

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>C</sub> = +25°C
30V	1.6mΩ @ V <sub>GS</sub> = 10V	120A
	2.6mΩ @ V <sub>GS</sub> = 4.5V	97A

## Description and Applications

This MOSFET is designed to minimize the on-state resistance (R<sub>DS(ON)</sub>) yet maintain superior switching performance, making it ideal for high-efficiency power-management applications.

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

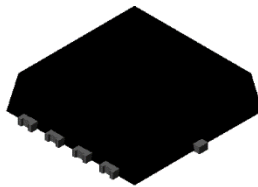
## Features and Benefits

- Low R<sub>DS(ON)</sub> – Ensures On-State Losses Are Minimized
- 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
- **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](https://www.diodes.com/quality/product-definitions/) or your local Diodes representative.**  
<https://www.diodes.com/quality/product-definitions/>

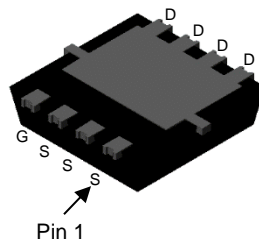
## Mechanical Data

- 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 208③
- Weight: 0.03 grams (Approximate)

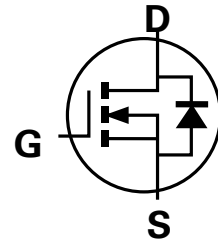
PowerDI3333-8/SWP (Type UX)



Top View



Bottom View



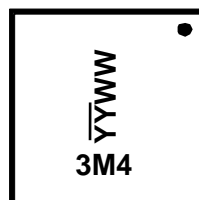
Equivalent Circuit

## Ordering Information (Note 4)

Orderable Part Number	Package	Packing	
		Qty.	Carrier
DMT31M4LFVW-7	PowerDI3333-8/SWP (Type UX)	2000	Tape & Reel
DMT31M4LFVW-13	PowerDI3333-8/SWP (Type UX)	3000	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/>.

## Marking Information



3M4 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Two Digits of Year (ex: 25 = 2025)  
WW = Week Code (01 to 53)

**Maximum Ratings** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V <sub>DSS</sub>	30	V
Gate-Source Voltage	V <sub>GSS</sub>	±20	V
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 5)	I <sub>D</sub>	34 27	A
Continuous Drain Current, V <sub>GS</sub> = 10V (Note 6)	I <sub>D</sub>	120 96	A
Maximum Continuous Body Diode Forward Current (Note 5)	I <sub>S</sub>	3.5	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I <sub>DM</sub>	448	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I <sub>SM</sub>	448	A
Avalanche Current, L = 0.1mH	I <sub>AS</sub>	50	A
Avalanche Energy, L = 0.1mH	E <sub>AS</sub>	128	mJ

**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P <sub>D</sub>	3.2	W
Thermal Resistance, Junction to Ambient (Note 5)	R <sub>θJA</sub>	38.4	°C/W
Total Power Dissipation (Note 7)	P <sub>D</sub>	1.4	W
Thermal Resistance, Junction to Ambient (Note 7)	R <sub>θJA</sub>	90.6	°C/W
Thermal Resistance, Junction to Case (Note 6)	R <sub>θJC</sub>	3.06	°C/W
Operating and Storage Temperature Range	T <sub>J</sub> , T <sub>STG</sub>	-55 to +150	°C

