60V N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8 (TYPE UX)

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
60V	16mΩ @ V_{GS} = 10V	35A
	22mΩ @ V_{GS} = 4.5V	28A

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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Description and Applications

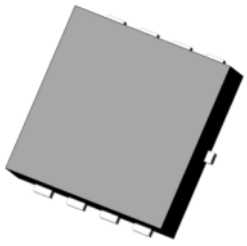
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$), yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Motor Control
- DC-DC Converters
- Power Management

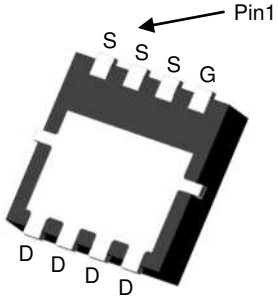
Mechanical Data

- Case: PowerDI®3333-8 (Type UX)
- 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 e3
- Weight: 0.072 grams (Approximate)

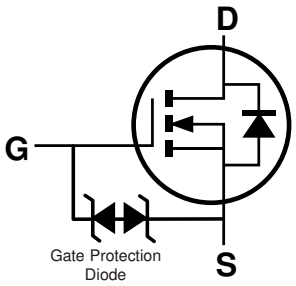
PowerDI3333-8 (Type UX)



Top View



Bottom View



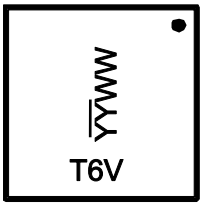
Internal Schematic

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6015LFV-7	PowerDI3333-8 (Type UX)	2,000/Tape & Reel
DMT6015LFV-13	PowerDI3333-8 (Type UX)	3,000/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 http://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



T6V= Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 = 2018)
WW = Week Code (01 to 53)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	±16	V
Continuous Drain Current (Note 5) V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	9.5 7.6	A
	T_C = +25°C T_C = +100°C	I_D	35 22	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	60	A
Maximum Continuous Body Diode Forward Current (Note 5)		I_S	2	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)		I_{SM}	60	A
Avalanche Current, L = 0.1mH		I_{AS}	17	A
Avalanche Energy, L = 0.1mH		E_{AS}	14.5	mJ
V_{DS} Spike	t = 10µs	V_{SPIKE}	75	V

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T_A = +25°C	P_D	2.2	W
	T_C = +25°C		30	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	57	°C/W
	t<10s		35	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	4.2	
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 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 48V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±10	µA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.5	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	11.7	16	mΩ	V_{GS} = 10V, I_D = 10A
		—	15.7	22		V_{GS} = 4.5V, I_D = 6A
Diode Forward Voltage	V_{SD}	—	0.7	1.2	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	1103	—	pF	V_{DS} = 30V, V_{GS} = 0V, f = 1MHz
Output Capacitance	C_{oss}	—	251	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	20	—	pF	
Gate Resistance	R_g	—	1.5	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	8.9	—	nC	V_{DS} = 30V, I_D = 10A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	18.9	—	nC	
Gate-Source Charge	Q_{gs}	—	3	—	nC	
Gate-Drain Charge	Q_{gd}	—	2.8	—	nC	
Turn-On Delay Time	$t_{D(ON)}$	—	4.1	—	ns	V_{GS} = 10V, V_{DS} = 30V, R_g = 6Ω, I_D = 10A
Turn-On Rise Time	t_R	—	7.1	—	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	—	19.5	—	ns	
Turn-Off Fall Time	t_F	—	8.6	—	ns	
Body Diode Reverse Recovery Time	t_{RR}	—	21.2	—	ns	I_F = 10A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	13.2	—	nC	

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

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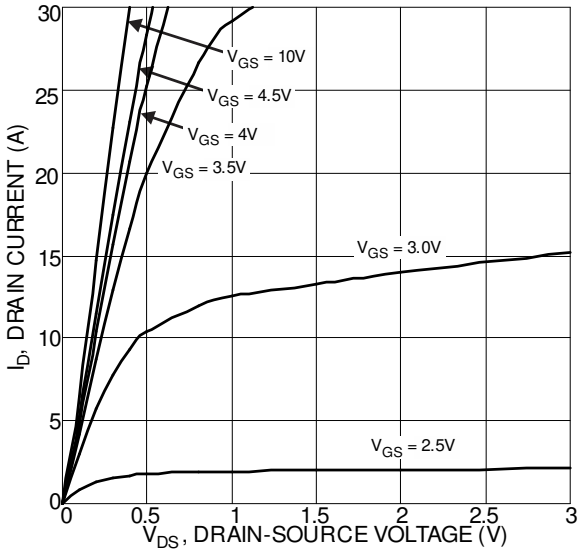

