

Product Summary

BV_{DSS}	R_{DS(ON)} Max	I_D Max T_C = +25°C
60V	6mΩ @ V _{GS} = 10V	80A
	8.5mΩ @ V _{GS} = 4.5V	70A

Description

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

Applications

- Synchronous Rectifier
- Backlighting
- Power Management Functions
- DC-DC Converters

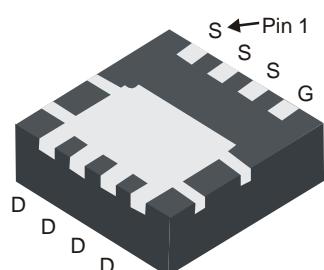
Features and Benefits

- Low R_{DS(ON)} – Ensures On-State Losses are Minimized
- Excellent Q_{gd} × R_{DS(ON)} Product (FOM)
- Advanced Technology for DC-DC Converters
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area by enabling smaller end products
- 100% UIS (Avalanche) Rated
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**

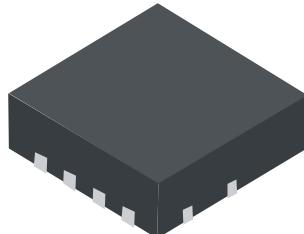
Mechanical Data

- 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 Indicator: See Diagram
- Terminal Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (E3)
- Weight: 0.008 grams (Approximate)

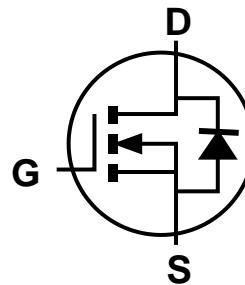
POWERDI®3333-8



Bottom View



Top View



Equivalent Circuit

Ordering Information (Note 4)

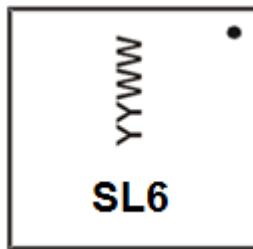
Part Number	Case	Packaging
DMT6007LFG-7	POWERDI®3333-8	2,000/Tape & Reel
DMT6007LFG-13	POWERDI®3333-8	3,000/Tape & Reel

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

POWERDI®3333-8



SL6 = 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}	60	V
Gate-Source Voltage	V_{GSS}	± 20	V
Continuous Drain Current (Note 5) $V_{GS} = 10\text{V}$	I_D	15	A
		12	
Maximum Continuous Body Diode Forward Current (Note 6)	I_S	80	A
		65	
Pulsed Drain Current (10 μs pulse, duty cycle = 1%)	I_{DM}	80	A
Avalanche Current, L=0.1mH	I_{AS}	20	A
Avalanche Energy, L=0.1mH	E_{AS}	20	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Units
Total Power Dissipation (Note 5)	P_D	2.2	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	55	$^\circ\text{C}/\text{W}$
Total Power Dissipation (Note 6)	P_D	62.5	W
Thermal Resistance, Junction to Case (Note 6)	$R_{\theta JC}$	2	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{STG}	-55 to +150	$^\circ\text{C}$

Notes: 5. $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
 6. Short duration pulse test used to minimize self-heating effect.

