

Product Summary

BV_{DSS}	R_{DSON} Max	I_D Max T_C = +25°C
-20V	9.5mΩ @ V _{GS} = -4.5V	-50A
	12.5mΩ @ V _{GS} = -2.5V	

Description

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

Applications

- Load Switch
- Power Management Functions

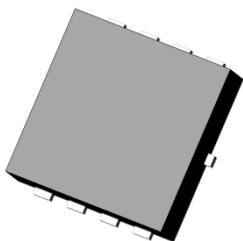
Features

- Low R_{DSON} – 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

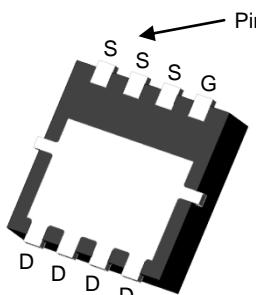
Mechanical Data

- Case: PowerDI[®] 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 E3
- Weight: 0.072 grams (Approximate)

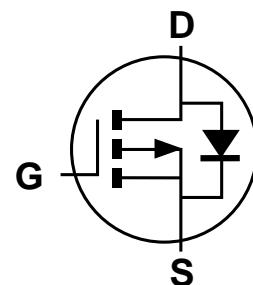
PowerDI3333-8 (Type UX)



Top View



Bottom View



Equivalent Circuit

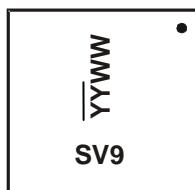
Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2010UFV-7	PowerDI3333-8 (Type UX)	2000/Tape & Reel
DMP2010UFV-13	PowerDI3333-8 (Type UX)	3000/Tape & Reel

Notes:

1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
2. See http://www.diodes.com/quality/lead_free.html 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 <http://www.diodes.com/products/packages.html>.

Marking Information



SV9 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 17 = 2017)
 WW = Week Code (01 to 53)

Maximum Ratings (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	-20	V
Gate-Source Voltage		V_{GSS}	± 10	V
Continuous Drain Current, $V_{GS} = -4.5\text{V}$ (Note 7)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	-50 -40	A
Maximum Continuous Body Diode Forward Current (Note 7)		I_S	-50	A
Pulsed Drain Current (380 μs Pulse, Duty Cycle = 1%)		I_{DM}	-80	A
Avalanche Current, $L = 0.1\text{mH}$ (Note 8)		I_{AS}	-35	A
Avalanche Energy, $L = 0.1\text{mH}$ (Note 8)		E_{AS}	64	mJ

Thermal Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	122	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)		P_D	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	62	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	3.5	
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics (@ $T_A = +25^\circ\text{C}$, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV_{DSS}	-20	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$V_{GS} = \pm 8\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1.2	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	7.5	9.5	$\text{m}\Omega$	$V_{GS} = -4.5\text{V}, I_D = -3.6\text{A}$
		—	9.5	12.5		$V_{GS} = -2.5\text{V}, I_D = -3.6\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -10\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	3350	—	pF	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	527	—		
Reverse Transfer Capacitance	C_{rss}	—	460	—		
Gate Resistance	R_G	—	10.7	—	Ω	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ($V_{GS} = -4.5\text{V}$)	Q_g	—	50	—	nC	$V_{DS} = -10\text{V}, I_D = -3.6\text{A}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	103	—		
Gate-Source Charge	Q_{qs}	—	6.0	—		
Gate-Drain Charge	Q_{qd}	—	14.4	—		
Turn-On Delay Time	$t_{D(ON)}$	—	9.7	—	ns	$V_{DD} = -10\text{V}, V_{GS} = -4.5\text{V}, R_{GEN} = 4.7\Omega, I_D = -3.6\text{A}$
Turn-On Rise Time	t_R	—	30	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	235	—		
Turn-Off Fall Time	t_F	—	110	—		
Reverse Recovery Time	t_{RR}	—	64	—	ns	$I_F = -3.6\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	60	—		

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 1-inch square copper plate.
- Thermal resistance from junction to soldering point (on the exposed drain pad).
- I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^\circ\text{C}$.
- Short duration pulse test used to minimize self-heating effect.
- Guaranteed by design. Not subject to product testing.

