



60V N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D Max T _C = +25°C
201/	12mΩ @ V _{GS} = 10V	43.3A
60V	15mΩ @ V _{GS} = 4.5V	38.7A

Description and Applications

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.

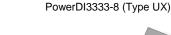
- Backlighting
- Power Management Functions
- DC-DC Converters

Features and Benefits

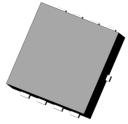
- 100% Unclamped Inductive Switching (UIS) Test in Production Ensures More Reliable and Robust End Application
- Low R_{DS(ON)} Ensures On-State Losses are Minimized
- Small Form Factor Thermally Efficient Package Enables Higher Density End Products
- Occupies just 33% of the Board Area Occupied by SO-8 Enabling Smaller End Product
- ESD Protected Gate
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Mechanical Data

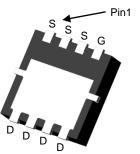
- Case: PowerDI[®]3333-8
- Case Material: Molded Plastic, "Green" Molding Compound.
 UL Flammability Classification Rating 94V-0
- Moisture Sensitivity: Level 1 per J-STD-020
- Terminal Connections Indicator: See Diagram
- Terminals: Finish Matte Tin Annealed over Copper Leadframe.
 Solderable per MIL-STD-202,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



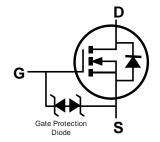








Bottom View



Internal Schematic

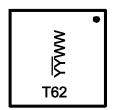
Ordering Information (Note 4)

Part Number	Case	Packaging
DMT6012LFV-7	PowerDI3333-8 (Type UX)	2,000/Tape and Reel
DMT6012LFV-13	PowerDI3333-8 (Type UX)	3,000/Tape and 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.
- See http://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



T62= 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 (Note 6) $V_{GS} = 10V$ $T_{C} = +25^{\circ}C$ $T_{C} = +70^{\circ}C$		Ι _D	43.3 34.7	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	170	Α	
Maximum Continuous Body Diode Forward Current (Note 6)	Is	40	Α	
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	170	Α	
Avalanche Current, L = 0.1mH	I _{AS}	23.7	Α	
Avalanche Energy, L = 0.1mH	E _{AS}	28.1	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}	1.95	W
Thermal Resistance, Junction to Ambient (Note 5)		$R_{ heta JA}$	64	
Total Power Dissipation (Note 6) $T_C = +25^{\circ}C$		P _D	33.78	°C/W
Thermal Resistance, Junction to Case (Note 6)		$R_{\theta JC}$	3.7	
Operating and Storage Temperature Range		T _{J,} T _{STG}	-55 to +150	°C

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

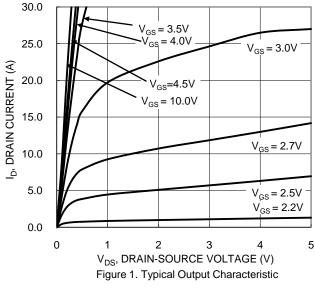
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V$, $I_D = 1mA$	
Zero Gate Voltage Drain Current	I _{DSS}		_	1	μA	$V_{DS} = 48V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±10	μΑ	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	2.5	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance		_	8.2	12	mΩ	$V_{GS} = 10V, I_D = 20A$	
Static Diani-Source On-Resistance	R _{DS(ON)}		11.2	15	11122	$V_{GS} = 4.5V, I_D = 12.5A$	
Diode Forward Voltage	V_{SD}	_	0.8	1.2	V	$V_{GS} = 0V, I_{S} = 20A$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	C _{iss}	_	1522	_		$V_{DS} = 30V$, $V_{GS} = 0V$, $f = 1MHz$	
Output Capacitance	Coss	1	352	_	pF		
Reverse Transfer Capacitance	C _{rss}		27.5	_			
Gate Resistance	R_g	-	1.4	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Q_g	_	10.7	_			
Total Gate Charge (V _{GS} = 10V)	Q_g	_	22.2	_	nC	$V_{DS} = 30V, I_{D} = 10A$	
Gate-Source Charge	Q_{gs}		3.3	_	IIC		
Gate-Drain Charge	Q_{gd}	_	4.2	_			
Turn-On Delay Time	t _{D(ON)}	_	4.4	_		$V_{GS} = 10V, V_{DS} = 30V,$ $R_g = 6\Omega, I_D = 10A$	
Turn-On Rise Time	t _R	_	6.7	_			
Turn-Off Delay Time	t _{D(OFF)}	-	25.5	_	ns		
Turn-Off Fall Time	t _F	_	12.5	_			
Reverse Recovery Time	t _{RR}	_	25.8	_	ns	1 400 4:/44 4000/	
Reverse Recovery Charge	Q _{RR}	_	15.1	_	nC	$I_F = 10A$, 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.





