

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max (Note 5) T _c = +25°C
30V	1.9mΩ @ V _{GS} = 10V	141A
	2.9mΩ @ V _{GS} = 4.5V	114A

Features and Benefits

- Low R_{DS(ON)} – Ensures On-State Losses Are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- ESD Protected Gate
- Occupies Just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- Wettable Flank for Improved Optical Inspection
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. “Green” Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Description and Applications

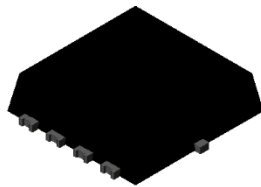
This MOSFET is designed to minimize the on-state resistance (R_{DS(ON)}) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

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

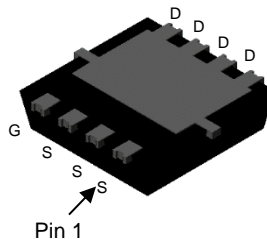
Mechanical Data

- 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)

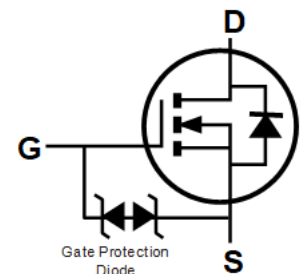
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



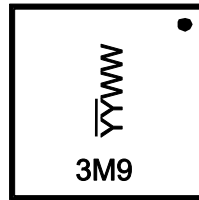
Equivalent Circuit

Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT31M9LFVW-7	PowerDI3333-8/SWP (Type UX)	2,000	Tape & Reel
DMT31M9LFVW-13	PowerDI3333-8/SWP (Type UX)	3,000	Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 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/>.
 5. Package limited.

Marking Information



3M9 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 24 = 2024)
 WW = Week Code (01 to 53)

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 (Note 6)	I _D	T _A = +25°C T _A = +70°C	24 19	A
Continuous Drain Current V _{GS} = 10V (Note 7)		T _C = +25°C T _C = +70°C	141 112	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	4	A	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%) (Note 7)	I _{DM}	177	A	
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%) (Note 7)	I _{SM}	177	A	
Avalanche Current, L = 1mH	I _{AS}	21.5	A	
Avalanche Energy, L = 1mH	E _{AS}	232	mJ	

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	1.7	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	75.6	°C/W
Total Power Dissipation (Note 7)	P _D	3.6	W
Thermal Resistance, Junction to Ambient (Note 7)	R _{θJA}	35.5	°C/W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	2.2	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +150	°C

Notes: 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
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}	—	—	±10	μA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1.2	—	2.5	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	1.1	1.9	mΩ	V _{GS} = 10V, I _D = 30A
		—	2.0	2.9		V _{GS} = 4.5V, I _D = 30A
Diode Forward Voltage	V _{SD}	—	0.6	1.2	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	3160	—	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	2565	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	164	—	pF	
Gate Resistance	R _g	—	0.72	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	23.5	—	nC	V _{DS} = 15V, V _{GS} = 4.5V I _D = 10A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	48.6	—	nC	
Gate-Source Charge	Q _{gs}	—	7.3	—	nC	
Gate-Drain Charge	Q _{gd}	—	5.2	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	8.5	—	ns	V _{GS} = 10V, V _{DD} = 15V R _g = 3.3Ω, I _D = 10A
Turn-On Rise Time	t _R	—	23.5	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	44	—	ns	
Turn-Off Fall Time	t _F	—	24	—	ns	