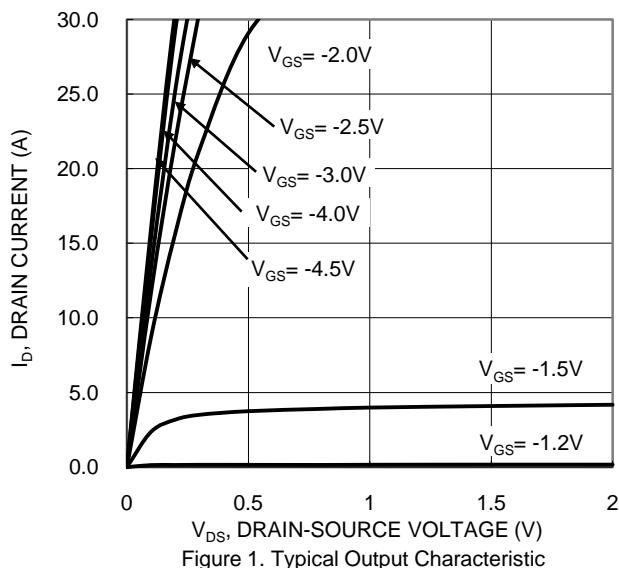


Figure 1. Typical Output Characteristic

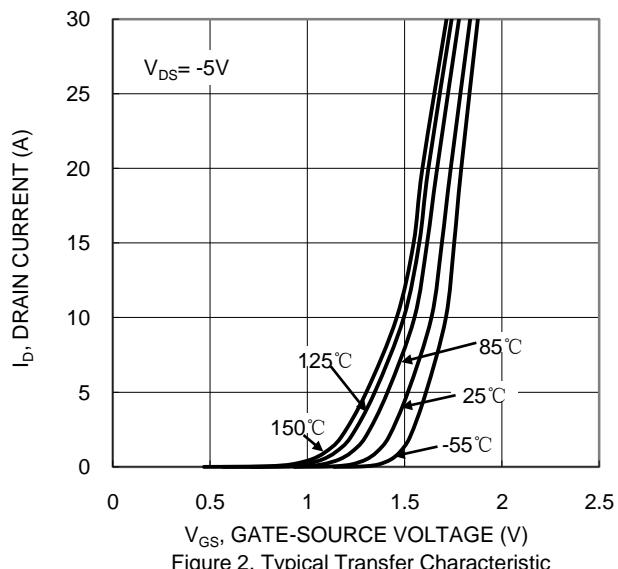


Figure 2. Typical Transfer Characteristic

