



## Description

The DMN39M1LFVWQ-13 uses advanced trench technology to provide excellent  $R_{DS(ON)}$ , low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

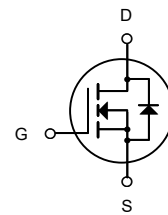


DFN3X3-8L

## General Features

$V_{DS} = 30V$   $I_D = 90A$

$R_{DS(ON)} < 4.6 m\Omega @ V_{GS}=10V$



N-Channel MOSFET

## Application

Battery protection

Load switch

Uninterruptible power supply

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DMN39M1LFVWQ-13	DFN3X3-8L	HXY MOSFET	5000

## Absolute Maximum Ratings ( $T_C=25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V <sub>DS</sub>	Drain-Source Voltage	30	V
V <sub>GS</sub>	Gate-Source Voltage	±20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	90	A
$I_D@T_C=75^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	45	A
IDM	Pulsed Drain Current <sup>2</sup>	290	A
EAS	Single Pulse Avalanche Energy <sup>3</sup>	196	mJ
IAS	Avalanche Current	36	A
$P_D@T_C=25^\circ C$	Total Power Dissipation <sup>4</sup>	46	W
TSTG	Storage Temperature Range	-55 to 175	°C
T <sub>J</sub>	Operating Junction Temperature Range	-55 to 175	°C
R <sub>θJA</sub>	Thermal Resistance Junction-ambient <sup>1</sup>	62	°C/W
R <sub>θJC</sub>	Thermal Resistance Junction-Case <sup>1</sup>	1.72	°C/W



**Electrical Characteristics (T<sub>J</sub>=25°C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	30	---	---	V
ΔBV <sub>DSS</sub> /ΔT <sub>J</sub>	BV <sub>DSS</sub> Temperature Coefficient	Reference to 25°C, I <sub>D</sub> =1mA	---	---	---	V/°C
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =30A	---	3.5	4.6	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =15A	---	7.8	10	
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250uA	1.2	1.6	2.5	V
ΔV <sub>GS(th)</sub>	V <sub>GS(th)</sub> Temperature Coefficient		---	---	---	mV/°C
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	---	---	1	uA
		V <sub>DS</sub> =30V, V <sub>GS</sub> =0V, T <sub>J</sub> =100°C	---	---	100	
I <sub>GSS</sub>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	---	---	±100	nA
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =30A	---	80	---	S
R <sub>g</sub>	Gate Resistance	V <sub>DS</sub> =0V, V <sub>GS</sub> =0V, f=1MHz	---	2	---	Ω
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A	---	20	---	nC
Q <sub>gs</sub>	Gate-Source Charge		---	5	---	
Q <sub>gd</sub>	Gate-Drain Charge		---	7.2	---	
T <sub>d(on)</sub>	Turn-On Delay Time	V <sub>GS</sub> =10V, V <sub>DD</sub> =15V, R <sub>G</sub> =3Ω, I <sub>D</sub> =30A	---	9	---	ns
T <sub>r</sub>	Rise Time		---	16	---	
T <sub>d(off)</sub>	Turn-Off Delay Time		---	43	---	
T <sub>f</sub>	Fall Time		---	12	---	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	2088	---	pF
C <sub>oss</sub>	Output Capacitance		---	277	---	
C <sub>rss</sub>	Reverse Transfer Capacitance		---	209	---	

**Diode Characteristics**

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
I <sub>S</sub>	Continuous Source Current <sup>1,5</sup>	V <sub>G</sub> =V <sub>D</sub> =0V, Force Current	---	---	90	A
V <sub>SD</sub>	Diode Forward Voltage <sup>2</sup>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A, T <sub>J</sub> =25°C	---	---	1.2	V

Note :

F The data is tested by surface mounted on a 1 inch<sup>2</sup> FR-4 board with 2OZ copper.

G The data is tested by pulsed pulse width ≤ 300us, duty cycle ≤ 2%

H The EAS data shows Max. heating at test condition as V<sub>GS</sub>=0, V<sub>DD</sub>=24V, V<sub>GS</sub>=10V, L=0.1mH, I<sub>AS</sub>=36A.

I The power dissipation is limited by 150°C junction temperature

J The data is theoretically the same as I<sub>DM</sub> and I<sub>DM(A)</sub>. In real applications it should be limited by total power dissipation.