Notes: 8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

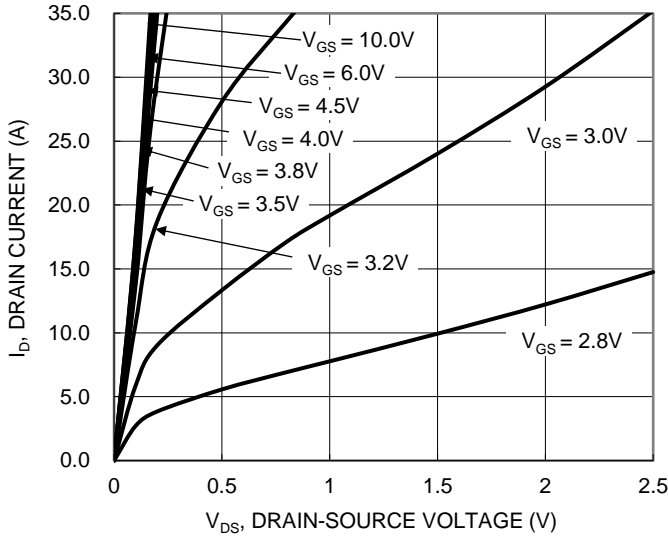


Figure 1. Typical Output Characteristic

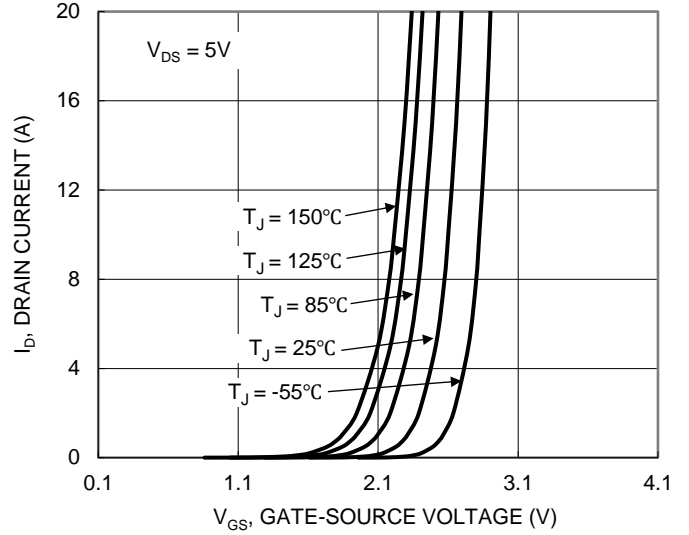


Figure 2. Typical Transfer Characteristic

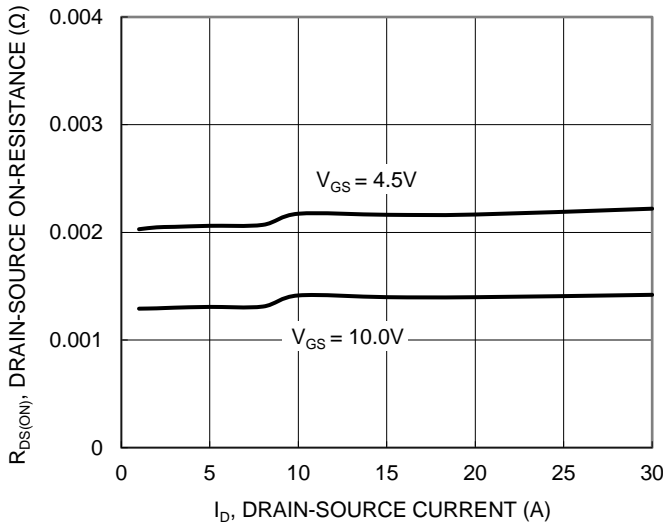


