



100V N-CHANNEL ENHANCEMENT MODE MOSFET

Product Summary

BV _{DSS}	R _{DS(ON)} Max	I _D T _C = +25°C
400\/	8.8mΩ @ V _{GS} = 10V	47A
100V	12.9mΩ @ V _{GS} = 4.5V	39A

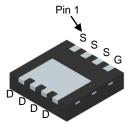
Description and Applications

This new generation N-Channel Enhancement Mode MOSFET is designed to minimize $R_{DS(ON)}$ and yet maintain superior switching performance. This device is ideal for use in notebook battery power management and loadswitch.

- Backlighting
- Power Management Functions
- DC-DC Converters







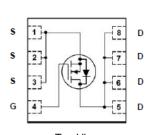
Bottom View

Features and Benefits

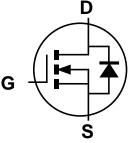
- 100% Unclamped Inductive Switch (UIS) Test in Production
- High Conversion Efficiency
- Low R_{DS(ON)} Minimizes On State Losses
- Low Input Capacitance
- Fast Switching Speed
- Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)
- Halogen and Antimony Free. "Green" Device (Note 3)

Mechanical Data

- Case: V-DFN3333-8 (Type B)
- 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 Below Diagram
- Terminals: Finish –NiPdAu over Copper Leadframe. Solderable per MIL-STD-202, Method 208 (4)
- Weight: 0.03 grams (Approximate)







Equivalent Circuit

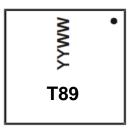
Ordering Information (Note 4)

Part Number	Case	Packaging
DMT10H009LCG-7	V-DFN3333-8 (Type B)	2,000/Tape & Reel
DMT10H009LCG-13	V-DFN3333-8 (Type B)	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



T89 = Product Type Marking Code YYWW = Date Code Marking YY = Year (ex: 18 = 2018) WW = Week (01 to 53)



Maximum Ratings (@T_A = +25°C, unless otherwise specified.)

Characteristic			Symbol	Value	Unit
Drain-Source Voltage			V _{DSS}	100	V
Gate-Source Voltage			V _{GSS}	±20	V
Continuous Drain Current, V _{GS} = 10V (Note 6)	Steady State	$T_A = +25^{\circ}C$ $T_A = +70^{\circ}C$	I _D	12.4 9.9	А
Continuous Drain Current, V _{GS} = 10V	Steady State	$T_{C} = +25^{\circ}C$ $T_{C} = +70^{\circ}C$	I _D	47 37	А
Maximum Continuous Body Diode Forward Current (Note 6)			Is	22	Α
Pulsed Drain Current (10µs Pulse, Duty Cycle = 1%)			I _{DM}	160	Α
Pulsed Body Diode Continuous Current (10µs Pulse, Duty Cycle = 1%)			I _{SM}	160	Α
Avalanche Current, L = 0.3mH (Note 8)			I _{AS}	21	Α
Avalanche Energy, L = 0.3mH (Note 8)			E _{AS}	66	mJ

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

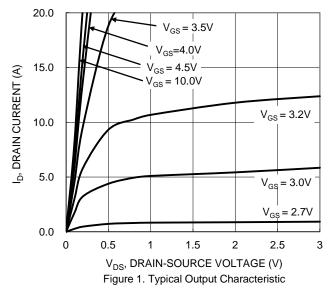
Characteristic	Symbol	Value	Unit
Total Power Dissipation (Note 5)	P_{D}	1	W
Thermal Resistance, Junction to Ambient (Note 5)	$R_{\theta JA}$	129	°C/W
Total Power Dissipation (Note 6)	P _D	2.1	W
Thermal Resistance, Junction to Ambient (Note 6)	$R_{ heta JA}$	59	°C/W
Thermal Resistance, Junction to Case	$R_{\theta JC}$	4.2	°C/W
Operating and Storage Temperature Range	$T_{J_1}T_{STG}$	-55 to +150	°C

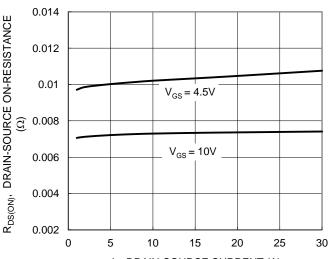
Electrical Characteristics (@T_A = +25°C, unless otherwise specified.)

