

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
24V	5.0mΩ @ V _{GS} = 10V	70A
	6.5mΩ @ V _{GS} = 4.5V	60A
	10.0mΩ @ V _{GS} = 2.5V	45A

Description and Applications

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

- Backlighting
- Power Management Functions
- DC-DC Converters

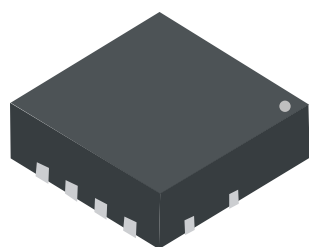
Features and Benefits

- Low R_{DS(ON)} – ensures on state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- 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)**

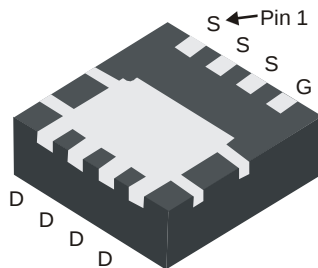
Mechanical Data

- 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
- Terminal Finish - Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.072 grams (Approximate)

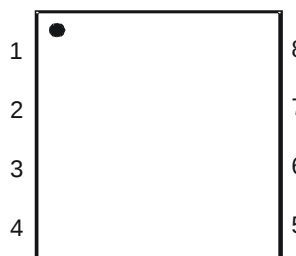
PowerDI3333-8



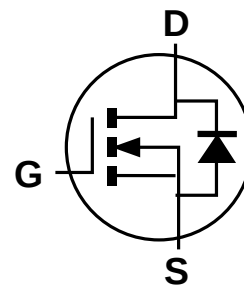
Top View



Bottom View



Top View
Internal Schematic



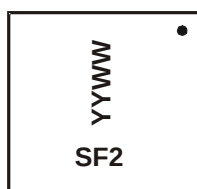
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT2004UFG-7	PowerDI3333-8	2,000/Tape & Reel
DMT2004UFG-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. For packaging details, go to our website at <http://www.diodes.com/products/packages.html>.

Marking Information



SF2 = 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	Unit
Drain-Source Voltage			V _{DSS}	24	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 7) V _{GS} = 10V	Steady State	T _C = +25°C T _C = +70°C	I _D	70 55	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	90	A
Continuous Source-Drain Diode Current (Note 6)			I _S	2.5	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	26	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	36	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	106	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.3	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	54	°C/W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	3.5	°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 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	24	—	—	V	V _{GS} = 0V, I _D = 250µA
Zero Gate Voltage Drain Current (T _J = +25°C)	I _{DSS}	—	—	1	µA	V _{DS} = 20V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	0.55	—	1.45	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	3.7	5.0	mΩ	V _{GS} = 10V, I _D = 12A
		—	4.5	6.5		V _{GS} = 4.5V, I _D = 12A
		—	7.5	10.0		V _{GS} = 2.5V, I _D = 12A
Diode Forward Voltage	V _{SD}	—	0.65	1.0	V	V _{GS} = 0V, I _S = 2A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	1683	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	581	—		
Reverse Transfer Capacitance	C _{rss}	—	559	—		
Gate Resistance	R _G	—	1.6	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	29.6	—	nC	V _{DD} = 15V, I _D = 9A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	53.7	—		
Gate-Source Charge	Q _{gs}	—	4.2	—		
Gate-Drain Charge	Q _{gd}	—	13.4	—		
Turn-On Delay Time	t _{D(ON)}	—	3.9	—	ns	V _{DD} = 15V, V _{GS} = 10V, R _G = 3Ω, I _D = 9A
Turn-On Rise Time	t _R	—	9.6	—		
Turn-Off Delay Time	t _{D(OFF)}	—	30.8	—		
Turn-Off Fall Time	t _F	—	38.6	—		
Reverse Recovery Time	t _{RR}	—	11.2	—	ns	I _F = 1.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	22.9	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - I_{AS} and E_{AS} rating 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.

