

Product Summary

Device	BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C (Note 10)
Q1 & Q2	30V	12mΩ @ V _{GS} = 10V	20A
		20mΩ @ V _{GS} = 4.5V	17A
		25mΩ @ V _{GS} = 3.8V	15A

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

- General Purpose Interfacing Switch
- Power Management Functions

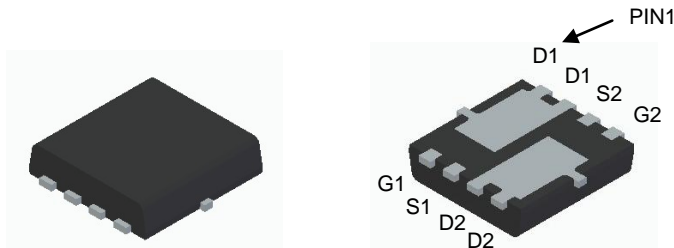
Features and Benefits

- Low Gate Threshold Voltage
- Low On-Resistance
- Low Input Capacitance
- Fast Switching Speed
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**

Mechanical Data

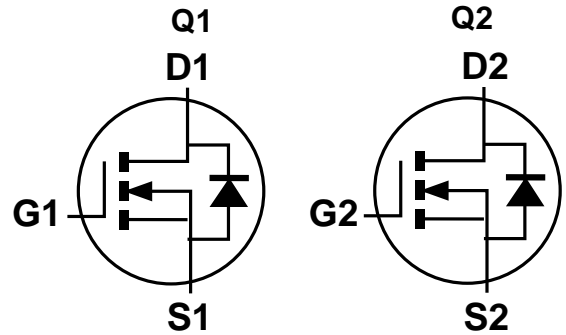
- Case: PowerDI[®] 3333-8
- Case Material: Molded Plastic, "Green" Molding Compound.
UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish — Matte Tin Annealed over Copper Leadframe.
Solderable per MIL-STD-202,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

PowerDI3333-8 (Type UXD)



Top View

Bottom View



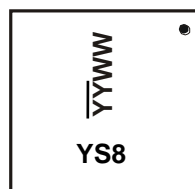
Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT3009LEV-7	PowerDI3333-8 (Type UXD)	2,000/Tape & Reel
DMT3009LEV-13	PowerDI3333-8 (Type UXD)	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 <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



YS8 = Product Type Marking Code
 YYWW = Date Code Marking
 YY = Last Two Digits of Year (ex: 18 for 2018)
 WW = Week Code (01 to 53)

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

Characteristic	Symbol	Q1&Q2	Unit
Drain-Source Voltage	V _{DSS}	30	V
Gate-Source Voltage	V _{GSS}	+20, -16	V
Continuous Drain Current (Note 6) V _{GS} = 10V	I _D	Steady State (Note 10)	20
		T _C = +25°C T _C = +70°C	15
Maximum Body Diode Forward Current (Note 6)	I _S	2.4	A
Pulsed Drain Current (10μs Pulse, Duty Cycle = 1%)	I _{DM}	90	A
Pulsed Body Diode Forward Current (10μs Pulse, Duty Cycle = 1%)	I _{SM}	90	A
Avalanche Current (Note 7) L = 0.1mH	I _{AS}	19.3	A
Avalanche Energy (Note 7) L = 0.1mH	E _{AS}	18.6	mJ