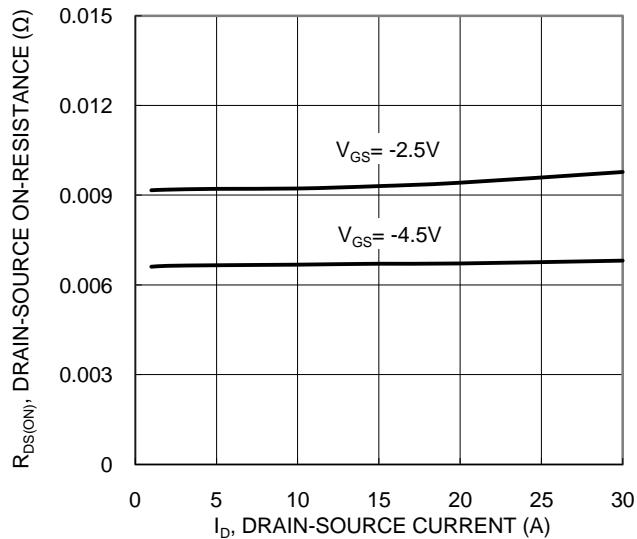


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

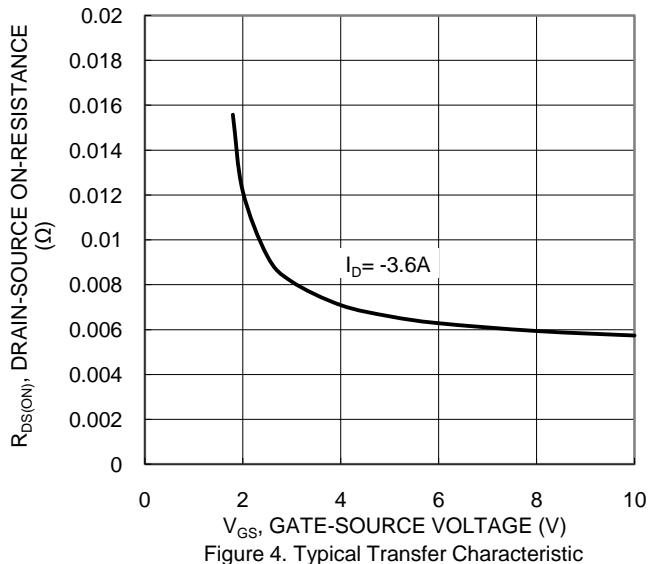


Figure 4. Typical Transfer Characteristic