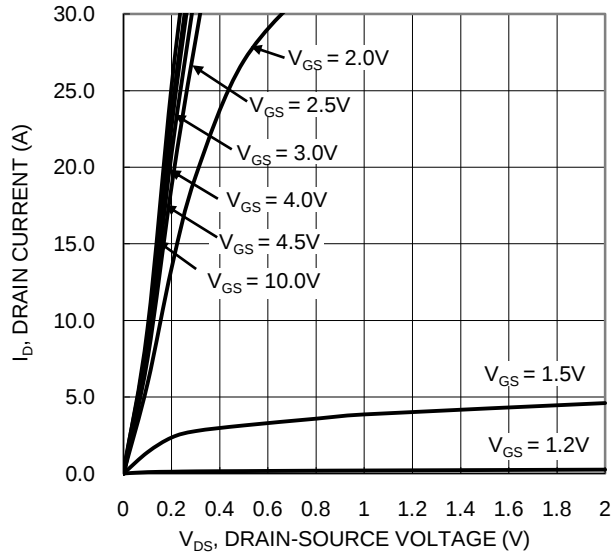


Figure 1. Typical Output Characteristic

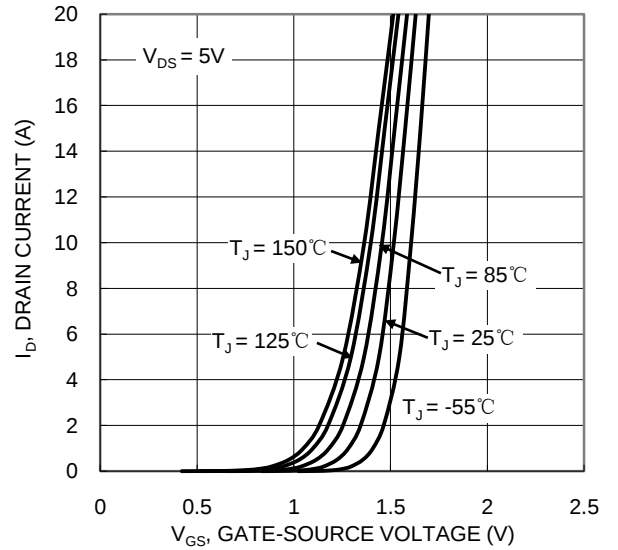


Figure 2. Typical Transfer Characteristic

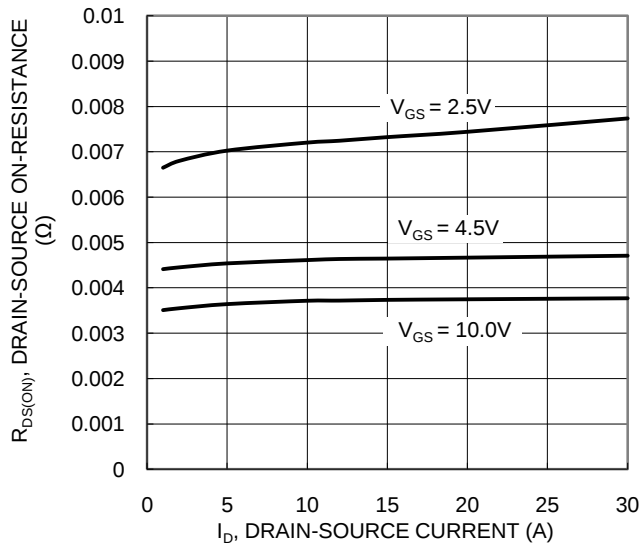


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

