

Product Summary

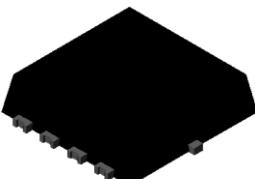
BV_{DSS}	R_{D(S(ON))} Max	I_D Max T_C = +25°C
-40V	25mΩ @ V _{GS} = -10V	-40A
	45mΩ @ V _{GS} = -4.5V	-30A

Description and Applications

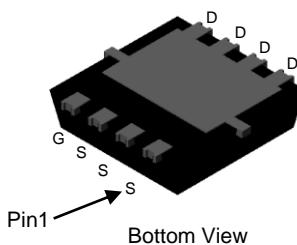
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- Reverse-Polarity Protection
- Power-Management Functions
- DC-DC Converters

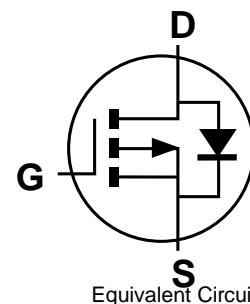
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



Equivalent Circuit

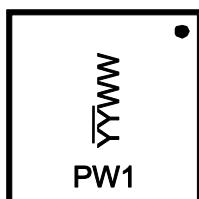
Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH4025SFVWQ-7	PowerDI3333-8 (SWP) (Type UX)	2000/Tape & Reel
DMPH4025SFVWQ-13	PowerDI3333-8 (SWP) (Type UX)	3000/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 <https://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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



PW1 = Product Type Marking Code

YYWW = Date Code Marking

YY = Last Two Digits of Year (ex: 17 = 2017)

WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V_{DSS}	-40	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	I_D	-8.7 -7.3	A
		-40 (Package Limit)	A
		-33	
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)	I_{DM}	-80	A
Maximum Continuous Body Diode Forward Current	I_S	-3	A
Pulsed Source Current (10 μs Pulse, Duty Cycle = 1%)	I_{SM}	-80	A
Avalanche Current, $L = 0.3\text{mH}$	I_{AS}	-23	A
Avalanche Energy, $L = 0.3\text{mH}$	E_{AS}	82	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P_D	2.3	W
		60	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{\theta JA}$	53	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 6)		2.5	
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +175	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	-40	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -40\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(\text{TH})}$	-0.8	—	-1.8	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{ON})}$	—	18	25	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -30\text{A}$
		—	23	45		$V_{GS} = -4.5\text{V}, I_D = -15\text{A}$
Diode Forward Voltage	V_{SD}	—	—	-1	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	—	1918	—	pF	$V_{DS} = -20\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	390	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	151	—	pF	
Gate Resistance	R_g	—	5.76	—	Ω	
Total Gate Charge ($V_{GS} = -4.5\text{V}$)	Q_g	—	19.6	—	nC	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	38.6	—	nC	
Gate-Source Charge	Q_{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q_{gd}	—	7.3	—	nC	
Turn-On Delay Time	$t_{D(\text{ON})}$	—	4.8	—	ns	$V_{DD} = -20\text{V}, V_{GS} = -10\text{V}, I_D = -3\text{A}$
Turn-On Rise Time	t_R	—	14.2	—	ns	
Turn-Off Delay Time	$t_{D(\text{OFF})}$	—	72.2	—	ns	
Turn-Off Fall Time	t_F	—	35.9	—	ns	

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.

