

## Product Summary

BV <sub>DSS</sub>	R <sub>DS(ON)</sub> Max	I <sub>D</sub> Max T <sub>C</sub> = +25°C
30V	7mΩ @ V <sub>GS</sub> = 10V	60A
	11mΩ @ V <sub>GS</sub> = 4.5V	

## Description

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.

## Applications

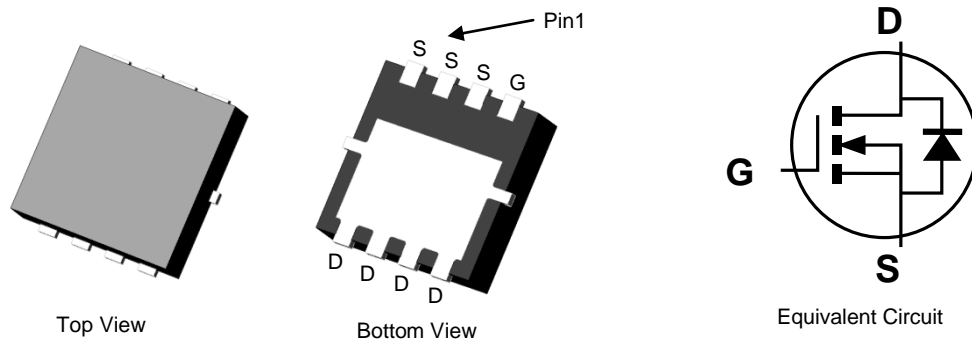
- Power Management Functions
- Analog Switch

## Features

- Low R<sub>DS(ON)</sub> – Ensures On-State Losses are Minimized
- 100% Unclamped Inductive Switching (Test in Production) – Ensures More Reliable and Robust End Application
- 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
- 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)**

## Mechanical Data

- Case: PowerDI<sup>®</sup> 3333-8 (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 Ⓔ
- Weight: 0.03 grams (Approximate)

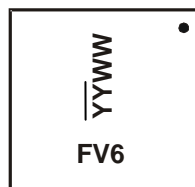


## Ordering Information (Note 5)

Part Number	Case	Packaging
DMT3006LFVQ-7	PowerDI3333-8 (Type UX)	2,000/Tape & Reel
DMT3006LFVQ-13	PowerDI3333-8 (Type UX)	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
  - 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.
  - Halogen- and Antimony-free “Green” products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
  - Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
  - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

## Marking Information



FV6 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Two Digits of Year (ex: 18 = 2018)  
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 8)	Steady State	T <sub>C</sub> = +25°C	I <sub>D</sub>	60	A
		T <sub>C</sub> = +70°C		45	
Maximum Body Diode Forward Current (Note 8)			I <sub>S</sub>	2	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I <sub>DM</sub>	90	A
Pulsed Drain Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)			I <sub>SM</sub>	90	A
Avalanche Current (L = 0.1mH) (Note 9)			I <sub>AS</sub>	24	A
Avalanche Energy (L = 0.1mH) (Note 9)			E <sub>AS</sub>	29	mJ