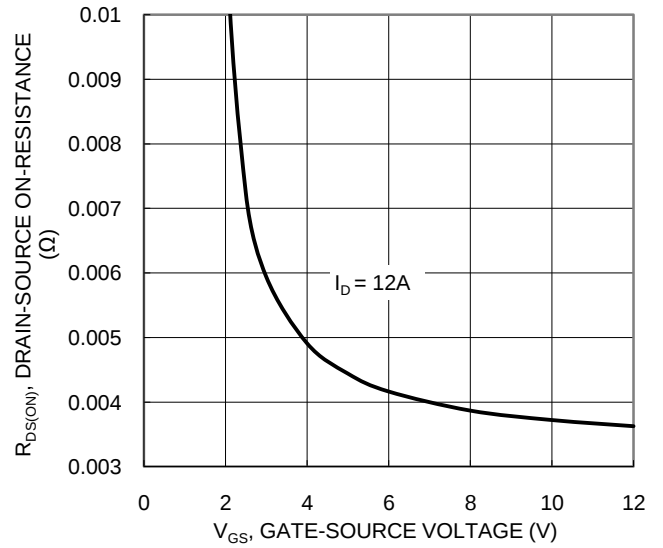


Figure 4. Typical Transfer Characteristic

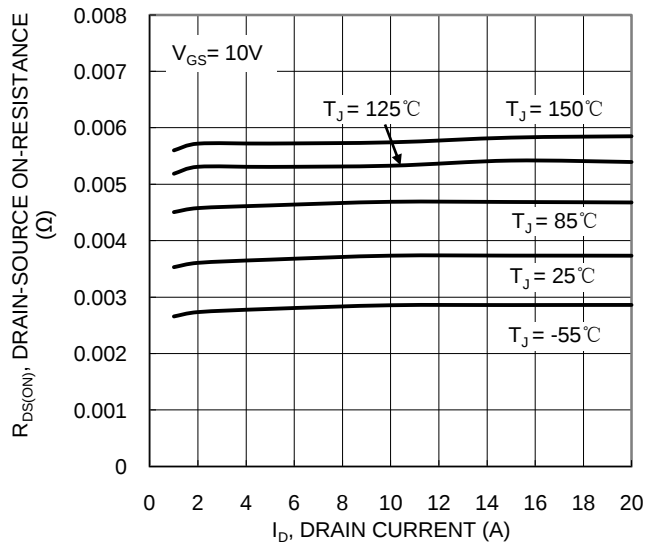


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

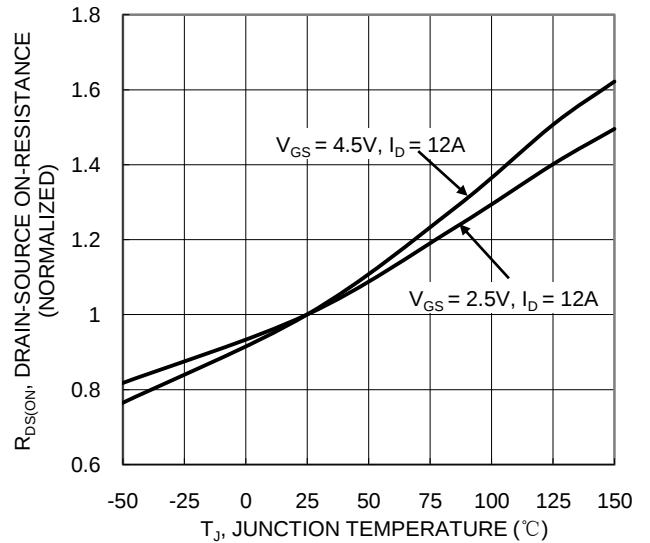
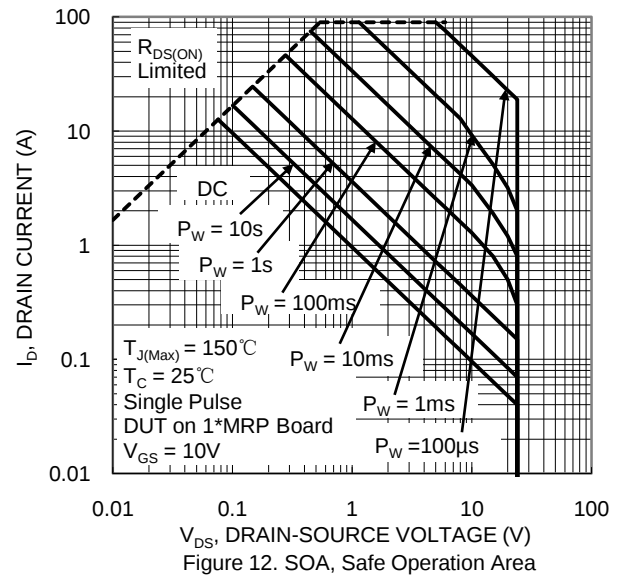