Thermal Characteristics

Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P _D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	R _{θJA}	129	°C/W
Total Power Dissipation (Note 6)	P _D	1.8	W
Thermal Resistance, Junction to Ambient (Note 6)	R _{θJA}	68	°C/W
Thermal Resistance, Junction to Case (Note 6)	R _{θJC}	19	
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 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
Zero Gate Voltage Drain Current T _J = +150°C (Note 9)	I _{DSS}	—	—	100	μA	V _{DS} = 24V, V _{GS} = 0V
Gate-Source Leakage	I _{GSS}	—	—	±100	nA	V _{GS} = 20V, V _{DS} = 0V 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)}	—	9	12	mΩ	V _{GS} = 10V, I _D = 14.4A
		—	13	20		V _{GS} = 4.5V, I _D = 7A
		—	16	25		V _{GS} = 3.8V, I _D = 5A
Diode Forward Voltage	V _{SD}	—	0.8	1.2	V	V _{GS} = 0V, I _S = 10A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C _{iss}	—	823	-	pF	V _{DS} = 15V, V _{GS} = 0V, f = 1.0MHz
Output Capacitance	C _{oss}	—	352	-		
Reverse Transfer Capacitance	C _{rss}	—	52	-		
Gate Resistance	R _g	—	1.2	-	Ω	V _{DS} = 0V, V _{GS} = 0V, f = 1.0MHz
Total Gate Charge (V _{GS} = 10V)	Q _g	—	12	-	nC	V _{DS} = 15V, I _D = 14.4A
Total Gate Charge (V _{GS} = 4.5V)	Q _g	—	5.8	-		
Gate-Source Charge	Q _{gs}	—	1.7	-		
Gate-Drain Charge	Q _{gd}	—	2.4	-		
Turn-On Delay Time	t _{D(ON)}	—	3.2	-	ns	V _{GS} = 10V, V _{DD} = 15V, R _g = 1Ω, I _D = 10A
Turn-On Rise Time	t _R	—	5.2	-		
Turn-Off Delay Time	t _{D(OFF)}	—	8.9	-		
Turn-Off Fall Time	t _F	—	1.5	-		
Body Diode Reverse Recovery Time	t _{RR}	—	16.4	-	ns	I _F = 10A, di/dt = 100A/μs
Body Diode Reverse Recovery Charge	Q _{RR}	—	5.9	-	nC	I _F = 10A, di/dt = 100A/μs

- Notes:
- Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 - Device mounted on FR-4 substrate PC board, 2oz copper, with 1-inch square copper plate.
 - UIS in production with L = 0.1mH, starting T_A = +25°C.
 - Short duration pulse test used to minimize self-heating effect.
 - Guaranteed by design. Not subject to product testing.
 - Package limited.