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

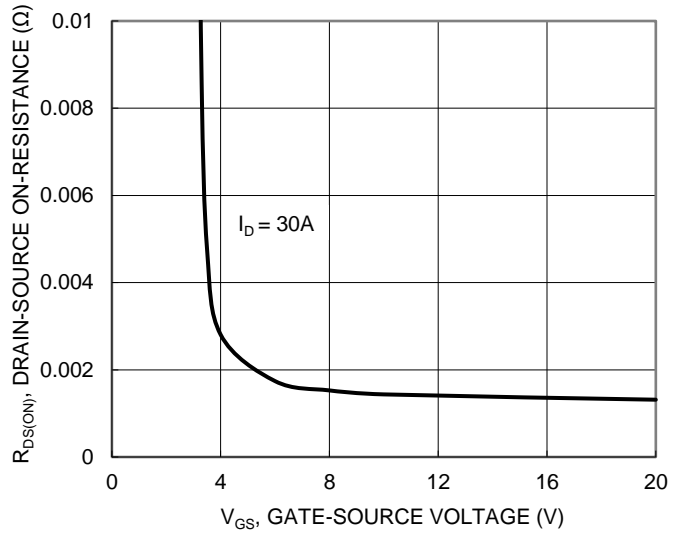


Figure 4. Typical Transfer Characteristic

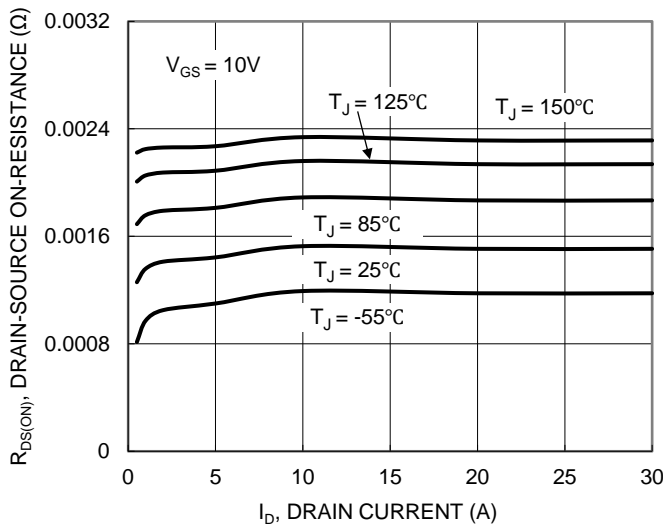


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

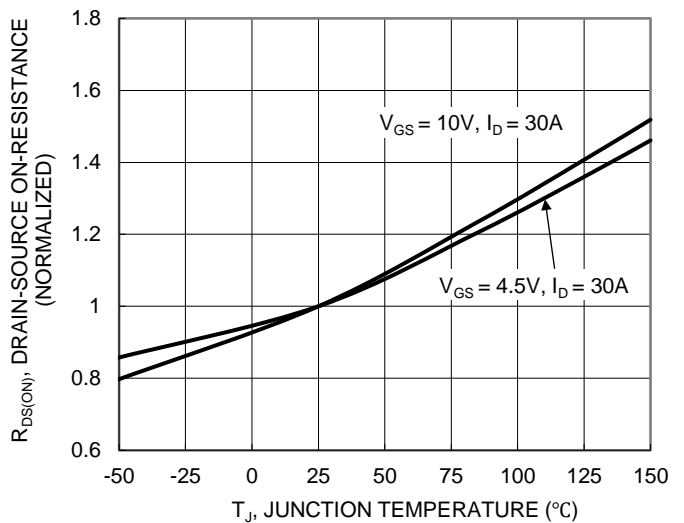


