

## Product Summary

$V_{(BR)DSS}$	$R_{DS(ON)} \text{ max}$	$I_D \text{ max}$ $T_c = +25^\circ\text{C}$
-20V	5.5mΩ @ $V_{GS} = -10\text{V}$	-40A
	7.0mΩ @ $V_{GS} = -4.5\text{V}$	-40A
	9.0mΩ @ $V_{GS} = -2.5\text{V}$	-40A

## 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

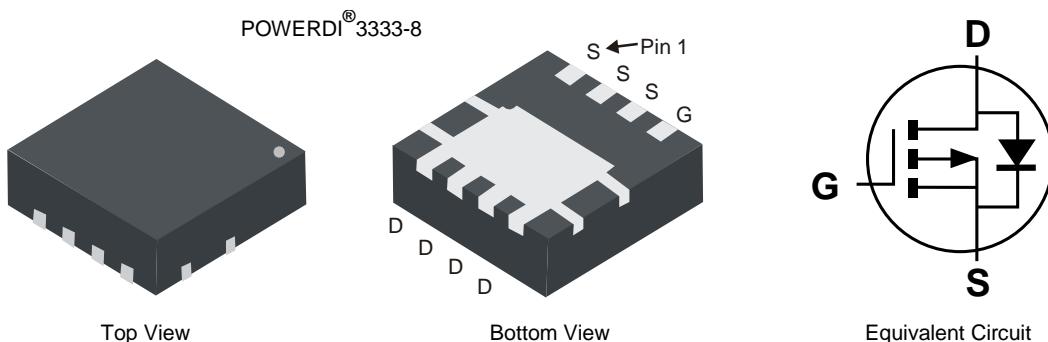
- Load Switch
- Power Management Functions

## Features

- 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)**

## Mechanical Data

- Case: POWERDI<sup>®</sup> 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 (63)
- Weight: 0.030 grams (Approximate)



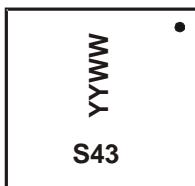
## Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2007UFG-7	POWERDI3333-8	2,000/Tape & Reel
DMP2007UFG-13	POWERDI3333-8	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



S43 = Product Type Marking Code  
YYWW = Date Code Marking  
YY = Last Digit of Year (ex: 14 = 2014)  
WW = Week Code (01 ~ 53)

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

Characteristic			Symbol	Value	Units
Drain-Source Voltage			$V_{DSS}$	-20	V
Gate-Source Voltage			$V_{GSS}$	$\pm 12$	V
Continuous Drain Current (Note 5) $V_{GS} = -10\text{V}$	Steady State	$T_A = +25^\circ\text{C}$ $T_A = +70^\circ\text{C}$ $T_C = +25^\circ\text{C}$	$I_D$	-18.0 -14.5 -40	A
Pulsed Drain Current (10 $\mu\text{s}$ Pulse, Duty Cycle = 1%)			$I_{DM}$	-80	A
Maximum Continuous Body Diode Forward Current (Note 5)			$I_S$	-2.2	A
Avalanche Current L=0.1mH			$I_{AS}$	-30	A
Avalanche Energy L=0.1mH			$E_{AS}$	50	mJ

