N-CHANNEL ENHANCEMENT MODE MOSFET
POWERDI®

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D T_A = +25°C
30V	18.6mΩ @ V_{GS} = 10V	8.0A
	26.5mΩ @ V_{GS} = 4.5V	6.5A

Description

This new generation 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
- DC-DC Converters
- Power Management Functions

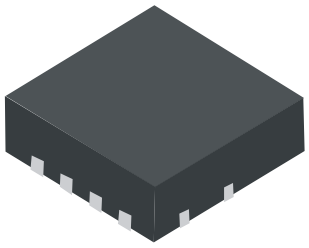
Features

- 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
- 100% UIS (Avalanche) Rated
- 100% R_g Tested
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

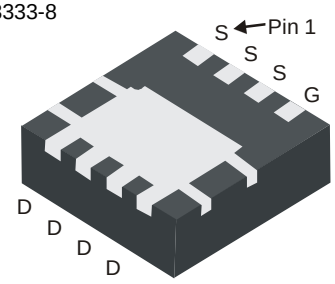
Mechanical Data

- 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: See Diagram Below
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 e3
- Weight: 0.072 grams (Approximate)

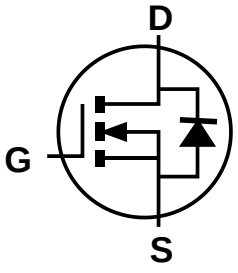
POWERDI®3333-8



Top View



Bottom View



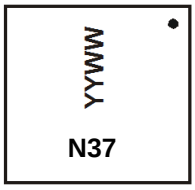
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3027LFG-7	POWERDI®3333-8	2,000 / Tape & Reel
DMN3027LFG-13	POWERDI®3333-8	3,000 / Tape & Reel

Notes:
1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
2. See 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



N37 = Product Marking Code
YYWW = Date Code Marking
YY = Last Digit of Year (ex: 15 for 2015)
WW = Week Code (01 – 53)

Maximum Ratings (@T_A = +25°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 5) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	5.3 4.2	A
Continuous Drain Current (Note 6) V_{GS} = 10V	Steady State	T_A = +25°C T_A = +70°C	I_D	8.0 6.3	A
Continuous Drain Current (Note 6) V_{GS} = 10V	t ≤ 10s	T_A = +25°C T_A = +70°C	I_D	9.5 7.7	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	Steady State	T_A = +25°C T_A = +70°C	I_D	6.5 4.9	A
Continuous Drain Current (Note 6) V_{GS} = 4.5V	t ≤ 10s	T_A = +25°C T_A = +70°C	I_D	7.8 6.2	A
Pulsed Drain Current (Note 7)			I_{DM}	70	A
Avalanche Current (Notes 7 & 8)			I_{AR}	18	A
Repetitive Avalanche Energy (Notes 7 & 8) L = 0.1mH			E_{AR}	16	mJ

Thermal Characteristics

Characteristic	Symbol	Max	Unit
Power Dissipation (Note 5)	P_D	1.0	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 5)	$R_{\theta JA}$	130.6	°C/W
Power Dissipation (Note 6)	P_D	2.07	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6)	$R_{\theta JA}$	62.5	°C/W
Power Dissipation (Note 6) t ≤ 10s	P_D	3.0	W
Thermal Resistance, Junction to Ambient @T_A = +25°C (Note 6) t ≤ 10s	$R_{\theta JA}$	43.8	°C/W
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	°C

Notes: 5. Device mounted on FR-4 PCB with minimum recommended pad layout, single sided.
6. Device mounted on 2" x 2" FR-4 PCB with high coverage 2 oz. Copper, single sided.
7. Repetitive rating, pulse width limited by junction temperature.
8. I_{AR} and E_{AR} rating are based on low frequency and duty cycles to keep T_J = +25°C.

