

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
-40V	25mΩ @ V _{GS} = -10V	-40A
	45mΩ @ V _{GS} = -4.5V	-30A

Features and Benefits

- Rated to +175°C—Ideal for High Ambient Temperature Environments
- Low R_{DS(ON)}—Ensures Minimal On-State Losses
- 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
- **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 (Note 4)**

Description and Applications

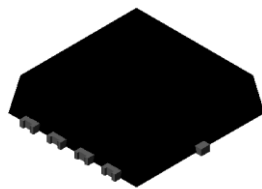
This MOSFET is designed to meet the stringent requirements of automotive applications. It is qualified to AEC-Q101, supported by a PPAP, and is ideal for use in:

- Reverse-Polarity Protection
- Power-Management Functions
- DC-DC Converters

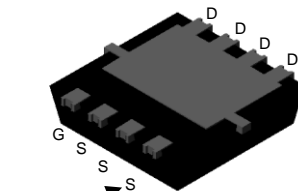
Mechanical Data

- Case: PowerDI[®]3333-8 (SWP) (Type UX)
- 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 (E3)
- Weight: 0.072 grams (Approximate)

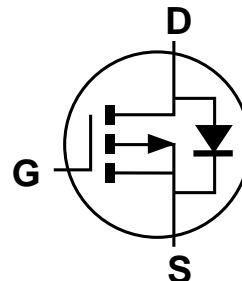
PowerDI3333-8 (SWP) (Type UX)



Top View



Bottom View



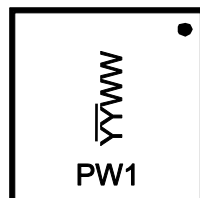
Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMPH4025SFVWQ-7	PowerDI3333-8 (SWP) (Type UX)	2000/Tape & Reel
DMPH4025SFVWQ-13	PowerDI3333-8 (SWP) (Type UX)	3000/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 <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



PW1 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 17 = 2017)
 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 6) V _{GS} = -10V	T _A = +25°C	-8.7	A
	T _A = +70°C	-7.3	A
	T _C = +25°C	-40	A
	T _C = +70°C	-33 (Package Limit)	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-80	A
Maximum Continuous Body Diode Forward Current	I _S	-3	A
Pulsed Source Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	-80	A
Avalanche Current, L = 0.3mH	I _{AS}	-23	A
Avalanche Energy, L = 0.3mH	E _{AS}	82	mJ

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

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 6)	P _D	T _A = +25°C	2.3
		T _C = +25°C	60
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	53	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	2.5	
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 7)						
Drain-Source Breakdown Voltage	BV _{DSS}	-40	—	—	V	V _{GS} = 0V, I _D = -250µA
Zero Gate Voltage Drain Current	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 7)						
Gate Threshold Voltage	V _{GS(TH)}	-0.8	—	-1.8	V	V _{DS} = V _{GS} , I _D = -250µA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	18	25	mΩ	V _{GS} = -10V, I _D = -30A
		—	23	45		V _{GS} = -4.5V, I _D = -15A
Diode Forward Voltage	V _{SD}	—	—	-1	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 8)						
Input Capacitance	C _{ISS}	—	1918	—	pF	V _{DS} = -20V, V _{GS} = 0V, f = 1MHz
Output Capacitance	C _{OSS}	—	390	—	pF	
Reverse Transfer Capacitance	C _{RSS}	—	151	—	pF	
Gate Resistance	R _g	—	5.76	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	19.6	—	nC	V _{DS} = -20V, I _D = -3A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	38.6	—	nC	
Gate-Source Charge	Q _{gs}	—	3.7	—	nC	
Gate-Drain Charge	Q _{gd}	—	7.3	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4.8	—	ns	
Turn-On Rise Time	t _R	—	14.2	—	ns	V _{DD} = -20V, V _{GS} = -10V, I _D = -3A
Turn-Off Delay Time	t _{D(OFF)}	—	72.2	—	ns	
Turn-Off Fall Time	t _F	—	35.9	—	ns	

- Notes:
6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
 7. Short duration pulse test used to minimize self-heating effect.
 8. Guaranteed by design. Not subject to product testing.

