

Product Summary

BV _{DSS}	R _{D(on)} Max	I _D Max T _C = +25°C
-30V	15mΩ @ V _{GS} = -10V	-42A
	25mΩ @ V _{GS} = -5V	-32A

Description

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

Applications

- General purpose interfacing switches
- Power management functions

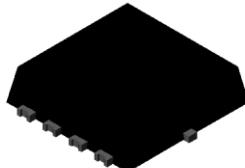
Features and Benefits

- Low R_{D(on)} – 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
- ESD Protected Gate**
- 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 ([DMP3021SFVWQ](#))**

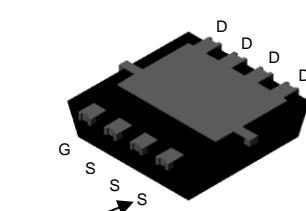
Mechanical Data

- 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: 0.072 grams (Approximate)

PowerDI3333-8 (SWP) (Type UX)

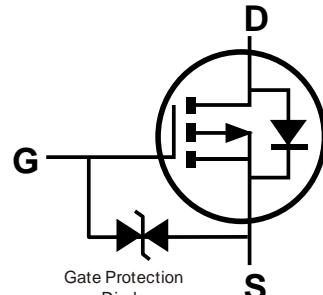


Top View



Pin1

Bottom View



Equivalent Circuit

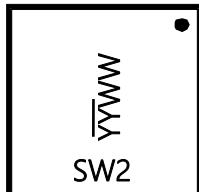
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP3021SFVW-7	PowerDI3333-8 (SWP) (Type UX)	2,000	Tape & Reel
DMP3021SFVW-13	PowerDI3333-8 (SWP) (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.
- For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



SW2 = Product Type Marking Code

YYWW = Date Code Marking

YY = Last Two Digits of Year (ex: 22 = 2022)

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}	-30	V
Gate-Source Voltage			V_{GSS}	± 25	V
Continuous Drain Current (Note 6) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	I_D	-11 -9	A
Continuous Drain Current (Note 7) $V_{GS} = -10\text{V}$	Steady State	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	I_D	-42 -34	A
Maximum Continuous Body Diode Forward Current (Note 7)			I_S	-42	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)			I_{DM}	-128	A
Pulsed Body Diode Forward Current (10 μs Pulse, Duty Cycle = 1%)			I_{SM}	-128	A
Avalanche Current (Note 8) $L = 1\text{mH}$			I_{AS}	-13	A
Avalanche Energy (Note 8) $L = 1\text{mH}$			E_{AS}	84	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	P_D	1	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	126.6	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	P_D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	51.2	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	3.6	$^\circ\text{C/W}$
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}	-30	—	—	V	$V_{GS} = 0\text{V}, I_D = -250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	-1	μA	$V_{DS} = -30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 10	μA	$V_{GS} = \pm 25\text{V}, V_{DS} = 0\text{V}$
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(\text{th})}$	-1.0	—	-2.5	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(\text{on})}$	—	10.3	15	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -8\text{A}$
		—	15.5	25		$V_{GS} = -5\text{V}, I_D = -5\text{A}$
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -1\text{A}$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	—	1799	—	pF	$V_{DS} = -15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	C_{oss}	—	259	—	pF	
Reverse Transfer Capacitance	C_{rss}	—	225	—	pF	
Gate Resistance	R_g	—	2.1	—	Ω	
Total Gate Charge ($V_{GS} = -5\text{V}$)	Q_g	—	17.4	—	nC	$V_{DS} = -15\text{V}, I_D = -10\text{A}$
Total Gate Charge ($V_{GS} = -10\text{V}$)	Q_g	—	34	—	nC	
Gate-Source Charge	Q_{gs}	—	5.1	—	nC	
Gate-Drain Charge	Q_{gd}	—	8.4	—	nC	
Turn-On Delay Time	$t_{D(\text{on})}$	—	6.5	—	ns	$V_{DD} = -15\text{V}, V_{GS} = -10\text{V}, R_G = 3\Omega, I_D = -10\text{A}$
Turn-On Rise Time	t_R	—	18.3	—	ns	
Turn-Off Delay Time	$t_{D(\text{off})}$	—	35.8	—	ns	
Turn-Off Fall Time	t_F	—	23.7	—	ns	
Reverse Recovery Time	t_{RR}	—	14.9	—	ns	$I_S = -8\text{A}, dI/dt = 500\text{A}/\mu\text{s}$
Reverse Recovery Charge	Q_{RR}	—	15	—	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 $T_J = +25^\circ\text{C}$.
9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to product testing.

