



## Description

The DMG7408SFG 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.

## General Features

$V_{DS} = 30V$   $I_D = 20A$

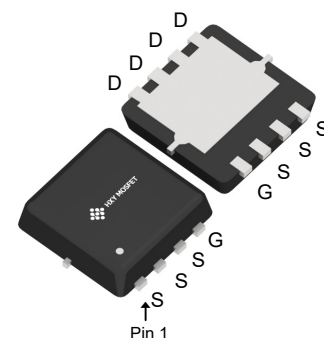
$R_{DS(ON)} < 20m\Omega$  @  $V_{GS}=10V$

## Application

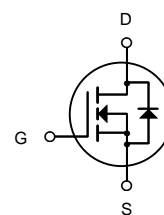
Battery protection

Load switch

Uninterruptible power supply



DFN3X3-8L  
(PowerDI3333-8)



N-Channel MOSFET

## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
DMG7408SFG	DFN3X3-8L(PowerDI3333-8)	HXY MOSFET	5000

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D@T_c=25^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	20	A
$I_D@T_c=100^{\circ}C$	Continuous Drain Current, $V_{GS}$ @ 10V <sup>1</sup>	8	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	38	A
$E_{AS}$	Single Pulse Avalanche Energy <sup>3</sup>	28	mJ
$I_{AS}$	Avalanche Current	13.8	A
$P_D@T_c=25^{\circ}C$	Total Power Dissipation <sup>4</sup>	5.5	W
$T_{STG}$	Storage Temperature Range	-55 to 175	$^{\circ}C$
$T_J$	Operating Junction Temperature Range	-55 to 175	$^{\circ}C$
$R_{\theta JC}$	Thermal Resistance Junction-Case <sup>1</sup>	36	$^{\circ}C/W$



**Electrical Characteristics** ( $T_J=25^{\circ}\text{C}$  unless otherwise specified)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V <sub>(BR)DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	30	-	-	V
I <sub>DSS</sub>	Zero Gate Voltage Drain Current	V <sub>DS</sub> =30V, V <sub>GS</sub> = 0V,	-	-	1.0	μA
I <sub>GSS</sub>	Gate to Body Leakage Current	V <sub>DS</sub> =0V, V <sub>GS</sub> = ±20V	-	-	±100	nA
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250μA	1.0	1.5	2.5	V
R <sub>DS(on)</sub>	Static Drain-Source on-Resistance <small>note3</small>	V <sub>GS</sub> =10V, I <sub>D</sub> =5A	-	15	20	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =3A	-	21	29	
C <sub>iss</sub>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1.0MHz	-	490	-	pF
C <sub>oss</sub>	Output Capacitance		-	79	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance		-	61	-	pF
Q <sub>g</sub>	Total Gate Charge	V <sub>DS</sub> =15V, I <sub>D</sub> =5.8A, V <sub>GS</sub> =10V	-	10	-	nC
Q <sub>gs</sub>	Gate-Source Charge		-	1.7	-	nC
Q <sub>gd</sub>	Gate-Drain(“Miller”) Charge		-	2.5	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =3A, V <sub>GS</sub> =10V, R <sub>REN</sub> =3Ω	-	6	-	ns
t <sub>r</sub>	Turn-on Rise Time		-	15	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time		-	17	-	ns
t <sub>f</sub>	Turn-off Fall Time		-	17	-	ns
I <sub>S</sub>	Maximum Continuous Drain to Source Diode Forward Current		-	-	9	A
I <sub>SM</sub>	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
V <sub>SD</sub>	Drain to Source Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>S</sub> =9A	-	-	1.2	V
t <sub>rr</sub>	Body Diode Reverse Recovery Time	I <sub>F</sub> =5A, dI/dt=100A/μs	-	7	-	ns
Q <sub>rr</sub>	Body Diode Reverse Recovery Charge		-	2	-	nC

