80V 175°C N-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8

Product Summary

BV_{DSS}	$R_{DS(ON)}$ MAX	I_D MAX T_C = +25°C
80V	25mΩ @ V_{GS} = 10V	27A
	41mΩ @ V_{GS} = 4.5V	21A

Description

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.

Applications

- Backlighting
- Power-management functions
- DC-DC converters

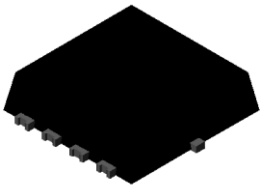
Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production – Ensures More Reliable and Robust End Application
- Small Form Factor, Thermally Efficient Package Enables Higher Density End Products
- Wettable Flank for Improved Optical Inspection
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **An automotive-compliant part is available under separate datasheet (DMTH8028LFVWQ)**

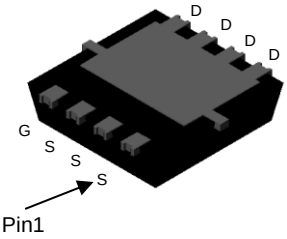
Mechanical Data

- Package: PowerDI®3333-8
- Package 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)

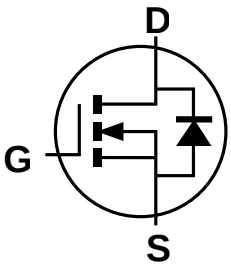
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



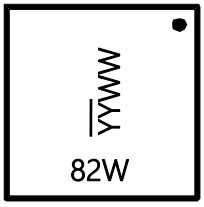
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMTH8028LFVW-7	PowerDI3333-8/SWP (Type UX)	2,000	Tape and Reel
DMTH8028LFVW-13	PowerDI3333-8/SWP (Type UX)	3,000	Tape and 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. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



82W = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 23 = 2023)
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}	80	V
Gate-Source Voltage		V_{GSS}	±20	V
Continuous Drain Current (Note 7) V_{GS} = 10V	T_C = +25°C	I_D	27	A
	T_C = +100°C		19	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)		I_{DM}	108	A
Maximum Continuous Body Diode Forward Current (Note 7)		I_S	27	A
Pulsed Body Diode Forward Current		I_{SM}	108	A
Avalanche Current, L = 0.3mH (Note 8)		I_{AS}	12.5	A
Avalanche Energy, L = 0.3mH (Note 8)		E_{AS}	23.4	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.5	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	98	°C/W
Total Power Dissipation (Note 6)		P_D	3.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	42	°C/W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	4.0	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +175	°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}	80	—	—	V	V_{GS} = 0V, I_D = 1mA
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	µA	V_{DS} = 64V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	—	—	±100	nA	V_{GS} = ±20V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	1.3	—	2.5	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	17	25	mΩ	V_{GS} = 10V, I_D = 5A
		—	26	41		V_{GS} = 4.5V, I_D = 4.5A
Diode Forward Voltage	V_{SD}	—	0.8	1.2	V	V_{GS} = 0V, I_S = 5A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	631	—	pF	V_{DS} = 40V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	—	200	—		
Reverse Transfer Capacitance	C_{rss}	—	19.5	—		
Gate Resistance	R_g	—	1.1	—	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = 4.5V)	Q_g	—	5.4	—	nC	V_{DS} = 40V, I_D = 7.5A
Total Gate Charge (V_{GS} = 10V)	Q_g	—	10.4	—		
Gate-Source Charge	Q_{gs}	—	1.8	—		
Gate-Drain Charge	Q_{gd}	—	2.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	7.1	—	ns	V_{DD} = 40V, V_{GS} = 4.5V, R_G = 2.7Ω, I_D = 10A
Turn-On Rise Time	t_R	—	9.7	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	18.6	—		
Turn-Off Fall Time	t_F	—	8.6	—		
Body Diode Reverse Recovery Time	t_{RR}	—	28.5	—	ns	I_F = 7.5A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q_{RR}	—	21.7	—	nC	