Electrical Characteristics (@T_A = +25°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} = 0V, I_D = 250µA
Zero Gate Voltage Drain Current T_J = +25°C	I_{DSS}	-	-	100	nA	V_{DS} = 30V, V_{GS} = 0V
Gate-Source Leakage	I_{GSS}	-	-	±100	nA	V_{GS} = ±25V, V_{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	$V_{GS(TH)}$	0.9	1.2	1.8	V	V_{DS} = V_{GS}, I_D = 250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	-	13.5	18.6	mΩ	V_{GS} = 10V, I_D = 10A
		-	22	26.5		V_{GS} = 4.5V, I_D = 7.5A
Diode Forward Voltage	V_{SD}	-	0.7	1.0	V	V_{GS} = 0V, I_S = 1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C_{iss}	-	580	-	pF	V_{DS} = 15V, V_{GS} = 0V, f = 1.0MHz
Output Capacitance	C_{oss}	-	110	-		
Reverse Transfer Capacitance	C_{rss}	-	70	-		
Gate Resistance	R_g	-	2.0	3.0	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1MHz
Total Gate Charge V_{GS} = 4.5V	Q_g	-	5.3	-	nC	V_{GS} = 4.5V, V_{DS} = 15V, I_D = 10A
Total Gate Charge V_{GS} = 10V	Q_g	-	11.3	-		V_{GS} = 10V, V_{DS} = 15V, I_D = 10A
Gate-Source Charge	Q_{gs}	-	1.9	-		
Gate-Drain Charge	Q_{gd}	-	1.9	-		
Turn-On Delay Time	$t_{D(ON)}$	-	4.4	-	ns	V_{GS} = 10V, V_{DS} = 15V, R_L = 15Ω, R_G = 6Ω
Turn-On Rise Time	t_R	-	4.6	-	ns	
Turn-Off Delay Time	$t_{D(OFF)}$	-	19.5	-	ns	
Turn-Off Fall Time	t_F	-	5.8	-	ns	

Notes: 9. Short duration pulse test used to minimize self-heating effect.
10. Guaranteed by design. Not subject to production testing.