Figure 1 Typical Output Characteristic

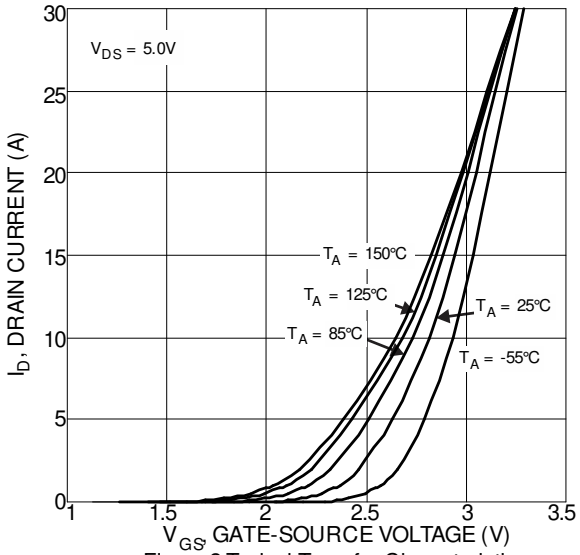

Figure 2 Typical Transfer Characteristics

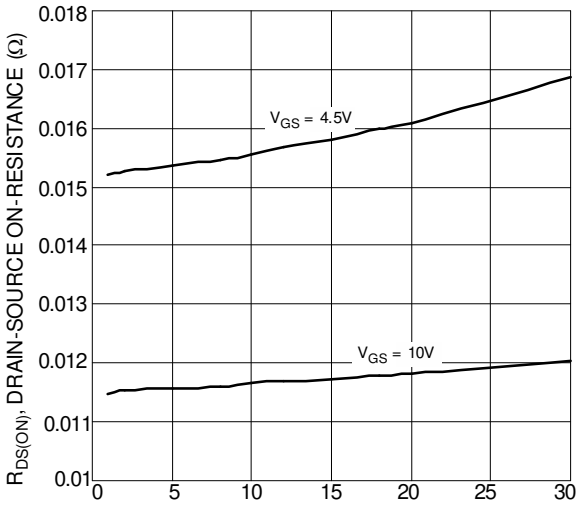

Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

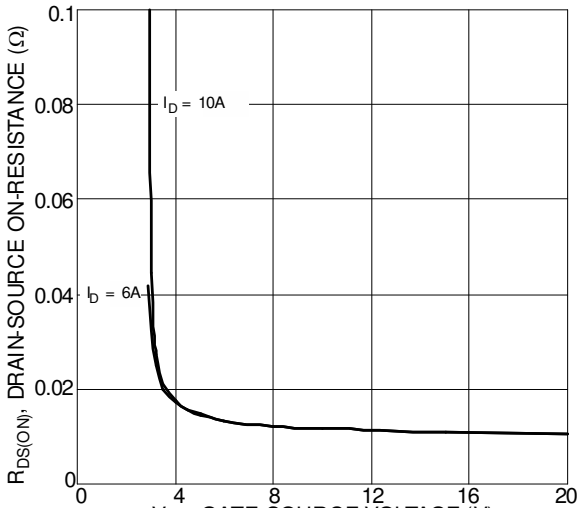

Figure 4 Typical Drain-Source On-Resistance vs. Gate-Source Voltage