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 6)						
Drain-Source Breakdown Voltage	BV_{DSS}	60	—	—	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_D = 250\mu\text{A}$
Zero Gate Voltage Drain Current	I_{DSS}	—	—	1	μA	$\text{V}_{\text{DS}} = 48\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$
Gate-Source Leakage	I_{GSS}	—	—	± 100	nA	$\text{V}_{\text{GS}} = \pm 20\text{V}$, $\text{V}_{\text{DS}} = 0\text{V}$
ON CHARACTERISTICS (Note 6)						
Gate Threshold Voltage	$\text{V}_{\text{GS(TH)}}$	0.8	—	2	V	$\text{V}_{\text{DS}} = \text{V}_{\text{GS}}$, $\text{I}_D = 250\mu\text{A}$
Static Drain-Source On-Resistance	$\text{R}_{\text{DS(ON)}}$	—	4.5	6	$\text{m}\Omega$	$\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 20\text{A}$
		—	6.5	8.5		$\text{V}_{\text{GS}} = 4.5\text{V}$, $\text{I}_D = 15\text{A}$
Forward Transconductance	G_{FS}	—	100	—	S	$\text{V}_{\text{DS}} = 5\text{V}$, $\text{I}_D = 20\text{A}$
Diode Forward Voltage	V_{SD}	—	0.9	1.2	V	$\text{V}_{\text{GS}} = 0\text{V}$, $\text{I}_s = 20\text{A}$
DYNAMIC CHARACTERISTICS (Note 7)						
Input Capacitance	C_{iss}	—	2090	—	pF	$\text{V}_{\text{DS}} = 30\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1\text{MHz}$
Output Capacitance	C_{oss}	—	746	—		
Reverse Transfer Capacitance	C_{rss}	—	38.5	—		
Gate Resistance	R_g	—	0.59	—	Ω	$\text{V}_{\text{DS}} = 0\text{V}$, $\text{V}_{\text{GS}} = 0\text{V}$, $f = 1\text{MHz}$
Total Gate Charge ($\text{V}_{\text{GS}} = 4.5\text{V}$)	Q_g	—	19.3	—	nC	$\text{V}_{\text{DS}} = 30\text{V}$, $\text{I}_D = 20\text{A}$
Total Gate Charge ($\text{V}_{\text{GS}} = 10\text{V}$)	Q_g	—	41.3	—		
Gate-Source Charge	Q_{gs}	—	6.0	—		
Gate-Drain Charge	Q_{gd}	—	8.8	—		
Turn-On Delay Time	$\text{t}_{\text{D(ON)}}$	—	5.7	—	ns	$\text{V}_{\text{DD}} = 30\text{V}$, $\text{V}_{\text{GS}} = 10\text{V}$, $\text{I}_D = 20\text{A}$, $\text{R}_G = 3\Omega$
Turn-On Rise Time	t_R	—	4.3	—		
Turn-Off Delay Time	$\text{t}_{\text{D(OFF)}}$	—	23.4	—		
Turn-Off Fall Time	t_F	—	9.7	—		
Body Diode Reverse Recovery Time	t_{RR}	—	35.4	—	ns	$\text{I}_F = 20\text{A}$, $\text{di}/\text{dt} = 100\text{A}/\mu\text{s}$
Body Diode Reverse Recovery Charge	Q_{RR}	—	38.2	—	nC	

Note: 7. Guaranteed by design. Not subject to product testing.