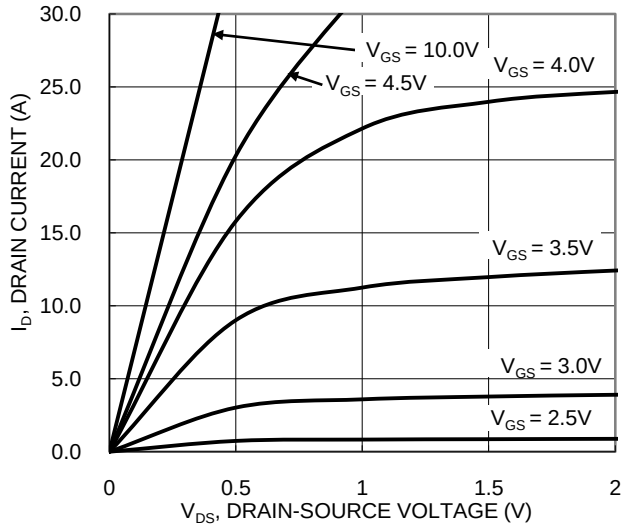


Figure 1. Typical Output Characteristic

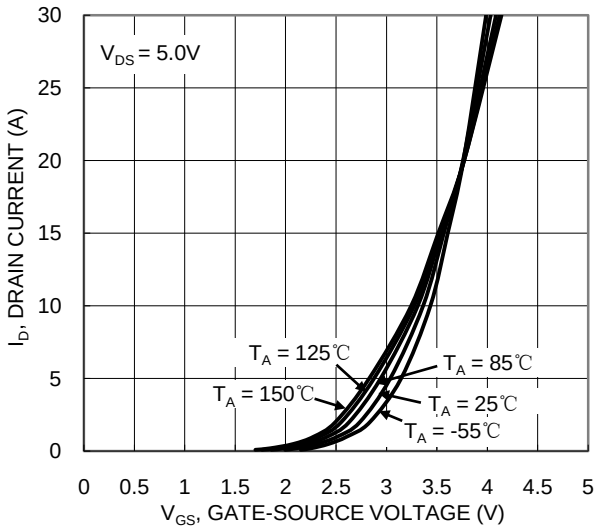


Figure 2. Typical Transfer Characteristic

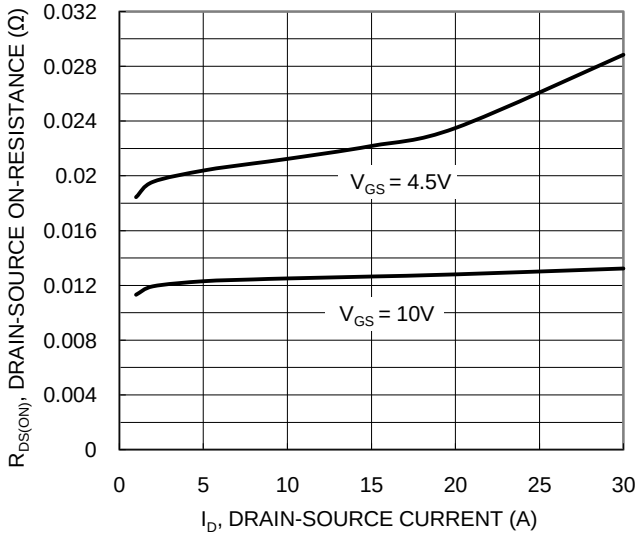


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

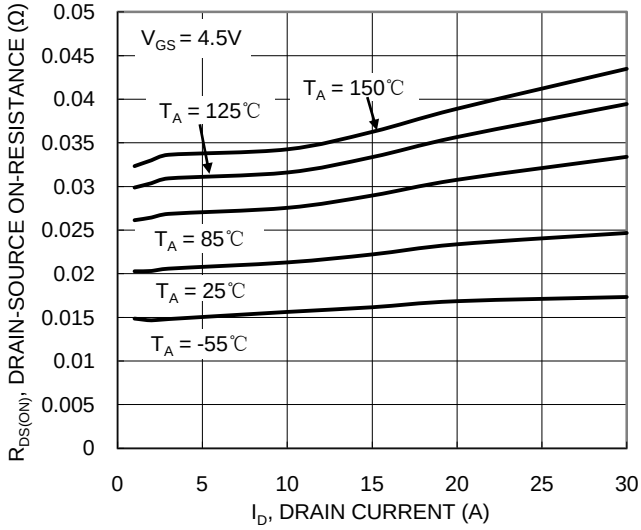


Figure 4. Typical On-Resistance vs. Drain Current and Temperature

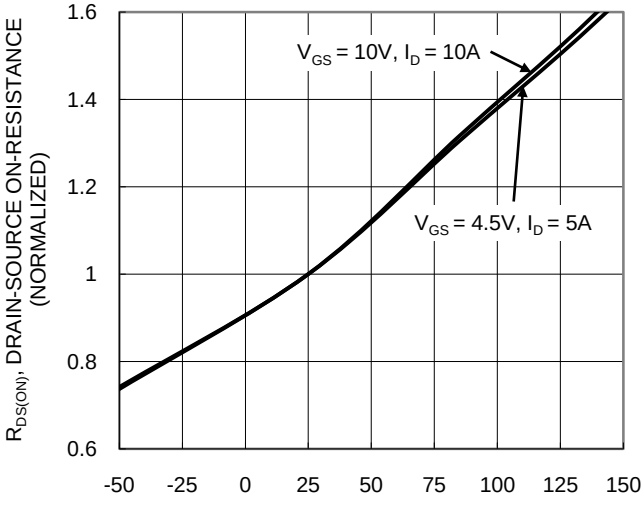


Figure 5. On-Resistance Variation with Temperature

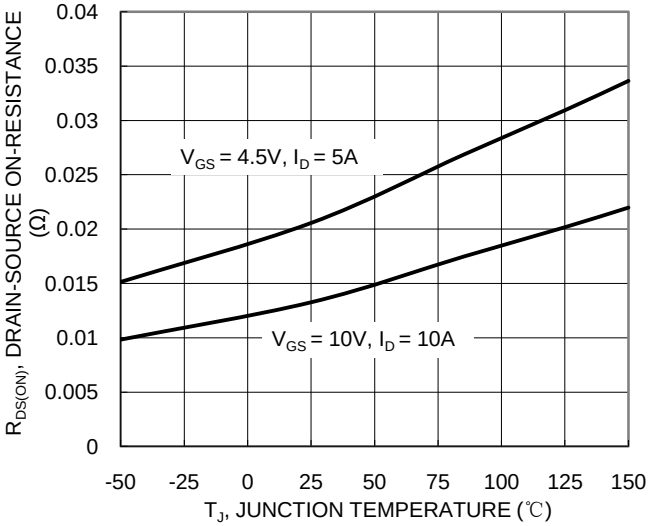


