

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON) \text{ max}}$	$I_D \text{ max}$ $T_A = +25^\circ\text{C}$
30V	4.4mΩ @ $V_{GS} = 10V$	17.6A
	5.5mΩ @ $V_{GS} = 4.5V$	16.1A

## Description

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

## Applications

- Backlighting
- Power Management Functions
- DC-DC Converters

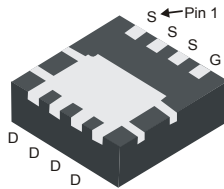
## Features and Benefits

- Low  $R_{DS(ON)}$  – Ensures on-state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies only 33% of the board area occupied by SO-8 enabling smaller end products
- 100% Unclamped Inductive Switch (UIS) test in production
- **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**

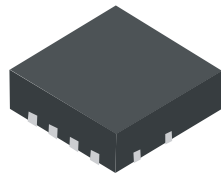
## Mechanical Data

- 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)

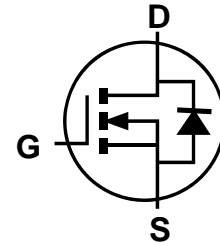
POWERDI®3333-8



Bottom View



Top View



Equivalent Circuit

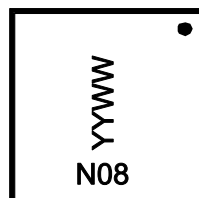
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3008SFG-7	POWERDI®3333-8	2,000/Tape & Reel
DMN3008SFG-13	POWERDI®3333-8	3,000/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](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

POWERDI®3333-8



N08= Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last Digit of Year (ex: 13 = 2013)  
 WW = Week Code (01 ~ 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	30	V
Gate-Source Voltage			$V_{GSS}$	$\pm 20$	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	17.6 14.1	A
	$t < 10\text{s}$	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$	$I_D$	23.0 18.4	A
Pulsed Drain Current (10 $\mu\text{s}$ pulse, duty cycle = 1%)			$I_{DM}$	80	A
Maximum Continuous Body Diode Forward Current (Note 6)			$I_S$	2	A
Avalanche Current, $L = 0.1\text{mH}$			$I_{AS}$	45	A
Avalanche Energy, $L = 0.1\text{mH}$			$E_{AS}$	101	mJ

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	0.9	W
	$T_A = +70^\circ\text{C}$		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	134	$^\circ\text{C/W}$
	$t < 10\text{s}$		79	$^\circ\text{C/W}$
Total Power Dissipation (Note 6)	$T_A = +25^\circ\text{C}$	$P_D$	2.1	W
	$T_A = +70^\circ\text{C}$		1.3	
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	58	$^\circ\text{C/W}$
	$t < 10\text{s}$		34	$^\circ\text{C/W}$
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	6.6	$^\circ\text{C/W}$
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
<b>OFF CHARACTERISTICS</b> (Note 7)						
Drain-Source Breakdown Voltage	$BV_{DSS}$	30	—	—	V	$V_{GS} = 0\text{V}, I_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	$I_{DSS}$	—	—	10	$\mu\text{A}$	$V_{DS} = 30\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 20\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS</b> (Note 7)						
Gate Threshold Voltage	$V_{GS(th)}$	1	—	2.3	V	$V_{DS} = V_{GS}, I_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(on)}$	—	3.9	4.4	m $\Omega$	$V_{GS} = 10\text{V}, I_D = 13.5\text{A}$
		—	4.6	5.5		$V_{GS} = 4.5\text{V}, I_D = 13.5\text{A}$
Diode Forward Voltage	$V_{SD}$	—	0.75	1.2	V	$V_{GS} = 0\text{V}, I_S = 1\text{A}$
<b>DYNAMIC CHARACTERISTICS</b> (Note 8)						
Input Capacitance	$C_{iss}$	—	3690	—	pF	$V_{DS} = 10\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Output Capacitance	$C_{oss}$	—	530	—	pF	
Reverse Transfer Capacitance	$C_{rss}$	—	459	—	pF	
Gate resistance	$R_g$	—	0.9	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1\text{MHz}$
Total Gate Charge ( $V_{GS} = 4.5\text{V}$ )	$Q_g$	—	41	—	nC	$V_{DS} = 24\text{V}, I_D = 27\text{A}$
Total Gate Charge ( $V_{GS} = 10\text{V}$ )	$Q_g$	—	86	—	nC	
Gate-Source Charge	$Q_{gs}$	—	9.2	—	nC	
Gate-Drain Charge	$Q_{gd}$	—	18.6	—	nC	
Turn-On Delay Time	$t_{D(on)}$	—	5.7	—	ns	$V_{DD} = 15\text{V}, V_{GS} = 10\text{V}, R_L = 1.11\Omega, R_G = 4.7\Omega, I_D = 13.5\text{A}$
Turn-On Rise Time	$t_r$	—	14.0	—	ns	
Turn-Off Delay Time	$t_{D(off)}$	—	63.7	—	ns	
Turn-Off Fall Time	$t_f$	—	28.4	—	ns	
Reverse Recovery Time	$t_{rr}$	—	19.3	—	ns	$I_F = 13.5\text{A}, di/dt = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	—	10.7	—	nC	