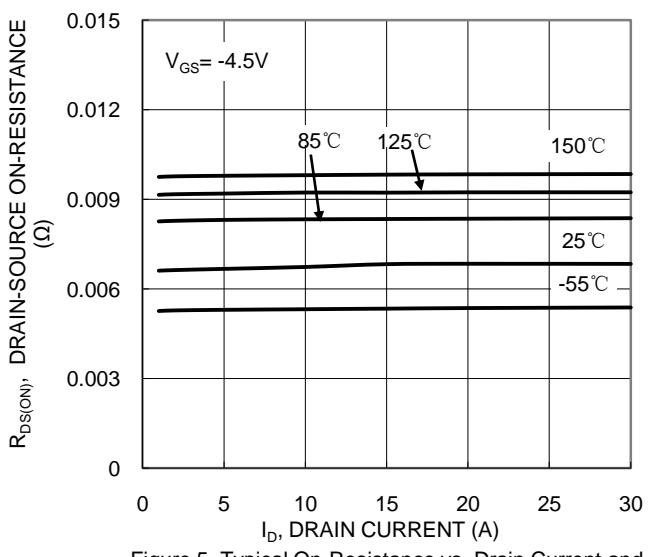


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

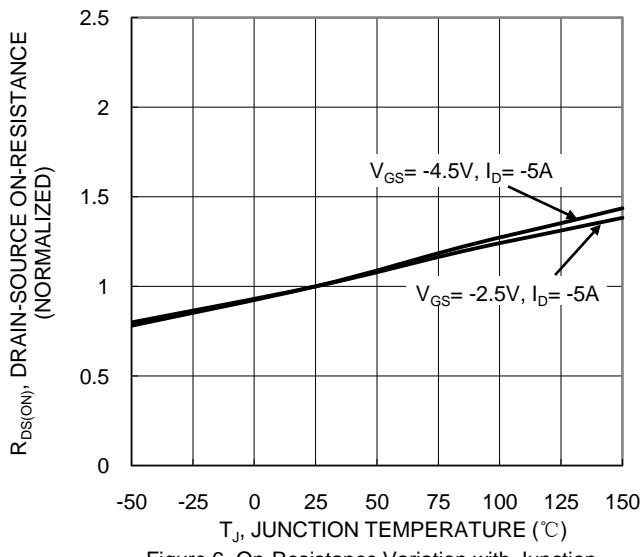
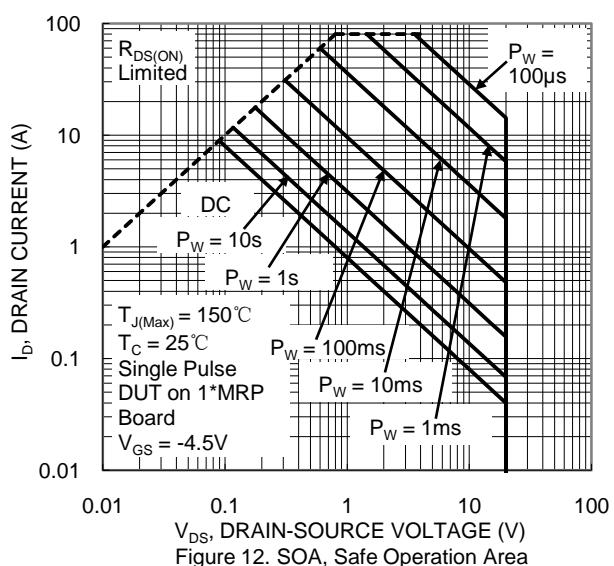
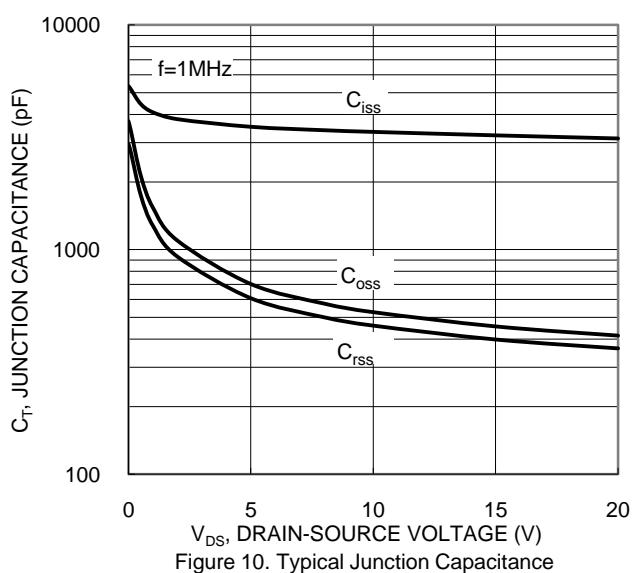