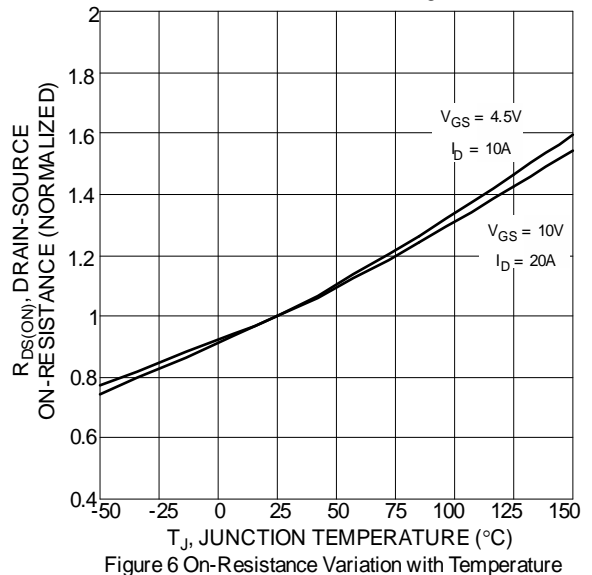
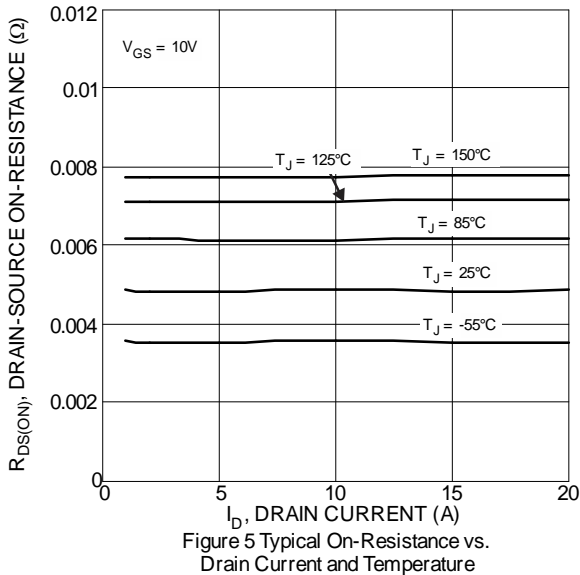
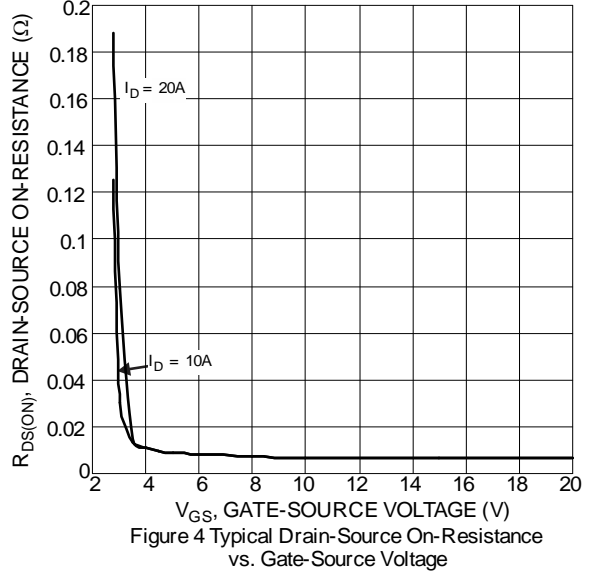
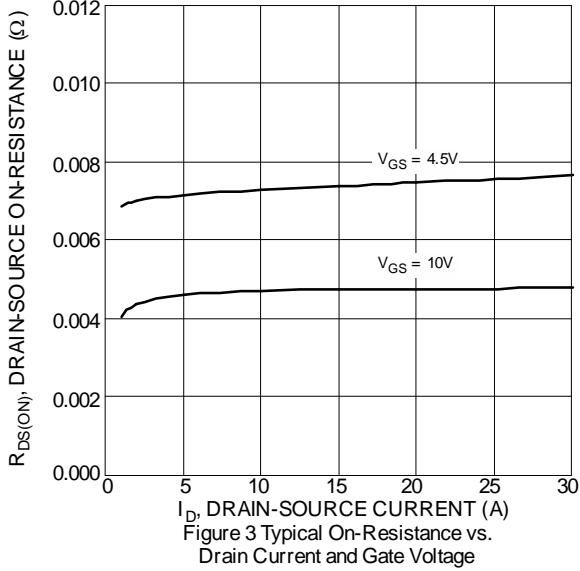
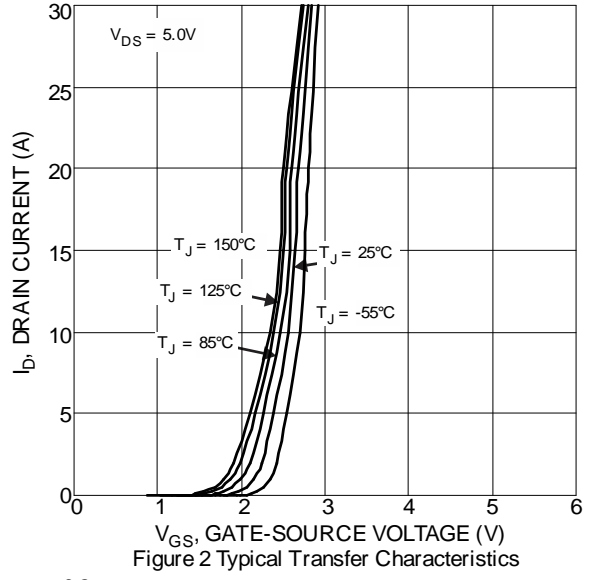
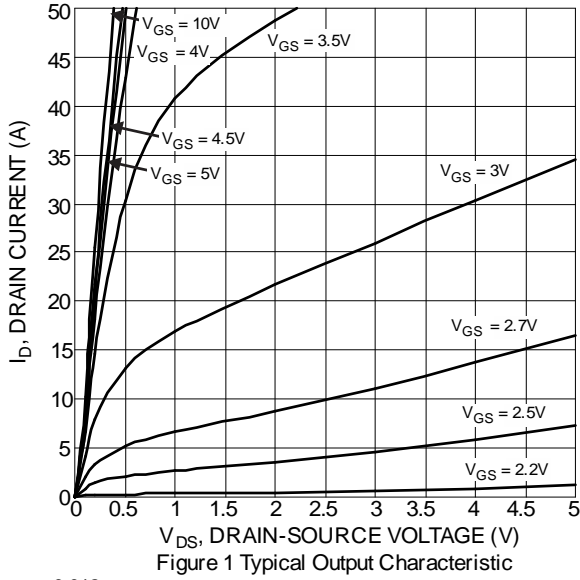
**Thermal Characteristics** (@T<sub>A</sub> = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Total Power Dissipation (Note 6)			P <sub>D</sub>	1.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		R <sub>θJA</sub>	130	°C/W
Total Power Dissipation (Note 7)			P <sub>D</sub>	2.0	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State		R <sub>θJA</sub>	63	°C/W
Thermal Resistance, Junction to Case (Note 8)			R <sub>θJC</sub>	2.9	
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</b> (Note 10)						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	30	—	—	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250µA
Zero Gate Voltage Drain Current T <sub>J</sub> = +25°C	I <sub>DSS</sub>	—	—	1	µA	V <sub>DS</sub> = 24V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	—	—	±100	nA	V <sub>GS</sub> = +20V, V <sub>DS</sub> = 0V V <sub>GS</sub> = -16V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS</b> (Note 10)						
Gate Threshold Voltage	V <sub>GS(TH)</sub>	1.0	—	3.0	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = 250µA
