

Product Summary

BV_{DSS}	$R_{DS(ON)}$ Max	I_D Max $T_C = +25^\circ\text{C}$
60V	$6\text{m}\Omega @ V_{GS} = 10\text{V}$	80A
	$8.5\text{m}\Omega @ V_{GS} = 4.5\text{V}$	70A

Description and Applications

This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

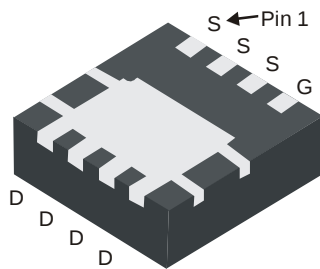
- Brushless DC Motor Control
- DC-DC Converters
- Load Switch

Features and Benefits

- Low $R_{DS(ON)}$ – Ensures On-State Losses are Minimized
- Excellent $Q_{gd} \times R_{DS(ON)}$ Product (FOM)
- Small form factor thermally efficient package enables higher density end products
- 100% Unclamped Inductive Switching, Test in Production – Ensures More Reliable And Robust End Application
- **Lead-Free Finish; RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **Qualified to AEC-Q101 Standards for High Reliability**
- **PPAP Capable (Note 4)**

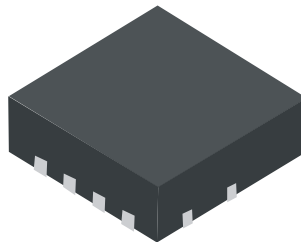
Mechanical Data

- 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@
- Weight: 0.008 grams (Approximate)

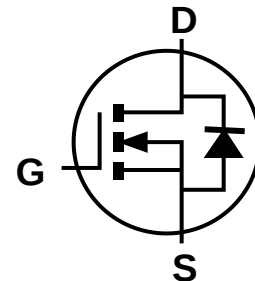


Bottom View

PowerDI3333-8



Top View



Equivalent Circuit

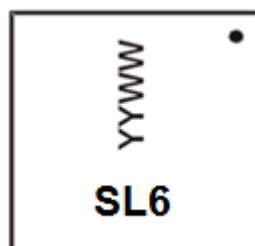
Ordering Information (Note 5)

Part Number	Case	Packaging
DMT6007LFGQ-7	PowerDI3333-8	2,000/Tape & Reel
DMT6007LFGQ-13	PowerDI3333-8	3,000/Tape & Reel

- Notes:
1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
 2. See <https://www.diodes.com/quality/lead-free/> 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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to <https://www.diodes.com/quality/>.
 5. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information

PowerDI3333-8



SL6 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 18 = 2018)
WW = Week Code (01 to 53)

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

Characteristic		Symbol	Value	Unit
Drain-Source Voltage		V_{DSS}	60	V
Gate-Source Voltage		V_{GSS}	± 20	V
Continuous Drain Current (Note 6) $V_{GS} = 10\text{V}$	$T_A = +25^{\circ}\text{C}$	I_D	15	A
	$T_A = +70^{\circ}\text{C}$		12	A
	$T_C = +25^{\circ}\text{C}$	I_D	80	A
	$T_C = +70^{\circ}\text{C}$		65	A
Maximum Continuous Body Diode Forward Current (Note 7)		I_S	80	A
Pulsed Drain Current (10 μs Pulse, Duty Cycle = 1%)		I_{DM}	80	A
Avalanche Current, $L = 0.1\text{mH}$		I_{AS}	20	A
Avalanche Energy, $L = 0.1\text{mH}$		E_{AS}	20	mJ

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)	$T_A = +25^{\circ}\text{C}$	P_D	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)		$R_{\theta JA}$	55	$^{\circ}\text{C/W}$
Total Power Dissipation (Note 7)	$T_C = +25^{\circ}\text{C}$	P_D	62.5	W
Thermal Resistance, Junction to Case (Note 7)		$R_{\theta JC}$	2	$^{\circ}\text{C/W}$
Operating and Storage Temperature Range		T_J, T_{STG}	-55 to +150	$^{\circ}\text{C}$

Notes: 6. $R_{\theta JA}$ 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.
7. Short duration pulse test used to minimize self-heating effect.

Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	60	—	—	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	1	μA	V _{DS} = 48V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 7)						
Gate Threshold Voltage	V _{GS(TH)}	0.8	—	2	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	4.5	6	mΩ	V _{GS} = 10V, I _D = 20A
		—	6.5	8.5		V _{GS} = 4.5V, I _D = 15A
Forward Transconductance	G _{FS}	—	100	—	S	V _{DS} = 5V, I _D = 20A
Diode Forward Voltage	V _{SD}	—	0.9	1.2	V	V _{GS} = 0V, I _S = 20A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{iss}	—	2090	—	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	—	746	—		
Reverse Transfer Capacitance	C _{rss}	—	38.5	—		
Gate Resistance	R _g	—	0.59	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	19.3	—	nC	V _{DS} = 30V, I _D = 20A
Total Gate Charge (V _{GS} = 10V)	Q _g	—	41.3	—		
Gate-Source Charge	Q _{gs}	—	6.0	—		
Gate-Drain Charge	Q _{gd}	—	8.8	—		
Turn-On Delay Time	t _{D(ON)}	—	5.7	—	ns	V _{DD} = 30V, V _{GS} = 10V, I _D = 20A, R _G = 3Ω
Turn-On Rise Time	t _R	—	4.3	—		
Turn-Off Delay Time	t _{D(OFF)}	—	23.4	—		
Turn-Off Fall Time	t _F	—	9.7	—		
Body Diode Reverse Recovery Time	t _{RR}	—	35.4	—	ns	I _F = 20A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	38.2	—	nC	

Notes: 7. Short duration pulse test used to minimize self-heating effect.
8. Guaranteed by design. Not subject to product testing.