### Typical Characteristics

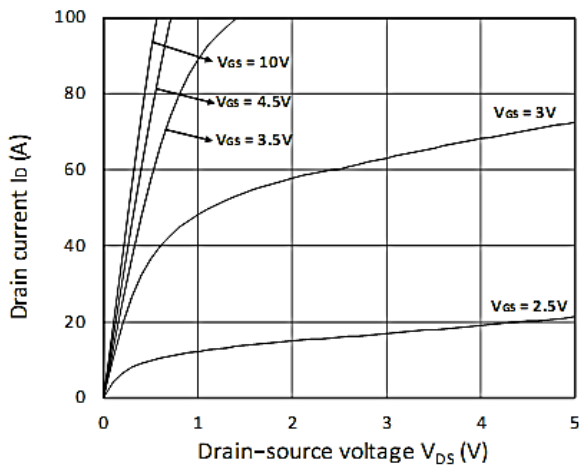


Figure 1. Output Characteristics

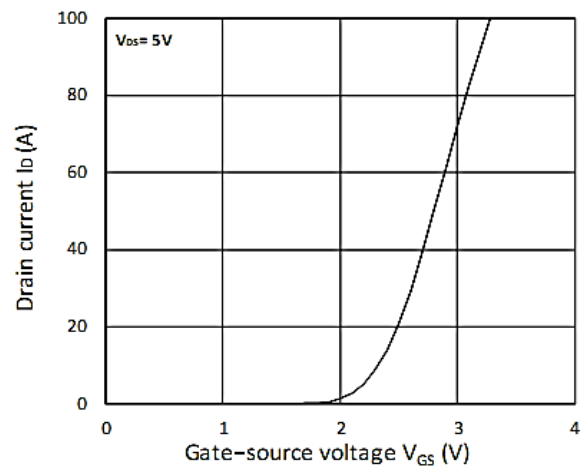


Figure 2. Transfer Characteristics

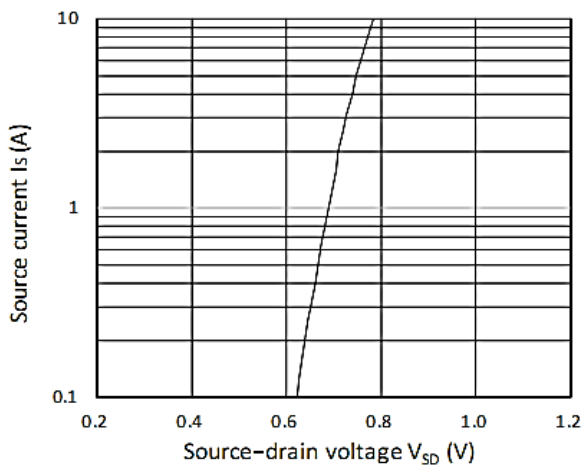


Figure 3. Forward Characteristics of Reverse

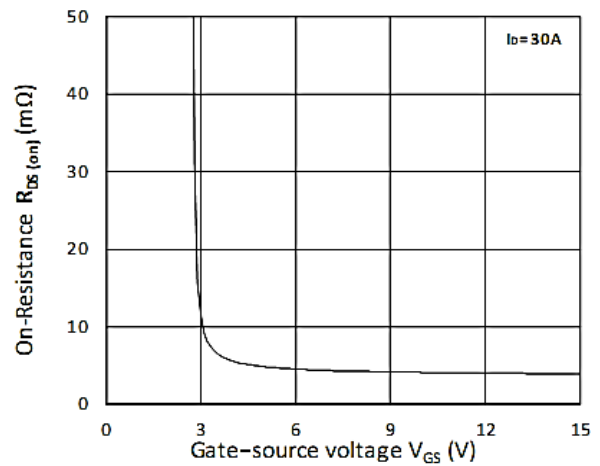


Figure 4. R\_DS(ON) vs. V\_GS

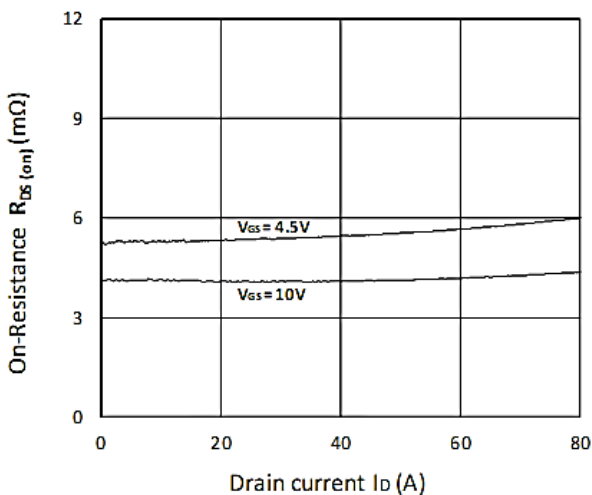


Figure 5. R\_DS(ON) vs. I\_D