- 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 1inch square copper plate.  
7. Short duration pulse test used to minimize self-heating effect.  
8. Guaranteed by design. Not subject to product testing.

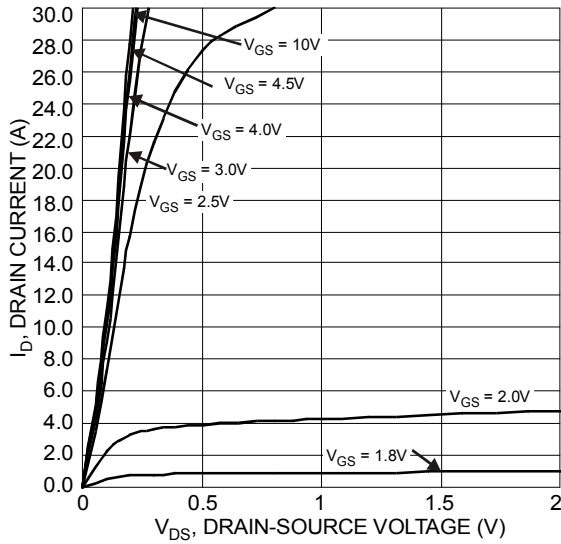


Figure 1 Typical Output Characteristic

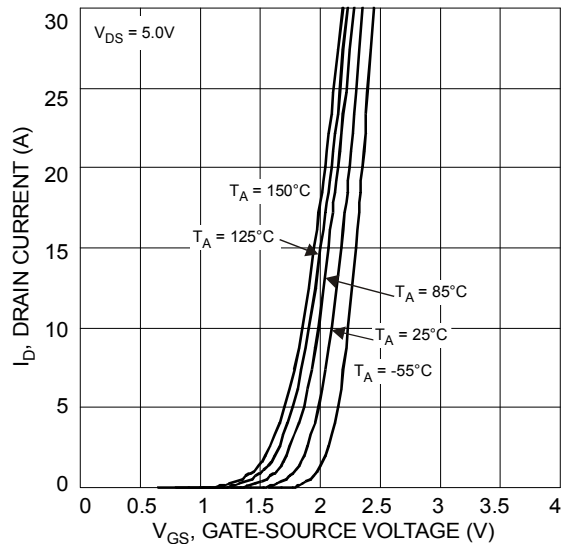


Figure 2 Typical Transfer Characteristics

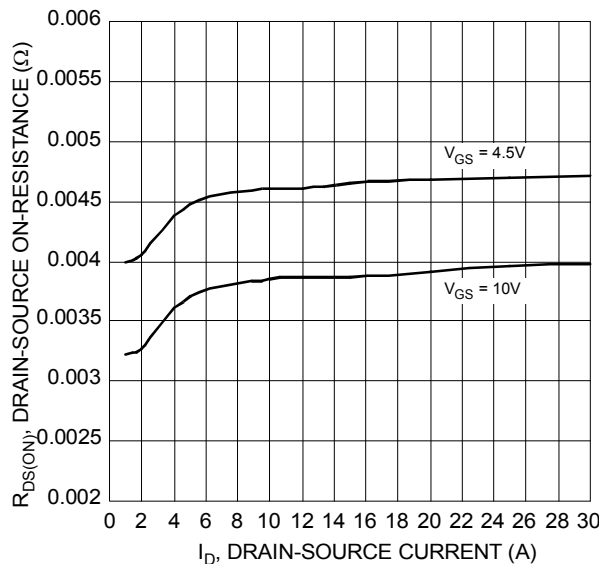


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

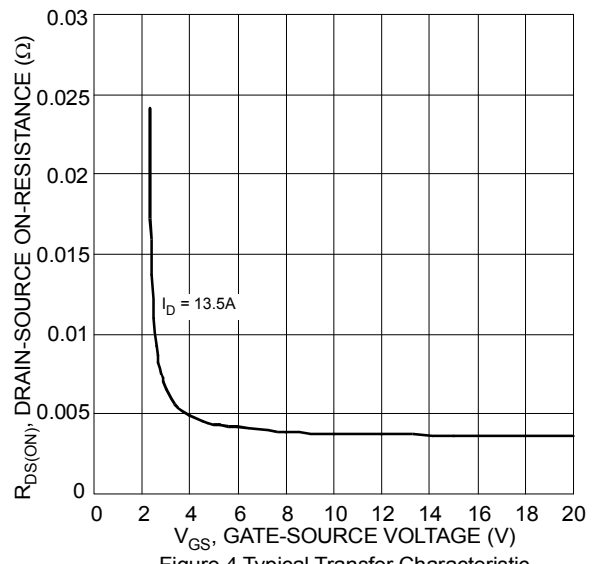


Figure 4 Typical Transfer Characteristic

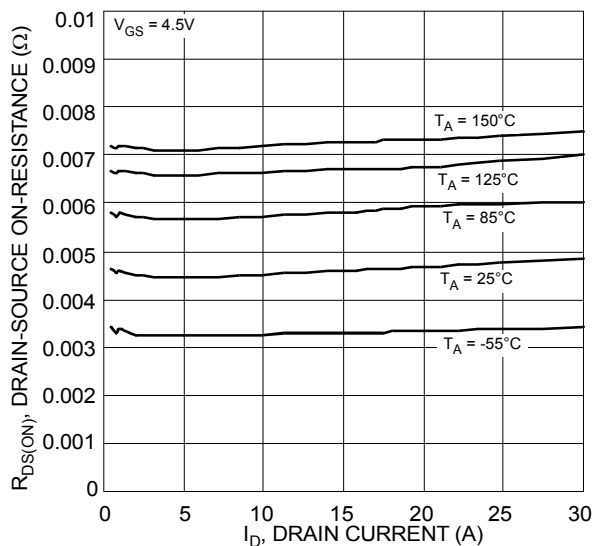