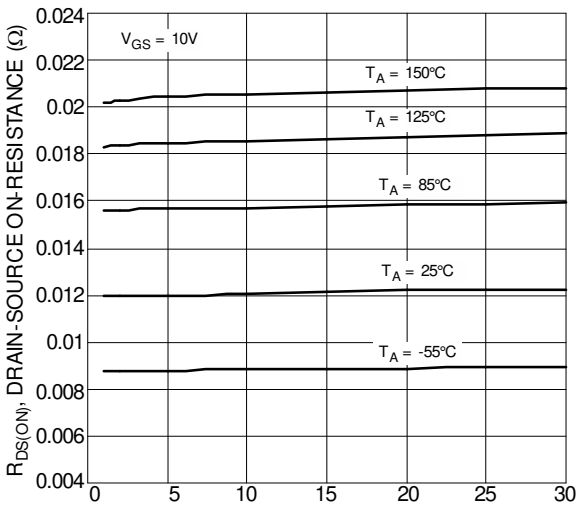

Figure 5 Typical On-Resistance vs. Drain Current and Temperature

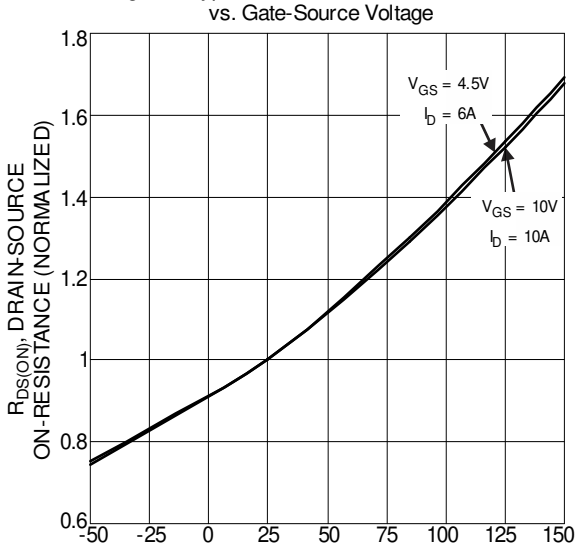

Figure 6 On-Resistance Variation with Temperature

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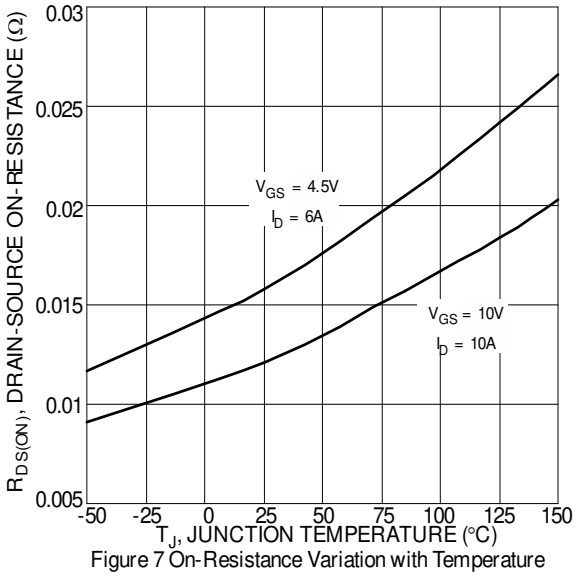