Static Drain-Source On-Resistance	R <sub>DS(ON)</sub>	—	5.6	7	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 9.0A
			8.0	11		V <sub>GS</sub> = 4.5V, I <sub>D</sub> = 8.5A
Diode Forward Voltage	V <sub>SD</sub>	—	0.70	1.2	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 1A
<b>DYNAMIC CHARACTERISTICS</b> (Note 11)						
Input Capacitance	C <sub>iss</sub>	—	1,155	—	pF	V <sub>DS</sub> = 15V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	—	456	—		
Reverse Transfer Capacitance	C <sub>rss</sub>	—	72	—		
Gate Resistance	R <sub>g</sub>	—	1.6	—	Ω	V <sub>DS</sub> = 0V, V <sub>GS</sub> = 0V, f = 1.0MHz
Total Gate Charge (V <sub>GS</sub> = 4.5V)	Q <sub>g</sub>	—	8.4	—	nC	V <sub>DD</sub> = 15V, I <sub>D</sub> = 9A
Total Gate Charge (V <sub>GS</sub> = 10V)	Q <sub>g</sub>	—	16.7	—		
Gate-Source Charge	Q <sub>gs</sub>	—	2.2	—		
Gate-Drain Charge	Q <sub>gd</sub>	—	3.5	—		
Turn-On Delay Time	t <sub>D(ON)</sub>	—	3.5	—	ns	V <sub>DD</sub> = 15V, V <sub>GS</sub> = 10V, R <sub>G</sub> = 3Ω, I <sub>D</sub> = 9A
Turn-On Rise Time	t <sub>R</sub>	—	5.5	—		
Turn-Off Delay Time	t <sub>D(OFF)</sub>	—	13.5	—		
Turn-Off Fall Time	t <sub>F</sub>	—	4.6	—		
Reverse Recovery Time	t <sub>RR</sub>	—	19.3	—	ns	I <sub>F</sub> = 1.5A, di/dt = 100A/µs
Reverse Recovery Charge	Q <sub>RR</sub>	—	8.6	—	nC	