Notes:
5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
7. Thermal resistance from junction to soldering point (on the exposed drain pad).
8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

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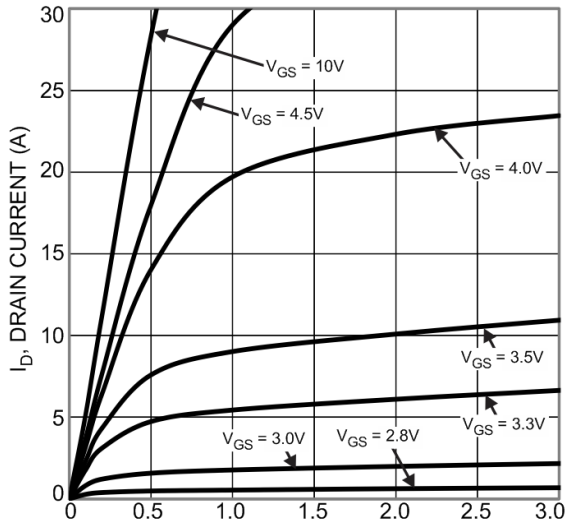


Fig. 1 Typical Output Characteristic

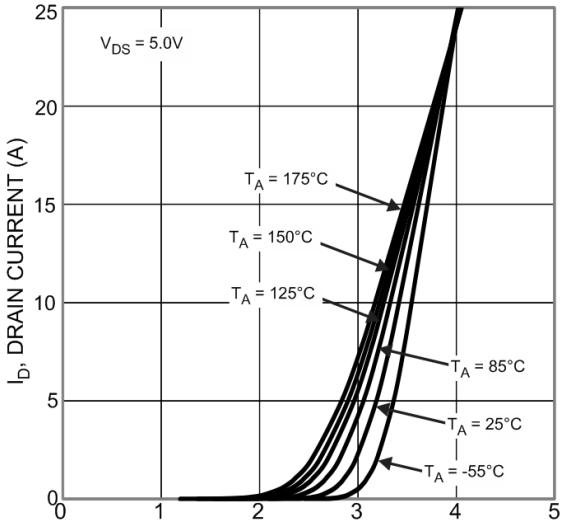


Fig. 2 Typical Transfer Characteristics

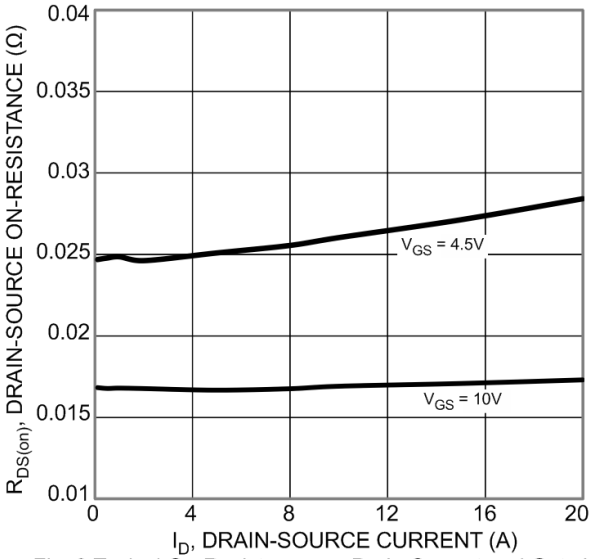