**Electrical Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 8)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0, I <sub>D</sub> = 250μA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	—	—	1	μA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0
<b>ON CHARACTERISTICS (Note 8)</b>						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.2	—	2.5	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250μA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	1.1	1.6	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 30A
		—	2.3	2.6		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 30A
Diode Forward Voltage	V <sub>SD</sub>	—	0.7	1.2	V	V <sub>GS</sub> = 0, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS (Note 9)</b>						
Input Capacitance	C <sub>iss</sub>	—	2955	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	899	—	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	—	54	—	pF	
Gate Resistance	R <sub>g</sub>	—	1.51	—	Ω	V <sub>DS</sub> = 0, V <sub>GS</sub> = 0, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	18.2	—	nC	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 10A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	37.3	—	nC	
Gate-Source Charge	Q <sub>gs</sub>	—	7.8	—	nC	
Gate-Drain Charge	Q <sub>gd</sub>	—	4.1	—	nC	
Turn-On Delay Time	t <sub>D(ON)</sub>	—	4.5	—	ns	V <sub>GS</sub> = 10V, V <sub>DD</sub> = 15V, R <sub>G</sub> = 3.3Ω, I <sub>D</sub> = 10A
Turn-On Rise Time	t <sub>r</sub>	—	12	—	ns	
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	22.9	—	ns	
Turn-Off Fall Time	t <sub>f</sub>	—	12	—	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1 inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

