

DUAL 24V N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8 (Type UXC)

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D $T_A = +25^\circ\text{C}$
24V	7m Ω @ $V_{GS} = 10\text{V}$	50
	8m Ω @ $V_{GS} = 4.5\text{V}$	47
	10m Ω @ $V_{GS} = 3.7\text{V}$	42
	12m Ω @ $V_{GS} = 2.5\text{V}$	38

Description

This new generation 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.


Applications

- Power Management Functions
- Analog Switch

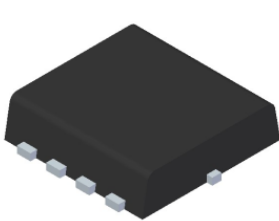
Features

- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

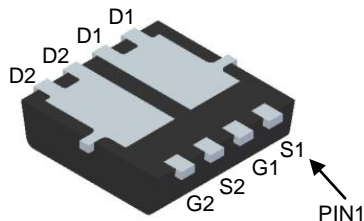
Mechanical Data

- Case: PowerDI[®] 3333-8 (Type UXC)
- 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)

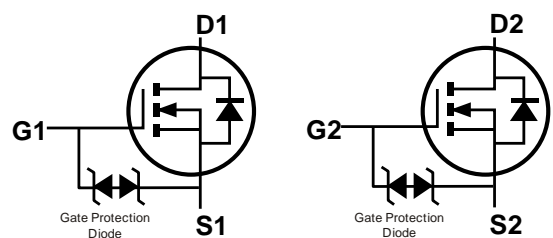
PowerDI3333-8 (Type UXC)



Top View



Bottom View



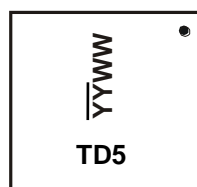
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT2005UDV-7	PowerDI3333-8 (Type UXC)	2,000/Tape & Reel
DMT2005UDV-13	PowerDI3333-8 (Type UXC)	3000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



TD5 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 for 2018)
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	50 40	A
Maximum Body Diode Forward Current (Note 7)			I _S	30	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	70	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)			I _{SM}	70	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	26	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	34	mJ