Notes:1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature

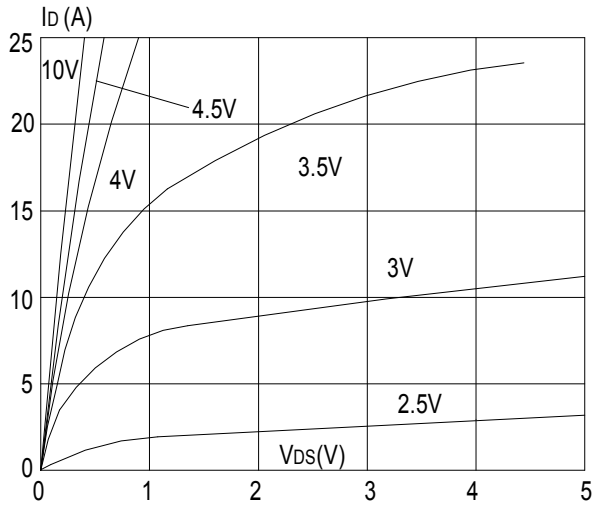
2. EAS condition :  $T_J=25^{\circ}\text{C}, V_{DD}=15V, V_G=10V, L=0.5mH, R_g=25\Omega, I_{AS}=6A$

3. Pulse Test: Pulse Width $\leq 300\mu s$ , Duty Cycle $\leq 0.5\%$

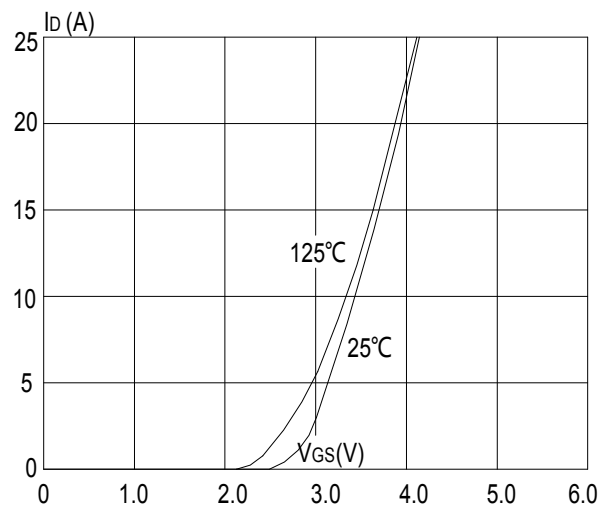


## Typical Performance Characteristics

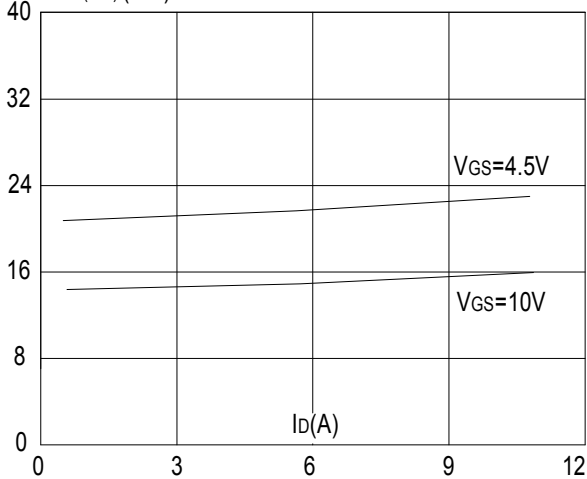
**Figure1:** Output Characteristics



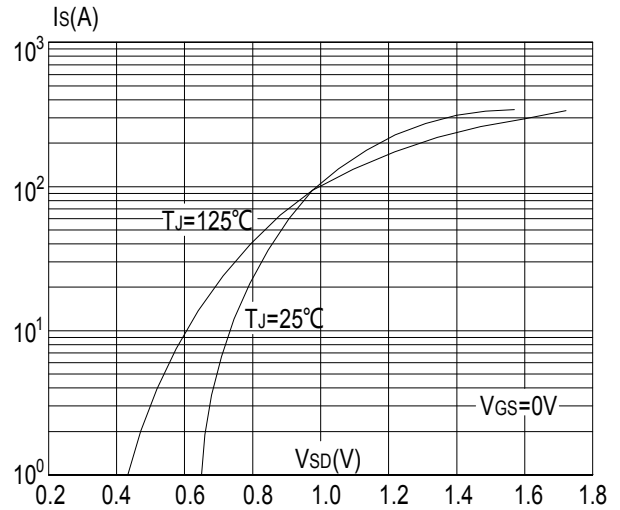
**Figure 2:** Typical Transfer Characteristics



