30V N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8 (SWP) (Type UX)

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max T_C = +25°C
30V	11mΩ @ V_{GS} = 10V	50A
	13mΩ @ V_{GS} = 4.5V	45A

Features and Benefits

- Low $R_{DS(ON)}$ – Ensures On State Losses Are Minimized
- 100% Unclamped Inductive Switching (Test in Production) – Ensures More Reliable
- 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
- Wettable Flank for Improved Optical Inspection
- **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)**

Description and Applications

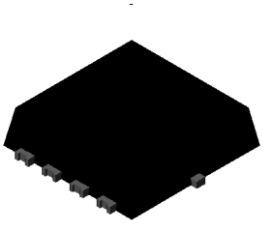
This MOSFET is designed to minimize the on-state resistance ($R_{DS(ON)}$) and yet maintain superior switching performance, making it ideal for high efficiency power management applications.

- Backlighting
- Power Management Functions
- DC-DC Converters

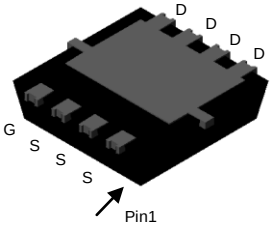
Mechanical Data

- Case: PowerDI®3333-8 (SWP) (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: 0.03 grams (Approximate)

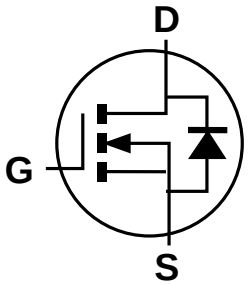
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



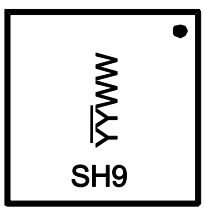
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMT3009LFVWQ-7	PowerDI3333-8 (SWP) (Type UX)	2,000/Tape & Reel
DMT3009LFVWQ-13	PowerDI3333-8 (SWP) (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 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



SH9= 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}	30	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current V_{GS} = 10V	T_A = +25°C T_A = +70°C	I_D	12 10	A
	T_C = +25°C T_C = +70°C	I_D	50 37	A
Maximum Continuous Body Diode Forward Current (Note 6)		I_S	3	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	90	A
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)		I_{SM}	90	A
Avalanche Current, L = 0.1mH		I_{AS}	19	A
Avalanche Energy, L = 0.1mH		E_{AS}	19	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	T_A = +25°C	P_D	2.3	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	55	°C/W
Total Power Dissipation (Note 9)	T_C = +25°C	P_D	35.7	W
Thermal Resistance, Junction to Case (Note 9)	Steady State	$R_{\theta JC}$	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 7)						
Drain-Source Breakdown Voltage	BV_{DSS}	30	-	-	V	V_{GS} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current	I_{DSS}	-	-	1	µA	V_{DS} = 24V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±16V, V_{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	-	3	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	6.6	11	mΩ	V_{GS} = 10V, I_D = 14.4A
		-	10.5	13		V_{GS} = 4.5V, I_D = 7A
		-	13.4	20		V_{GS} = 3.8V, I_D = 5A
Diode Forward Voltage	V_{SD}	-	0.8	1.2	V	V_{GS} = 0V, I_S = 10A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C_{iss}	-	823	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	352	-	pF	
Reverse Transfer Capacitance	C_{rss}	-	52	-	pF	
Gate Resistance	R_g	-	1.2	-	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	-	5.8	-	nC	V_{DS} = 15V, I_D = 14.4A
Total Gate Charge (V_{GS} = 10V)	Q_g	-	12	-	nC	
Gate-Source Charge	Q_{gs}	-	1.7	-	nC	
Gate-Drain Charge	Q_{gd}	-	2.4	-	nC	
Turn-On Delay Time	$t_{D(ON)}$	-	3.2	-	ns	V_{GS} = 10V, V_{DD} = 15V, R_G = 1Ω, I_D = 10A
Turn-On Rise Time	t_R	-	5.2	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	8.9	-	ns	
Turn-Off Fall Time	t_F	-	1.5	-	ns	
Body Diode Reverse Recovery Time	t_{RR}	-	16.4	-	ns	I_F = 10A, dI/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	-	5.9	-	nC	

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.
9. Thermal resistance from junction to soldering point (on the exposed drain pad).

