NOT RECOMMENDED FOR NEW DESIGN
USE DMP26M1UFG

Lead-free Green

DMP2006UFG

20V P-CHANNEL ENHANCEMENT MODE MOSFET
PowerDI3333-8

Product Summary

BV_{DSS}	$R_{DS(ON)}$ max	I_D max T_C = +25°C
-20V	5.5mΩ @ V_{GS} = -4.5V	-40A
	7.5mΩ @ V_{GS} = -2.5V	-40A

Description

This 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

- Load switches
- Power management functions

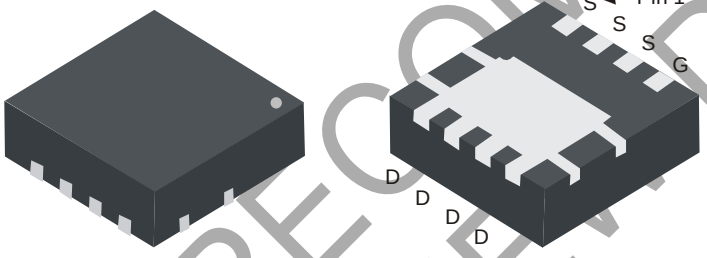
Features

- 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
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **This part is qualified to JEDEC standards (as references in AEC-Q) for High Reliability. https://www.diodes.com/quality/product-definitions/**
- **An Automotive-Compliant Part is Available Under Separate Datasheet (DMP2006UFGQ)**

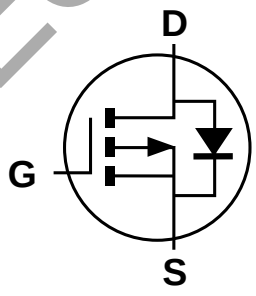
Mechanical Data

- Package: PowerDI®3333-8
- Package 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: 0.030 grams (Approximate)

PowerDI3333-8



Top View Bottom View



Equivalent Circuit

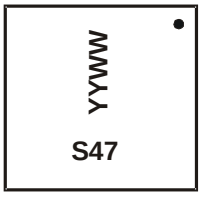
Ordering Information (Note 4)

Part Number	Package	Packing	
		Qty.	Carrier
DMP2006UFG-7	PowerDI3333-8	2,000	Tape & Reel
DMP2006UFG-13	PowerDI3333-8	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

PowerDI3333-8



S47 = Product Type Marking Code
YYWW = Date Code Marking
YY = Last Two Digits of Year (ex: 22 = 2022)
WW = Week Code (01 to 53)