7. Short duration pulse test used to minimize self-heating effect.

8. Guaranteed by design. Not subject to product testing.

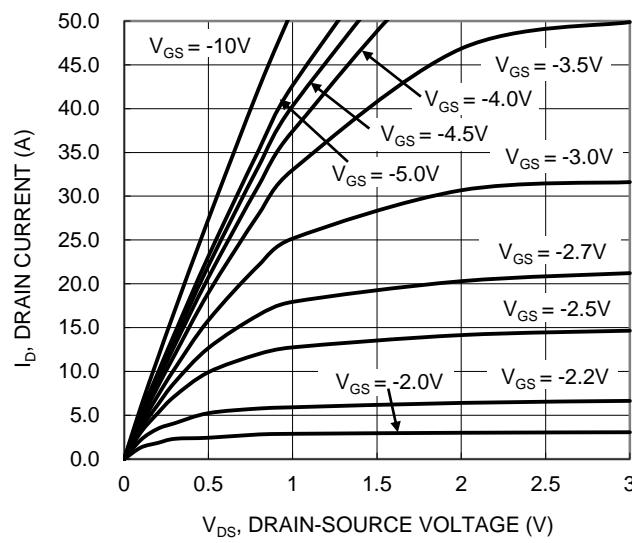


Figure 1. Typical Output Characteristic

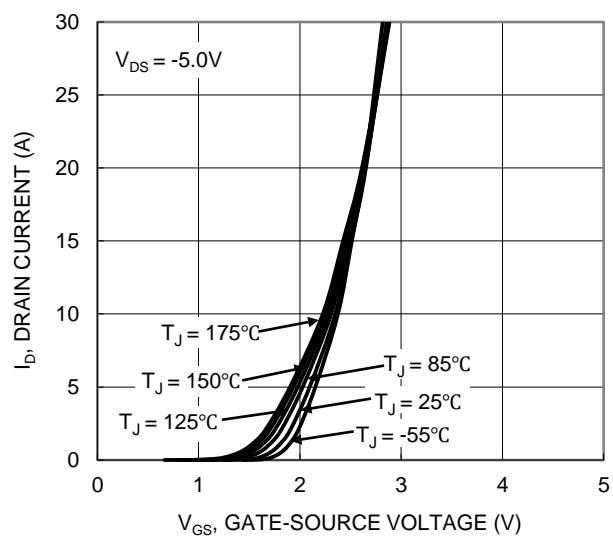


Figure 2. Typical Transfer Characteristic