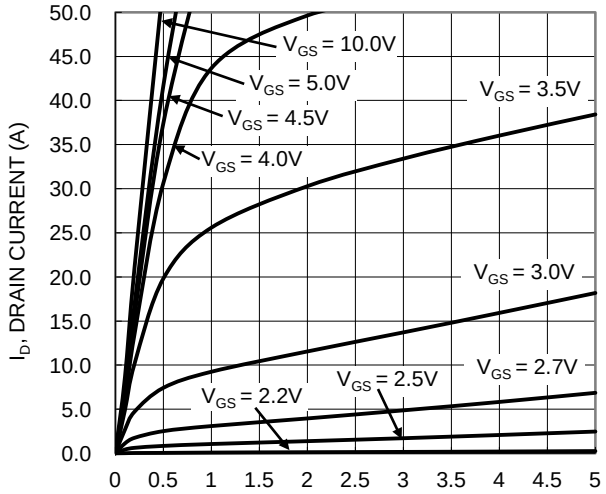


Figure 1.Typical Output Characteristic

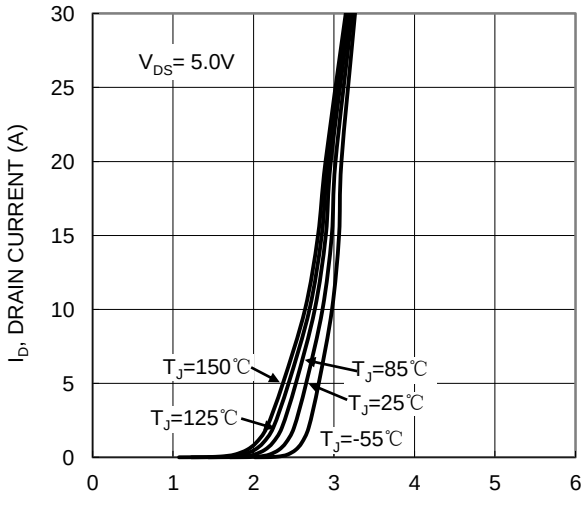


Figure 2. Typical Transfer Characteristic

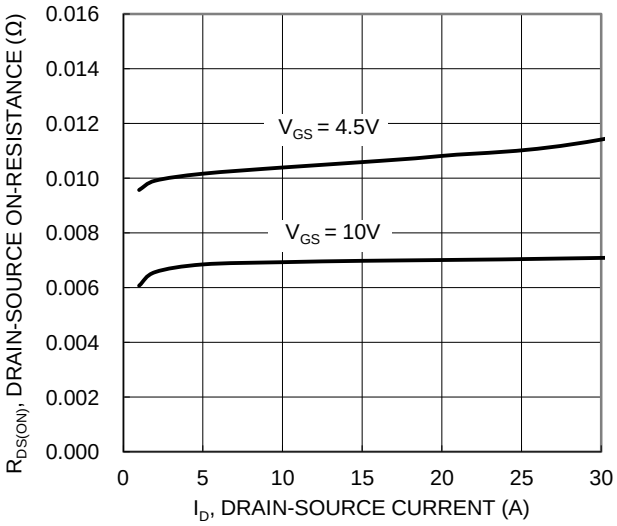


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

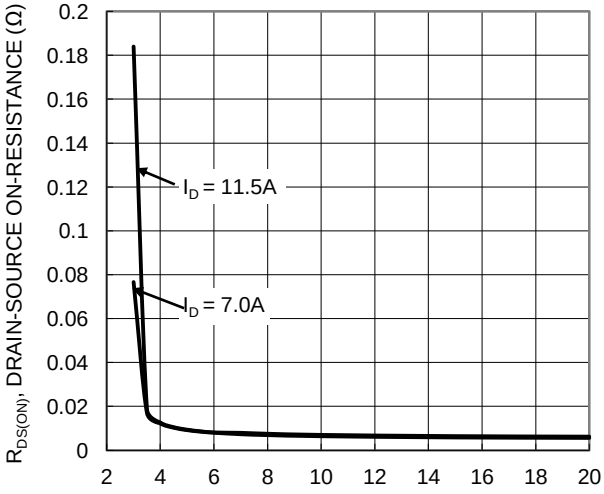


Figure 4. Typical Transfer Characteristic

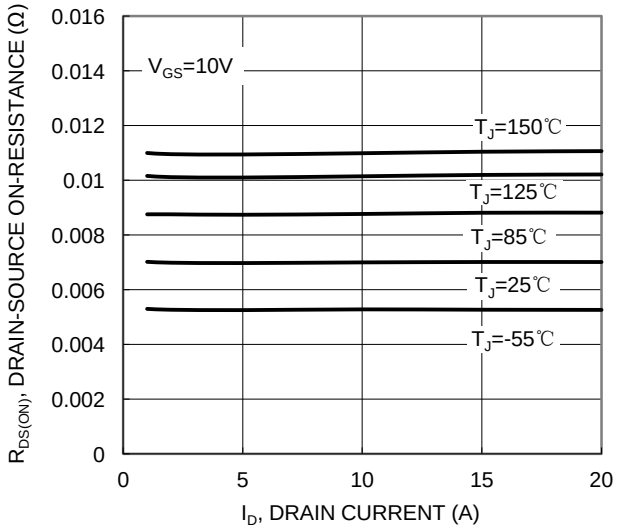


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