Characteristic	Symbol	Min	Тур	Max	Unit	Test Condition	
OFF CHARACTERISTICS (Note 7)							
Drain-Source Breakdown Voltage	BV _{DSS}	100	_	_	V	$V_{GS} = 0V$, $I_D = 1mA$	
Zero Gate Voltage Drain Current	I _{DSS}	1	_	1	μΑ	$V_{DS} = 80V, V_{GS} = 0V$	
Gate-Source Leakage	Igss	1	_	±100	nA	$V_{GS} = \pm 20V, V_{DS} = 0V$	
ON CHARACTERISTICS (Note 7)							
Gate Threshold Voltage	V _{GS(TH)}	1.1	I	2.5	٧	$V_{DS} = V_{GS}$, $I_D = 250\mu A$	
Static Drain-Source On-Resistance		1	7.2	8.8	mΩ	$V_{GS} = 10V, I_D = 20A$	
Static Diam-Source On-Resistance	R _{DS(ON)}	1	9.8	12.9	mΩ	$V_{GS} = 4.5V, I_D = 5A$	
Diode Forward Voltage	V_{SD}	1	0.8	1.2	V	$V_{GS} = 0V, I_{S} = 20A$	
DYNAMIC CHARACTERISTICS (Note 8)							
Input Capacitance	Ciss	_	2309	_		$V_{DS} = 50V$, $V_{GS} = 0V$ f = 1MHz	
Output Capacitance	Coss	1	536	_	pF		
Reverse Transfer Capacitance	C _{rss}		13.7	_			
Gate Resistance	Rg	1	1.9	_	Ω	$V_{DS} = 0V$, $V_{GS} = 0V$, $f = 1MHz$	
Total Gate Charge	Qq	_	20.2	_		V 50V L 60A	
Gate-Source Charge	Qgs	_	7.0	_	nC	$V_{DD} = 50V, I_D = 20A,$ $V_{GS} = 4.5V$	
Gate-Drain Charge	Q _{gd}	_	8.5	_			
Turn-On Delay Time	t _{D(ON)}	-	5.4	_		$V_{DD} = 50V, V_{GS} = 10V,$ $I_{D} = 20A, R_{G} = 3\Omega$	
Turn-On Rise Time	t _R	_	10.6	_			
Turn-Off Delay Time	t _{D(OFF)}		28.3	_	ns		
Turn-Off Fall Time	t _F	-	14.9	_			
Reverse Recovery Time	t _{RR}	_	44.3	_	ns	1 200 1:/14 1000//	
Reverse Recovery Charge	Q _{RR}	_	65.5	_	nC	$I_F = 20A$, di/dt = 100A/ μ s	

Device mounted on FR-4 substrate PC board, 2oz copper, with minimum recommended pad layout.
 Device mounted on FR-4 substrate PC board, 2oz copper, with 1inch square copper plate.
 Short duration pulse test used to minimize self-heating effect.
 Guaranteed by design. Not subject to product testing.







I_D, DRAIN-SOURCE CURRENT (A) Figure 3. Typical On-Resistance vs. Drain Current and Gate Voltage

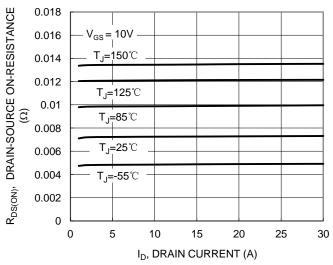


Figure 5. Typical On-Resistance vs. Drain Current and Junction Temperature

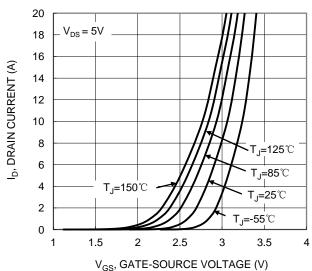
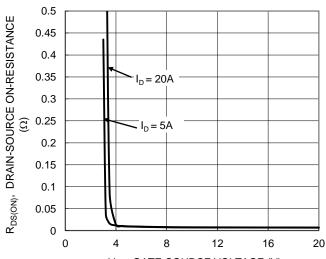


