

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
-30V	9.5mΩ @ V _{GS} = -10V	-35A
	17mΩ @ V _{GS} = -4.5V	-25A

Description

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.

Applications

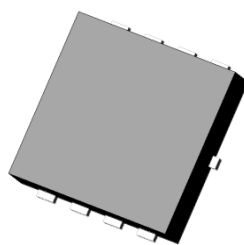
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

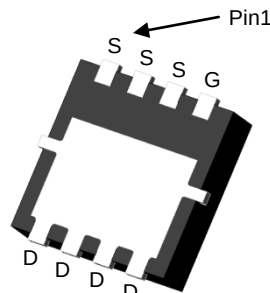
- Low R_{DS(ON)} – ensures on-state losses are minimized
- Small form factor thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- ESD Protected Gate**
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

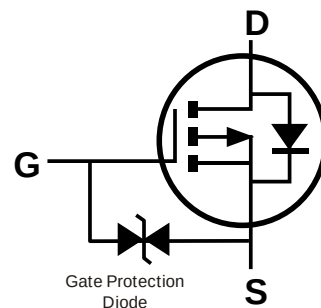
- Case: PowerDI[®] 3333-8 (Type UX)
- Case Material: Molded Plastic, "Green" Molding Compound. UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish – Matte Tin Annealed over Copper Leadframe. Solderable per MIL-STD-202, Method 208 [Ⓔ]
- Weight: 0.03 grams (Approximate)



Top View



Bottom View



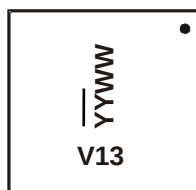
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMP3013SFV-7	PowerDI3333-8 (Type UX)	2,000/Tape & Reel
DMP3013SFV-13	PowerDI3333-8 (Type UX)	3,000/Tape & Reel

- Notes:
- No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 - 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.
 - Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.
 - For packaging details, go to our website at <https://www.diodes.com/design/support/packaging/diodes-packaging/>.

Marking Information



V13 = 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}	±25	V
Continuous Drain Current (Note 6) V _{GS} = -10V	Steady State	T _A = +25°C T _A = +70°C	I _D	-12 -10	A
Continuous Drain Current (Note 7) V _{GS} = -10V	Steady State	T _C = +25°C T _C = +70°C	I _D	-35 -25	A
Maximum Continuous Body Diode Forward Current (Note 7)			I _S	-1.35	A
Pulsed Drain Current (380µs Pulse, Duty Cycle = 1%)			I _{DM}	-80	A
Pulsed Body Diode Forward Current (380µs Pulse, Duty Cycle = 1%)			I _{SM}	-80	A
Avalanche Current (Note 8) L = 1mH			I _{AS}	-14	A
Avalanche Energy (Note 8) L = 1mH			E _{AS}	100	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	0.94	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	R _{θJA}	134	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	1.94	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	R _{θJA}	65	°C/W
Total Power Dissipation (Note 7)		P _D	31	W
Thermal Resistance, Junction to Case (Note 7)		R _{θJC}	4.0	°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}	-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}	—	—	±10	µA	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)}	—	8	9.5	mΩ	V _{GS} = -10V, I _D = -11.5A
		—	11	17		V _{GS} = -4.5V, I _D = -8.5A
Diode Forward Voltage	V _{SD}	—	-0.7	-1.2	V	V _{GS} = 0V, I _S = -1A
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	C _{iss}	—	1674	—	pF	V _{DS} = -15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	302	—	pF	
Reverse Transfer Capacitance	C _{rss}	—	230	—	pF	
Gate Resistance	R _g	—	15.2	—	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = -5V)	Q _g	—	16.2	—	nC	V _{DS} = -15V, I _D = -11.5A
Total Gate Charge (V _{GS} = -10V)	Q _g	—	33.7	—	nC	
Gate-Source Charge	Q _{gs}	—	3.5	—	nC	
Gate-Drain Charge	Q _{gd}	—	6.7	—	nC	
Turn-On Delay Time	t _{D(ON)}	—	4.0	—	ns	V _{DD} = -15V, V _{GS} = -10V, R _G = 6Ω, I _D = -11.5A
Turn-On Rise Time	t _R	—	4.5	—	ns	
Turn-Off Delay Time	t _{D(OFF)}	—	96	—	ns	
Turn-Off Fall Time	t _F	—	106.5	—	ns	
Reverse Recovery Time	t _{RR}	—	46	—	ns	I _S = -11.5A, dI/dt = 100A/µs
Reverse Recovery Charge	Q _{RR}	—	25.5	—	nC	

