

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

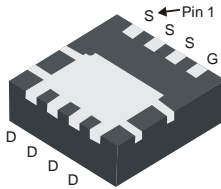
Features and Benefits

- 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)**

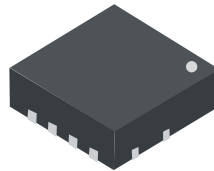
Mechanical Data

- 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)

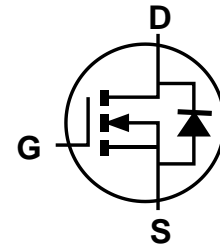
PowerDI3333-8



Bottom View



Top View



Equivalent Circuit

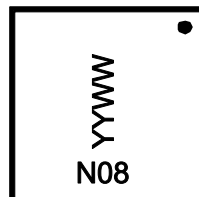
Ordering Information (Note 5)

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.

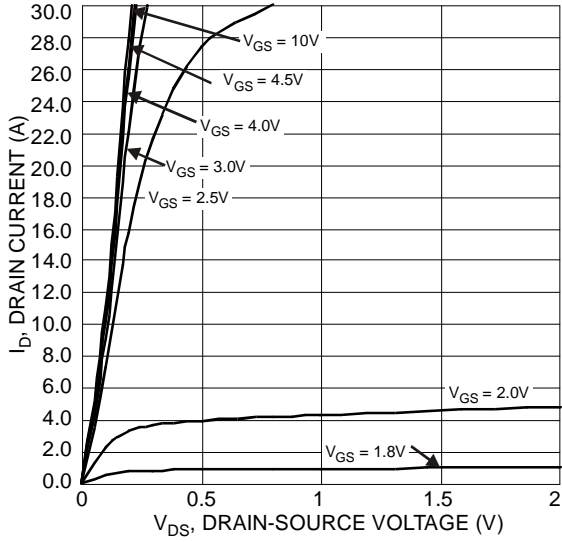


Figure 1 Typical Output Characteristic

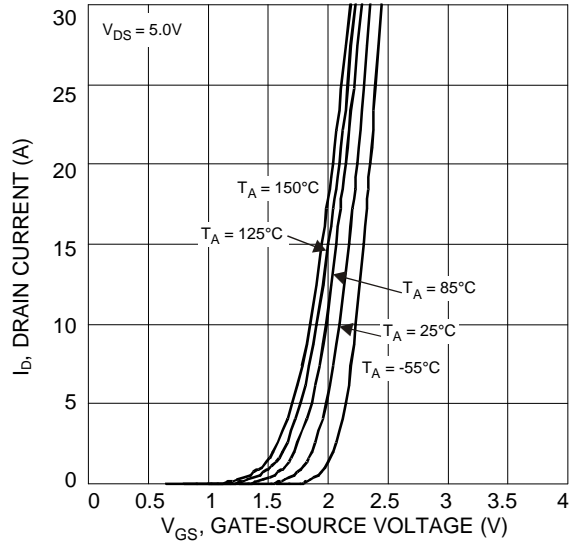


Figure 2 Typical Transfer Characteristics

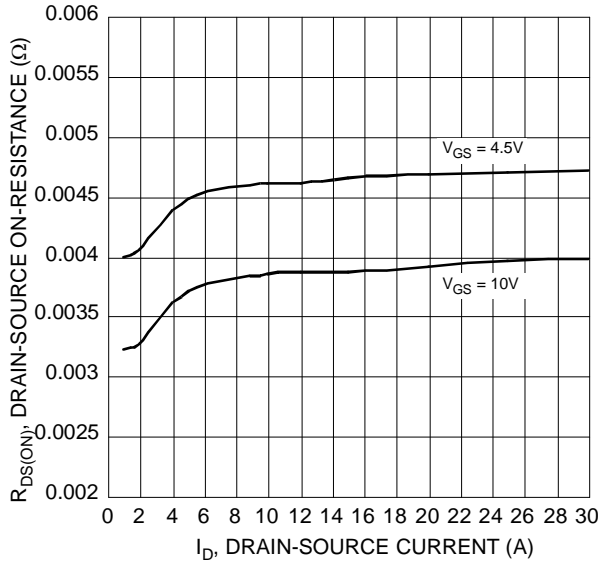


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

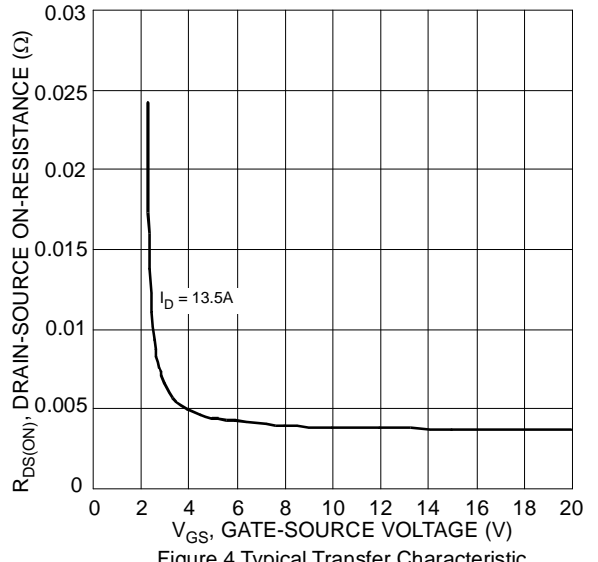


