

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
30V	5.5mΩ @ V _{GS} = 10V	75A
	8.5mΩ @ V _{GS} = 4.5V	50A

Description and Applications

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.

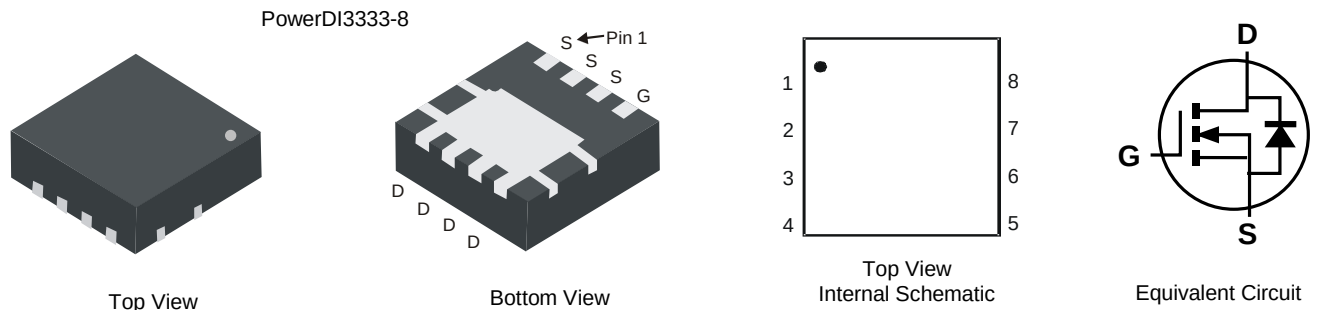
- Engine Management Systems
- Body Control Electronics
- DC-DC Converters

Features and Benefits

- Rated to +175°C – Ideal for High Ambient Temperature Environments
- 100% Unclamped Inductive Switching (Test in Production) – Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} – Ensures On-State Losses are Minimized
- Excellent Q_{gd} x R_{DS(ON)} Product (FOM)
- 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
- **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**
- **PPAP Capable (Note4)**

Mechanical Data

- Case: PowerDI[®] 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 3 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 
- Weight: 0.072 grams (Approximate)

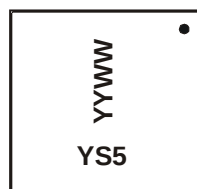


Ordering Information (Note 5)

Part Number	Case	Packaging
DMTH3004LFGQ-7	PowerDI3333-8	2,000/Tape & Reel
DMTH3004LFGQ-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) & 2015/863/EU (RoHS 3) compliant.
 2. See http://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



YS5 = 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°C, unless otherwise specified.)

Characteristic	Symbol	Value	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	±16	V
Continuous Drain Current (Notes 7 & 10) V _{GS} = 10V	I _D	75 52	A
Continuous Drain Current (Note 6) V _{GS} = 10V	I _D	15 10	A
Maximum Continuous Body Diode Forward Current (Note 6)	I _S	3	A
Pulsed Drain Current (100μs Pulse, Duty Cycle = 1%)	I _{DM}	250	A
Pulsed Body Diode Forward Current (100μs Pulse, Duty Cycle = 1%)	I _{SM}	250	A
Avalanche Current, L=0.3mH	I _{AS}	27	A
Avalanche Energy, L=0.3mH	E _{AS}	110	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 7)	P _D	50	W
Thermal Resistance, Junction to Case (Note 7)	R _{θJC}	3	°C/W
Total Power Dissipation (Note 6)	P _D	2.5	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	60	°C/W
Operating and Storage Temperature Range	T _J , T _{STG}	-55 to +175	°C