Figure 6. On-Resistance Variation with Temperature

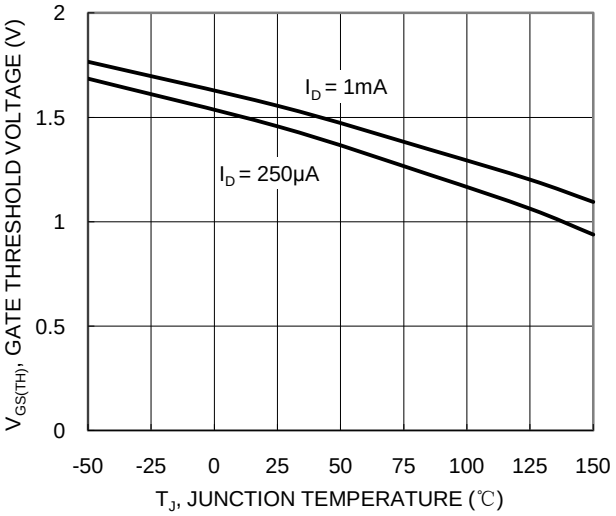


Figure 7. Gate Threshold Variation vs. Temperature

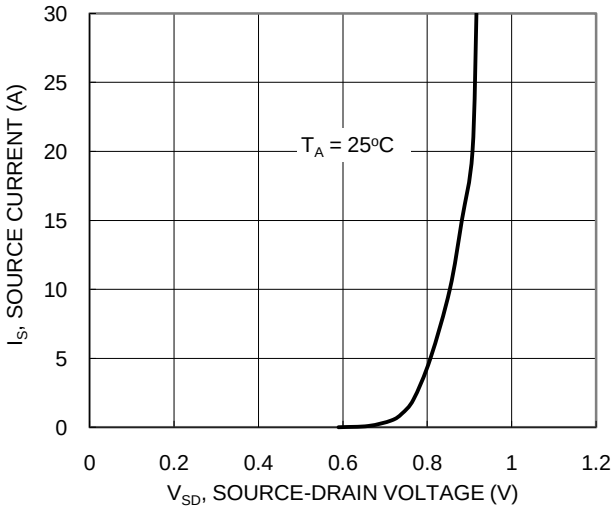


Figure 8. Diode Forward Voltage vs. Current

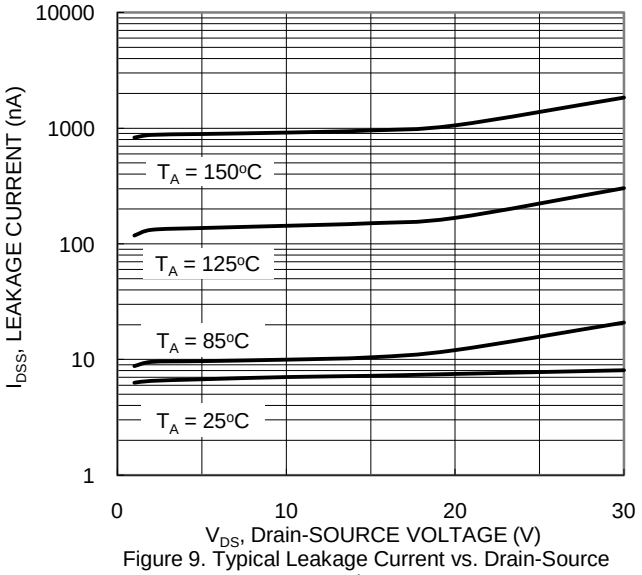


Figure 9. Typical Leakage Current vs. Drain-Source Voltage

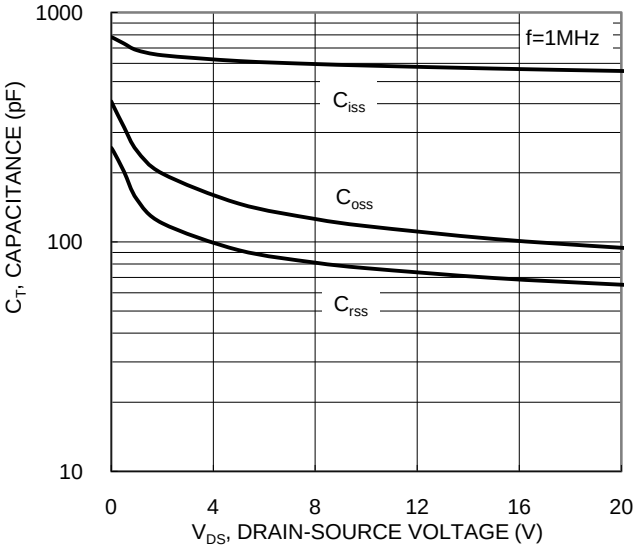


Figure 10. Typical Total Capacitance

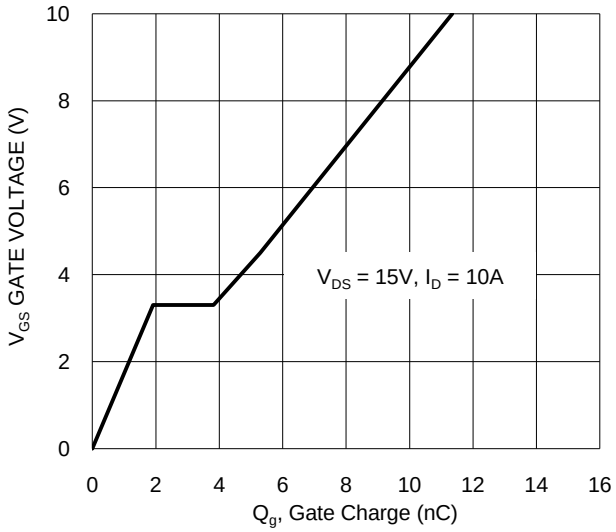


Figure 11. Gate Charge

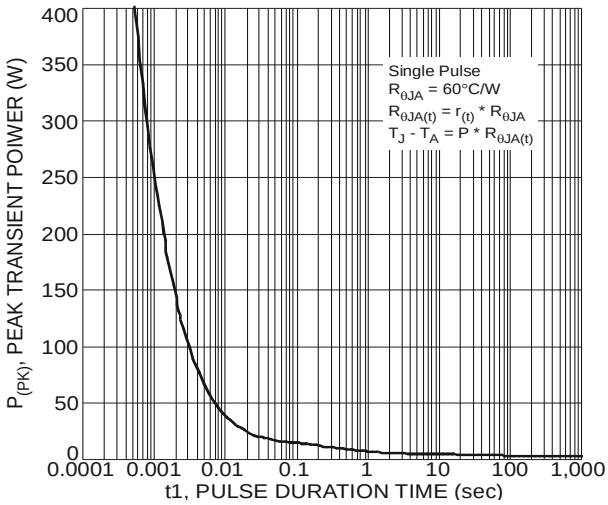