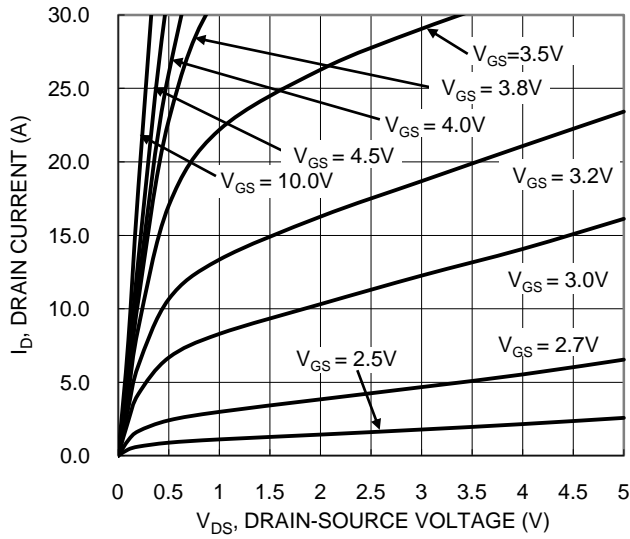


Figure 1. Typical Output Characteristic

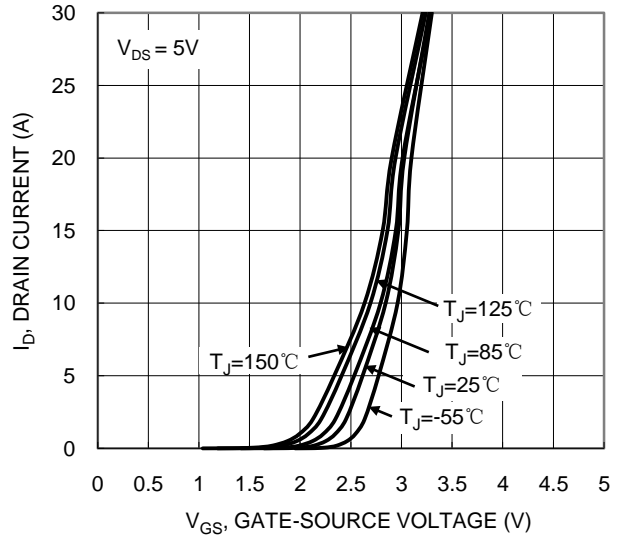


Figure 2. Typical Transfer Characteristic

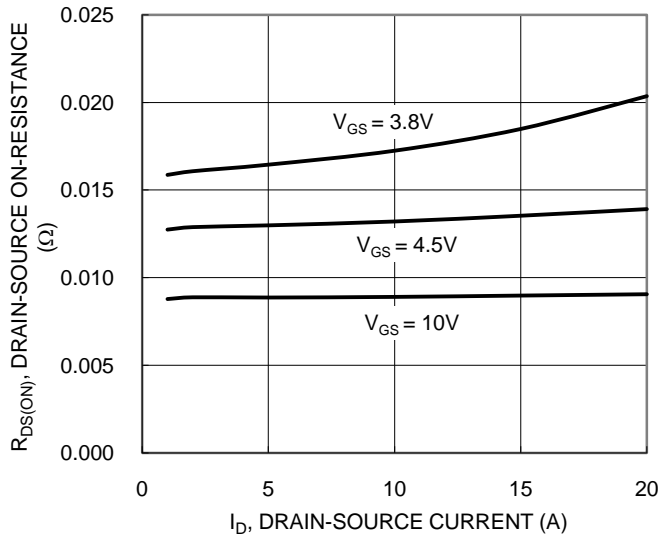


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

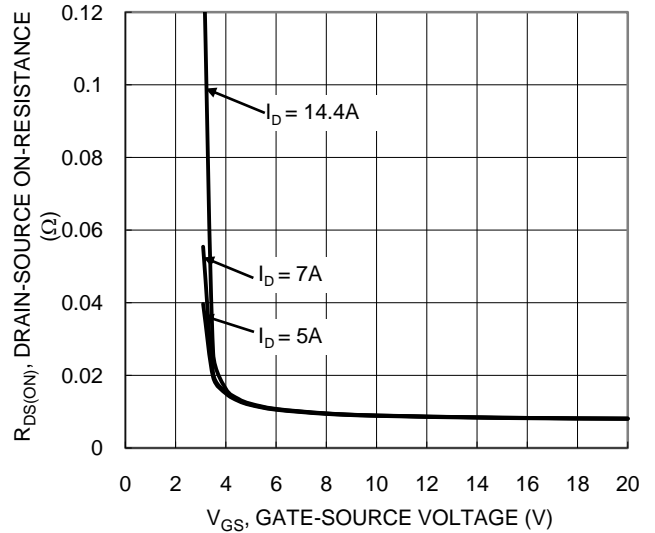


Figure 4. Typical Transfer Characteristic

