

## Product Summary

Device	BV <sub>DSS</sub>	R <sub>DSON</sub> Max	I <sub>D</sub> Max T <sub>C</sub> = +25°C (Note 10)
Q1 & Q2	30V	12mΩ @ V <sub>GS</sub> = 10V	20A
		20mΩ @ V <sub>GS</sub> = 4.5V	17A
		25mΩ @ V <sub>GS</sub> = 3.8V	15A

## Description

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

## Applications

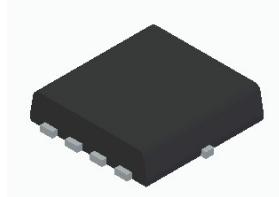
- General Purpose Interfacing Switch
- Power Management Functions

## Features and Benefits

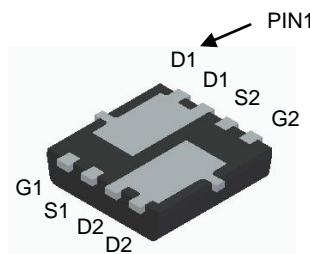
- Low Gate Threshold Voltage
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

## Mechanical Data

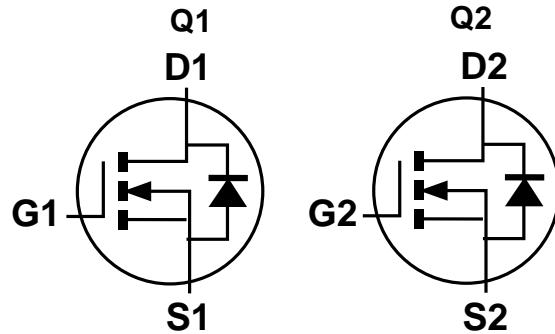
- Case: PowerDI® 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208
- Weight: 0.072 grams (Approximate)



Top View



Bottom View



Equivalent Circuit

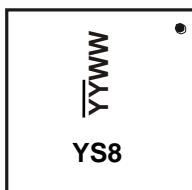
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3009LEV-7	PowerDI3333-8 (Type UXD)	2,000/Tape & Reel
DMT3009LEV-13	PowerDI3333-8 (Type UXD)	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



YS8 = Product Type Marking Code

YYWW = Date Code Marking

YY = Last Two Digits of Year (ex: 18 for 2018)

WW = Week Code (01 to 53)

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

Characteristic			Symbol	Q1&Q2	Unit
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	+20, -16	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State (Note 10)	$T_C = +25^\circ\text{C}$ $T_C = +70^\circ\text{C}$	$I_D$	20 15	A
Maximum Body Diode Forward Current (Note 6)			$I_S$	2.4	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	90	A
Pulsed Body Diode Forward Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{SM}$	90	A
Avalanche Current (Note 7) $L = 0.1\text{mH}$			$I_{AS}$	19.3	A
Avalanche Energy (Note 7) $L = 0.1\text{mH}$			$E_{AS}$	18.6	mJ

**Thermal Characteristics**

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	129	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	68	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	19	
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
<b>OFF CHARACTERISTICS</b> (Note 8)						
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	$\mu\text{A}$	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Zero Gate Voltage Drain Current $T_J = +150^\circ\text{C}$ (Note 9)	$I_{DSS}$	—	—	100	$\mu\text{A}$	$V_{DS} = 24\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = 20\text{V}, V_{DS} = 0\text{V}$ $V_{GS} = -16\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b> (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	1	—	3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	9	12	$\text{m}\Omega$	$V_{GS} = 10\text{V}, I_D = 14.4\text{A}$
		—	13	20		$V_{GS} = 4.5\text{V}, I_D = 7\text{A}$
		—	16	25		$V_{GS} = 3.8\text{V}, I_D = 5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.8	1.2	V	$V_{GS} = 0\text{V}, I_S = 10\text{A}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 9)						
Input Capacitance	$C_{iss}$	—	823	—	$\text{pF}$	$V_{DS} = 15\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	352	—		
Reverse Transfer Capacitance	$C_{rss}$	—	52	—		
Gate Resistance	$R_g$	—	1.2	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	12	—	$\text{nC}$	$V_{DS} = 15\text{V}, I_D = 14.4\text{A}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	5.8	—		
Gate-Source Charge	$Q_{gs}$	—	1.7	—		
Gate-Drain Charge	$Q_{gd}$	—	2.4	—	$\text{ns}$	$V_{GS} = 10\text{V}, V_{DD} = 15\text{V}, R_g = 1\Omega, I_D = 10\text{A}$
Turn-On Delay Time	$t_{D(ON)}$	—	3.2	—		
Turn-On Rise Time	$t_R$	—	5.2	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	8.9	—		
Turn-Off Fall Time	$t_F$	—	1.5	—	$\text{nC}$	$I_F = 10\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Time	$t_{RR}$	—	16.4	—		
Body Diode Reverse Recovery Charge	$Q_{RR}$	—	5.9	—		

