

DUAL P-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _A = +25°C
-20V	36mΩ @ V _{GS} = -4.5V	-5.3A
	60mΩ @ V _{GS} = -2.5V	-3.9A

Description

This new generation 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

- Backlighting
- Power Management Functions
- DC-DC Converters

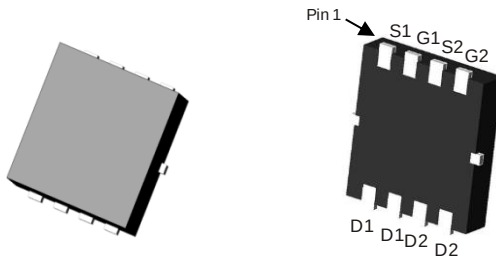
Features

- Dual P-Channel MOSFET
- Low On-Resistance
- Low Gate Threshold Voltage
- Low Input Capacitance
- Fast Switching Speed
- Low Input/Output Leakage
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](mailto:contact@diodes.com) or your local Diodes representative.**
<https://www.diodes.com/quality/product-definitions/>

Mechanical Data

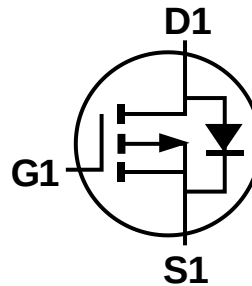
- Case: POWERDI®3333-8
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminals Connections Indicator: See Diagram
- Terminals: Finish - Matte Tin Annealed over Copper Lead Frame. Solderable per MIL-STD-202, Method 208 (e3)
- Weight: 0.072 grams (Approximate)

POWERDI3333-8 (Type UXB)

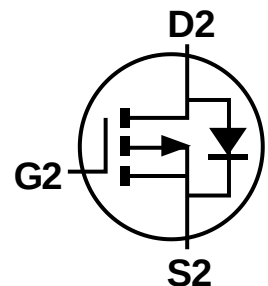


Top View

Bottom View



P-Channel MOSFET



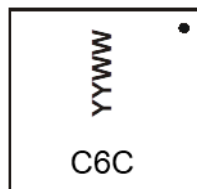
P-Channel MOSFET

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP2040UND-7	POWERDI3333-8 (Type UXB)	2000/Tape & Reel
DMP2040UND-13	POWERDI3333-8 (Type UXB)	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. For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



C6C = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 20 for 2020)
WW = Week Code (01 to 53)

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

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	-20	V
Gate-Source Voltage			V _{GSS}	±12	V
Continuous Drain Current (Note 6) V _{GS} = -4.5V	Steady State	T _A = +25°C T _A = +70°C	I _D	-5.3 -4.2	A
Continuous Drain Current (Note 7) V _{GS} = -4.5V	Steady State	T _C = +25°C T _C = +70°C	I _D	-13.6 -10.9	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)			I _{DM}	-25	A
Continuous Source-Drain Diode Current (Note 6)			I _S	-1.9	A
Avalanche Current (Note 8) L = 0.1mH			I _{AS}	-19	A
Avalanche Energy (Note 8) L = 0.1mH			E _{AS}	18	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	0.9	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	148	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.4	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	88	°C/W
Thermal Resistance, Junction to Case (Note 7)	Steady State	R _{θJC}	13.2	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°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}	-20	—	—	V	V _{GS} = 0V, I _D = -250μA
Zero Gate Voltage Drain Current	I _{DSS}	—	—	-1	μA	V _{DS} = -16V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = ±12V, V _{DS} = 0V
ON CHARACTERISTICS (Note 9)						
Gate Threshold Voltage	V _{GS(TH)}	-0.6	—	-1.5	V	V _{DS} = V _{GS} , I _D = -250μA
Static Drain-Source On-Resistance	R _{DS(ON)}	—	28	36	mΩ	V _{GS} = -4.5V, I _D = -8.9A
		—	38	60		V _{GS} = -2.5V, I _D = -6.9A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -2.9A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	834	—	pF	V _{DS} = -10V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	133	—		
Reverse Transfer Capacitance	C _{rss}	—	105	—		
Gate Resistance	R _g	—	4.9	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -4.5V)	Q _g	—	9.6	—	nC	V _{DS} = -6V, I _D = -8.9A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	20	—		
Gate-Source Charge	Q _{gs}	—	1.1	—		
Gate-Drain Charge	Q _{gd}	—	2.6	—		
Turn-On Delay Time	t _{D(ON)}	—	14.6	—	ns	V _{DD} = -6V, R _L = 6Ω V _{GS} = -4.5V, R _g = 6Ω, I _D = -1A
Turn-On Rise Time	t _r	—	5.5	—		
Turn-Off Delay Time	t _{D(OFF)}	—	38.7	—		
Turn-Off Fall Time	t _f	—	18.3	—		
Body Diode Reverse Recovery Time	t _{RR}	—	9.8	—	ns	I _F = -8.9A, di/dt = -100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	2.7	—	nC	I _F = -8.9A, 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.
 - Thermal resistance from junction to soldering point (on the exposed drain pad).
 - 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.