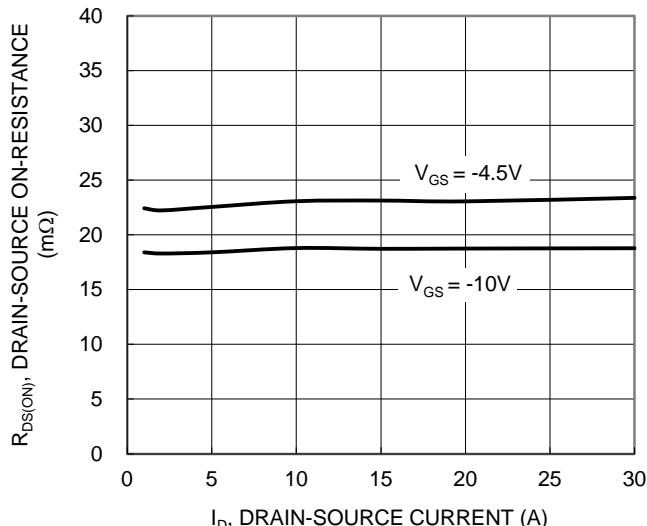


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

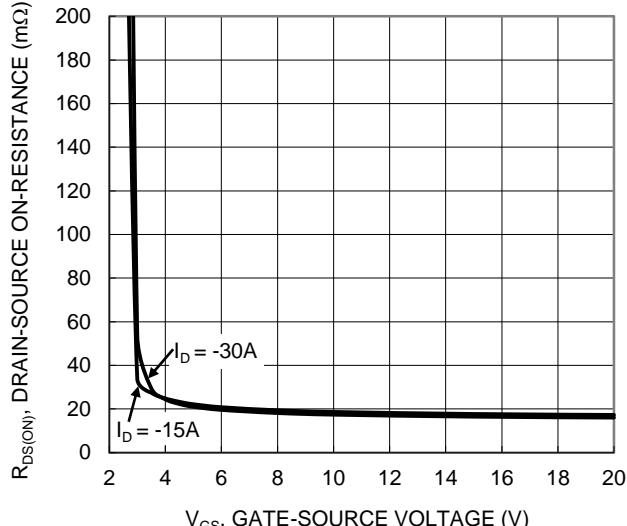


Figure 4. Typical Transfer Characteristic

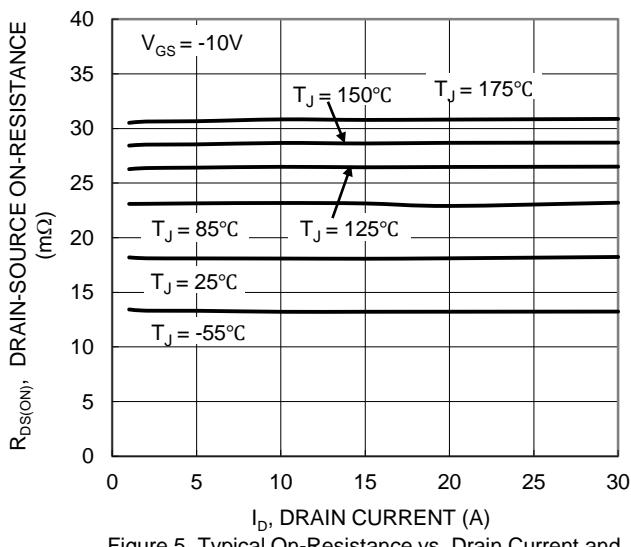


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