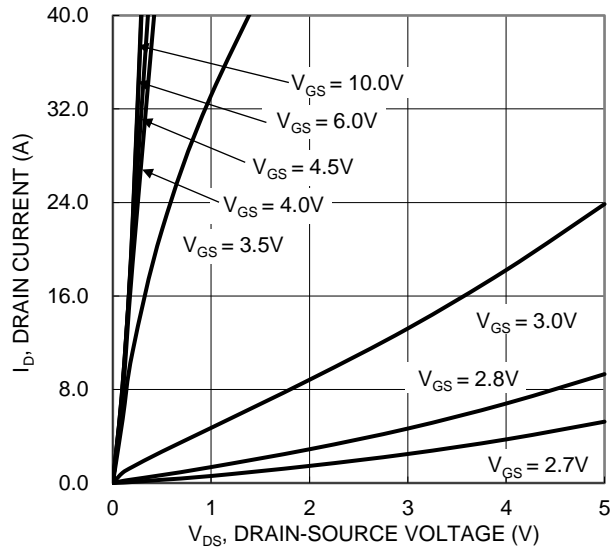


Figure 1. Typical Output Characteristic

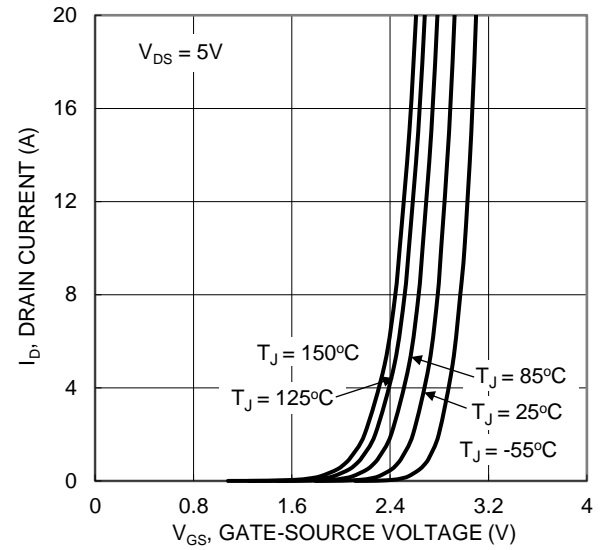


Figure 2. Typical Transfer Characteristic

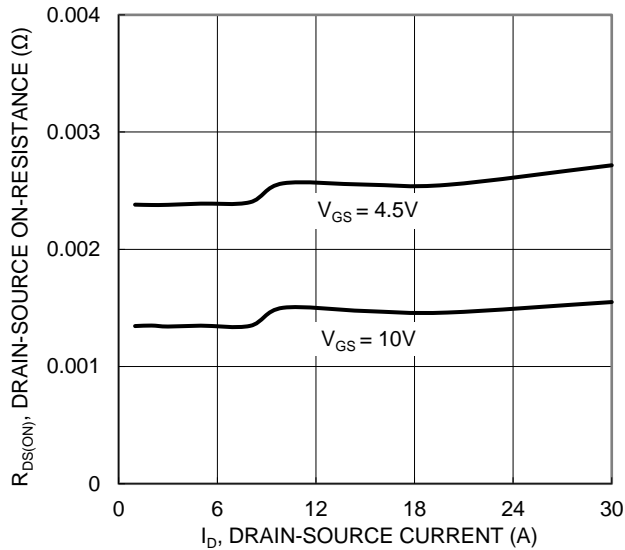


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