Figure 6. On-Resistance Variation with Junction Temperature

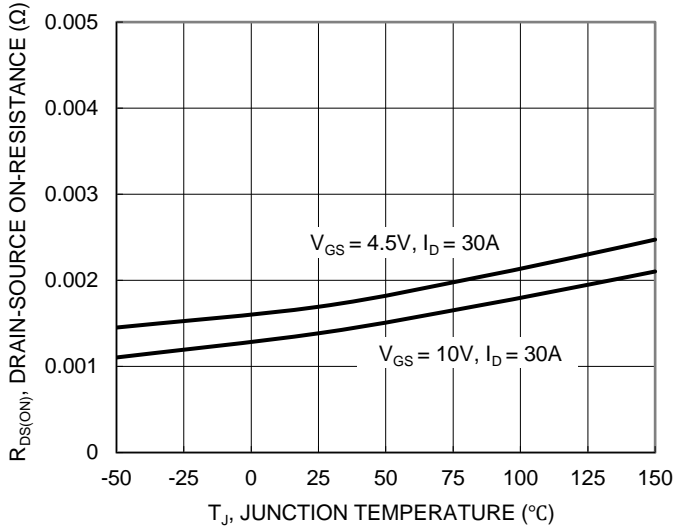


Figure 7. On-Resistance Variation with Junction Temperature

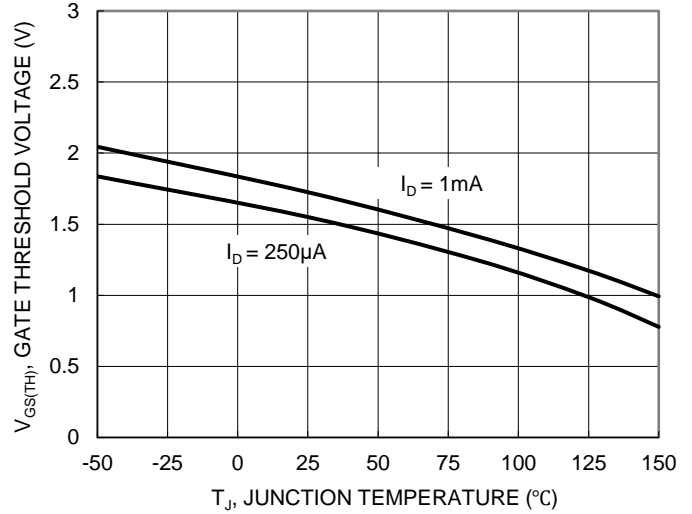


Figure 8. Gate Threshold Variation vs. Junction Temperature

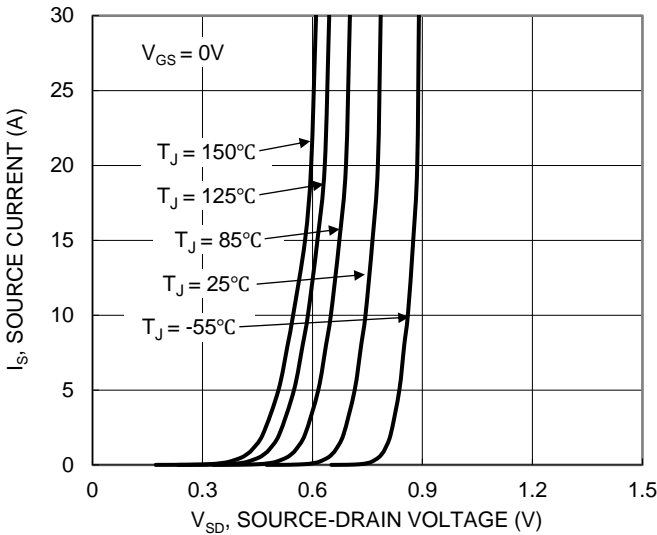


