

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)}$ max	$I_D$ max $T_A = +25^\circ C$
100V	110mΩ @ $V_{GS} = 10V$	3.8 A
	122mΩ @ $V_{GS} = 6.0V$	3.6 A

## 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

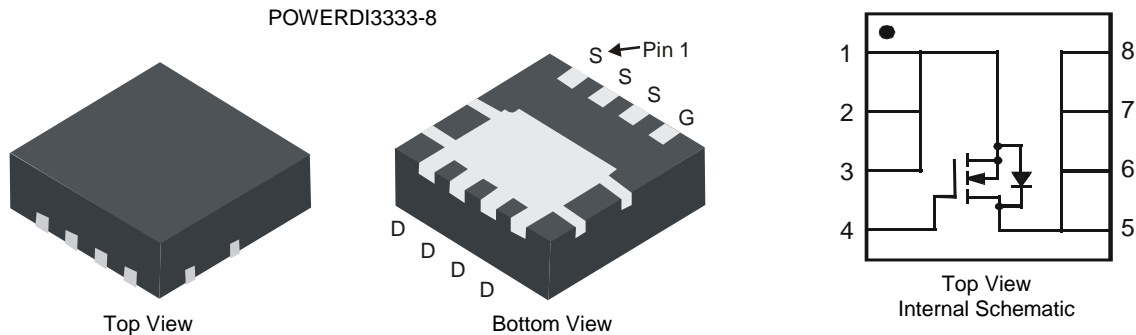
- Power Management Functions
- DC-DC Converters

## 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 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**

## Mechanical Data

- Case: POWERDI3333-8
- 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 (e3)
- Weight: 0.008 grams (approximate)

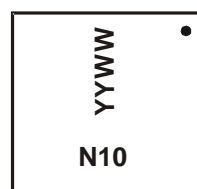


## Ordering Information (Note 4)

Part Number	Compliance	Case	Packaging
DMN10H120SFG-7	Standard	POWERDI3333-8	2000/Tape & Reel
DMN10H120SFG-13	Standard	POWERDI3333-8	3000/Tape & Reel

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

## Marking Information



N10 = Product Type Marking Code  
 YYWW = Date Code Marking  
 YY = Last digit of year (ex: 13 = 2013)  
 WW = Week code (01 ~ 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			V <sub>DSS</sub>	100	V
Gate-Source Voltage			V <sub>GSS</sub>	±20	V
Continuous Drain Current (Note 6) V <sub>GS</sub> = 10V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	3.8 3.0	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	5.3 4.2	A
Continuous Drain Current (Note 6) V <sub>GS</sub> = 6V	Steady State	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	3.6 2.9	A
	t < 10s	T <sub>A</sub> = +25°C T <sub>A</sub> = +70°C	I <sub>D</sub>	5.0 4.0	A
Pulsed Drain Current (10µs pulse, duty cycle = 1%)			I <sub>DM</sub>	20	A