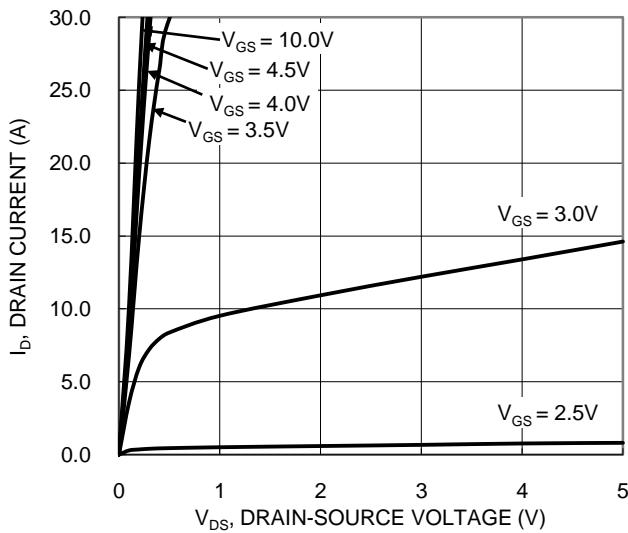


Figure 1. Typical Output Characteristic

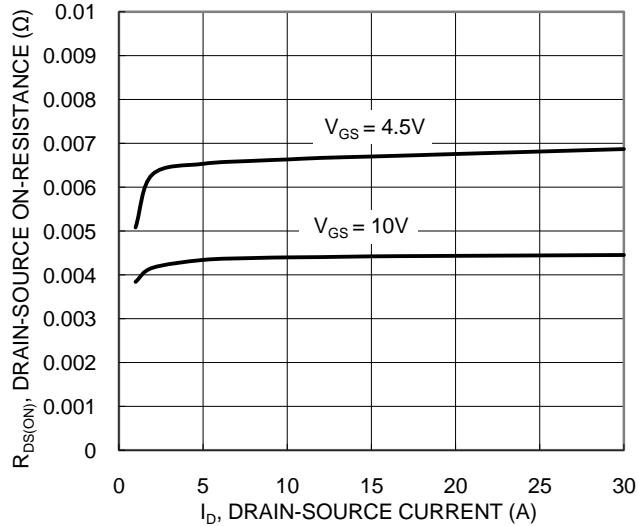


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

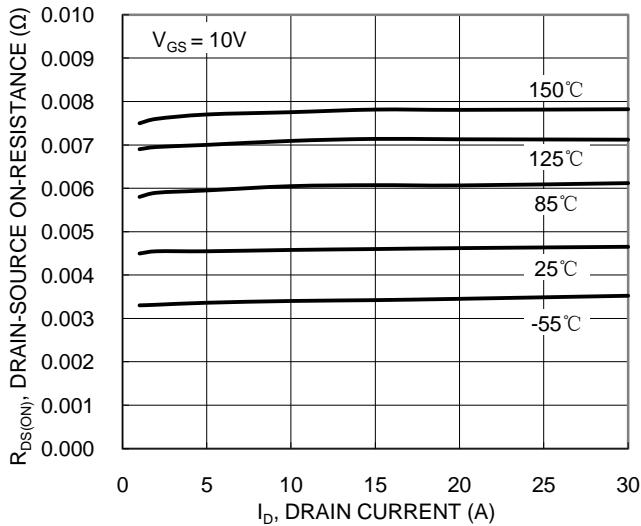


