



60V N-CHANNEL ENHANCEMENT MODE MOSFET PowerDI3333-8

Product Summary

BV _{DSS}	R _{DS(ON)} max	I _D max T _A = +25°C
00)/	$13m\Omega$ @ $V_{GS} = 10V$	10.3A
60V	$18m\Omega @ V_{GS} = 4.5V$	8.8A

Description and Applications

This MOSFET is designed to meet the stringent requirements of Automotive applications. It is qualified to AEC-Q101, supported by a PPAP and is ideal for use in:

- Motor Control
- DC to DC Converters
- Reverse Polarity Protection

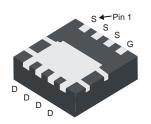
Features and Benefits

- 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)
- Qualified to AEC-Q101 Standards for High Reliability
- PPAP Capable (Note 4)

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: 0.072 grams (Approximate)

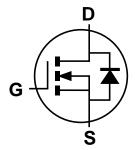








Top View



Equivalent Circuit

Ordering Information (Note 5)

Part Number	Case	Packaging
DMN6013LFGQ-7	PowerDI3333-8	2,000/Tape & Reel
DMN6013LFGQ-13	PowerDI3333-8	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. Automotive products are AEC-Q101 qualified and are PPAP capable. Refer to https://www.diodes.com/quality/.
- 5. For packaging details, go to our website at https://www.diodes.com/design/support/packaging/diodes-packaging/.

Marking Information



N63 = Product Type Marking Code YYWW = Date Code Marking YY = Last Two Digits of Year (ex: 18 = 2018) WW = Week Code (01 to 53)



Characteristic	Symbol	Value	Unit	
Drain-Source Voltage	V_{DSS}	60	V	
Gate-Source Voltage	V _{GSS}	±20	V	
Outliness Bridge Owner (Abril 7) / 40)	T _A = +25°C T _A = +70°C	I _D	10.3 8.3	А
Continuous Drain Current (Note 7) V _{GS} = 10V	$T_{C} = +25^{\circ}C$ $T_{C} = +100^{\circ}C$	I _D	45 28	А
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)	I _{DM}	58.3	Α	
Maximum Continuous Body Diode Forward Current (Note 7)		I _S	3	Α
Avalanche Current, L = 0.1mH	I _{AS}	33.3	Α	
Avalanche Energy, L = 0.1mH	Eas	56.8	mJ	

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

Characteristic	Symbol	Value	Unit	
Total Power Dissipation (Note 6)		P _D	1	W
Thermal Resistance, Junction to Ambient (Note 6)	Steady State		123	°C/W
Thermal Nesistance, sunction to Ambient (Note o)	t < 10s	$R_{\theta JA}$	69	
Total Power Dissipation (Note 7)		P_D	2.1	W
Thermal Resistance, Junction to Ambient (Note 7)	Steady State	$R_{ hetaJA}$	60	°C/W
Thermal Nesistance, sunction to Ambient (Note 1)	t < 10s		34	
Total Power Dissipation (Note 7)	P_D	40	W	
Thermal Resistance, Junction to Case (Note 7)		$R_{ heta JC}$	3.2	°C/W
Operating and Storage Temperature Range		T _{J,} T _{STG}	-55 to +150	°C