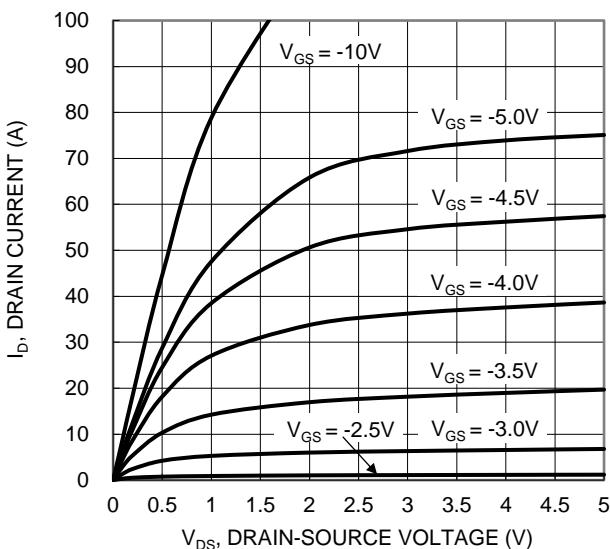


Figure 1. Typical Output Characteristic

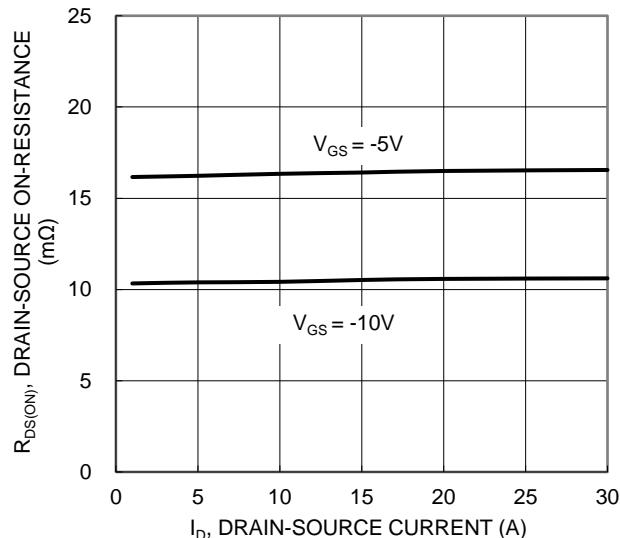


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

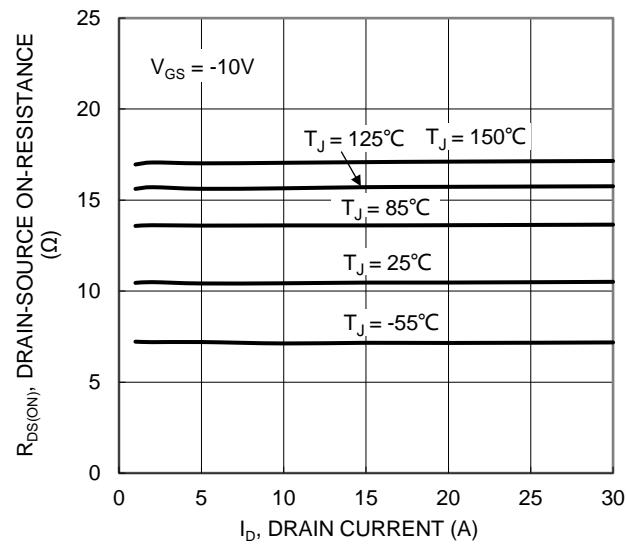


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

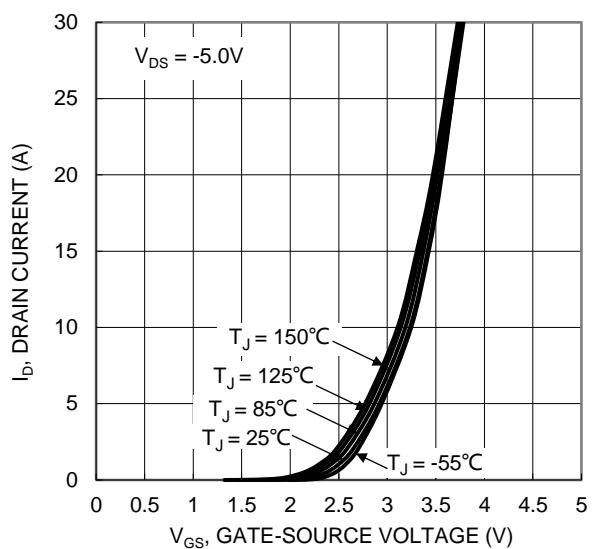