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T <sub>A</sub> = +25°C	P <sub>D</sub>	1.0	W
	T <sub>A</sub> = +70°C		0.6	
Thermal Resistance, Junction to Ambient (Note 5)	Steady state	R <sub>θJA</sub>	131	°C/W
	t < 10s		76	
Total Power Dissipation (Note 6)	T <sub>A</sub> = +25°C	P <sub>D</sub>	2.4	W
	T <sub>A</sub> = +70°C		1.5	
Thermal Resistance, Junction to Ambient (Note 6)	Steady state	R <sub>θJA</sub>	52	°C/W
	t < 10s		27	
Thermal Resistance, Junction to Case (Note 6)		R <sub>θJC</sub>	6.9	
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 (Note 7)</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	100	-	-	V	V <sub>GS</sub> = 0V, I <sub>D</sub> = 250 µA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	-	-	1.0	µA	V <sub>DS</sub> = 80V, V <sub>GS</sub> = 0V
Gate-Source Leakage	I <sub>GSS</sub>	-	-	±100	nA	V <sub>GS</sub> = ±20V, V <sub>DS</sub> = 0V
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	V <sub>GS(th)</sub>	1.5	2.0	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>	-	68	110	mΩ	V <sub>GS</sub> = 10V, I <sub>D</sub> = 3.3A
		-	75	122		V <sub>GS</sub> = 6.0V, I <sub>D</sub> = 3.0A
Forward Transfer Admittance	Y <sub>fs</sub>	-	13	-	S	V <sub>DS</sub> = 10V, I <sub>D</sub> = 3.3A
Diode Forward Voltage	V <sub>SD</sub>	-	0.78	-	V	V <sub>GS</sub> = 0V, I <sub>S</sub> = 3.2A
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	C <sub>iss</sub>	-	549	-	pF	V <sub>DS</sub> = 50V, V <sub>GS</sub> = 0V, f = 1.0MHz
Output Capacitance	C <sub>oss</sub>	-	41.1	-	pF	
Reverse Transfer Capacitance	C <sub>rss</sub>	-	19.0	-	pF	
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> = 10V	Q <sub>g</sub>	-	10.6	-	nC	
Total Gate Charge V <sub>GS</sub> = 4.5V	Q <sub>g</sub>	-	5.2	-	nC	
Gate-Source Charge	Q <sub>gs</sub>	-	2.3	-	nC	
Gate-Drain Charge	Q <sub>gd</sub>	-	2.6	-	nC	V <sub>DS</sub> = 50V, I <sub>D</sub> = 3.3A
Turn-On Delay Time	t <sub>D(on)</sub>	-	3.8	-	ns	
Turn-On Rise Time	t <sub>r</sub>	-	1.8	-	ns	
Turn-Off Delay Time	t <sub>D(off)</sub>	-	11.5	-	ns	
Turn-Off Fall Time	t <sub>f</sub>	-	2.5	-	ns	

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
  - Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
  - Short duration pulse test used to minimize self-heating effect.
  - Guaranteed by design. Not subject to product testing.