Fig. 3 Typical On-Resistance vs. Drain Current and Gate Voltage

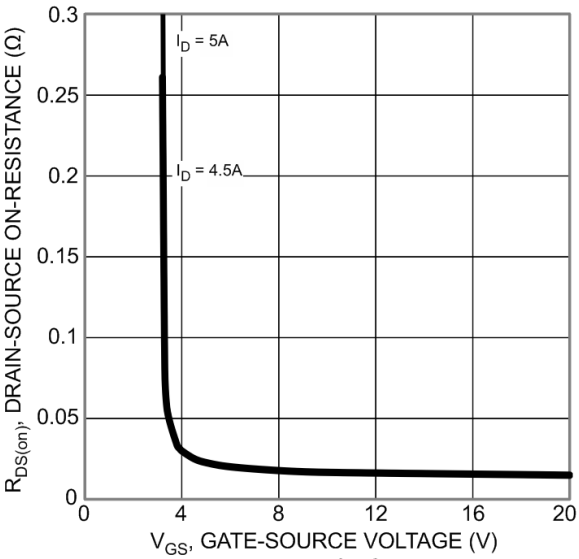


Fig. 4 Typical Transfer Characteristic

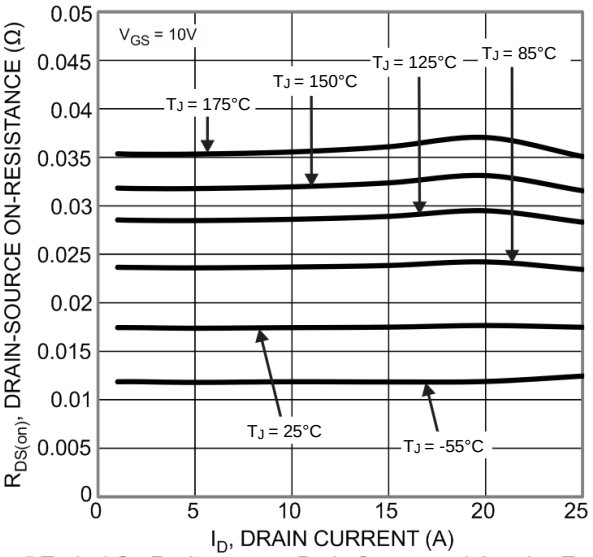


Fig. 5 Typical On-Resistance vs. Drain Current and Junction Temperature

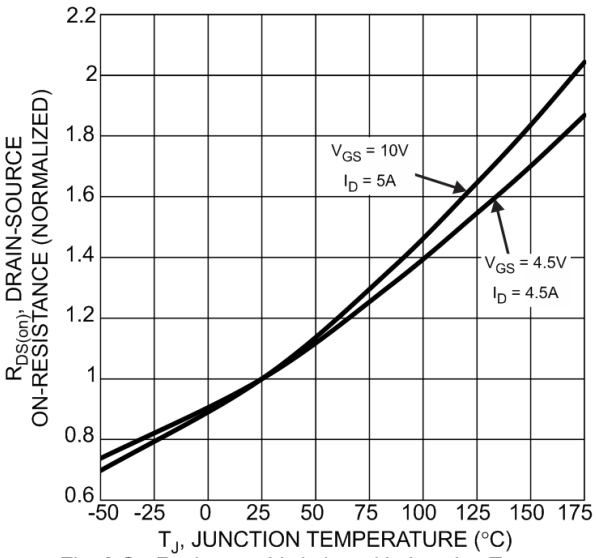


Fig. 6 On-Resistance Variation with Junction Temperature

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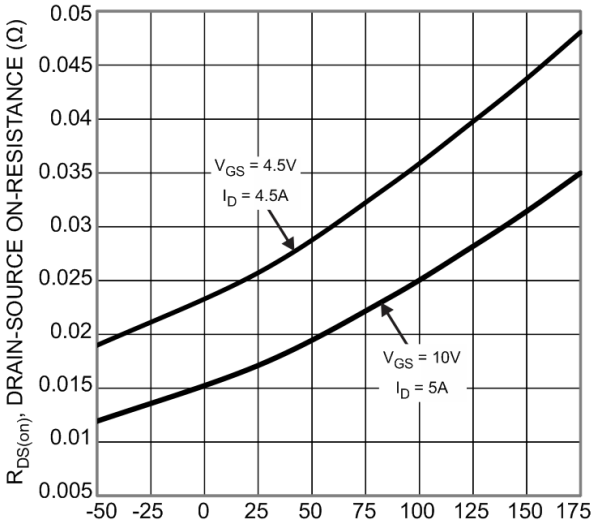


