

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _A = +25°C
-40V	29mΩ @ V _{GS} = -10V	-8.0A
	45mΩ @ V _{GS} = -4.5V	-6.0A

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
- 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
- **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)**

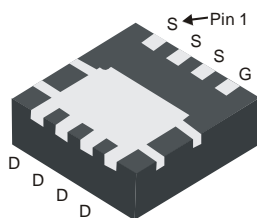
Description and Applications

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:

- Backlighting
- Power Management Functions
- DC-DC Converters

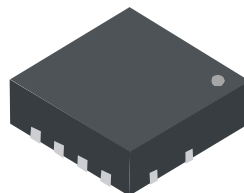
Mechanical Data

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

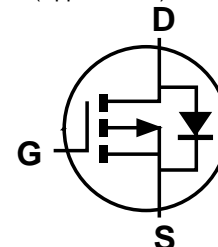


Bottom View

PowerDI3333-8



Top View



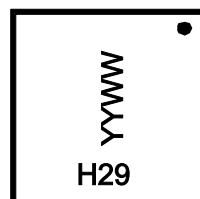
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH4029LFGQ-7	PowerDI3333-8	2000/Tape & Reel
DMPH4029LFGQ-13	PowerDI3333-8	3000/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



H29= Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 19 = 2019)
 WW = Week Code (01 to 53)

Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-40	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-8.0 -6.7	A
	Steady State	T _C = +25°C T _C = +70°C	I _D	-22 -18	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	-88	A
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	-2.0	A
Pulsed Source Current (380µs Pulse, Duty Cycle = 1%)			I _{SM}	-88	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	-25	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	32	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 6)		P _D	1.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	125	°C/W
	t < 10s		85	
Total Power Dissipation (Note 7)		P _D	2.8	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	R _{θJA}	54	°C/W
	t < 10s		36	
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	6	
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 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current T _J = +25°C	I _{DSS}	—	—	-1	µA	V _{DS} = -40V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±20V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-1.0	—	-3.0	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	18	29	mΩ	V _{GS} = -10V, I _D = -3A
		—	23	45		V _{GS} = -4.5V, I _D = -3A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	1626	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	135	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	107	—	pF	
Gate Resistance	R _g	—	11	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	17	—	nC	V _{DS} = -20V, I _D = -3A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	34	—	nC	
Gate-Source Charge	Q _{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	6.0	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	3.9	—	ns	V _{GS} = -10V, V _{DS} = -20V, R _G = 3Ω, I _D = -3A
Turn-On Rise Time	t _R	—	2.8	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	83	—	ns	
Turn-Off Fall Time	t _F	—	30	—	ns	
Body Diode Reverse Recovery Time	t _{RR}	—	17.3	—	ns	I _F = -3A, di/dt = 100A/µs
Body Diode Reverse Recovery Charge	Q _{RR}	—	7.2	—	nC	I _F = -3A, di/dt = 100A/µs

- Notes:
- Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 - I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.