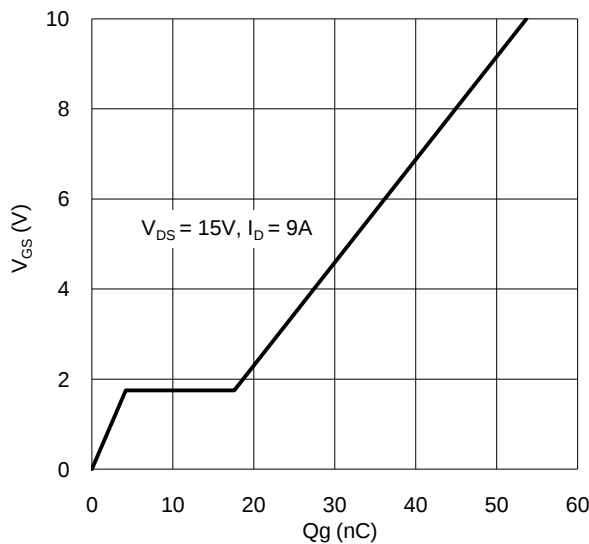
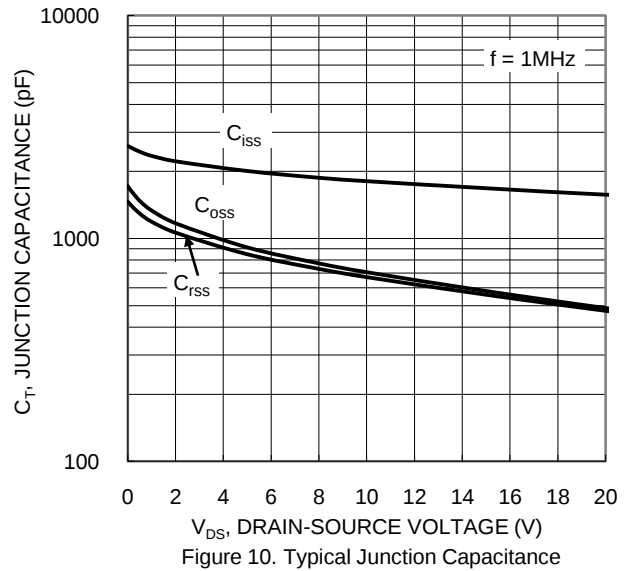
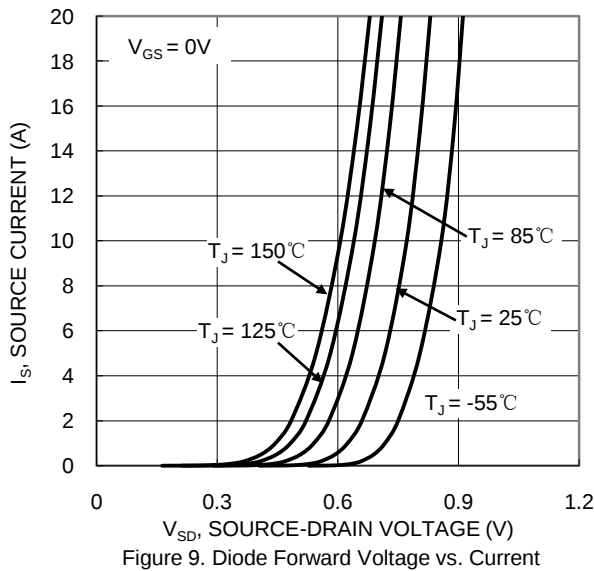
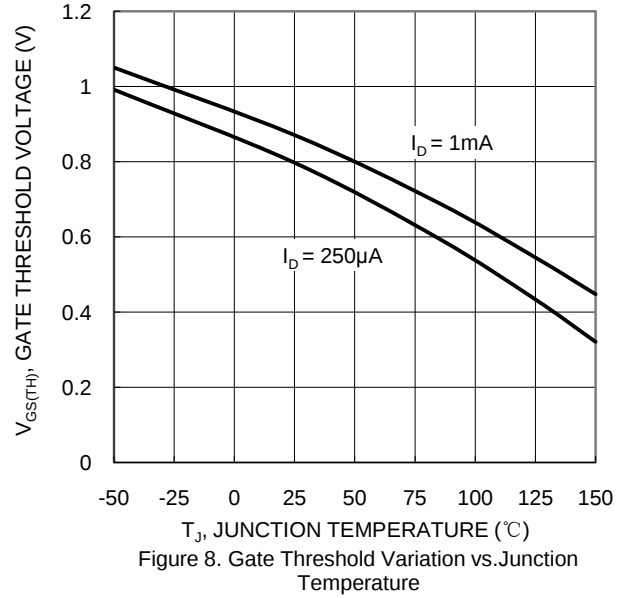
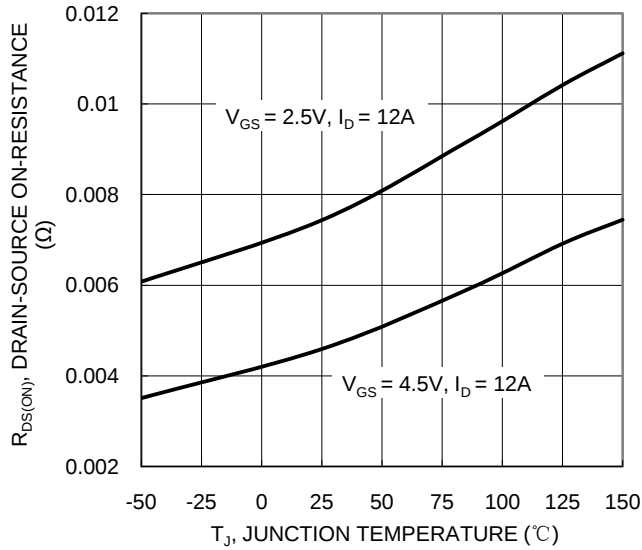
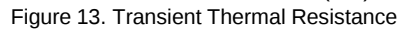