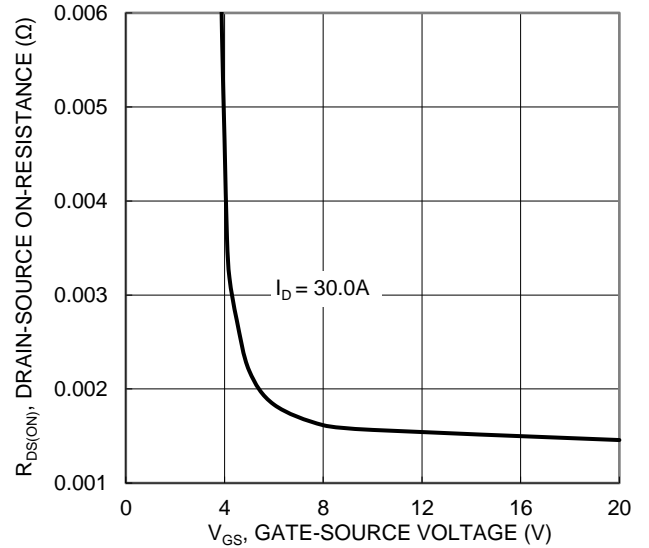


Figure 4. Typical Transfer Characteristic

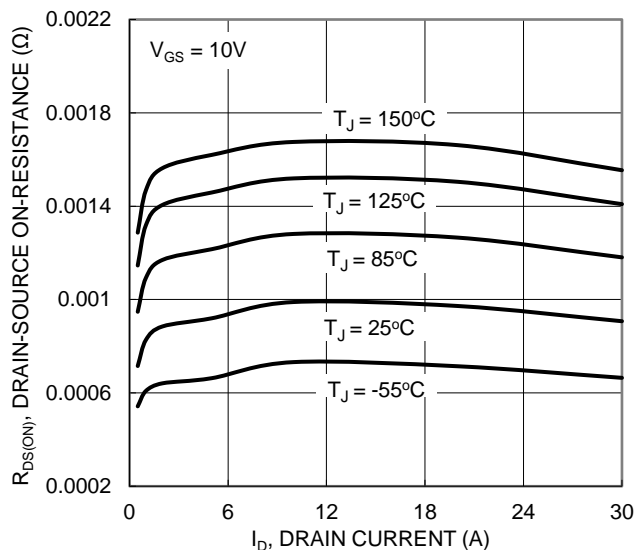


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

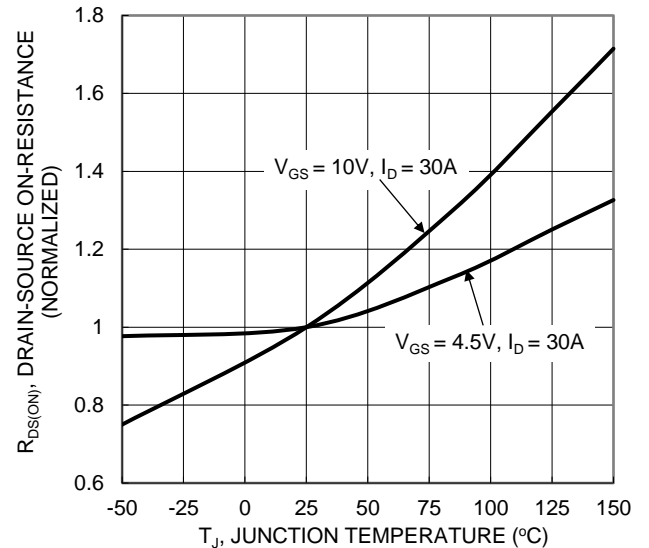
