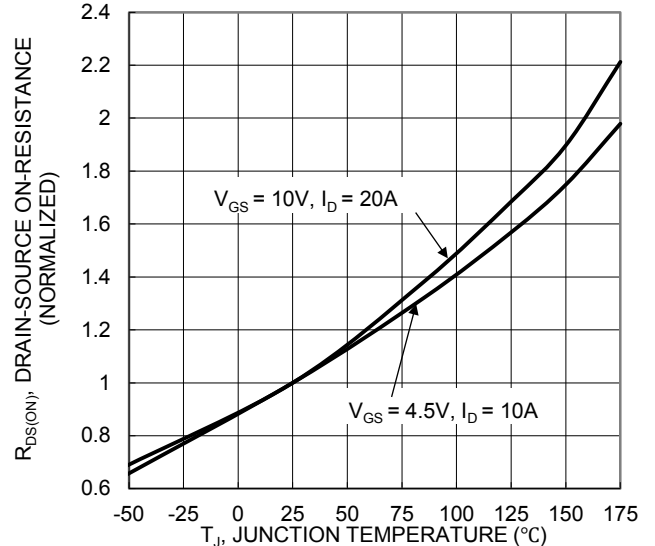


Figure 6. On-Resistance Variation with Junction Temperature

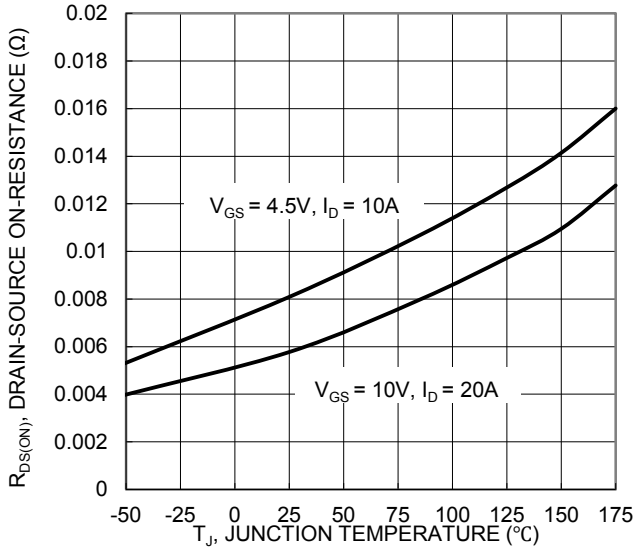


Figure 7. On-Resistance Variation with Junction Temperature

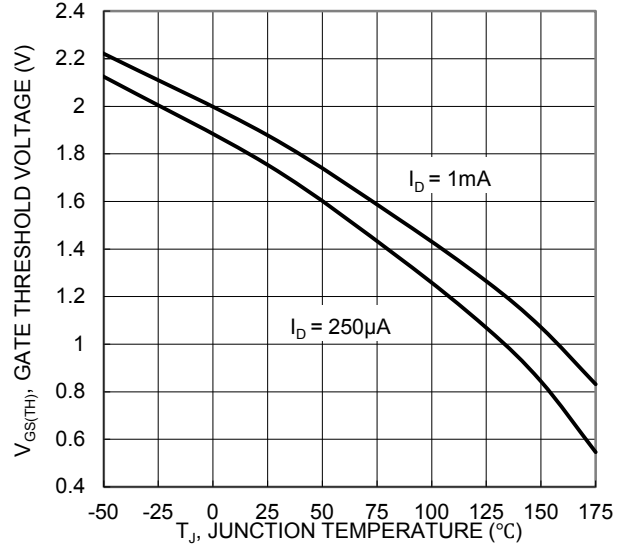


Figure 8. Gate Threshold Variation vs. Junction Temperature

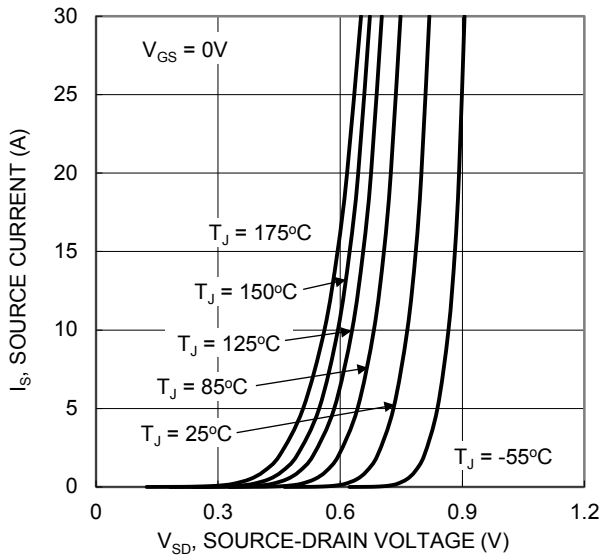