Figure 6. On-Resistance Variation with Temperature

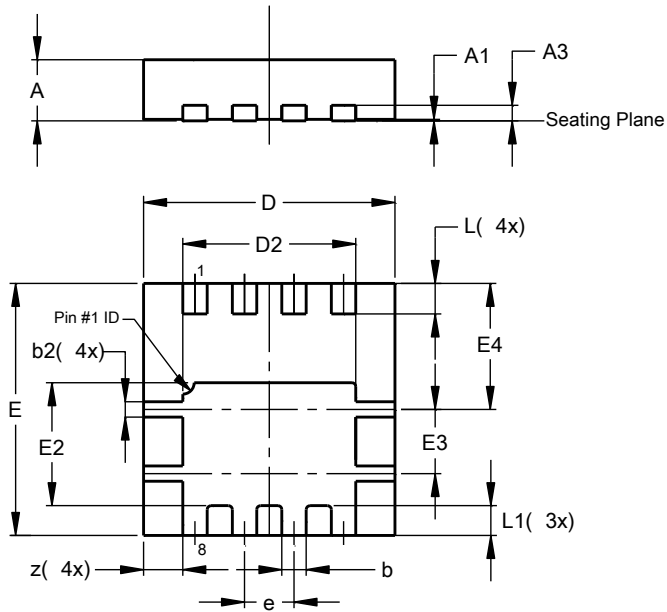




Package Outline Dimensions

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

PowerDI3333-8

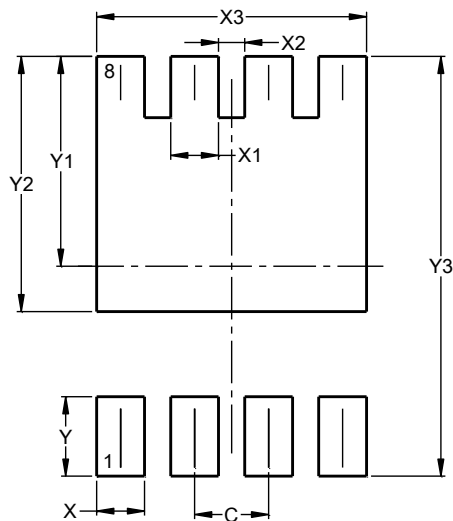


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

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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