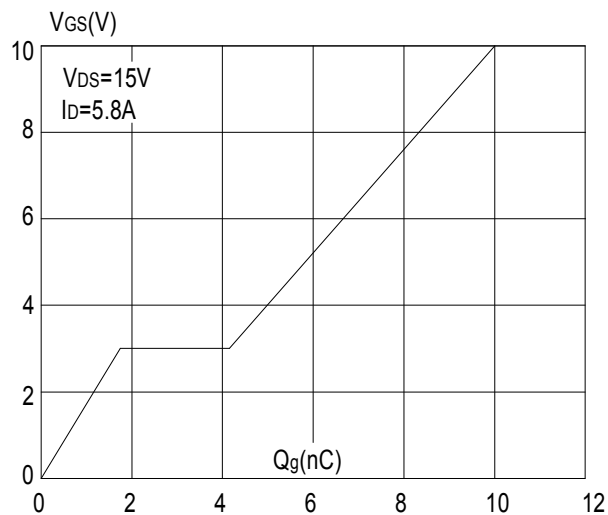
**Figure 3:** On-resistance vs. Drain Current  
 $R_{DS(ON)}$  (m $\Omega$ )



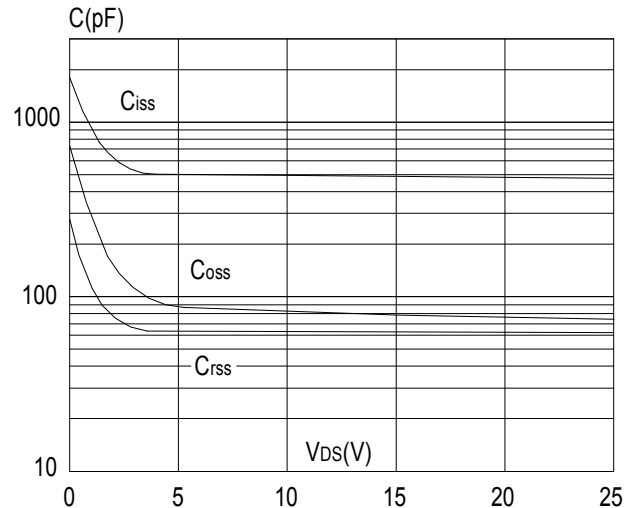
**Figure 4:** Body Diode Characteristics



