

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
30V	4.4mΩ @ V _{GS} = 10V	62A
	5.5mΩ @ V _{GS} = 4.5V	56A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

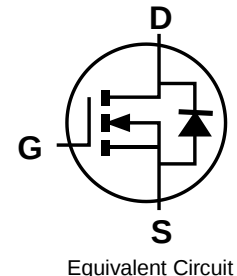
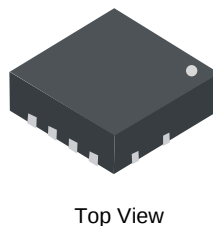
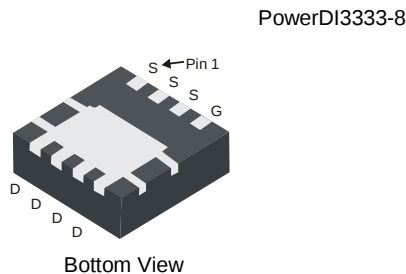
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

- Low R_{DS(ON)} – Ensures on-state losses are minimized
- Small, form factor thermally efficient package enables higher density end products
- Occupies only 33% of the board area occupied by SO-8 enabling smaller end products
- 100% Unclamped Inductive Switch (UIS) Test in Production
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

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 Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.072 grams (Approximate)



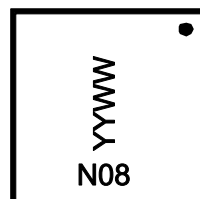
Ordering Information (Note 5)

Part Number	Case	Packaging
DMN3008SFGQ-7	PowerDI3333-8	2,000/Tape & Reel
DMN3008SFGQ-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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to http://www.diodes.com/product_compliance_definitions.html.
 5. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information

PowerDI3333-8



N08 = 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	Units
Drain-Source Voltage			V _{DSS}	30	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = 10V	Steady State	T _A = +25°C T _A = +70°C	I _D	17.6 14.1	A
	t < 10s	T _A = +25°C T _A = +70°C	I _D	23.0 18.4	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	62 50	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I _{DM}	80	A
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	2	A
Avalanche Current, L = 0.1mH			I _{AS}	45	A
Avalanche Energy, L = 0.1mH			E _{AS}	101	mJ