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

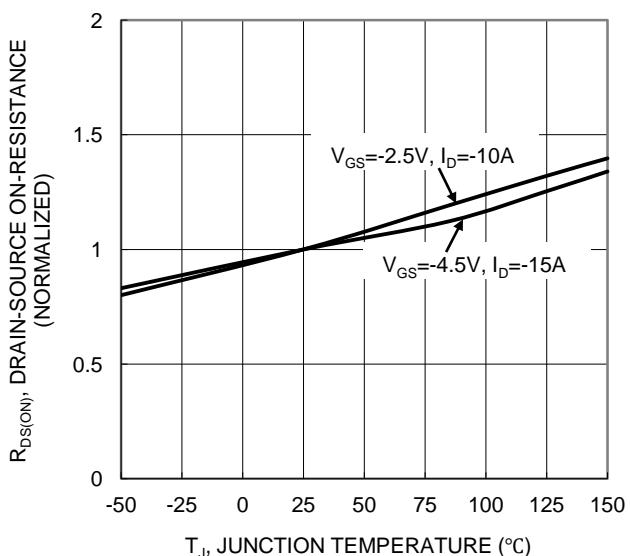
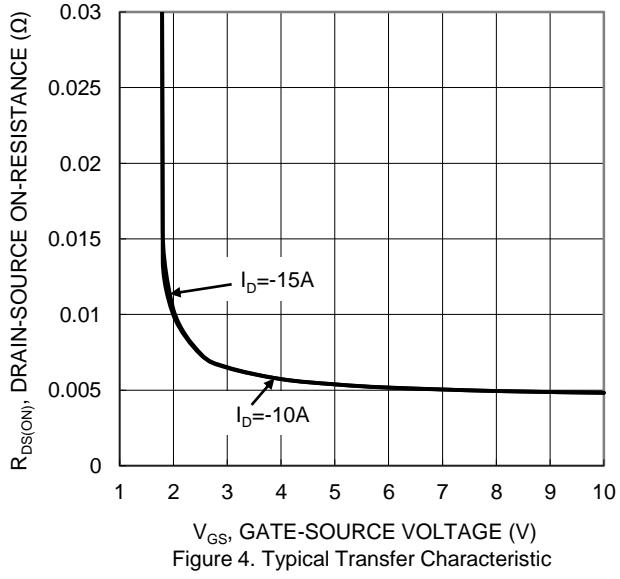
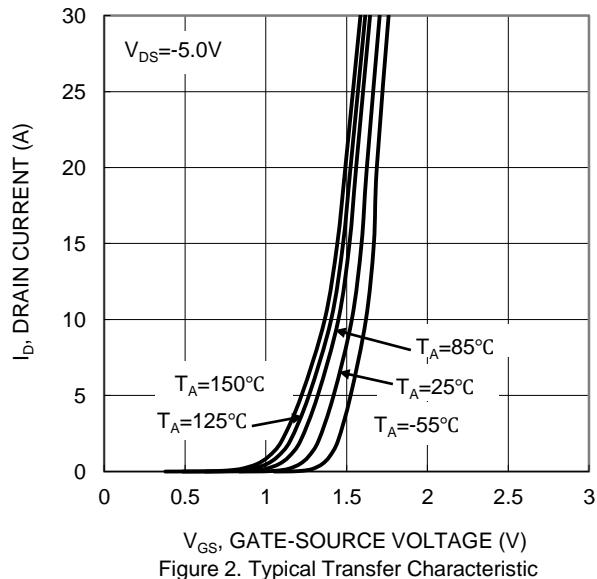
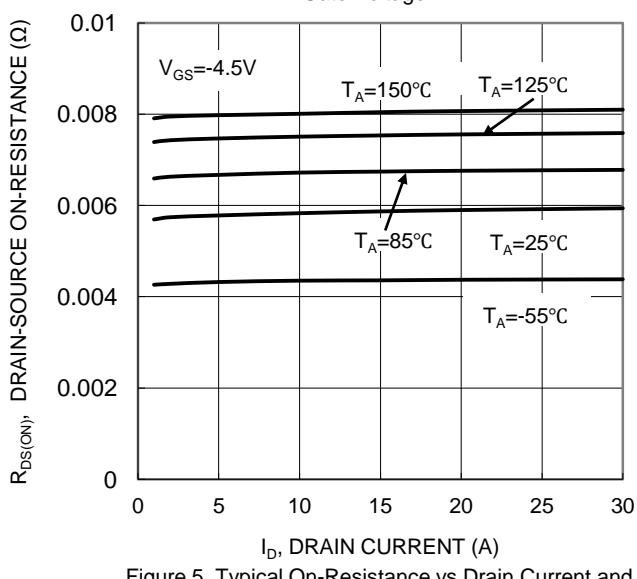
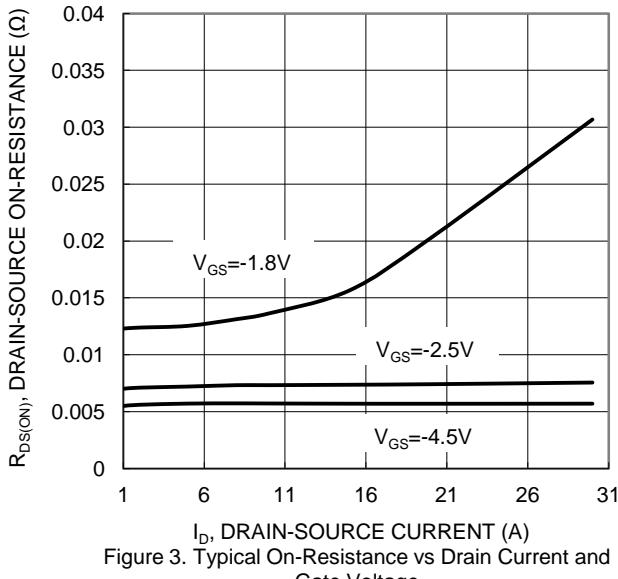
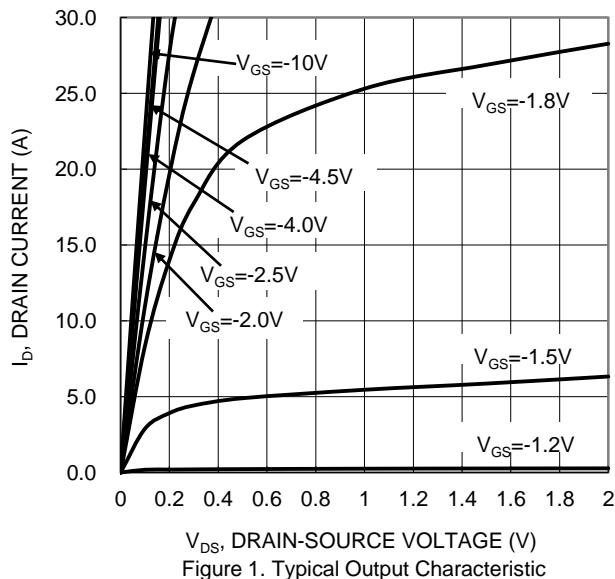
Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	$T_A = +25^\circ\text{C}$	$P_D$	2.3	W
	$T_C = +25^\circ\text{C}$		41	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	58	°C/W
	(Note 6)		143	
Thermal Resistance, Junction to Case		$R_{\theta JC}$	3.0	
Operating and Storage Temperature Range		$T_J, T_{STG}$	-55 to +150	°C

