

60V N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8 (Type UX)

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
	18mΩ @ V _{GS} = 10V	35A
60V	20mΩ @ V _{GS} = 4.5V	34A

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

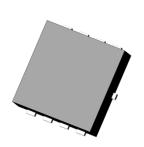
Features and Benefits

- 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)

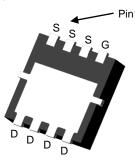
Mechanical Data

- Case: PowerDI[®]3333-8 (Type UX)
- 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)

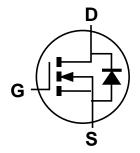
PowerDI3333-8 (Type UX)



Top View



Bottom View



Equivalent Circuit

Ordering Information (Note 4)

Part Number	Case	Packaging
DMN6017SFV-7	PowerDI3333-8 (Type UX)	2,000/Tape & Reel
DMN6017SFV-13	PowerDI3333-8 (Type UX)	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



 $\underline{\text{N67}}$ = Product Type Marking Code $\underline{\text{YY}}$ WW = Date Code Marking $\underline{\text{YY}}$ = Last Two Digits of Year (ex: 18 = 2018) WW = Week Code (01 to 53)



Maximum Ratings (@T_A = +25°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 7) V _{GS} = 10V	$T_C = +25$ °C $T_C = +70$ °C	ΔD	35 28	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	140	Α	
Maximum Continuous Body Diode Forward Current (Note 7)	Is	20	Α	
Pulsed Body Diode Forward Current (10µs Pulse, Duty Cycle = 1%)	I _{SM}	140	Α	
Avalanche Current, L = 0.1mH (Note 8)	I _{AS}	25	Α	
Avalanche Energy, L = 0.1mH (Note 8)		E _{AS}	32	mJ

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

Characteristic		Symbol	Value	Unit
Total Power Dissipation (Note 5)		P_D	1.0	W
Thermal Resistance, Junction to Ambient (Note 5)	Steady State	$R_{ hetaJA}$	126	°C/W
Total Power Dissipation (Note 6)		P_{D}	2.0	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State	$R_{ heta JA}$	62	°C/W
Thermal Resistance, Junction to Case (Note 7)		$R_{ heta JC}$	3.7	C/VV
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)	Oymboi		ΙJP	WIGA	Oilit	rest condition	
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	V _{GS} = 0V, I _D = 250μA	
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 9)					I.	, 20	
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	V	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance		_	12	18	mΩ	V _{GS} = 10V, I _D = 6A	
Static Drain-Source On-Resistance	R _{DS(ON)}	_	13	20	11177	$V_{GS} = 4.5V, I_D = 4A$	
Diode Forward Voltage	V _{SD}	_	0.7	1	V	V _G S = 0V, I _S = 1A	
DYNAMIC CHARACTERISTICS (Note 10)				•	•	•	
Input Capacitance	C _{iss}	-	2711	_	pF	\\ A5\\\\\ 0\\	
Output Capacitance	Coss	_	152	_	pF		
Reverse Transfer Capacitance	C _{rss}	_	126	_	pF		
Gate Resistance	Rg	_	1.4	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	26	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qq	_	55	_	nC	$V_{DS} = 48V, I_{D} = 6A$	
Gate-Source Charge	Q _{gs}	_	6.2	_	nC		
Gate-Drain Charge	Q_gd	_	8.5	_	nC		
Turn-On Delay Time	t _{D(ON)}	_	4.9	_	ns		
Turn-On Rise Time	t _R	_	5.4	_	ns	$V_{DD} = 30V, V_{GS} = 10V,$ $R_G = 3.3\Omega, I_D = 6A$	
Turn-Off Delay Time	t _{D(OFF)}	_	38.2	_	ns		
Turn-Off Fall Time	t _F	_	11	_	ns		
Reverse Recovery Time	t _{RR}	_	16.6	_	ns		
Reverse Recovery Charge	Q_{RR}	_	10.3	_	nC	$_{\text{nC}}$ I _F = 6A, di/dt = 100A/ μ s	

- 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 1-inch square copper plate.
 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep T_J = +25°C.
- Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.