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

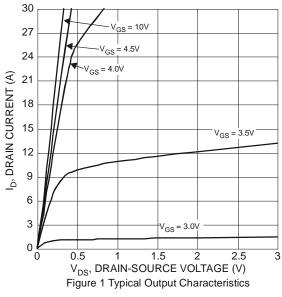
Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 8)							
Drain-Source Breakdown Voltage	BV _{DSS}	60	_	_	V	$V_{GS} = 0V, I_D = 250\mu A$	
Zero Gate Voltage Drain Current, T _J = +25°C	I _{DSS}	_	_	1	μA	$V_{DS} = 60V, V_{GS} = 0V$	
Gate-Source Leakage	I _{GSS}	_	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 8)							
Gate Threshold Voltage	V _{GS(TH)}	1	1.8	3	V	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
Static Drain-Source On-Resistance		_	9.3	13	mΩ	$V_{GS} = 10V, I_D = 10A$	
Static Dialii-Source Off-Resistance	R _{DS(ON)}	_	12.3	18		V _{GS} = 4.5V, I _D = 8A	
Diode Forward Voltage	V_{SD}	_	0.7	1.2	V	$V_{GS} = 0V, I_{S} = 1.7A$	
DYNAMIC CHARACTERISTICS (Note 9)							
Input Capacitance	Ciss	_	2577	_	pF	V _{DS} = 30V, V _{GS} = 0V, f = 1MHz	
Output Capacitance	Coss	_	162	_	pF		
Reverse Transfer Capacitance	C _{rss}	_	132	_	pF		
Gate Resistance	R_g	_	0.9	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge (V _{GS} = 4.5V)	Qg	_	26.6	_	nC		
Total Gate Charge (V _{GS} = 10V)	Qg	_	55.4	_	nC	-Vns = 30V. In = 10A	
Gate-Source Charge	Qgs	_	9.3	_	nC	V _{DS} = 30V, I _D = 10A	
Gate-Drain Charge	Q_{gd}	_	12.6	_	nC	1	
Turn-On Delay Time	t _{D(ON)}	_	6.2	_	ns	$V_{GS} = 10V, V_{DS} = 30V,$ $R_G = 3\Omega, I_D = 10A$	
Turn-On Rise Time	t _R	_	9.9	_	ns		
Turn-Off Delay Time	t _{D(OFF)}	_	27.6	_	ns		
Turn-Off Fall Time	t _F	_	11.7	_	ns		
Body Diode Reverse Recovery Time	t _{RR}	_	9.4	_	ns	- I _F = 10A, di/dt = 100A/μs	
Body Diode Reverse Recovery Charge	Q_{RR}	_	18.6	_	nC		

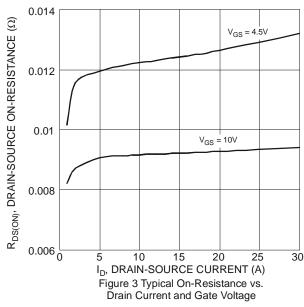
Notes:

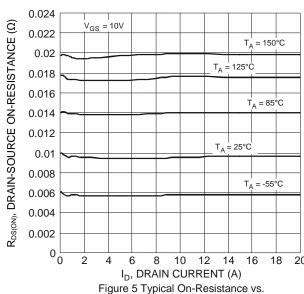
^{6.} Device mounted on FR-4 PC board, with minimum recommended pad layout, single sided.
7. Device mounted on FR-4 substrate PC board, 2oz copper, with thermal bias to bottom layer 1inch square copper plate.
8. Short duration pulse test used to minimize self-heating effect.
9. Guaranteed by design. Not subject to product testing.