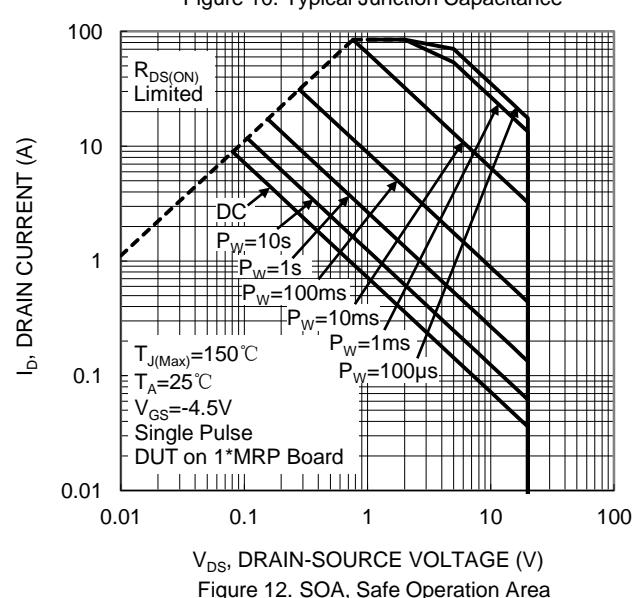
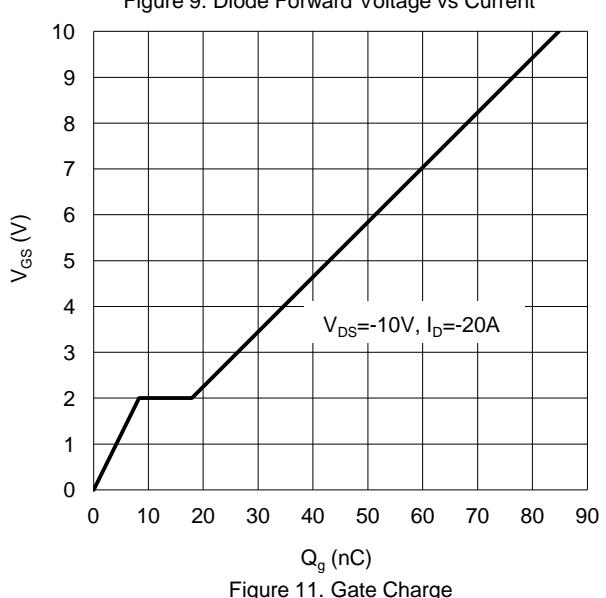
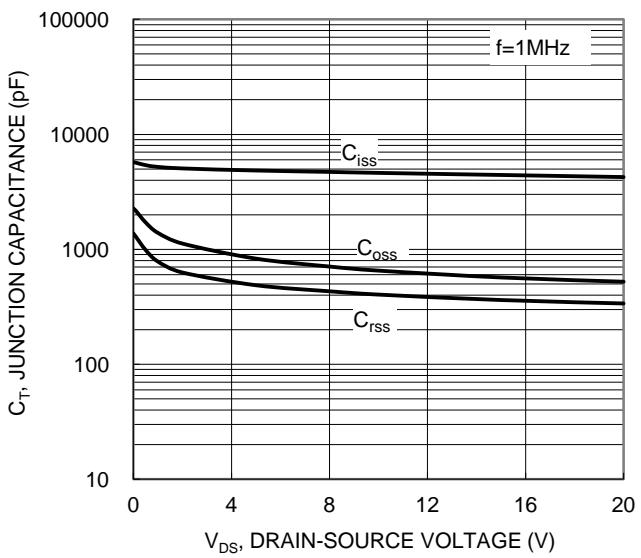
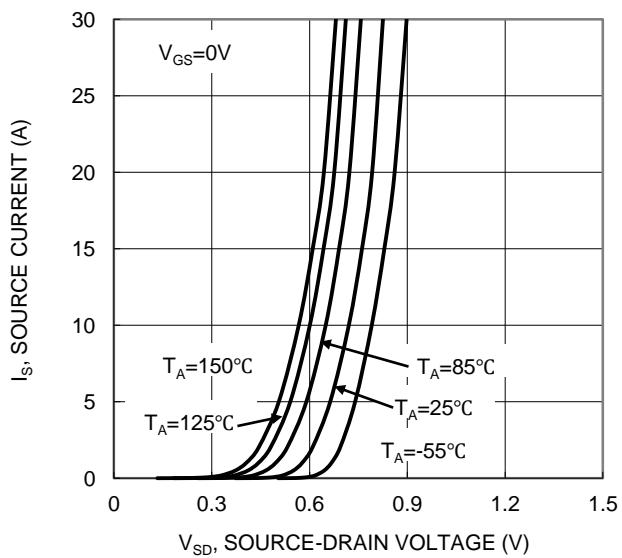
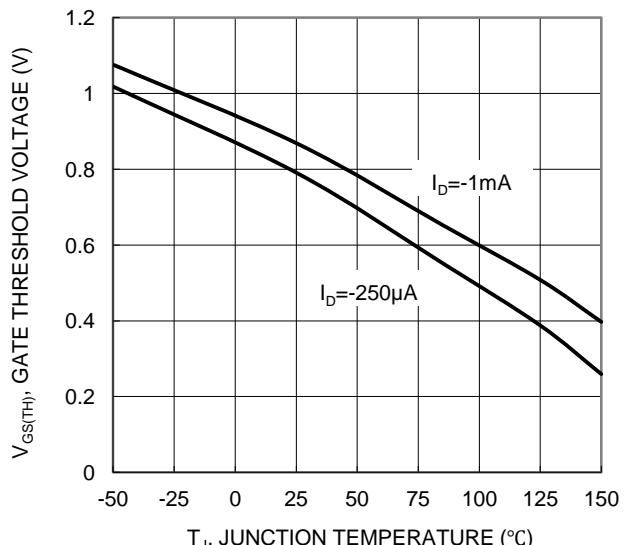
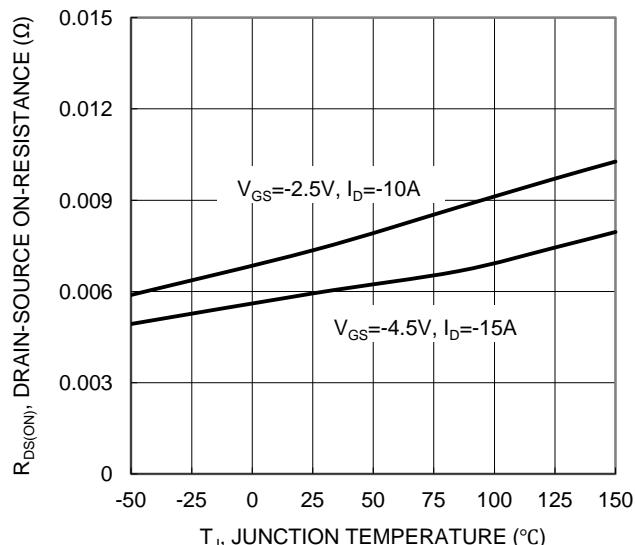
**Electrical Characteristics** (@ $T_A = +25^\circ\text{C}$ , unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
<b>OFF CHARACTERISTICS (Note 7)</b>						
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	$\mu\text{A}$	$V_{DS} = -16\text{V}, V_{GS} = 0\text{V}$
Gate-Source Leakage	$I_{GSS}$	—	—	$\pm 100$	nA	$V_{GS} = \pm 12\text{V}, V_{DS} = 0\text{V}$
<b>ON CHARACTERISTICS (Note 7)</b>						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1.3	V	$V_{DS} = V_{GS}, I_D = -250\mu\text{A}$
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	4.4	5.5	$\text{m}\Omega$	$V_{GS} = -10\text{V}, I_D = -15\text{A}$
		—	4.9	7.0		$V_{GS} = -4.5\text{V}, I_D = -15\text{A}$
		—	6.5	9.0		$V_{GS} = -2.5\text{V}, I_D = -10\text{A}$
Diode Forward Voltage	$V_{SD}$	—	-0.7	-1.2	V	$V_{GS} = 0\text{V}, I_S = -10\text{A}$