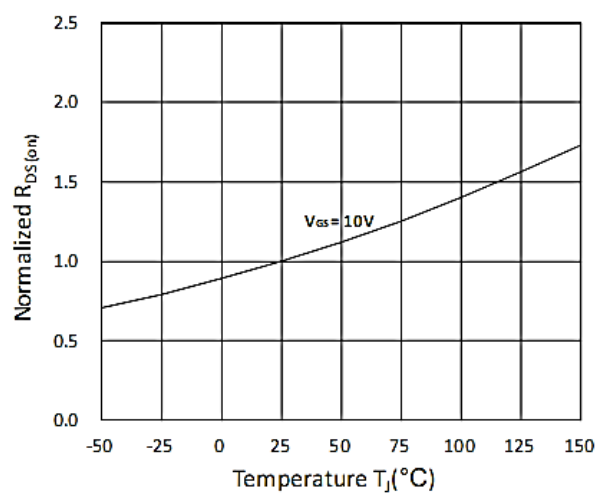


Figure 6. Normalized R\_DS(on) vs. Temperature

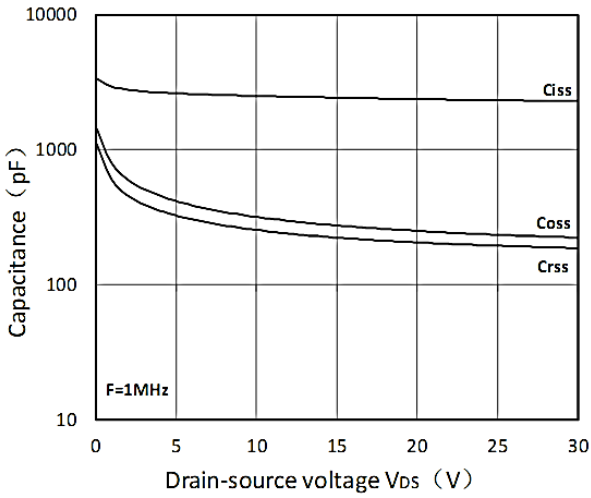


Figure 7. Capacitance Characteristics

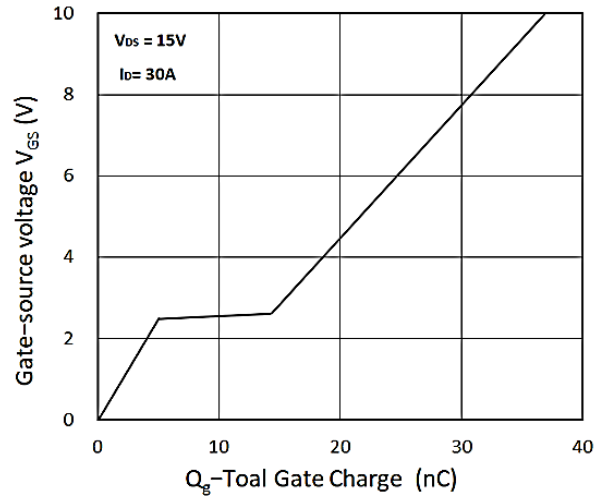


Figure 8. Gate Charge Characteristics

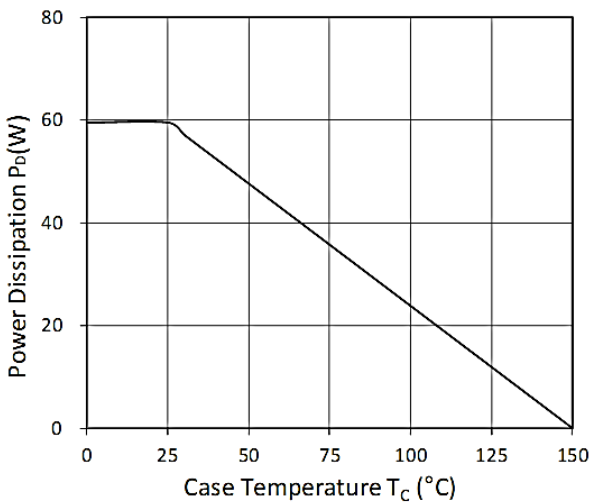


Figure 9. Power Dissipation

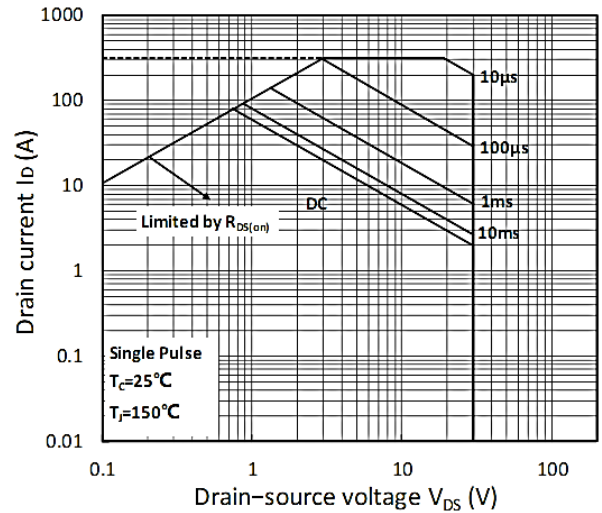


Figure 10. Safe Operating Area

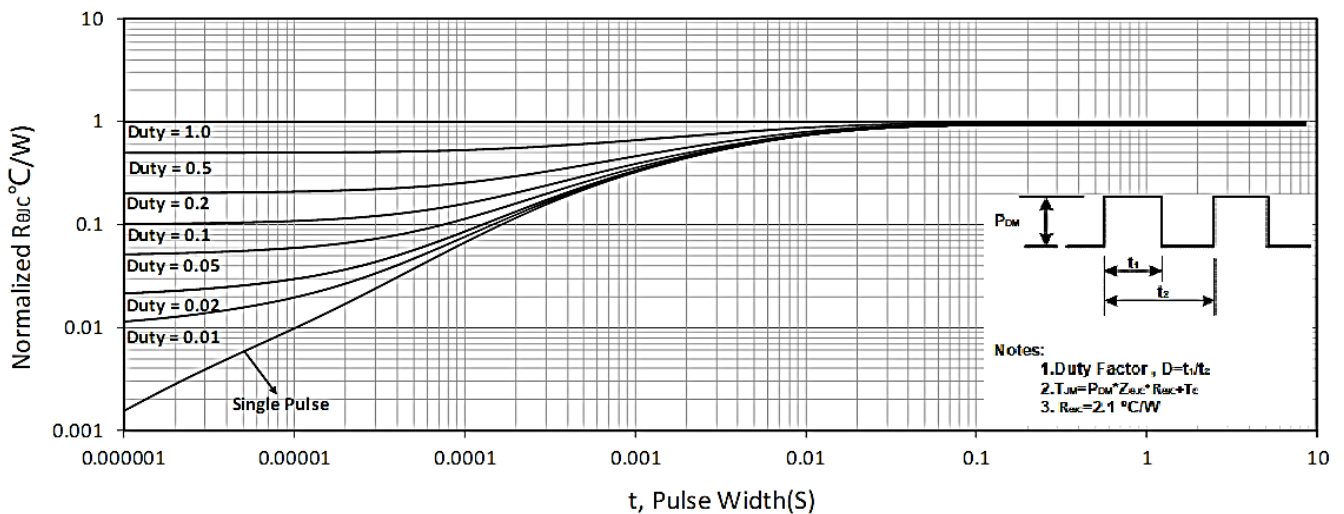


Figure 11. Normalized Maximum Transient Thermal Impedance



### DFN3X3-8L Package Information



Symbol	Dimensions In Millimeters		
	Min.	Nom.	Max.
A	0.70	0.75	0.80
b	0.25	0.30	0.35
c	0.10	0.15	0.25
D	3.25	3.35	3.45
D1	3.00	3.10	3.20
D2	1.48	1.58	1.68
D3	-	0.13	-
E	3.20	3.30	3.40
E1	3.00	3.15	3.20
E2	2.39	2.49	2.59
e	0.65BSC		
H	0.30	0.39	0.50
L	0.30	0.40	0.50
L1	-	0.13	-
M	*	*	0.15
$\theta$		10°	12°



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