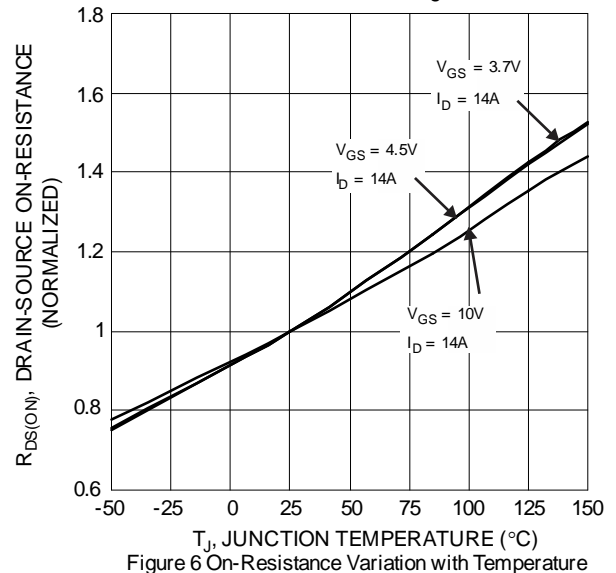
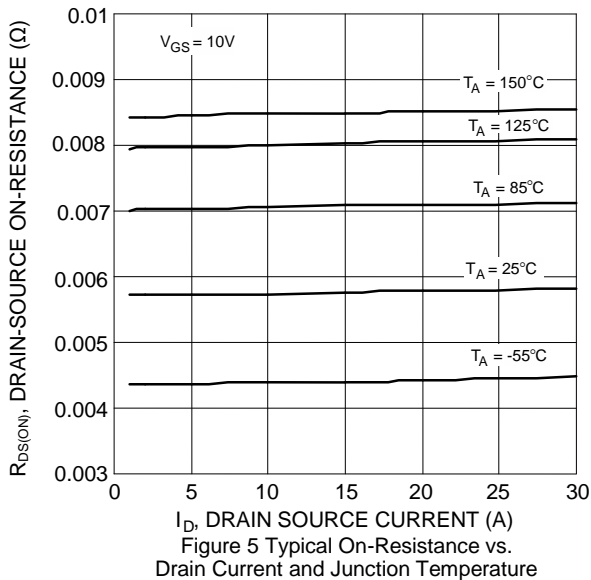
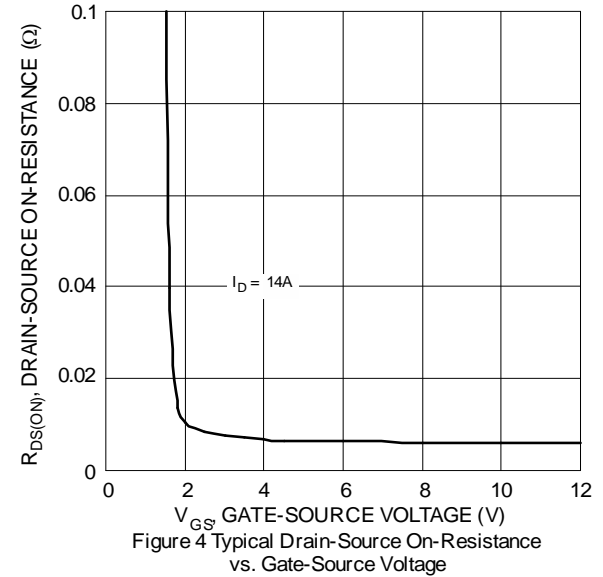
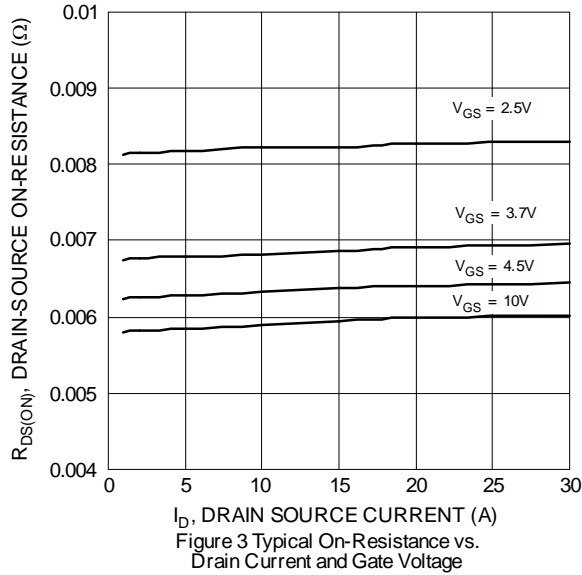
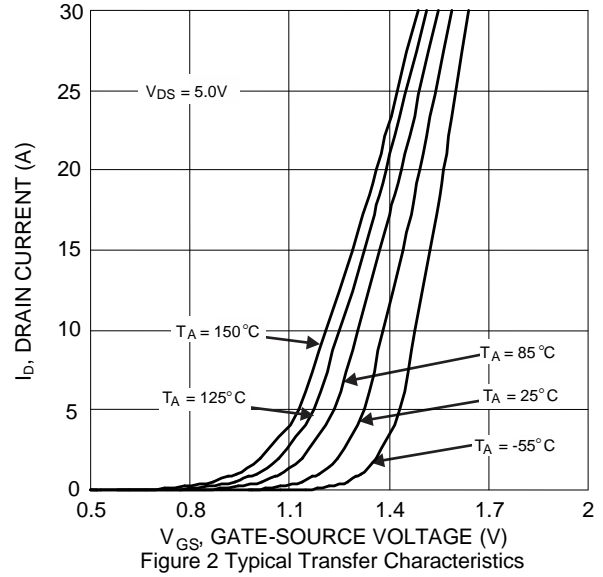
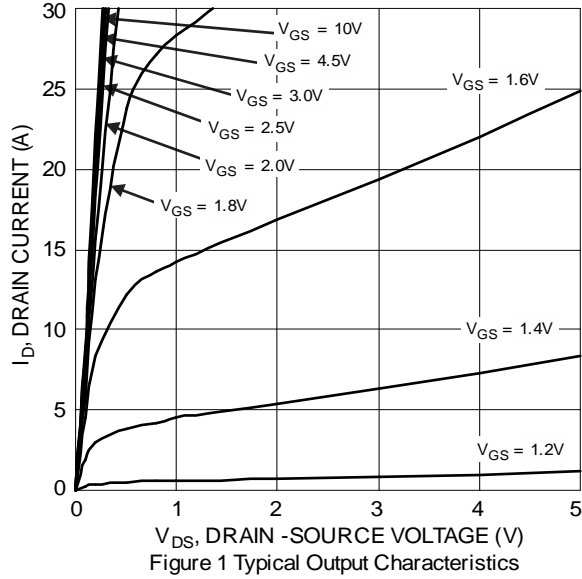
Thermal Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	141	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.9	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	66	°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 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}	—	—	±10	µA	V _{GS} = ±10V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	0.5	—	1.5	V	V _{DS} = V _{GS} , I _D = 250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	5.9	7.0	mΩ	V _{GS} = 10V, I _D = 14A
		—	6.3	8.0		V _{GS} = 4.5V, I _D = 14A
		—	6.7	10.0		V _{GS} = 3.7V, I _D = 14A
		—	8.9	12.0		V _{GS} = 2.5V, I _D = 13A
Diode Forward Voltage	V _{SD}	—	0.7	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	2,060	—	pF	V _{DS} = 10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	547	—		
Reverse Transfer Capacitance	C _{rss}	—	517	—		
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	—	24.8	—	nC	V _{DD} = 10V, I _D = 5A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	46.7	—		
Gate-Source Charge	Q _{gs}	—	3	—		
Gate-Drain Charge	Q _{gd}	—	9.6	—		
Turn-On Delay Time	t _{D(ON)}	—	3.7	—	ns	V _{DD} = 10V, V _{GS} = 10V, R _G = 3Ω, I _D = 5A
Turn-On Rise Time	t _r	—	7.2	—		
Turn-Off Delay Time	t _{D(OFF)}	—	37.5	—		
Turn-Off Fall Time	t _f	—	23.3	—		
Reverse Recovery Time	t _{RR}	—	19.9	—	ns	I _F = 5A, di/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	9.0	—	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} ratings 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.