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

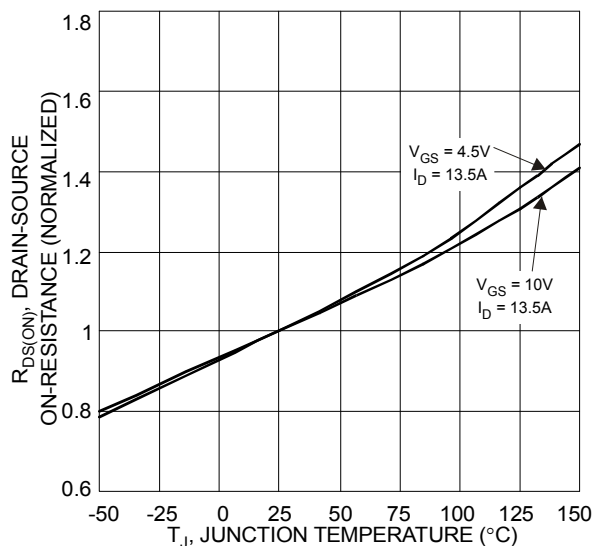
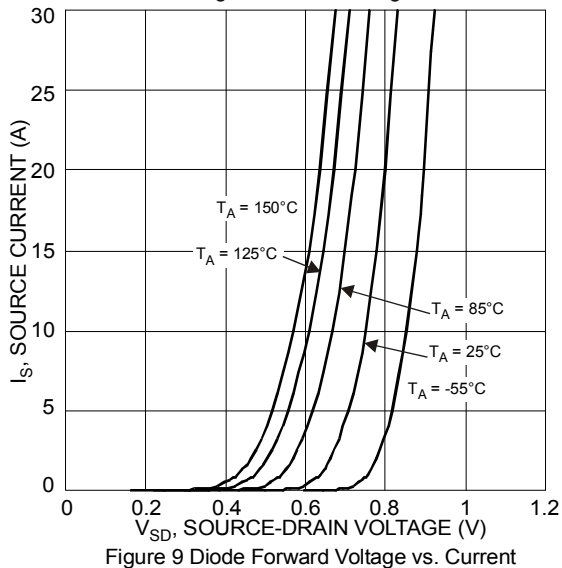
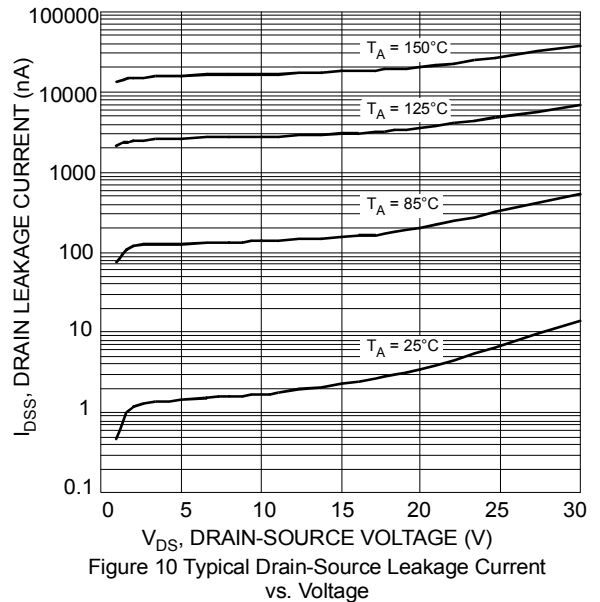
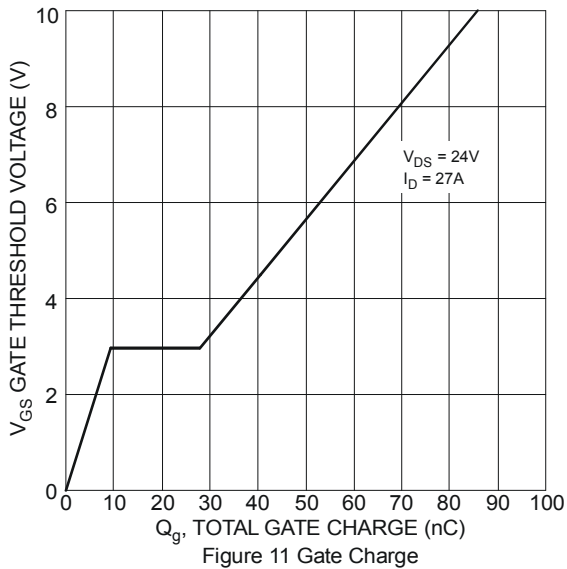
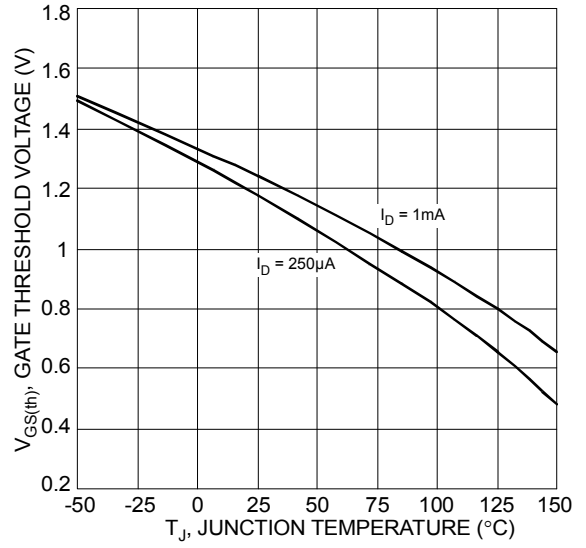
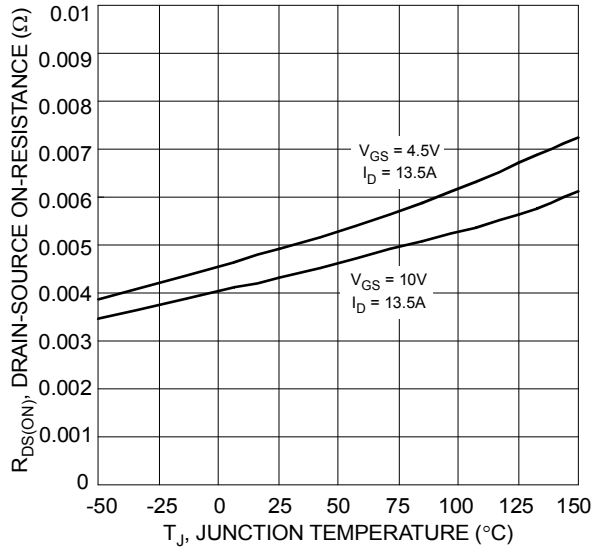


