



60V N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C (Note 9)
	4.1mΩ @ V _{GS} = 10V	100A
60V	6.3mΩ @ V _{GS} = 6V	81A
	$7m\Omega @ V_{GS} = 4.5V$	77A

Description and Applications

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.

- Synchronous Rectification
- Motor Control
- DC-DC Converters
- Power Management

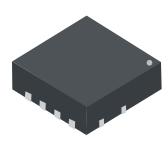
Features and Benefits

- 100% Unclamped Inductive Switching (UIS) Test in Production –
 Ensures more reliable and robust end application
- 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
- Lead-Free Finish; RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

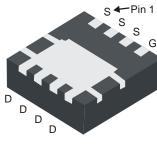
Mechanical Data

- 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 Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202, Method 208 @3
- Weight: 0.008 grams (Approximate)

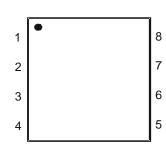
PowerDI3333-8



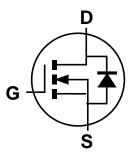




Bottom View



Top View



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6005LFG-7	PowerDI3333-8	2,000/Tape & Reel
DMT6005LFG-13	PowerDI3333-8	3,000/Tape & Reel

Notes:

- 1. EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant. All applicable RoHS exemptions applied.
- 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



SK6 = 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 (@ $T_A = +25^{\circ}C$, unless otherwise specified.)

Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	60	V	
Gate-Source Voltage	V_{GSS}	±20	V	
Continuous Drain Current (Notes 6 & 9) V _{GS} = 10V	$T_C = +25$ °C $T_C = +70$ °C	ΙD	100 80	Α
Continuous Drain Current (Note 5) V _{GS} = 10V	$T_A = +25$ °C $T_A = +70$ °C	I _D	18 14	Α
Maximum Continuous Body Diode Forward Current (Note 5)	Is	100	А	
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	400	Α	
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%	I _{SM}	400	Α	
Avalanche Current, L = 1mH	I _{AS}	18.5	Α	
Avalanche Energy, L = 1mH	Eas	171	mJ	

Thermal Characteristics

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)	$T_A = +25$ °C	P_{D}	1.98	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{\theta JA}$	63	°C/W
Total Power Dissipation (Note 6)	T _C = +25°C	P _D	62.5	W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	2.0	°C/W
Operating and Storage Temperature Range		$T_{J_i} T_{STG}$	-55 to +150	°C

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

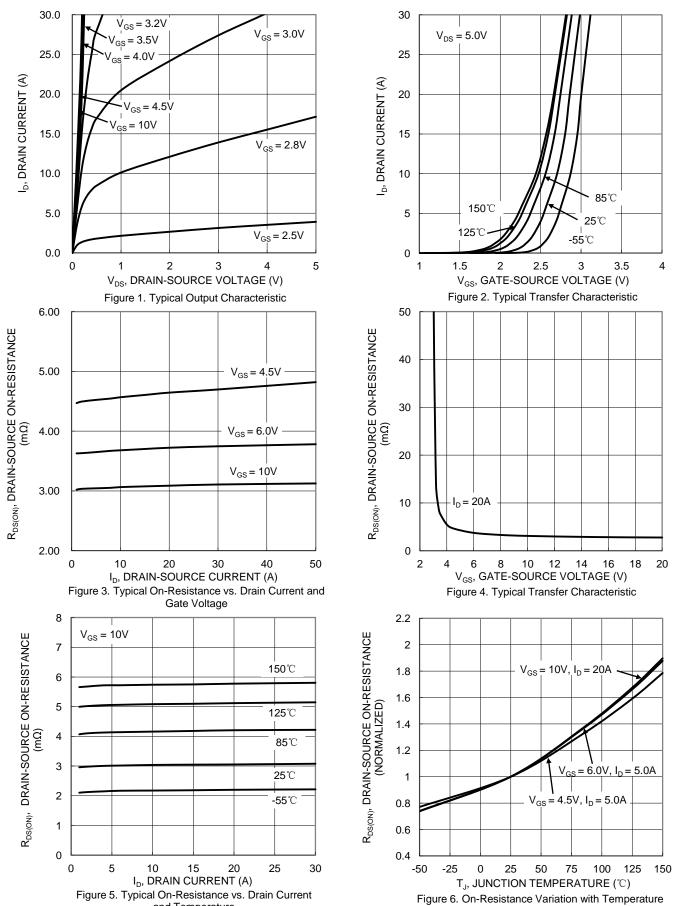
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Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V$, $I_D = 1mA$	
Zero Gate Voltage Drain Current	I _{DSS}	_	_	1	μΑ	$V_{DS} = 48V$, $V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	2.5	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
		_	3.1	4.1	mΩ	$V_{GS} = 10V, I_D = 20A$	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	3.6	6.3	mΩ	$V_{GS} = 6V, I_D = 20A$	
	, ,	_	4.4	7	mΩ	$V_{GS} = 4.5V, I_D = 20A$	
Diode Forward Voltage	V_{SD}	_	0.8	1.2	V	$V_{GS} = 0V, I_{S} = 20A$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	_	3150			.,	
Output Capacitance	Coss	_	1036	_	pF	$V_{DS} = 30V$, $V_{GS} = 0V$, $f = 1MHz$	
Reverse Transfer Capacitance	C _{rss}	_	69	_			
Gate Resistance	R _q	_	0.7	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 10V)	Qq	_	48.7	_			
Total Gate Charge (V _{GS} = 4.5V)	Qq	_	23.6	_	0	N/ 201/ I 50A	
Gate-Source Charge	Q _{qs}	_	7.0	_	nC	$V_{DD} = 30V, I_D = 50A$	
Gate-Drain Charge	Q _{gd}	_	11.2	_			
Turn-On Delay Time	t _{D(ON)}	_	7.3	_		$V_{DD} = 30V, V_{GS} = 10V,$ $I_{D} = 30A, R_{G} = 3.3\Omega$	
Turn-On Rise Time	t _R	_	11.3	_	20		
Turn-Off Delay Time	t _{D(OFF)}	_	26.0	_	ns		
Turn-Off Fall Time	t _F	_	11.0	_			
Bodyy Diode Reverse Recovery Time	t _{RR}	_	40.8	_	ns I con little 1001/		
Body Diode Reverse Recovery Charge	Q_{RR}	_	51.5	_	$_{\rm nC}$ $_{\rm lf}$ = 30A, di/dt = 100A/ μ s		

