



20V P-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C		
001/	4.0mΩ @ V _{GS} = -4.5V	-89A		
-20V	6.5mΩ @ V _{GS} = -2.5V	-70A		

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

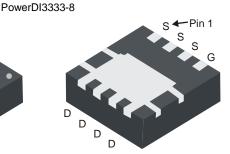
- Low R_{DS(ON)} ensures on state losses are minimized
- Small form factor, thermally efficient package enables higher density end products (PowerDI[®])
- Occupies just 33% of the board area occupied by SO-8 enabling smaller end product
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony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

Mechanical Data

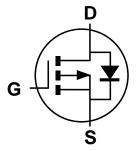
- Case: PowerDI3333-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminal Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 63
- Weight: 0.072 grams (Approximate)







Bottom View



Equivalent Circuit

Ordering Information (Note 4)

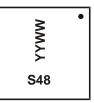
Part Number	Case	Packaging
DMP2005UFG-7	PowerDI3333-8	2,000/Tape & Reel
DMP2005UFG-13	PowerDI3333-8	3,000/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS) & 2011/65/EU (RoHS 2) compliant. All applicable RoHS exemptions applied.
- 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



S48 = Product Type Marking Code YYWW = Date Code Marking YY = Last Two Digits of Year (ex: 16 = 2016) WW = Week Code (01 to 53)



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

Characteristic	Symbol	Value	Units		
Drain-Source Voltage	V_{DSS}	-20	V		
Gate-Source Voltage	V_{GSS}	±10	V		
Continuous Drain Current V _{GS} = -4.5V (Note 7)	Steady State	$T_C = +25$ °C $T_C = +70$ °C	I _D	-89 -70	А
Continuous Drain Current V _{GS} = -4.5V (Note 6)	l _D	-19 -15	А		
Pulsed Drain Current (380µs pulse, duty cycle = 1%)	I _{DM}	-100	Α		
Maximum Continuous Body Diode Forward Current (Is	-2.5	Α		
Avalanche Current (Note 8) L = 0.1mH	I _{AS}	-27	Α		
Avalanche Energy (Note 8) L = 0.1mH	E _{AS}	35	mJ		

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

Characteristic		Symbol	Value	Units
Total Power Dissipation (Note 5)	T _A = +25°C	P _D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{\theta JA}$	128	°C/W
Total Power Dissipation (Note 6)	T _A = +25°C	P _D	2.2	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{\theta JA}$	57	°C/W
Total Power Dissipation (Note 7)	T _C = +25°C	P _D	48	W
Thermal Resistance, Junction to Case (Note 7)		$R_{ heta JC}$	2.6	°C/W
Operating and Storage Temperature Range		T _J , T _{STG}	-55 to +150	°C