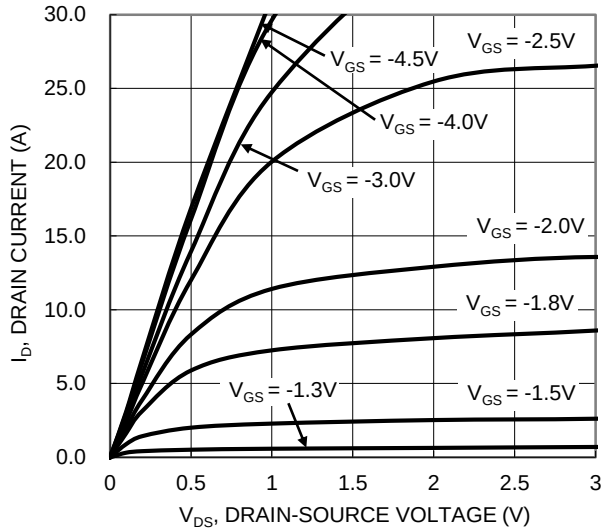


Figure 1. Typical Output Characteristic

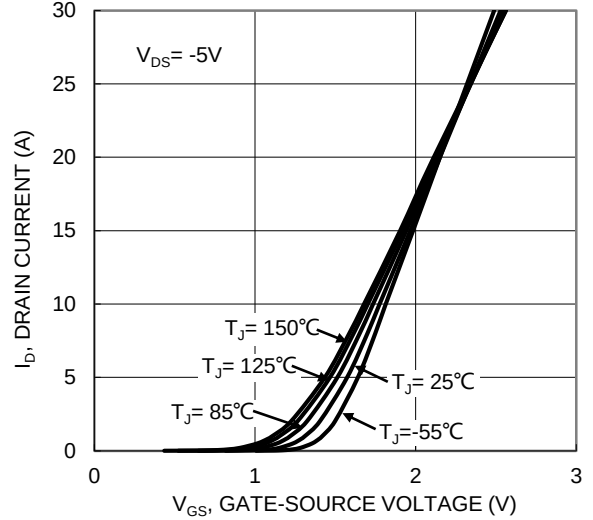


Figure 2. Typical Transfer Characteristic

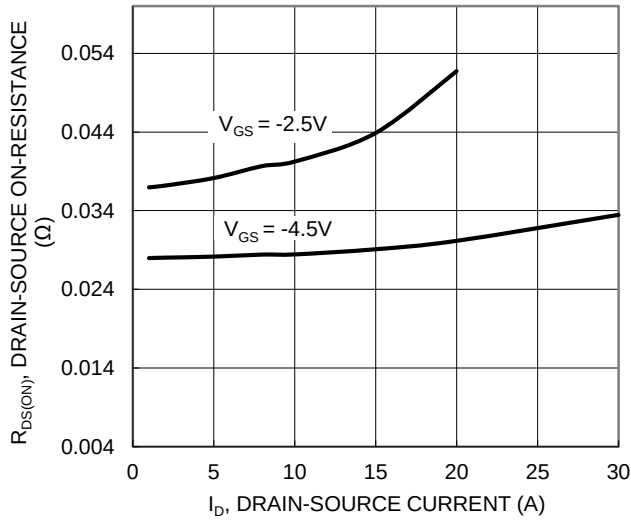


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

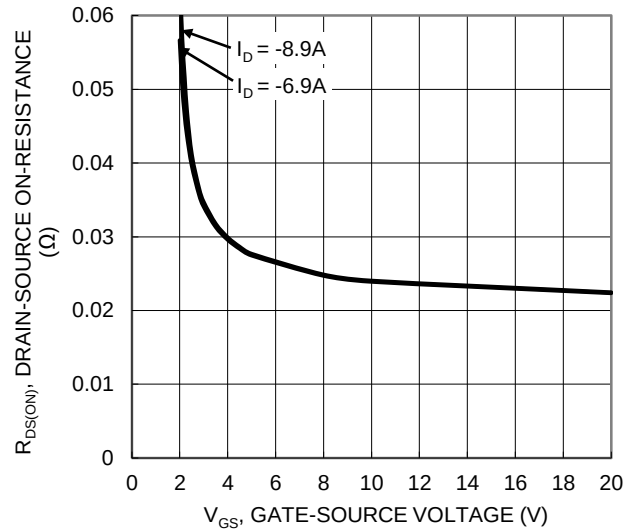


Figure 4. Typical Transfer Characteristic

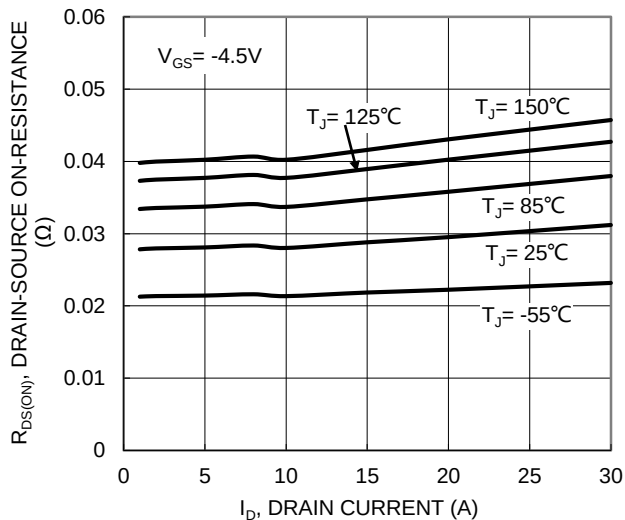


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