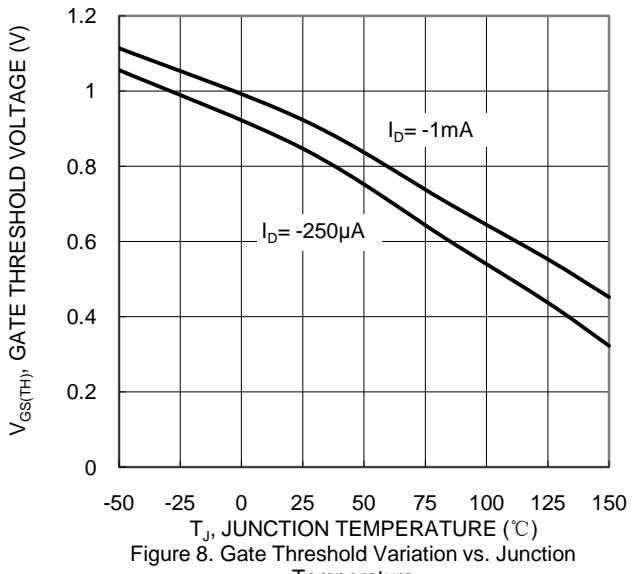
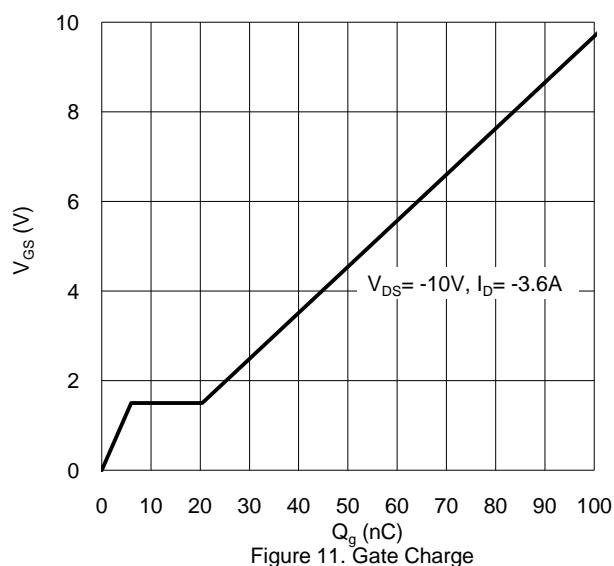
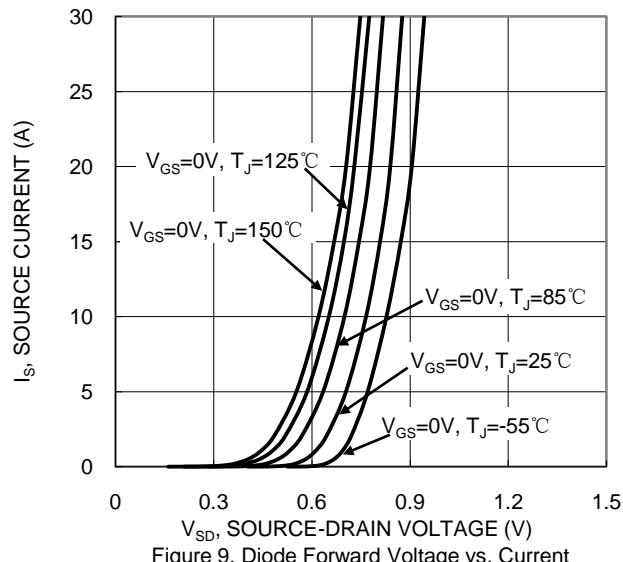
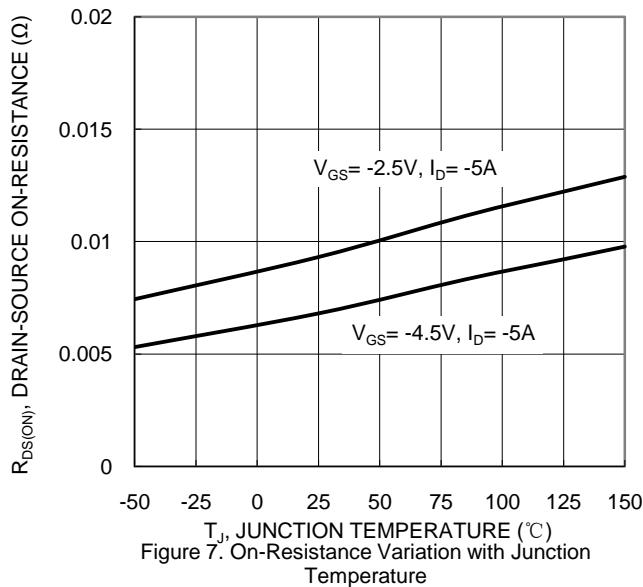