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

Characteristic	Symbol	Min	Typ	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 8)						
Drain-Source Breakdown Voltage	BV _{DSS}	30	-	-	V	V _{GS} = 0V, I _D = 250μA
Zero Gate Voltage Drain Current	I _{DSS}	-	-	1	μA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	-	-	±100	nA	V _{GS} = ±16V, V _{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	V _{GS(TH)}	1	-	3	V	V _{DS} = V _{GS} , I _D = 250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	-	4.1	5.5	mΩ	V _{GS} = 10V, I _D = 20A
		-	6.2	8.5		V _{GS} = 4.5V, I _D = 7A
Diode Forward Voltage	V _{SD}	-	0.7	1	V	V _{GS} = 0V, I _S = 1A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	-	2370	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{oss}	-	1360	-		
Reverse Transfer Capacitance	C _{rss}	-	240	-		
Gate Resistance	R _g	-	0.6	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = 4.5V)	Q _g	-	20	-	nC	V _{DS} = 15V, I _D = 20A
Total Gate Charge (V _{GS} = 10V)	Q _g	-	44	-		
Gate-Source Charge	Q _{gs}	-	7	-		
Gate-Drain Charge	Q _{gd}	-	8	-		
Turn-On Delay Time	t _{D(ON)}	-	6.2	-	ns	V _{DD} = 15V, V _{GS} = 10V, R _L = 0.75Ω, R _g = 3Ω, I _D = 20A
Turn-On Rise Time	t _R	-	4.3	-		
Turn-Off Delay Time	t _{D(OFF)}	-	21	-		
Turn-Off Fall Time	t _F	-	8	-		
Body Diode Reverse Recovery Time	t _{RR}	-	25	-	ns	I _F = 15A, di/dt = 500A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	-	37	-	nC	

- Notes:
6. R_{θJA} is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. R_{θJC} is guaranteed by design while R_{θJA} is determined by the user's board design.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
 8. Short duration pulse test used to minimize self-heating effect.
 9. Guaranteed by design. Not subject to product testing.
 10. Package limited.