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

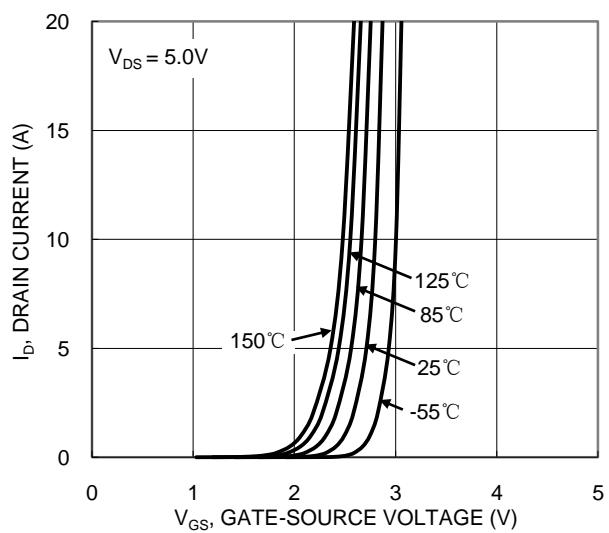


Figure 2. Typical Transfer Characteristic

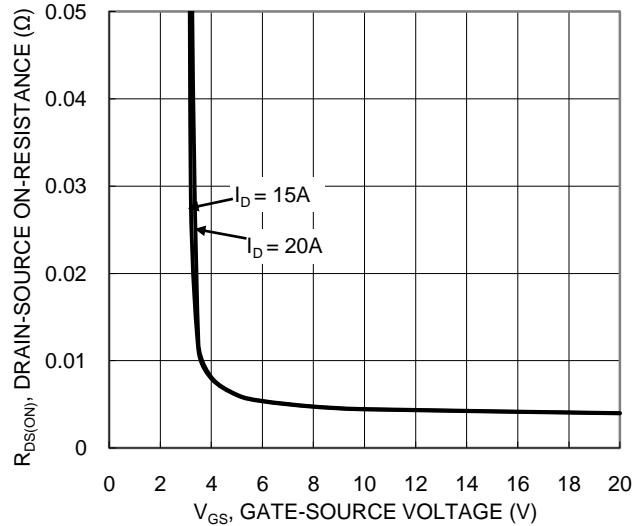


Figure 4. Typical Transfer Characteristic

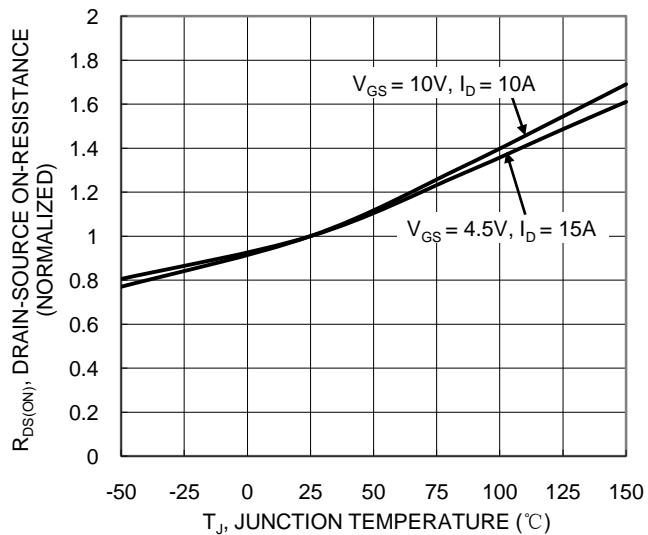