Fig. 7 On-Resistance Variation with Junction Temperature

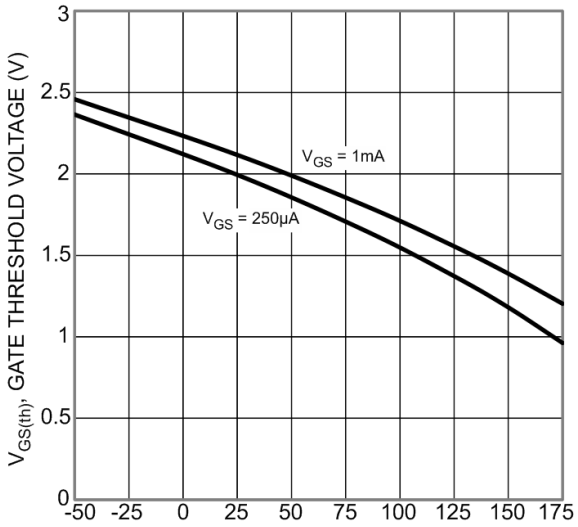


Fig. 8 Gate Threshold Variation vs Junction Temperature

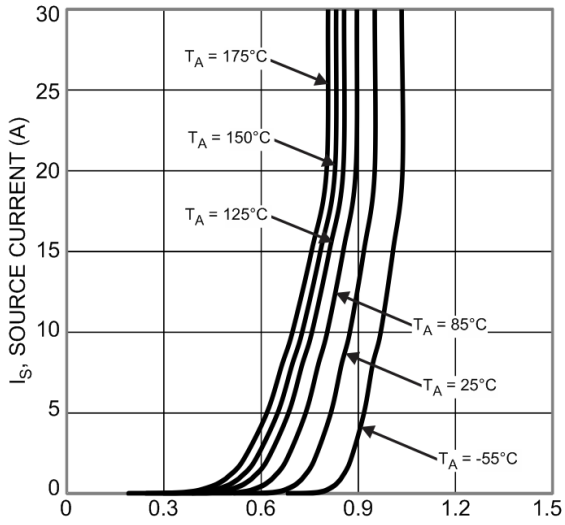


Fig. 9 Diode Forward Voltage vs Current

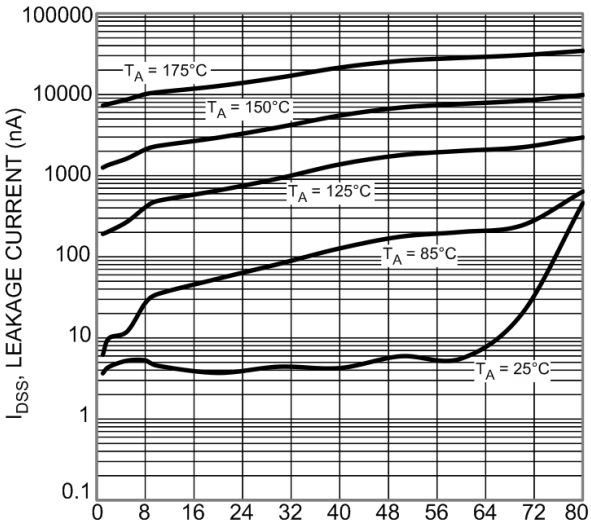