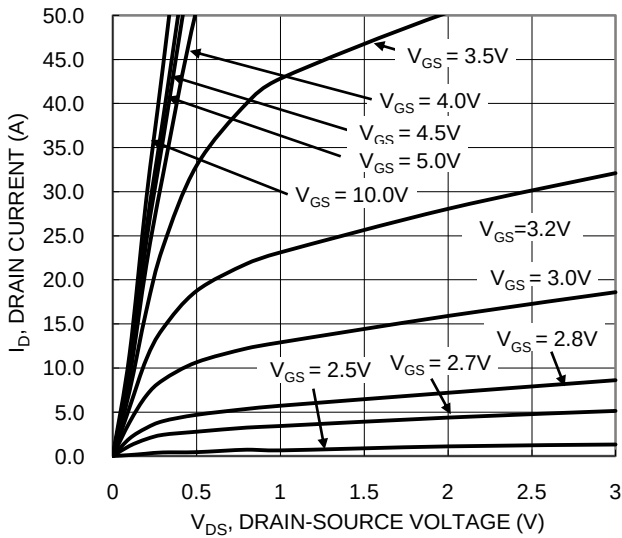


Figure 1. Typical Output Characteristic

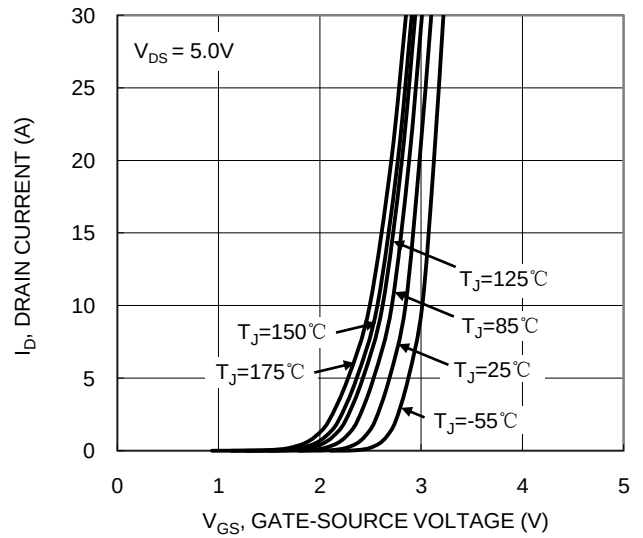


Figure 2. Typical Transfer Characteristic

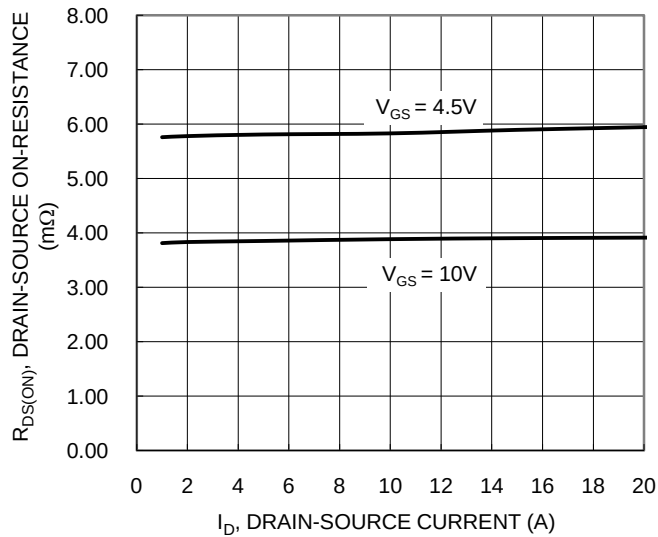


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