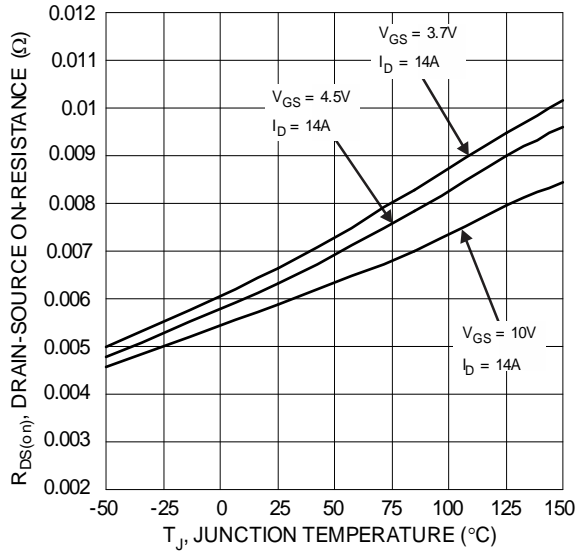


Figure 7 On-Resistance Variation with Junction Temperature

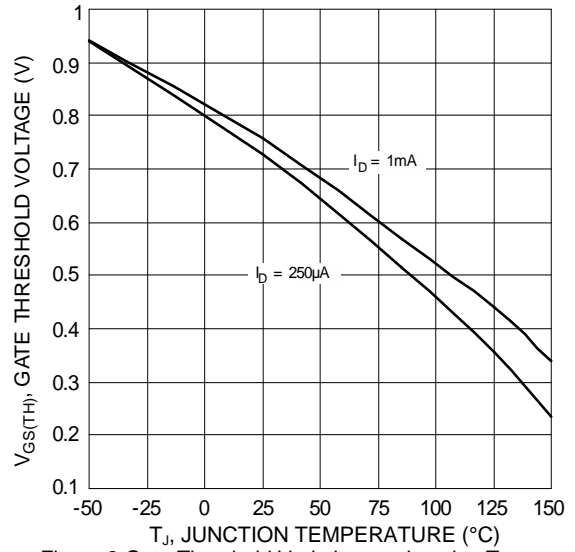


Figure 8 Gate Threshold Variation vs. Junction Temperature

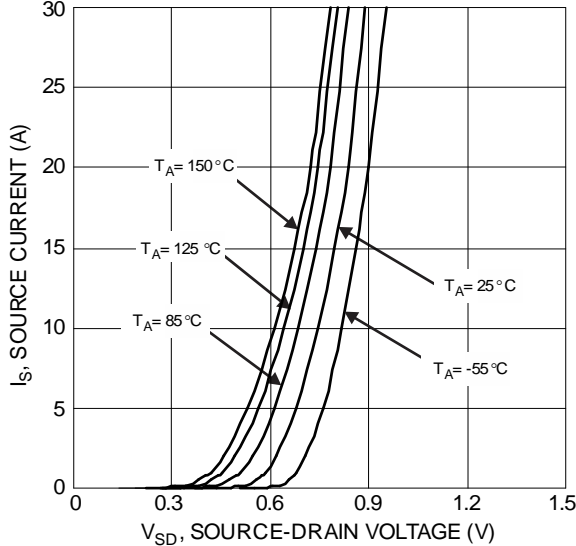


Figure 9 Diode Forward Voltage vs. Current

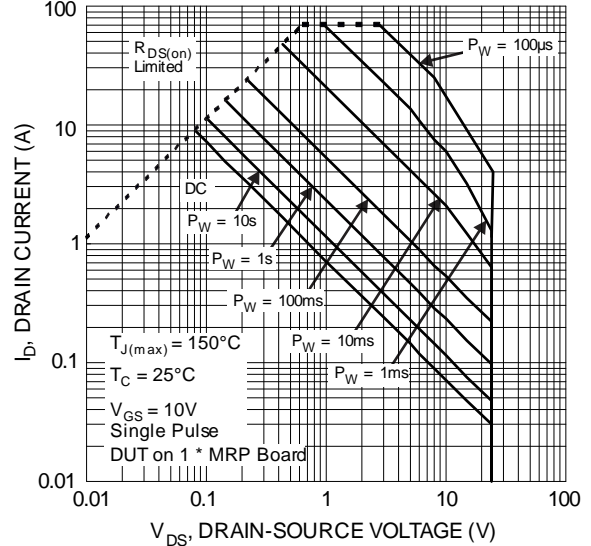


Figure 10 SOA, Safe Operation Area

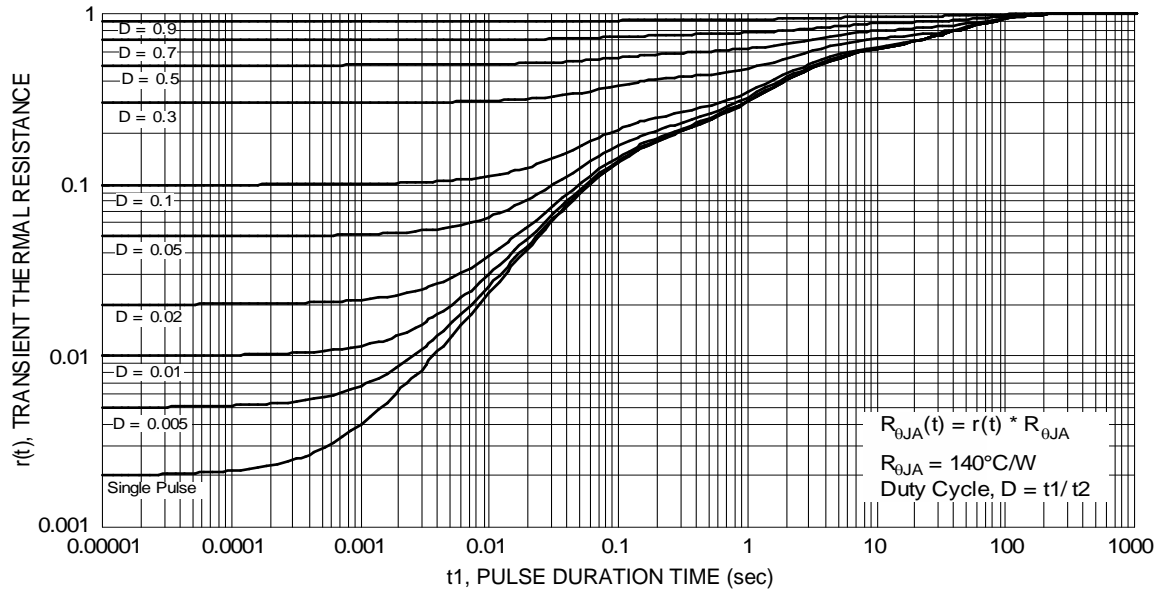
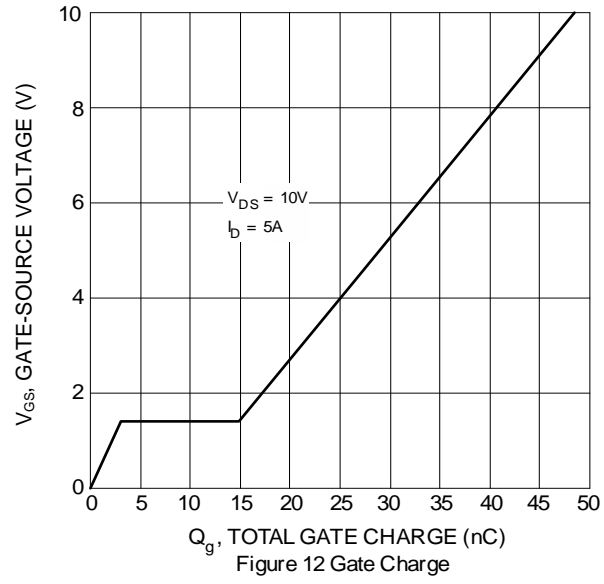