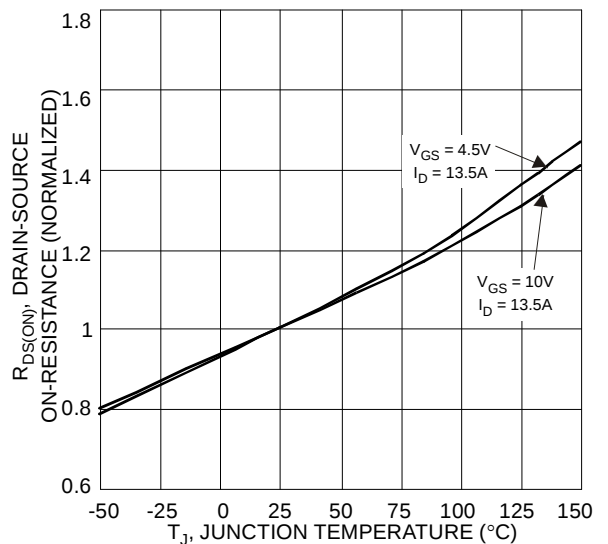
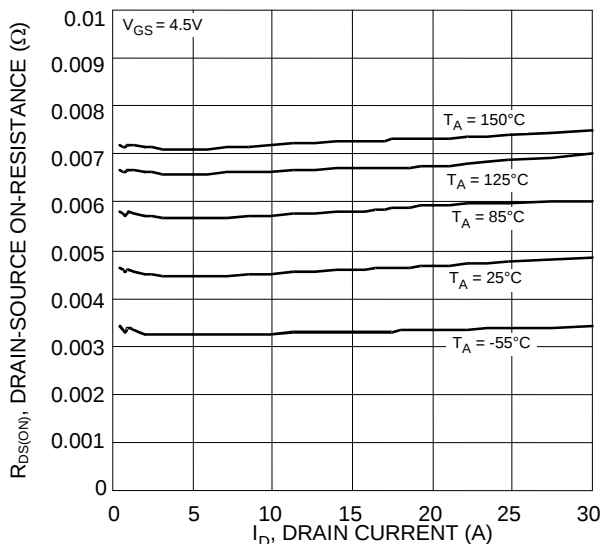
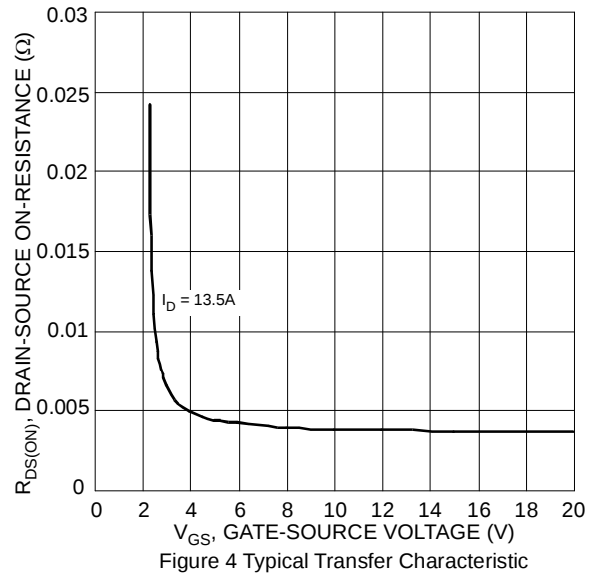
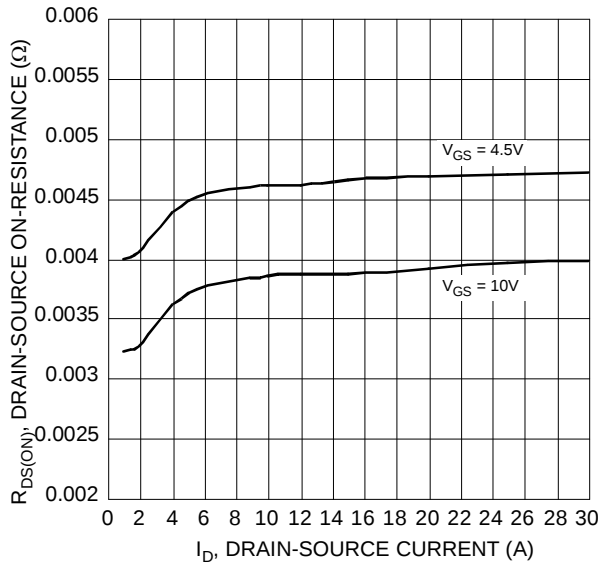
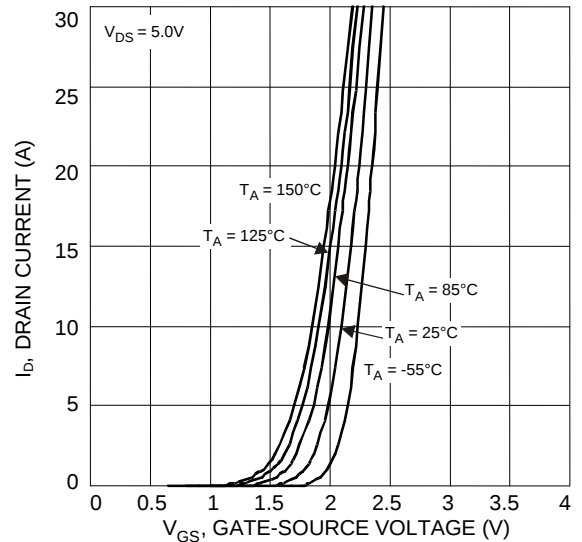
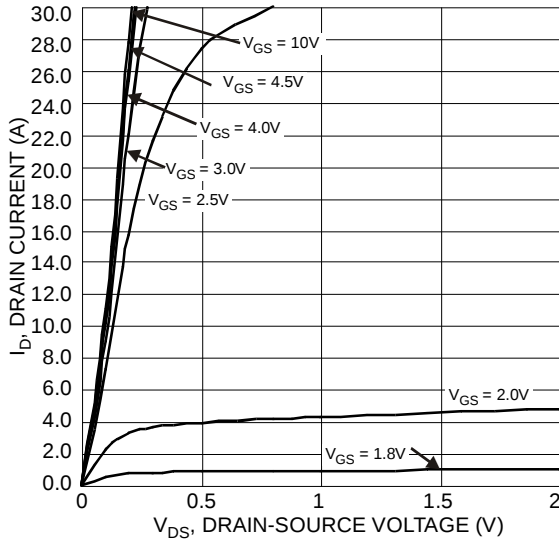
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