Figure 6. On-Resistance Variation with Junction Temperature



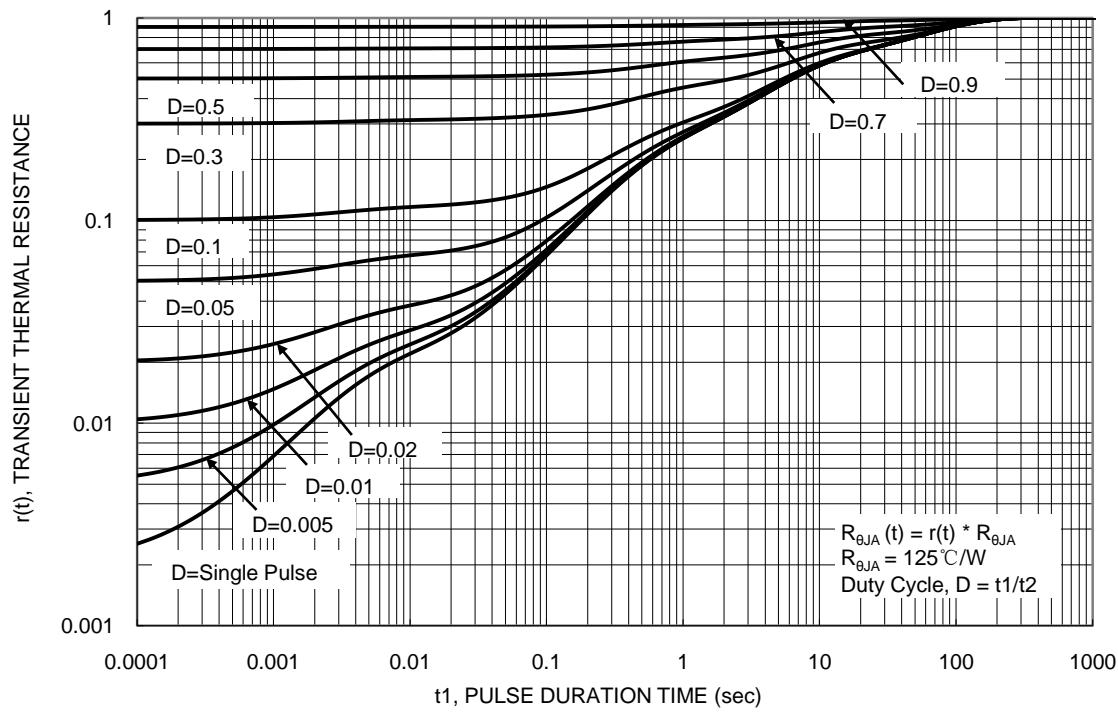
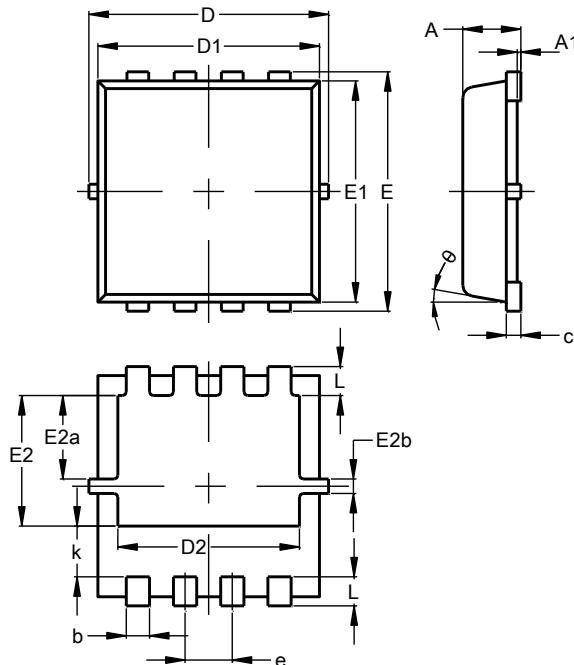


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (Type UX)



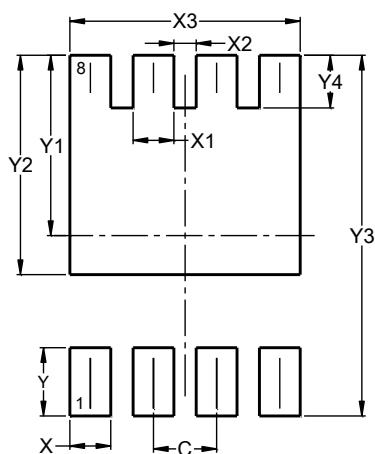
PowerDI3333-8 (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40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