Notes: 5. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.

6. Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.

7. UIS in production with  $L = 0.1\text{mH}$ , starting  $T_A = +25^\circ\text{C}$ .

8. Short duration pulse test used to minimize self-heating effect.

9. Guaranteed by design. Not subject to product testing.

10. Package limited.

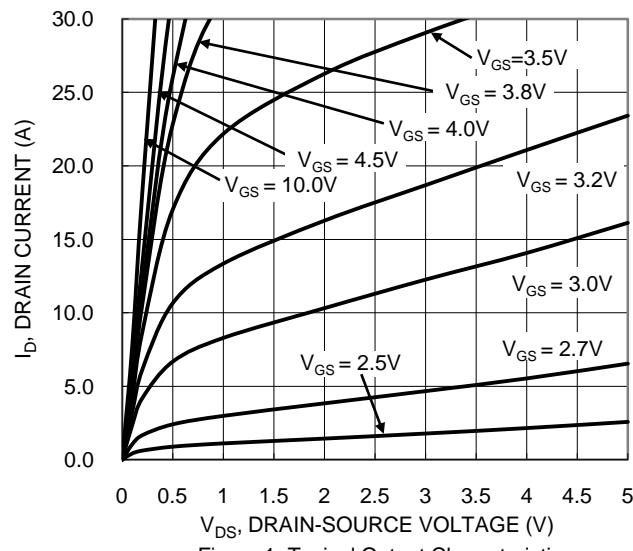


Figure 1. Typical Output Characteristic