Figure 9. Diode Forward Voltage vs. Current

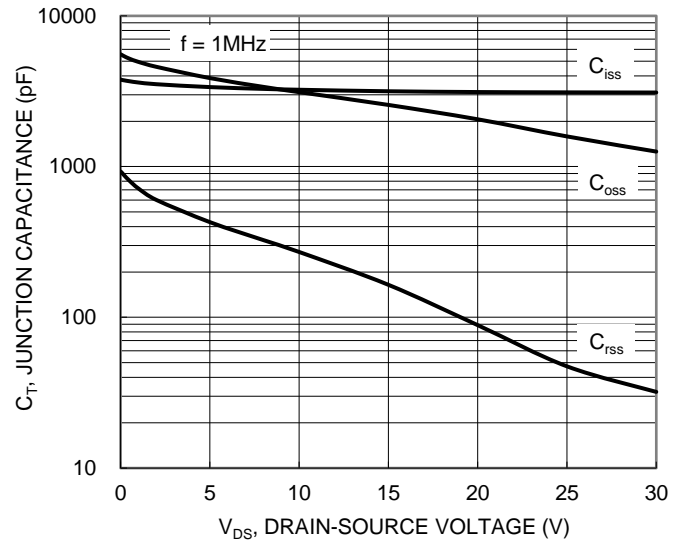


Figure 10. Typical Junction Capacitance

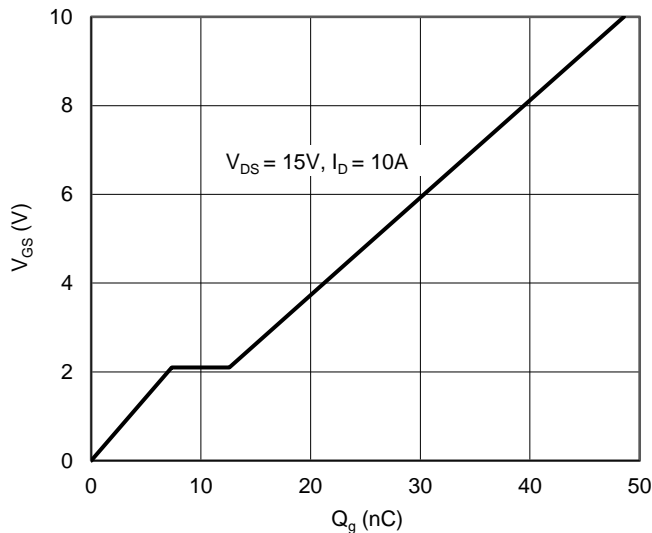


Figure 11. Gate Charge

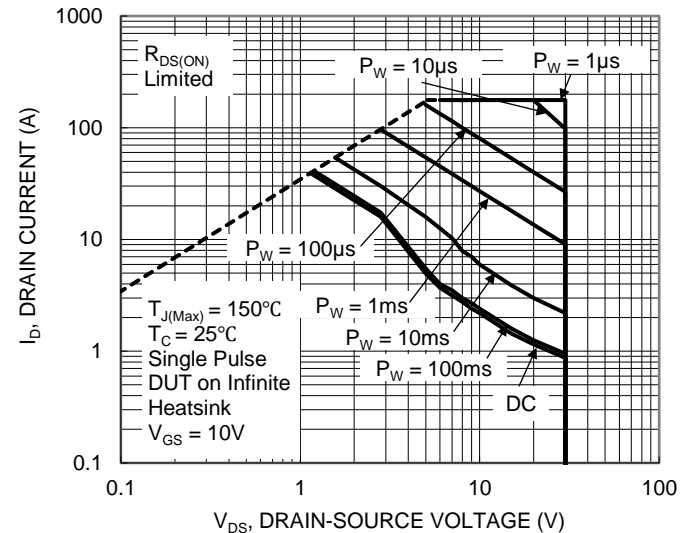


Figure 12. SOA, Safe Operation Area