Figure 4 Typical Transfer Characteristic

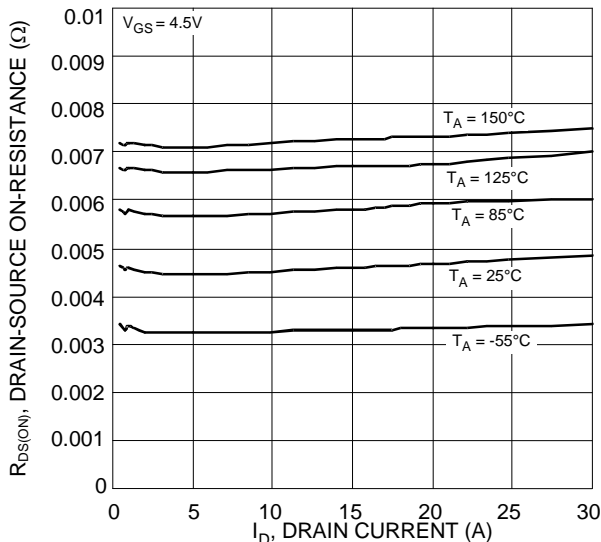


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

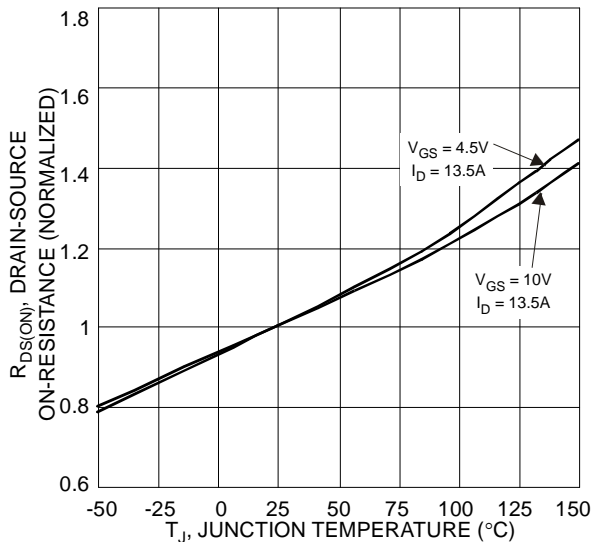
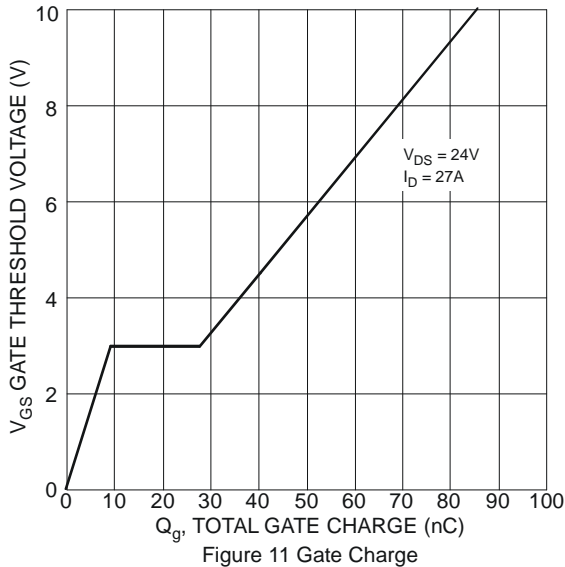
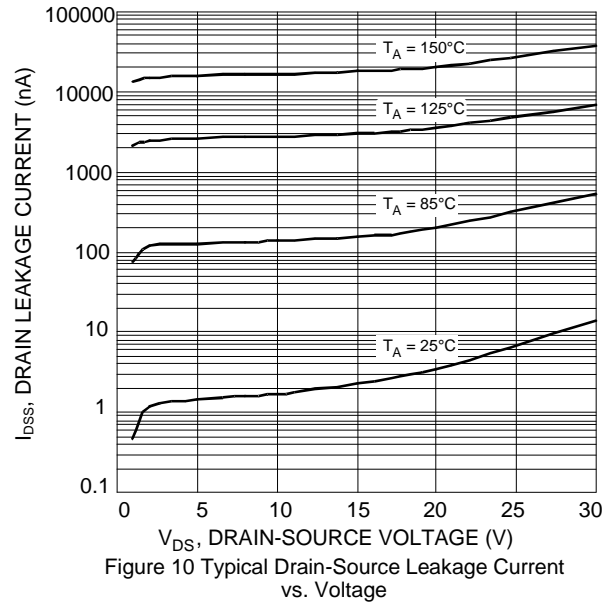
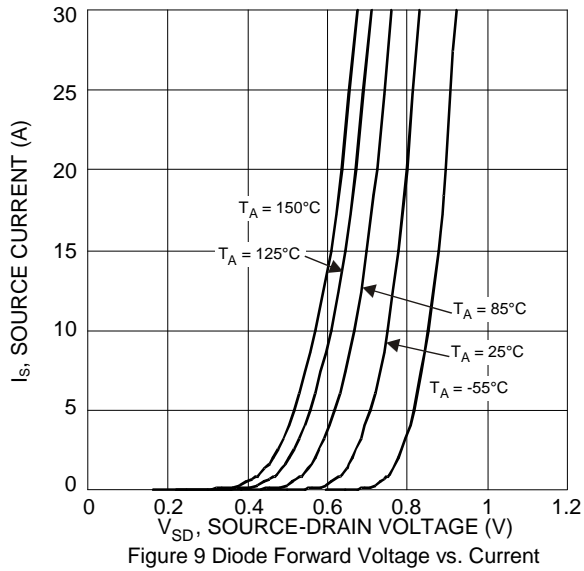
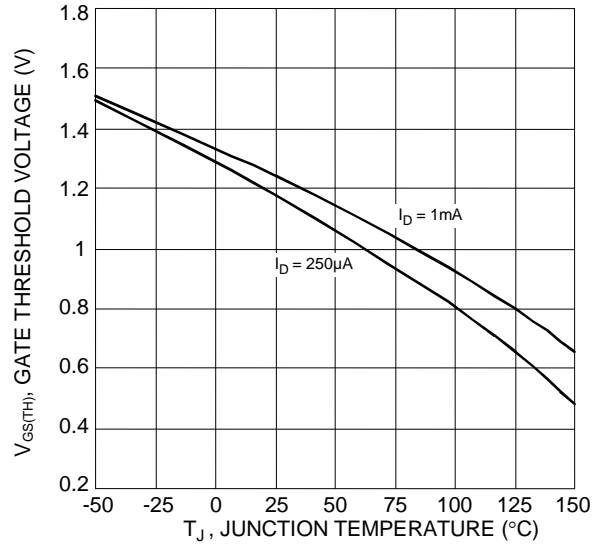
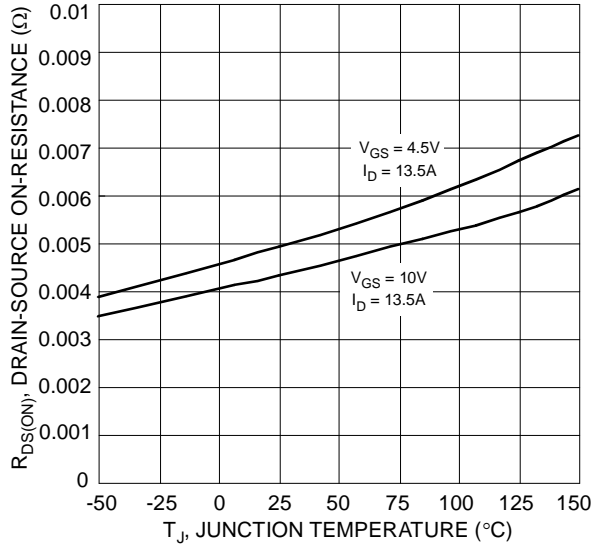