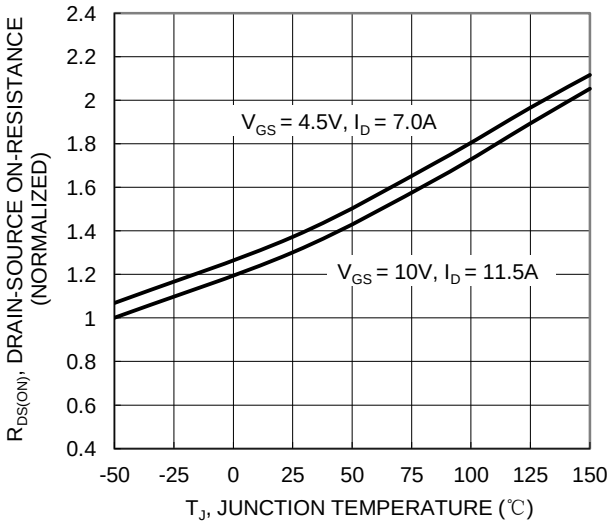


Figure 6. On-Resistance Variation with Temperature

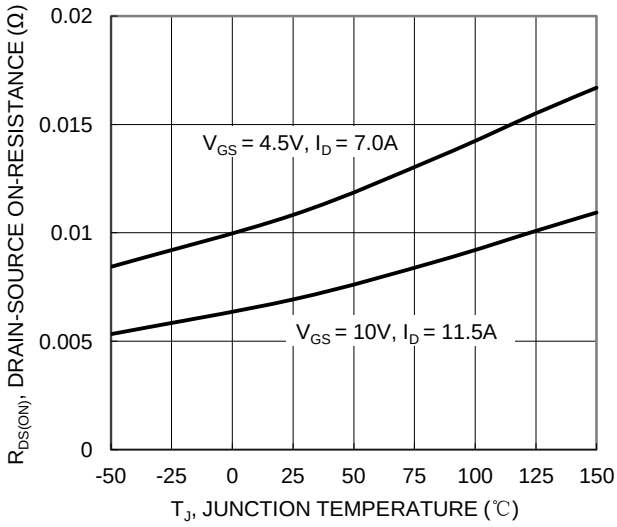


Figure 7. On-Resistance Variation with Temperature

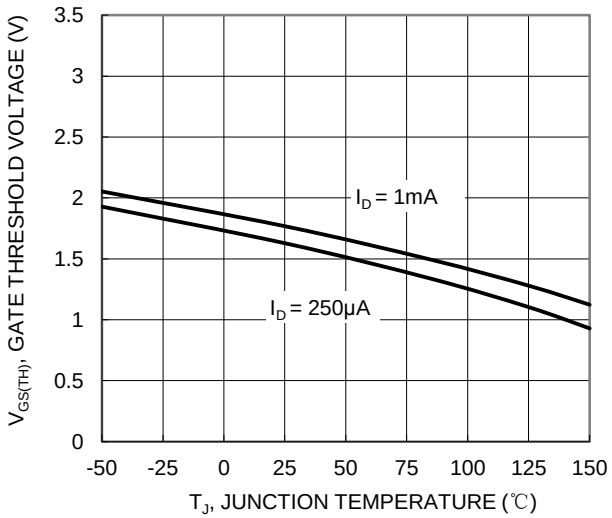


Figure 8. Gate Threshold Variation vs Junction Temperature

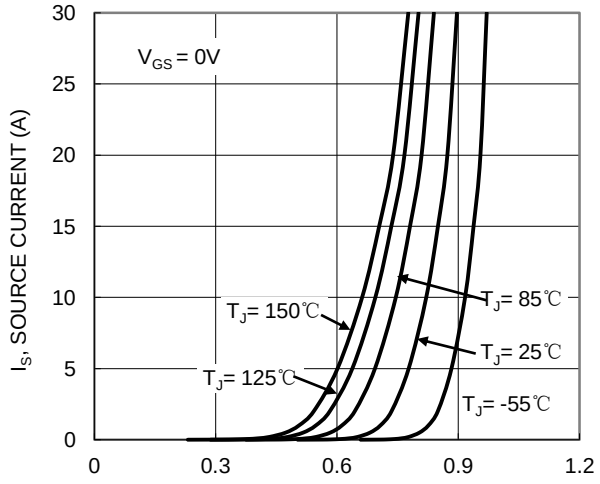


Figure 9. Diode Forward Voltage vs. Current