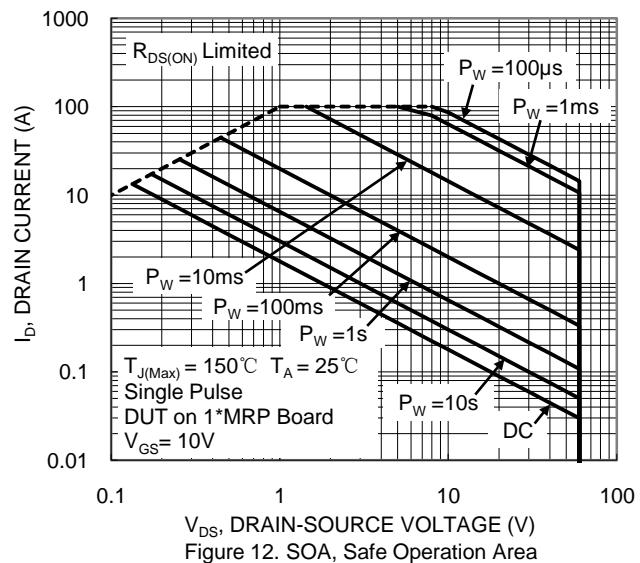
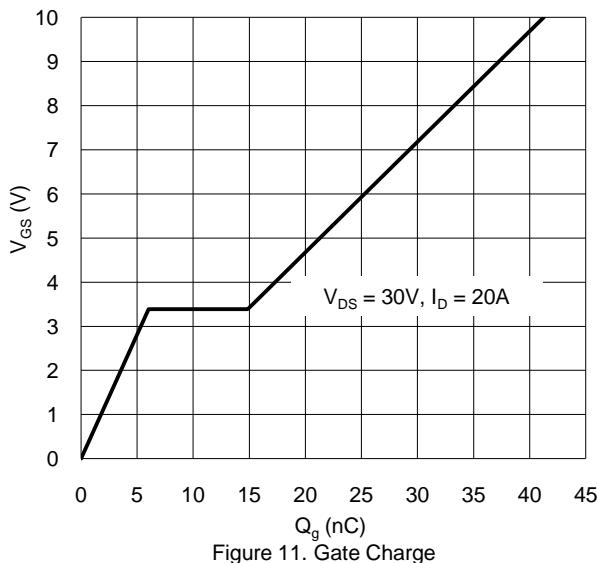
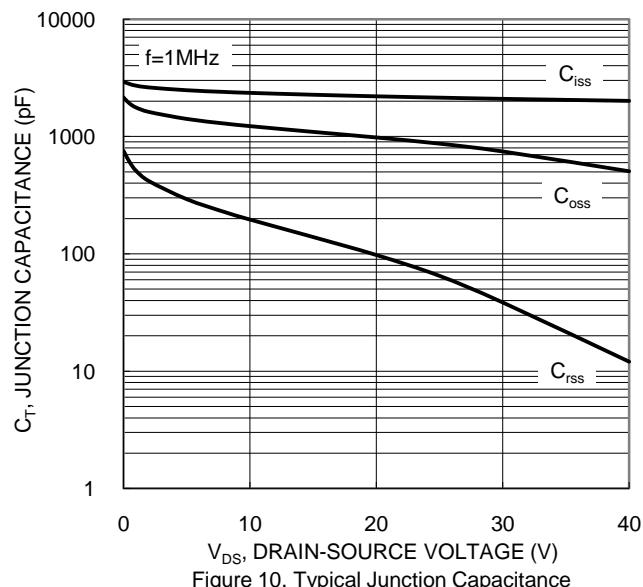
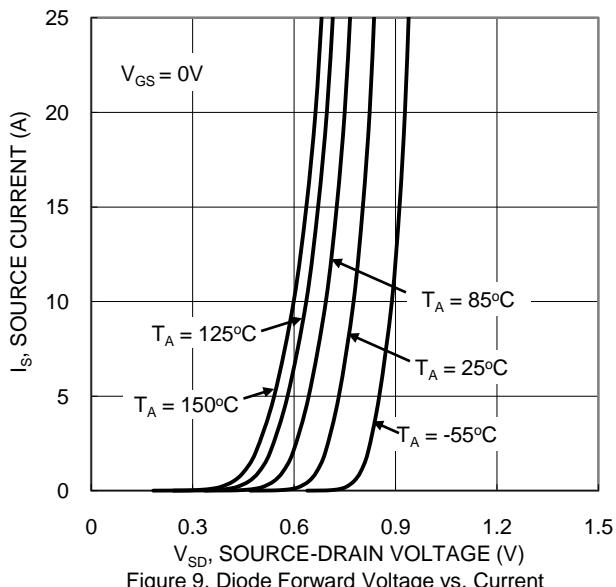
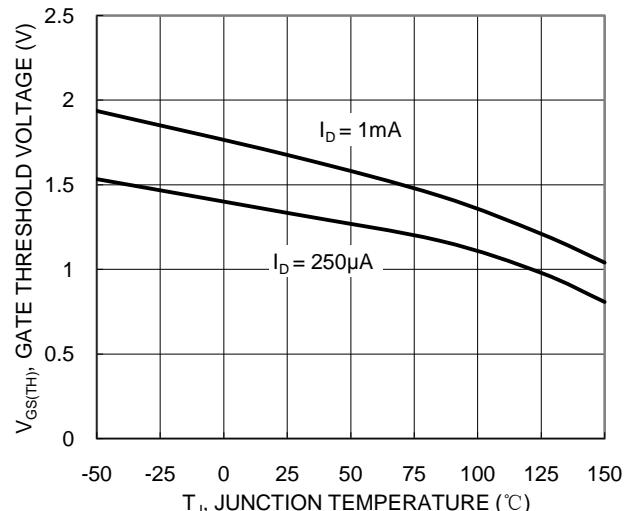
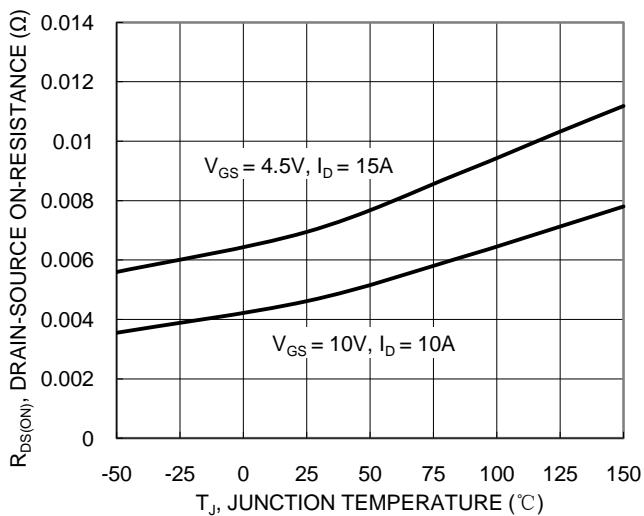