- 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 1-inch 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.

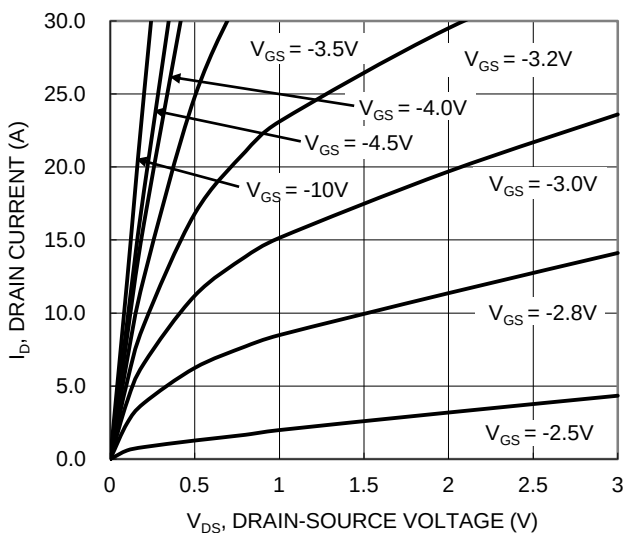


Figure 1. Typical Output Characteristic

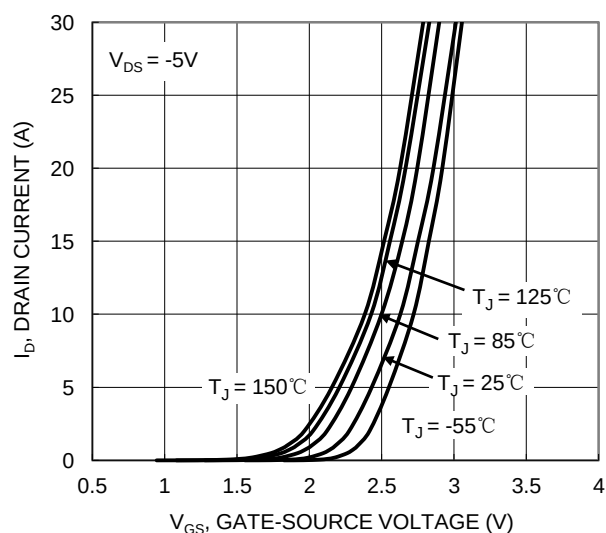


Figure 2. Typical Transfer Characteristic

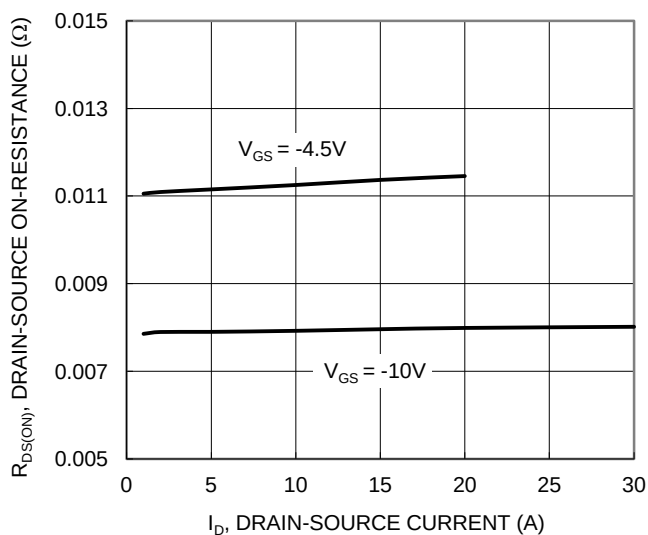


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

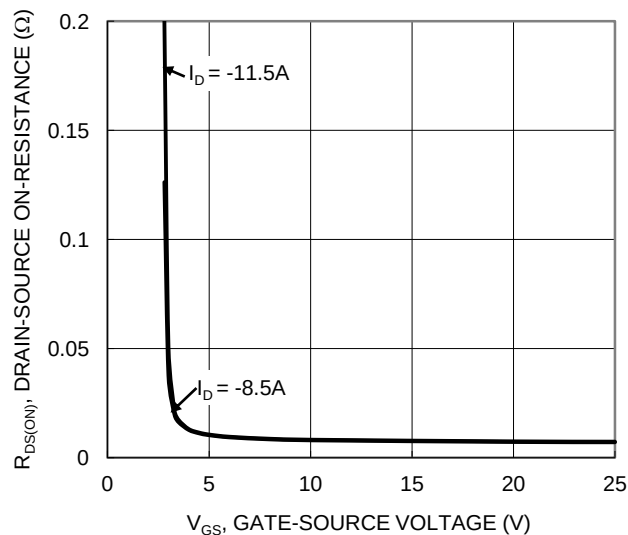