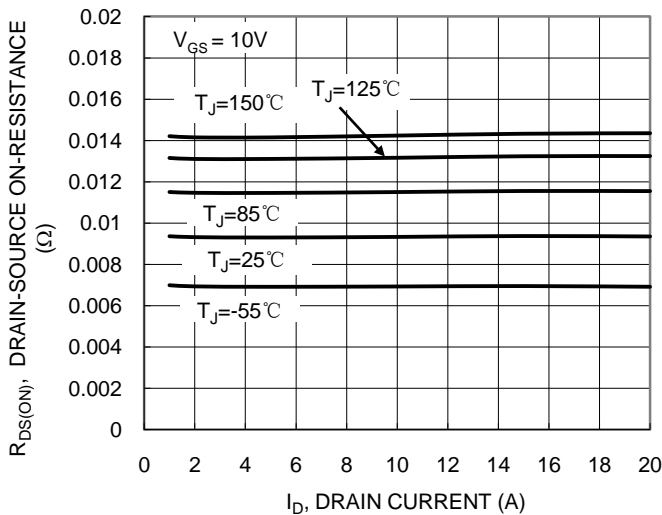


Figure 5. Typical On-Resistance vs. Drain Current and Temperature

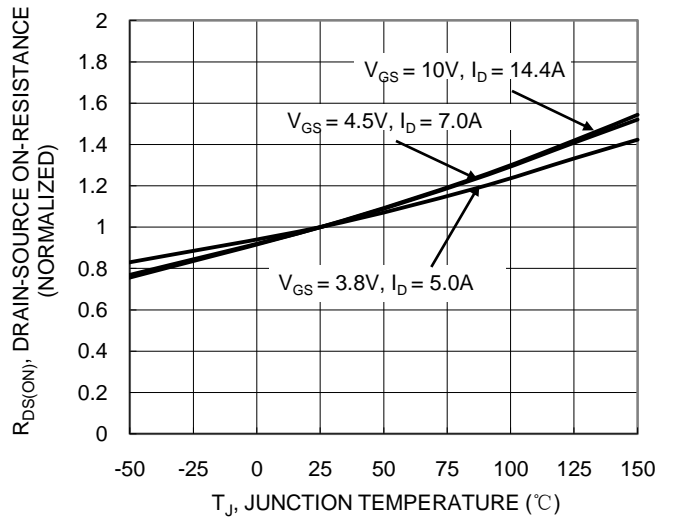


Figure 6. On-Resistance Variation with Temperature

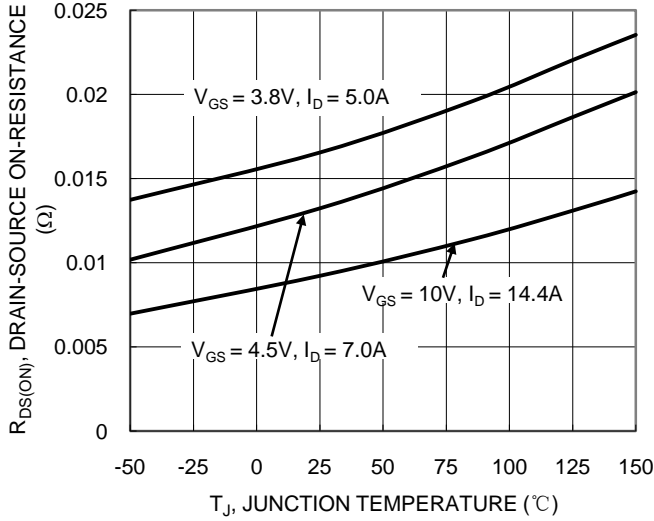


Figure 7. On-Resistance Variation with Temperature

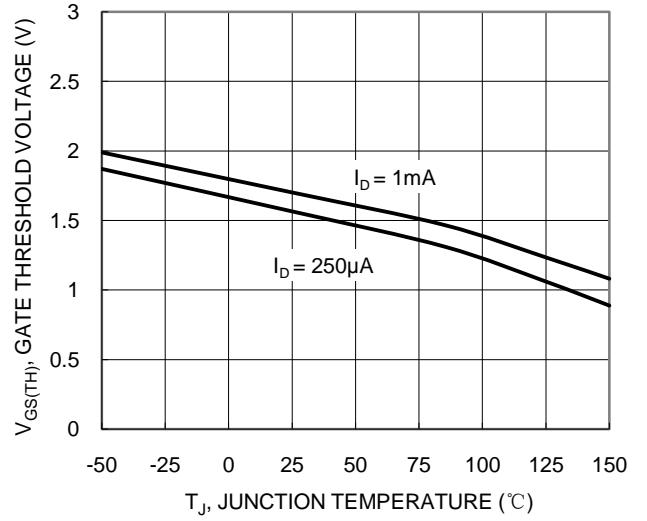