Figure 7 On-Resistance Variation with Temperature

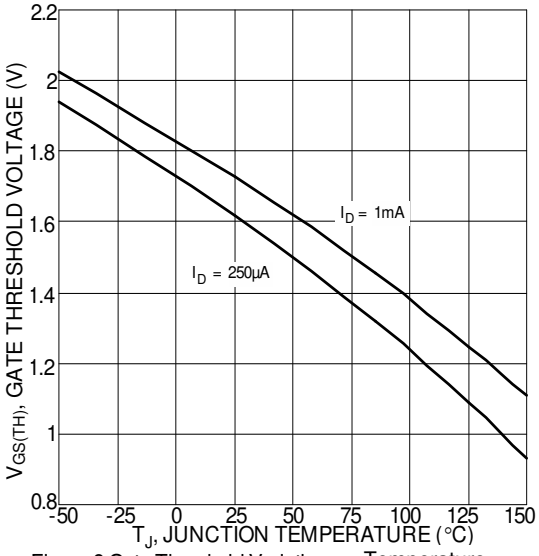

Figure 8 Gate Threshold Variation vs. Temperature

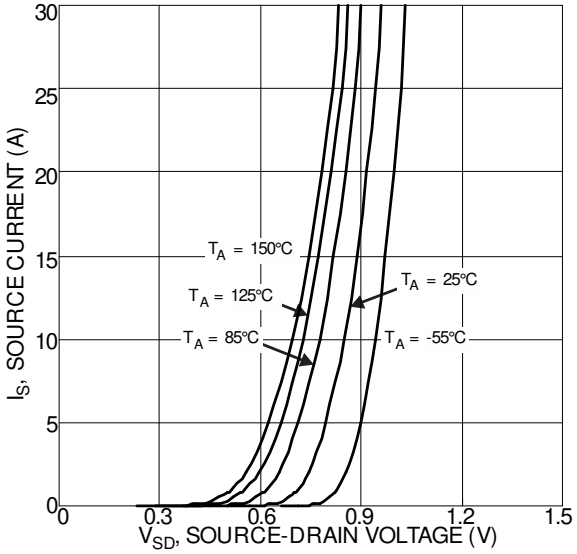

Figure 9 Diode Forward Voltage vs. Current

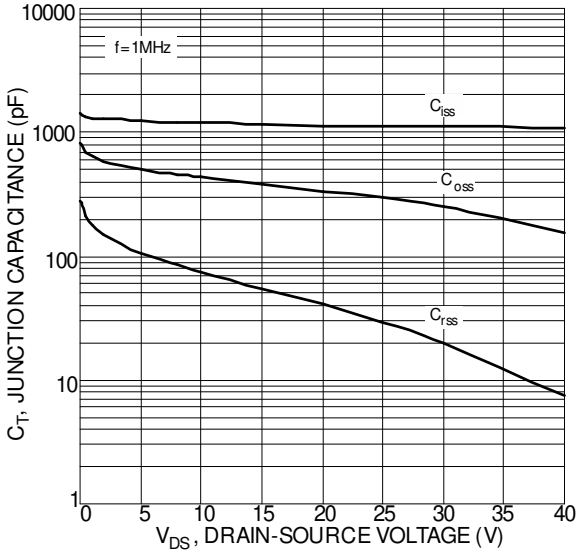

Figure 10 Typical Junction Capacitance

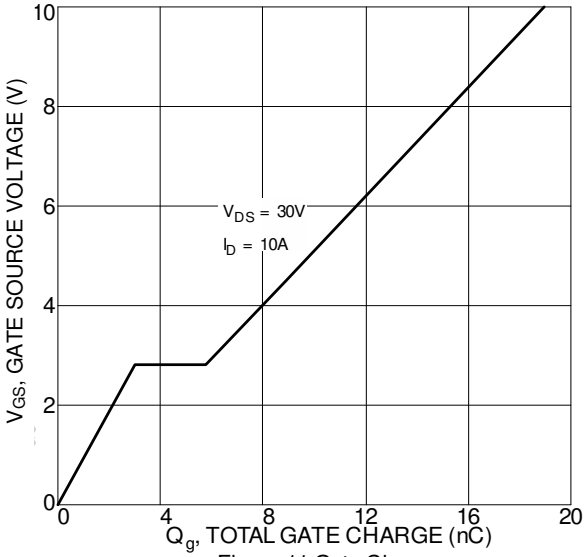

Figure 11 Gate Charge

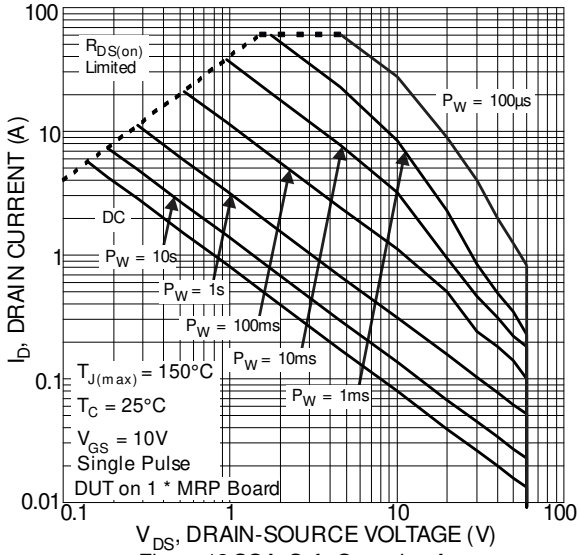

Figure 12 SOA, Safe Operation Area