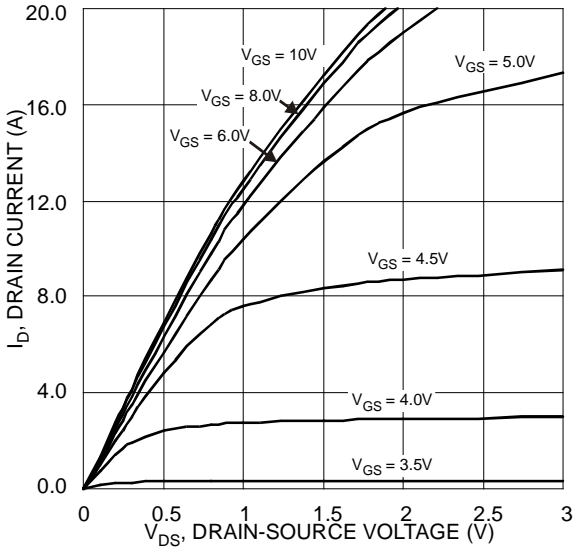


Figure 1 Typical Output Characteristic

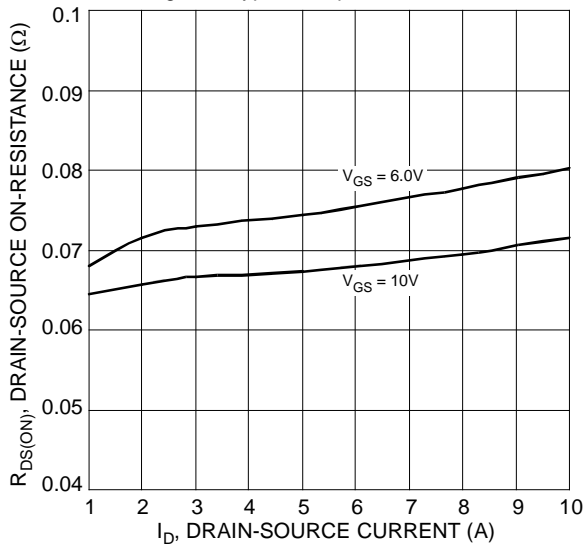


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

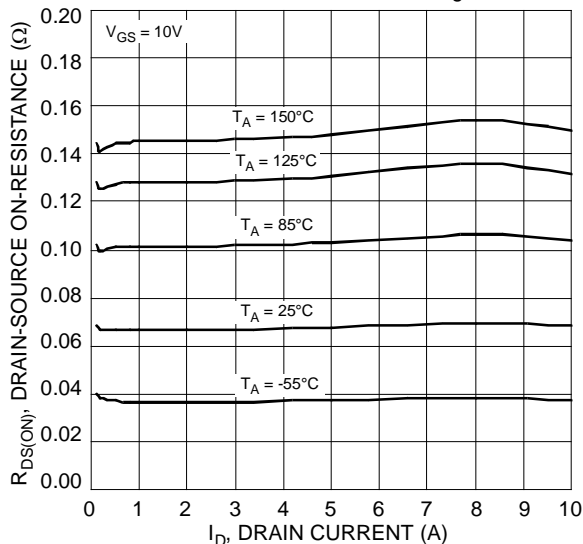


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

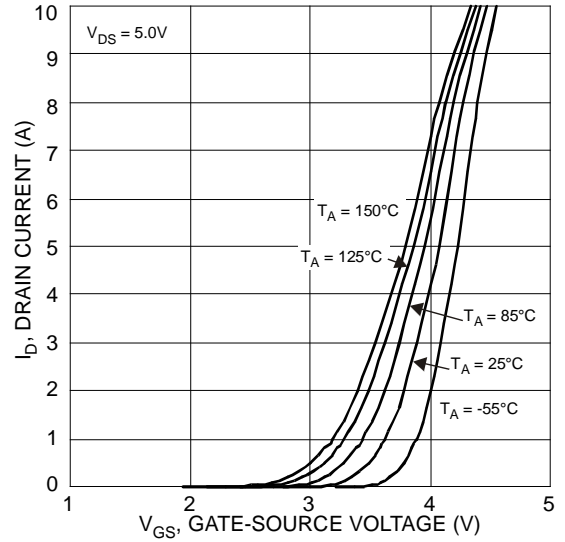


Figure 2 Typical Transfer Characteristics

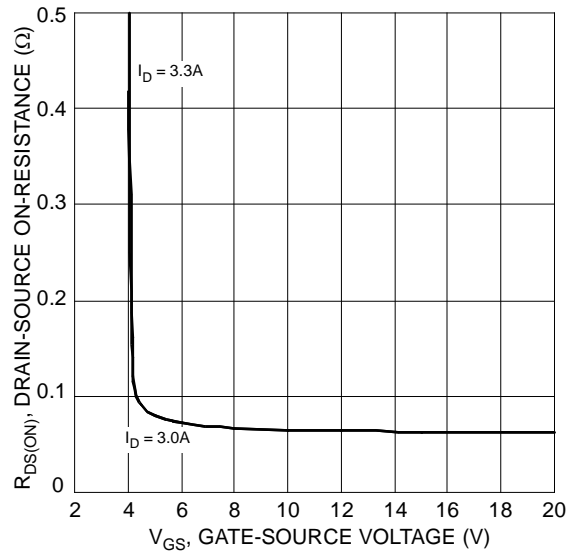