Figure 4. Typical Transfer Characteristic

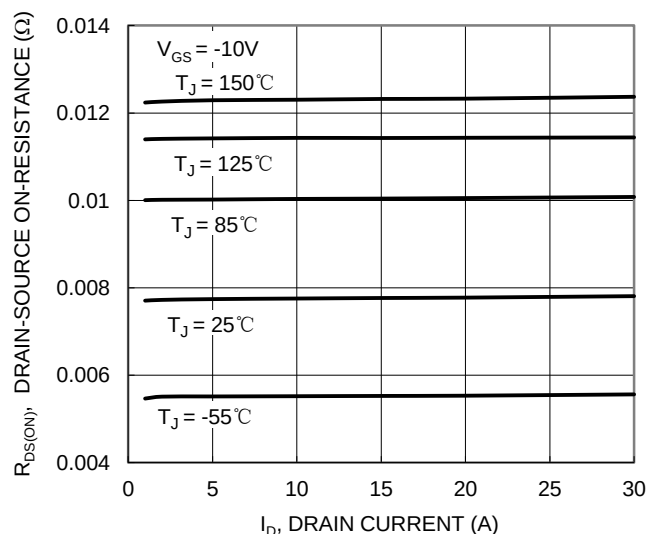


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

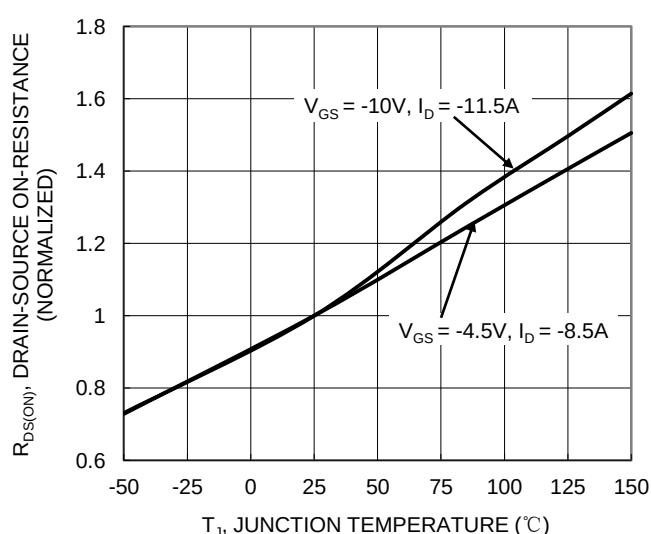
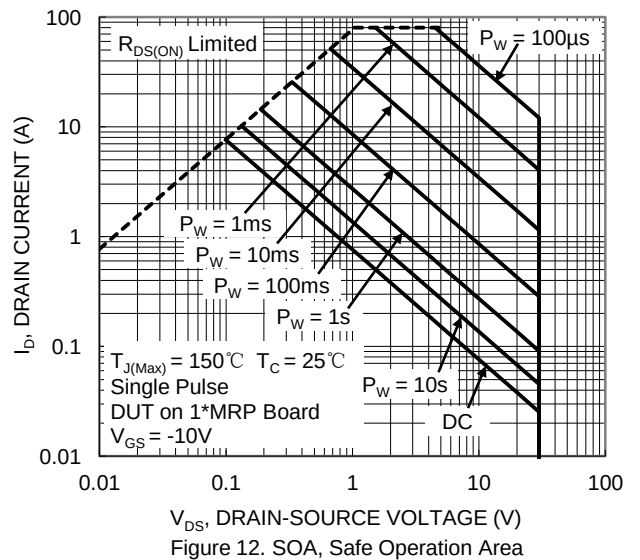