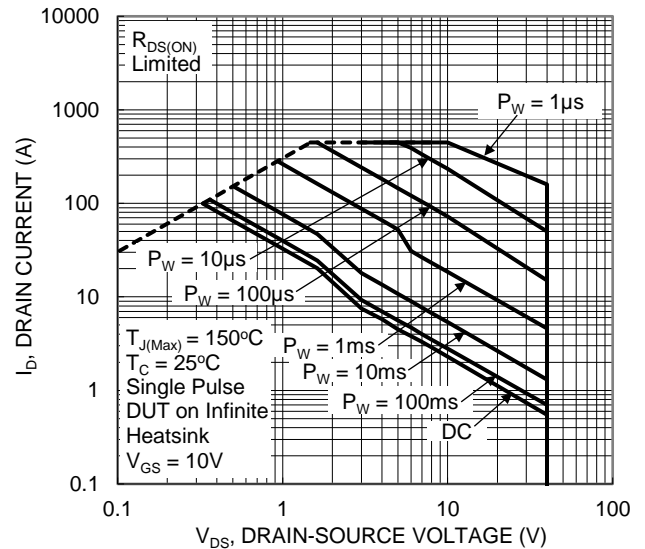
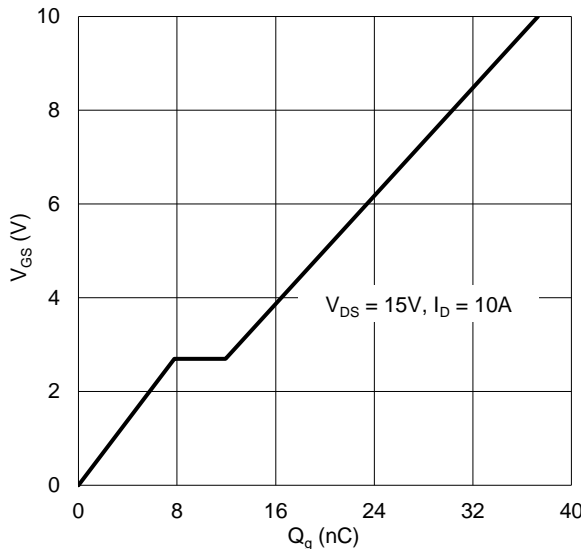
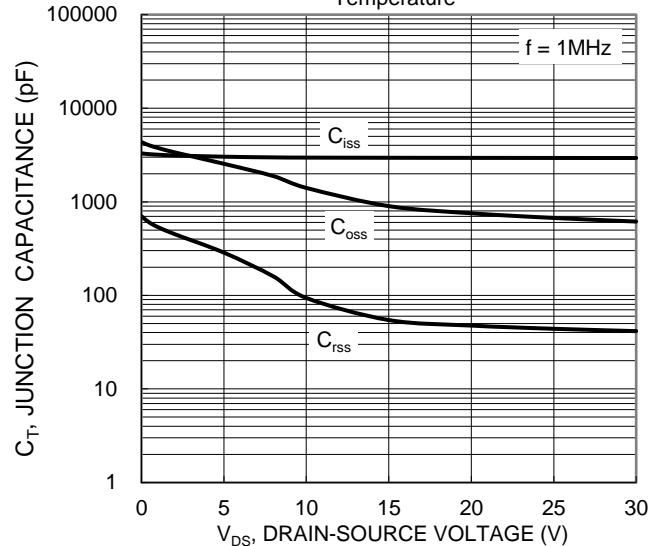
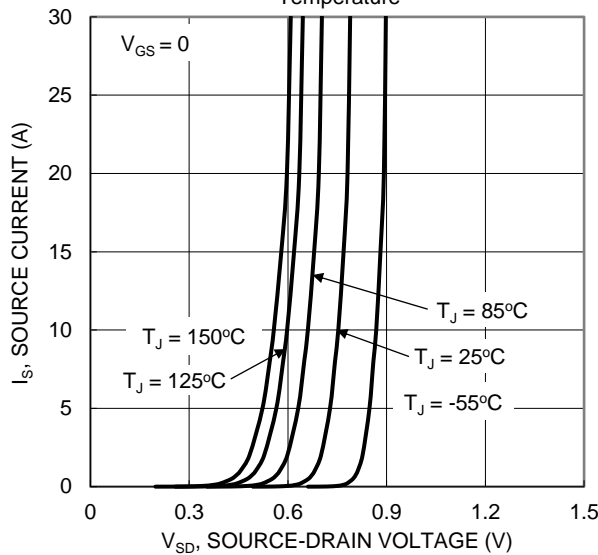
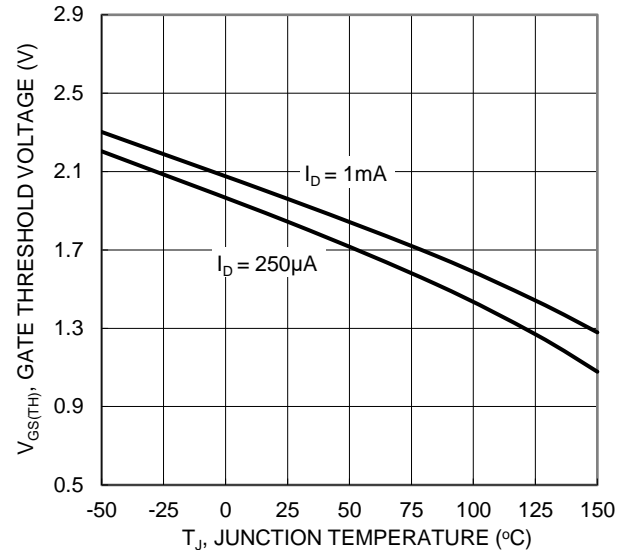
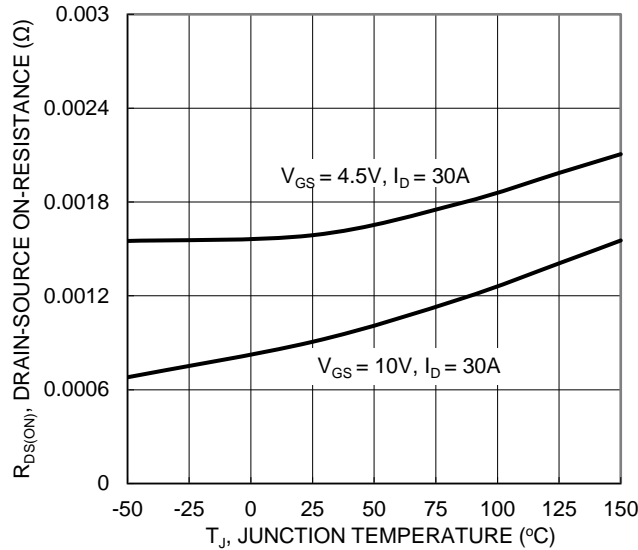