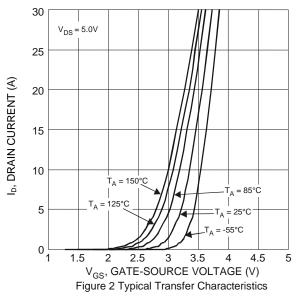


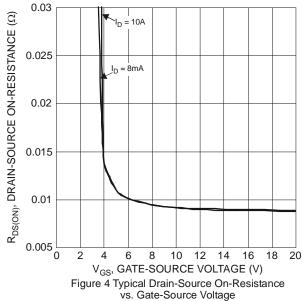






Drain Current and Temperature





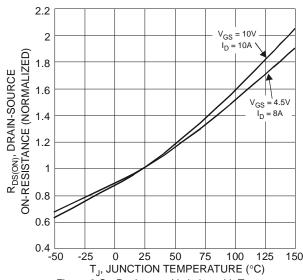
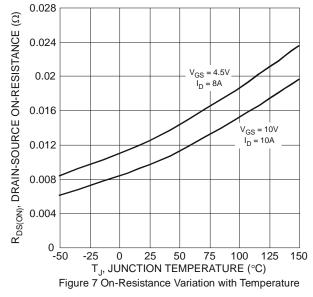
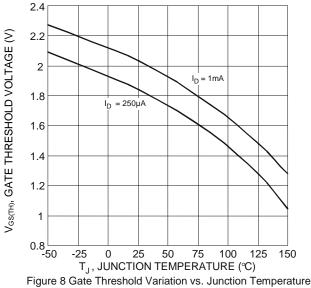


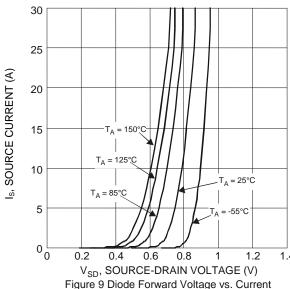
Figure 6 On-Resistance Variation with Temperature







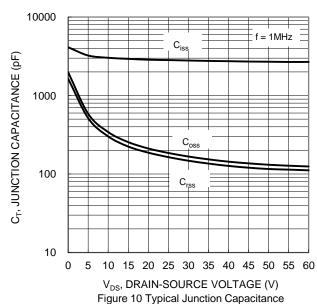


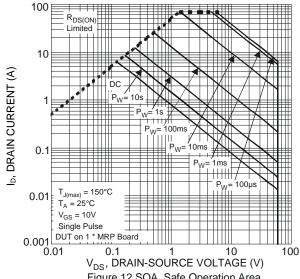


V_{GS}, GATE-SOURCE VOLTAGE (V) 8 6 $V_{DS} = 30V$ I_D = 10A 4

30 24

18





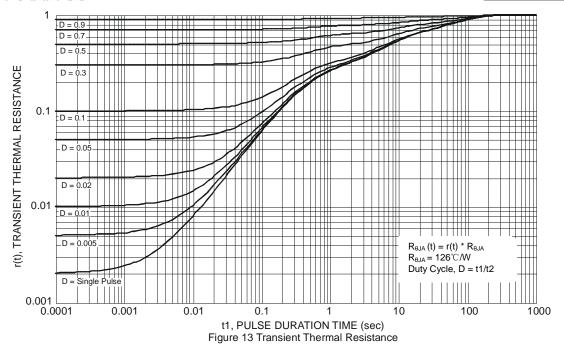
10

2

0 0

6



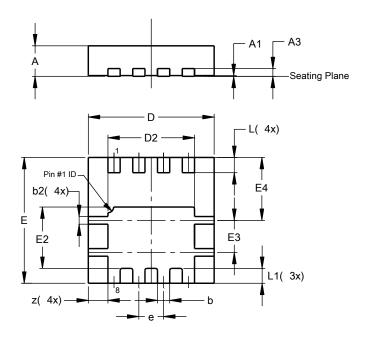




Package Outline Dimensions

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

PowerDI3333-8

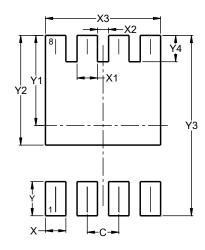


PowerDI3333-8					
Dim	Min	Max	Тур		
Α	0.75	0.85	0.80		
A1	0.00	0.05	0.02		
A3	_	_	0.203		
b	0.27	0.37	0.32		
b2	0.15	0.25	0.20		
D	3.25	3.35	3.30		
D2	2.22	2.32	2.27		
Е	3.25	3.35	3.30		
E2	1.56	1.66	1.61		
E3	0.79	0.89	0.84		
E4	1.60	1.70	1.65		
e	1	-	0.65		
L	0.35	0.45	0.40		
L1	_	_	0.39		
Z	_	_	0.515		
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)
С	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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