Figure 8. Gate Threshold Variation vs. Junction Temperature

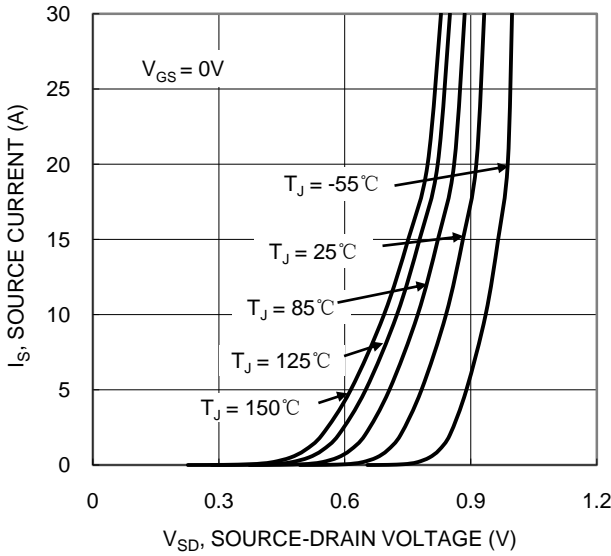


Figure 9. Diode Forward Voltage vs. Current

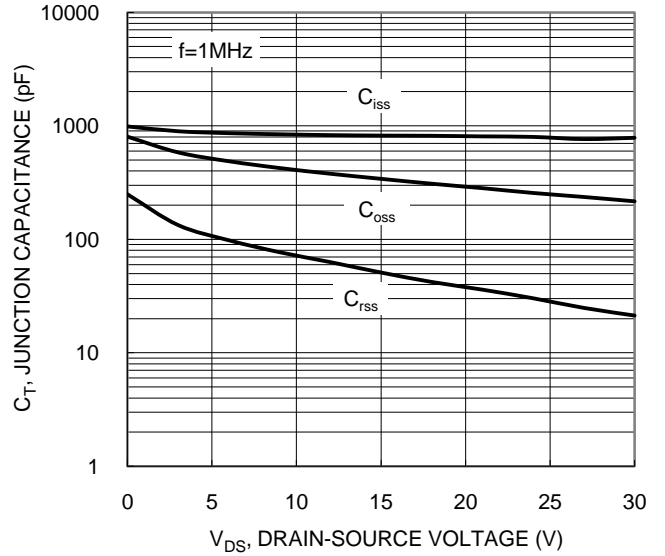


Figure 10. Typical Junction Capacitance

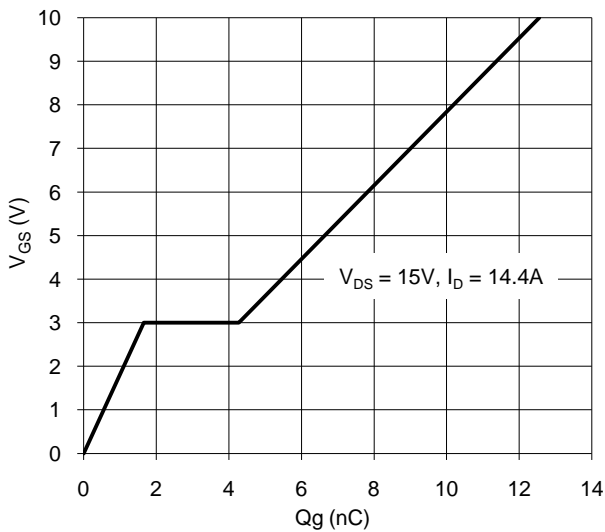


Figure 11. Gate Charge

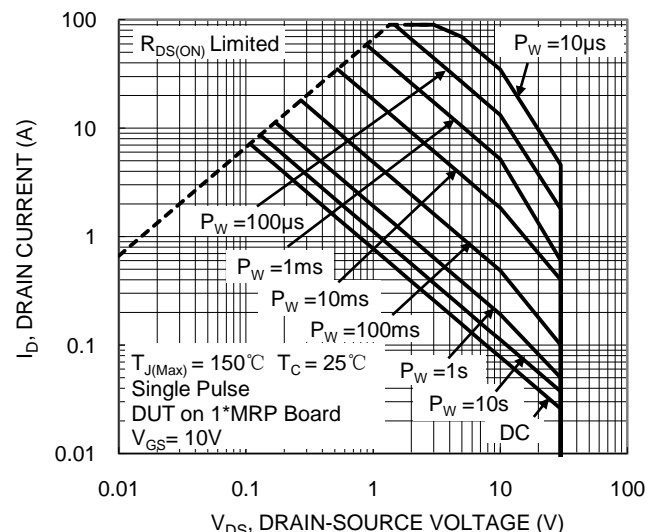
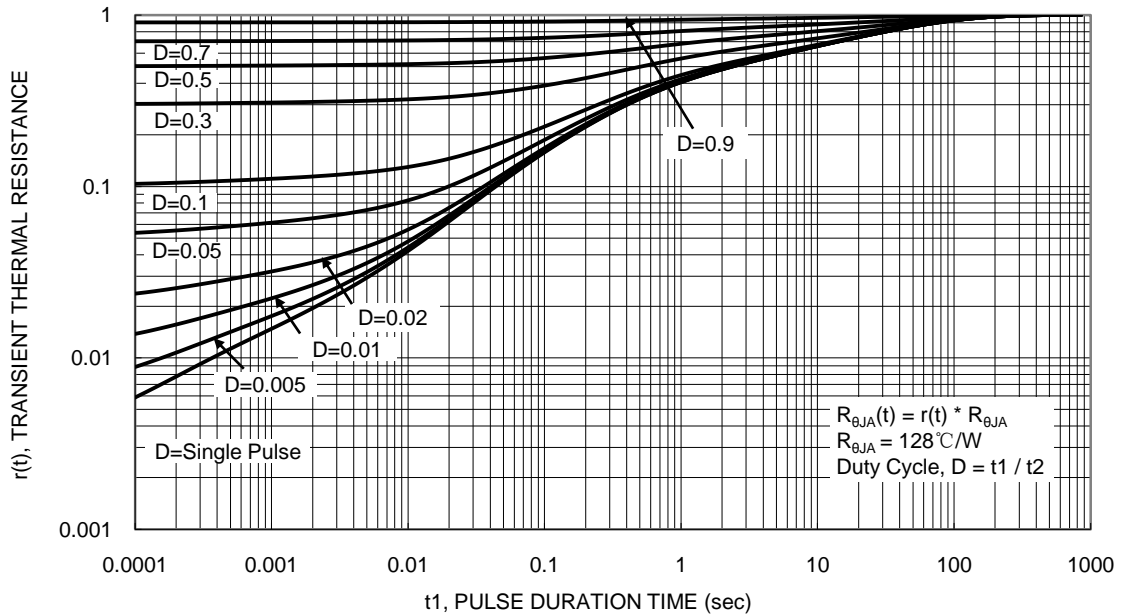