<b>DYNAMIC CHARACTERISTICS (Note 8)</b>						
Input Capacitance	$C_{iss}$	—	4,621	—	$\text{pF}$	$V_{DS} = -10\text{V}, V_{GS} = 0\text{V}$ $f = 1.0\text{MHz}$
Output Capacitance	$C_{oss}$	—	652	—		
Reverse Transfer Capacitance	$C_{rss}$	—	403	—		
Gate Resistance	$R_G$	—	3.2	—	$\Omega$	$V_{DS} = 0\text{V}, V_{GS} = 0\text{V}, f = 1.0\text{MHz}$
Total Gate Charge ( $V_{GS} = -4.5\text{V}$ )	$Q_g$	—	39	—	$\text{nC}$	$V_{DD} = -10\text{V}, I_D = -20\text{A}$
Total Gate Charge ( $V_{GS} = -10\text{V}$ )	$Q_g$	—	85	—		
Gate-Source Charge	$Q_{gs}$	—	8.3	—		
Gate-Drain Charge	$Q_{gd}$	—	9.6	—		
Turn-On Delay Time	$t_{D(ON)}$	—	10.1	—	$\text{ns}$	$V_{GS} = -4.5\text{V}, V_{DD} = -10\text{V}, R_G = 1\Omega, I_D = -10\text{A}$
Turn-On Rise Time	$t_R$	—	9.8	—		
Turn-Off Delay Time	$t_{D(OFF)}$	—	61	—		
Turn-Off Fall Time	$t_F$	—	51	—		
Reverse Recovery Time	$t_{RR}$	—	20.1	—	$\text{ns}$	$I_F = -10\text{A}, \text{di}/\text{dt} = 100\text{A}/\mu\text{s}$
Reverse Recovery Charge	$Q_{rr}$	—	10.1	—	$\text{nC}$	$I_F = -10\text{A}, \text{di}/\text{dt} = 100\text{A}/\mu\text{s}$