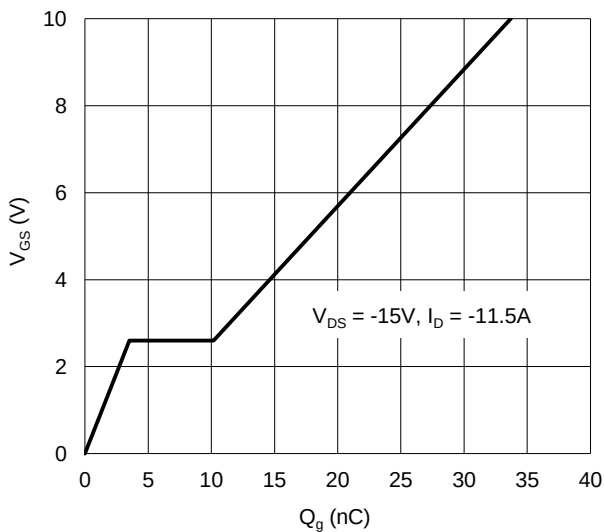
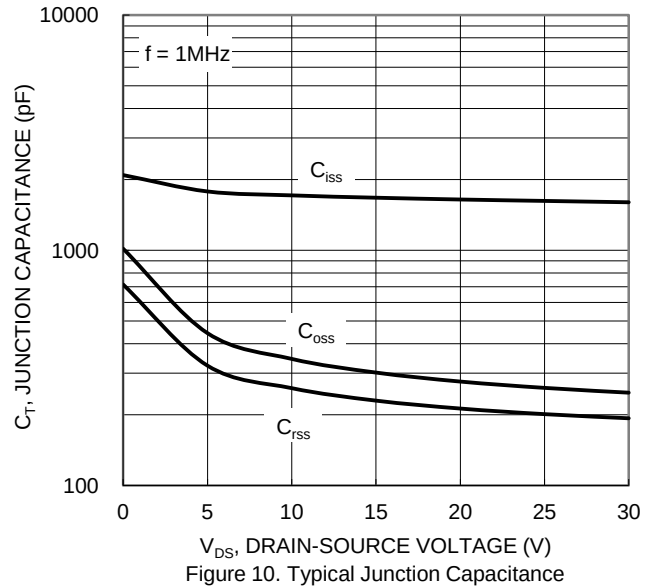
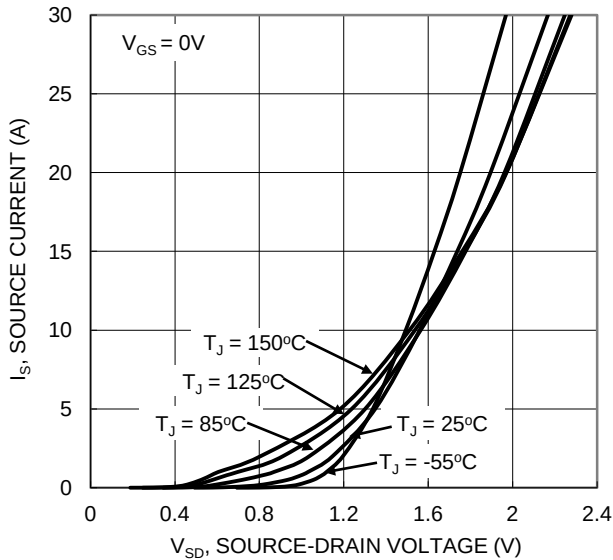
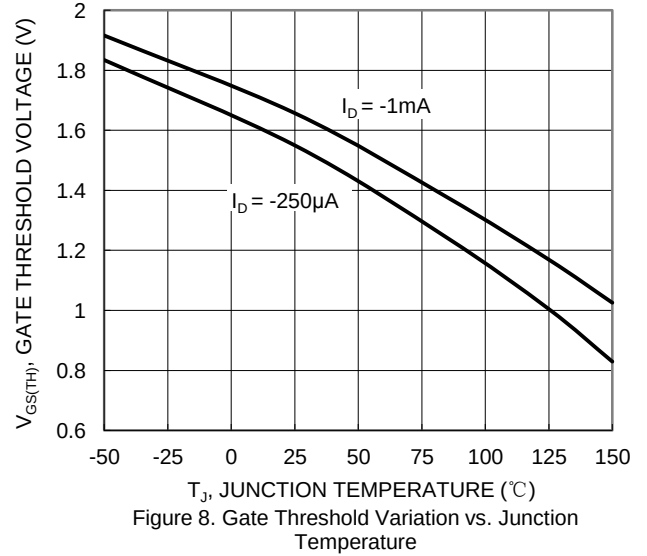
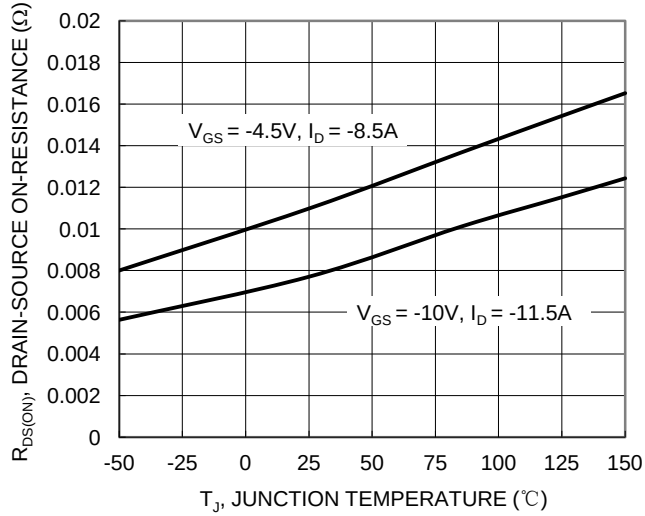