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
  - Thermal resistance from junction to soldering point (on the exposed drain pad).
  - I<sub>AS</sub> and E<sub>AS</sub> ratings are based on low frequency and duty cycles to keep T<sub>J</sub> = +25°C.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.



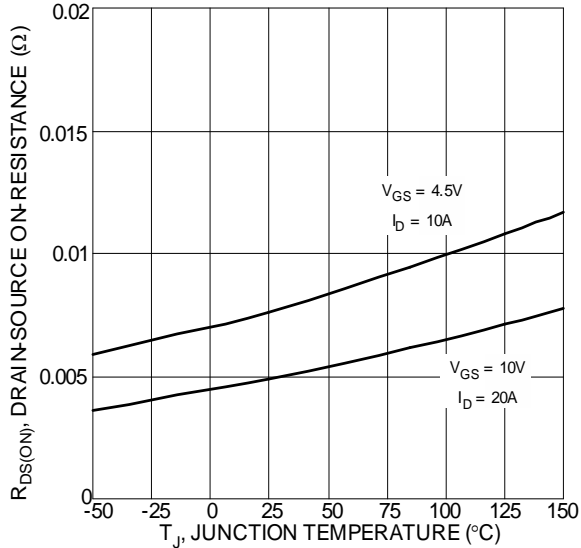


Figure 7 On-Resistance Variation with Temperature