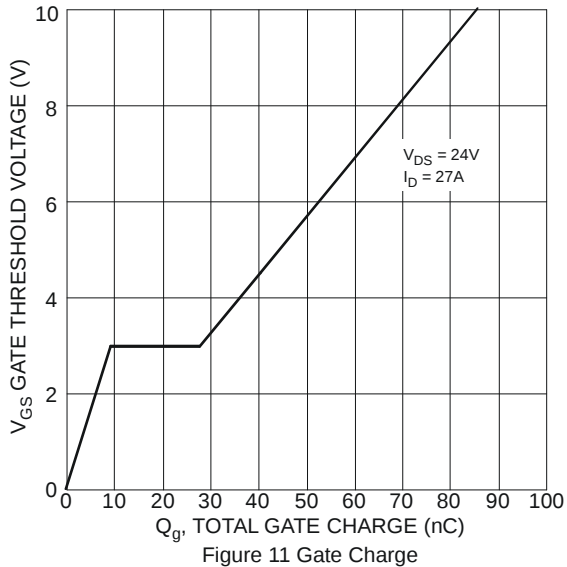
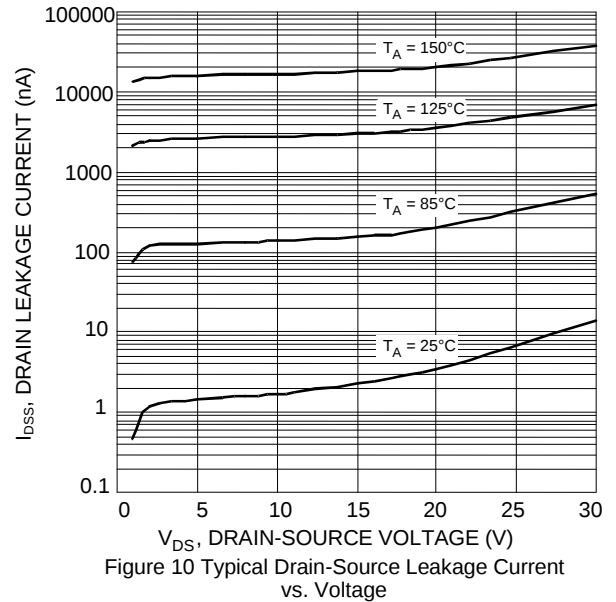
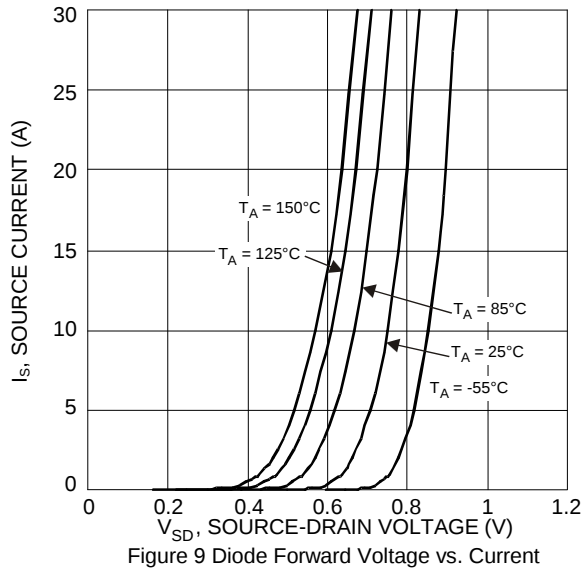
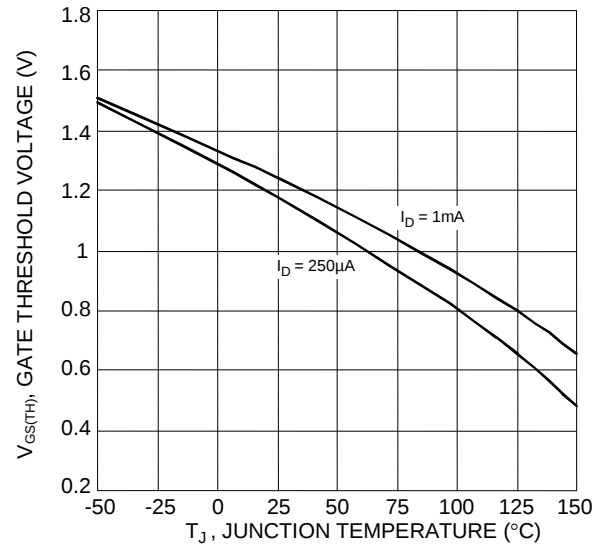
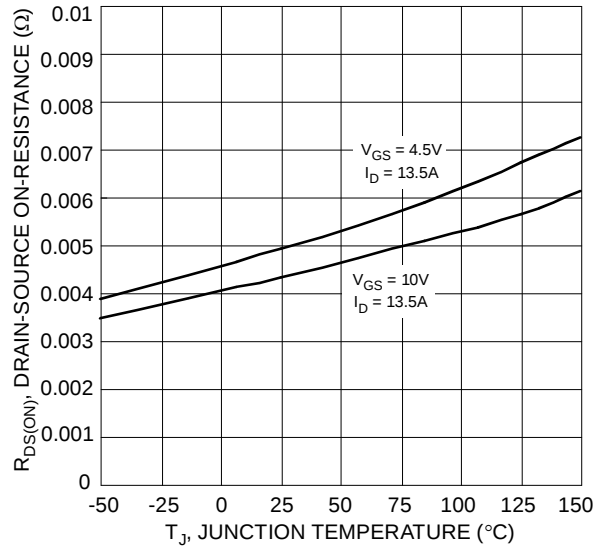
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	0.9	W
	T _A = +70°C		0.6	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	134	°C/W
	t < 10s		79	°C/W
Total Power Dissipation (Note 7)	T _A = +25°C	P _D	2.1	W
	T _A = +70°C		1.3	
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	58	°C/W
	t < 10s		34	°C/W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	4.8	°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 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	10	µA	V _{DS} = 30V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1	—	2.3	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.9	4.4	mΩ	V _{GS} = 10V, I _D = 13.5A
		—	4.6	5.5		V _{GS} = 4.5V, I _D = 13.5A
Diode Forward Voltage	V _{SD}	—	0.75	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	3,690	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	530	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	459	—	pF	
Gate Resistance	R _g	—	0.9	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	41	—	nC	V _{DS} = 24V, I _D = 27A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	86	—	nC	
Gate-Source Charge	Q _{gs}	—	9.2	—	nC	
Gate-Drain Charge	Q _{gd}	—	18.6	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	5.7	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 1.11Ω, R _G = 4.7Ω, I _D = 13.5A
Turn-On Rise Time	t _R	—	14.0	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	63.7	—	ns	
Turn-Off Fall Time	t _F	—	28.4	—	ns	
Reverse Recovery Time	t _{RR}	—	19.3	—	ns	I _F = 13.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	10.7	—	nC	