Figure 2. Typical Transfer Characteristic

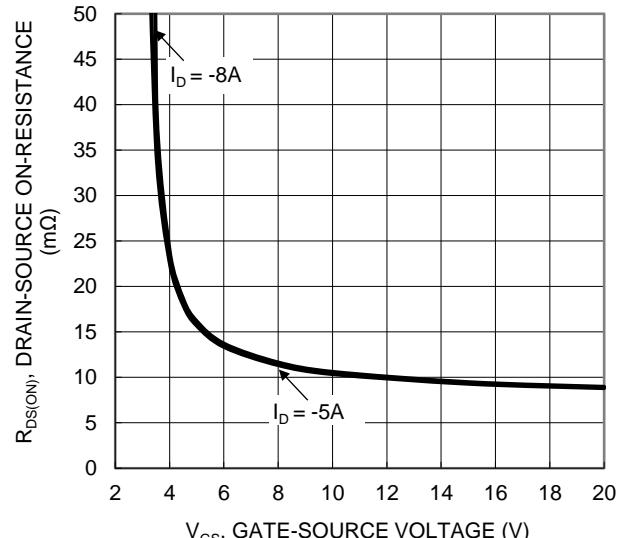


Figure 4. Typical Transfer Characteristic

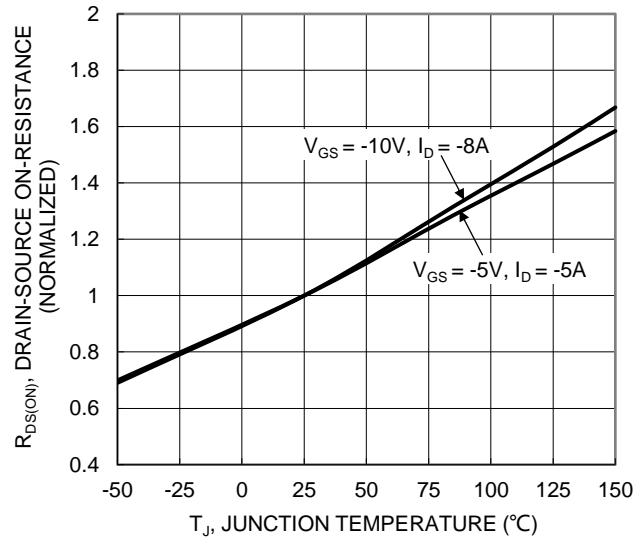
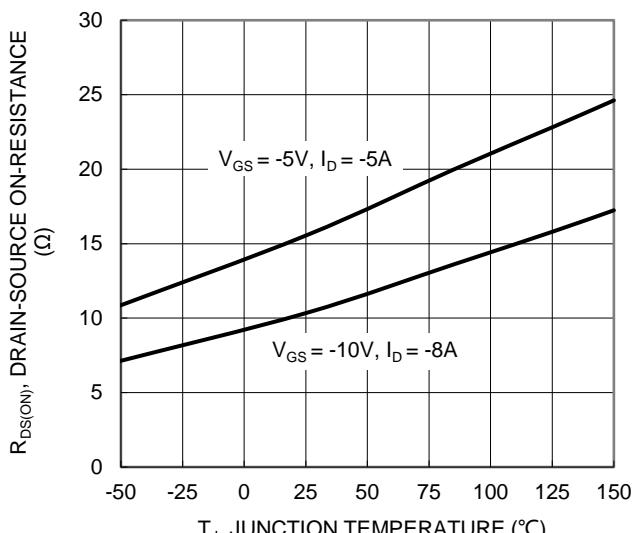
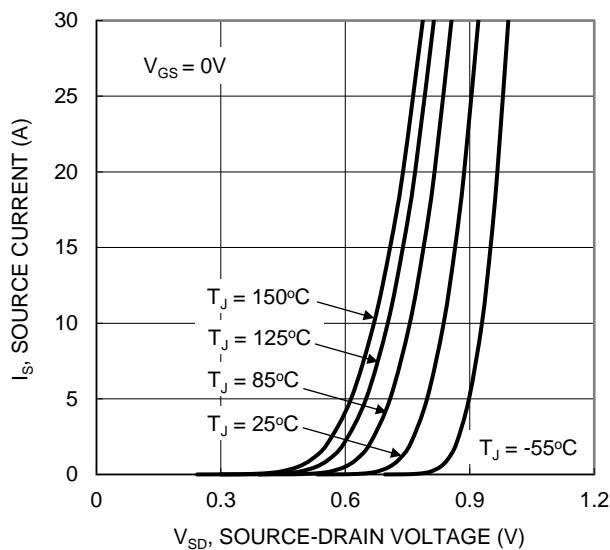
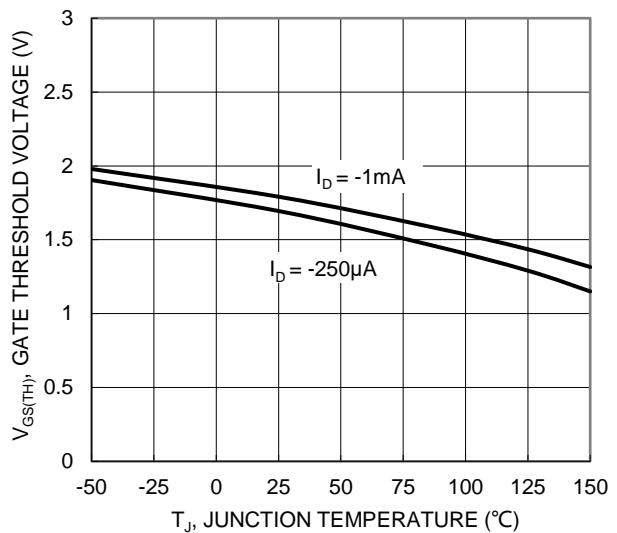