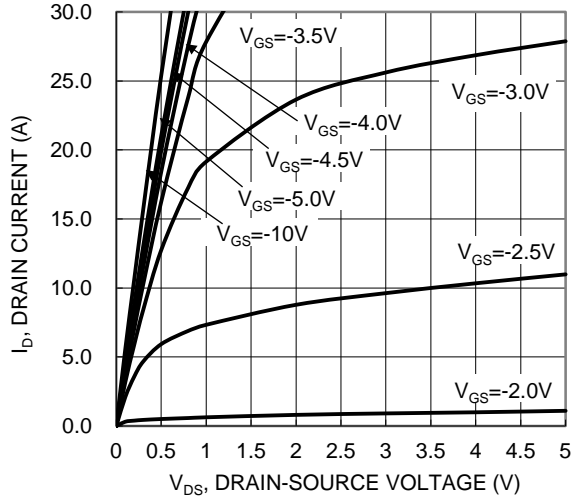


Figure 1. Typical Output Characteristic

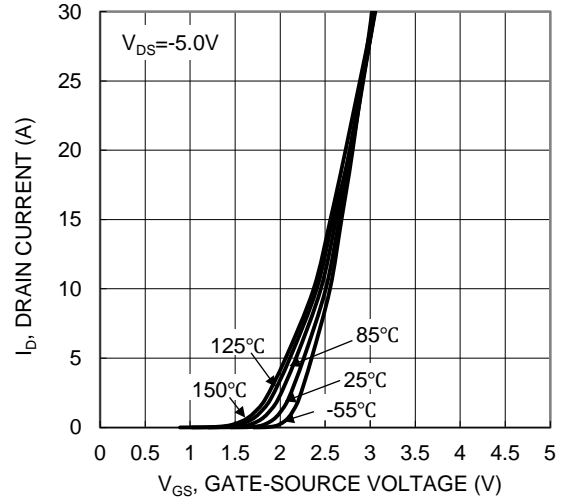


Figure 2. Typical Transfer Characteristic

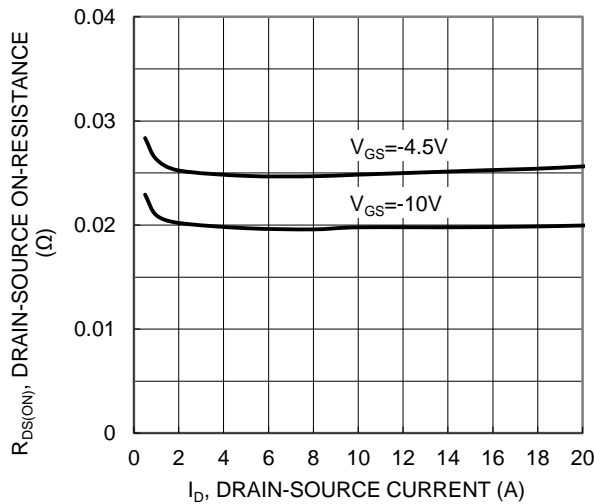


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

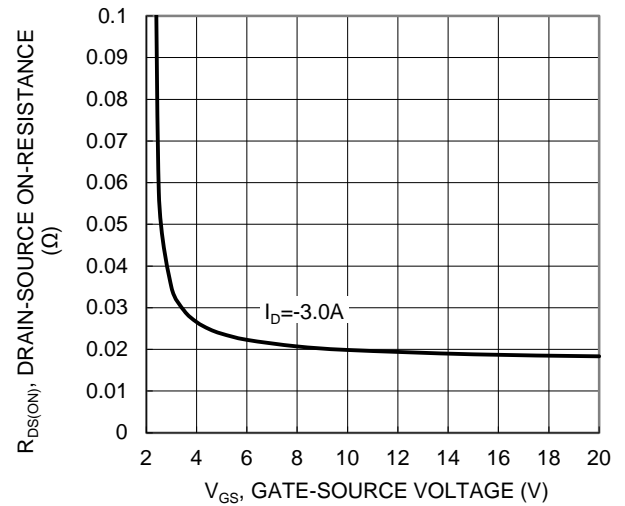


Figure 4. Typical Transfer Characteristic

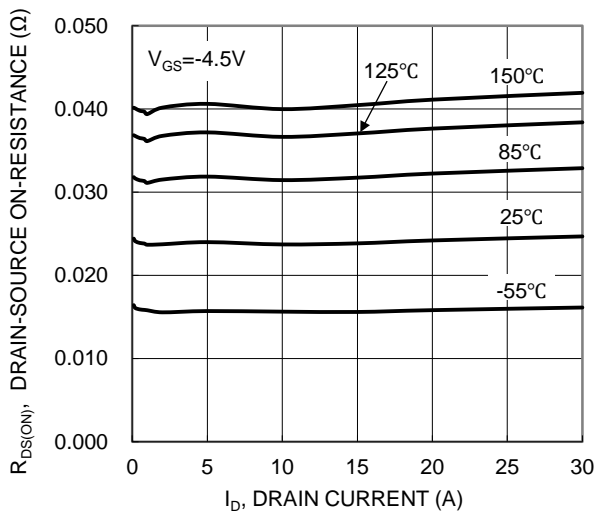


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