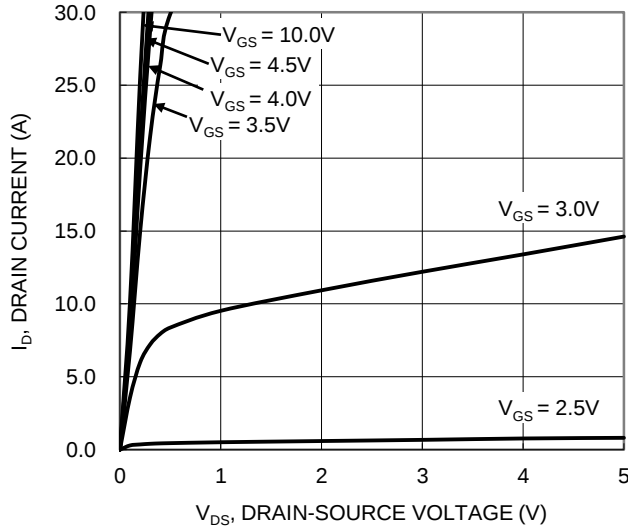


Figure 1. Typical Output Characteristic

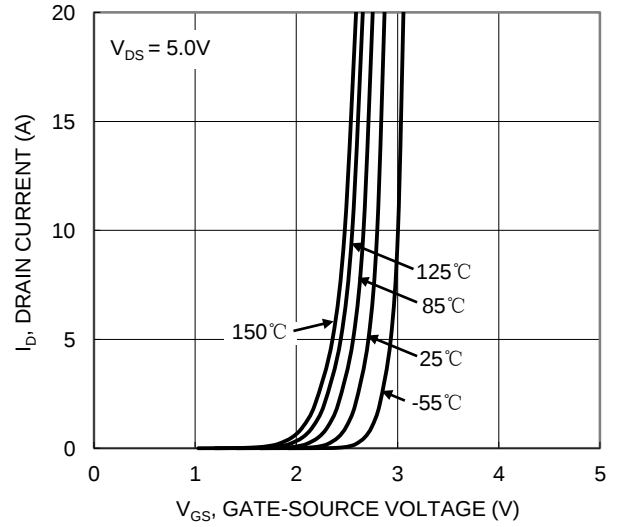


Figure 2. Typical Transfer Characteristic

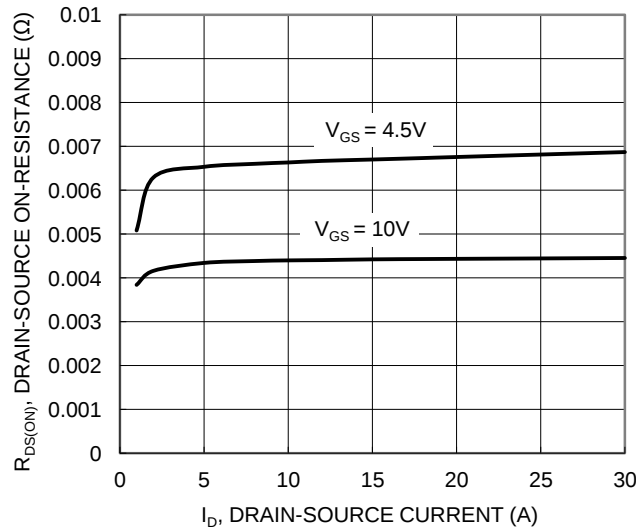


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