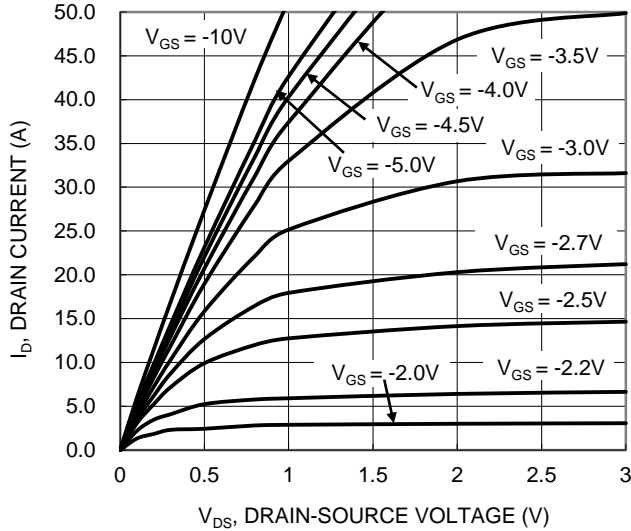


Figure 1. Typical Output Characteristic

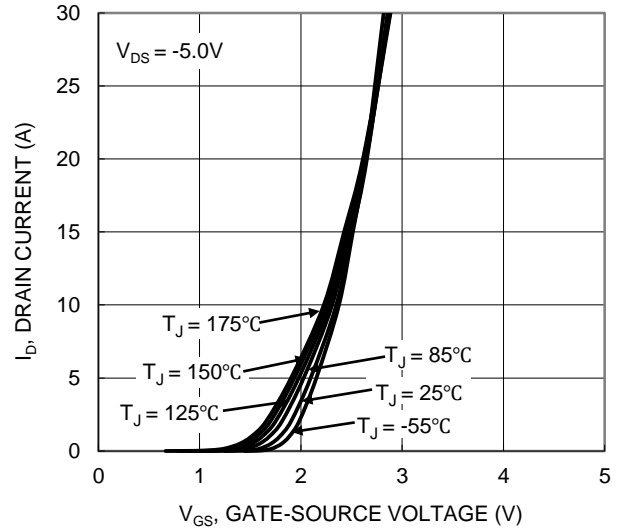


Figure 2. Typical Transfer Characteristic

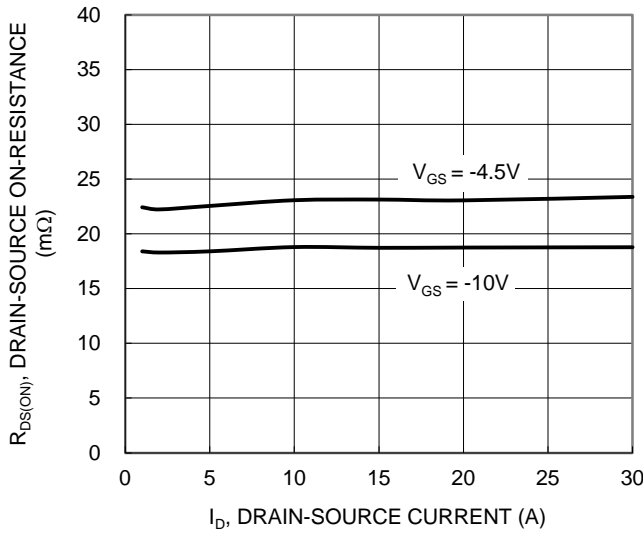


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

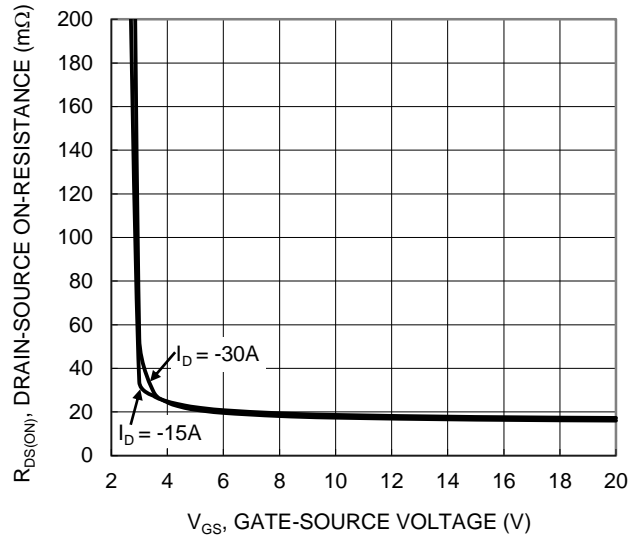


Figure 4. Typical Transfer Characteristic

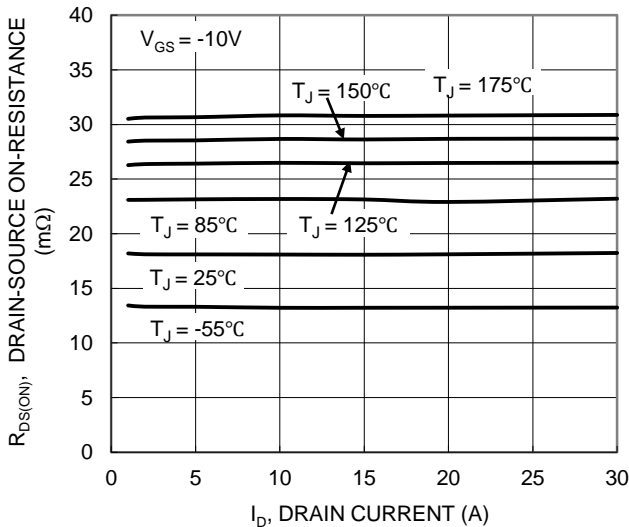