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 7. Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.





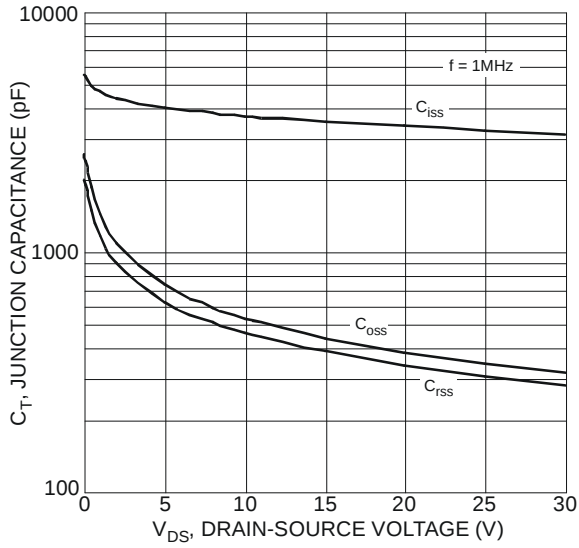


Figure 12 Typical Junction Capacitance

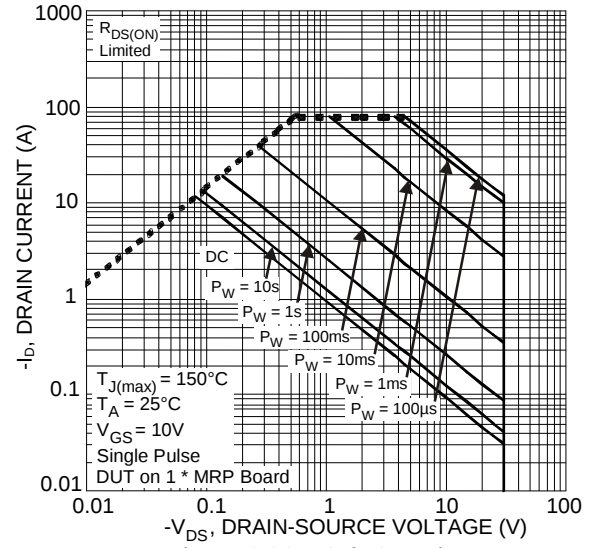


Figure 13 SOA, Safe Operation Area

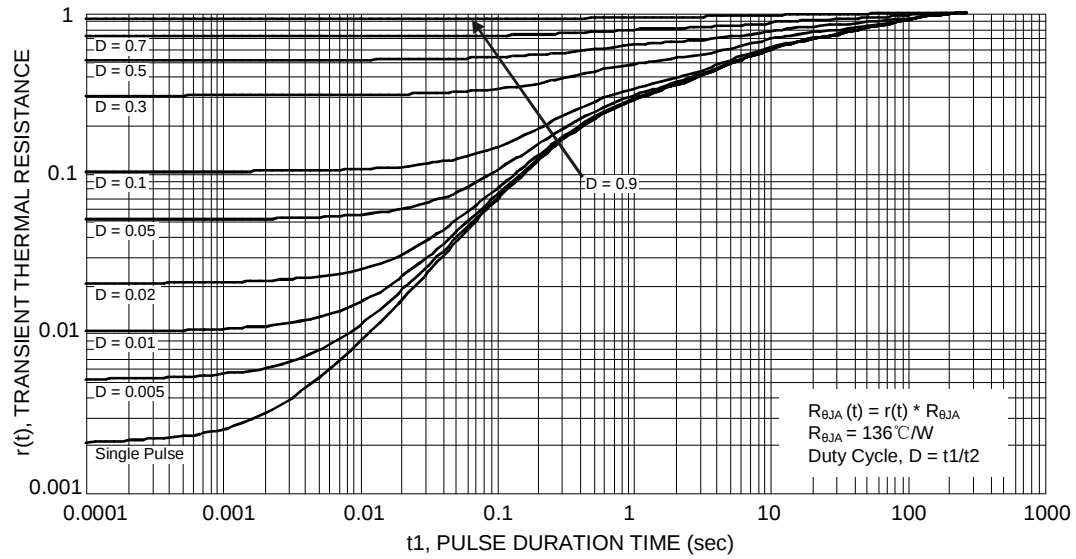
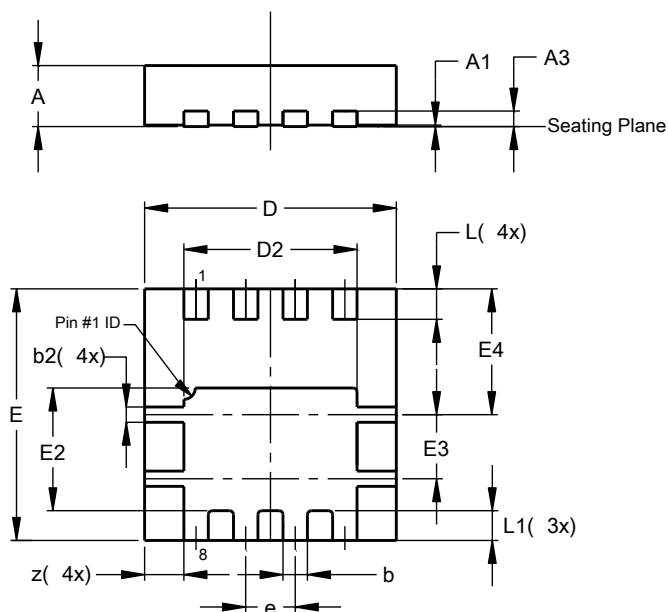


Figure 14 Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

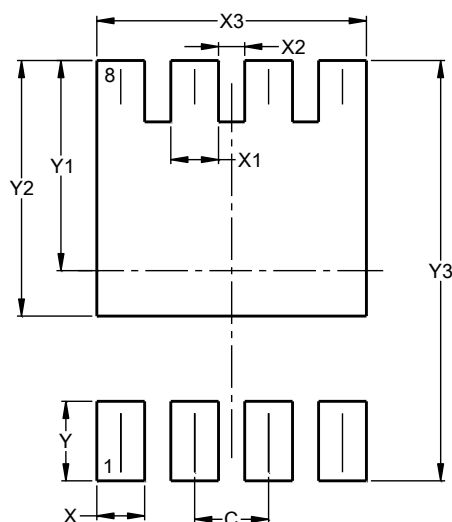


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout

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

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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