Figure 6. On-Resistance Variation with Junction Temperature



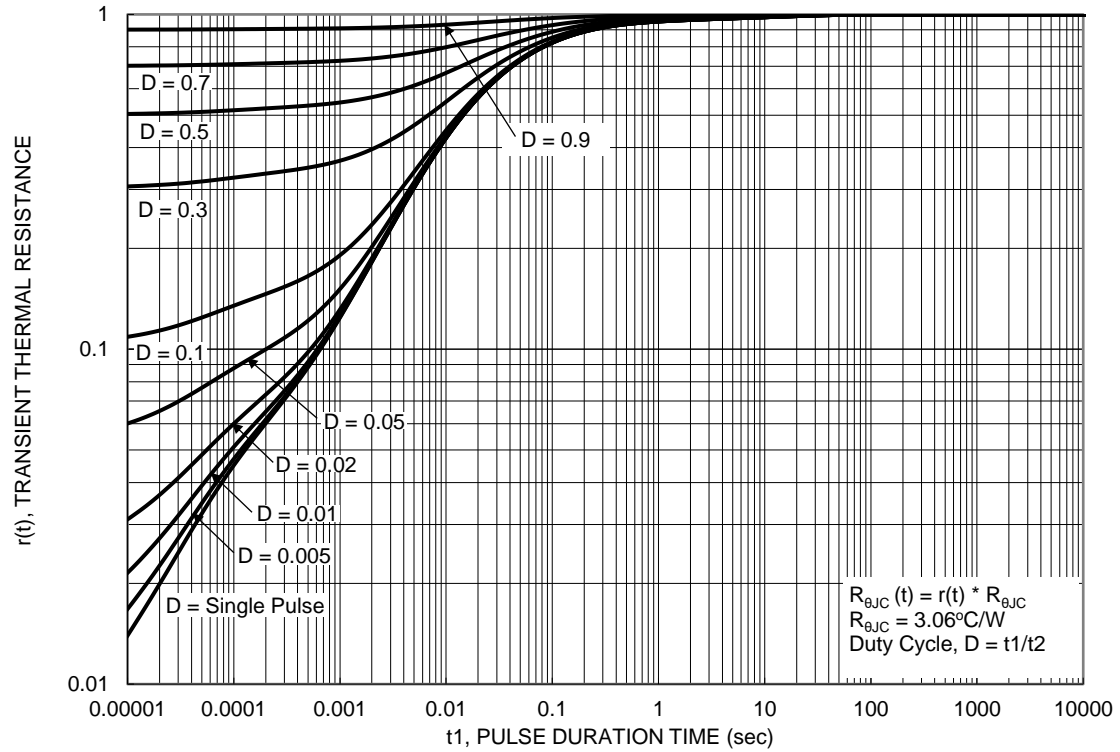
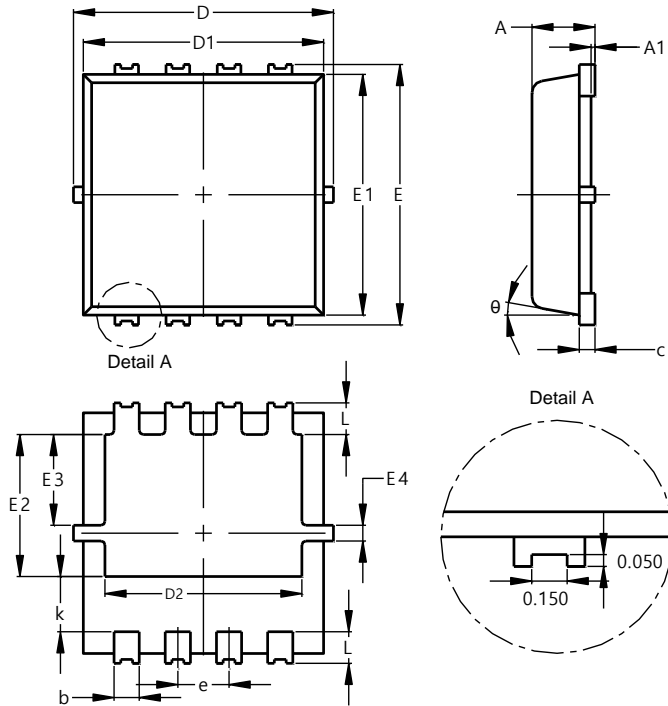


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

### PowerDI3333-8/SWP (Type UX)

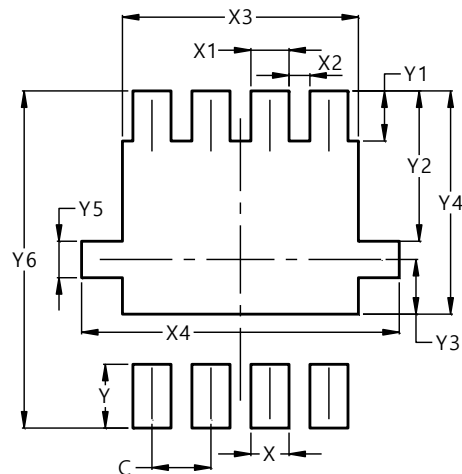


PowerDI3333-8/SWP (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	--	--	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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