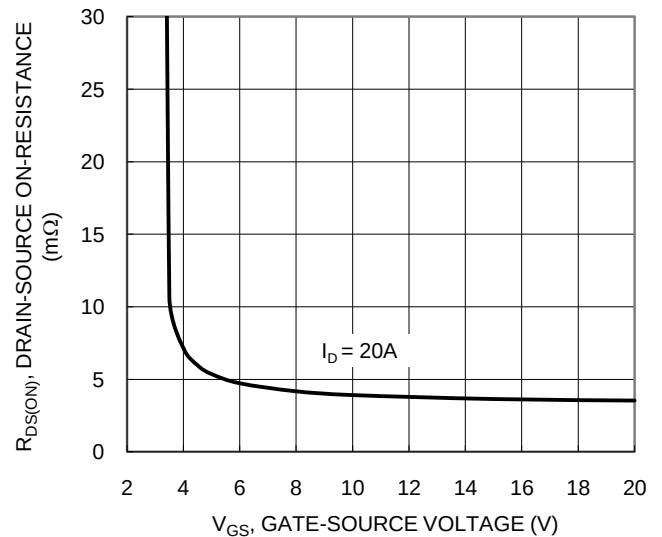


Figure 4. Typical Transfer Characteristic

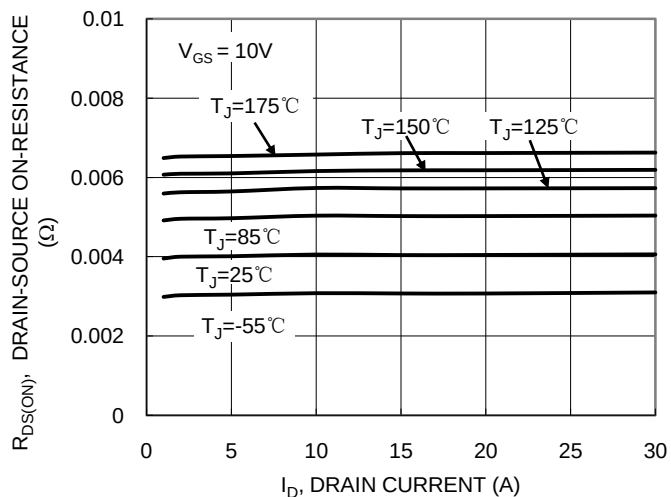


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

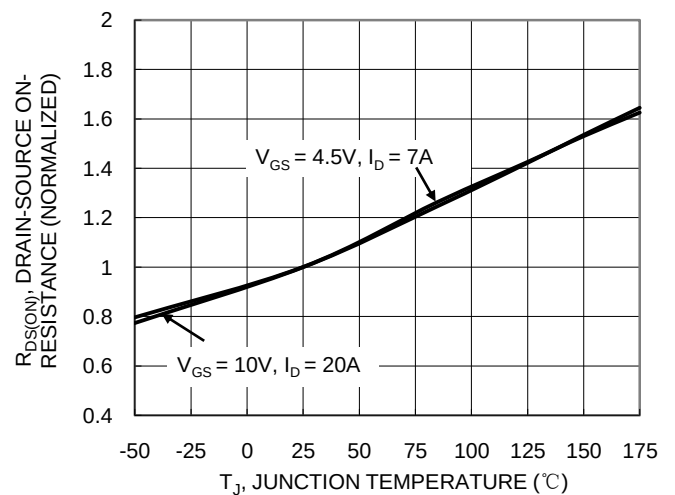