Figure 6 On-Resistance Variation with Temperature



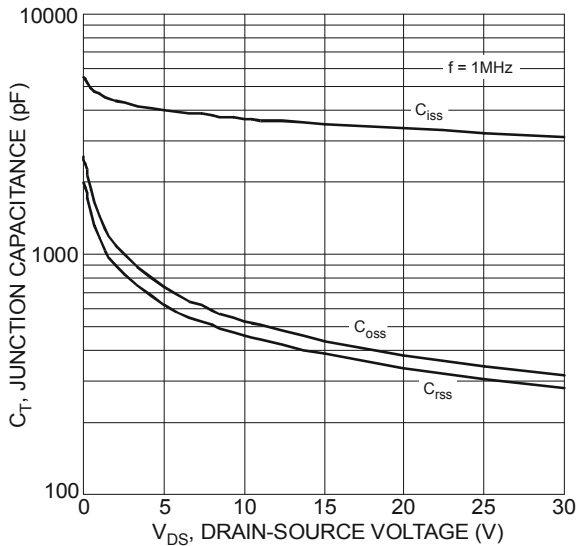


Figure 12 Typical Junction Capacitance

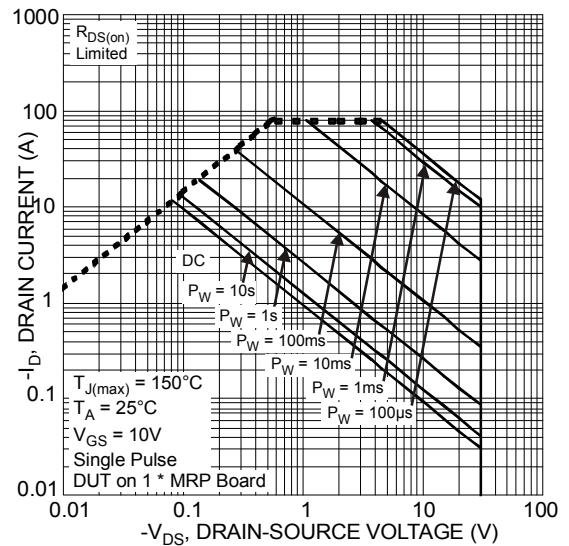


Figure 13 SOA, Safe Operation Area

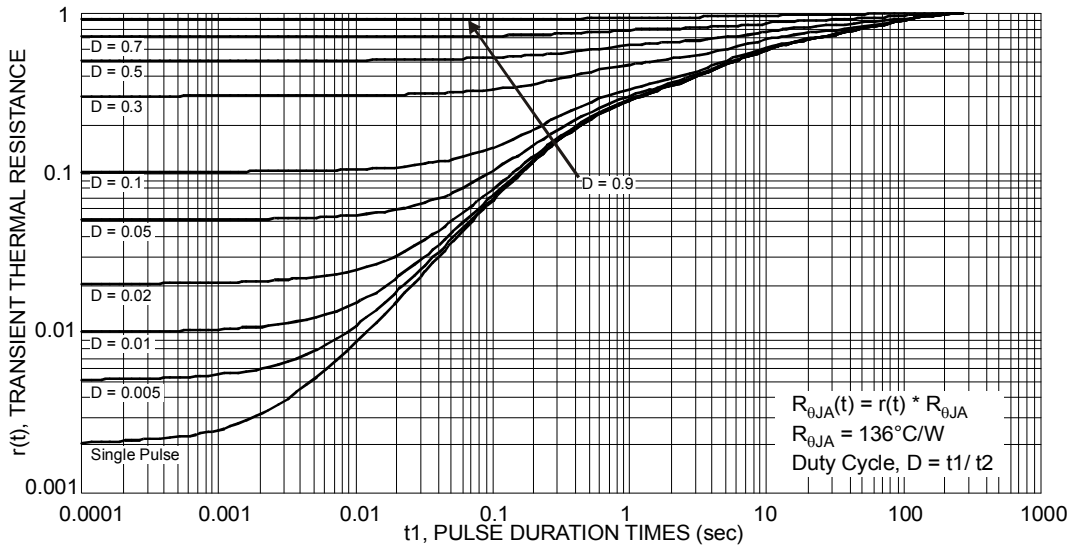
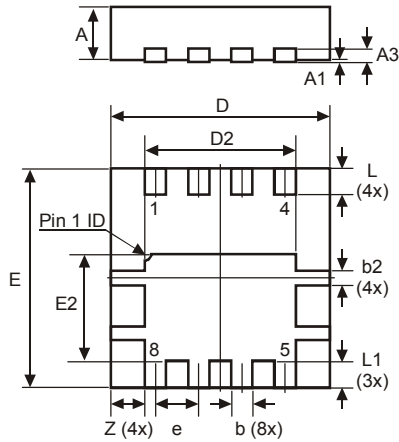


Figure 14 Transient Thermal Resistance

**Package Outline Dimensions**

Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.

**POWERDI® 3333-8**

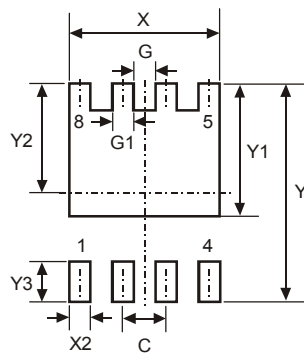


POWERDI® 3333-8			
Dim	Min	Max	Typ
D	3.25	3.35	3.30
E	3.25	3.35	3.30
D2	2.22	2.32	2.27
E2	1.56	1.66	1.61
A	0.75	0.85	0.80
A1	0	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	-	-	0.20
L	0.35	0.45	0.40
L1	-	-	0.39
e	-	-	0.65
Z	-	-	0.515
All Dimensions in mm			

**Suggested Pad Layout**

Please see AP02001 at <http://www.diodes.com/datasheets/ap02001.pdf> for the latest version.

**POWERDI® 3333-8**



Dimensions	Value (in mm)
C	0.650
G	0.230
G1	0.420
Y	3.700
Y1	2.250
Y2	1.850
Y3	0.700
X	2.370
X2	0.420

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