



20V P-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
-20V	$5.5 \text{m}\Omega$ @ $V_{GS} = -4.5 \text{V}$	-40A
	$7.5 \text{m}\Omega$ @ $V_{GS} = -2.5 \text{V}$	-40A

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

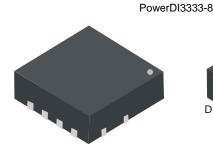
- Load Switch
- Power Management Functions

Features

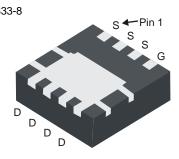
- Low R_{DS(ON)} ensures on state losses are minimized
- Small form factor, thermally efficient package enables higher density end products
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)
- Qualified to AEC-Q101 Standards for High Reliability

Mechanical Data

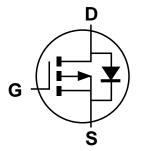
- Case: PowerDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound;
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe;
 Solderable per MIL-STD-202, Method 208 (3)
- Weight: 0.030 grams (Approximate)







Bottom View



Equivalent Circuit

Ordering Information (Note 4)

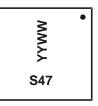
Part Number	Case	Packaging
DMP2006UFG-7	PowerDI3333-8	2,000/Tape & Reel
DMP2006UFG-13	PowerDI3333-8	3,000/Tape & Reel

Notes:

- 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant.
- 2. See http://www.diodes.com/quality/lead_free.html 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 http://www.diodes.com/products/packages.html.

Marking Information

PowerDI3333-8



S47 = 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}	-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_C = +25°C T_C = +25°C		I _D	-17.5 -14.0 -40	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	-80	А		
Maximum Continuous Body Diode Forward Current (Note 5)			Is	-2.2	Α
Avalanche Current (Note 7) L = 0.1mH			I _{AS}	-23	Α
Avalanche Energy (Note 7) L = 0.1mH			E _{AS}	28	mJ

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

Characteristic		Symbol	Value	Unit
Total Bower Dissinction (Note 5)	$T_A = +25^{\circ}C$	ם	2.3	W
Total Power Dissipation (Note 5)	$T_C = +25$ °C	P_{D}	41	
Thermal Resistance, Junction to Ambient	(Note 5)	D	54	
Thermal Resistance, Junction to Ambient	(Note 6)	$R_{\theta JA}$	136	°C/W
Thermal Resistance, Junction to Case (Note 5)	R ₀ JC	3.0		
Operating and Storage Temperature Range	$T_{J_i}T_{STG}$	-55 to +150	°C	

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

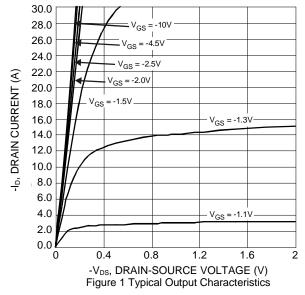
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	-20	_	_	V	$V_{GS} = 0V, I_D = -250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	-1	μΑ	$V_{DS} = -16V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	-	_	±100	nA	$V_{GS} = \pm 8V$, $V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	-0.4	_	-1.0	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$	
		1	4.2	5.5		$V_{GS} = -4.5V$, $I_{D} = -15A$	
Static Drain-Source On-Resistance	D	1	5.4	7.5	mΩ	$V_{GS} = -2.5V, I_D = -10A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	8	12	11122	$V_{GS} = -1.8V, I_{D} = -1A$	
		_	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		V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz	
Output Capacitance	Coss	_	728	1000	pF		
Reverse Transfer Capacitance	Crss	_	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)	Qg	_	64	100			
Total Gate Charge (V _{GS} = -10V)	Qg	_	140	200	nC	V 40V L 20A	
Gate-Source Charge	Q_{gs}	_	8.5	15	nc nc	$V_{DD} = -10V, I_{D} = -20A$	
Gate-Drain Charge	Q_{gd}	_	17	30			
Turn-On Delay Time	t _{D(ON)}	_	9.1	20		$V_{GS} = -4.5V, V_{DD} = -10V,$ $R_{G} = 1\Omega, R_{G} = 1\Omega, I_{D} = -10A$	
Turn-On Rise Time	t _R	_	19	35			
Turn-Off Delay Time	t _{D(OFF)}		146	220	ns		
Turn-Off Fall Time	t _F		104	150			
Reverse Recovery Time (Note 9)	t _{RR}	1	61	100	ns	I _F = -10A, di/dt = 100A/μs	
Reverse Recovery Charge (Note 9) Q_{RR} — 44 70 nC $I_F = -10A$		$I_F = -10A$, $di/dt = 100A/\mu s$					

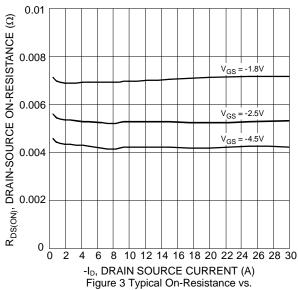
Notes:

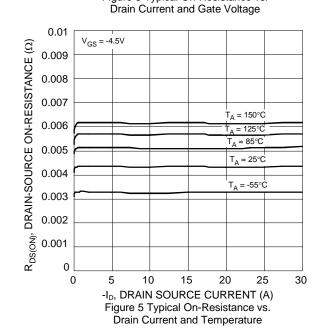
- 5. R_{BJA} is determined with the device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate. R_{BJC} is guaranteed by design while R_{BJA} is determined by the user's board design.
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.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

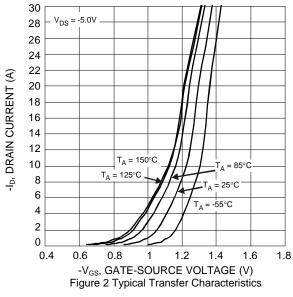


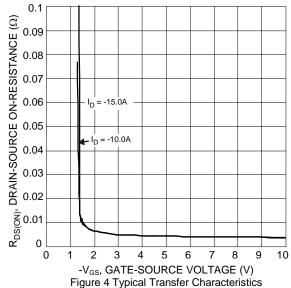


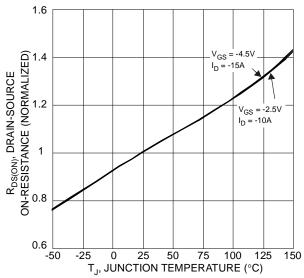






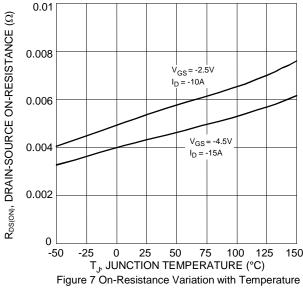


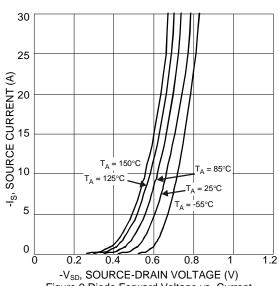


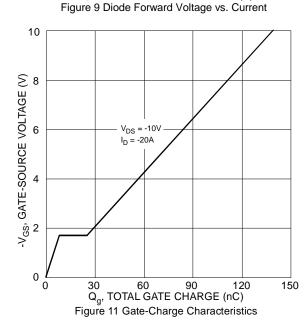












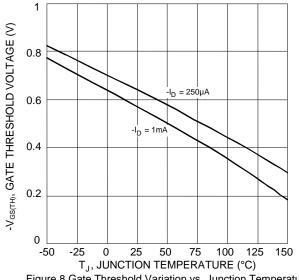
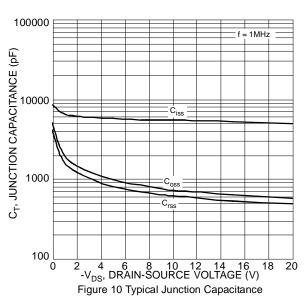
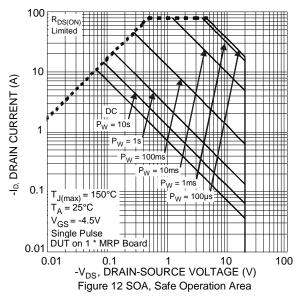
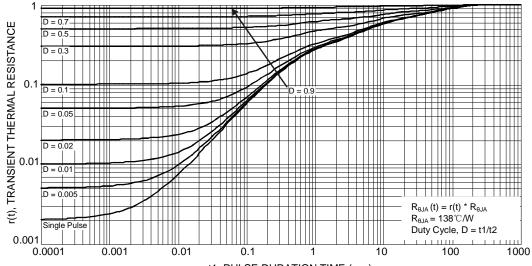


Figure 8 Gate Threshold Variation vs. Junction Temperature









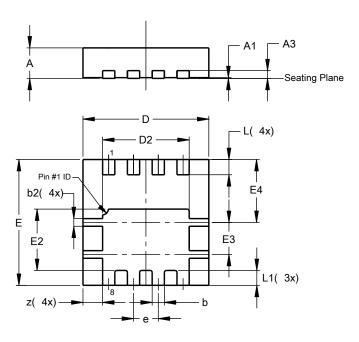
t1, PULSE DURATION TIME (sec) Figure 13 Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8

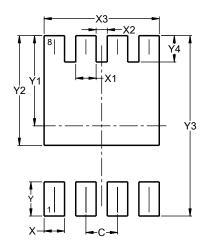


PowerDI3333-8				
Dim	Min Max		Тур	
Α	0.75	0.85	0.80	
A 1	0.00	0.05	0.02	
A3	_	_	0.203	
b	0.27	0.37	0.32	
b2	0.15	0.25	0.20	
D	3.25	3.35	3.30	
D2	2.22	2.32	2.27	
Е	3.25	3.35	3.30	
E2	1.56	1.66	1.61	
E3	0.79	0.89	0.84	
E4	1.60	1.70	1.65	
е	-	_	0.65	
L	0.35	0.45	0.40	
L1	_	_	0.39	
Z	_	_	0.515	
All Dimensions in mm				

Suggested Pad Layout

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

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Dimensions	Value (in mm)
C	0.650
X	0.420
X1	0.420
X2	0.230
Х3	2.370
Y	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540

March 2017

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