Figure 9. Diode Forward Voltage vs. Current

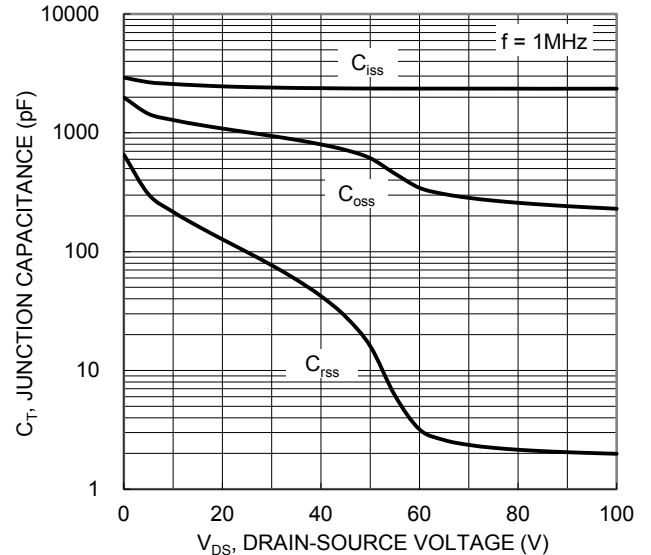


Figure 10. Typical Junction Capacitance

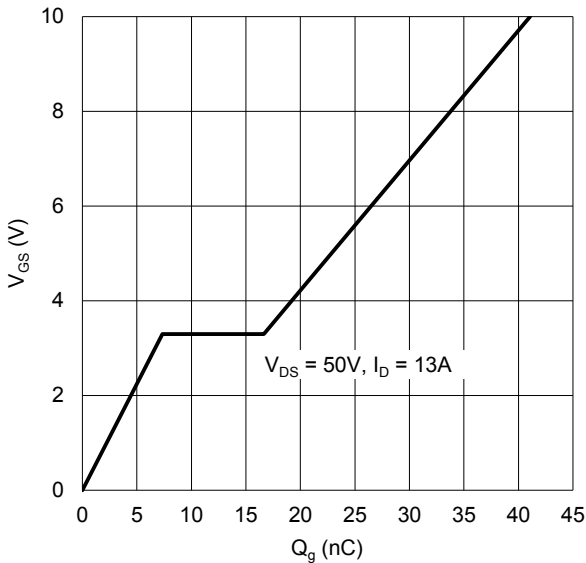


Figure 11. Gate Charge

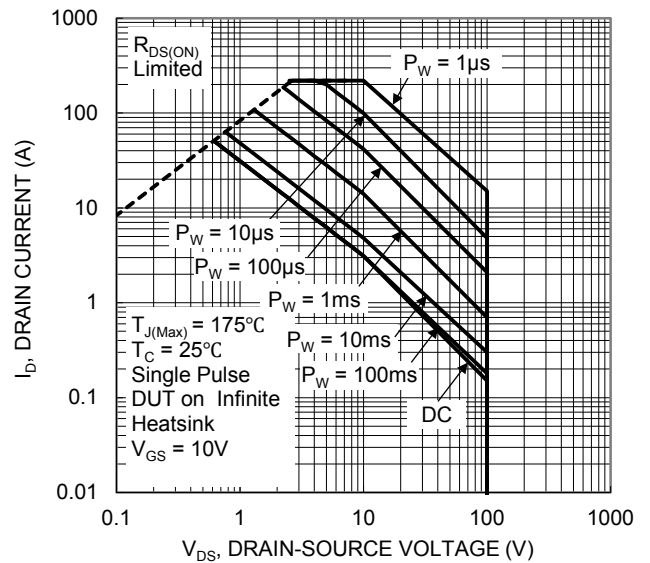


Figure 12. SOA, Safe Operation Area

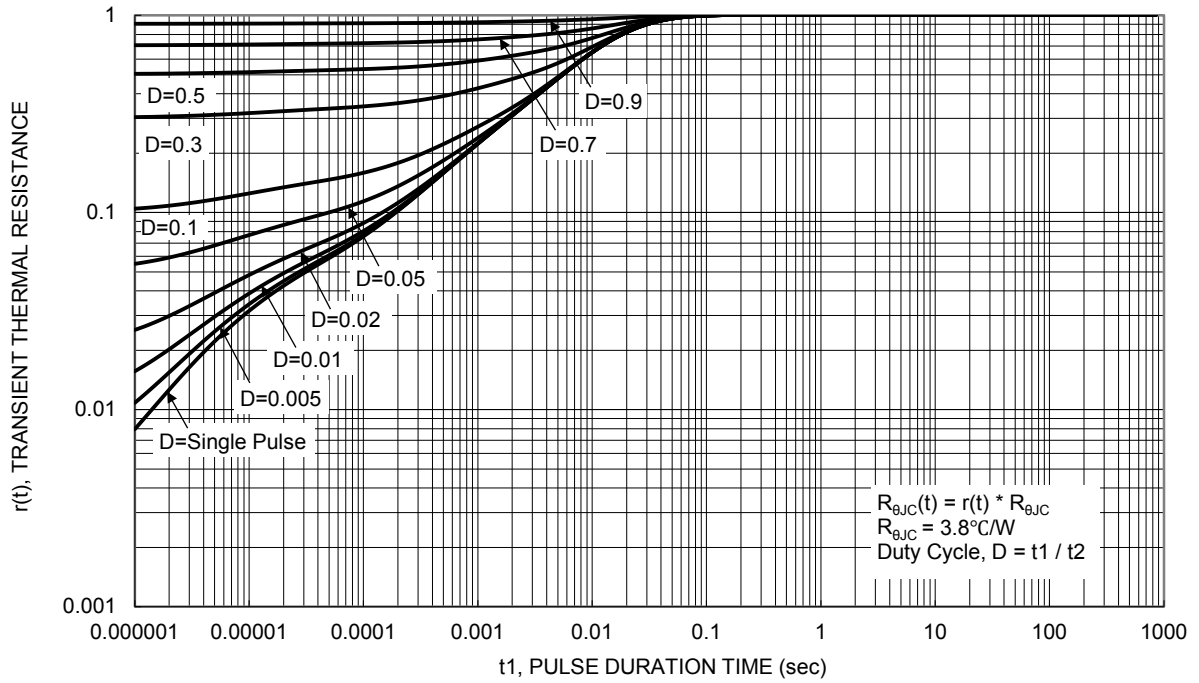
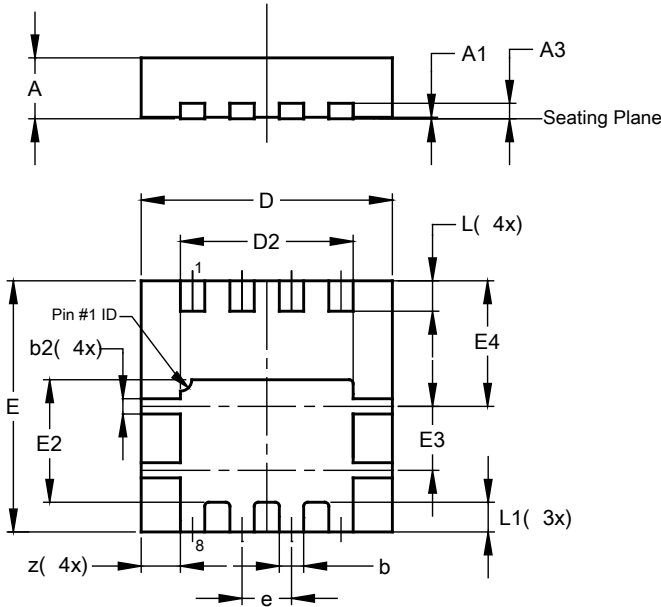


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

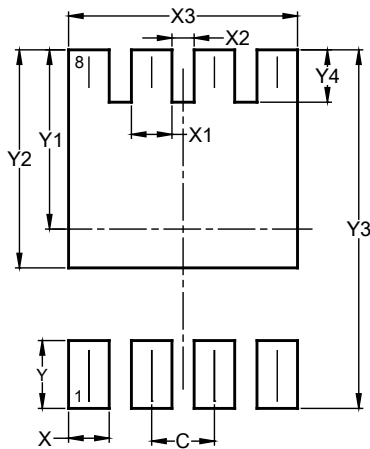


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

Suggested Pad Layout

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

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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