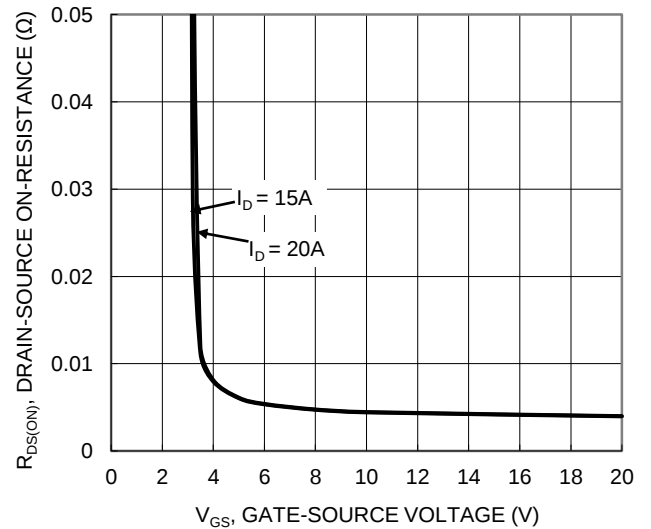


Figure 4. Typical Transfer Characteristic

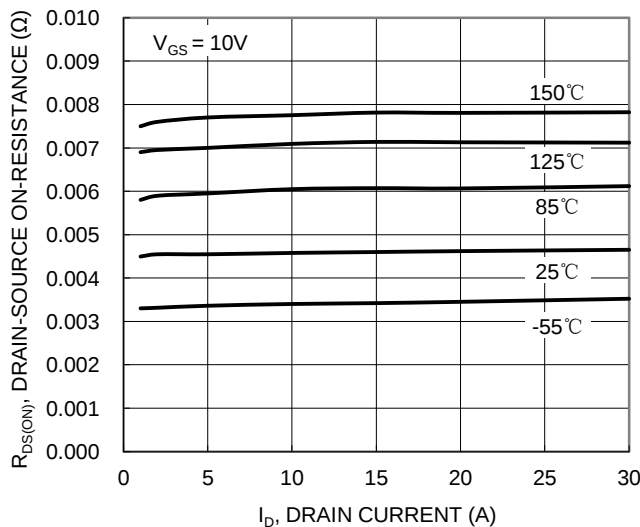


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

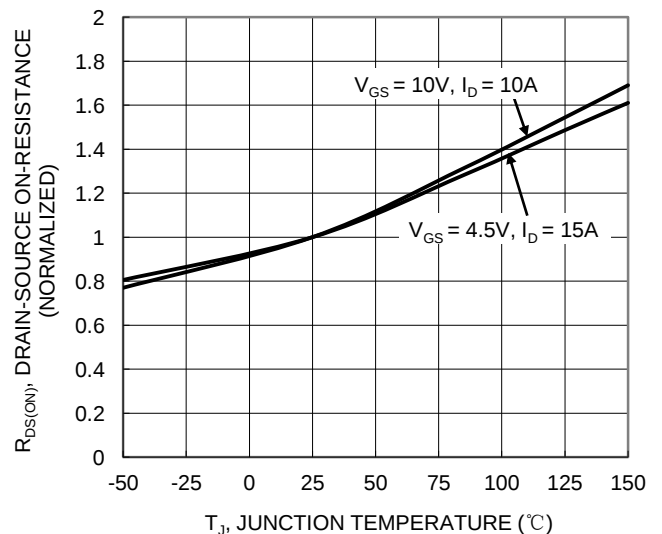