Notes:

5.  $R_{\theta JA}$  is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.  $R_{\theta JC}$  is guaranteed by design while  $R_{\theta JA}$  is determined by the user's board design.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.





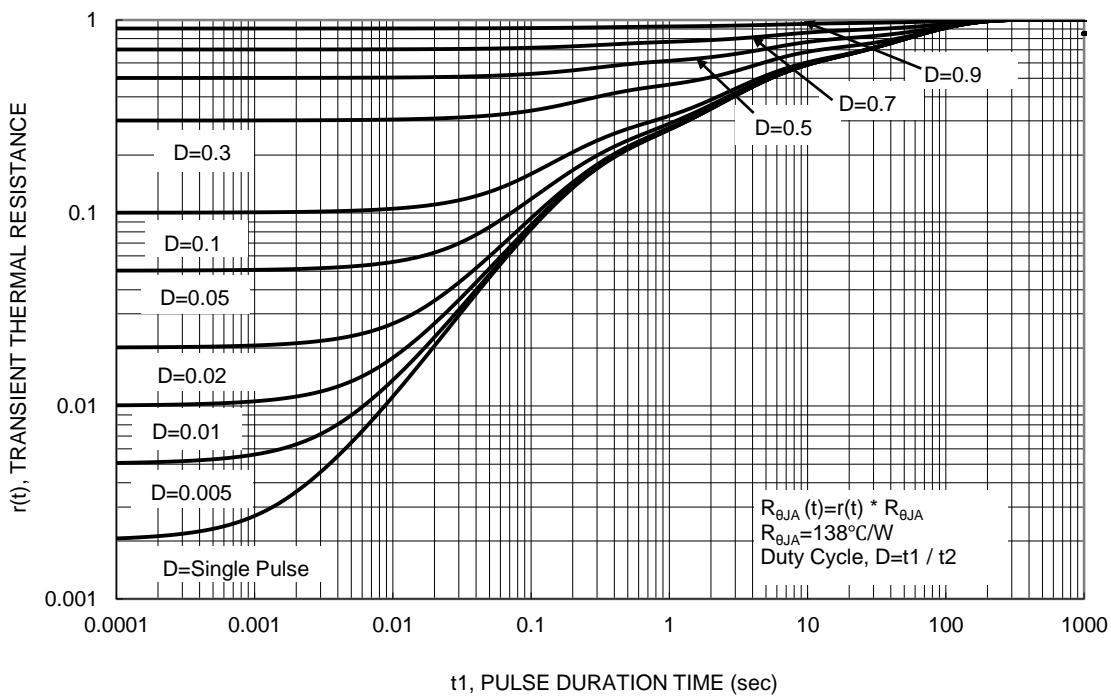
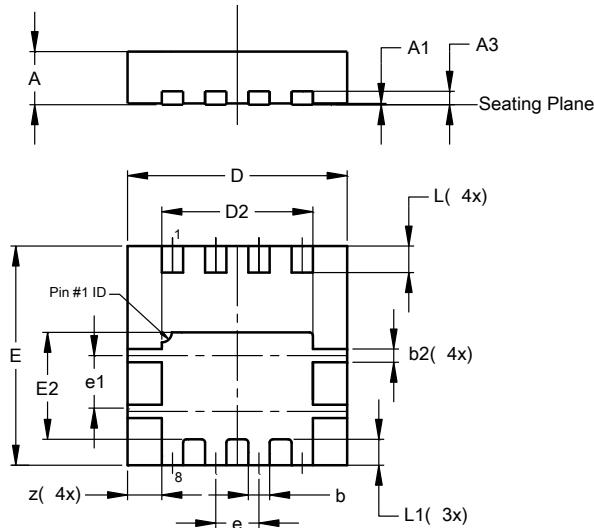


Figure 13. Transient Thermal Resistance

## Package Outline Dimensions

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

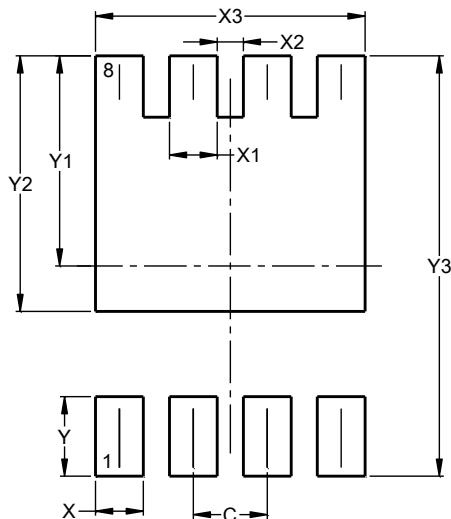


POWERDI®3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	—	—	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
e	—	—	0.65
e1	0.79	0.89	0.84
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515

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)
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

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