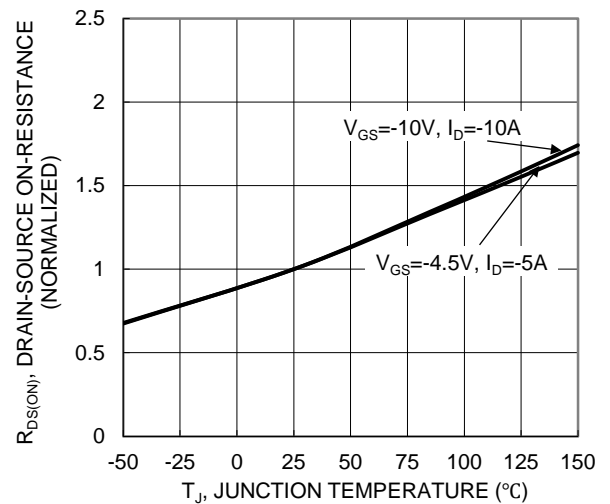


Figure 6. On-Resistance Variation with Temperature

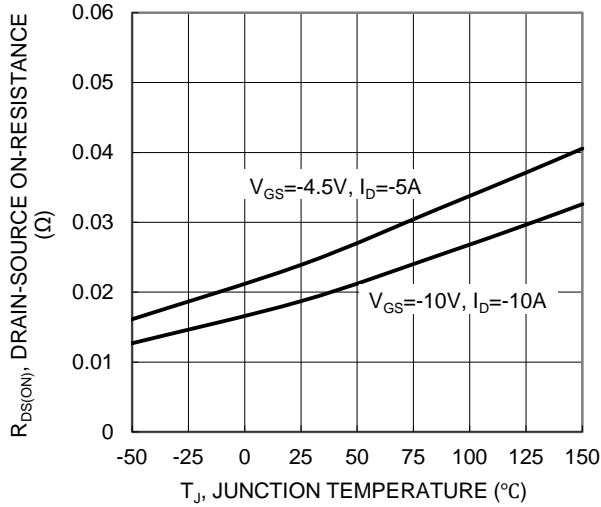


Figure 7. On-Resistance Variation with Temperature

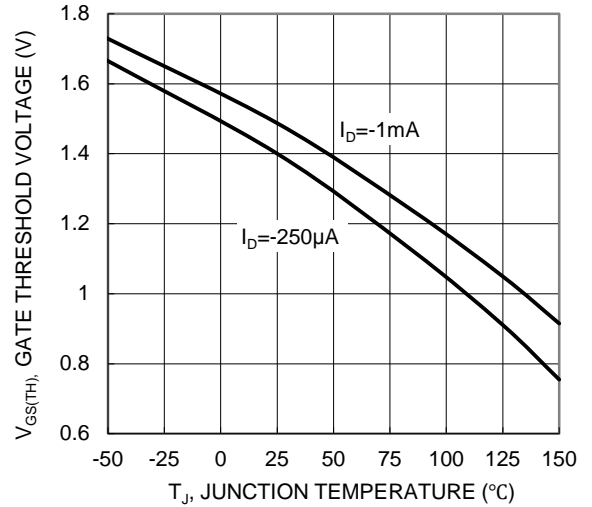


Figure 8. Gate Threshold Variation vs. Junction Temperature

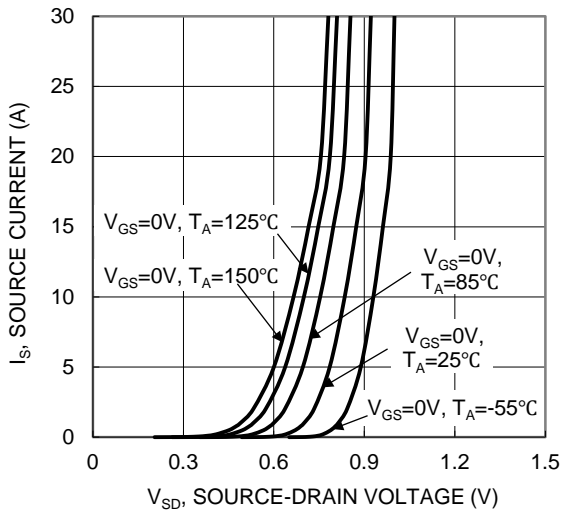


Figure 9. Diode Forward Voltage vs. Current

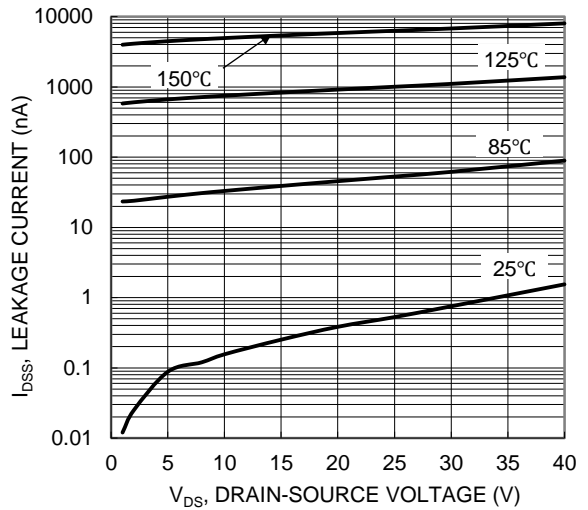