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

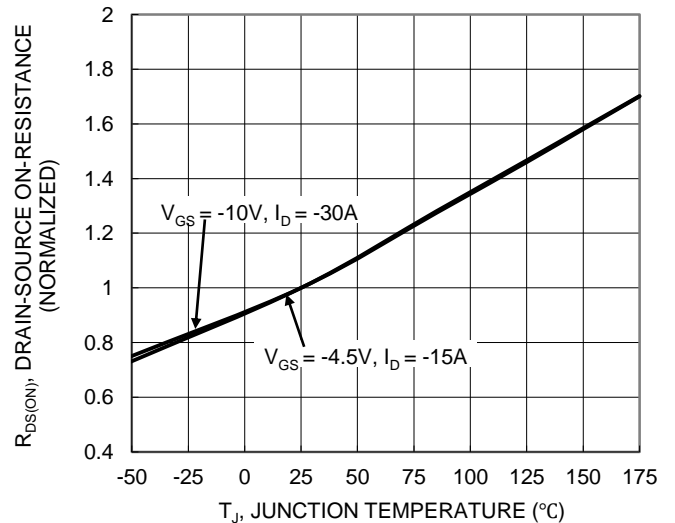


Figure 6. On-Resistance Variation with Temperature

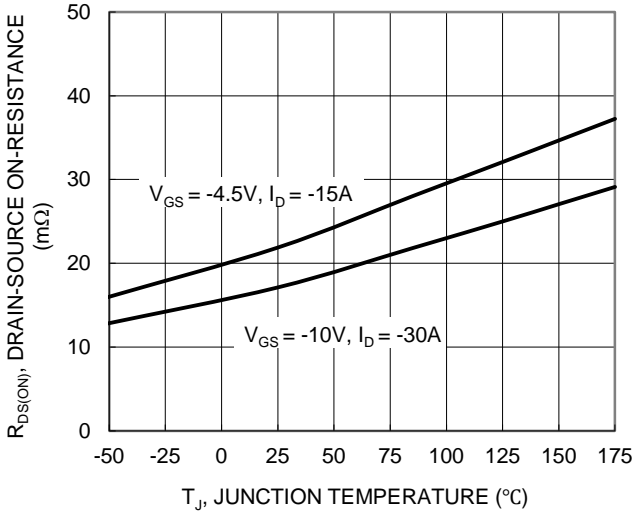


Figure 7. On-Resistance Variation with Temperature

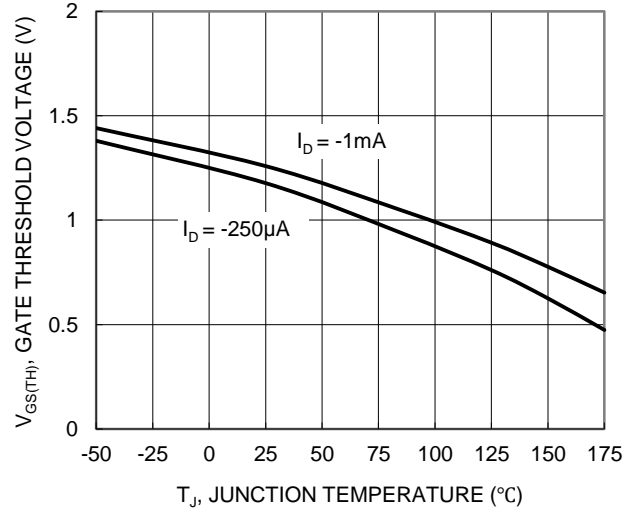


Figure 8. Gate Threshold Variation vs. Junction Temperature