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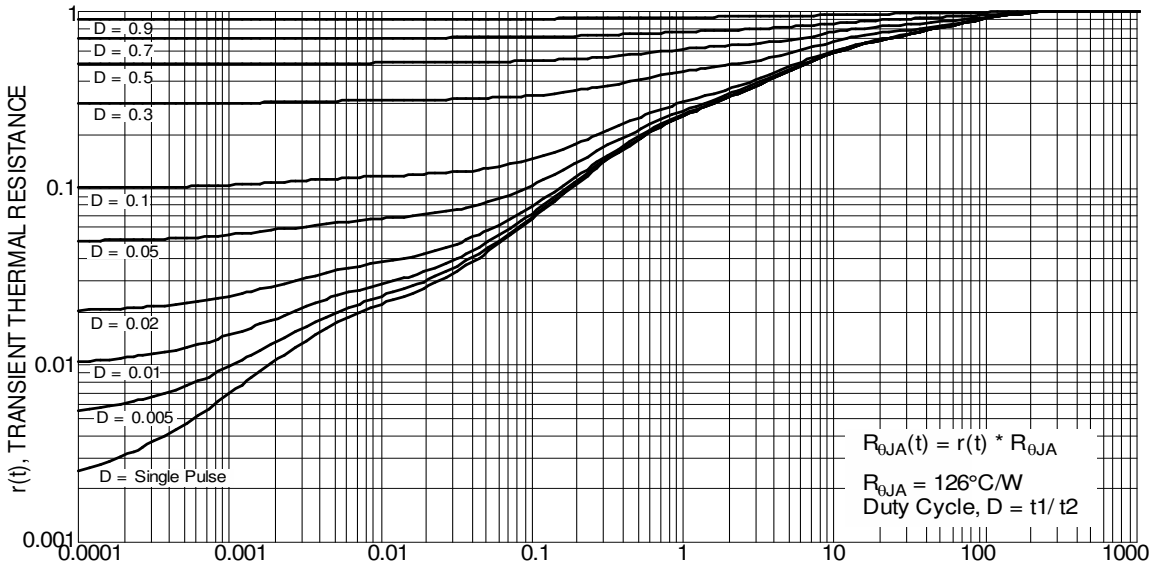

Figure 13 Transient Thermal Resistance

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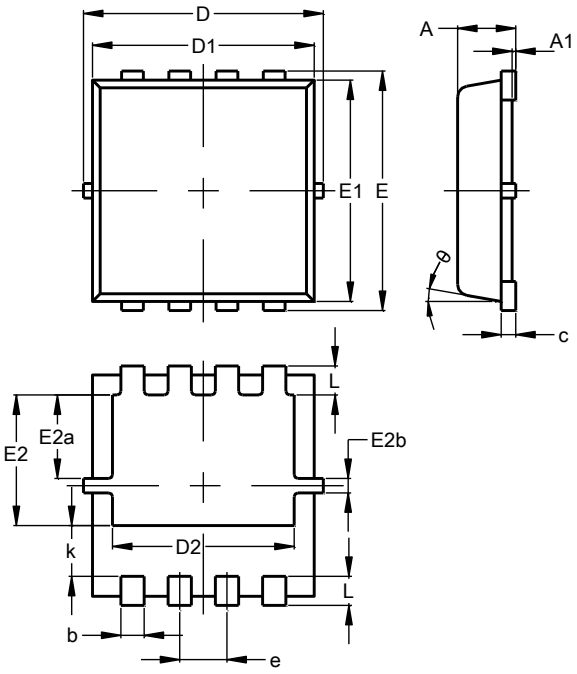
Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

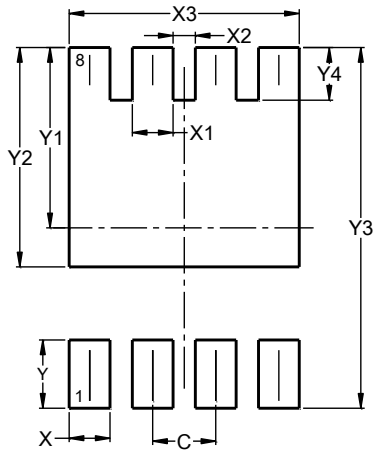


PowerDI3333-8 (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI3333-8 (Type UX)



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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