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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}	±10	V
Continuous Drain Current (Note 5) V_{GS} = -4.5V	Steady State	T_A = +25°C T_A = +70°C T_C = +25°C	I_D	-17.5 -14.0 -40	A
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I_{DM}	-80	A
Maximum Continuous Body Diode Forward Current (Note 5)			I_S	-2.2	A
Avalanche Current (Note 7) L = 0.1mH			I_{AS}	-23	A
Avalanche Energy (Note 7) L = 0.1mH			E_{AS}	28	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	2.3	W
	T_C = +25°C		41	
Thermal Resistance, Junction to Ambient	(Note 5)	$R_{\theta JA}$	54	°C/W
	(Note 6)		136	
Thermal Resistance, Junction to Case (Note 5)		$R_{\theta JC}$	3.0	
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}	-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} = ±8V, V_{DS} = 0V
ON CHARACTERISTICS (Note 8)						
Gate Threshold Voltage	$V_{GS(TH)}$	-0.4	—	-1.0	V	V_{DS} = V_{GS}, I_D = -250µA
Static Drain-Source On-Resistance	$R_{DS(ON)}$	—	4.2	5.5	mΩ	V_{GS} = -4.5V, I_D = -15A
		—	5.4	7.5		V_{GS} = -2.5V, I_D = -10A
		—	8	12		V_{GS} = -1.8V, I_D = -1A
		—	12	17		V_{GS} = -1.5V, I_D = -1A
Diode Forward Voltage	V_{SD}	—	-0.7	-1.2	V	V_{GS} = 0V, I_S = -10A
DYNAMIC CHARACTERISTICS (Note 9)						
Input Capacitance	C_{iss}	—	5404	7500	pF	V_{DS} = -10V, V_{GS} = 0V f = 1.0MHz
Output Capacitance	C_{oss}	—	728	1000		
Reverse Transfer Capacitance	C_{rss}	—	612	900		
Gate Resistance	R_G	—	3.8	8	Ω	V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz
Total Gate Charge (V_{GS} = -4.5V)	Q_g	—	64	100	nC	V_{DD} = -10V, I_D = -20A
Total Gate Charge (V_{GS} = -10V)	Q_g	—	140	200		
Gate-Source Charge	Q_{gs}	—	8.5	15		
Gate-Drain Charge	Q_{gd}	—	17	30		
Turn-On Delay Time	$t_{D(ON)}$	—	9.1	20	ns	V_{GS} = -4.5V, V_{DD} = -10V, R_G = 1Ω, R_G = 1Ω, I_D = -10A
Turn-On Rise Time	t_R	—	19	35		
Turn-Off Delay Time	$t_{D(OFF)}$	—	146	220		
Turn-Off Fall Time	t_F	—	104	150		
Reverse Recovery Time (Note 9)	t_{RR}	—	61	100	ns	I_F = -10A, di/dt = 100A/µs
Reverse Recovery Charge (Note 9)	Q_{RR}	—	44	70	nC	I_F = -10A, di/dt = 100A/µs

Notes:
5. $R_{\theta JA}$ is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. $R_{\theta JC}$ is guaranteed by design while $R_{\theta JA}$ is determined by the user's board design.
6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
7. .UIS in production with L = 0.1mH, T_J = +25°C
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.