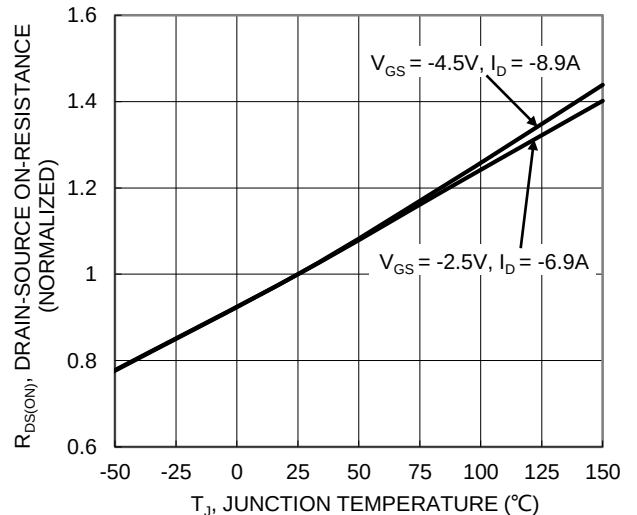


Figure 6. On-Resistance Variation with Temperature

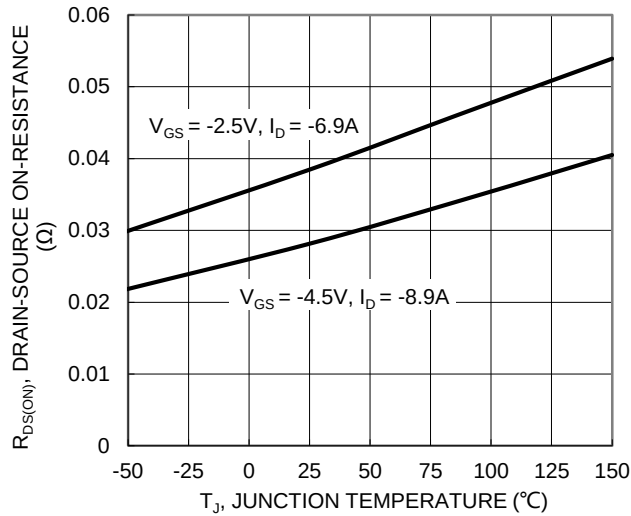


Figure 7. On-Resistance Variation with Temperature

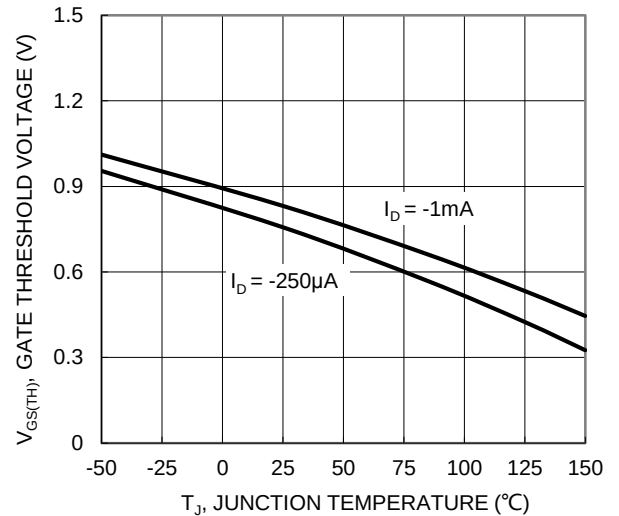


Figure 8. Gate Threshold Variation vs. Junction Temperature

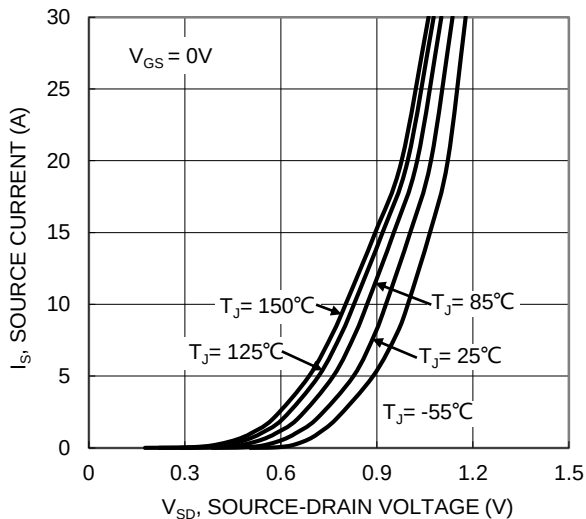


Figure 9. Diode Forward Voltage vs. Current

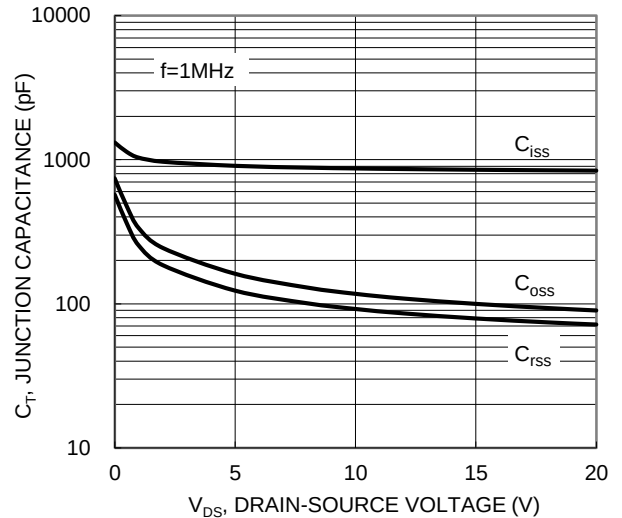