Figure 2. Typical Transfer Characteristic



 $\rm V_{GS}$, GATE-SOURCE VOLTAGE (V) Figure 4. Typical Transfer Characteristic

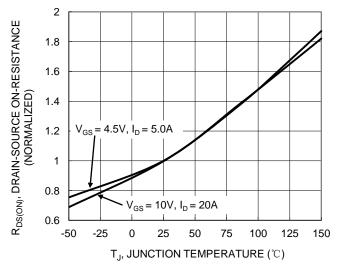


Figure 6. On-Resistance Variation with Junction Temperature





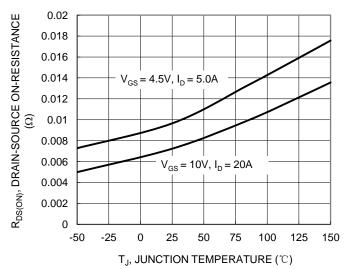


Figure 7. On-Resistance Variation with Junction Temperature

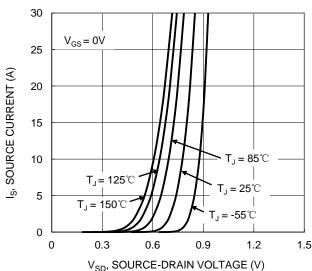


Figure 9. Diode Forward Voltage vs. Current

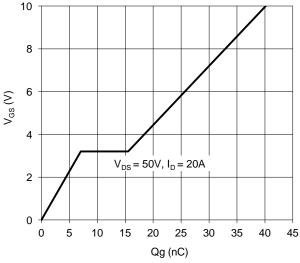


Figure 11. Gate Charge

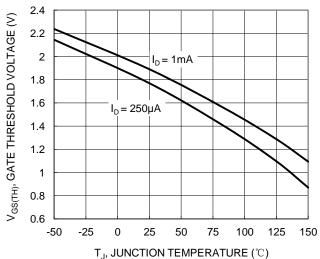
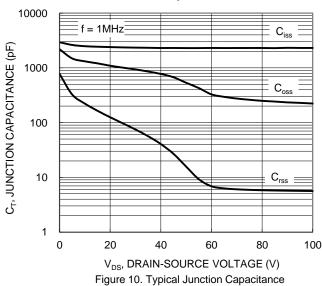


Figure 8. Gate Threshold Variation vs. Junction
Temperature



1000 $R_{DS(ON)}$ LIMITED P_w=100μs 100 ID, DRAIN CURRENT (A) 10 P_W=10n $T_{J(MAX)}$ =150°C T_{C} =25°C Single Pulse DUT on infinite heatsink V_{GS}=10V 0.1 0.1 10 100 1000

V_{DS}, DRAIN-SOURCE VOLTAGE (V) Figure 12. SOA, Safe Operation Area



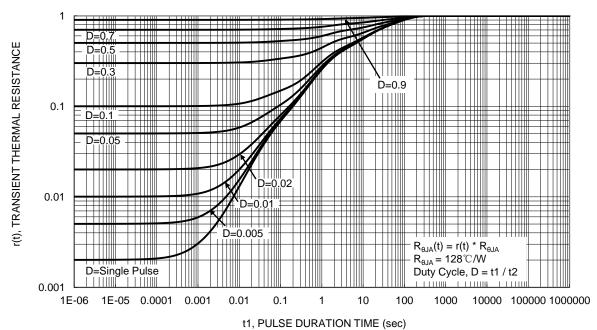


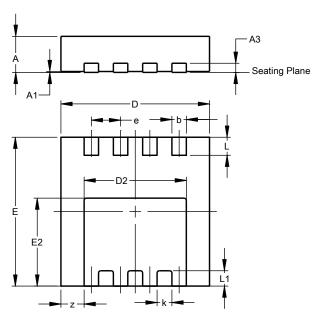
Figure 13. Transient Thermal Resistance



Package Outline Dimensions

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

V-DFN3333-8 (Type B)

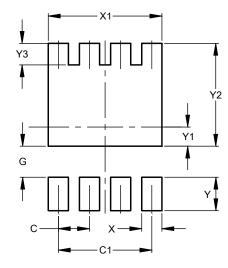


V-DFN3333-8						
	(Type B)					
Dim	Min	Max	Тур			
Α	0.75	0.85	0.80			
A1	0.00	0.05	0.02			
A3	1	-	0.203			
b	0.27	0.37	0.32			
D	3.25	3.35	3.30			
D2	2.17	2.37	2.27			
Е	3.25	3.35	3.30			
E2	1.85	2.05	1.95			
е			0.65			
k			0.33			
L	0.35	0.45	0.40			
L1			0.34			
Z	-		0.515			
All Dimensions in mm						

Suggested Pad Layout

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

V-DFN3333-8 (Type B)



Dimensions	Value (in mm)		
С	0.650		
C1	1.950		
G	0.650		
X	0.420		
X1	2.370		
Y	0.700		
Y1	0.400		
Y2	2.150		
V٦	0.450		



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