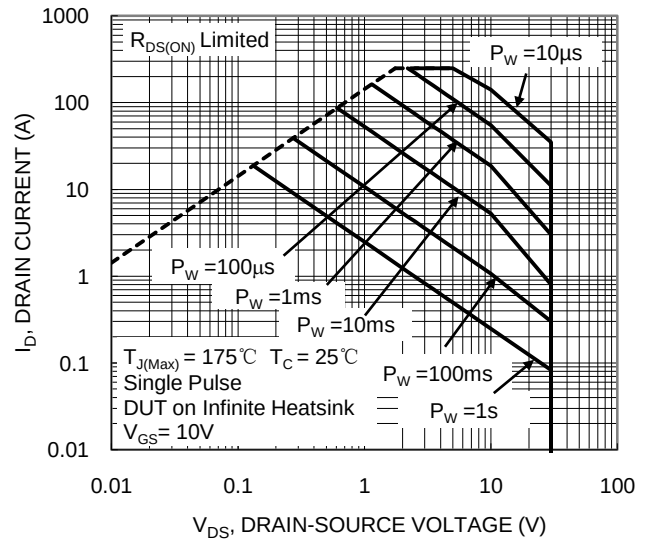
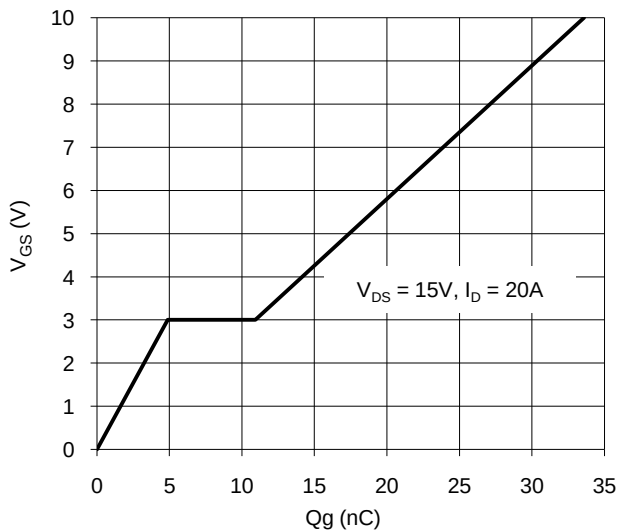
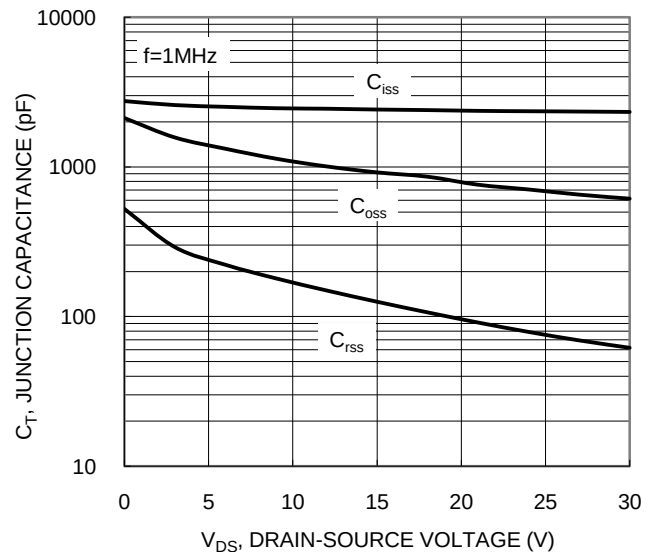
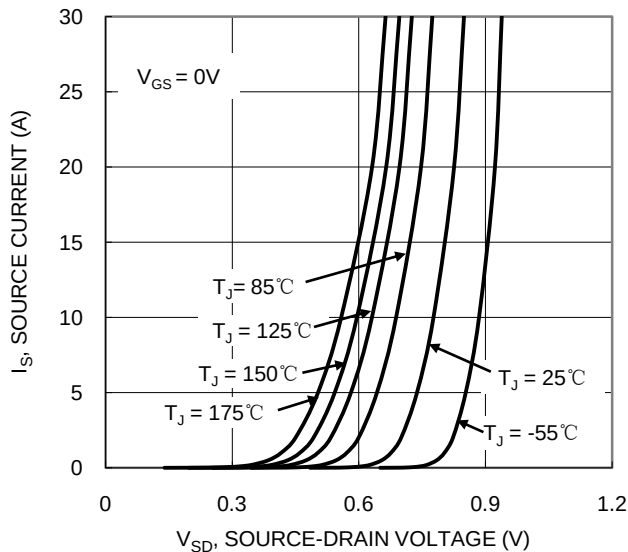
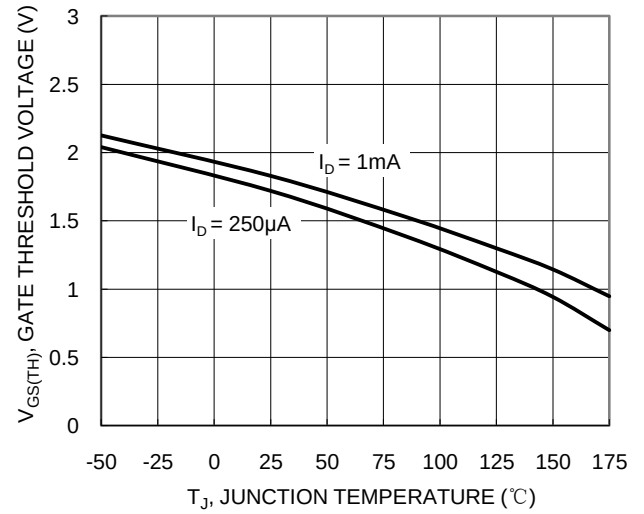
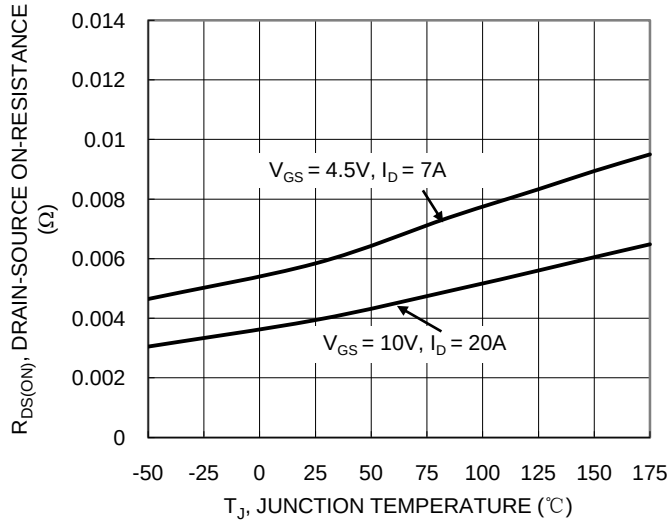