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

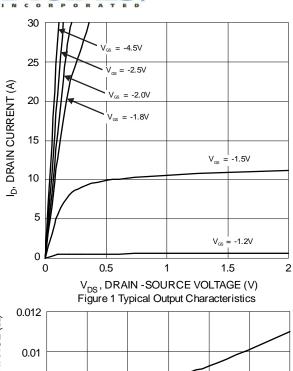
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition
OFF CHARACTERISTICS (Note 9)						
Drain-Source Breakdown Voltage	BV _{DSS}	-20	1	1	V	$V_{GS} = 0V, I_D = -250\mu A$
Zero Gate Voltage Drain Current	I _{DSS}	_	_	-1	μΑ	$V_{DS} = -16V, V_{GS} = 0V$
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 8V$, $V_{DS} = 0V$
ON CHARACTERISTICS (Note 9)						•
Gate Threshold Voltage	V _{GS(TH)}	-0.3	-0.7	-0.9	V	$V_{DS} = V_{GS}, I_{D} = -250 \mu A$
		_	3.5	4.0		$V_{GS} = -4.5V$, $I_{D} = -15A$
Static Drain-Source On-Resistance	R _{DS(ON)}	_	5.4	6.5	mΩ	$V_{GS} = -2.5V, I_D = -10A$
		_	8.0	14		$V_{GS} = -1.8V, I_D = -1A$
Diode Forward Voltage	V_{SD}	_	-0.7	-1.2	V	$V_{GS} = 0V, I_{S} = -10A$
DYNAMIC CHARACTERISTICS (Note 10)						
Input Capacitance	Ciss	_	4,670	_		V _{DS} = -10V, V _{GS} = 0V f = 1.0MHz
Output Capacitance	Coss	_	650	_	pF	
Reverse Transfer Capacitance	C _{rss}	_	550	_		
Gate Resistance	R _G	_	3.5	_	Ω	$V_{DS} = 0V, V_{GS} = 0V, f = 1.0MHz$
Total Gate Charge (V _{GS} = -4.5V)	Q_g	_	55	-		
Total Gate Charge (V _{GS} = -10V)	Q_g	_	125	_		
Gate-Source Charge	Qgs	_	7.8	_	nC	$V_{DD} = -10V, I_{D} = -20A$
Gate-Drain Charge	Q _{gd}	_	16.5	_		
Turn-On Delay Time	t _{D(ON)}	_	9.5	_		
Turn-On Rise Time	t _R	_	10.5	_		$V_{GS} = -4.5V$, $V_{DD} = -10V$, $R_G = 1\Omega$, $R_G = 1\Omega$, $I_D = -10A$
Turn-Off Delay Time	t _{D(OFF)}	_	115	_	ns	
Turn-Off Fall Time	t _F	_	85	_		
Reverse Recovery Time	e Recovery Time t _{RR} — 25 — ns I		I _F = -10A, di/dt = 100A/μs			
Reverse Recovery Charge	Q _{RR}	_	14	_	nC	I _F = -10A, di/dt = 100A/μs

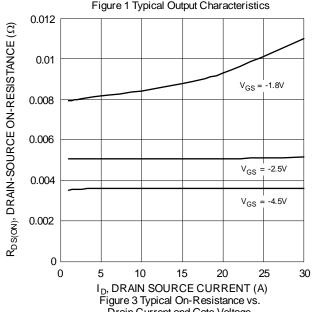
Notes:

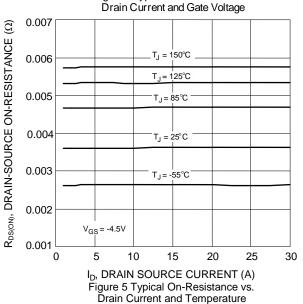
- 5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. I_{AS} and E_{AS} rating are based on low frequency and duty cycles to keep T_J = +25°C.
- 9. Short duration pulse test used to minimize self-heating effect.
- 10. Guaranteed by design. Not subject to product testing.