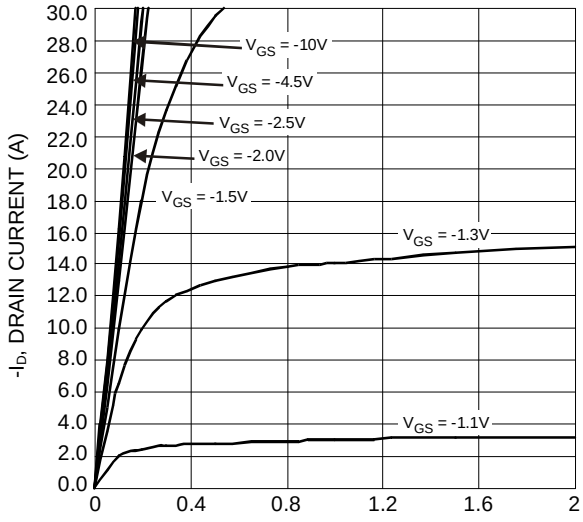


Figure 1 Typical Output Characteristics

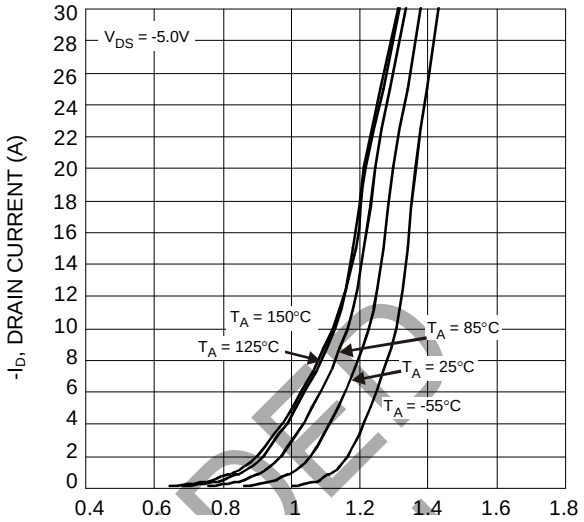


Figure 2 Typical Transfer Characteristics

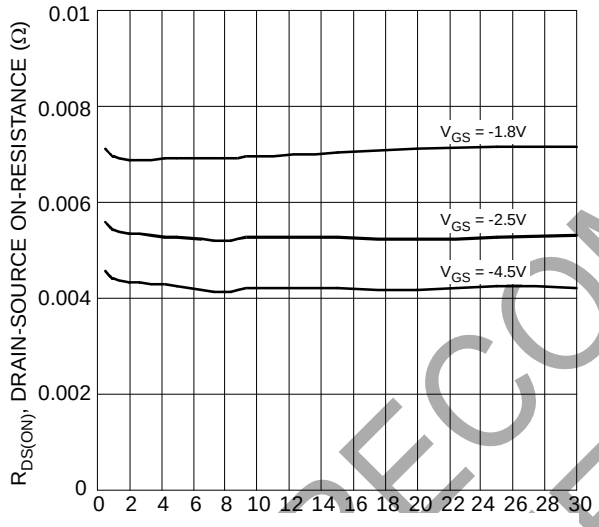


Figure 3 Typical On-Resistance vs. Drain Current and Gate Voltage

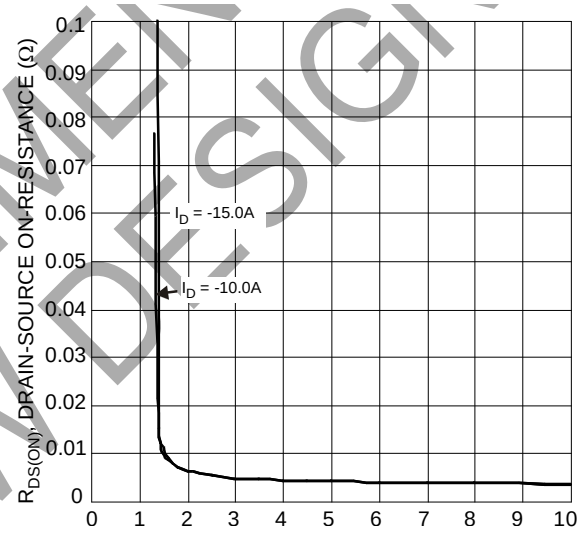


Figure 4 Typical Transfer Characteristics

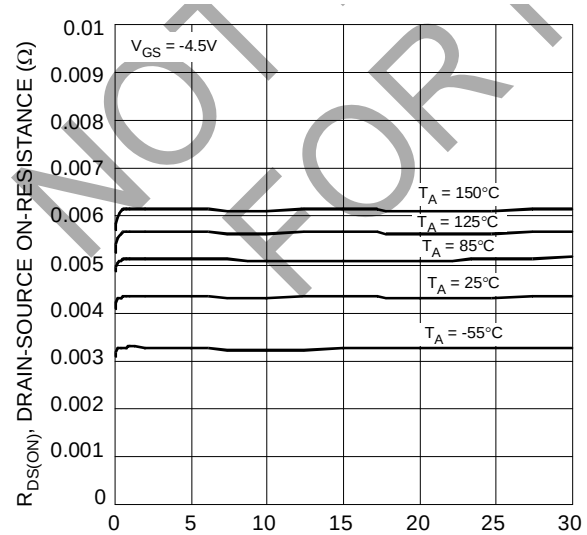


Figure 5 Typical On-Resistance vs. Drain Current and Temperature