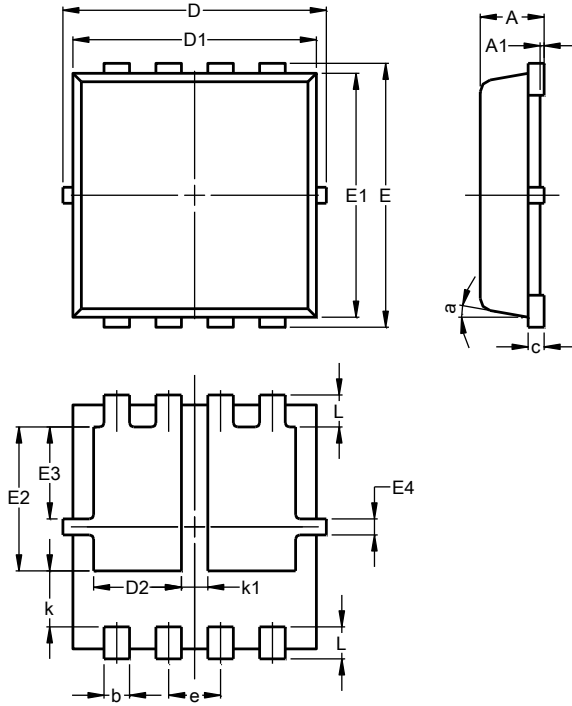
Figure 11. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8 (Type UXC)

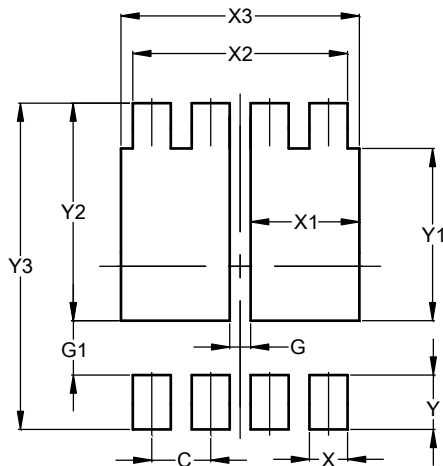


PowerDI3333-8 (Type UXC)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.90	1.30	1.10
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
L	0.30	0.50	0.40
k	0.50	0.90	0.70
k1	0.13	0.53	0.33
a	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 UXC)



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.600
X	0.420
X1	1.200
X2	2.370
X3	2.630
Y	0.600
Y1	1.900
Y2	2.400
Y3	3.600

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