Fig. 10 Typical Drain-Source Leakage Current vs. Voltage

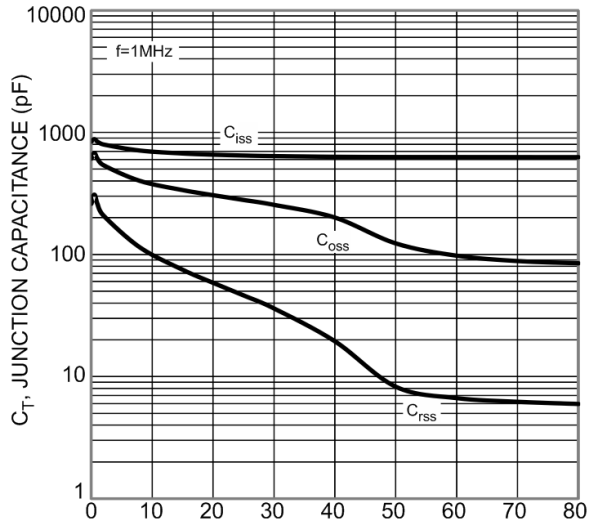


Fig. 11 Typical Junction Capacitance

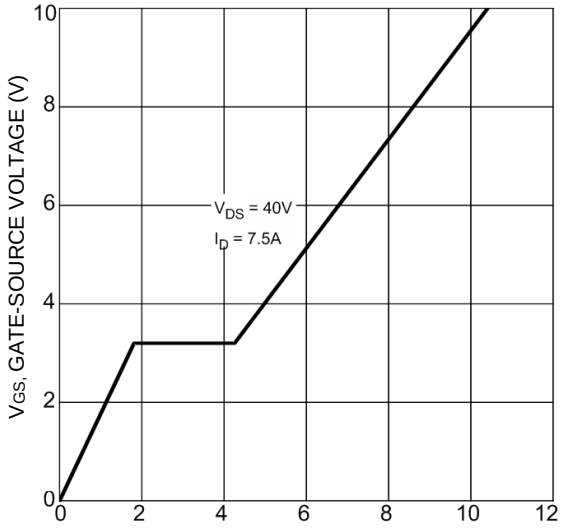


Fig. 12 Gate Charge

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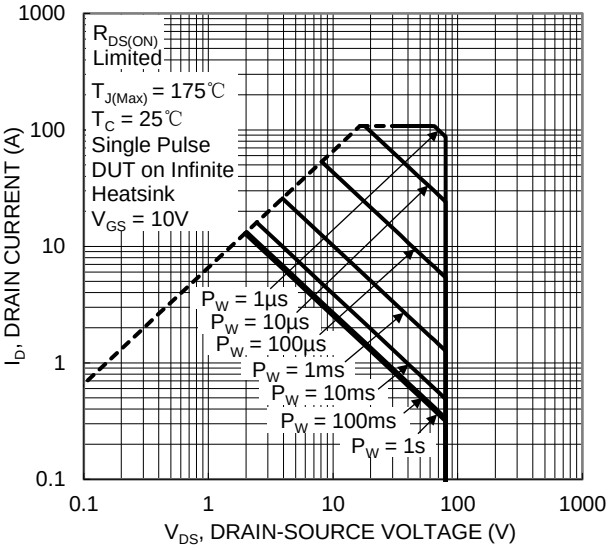