Figure 6. On-Resistance Variation with Temperature



$V_{GS} = -5V, I_D = -5A$

$V_{GS} = -10V, I_D = -8A$



$V_{GS} = 0V$

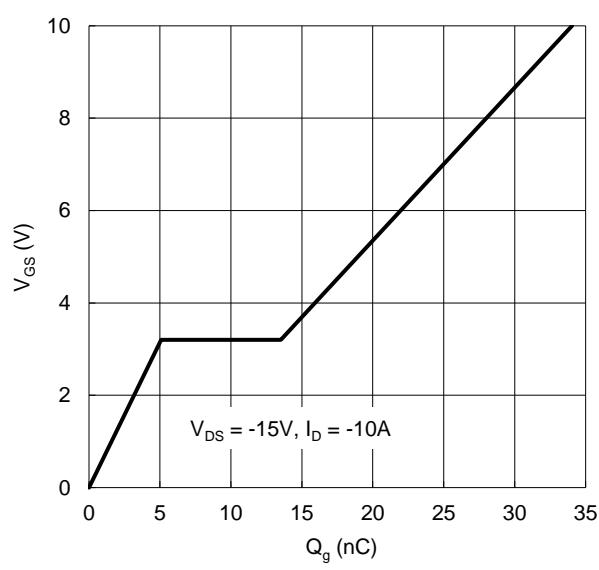
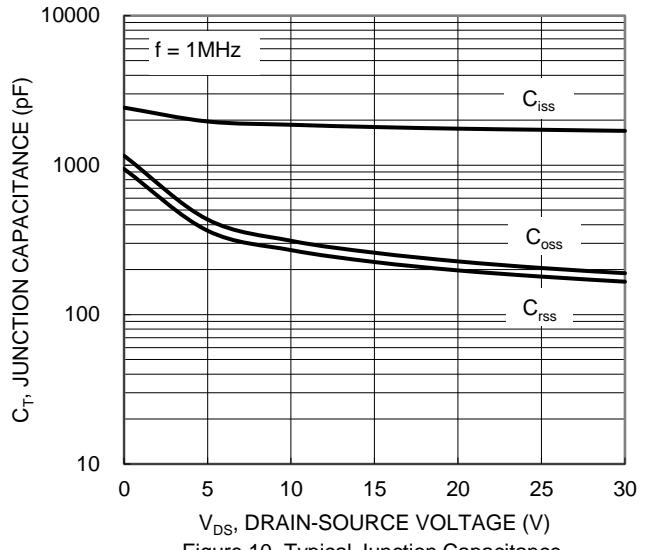
$T_J = 150^\circ C$

