

30V N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8 (Type UX)

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _C = +25°C
	5.5 m Ω @ V _{GS} = 10V	60A
30V	9.0mΩ @ V _{GS} = 4.5V	50A

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**

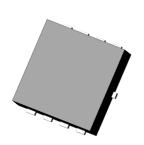
Features and Benefits

- 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)

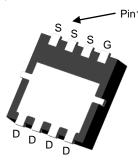
Mechanical Data

- 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: 0.072 grams (Approximate)

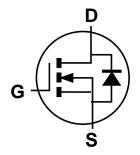
PowerDI3333-8 (Type UX)



Top View



Bottom View



Equivalent Circuit

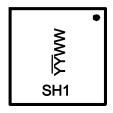
Ordering Information (Note 4)

Part Number	Case	Packaging
DMN3009LFV-7	PowerDI3333-8 (Type UX)	2,000/Tape & Reel
DMN3009LFV-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) 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



SH1= 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}	30	V	
Gate-Source Voltage	V_{GSS}	±20	V	
Continuous Drain Current (Note 7) V _{GS} = 10V	$T_C = +25$ °C $T_C = +70$ °C	ID	60 50	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	90	А	
Maximum Continuous Body Diode Forward Current (Note 7)		Is	60	А
Avalanche Current, L = 0.1mH (Note 8)		I _{AS}	33	А
Avalanche Energy, L = 0.1mH (Note 8)	E _{AS}	58	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	$R_{ hetaJA}$	62	°C/W
Thermal Resistance, Junction to Case (Note 7)		$R_{ heta JC}$	3.5	C/VV
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 9)							
Drain-Source Breakdown Voltage	BV _{DSS}	30	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current	I _{DSS}	1	_	1	μΑ	$V_{DS} = 24V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	1	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 9)							
Gate Threshold Voltage	V _{GS(TH)}	1	_	3	٧	$V_{DS} = V_{GS}, I_{D} = 250 \mu A$	
Static Drain-Source On-Resistance			3.5	5.5	mΩ	$V_{GS} = 10V, I_D = 30A$	
Static Dialii-Source Off-Resistance	R _{DS(ON)}	-	4.6	9.0	11122	$V_{GS} = 4.5V, I_D = 15A$	
Diode Forward Voltage	V_{SD}	1	0.7	1.2	٧	$V_{GS} = 0V, I_{S} = 1A$	
DYNAMIC CHARACTERISTICS (Note 10)							
Input Capacitance	C _{iss}	-	2,000	_	pF	., .=.,,,	
Output Capacitance	Coss	_	315	_	pF	V _{DS} = 15V, V _{GS} = 0V, - f = 1MHz	
Reverse Transfer Capacitance	Crss	1	247	-	рF		
Gate Resistance	R_g	1	2.2	1	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Q_g		20	_	nC		
Total Gate Charge (V _{GS} = 10V)	Q_g		42	_	nC	\/ 15\/ 15 A	
Gate-Source Charge	Q_{gs}	1	4.7	_	nC	$V_{DS} = 15V, I_D = 15A$	
Gate-Drain Charge	Q_{gd}	-	7.4	_	nC		
Turn-On Delay Time	t _{D(ON)}		3.9	_	ns		
Turn-On Rise Time	t _R	_	4.1	_	ns	$V_{DD} = 15V, V_{GS} = 10V,$ $R_G = 3.3\Omega, , I_D = 15A$	
Turn-Off Delay Time	t _{D(OFF)}	_	31	_	ns		
Turn-Off Fall Time	t _F	_	15	_	ns		
Body Diode Reverse Recovery Time	t _{RR}	-	15	_	ns	I _F = 15A, di/dt = 100A/μs	
Body Diode Reverse Recovery Charge	Q_{RR}	_	6.0	_	nC		

5. Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided. Notes:

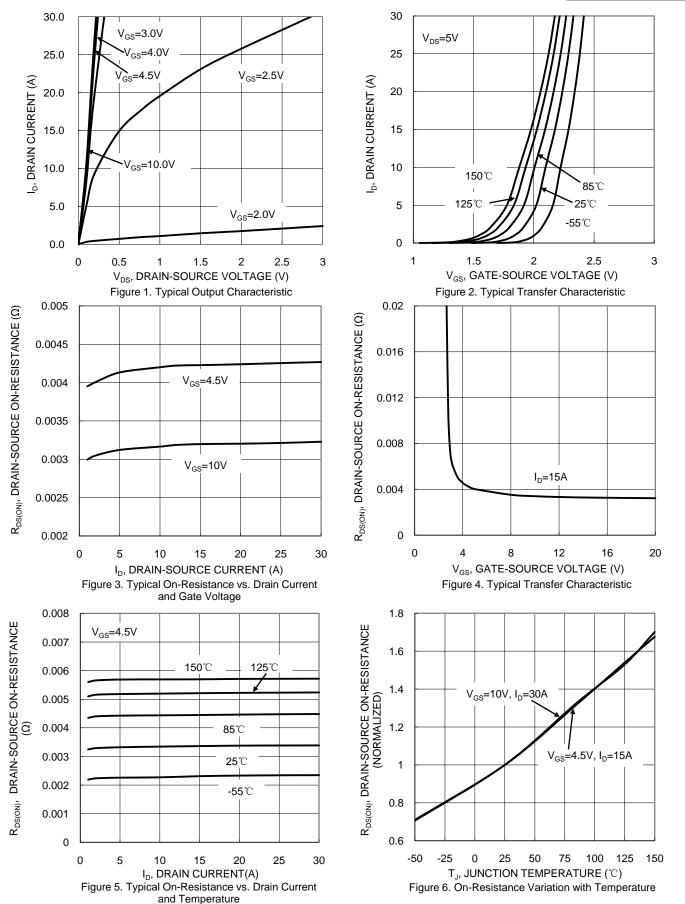
- 6. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1-inch square copper plate.
- 7. Thermal resistance from junction to soldering point (on the exposed drain pad).
- 8. I_{AS} and E_{AS} ratings are based on low frequency and duty cycles to keep $T_J = +25^{\circ}C$.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