Figure 4 Typical Transfer Characteristics

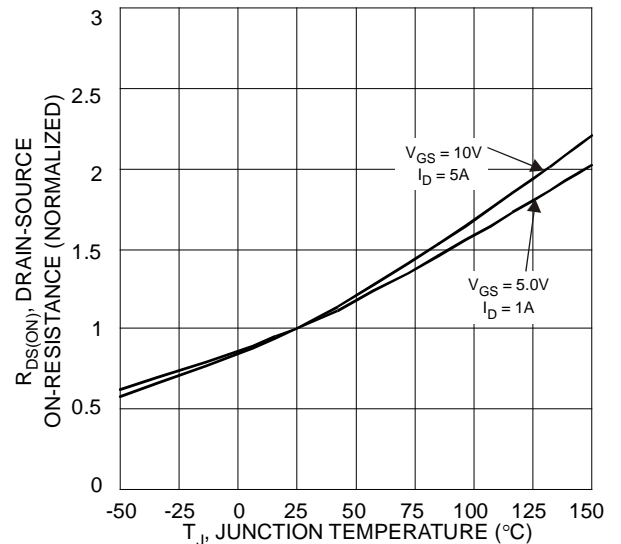


Figure 6 On-Resistance Variation with Temperature

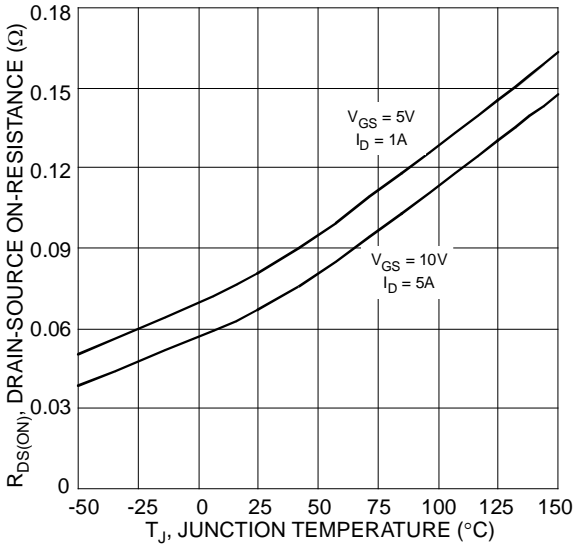


Figure 7 On-Resistance Variation with Temperature

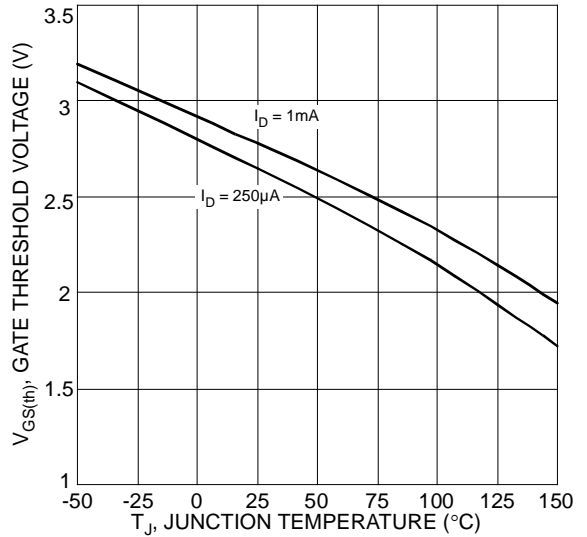


Figure 8 Gate Threshold Variation vs. Ambient Temperature

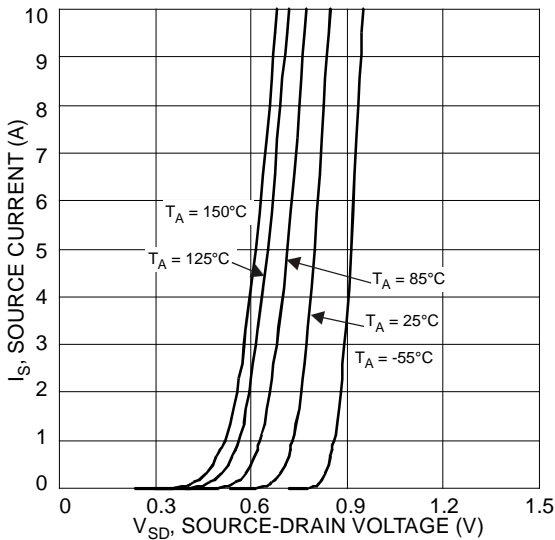