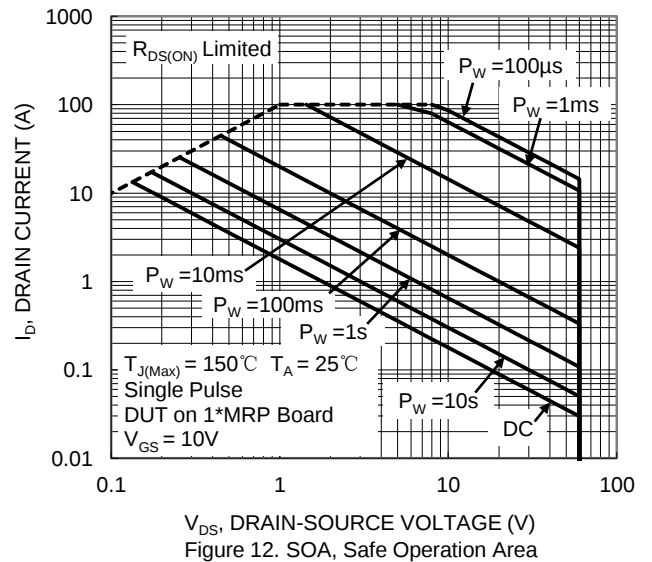
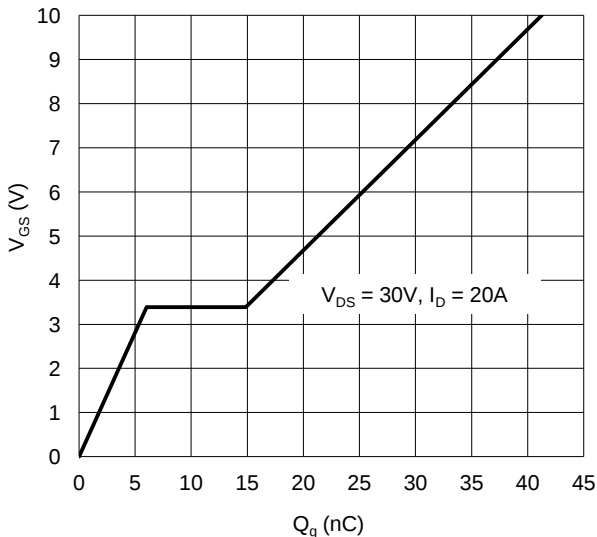
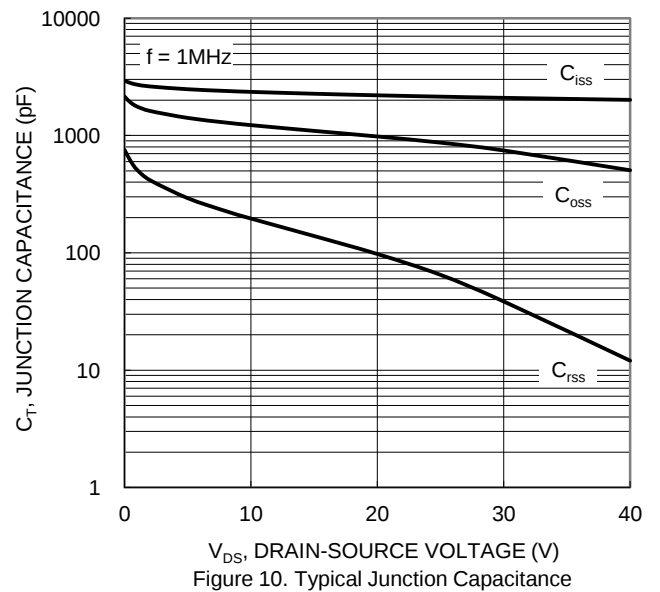
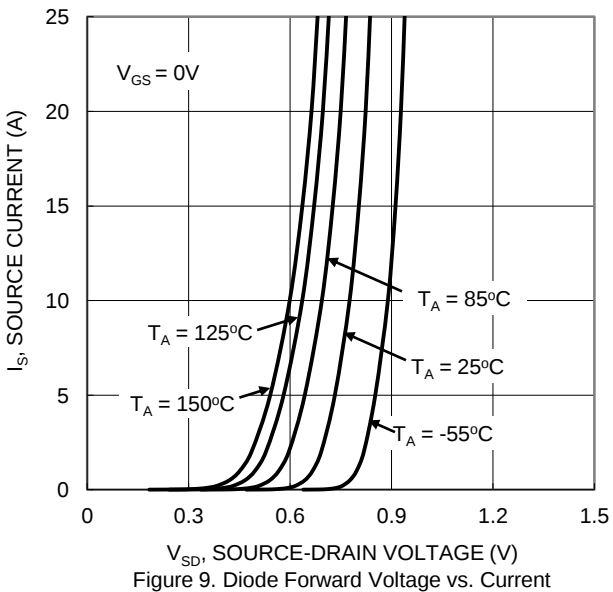
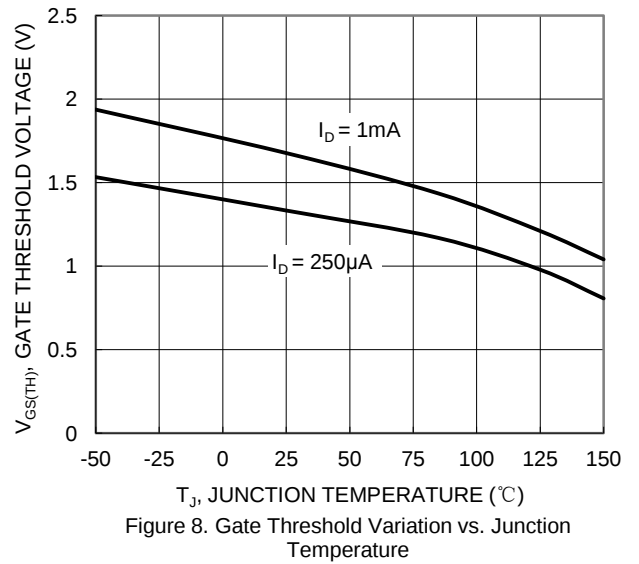
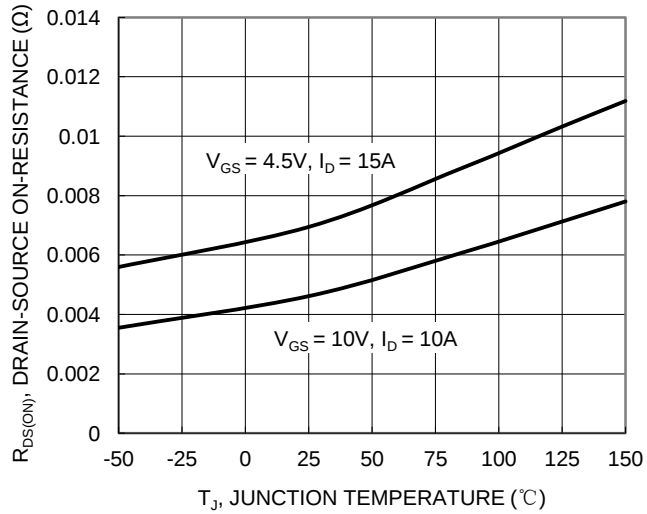