Figure 6 On-Resistance Variation with Temperature



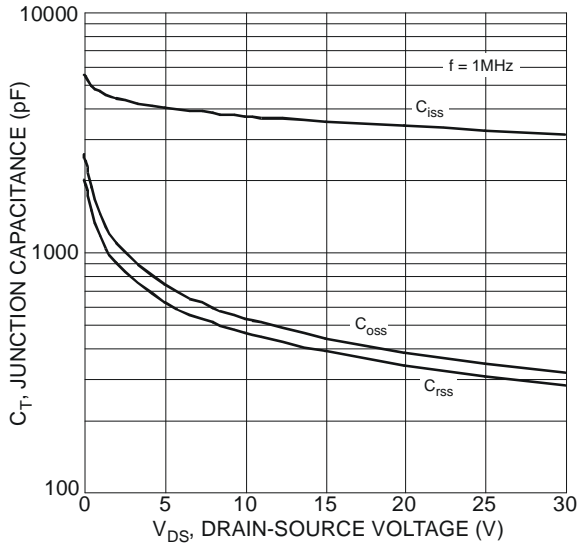


Figure 12 Typical Junction Capacitance

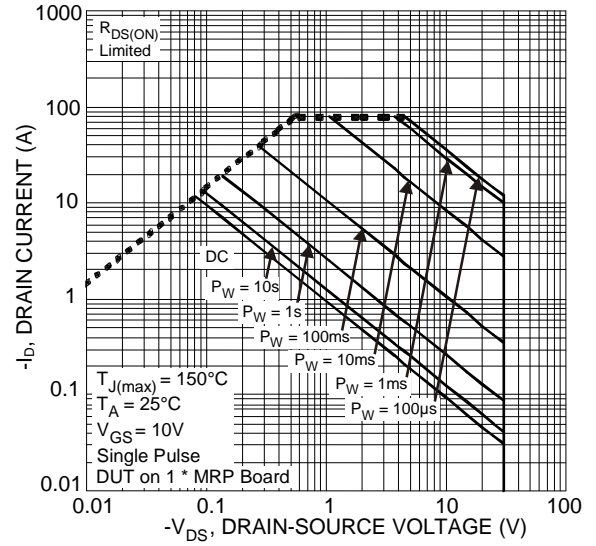


Figure 13 SOA, Safe Operation Area

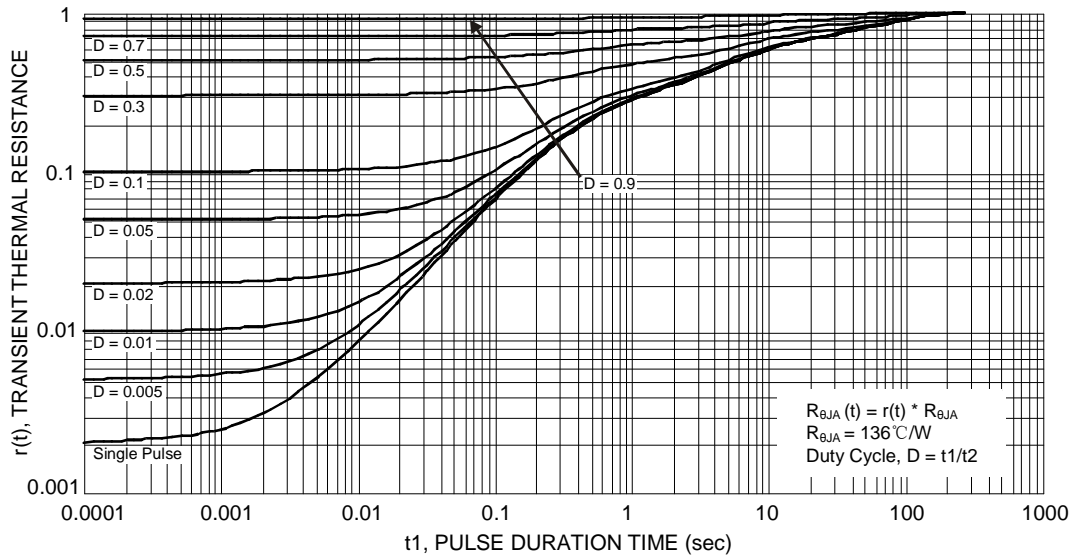


Figure 14 Transient Thermal Resistance

$$R_{\theta JA}(t) = r(t) * R_{\theta JA}$$

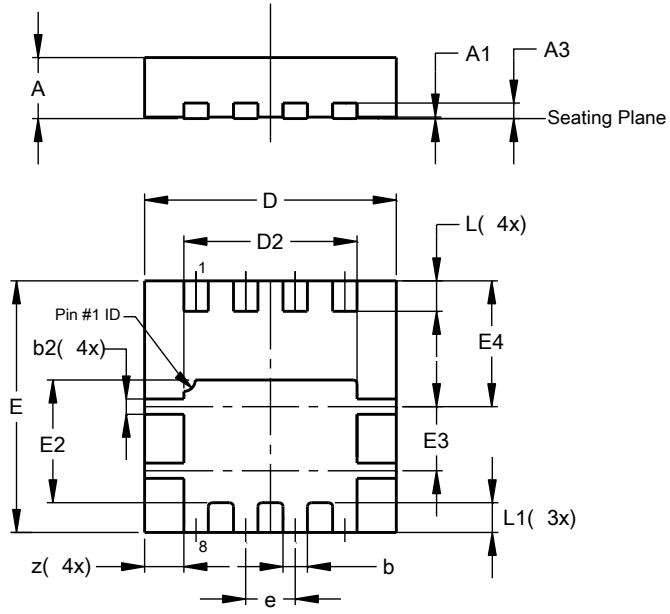
$$R_{\theta JA} = 136^{\circ}\text{C/W}$$

$$\text{Duty Cycle, } D = t1/t2$$

Package Outline Dimensions

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

PowerDI3333-8

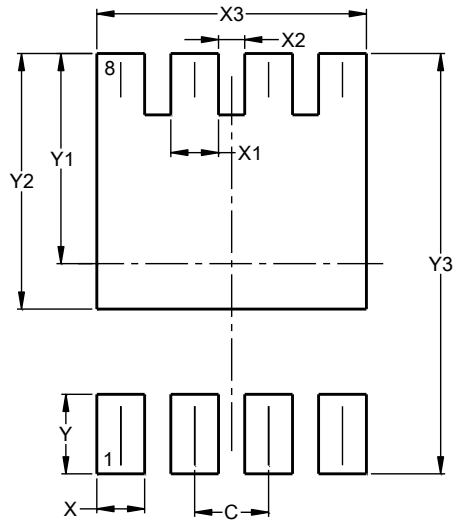


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

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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