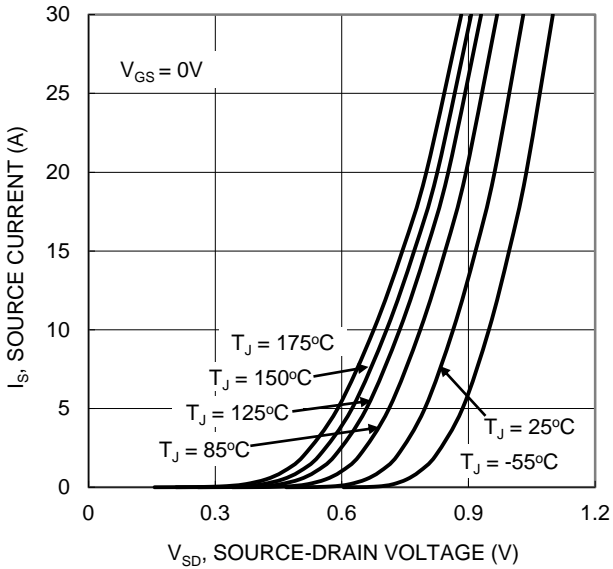


Figure 9. Diode Forward Voltage vs. Current

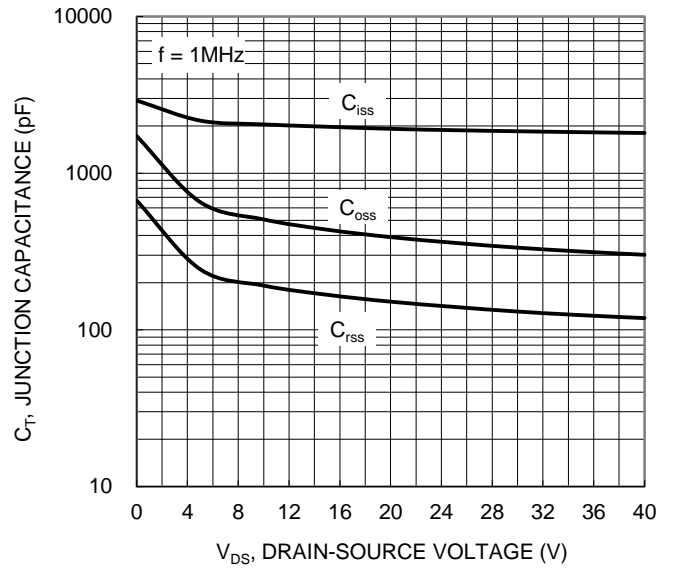


Figure 10. Typical Junction Capacitance

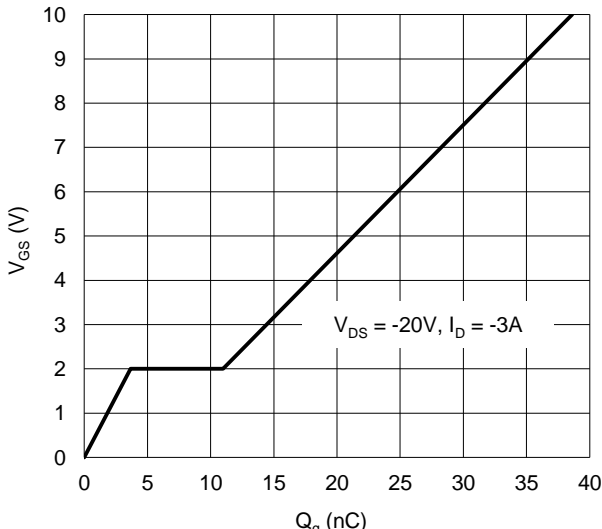


Figure 11. Gate Charge

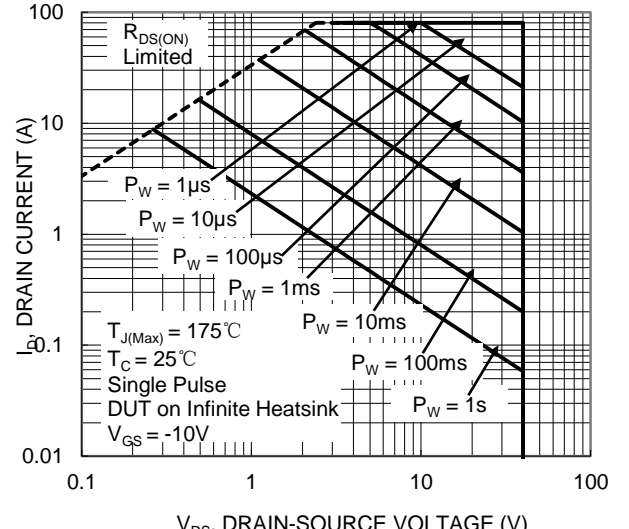


Figure 12. SOA, Safe Operation Area

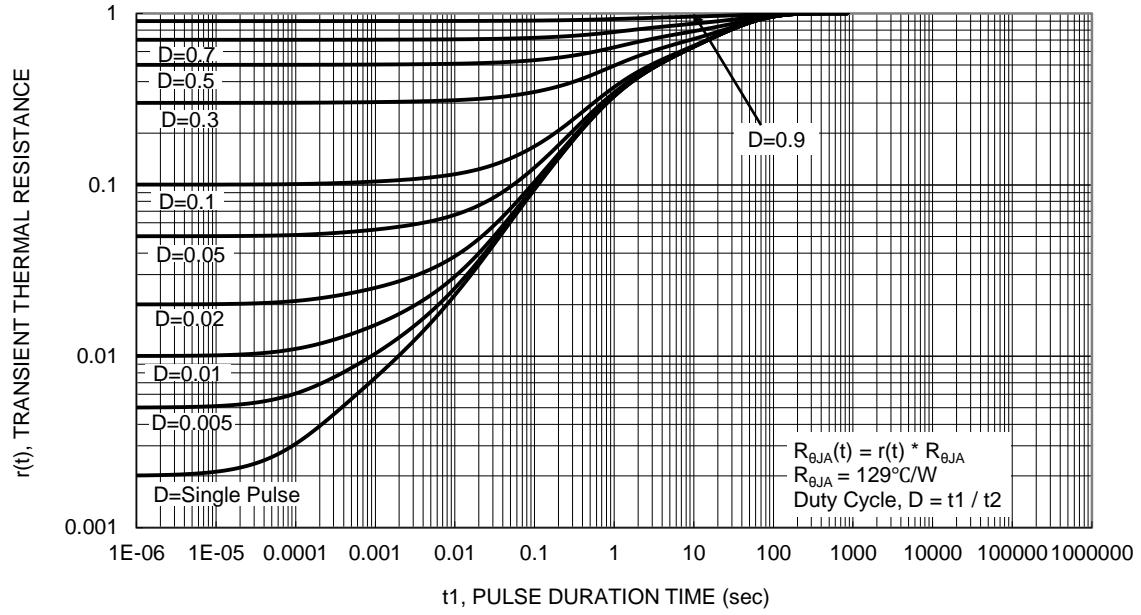
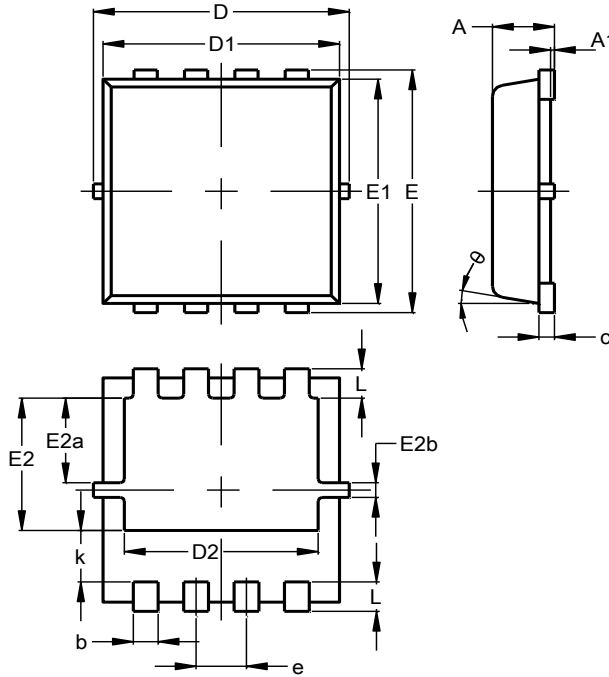


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

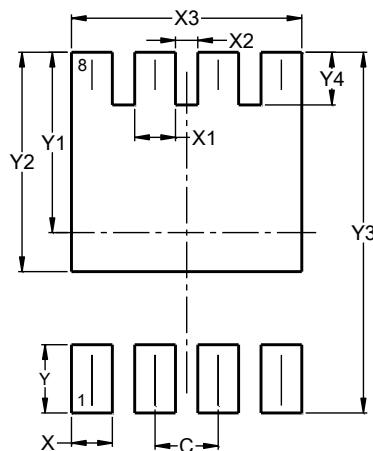


PowerDI3333-8 (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40
θ	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

PowerDI3333-8 (Type UX)



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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