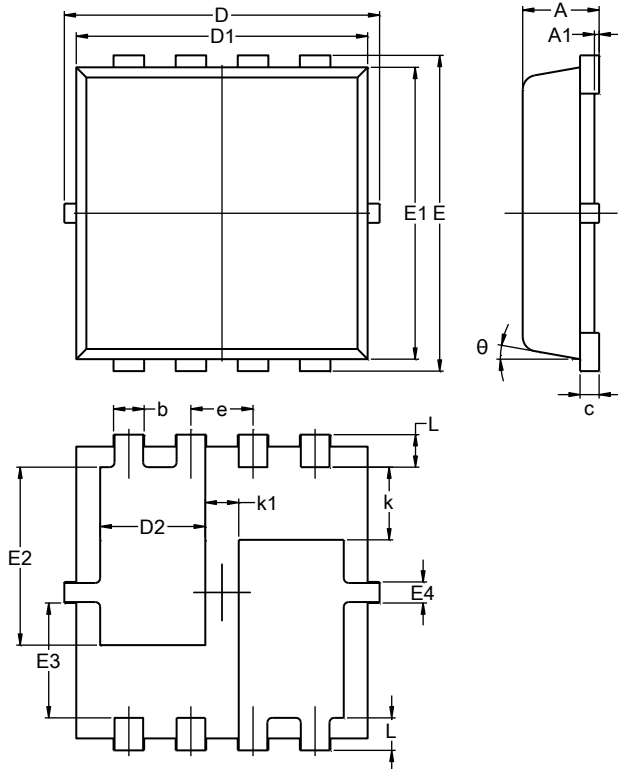
Figure 12. SOA, Safe Operation Area



Package Outline Dimensions

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

PowerDI3333-8 (Type UXD)

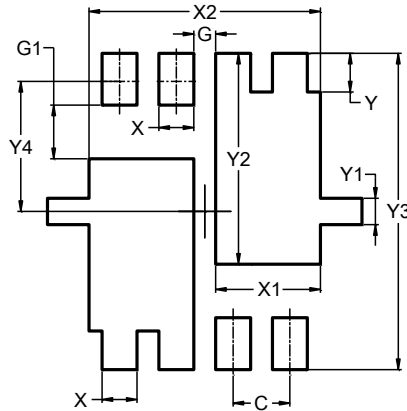


PowerDI3333-8 (Type UXD)			
Dim	Min	Max	Typ
A	0.75	0.85	0.80
A1	0.00	0.05	--
b	0.25	0.40	0.32
c	0.10	0.25	0.15
D	3.20	3.40	3.30
D1	2.95	3.15	3.05
D2	0.90	1.30	1.10
E	3.20	3.40	3.30
E1	2.95	3.15	3.05
E2	1.66	2.06	1.86
E3	1.10	1.30	1.20
E4	0.12	0.32	0.22
e	--	--	0.65
L	0.24	0.44	0.34
k	0.56	0.96	0.76
k1	0.15	0.55	0.35
theta	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 UXD)



Dimensions	Value (in mm)
C	0.650
G	0.250
G1	0.610
X	0.400
X1	1.200
X2	2.650
Y	0.440
Y1	0.300
Y2	2.400
Y3	3.600
Y4	1.480

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