$T_J = 125^\circ C$

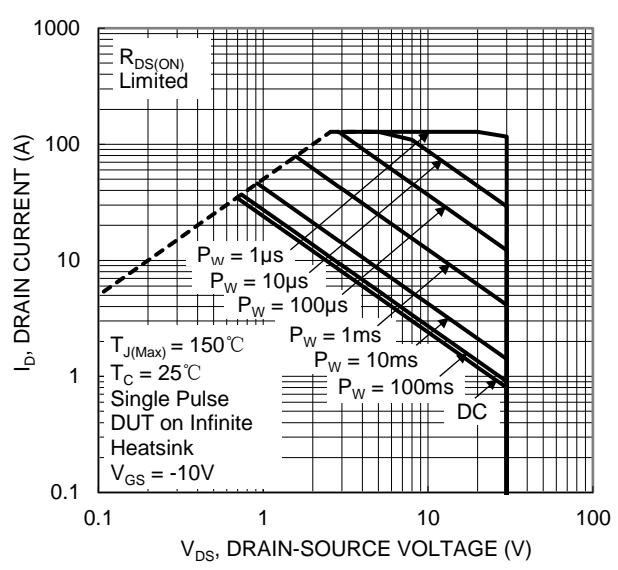
$T_J = 85^\circ C$

$T_J = 25^\circ C$

$T_J = -55^\circ C$



$V_{DS} = -15V, I_D = -10A$



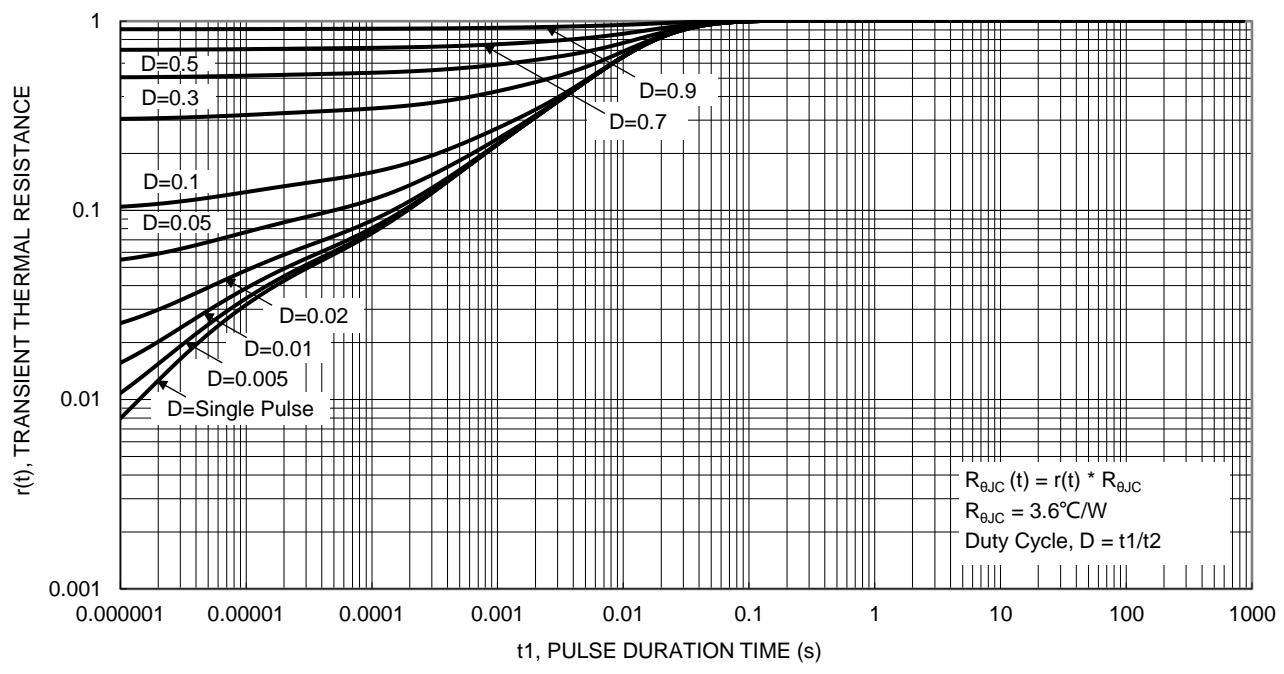
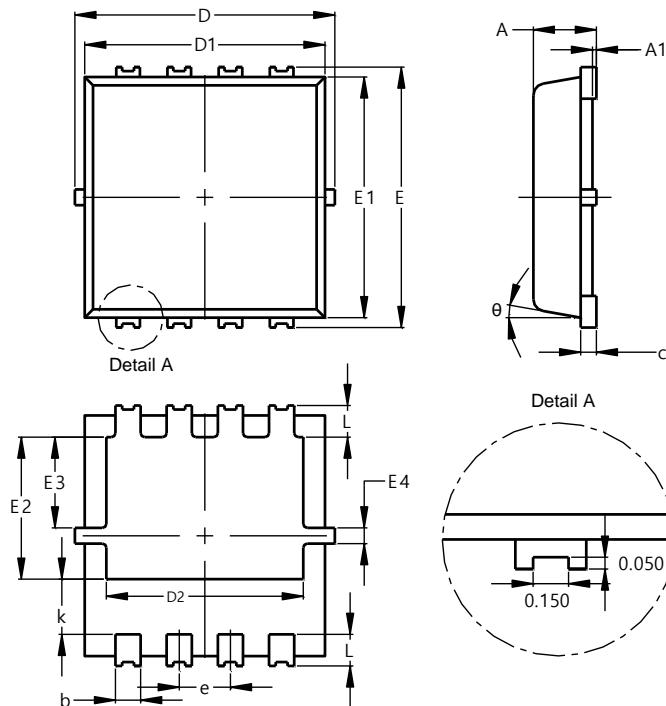


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (SWP) (Type UX)



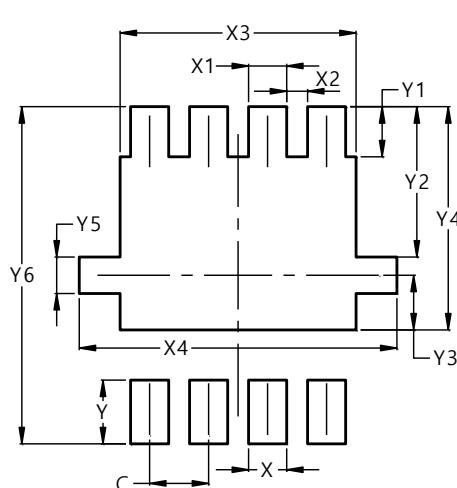
PowerDI3333-8 (SWP) (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	—
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E3	0.95	1.35	1.15
E4	0.10	0.30	0.20
e	—	—	0.65
k	0.50	0.90	0.70
L	0.30	0.50	0.40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