Figure 12. Single Pulse Maximum Power Dissipation

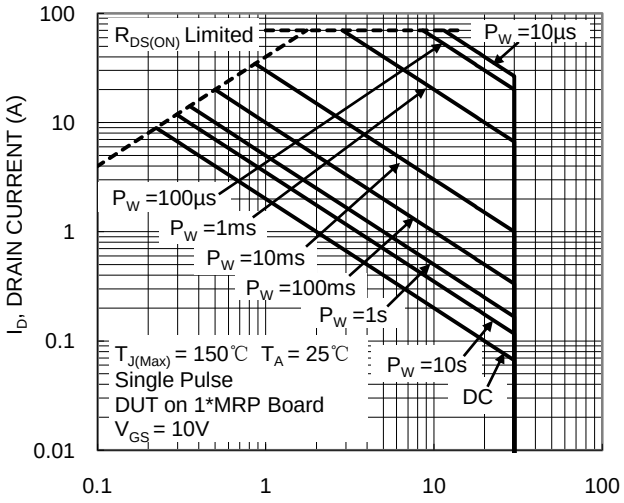


Figure 13. SOA, Safe Operation Area

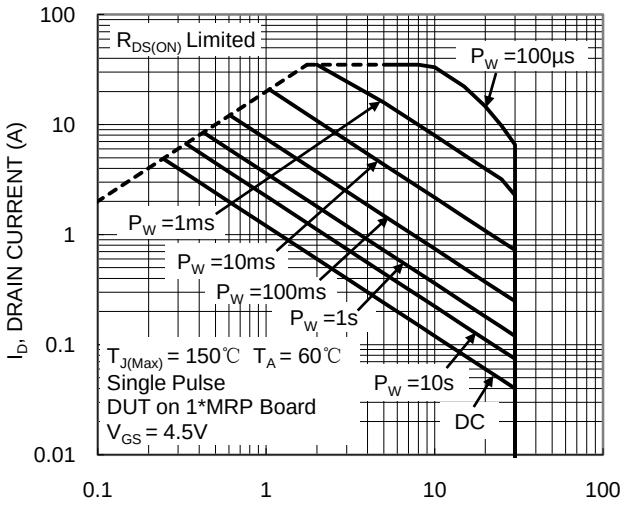


Figure 14. SOA, Safe Operation Area

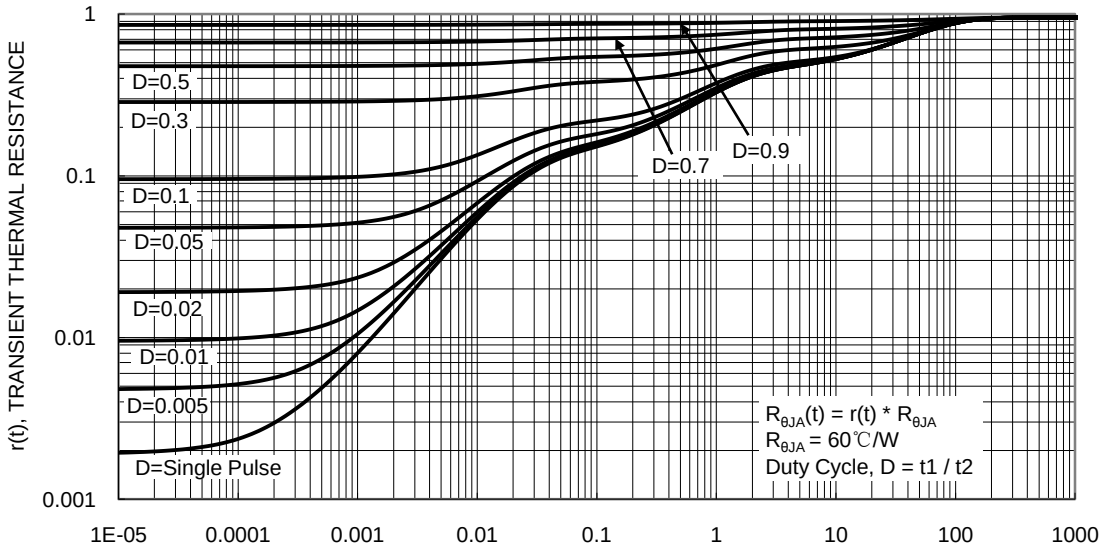


Figure 15. Transient Thermal Resistance

Package Outline Dimensions

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

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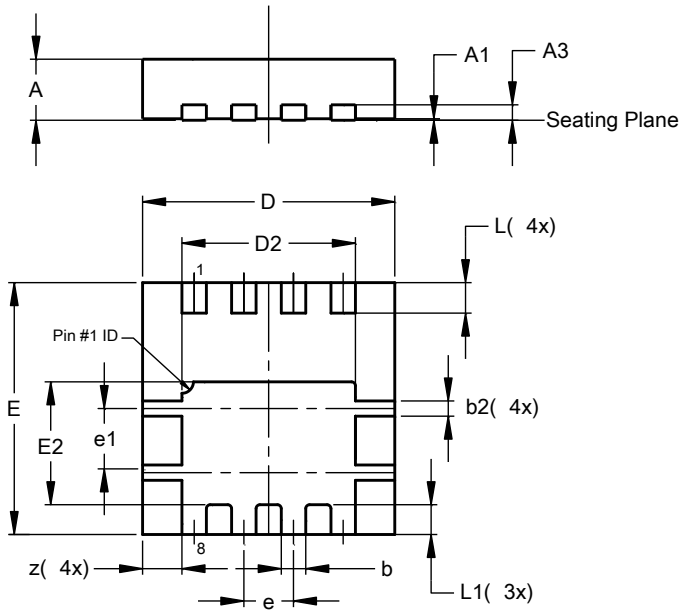

POWERDI®3333-8			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	–	–	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
e	–	–	0.65
e1	0.79	0.89	0.84
L	0.35	0.45	0.40
L1	–	–	0.39
z	–	–	0.515
All Dimensions in mm			

Suggested Pad Layout

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

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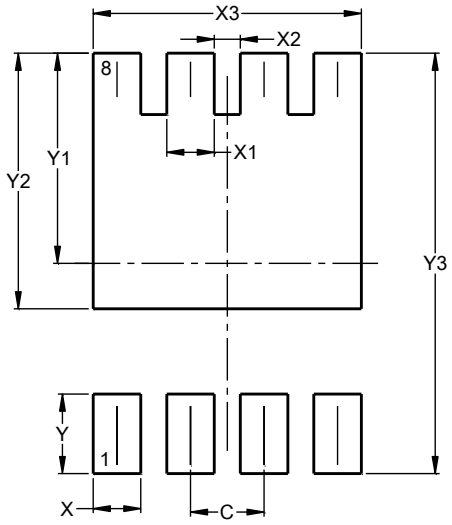

Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
X3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700

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