Figure 6. On-Resistance Variation with Temperature



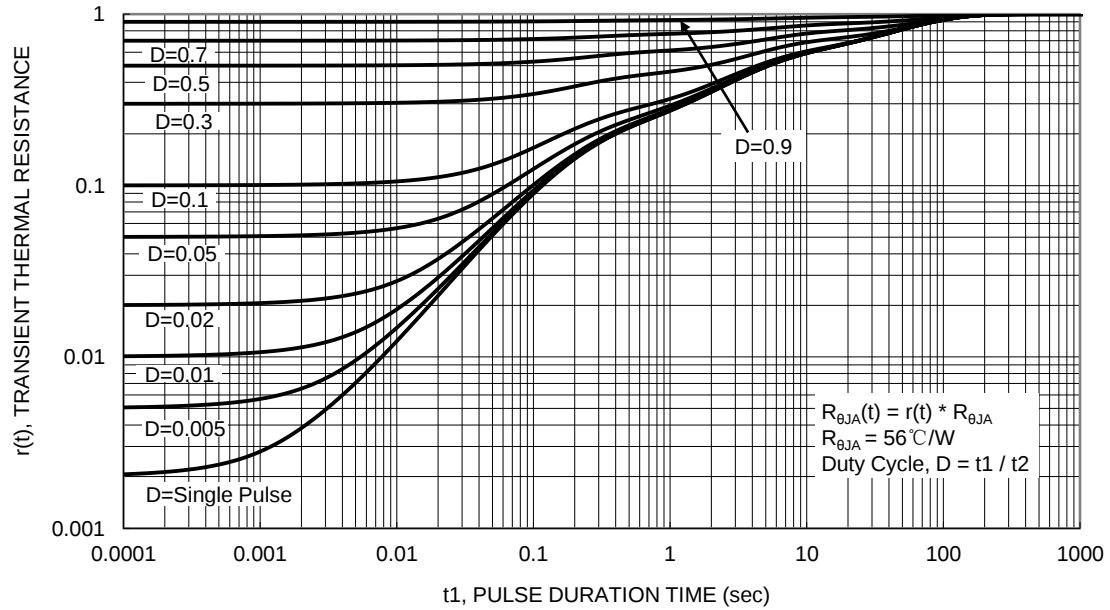
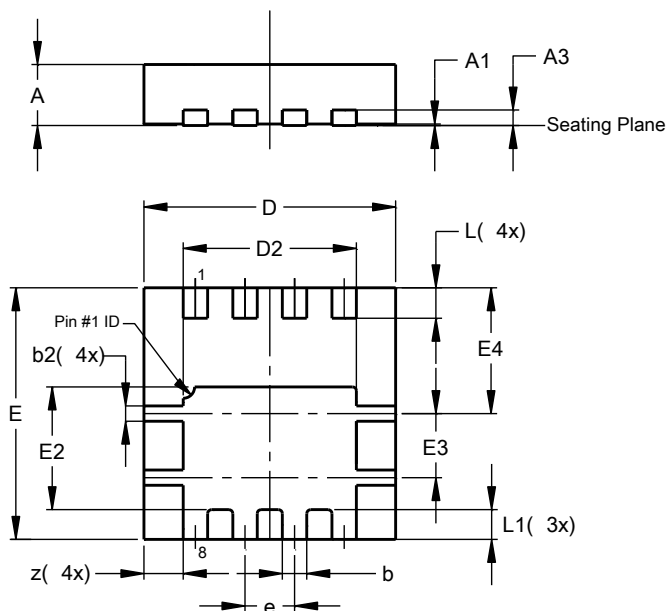


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

PowerDI3333-8

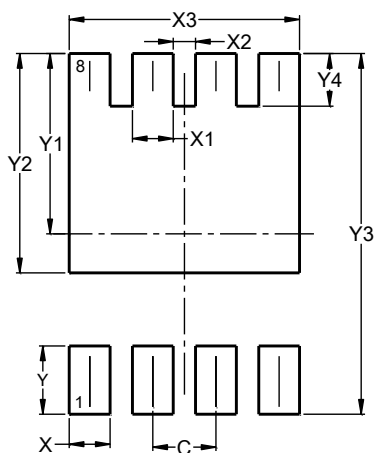


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout

Please see <http://www.diodes.com/package-outlines.html> 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
Y4	0.540

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