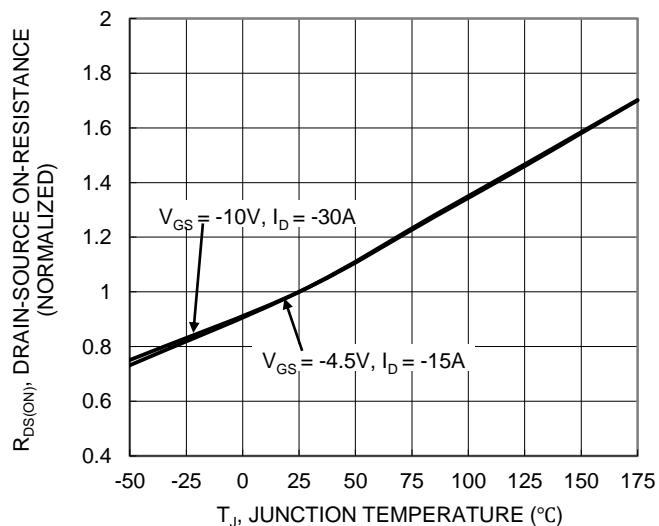
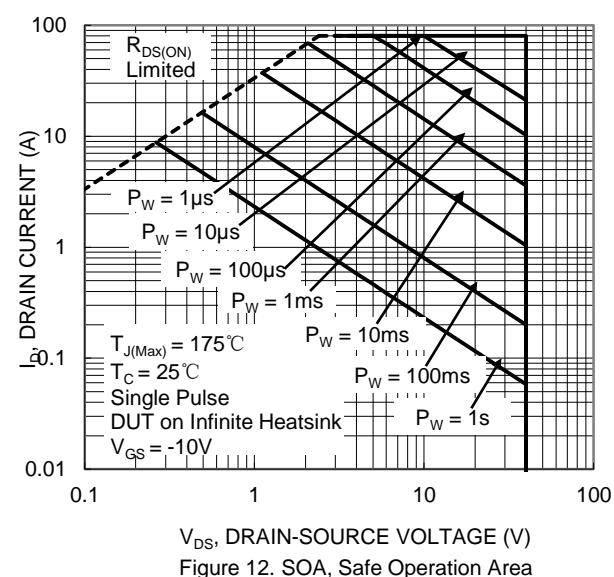
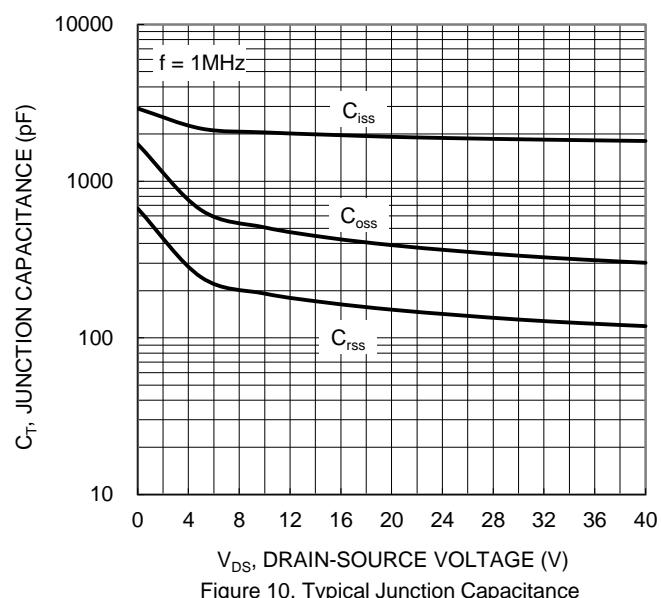
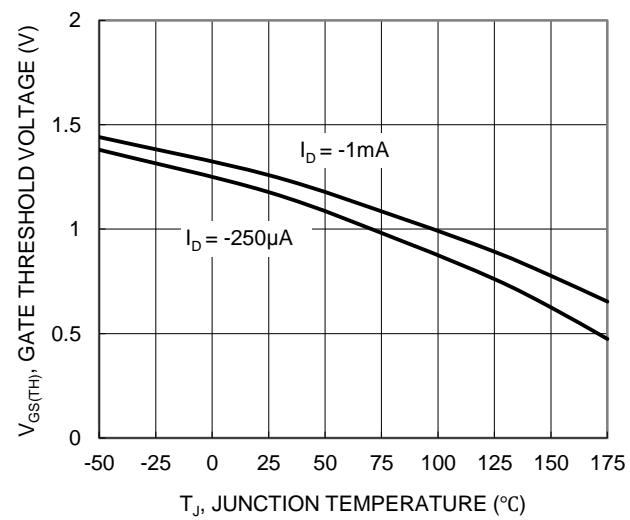
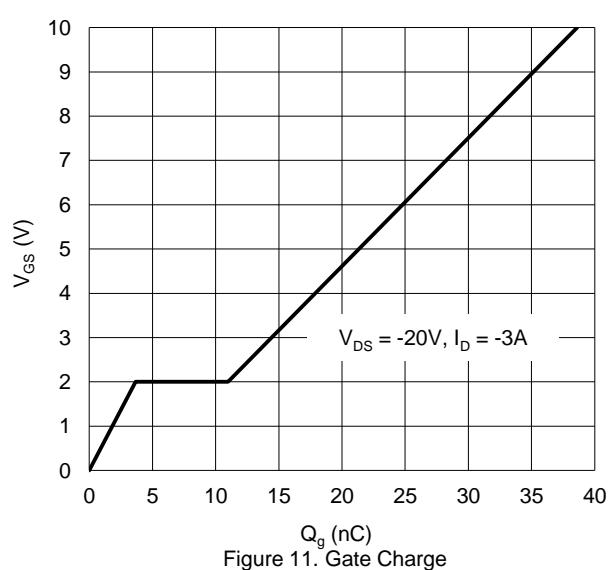
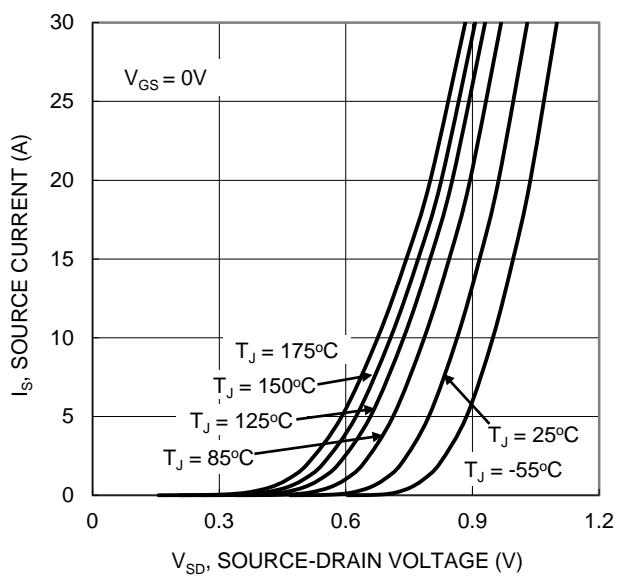
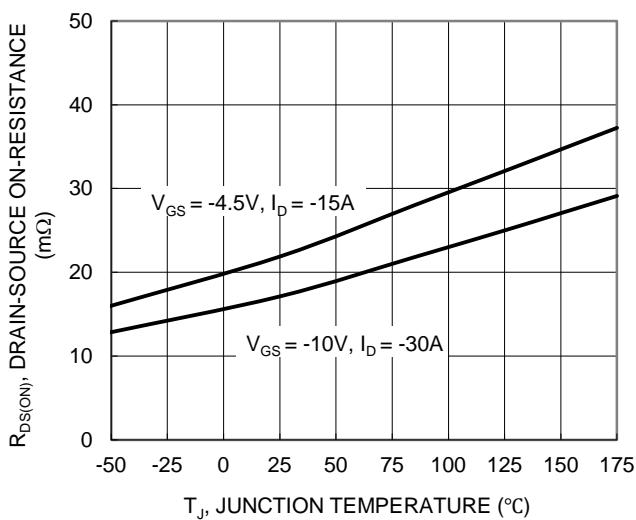