Fig. 13 SOA, Safe Operation Area

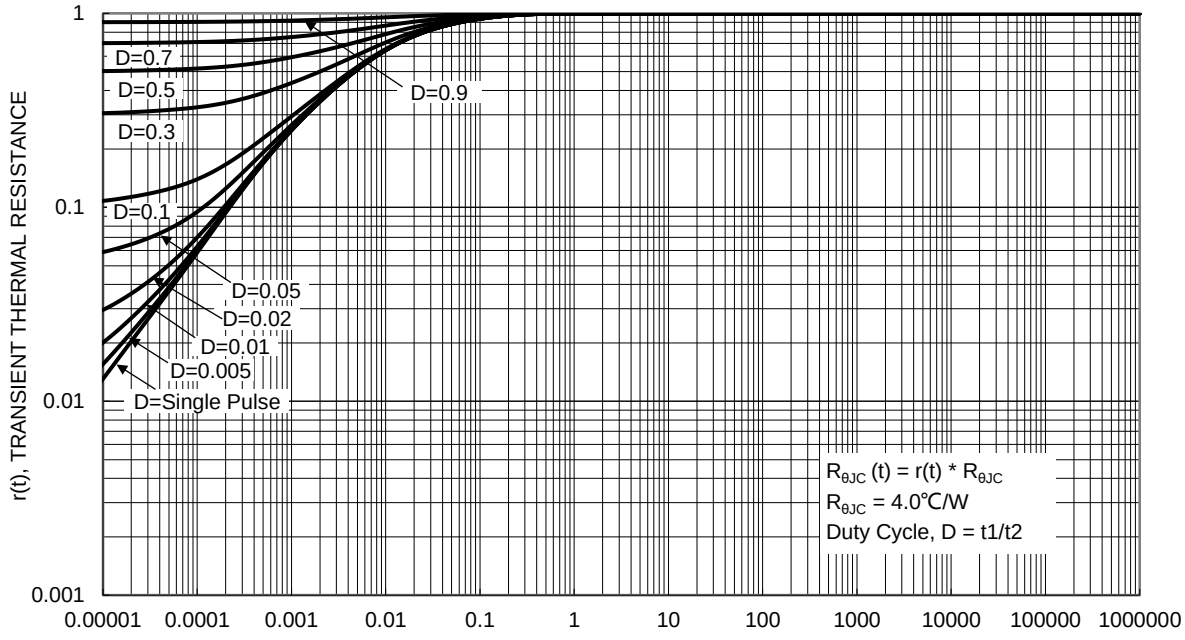


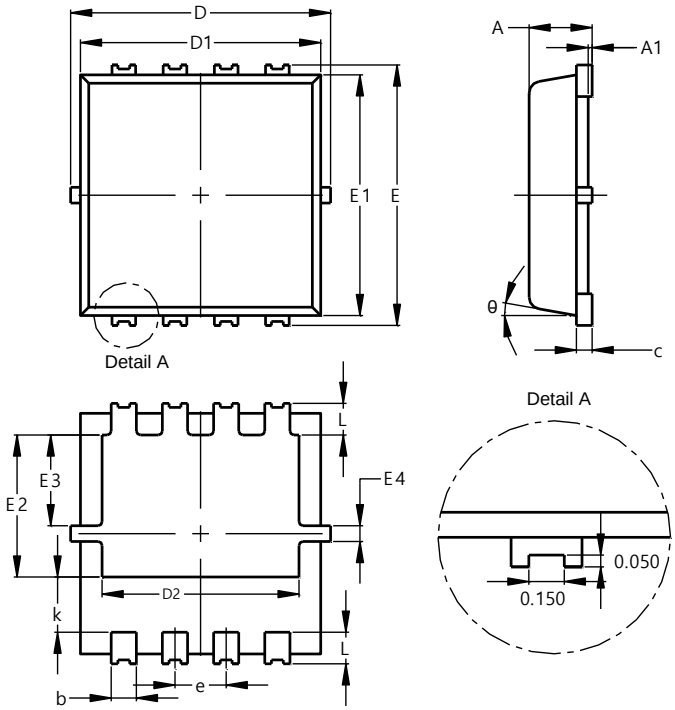
Fig. 14 Transient Thermal Resistance

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Package Outline Dimensions

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PowerDI3333-8/SWP (Type UX)

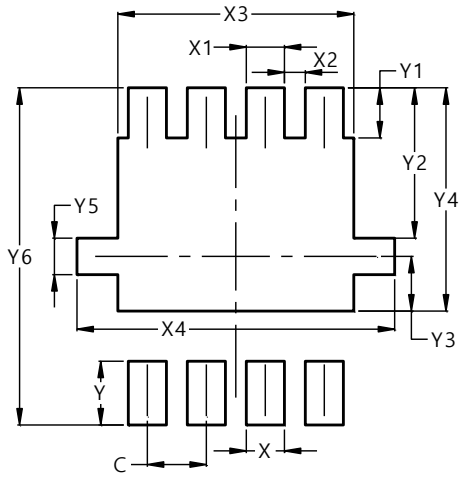


PowerDI3333-8/SWP (Type UX)			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	–	–	0.65
k	0.50	0.90	0.70
L	0.30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