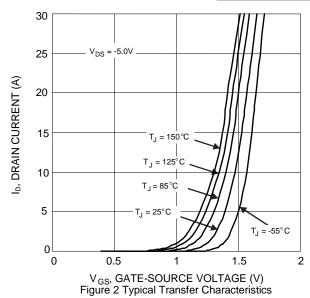


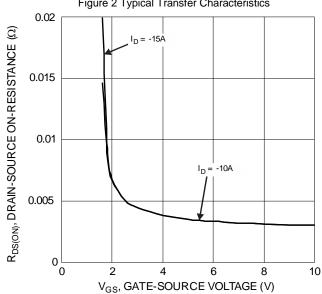


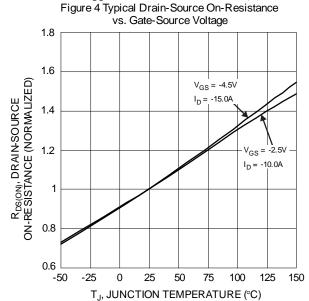




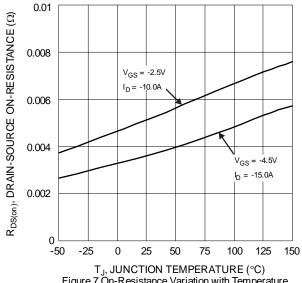


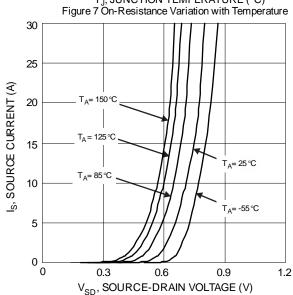


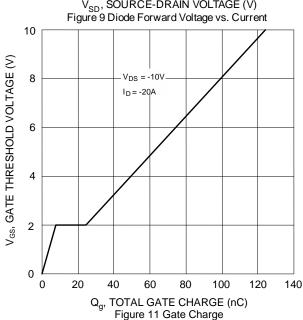


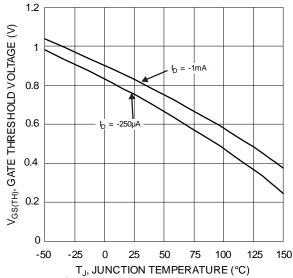


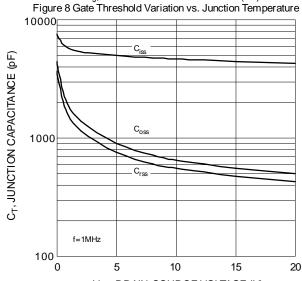


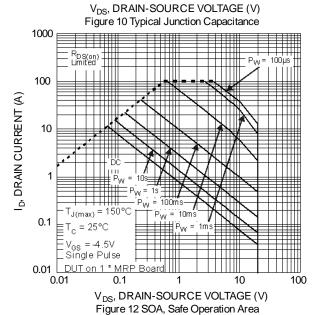














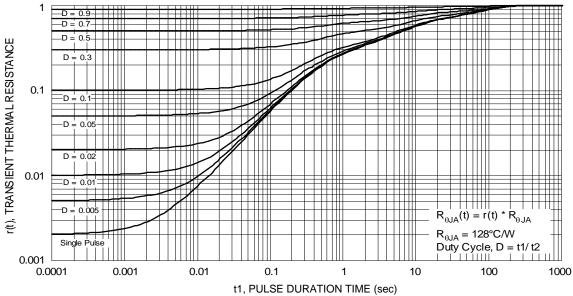


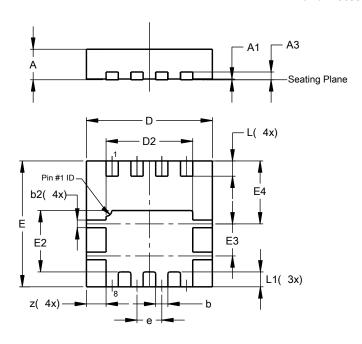
Figure 13 Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8

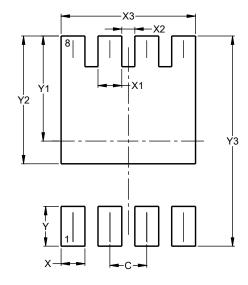


PowerDI3333-8					
Dim	Min	Max	Тур		
Α	0.75	0.85	0.80		
A1	0.00	0.05	0.02		
A3	_	ı	0.203		
b	0.27	0.37	0.32		
b2	0.15	0.25	0.20		
ם	3.25	3.35	3.30		
D2	2.22	2.32	2.27		
Е	3.25	3.35	3.30		
E2	1.56	1.66	1.61		
E3	0.79	0.89	0.84		
E4	1.60	1.70	1.65		
е	_	ı	0.65		
L	0.35	0.45	0.40		
L1	_	ı	0.39		
Z	-	ı	0.515		
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)
С	0.650
Х	0.420
X1	0.420
X2	0.230
Х3	2.370
Υ	0.700
Y1	1.850
Y2	2.250
Y3	3.700



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