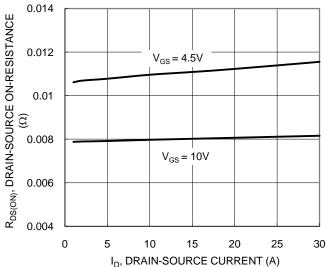
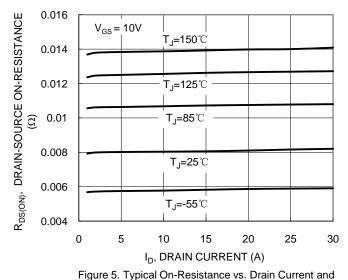


Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage



Junction Temperature

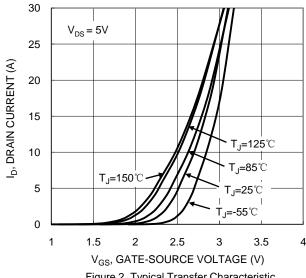


Figure 2. Typical Transfer Characteristic

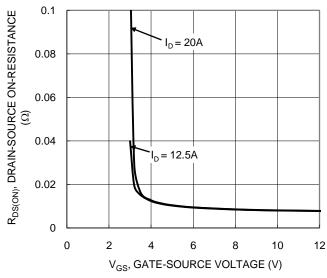


Figure 4. Typical Transfer Characteristic

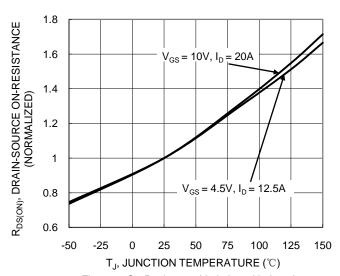


Figure 6. On-Resistance Variation with Junction Temperature



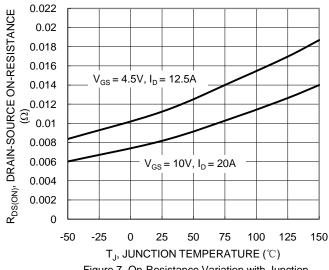


Figure 7. On-Resistance Variation with Junction Temperature

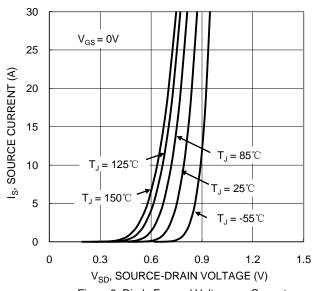


Figure 9. Diode Forward Voltage vs. Current

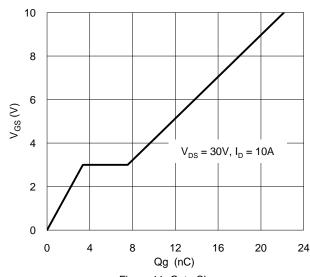


Figure 11. Gate Charge

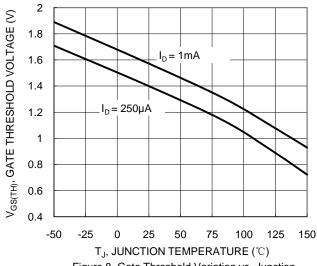
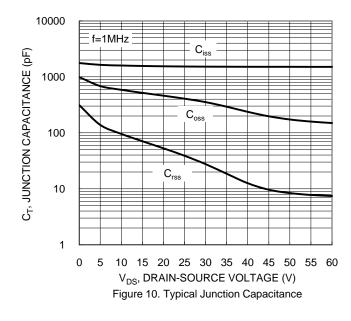


Figure 8. Gate Threshold Variation vs. Junction Temperature



1000 $R_{DS(ON)}$ Limited 100 I_D, DRAIN CURRENT (A) 10 P_W =10μs P_W =100μs T_{J(Max)} = 150°C T_C = 25°C Single Pulse $P_W = 100 ms$ 0.1 DUT on Infinite DC Heatsink $V_{GS} = 10V$ 0.01 0.1 10 100 V_{DS}, DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



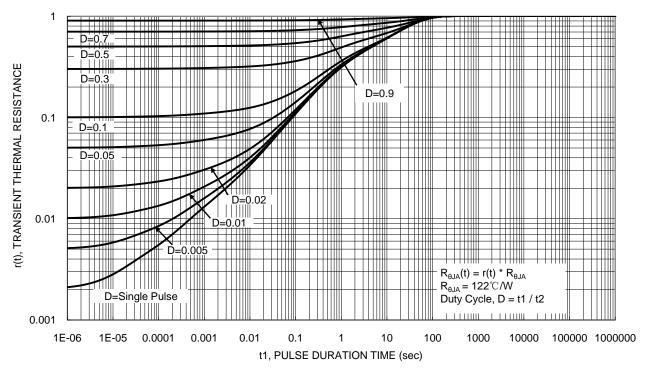


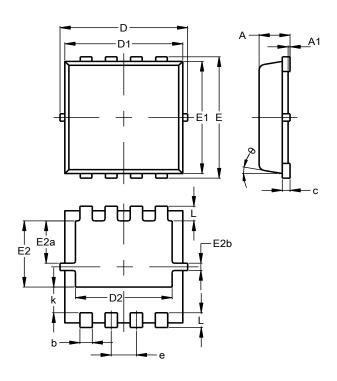
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

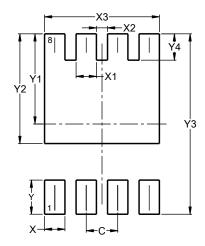


PowerDl3333-8 (Type UX)					
Dim	Min	Max	Тур		
Α	0.75	0.85	0.80		
A1	0.00	0.05			
b	0.25	0.40	0.32		
С	0.10	0.25	0.15		
D	3.20	3.40	3.30		
D1	2.95	3.15	3.05		
D2	2.30	2.70	2.50		
E	3.20	3.40	3.30		
E1	2.95	3.15	3.05		
E2	1.60	2.00	1.80		
E2a	0.95	1.35	1.15		
E2b	0.10	0.30	0.20		
е	0.65 BSC				
k	0.50	0.90	0.70		
L	0.30	0.50	0.40		
θ	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 UX)



Dimensions	Value (in mm)		
С	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		



IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel. Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

- A. Life support devices or systems are devices or systems which:
 - 1. are intended to implant into the body, or
 - 2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.
- B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2018, Diodes Incorporated

www.diodes.com