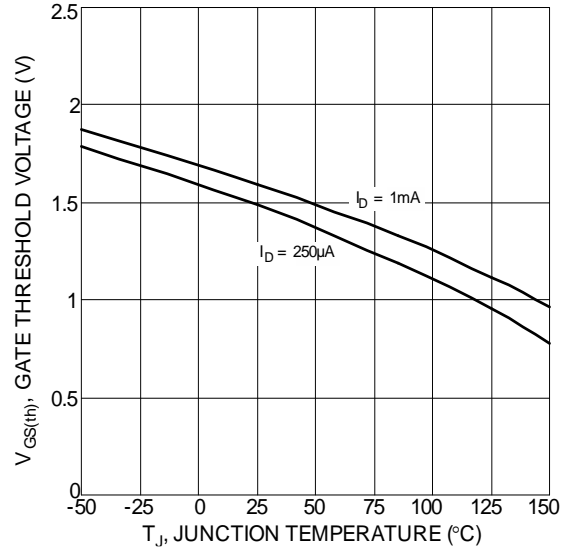


Figure 8 Gate Threshold Variation vs. Junction Temperature

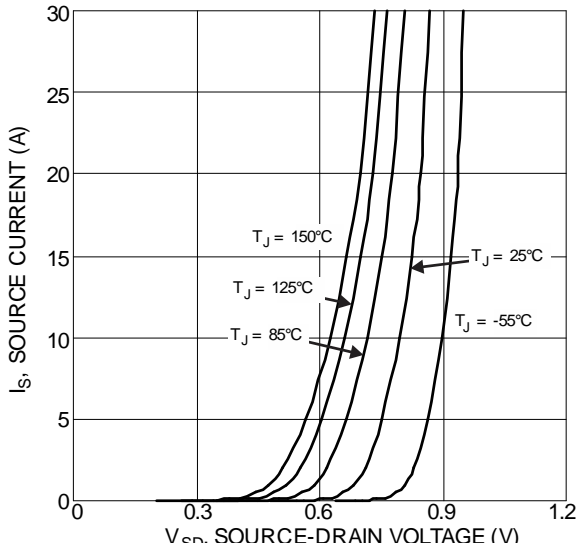


Figure 9 Diode Forward Voltage vs. Current

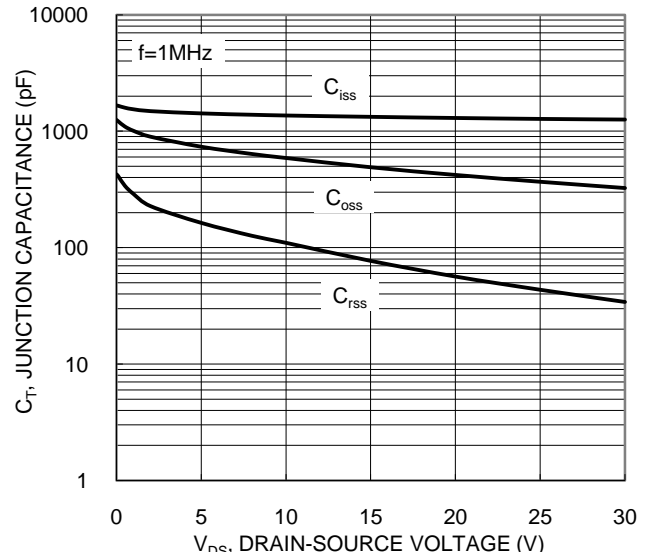


Figure 10. Typical Junction Capacitance

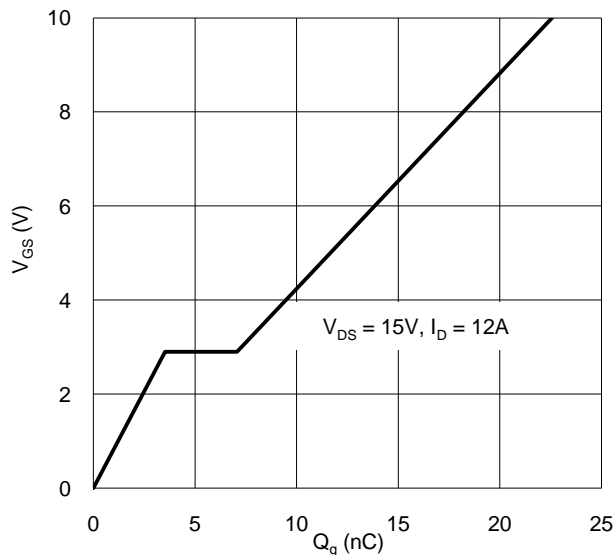


Figure 11. Gate Charge

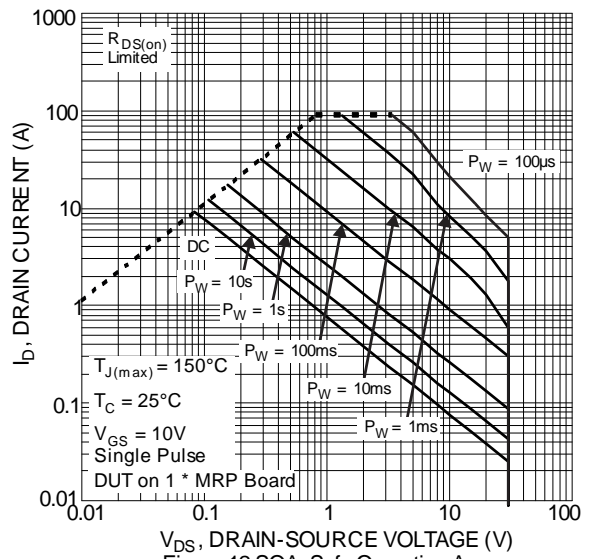