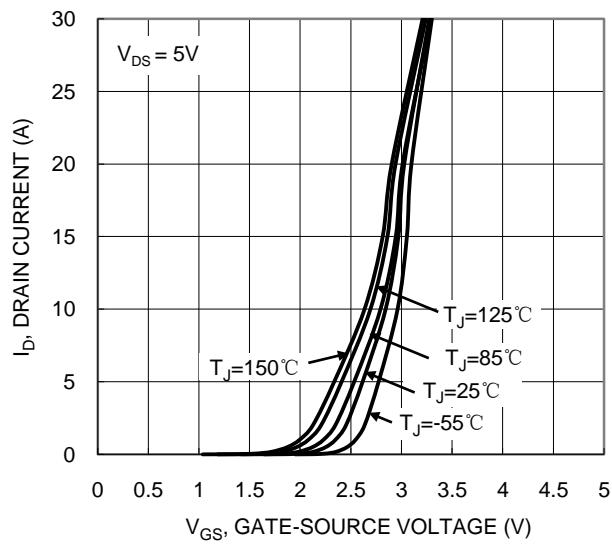


Figure 2. Typical Transfer Characteristic

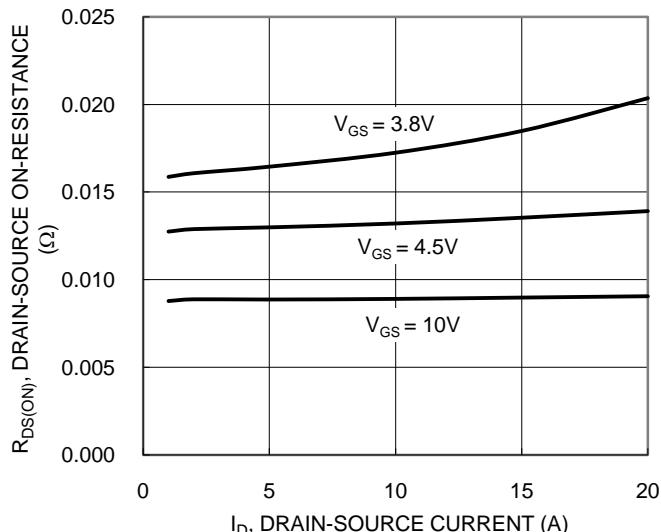


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

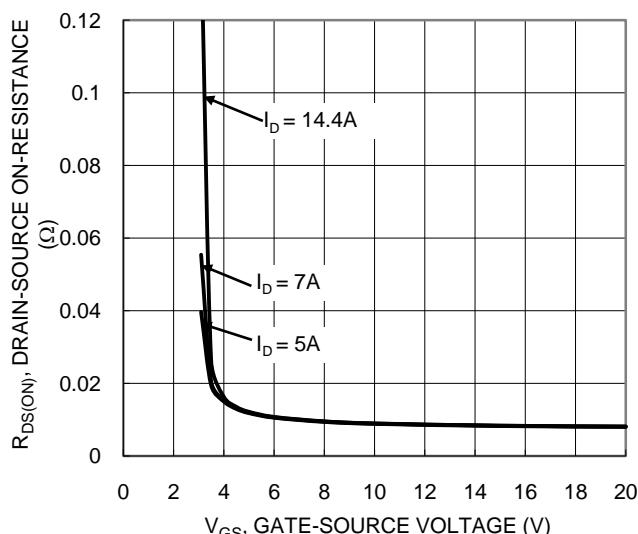


Figure 4. Typical Transfer Characteristic

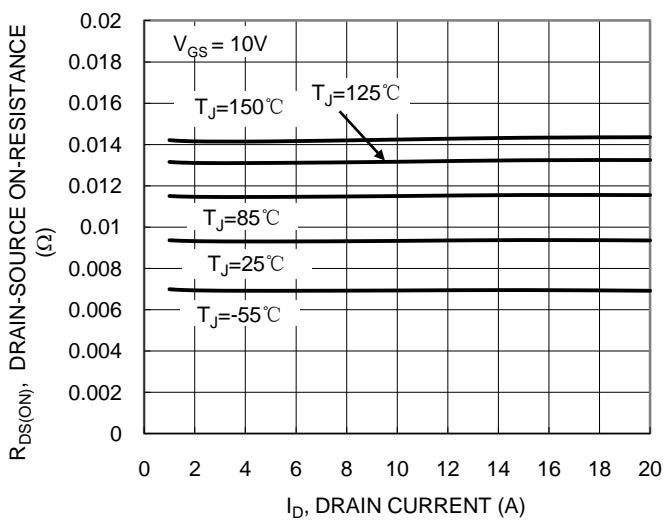


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

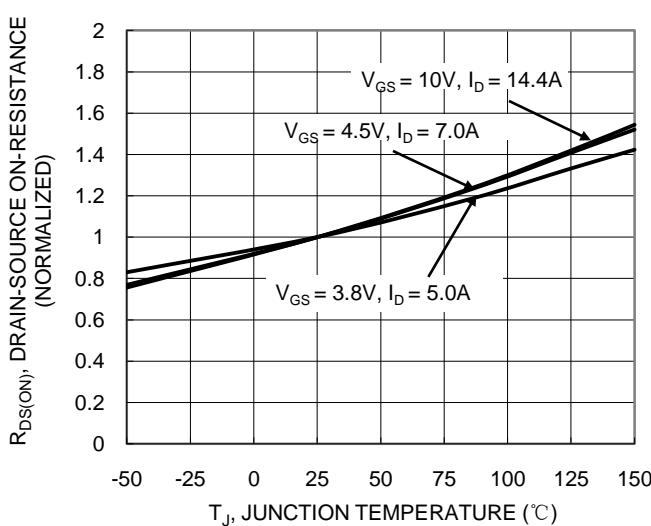