Figure 10. Typical Drain-Source Leakage Current vs. Voltage

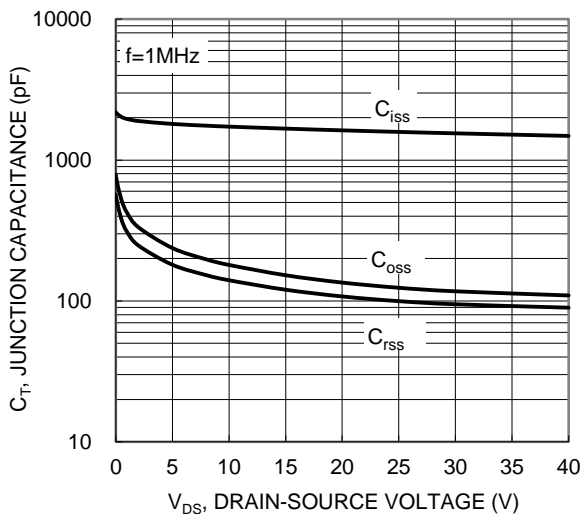


Figure 11. Typical Junction Capacitance

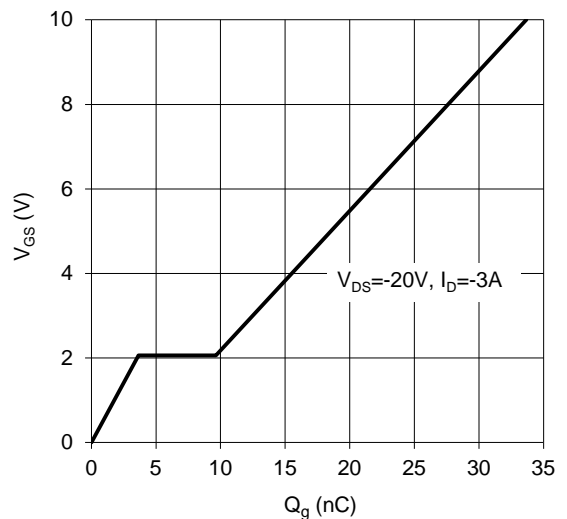


Figure 12. Gate Charge

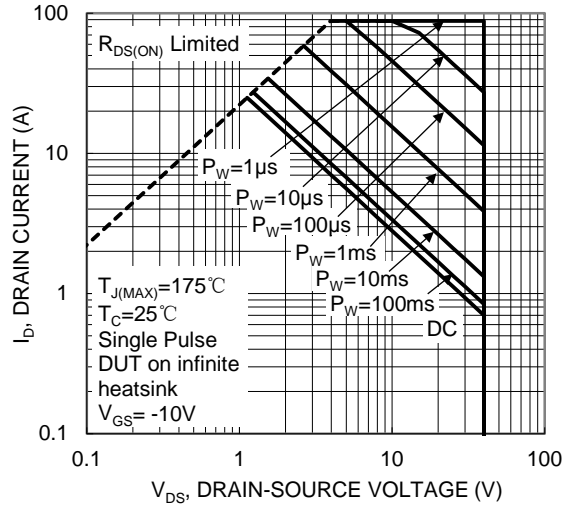


Figure 13. SOA, Safe Operation Area

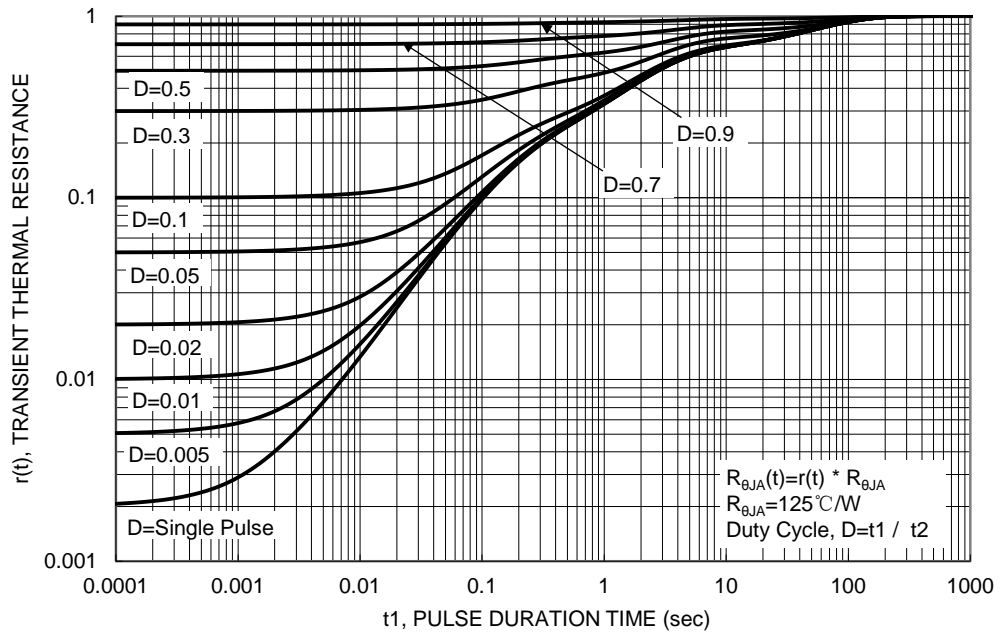
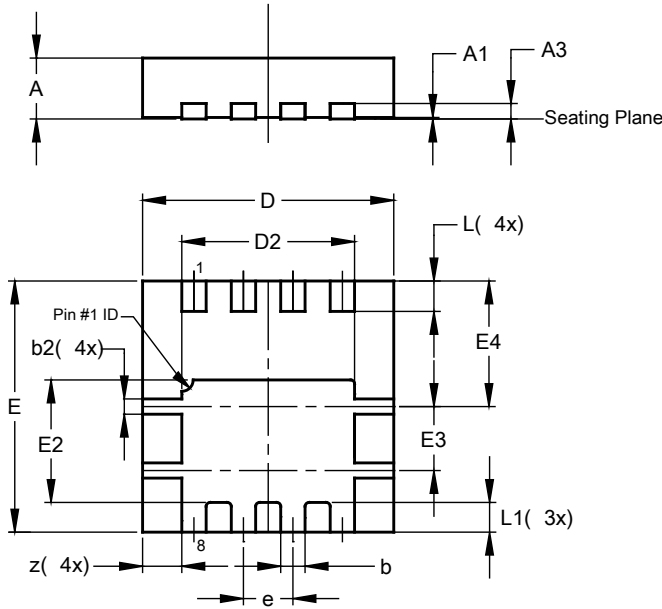


Figure 14. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

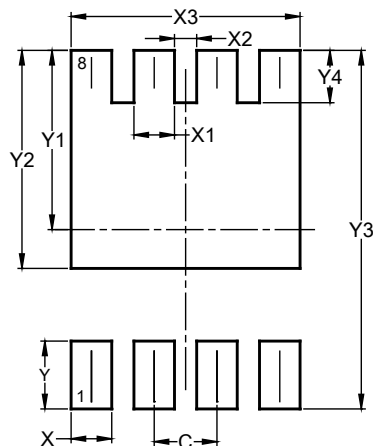


PowerDI3333-8			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	-	-	0.203
b	0.27	0.37	0.32
b2	0.15	0.25	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
E4	1.60	1.70	1.65
e	-	-	0.65
L	0.35	0.45	0.40
L1	-	-	0.39
z	-	-	0.515
All Dimensions in mm			

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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