Figure 10. Typical Junction Capacitance

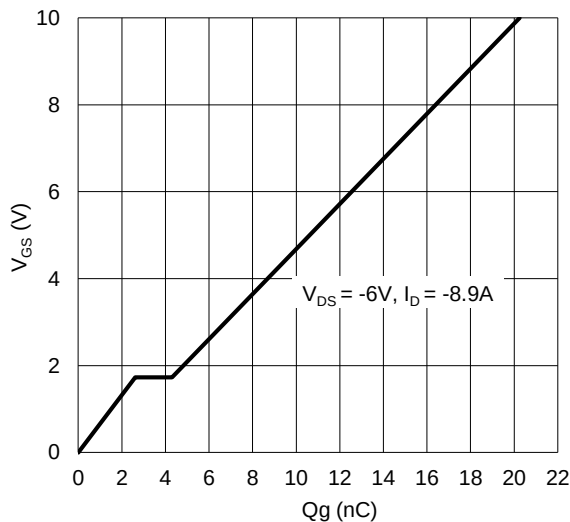


Figure 11. Gate Charge

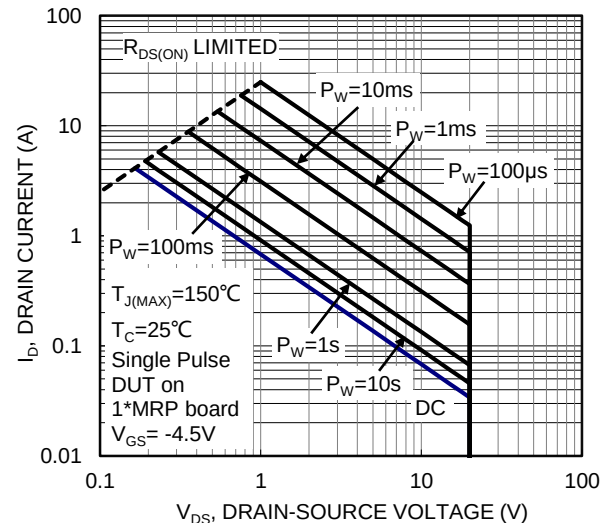


Figure 12. SOA, Safe Operation Area

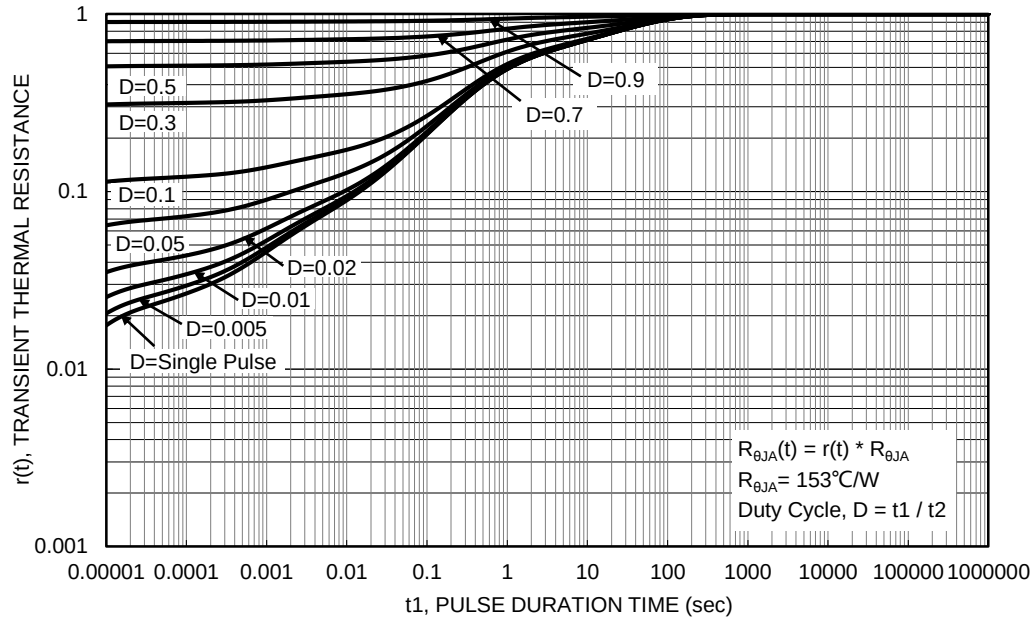
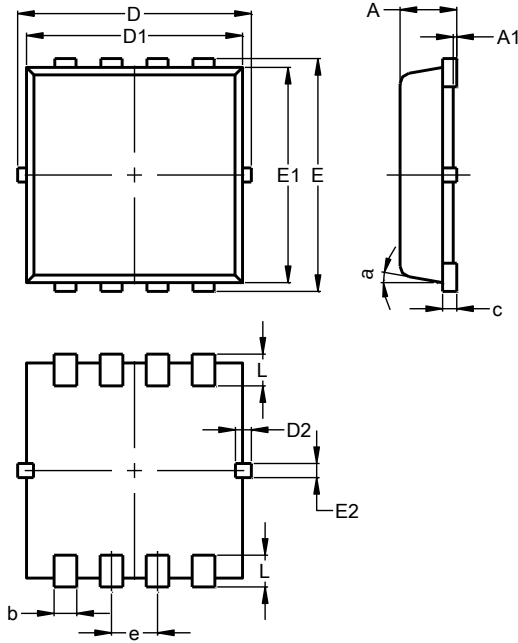


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

**POWERDI3333-8
(Type UXB)**

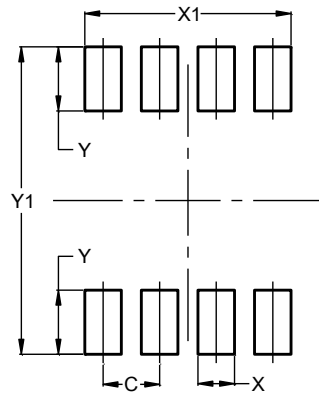


POWERDI3333-8 (Type UXB)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.10	0.35	0.23
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	0.10	0.30	0.20
e	--	--	0.65
L	0.35	0.55	0.45
a	0°	12°	10°
All Dimensions in mm			

Suggested Pad Layout

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

**POWERDI3333-8
(Type UXB)**



Dimensions	Value (in mm)
C	0.650
X	0.420
X1	2.370
Y	0.730
Y1	3.500

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