Figure 9 Diode Forward Voltage vs. Current

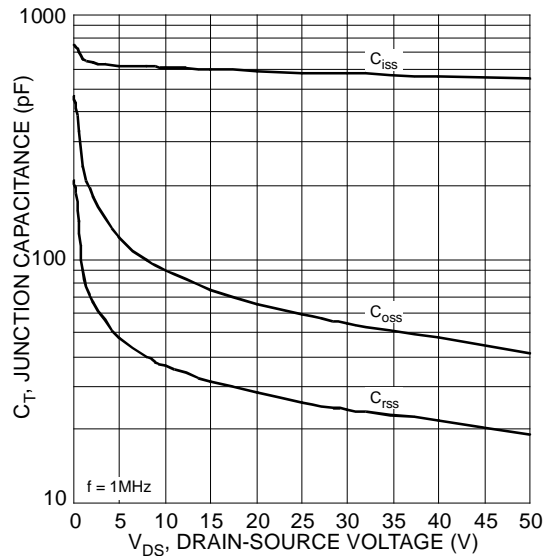


Figure 10 Typical Junction Capacitance

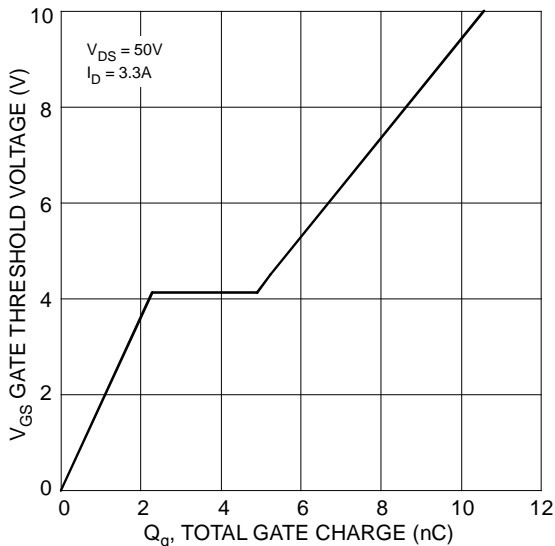


Figure 11 Gate Charge

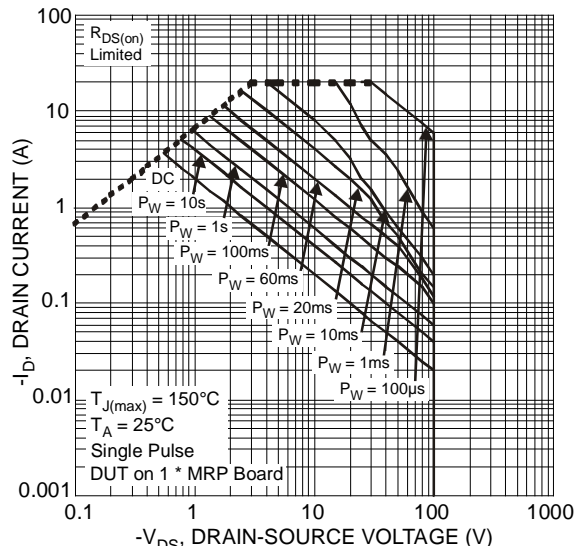


Figure 12 SOA, Safe Operation Area

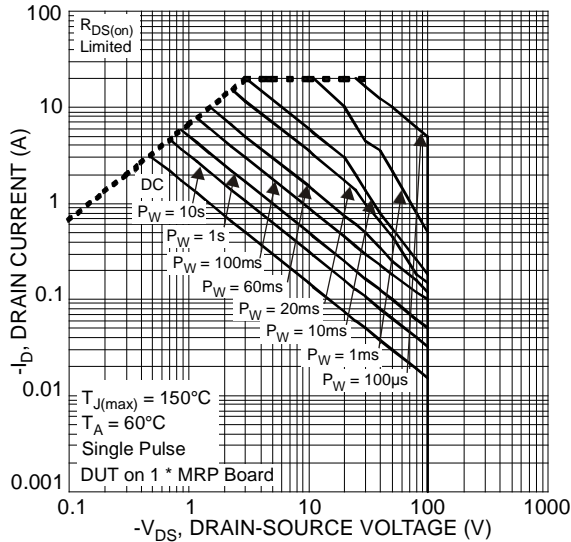


Figure 13 SOA, Safe Operation Area

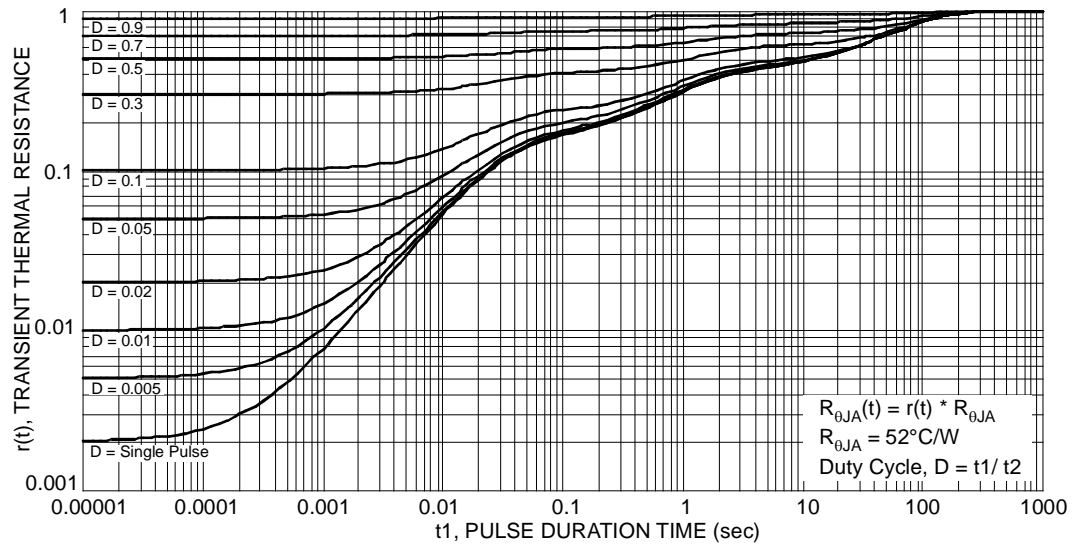
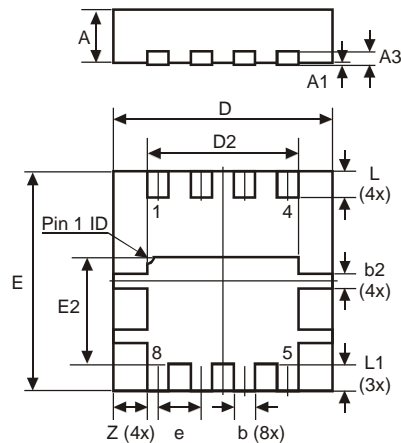


Figure 14 Transient Thermal Resistance

### Package Outline Dimensions

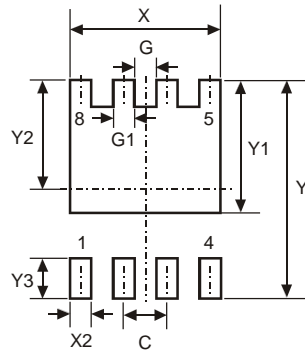
Please see AP02002 at <http://www.diodes.com/datasheets/ap02002.pdf> for latest version.



POWERDI3333-8			
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.



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

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