Figure 6. On-Resistance Variation with Temperature



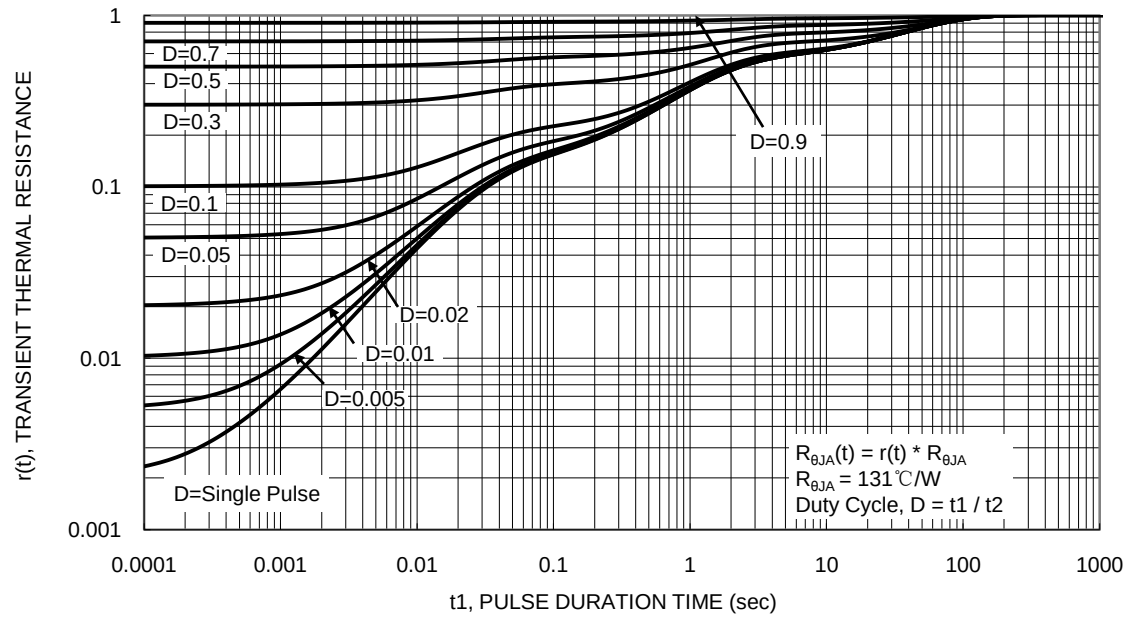
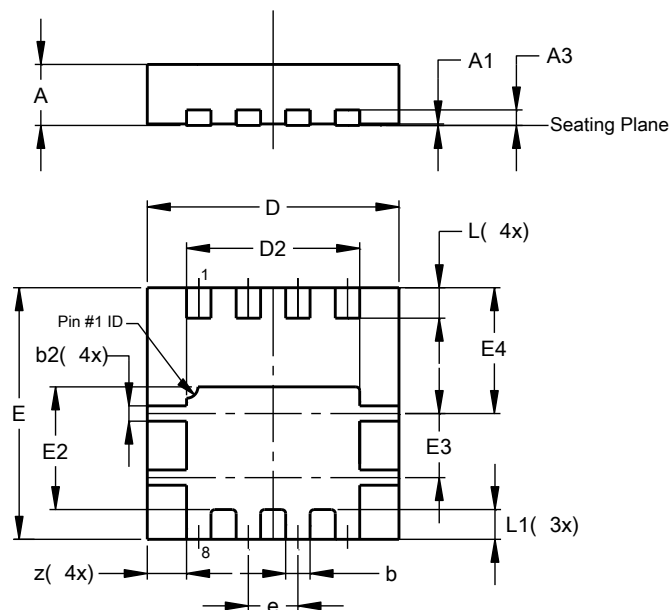


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

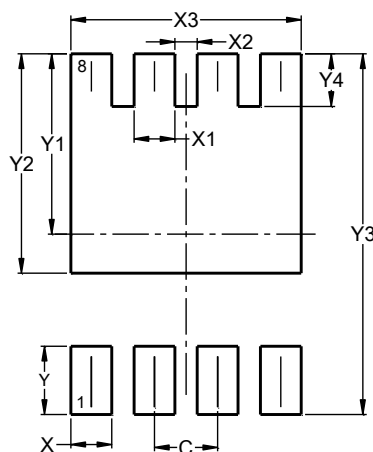


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	—	—	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	—	—	0.65
L	0.35	0.45	0.40
L1	—	—	0.39
z	—	—	0.515
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI3333-8



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
Y4	0.540

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