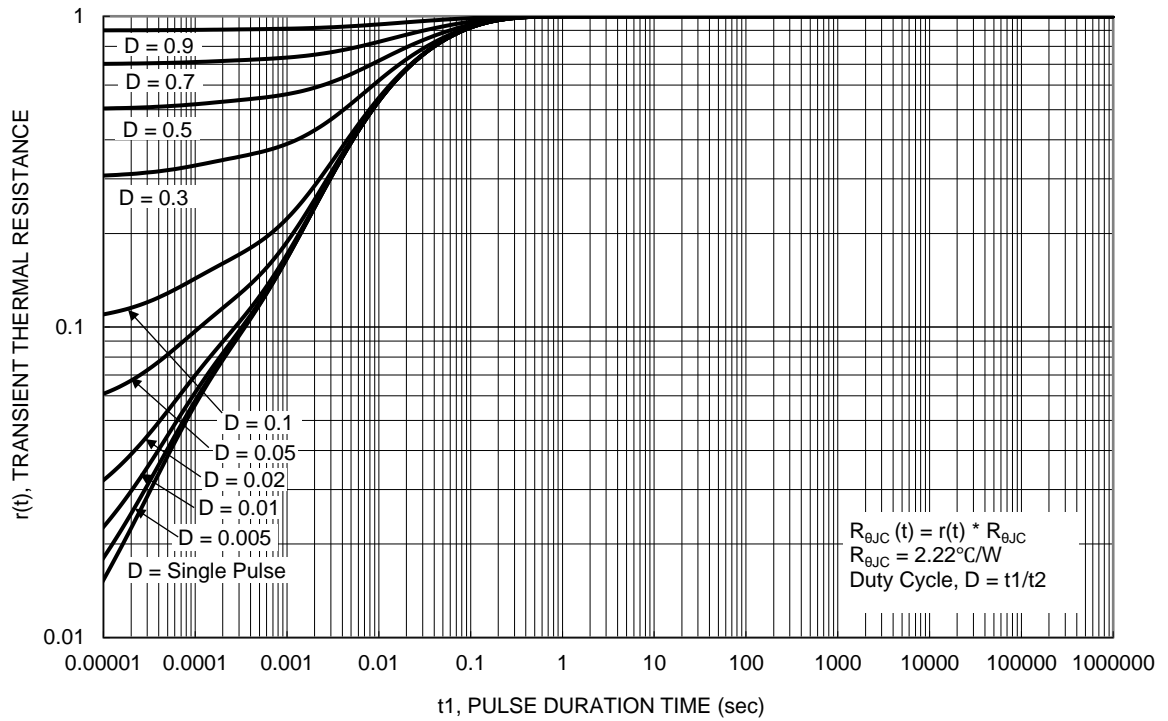
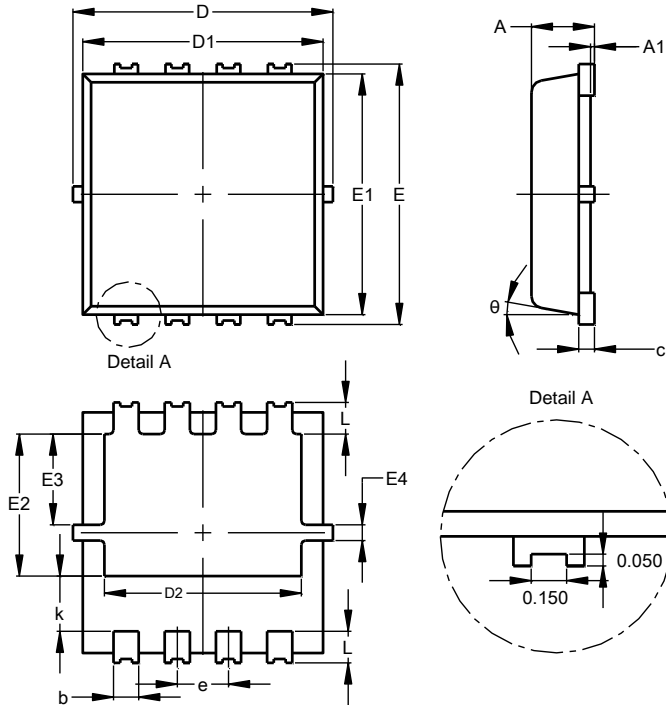


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8/SWP (Type UX)

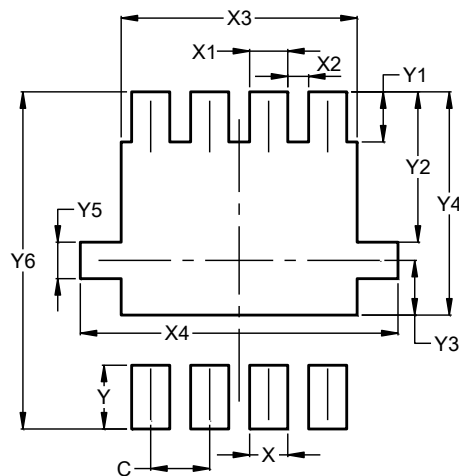


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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