Figure 6. On-Resistance Variation with Temperature



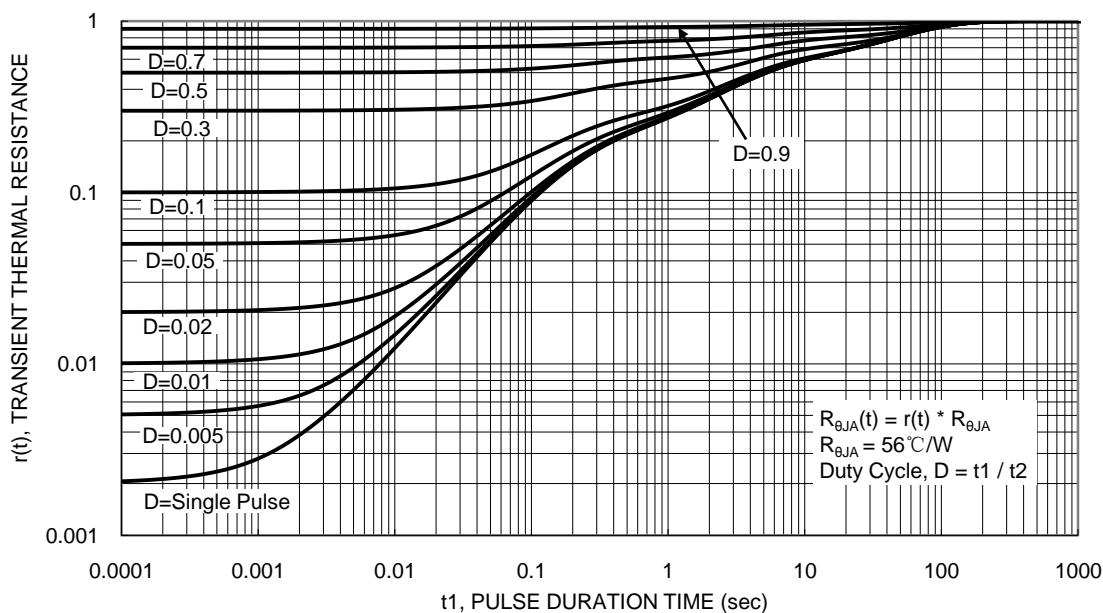
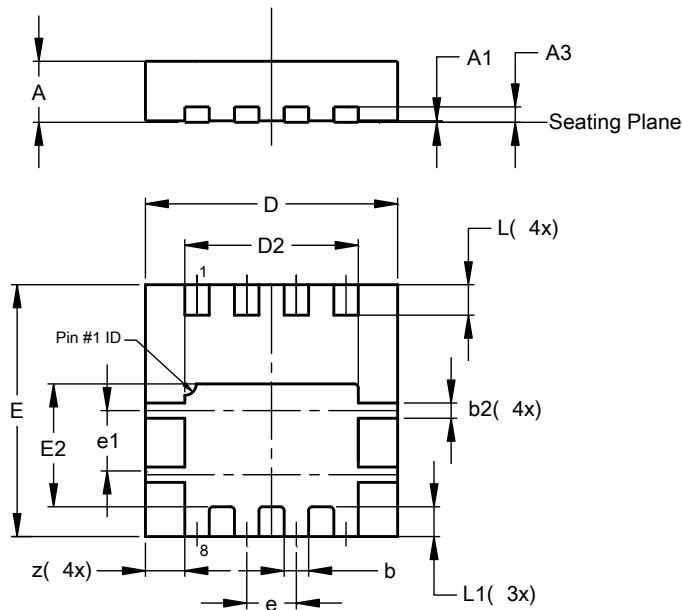


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

POWERDI®3333-8

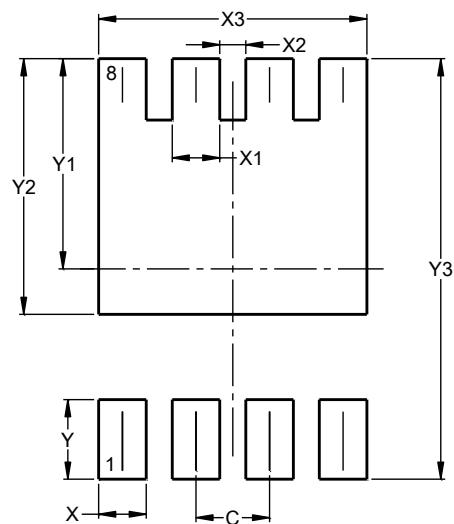


POWERDI®3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	—	—	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
e	—	—	0.65
e1	0.79	0.89	0.84
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout

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

POWERDI®3333-8



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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