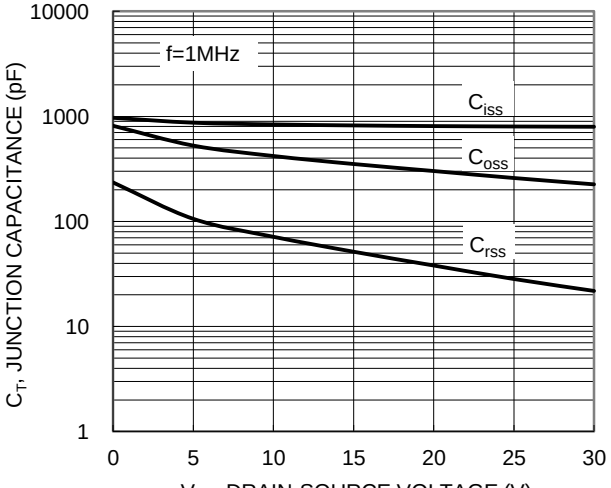


Figure 10. Typical Junction Capacitance

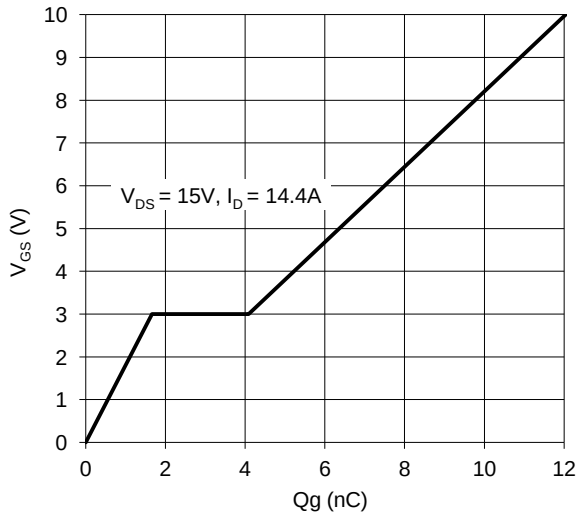


Figure 11. Gate Charge

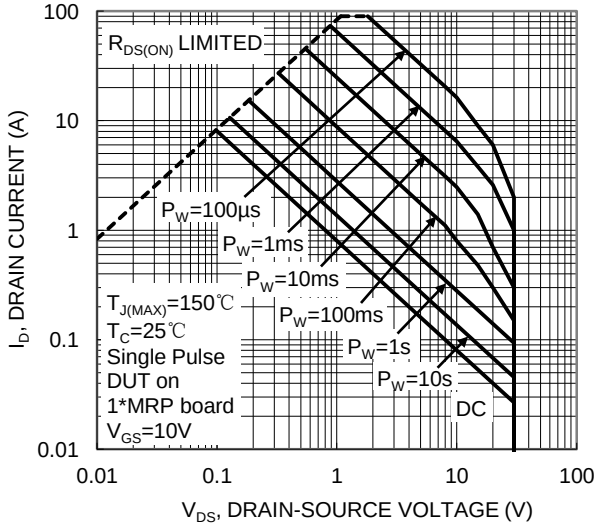


Figure 12. SOA, Safe Operation Area

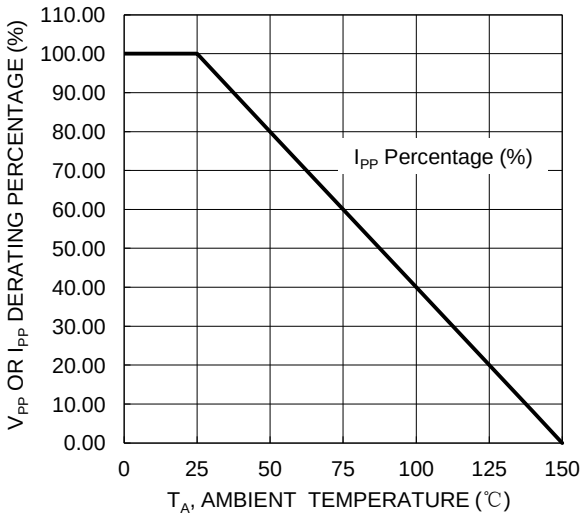


Figure 13. P_D vs. Ambient Temperature

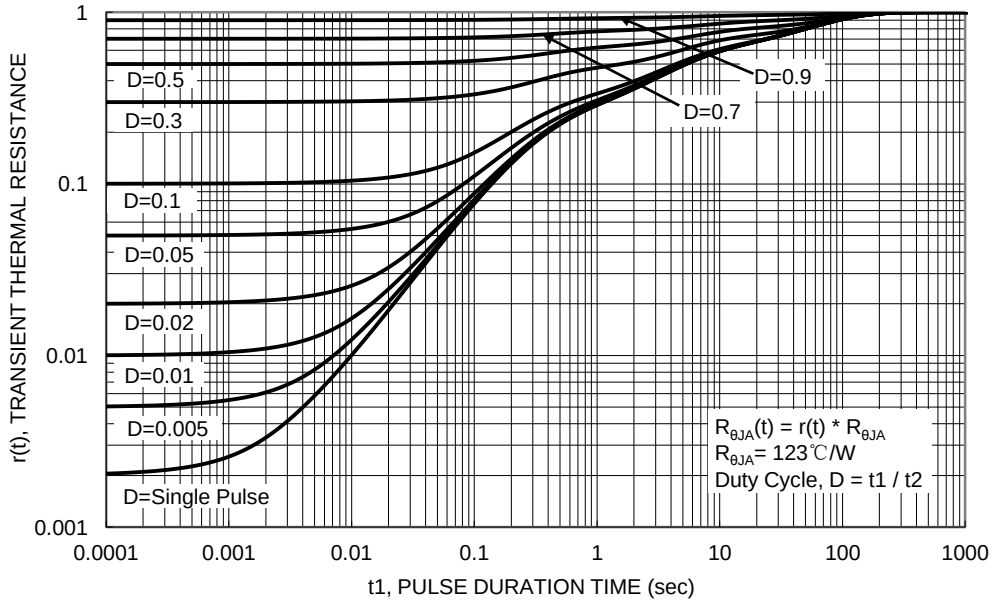
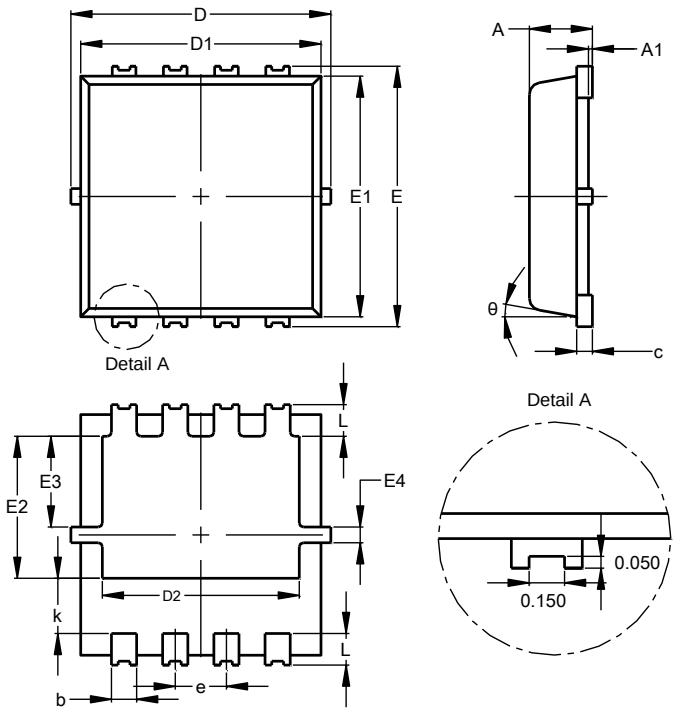


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (SWP) (Type UX)

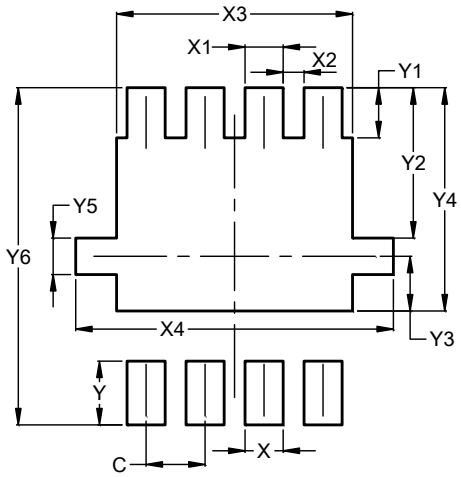


PowerDI3333-8 (SWP) (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
k	0.50	0.90	0.70
L	0.30	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 (SWP) (Type UX)



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.600
X4	3.500
Y	0.700
Y1	0.550
Y2	1.650
Y3	0.600
Y4	2.450
Y5	0.400
Y6	3.700

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