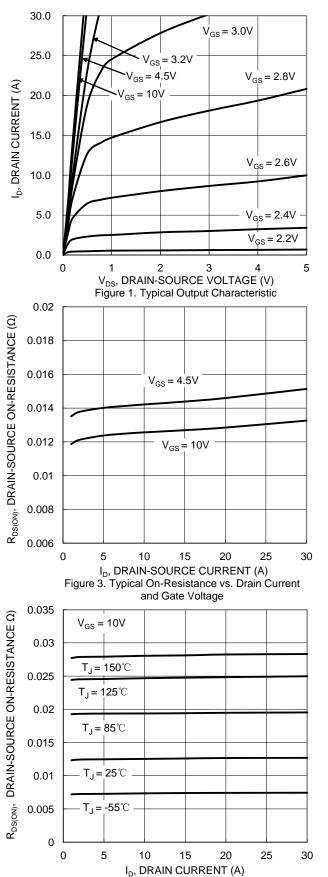
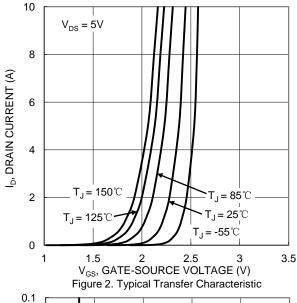
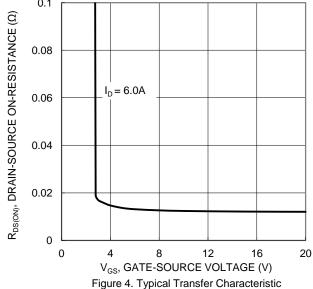


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature





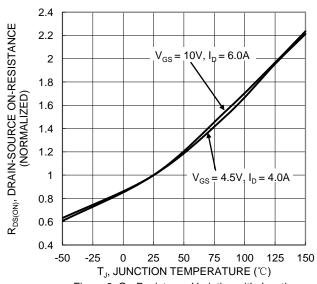


Figure 6. On-Resistance Variation with Junction Temperature





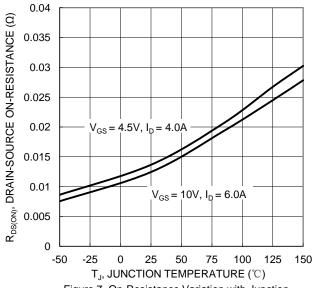
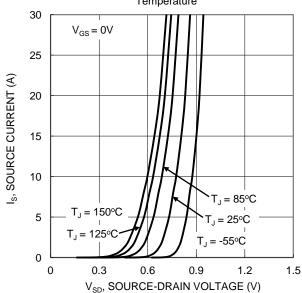
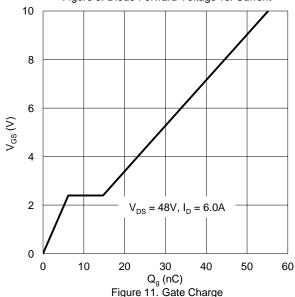


Figure 7. On-Resistance Variation with Junction Temperature



 V_{SD} , SOURCE-DRAIN VOLTAGE (V) Figure 9. Diode Forward Voltage vs. Current



2.2 $V_{\text{GS(TH)}}$, GATE THRESHOLD VOLTAGE (V) 2 1.8 $I_D = 1mA$ 1.6 1.4 $I_{D} = 250 \mu A$ 1.2 1 0.8 0.6 0.4 -50 -25 0 25 50 75 100 125 150 T_J, JUNCTION TEMPERATURE (°C)