Figure 6. On-Resistance Variation with Temperature

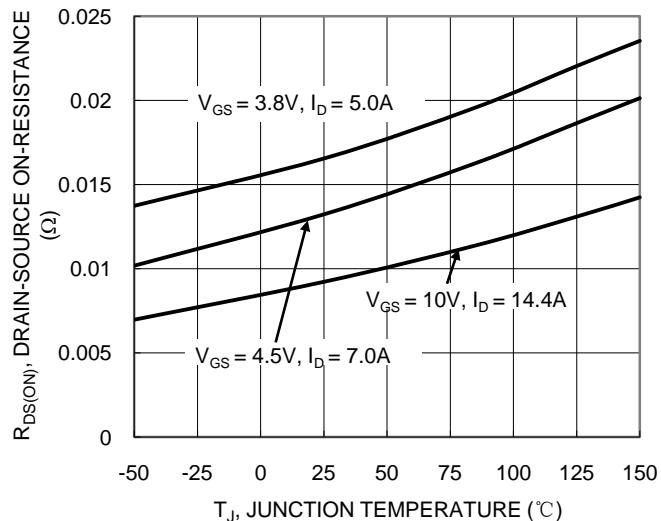


Figure 7. On-Resistance Variation with Temperature

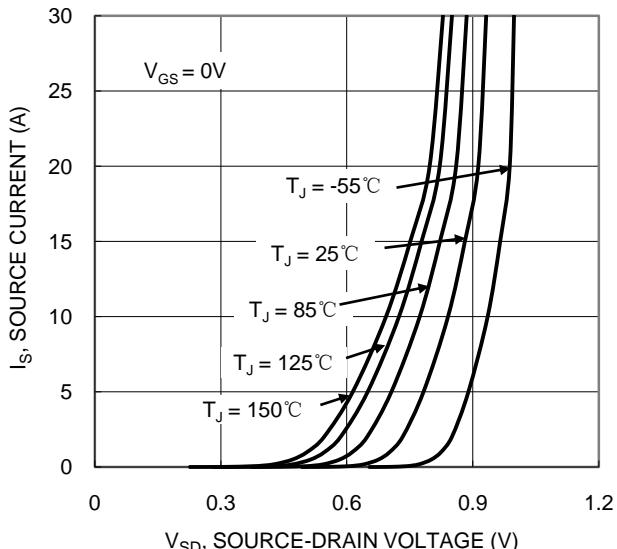


Figure 9. Diode Forward Voltage vs. Current

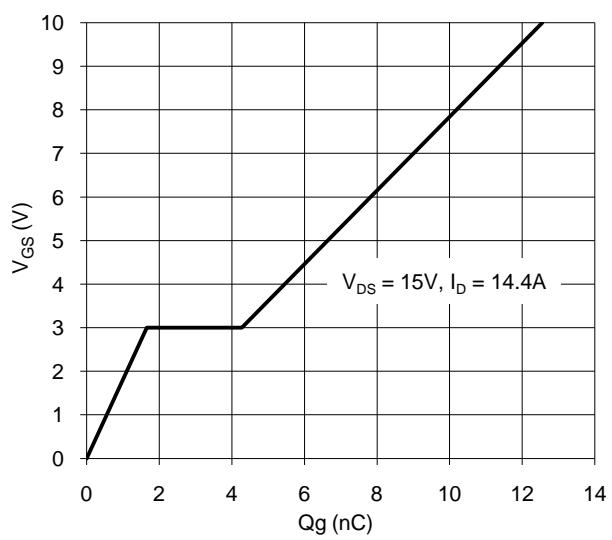


Figure 11. Gate Charge

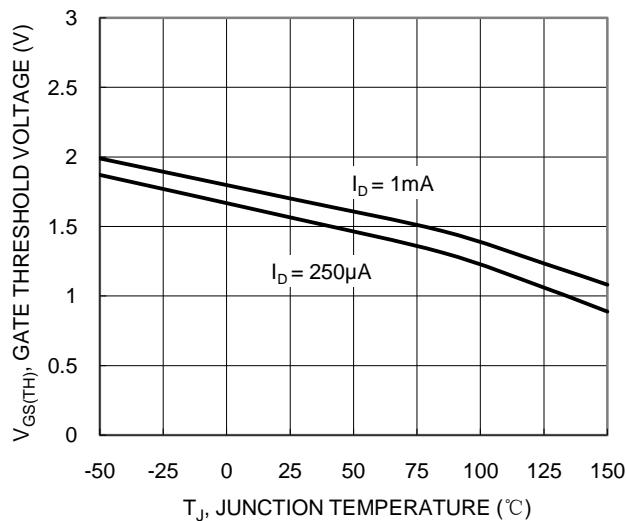


Figure 8. Gate Threshold Variation vs. Junction Temperature