Notes:

- 5. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
- 6. Thermal resistance from junction to soldering point (on the exposed drain pad).7. Short duration pulse test used to minimize self-heating effect.
- 8. Guaranteed by design. Not subject to product testing. 9. Limited by Package.







and Temperature





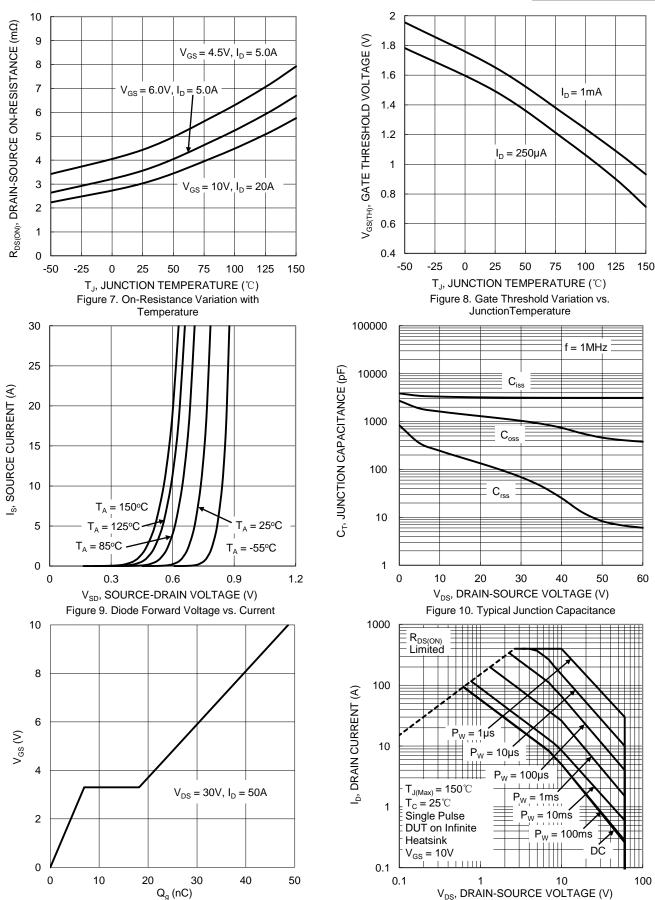


Figure 11. Gate Charge

Figure 12. SOA, Safe Operation Area



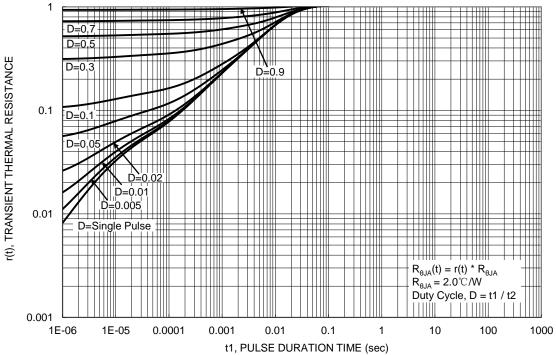


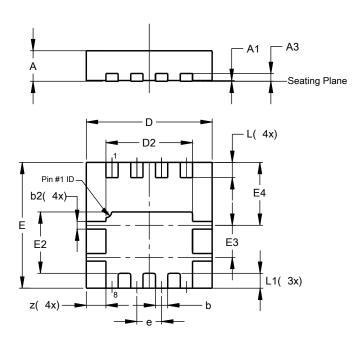
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8

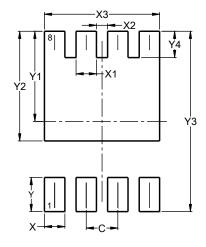


PowerDI3333-8					
Dim	Min	Max	Тур		
Α	0.75	0.85	0.80		
A1	0.00	0.05	0.02		
A3	-	_	0.203		
b	0.27	0.37	0.32		
b2	0.15	0.25	0.20		
D	3.25	3.35	3.30		
D2	2.22	2.32	2.27		
Е	3.25	3.35	3.30		
E2	1.56	1.66	1.61		
E3	0.79	0.89	0.84		
E4	1.60	1.70	1.65		
е	_	_	0.65		
۲	0.35	0.45	0.40		
L1	_	_	0.39		
Z	_	_	0.515		
All Dimensions in mm					

Suggested Pad Layout

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

PowerDI3333-8



Dimensions	Value (in mm)
C	0.650
Х	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



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Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru_6 moschip.ru 4 moschip.ru 9