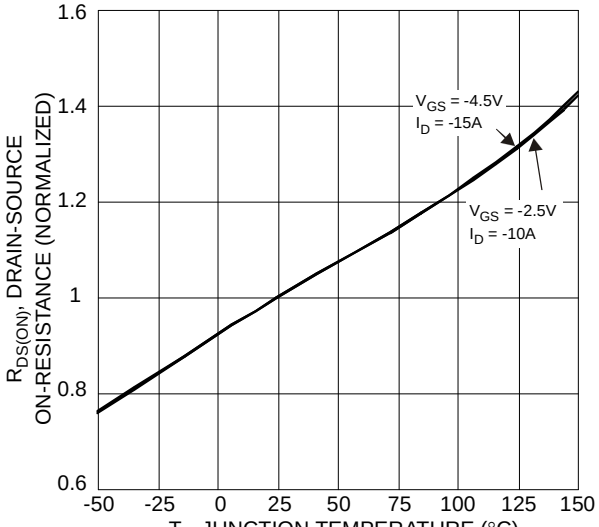


Figure 6 On-Resistance Variation with Temperature

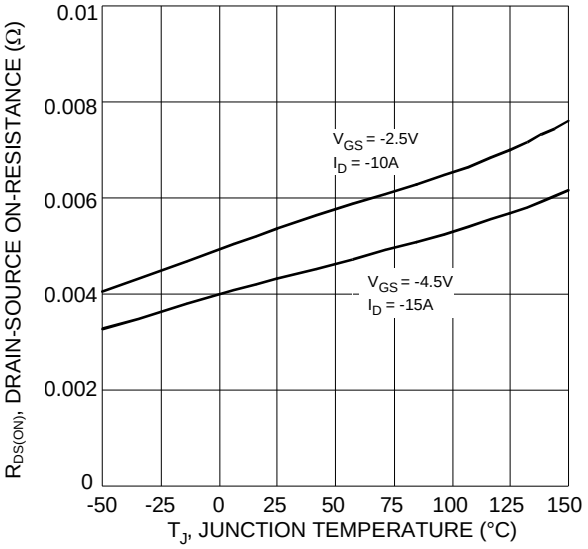


Figure 7 On-Resistance Variation with Temperature

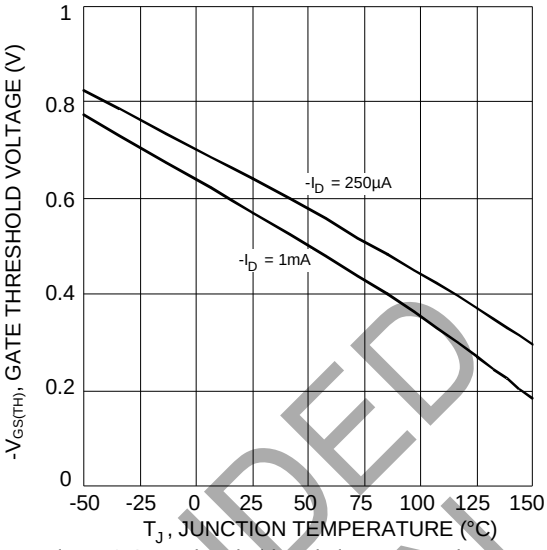


Figure 8 Gate Threshold Variation vs. Junction Temperature

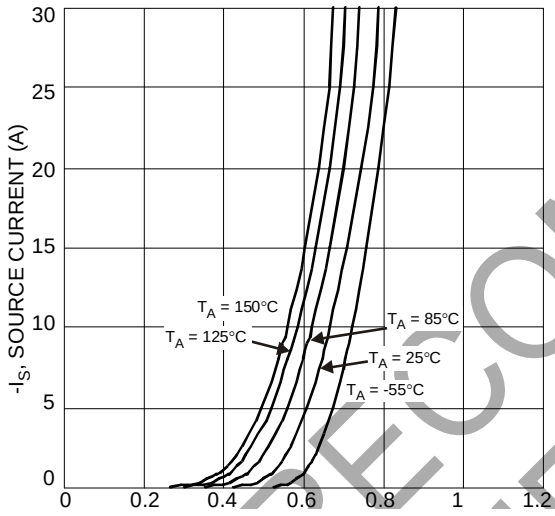


Figure 9 Diode Forward Voltage vs. Current

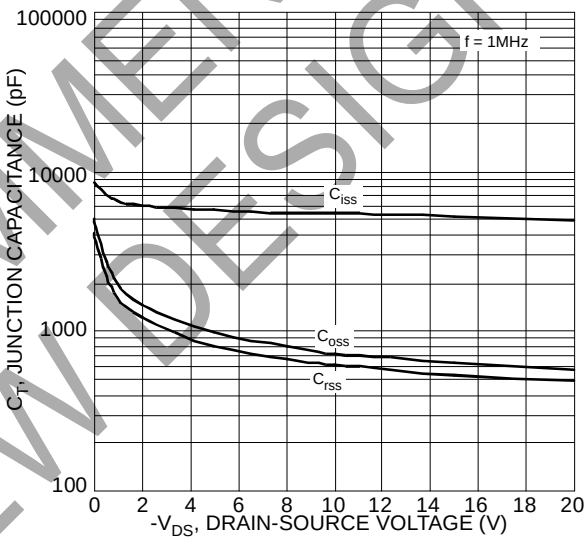