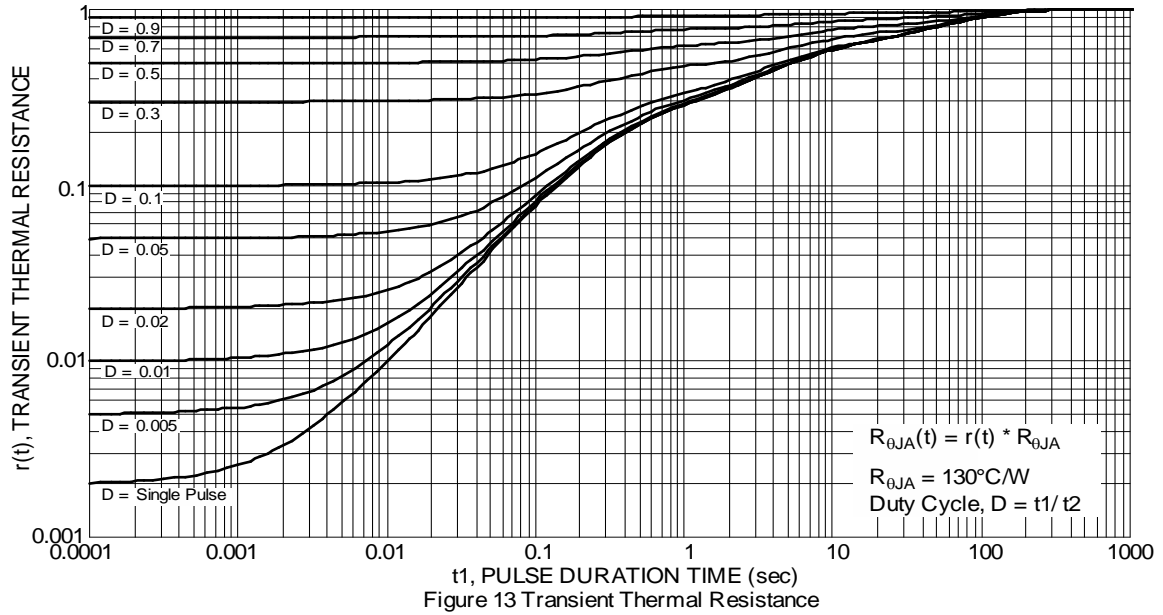


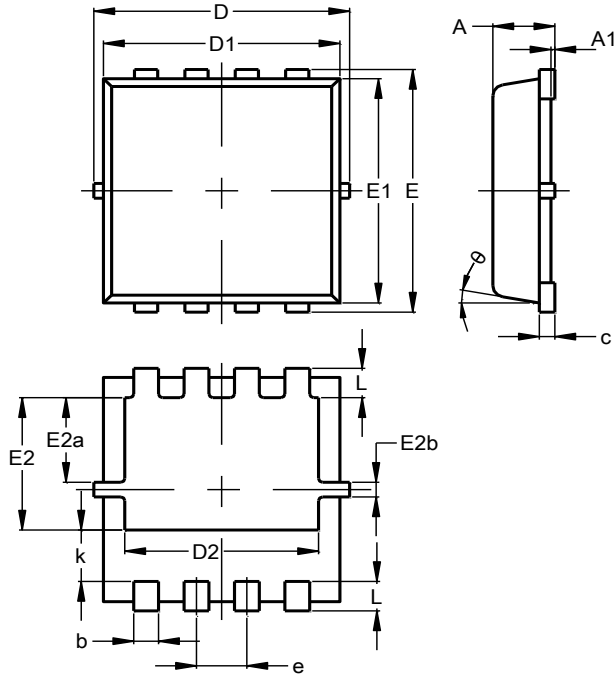
Figure 12 SOA, Safe Operation Area



**Package Outline Dimensions**

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

**PowerDI3333-8 (Type UX)**

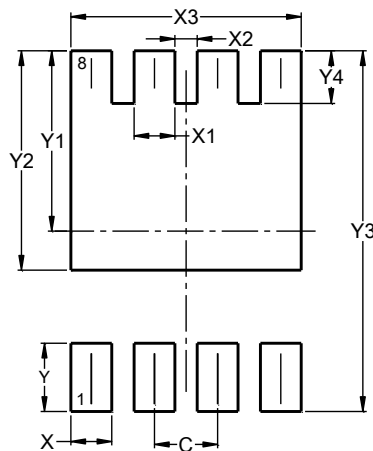


PowerDI3333-8 (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40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