March 2017

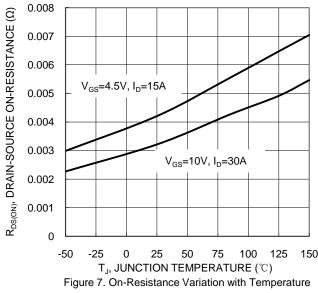
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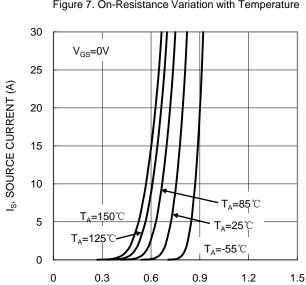




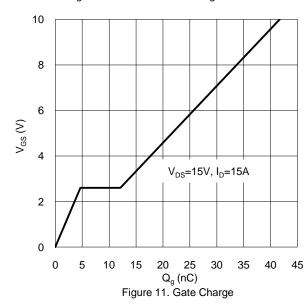






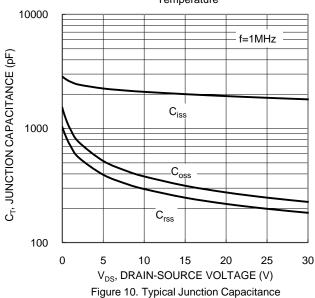


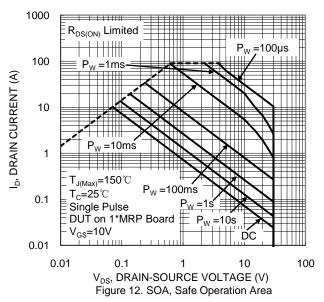
 V_{SD} , SOURCE-DRAIN VOLTAGE (V) Figure 9. Diode Forward Voltage vs. Current



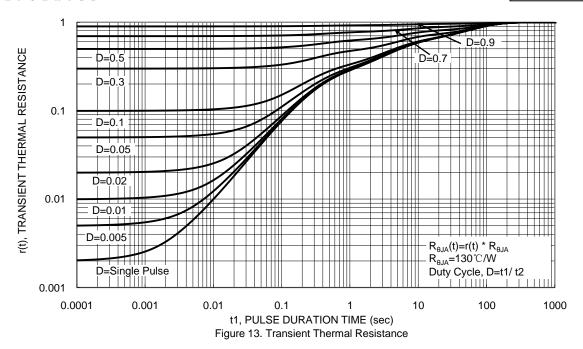
2 $V_{GS(TH)}, \, GATE \, THRESHOLD \, VOLTAGE \, (V)$ 1.7 I_D=1mA 1.4 1.1 $I_{D} = 250 \mu A$ 8.0 0.5 0.2 -50 -25 25 50 75 100 125 T_J , JUNCTION TEMPERATURE ($^{\circ}$ C)

Figure 8. Gate Threshold Variation vs. Junction Temperature







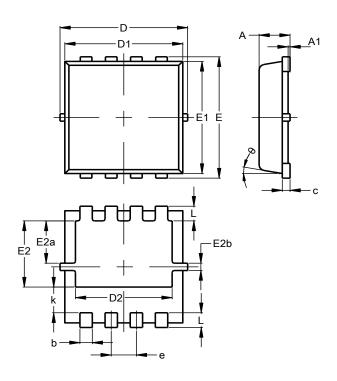




Package Outline Dimensions

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

PowerDI3333-8 (Type UX)

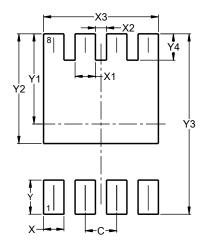


PowerDI3333-8 (Type UX)				
Dim	Min	Тур		
Α	0.75	0.85	0.80	
A1	0.00	0.05		
b	0.25	0.40	0.32	
C	0.10	0.25	0.15	
D	3.20	3.40	3.30	
D1	2.95	3.15	3.05	
D2	2.30	2.70	2.50	
E	3.20	3.40	3.30	
E1	2.95	3.15	3.05	
E2	1.60	2.00	1.80	
E2a	0.95	1.35	1.15	
E2b	0.10	0.30	0.20	
е	0.65 BSC			
k	0.50	0.90	0.70	
L	0.30	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		



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