Figure 8. Gate Threshold Variation vs. Junction Temperature

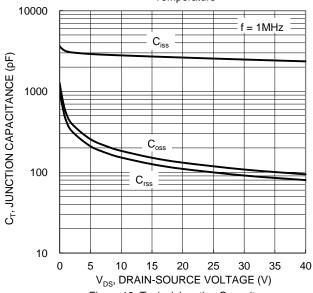
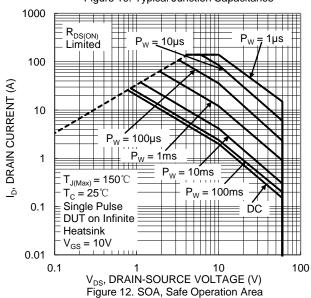


Figure 10. Typical Junction Capacitance





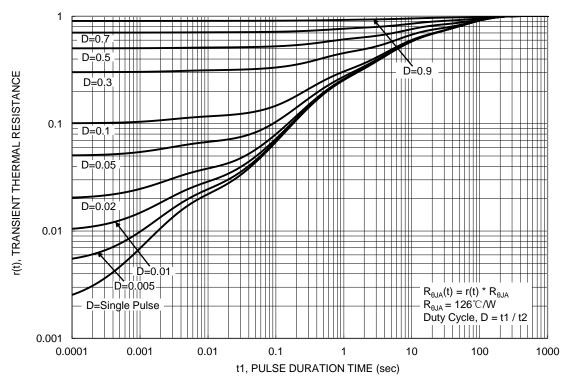


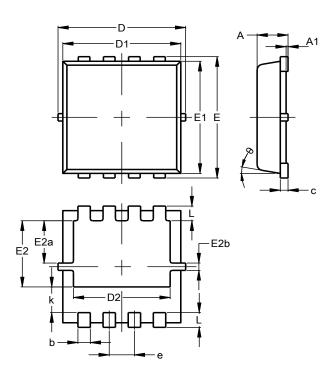
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

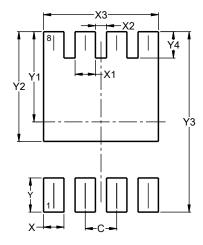


PowerDI3333-8					
(Type UX)					
Dim	Min	Max	Тур		
Α	0.75	0.85	0.80		
A1	0.00	0.05	-		
b	0.25	0.40	0.32		
C	0.10	0.25	0.15		
D	3.20	3.40	3.30		
D1	2.95	3.15	3.05		
D2	2.30	2.70	2.50		
Е	3.20	3.40	3.30		
E1	2.95	3.15	3.05		
E2	1.60	2.00	1.80		
E2a	0.95	1.35	1.15		
E2b	0.10	0.30	0.20		
е	0.65 BSC				
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
Х	0.420
X1	0.420
X2	0.230
Х3	2.370
Υ	0.700
Y1	1.850
Y2	2.250
Y3	3.700
Y4	0.540

August 2018

© Diodes Incorporated



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

ПОСТАВКА ЭЛЕКТРОННЫХ КОМПОНЕНТОВ

многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

Данный компонент на территории Российской Федерации Вы можете приобрести в компании MosChip.

Для оперативного оформления запроса Вам необходимо перейти по данной ссылке:

http://moschip.ru/get-element

Вы можете разместить у нас заказ для любого Вашего проекта, будь то серийное производство или разработка единичного прибора.

В нашем ассортименте представлены ведущие мировые производители активных и пассивных электронных компонентов.

Нашей специализацией является поставка электронной компонентной базы двойного назначения, продукции таких производителей как XILINX, Intel (ex.ALTERA), Vicor, Microchip, Texas Instruments, Analog Devices, Mini-Circuits, Amphenol, Glenair.

Сотрудничество с глобальными дистрибьюторами электронных компонентов, предоставляет возможность заказывать и получать с международных складов практически любой перечень компонентов в оптимальные для Вас сроки.

На всех этапах разработки и производства наши партнеры могут получить квалифицированную поддержку опытных инженеров.

Система менеджмента качества компании отвечает требованиям в соответствии с ГОСТ Р ИСО 9001, ГОСТ РВ 0015-002 и ЭС РД 009

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