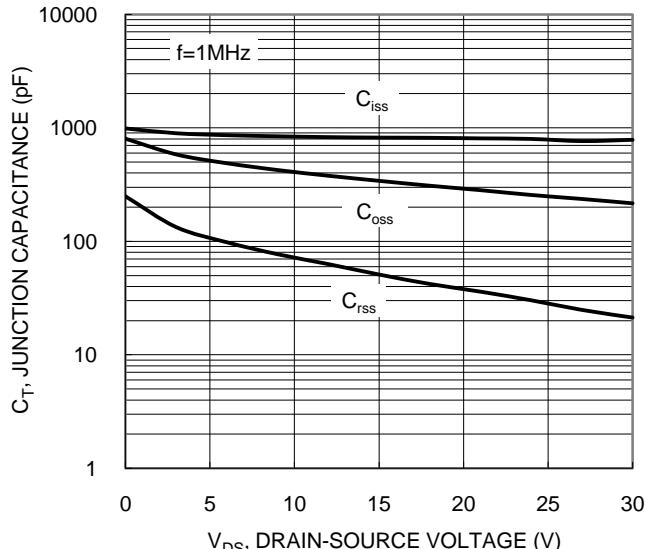


Figure 10. Typical Junction Capacitance

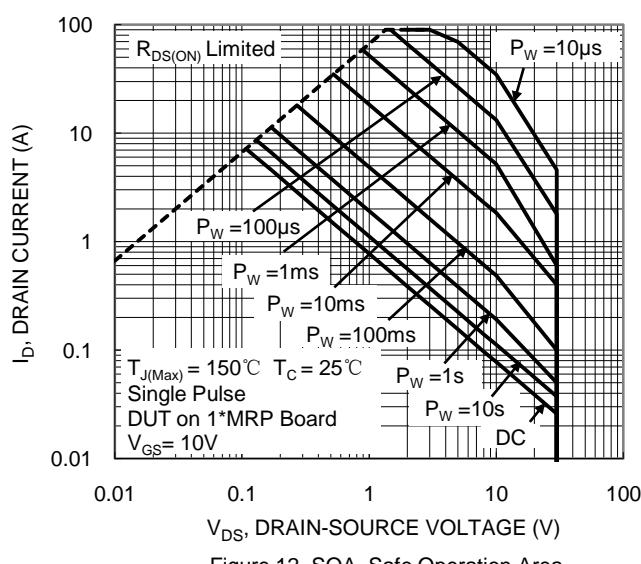


Figure 12. SOA, Safe Operation Area

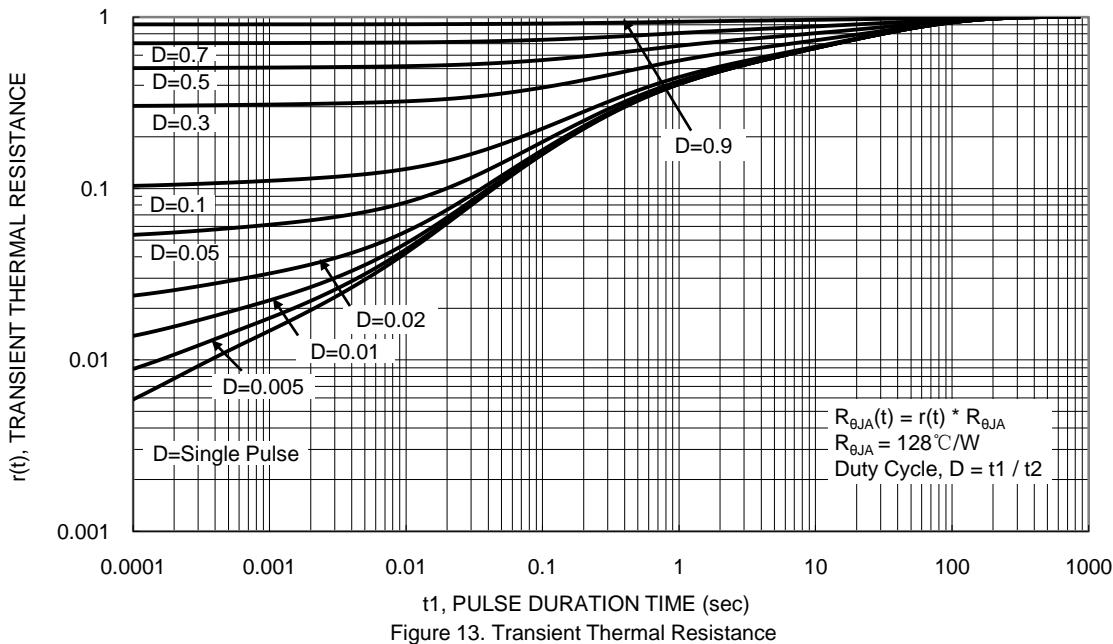
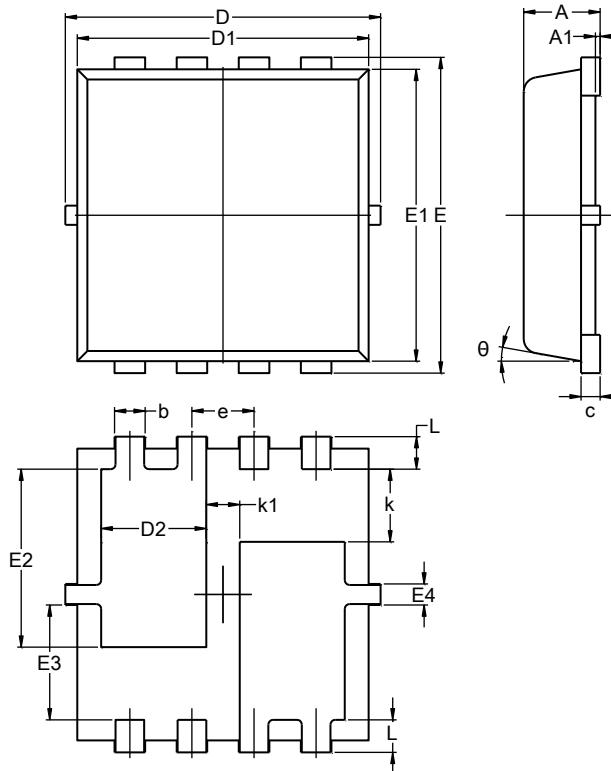


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

PowerDI3333-8 (Type UXD)



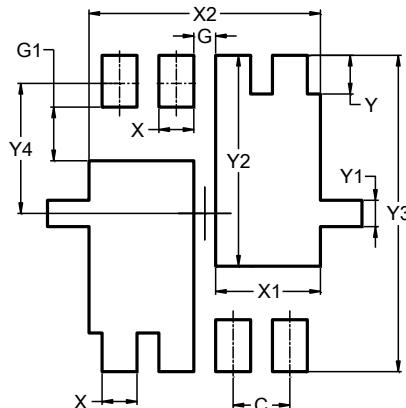
PowerDI3333-8 (Type UXD)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.90	1.30	1.10
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.66	2.06	1.86
E3	1.10	1.30	1.20
E4	0.12	0.32	0.22
e	—	—	0.65
L	0.24	0.44	0.34
k	0.56	0.96	0.76
k1	0.15	0.55	0.35
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 UXD)



Dimensions	Value (in mm)
C	0.650
G	0.250
G1	0.610
X	0.400
X1	1.200
X2	2.650
Y	0.440
Y1	0.300
Y2	2.400
Y3	3.600
Y4	1.480

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