Figure 10 Typical Junction Capacitance

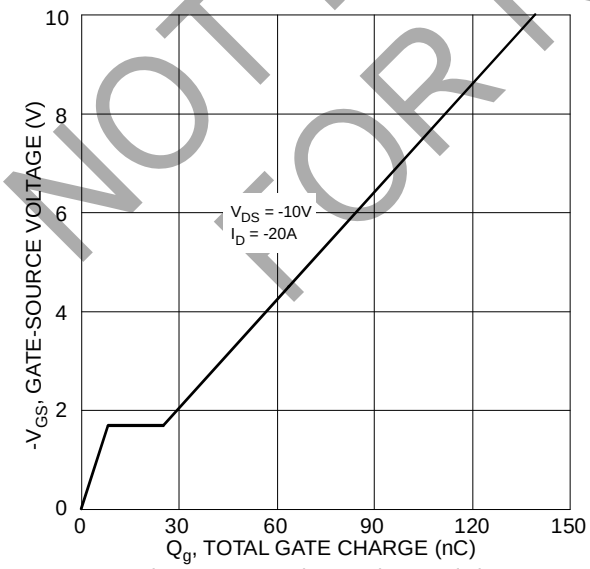


Figure 11 Gate-Charge Characteristics

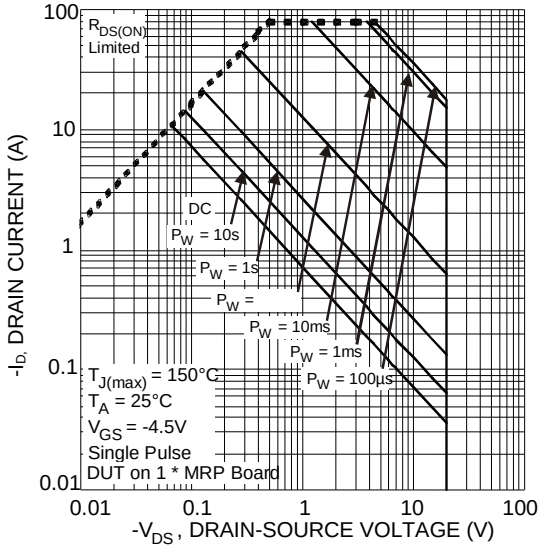


Figure 12 SOA, Safe Operation Area

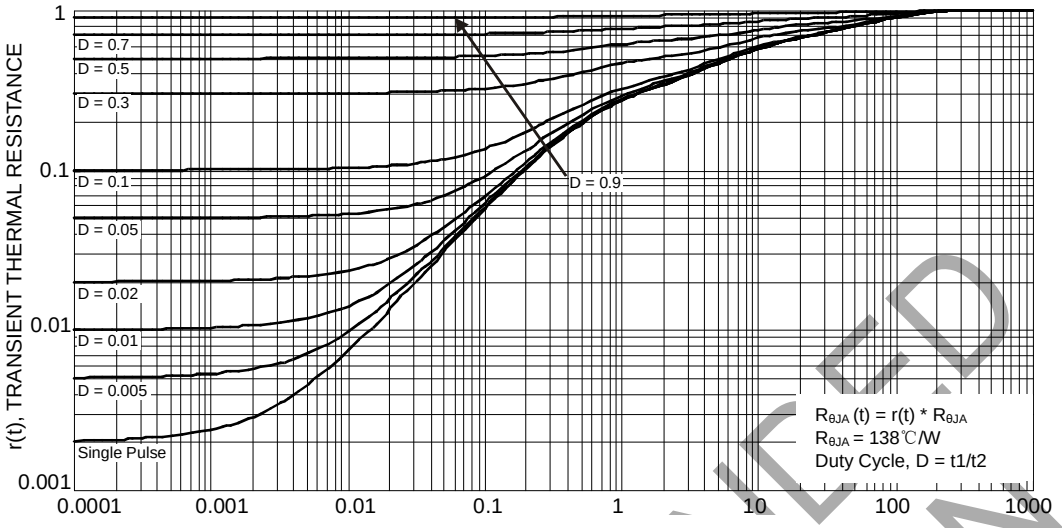
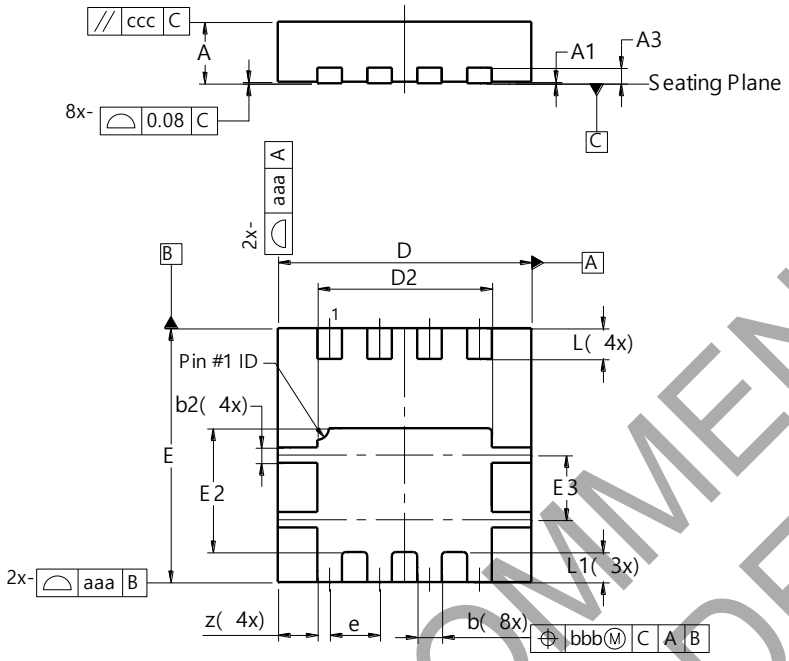


Figure 13 Transient Thermal Resistance

Package Outline Dimensions

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

PowerDI3333-8

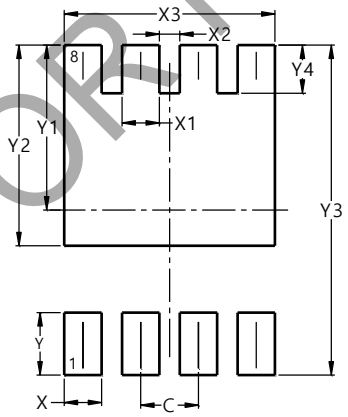


PowerDI3333-8			
Dim	**Min**	**Max**	**Typ**
A	0.75	0.85	0.80
A1	0.00	0.05	0.02
A3	–	–	0.203
b	0.27	0.37	0.32
b2	–	–	0.20
D	3.25	3.35	3.30
D2	2.22	2.32	2.27
E	3.25	3.35	3.30
E2	1.56	1.66	1.61
E3	0.79	0.89	0.84
e	–	–	0.65
L	0.35	0.45	0.40
L1		–	0.39
z	–	–	0.515
aaa	0.25		
bbb	0.10		
ccc	0.10		
All Dimensions 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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