Figure 6. On-Resistance Variation with Temperature



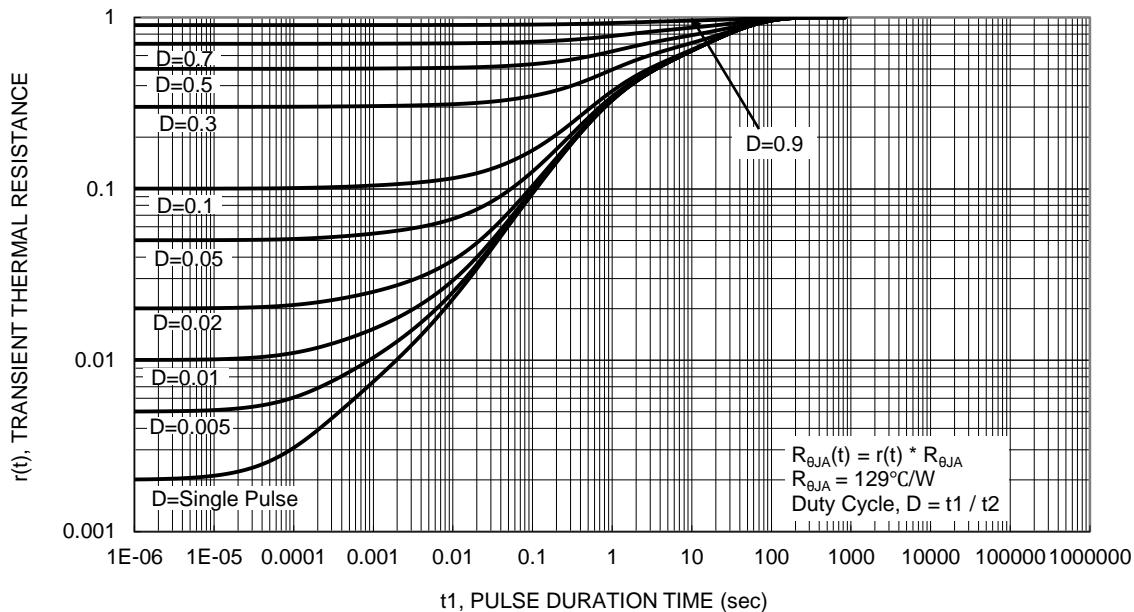
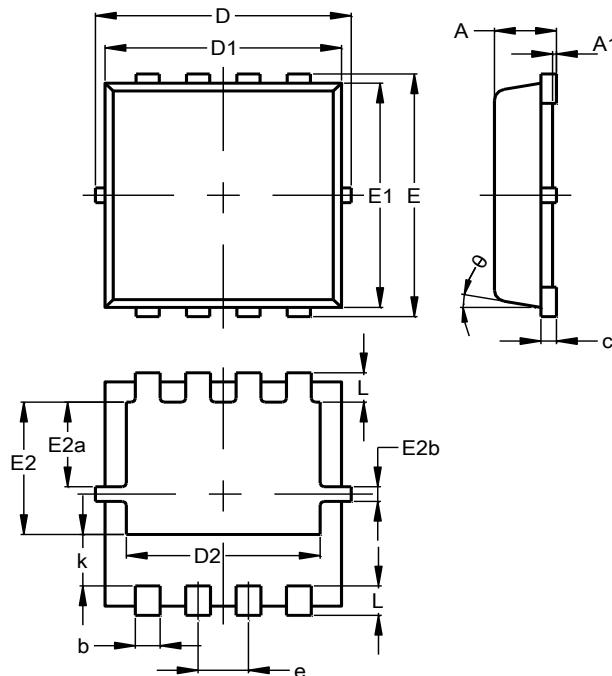


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (Type UX)



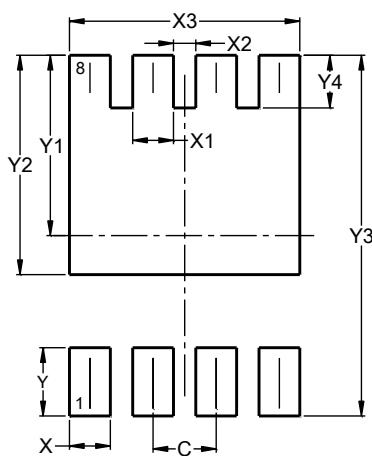
PowerDI3333-8 (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40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