Figure 6. On-Resistance Variation with Junction Temperature



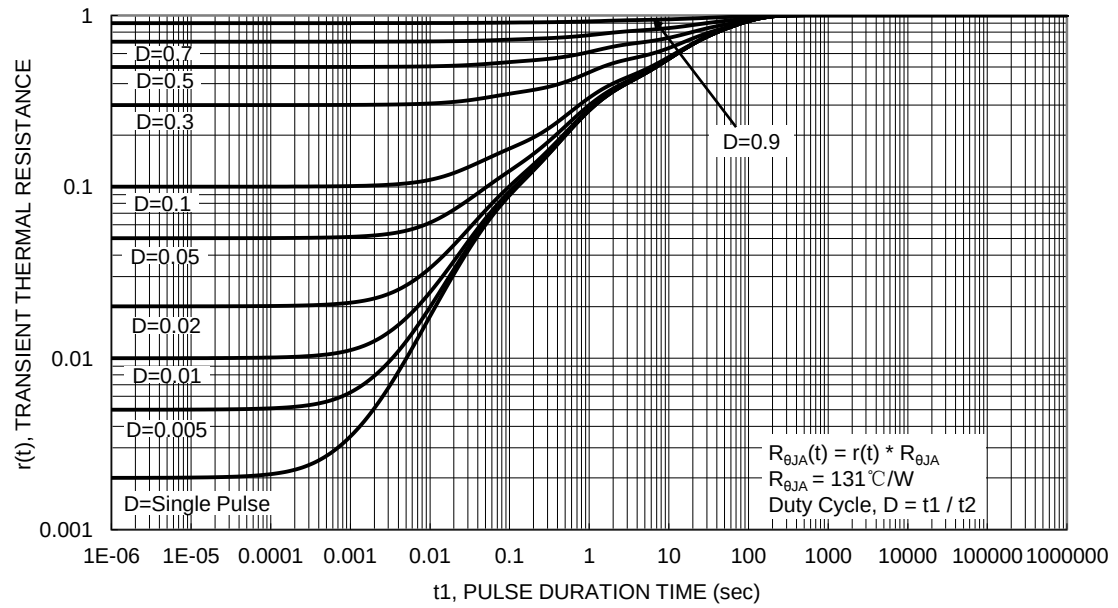
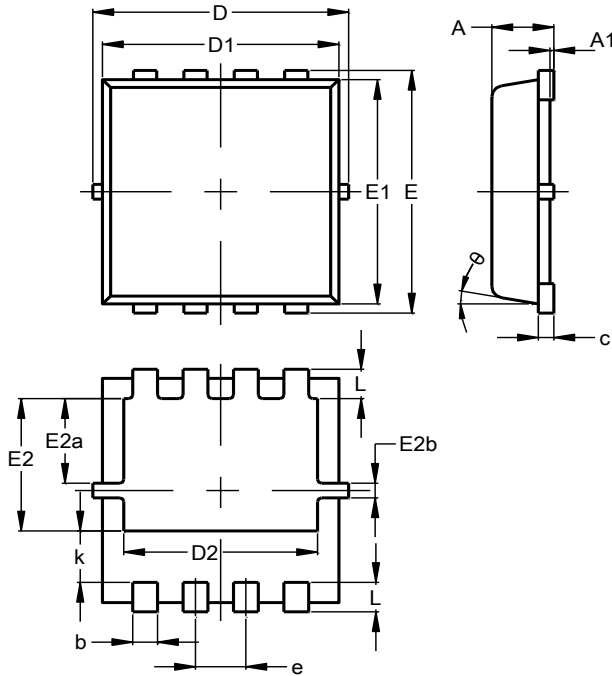


Figure 13. Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

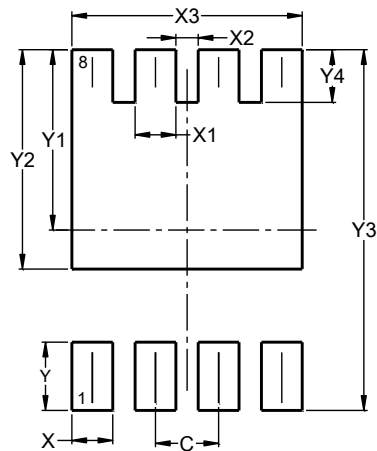


PowerDI3333-8 (Type UX)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	2.30	2.70	2.50
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.60	2.00	1.80
E2a	0.95	1.35	1.15
E2b	0.10	0.30	0.20
e	0.65 BSC		
k	0.50	0.90	0.70
L	0.30	0.50	0.40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