**Figure 5:** Gate Charge Characteristics

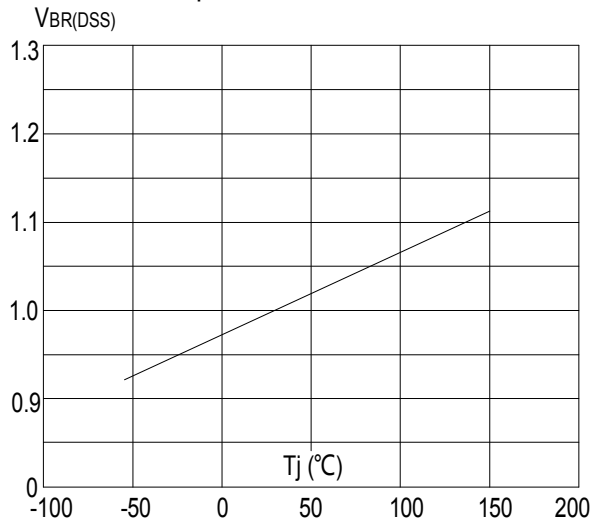


**Figure 6:** Capacitance Characteristics

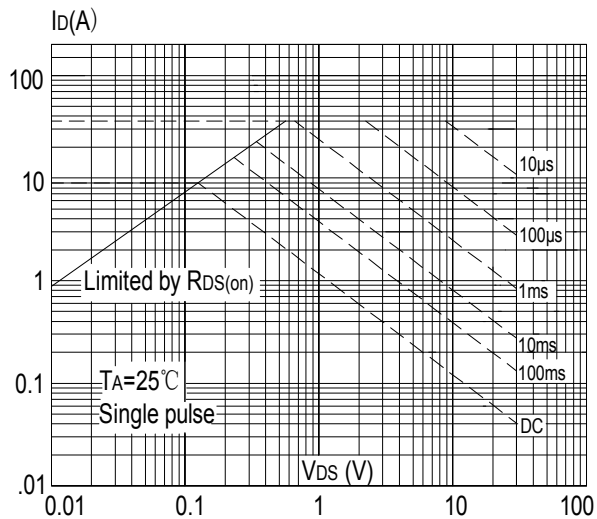




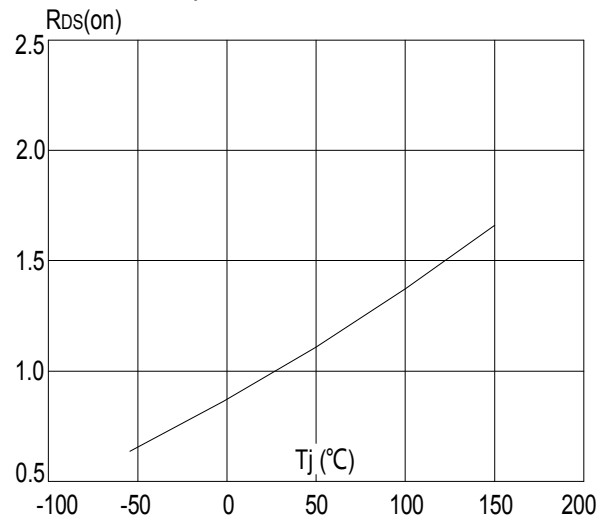
**Figure 7:** Normalized Breakdown Voltage vs. Junction Temperature



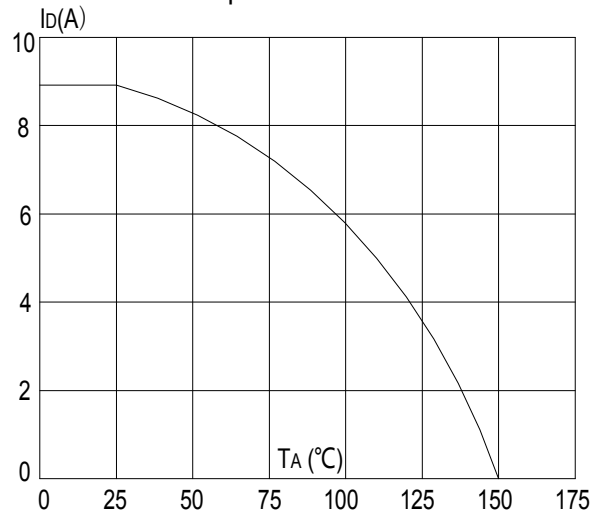
**Figure 9:** Maximum Safe Operating Area



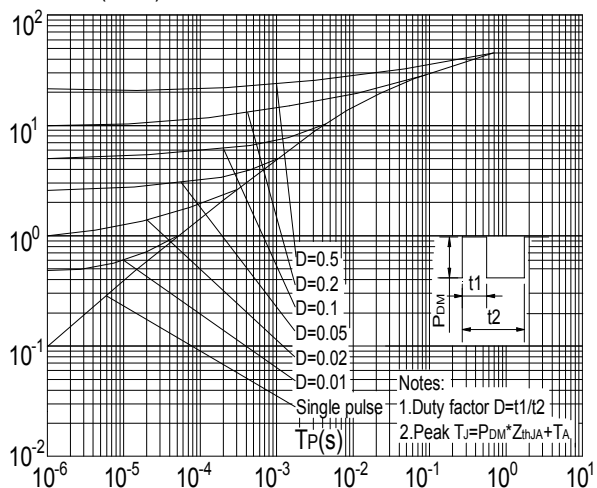
**Figure 8:** Normalized on Resistance vs. Junction Temperature



**Figure 10:** Maximum Continuous Drain Current vs. Ambient Temperature



**Figure.11:** Maximum Effective Transient Thermal Impedance, Junction-to-Ambient





## Test Circuit

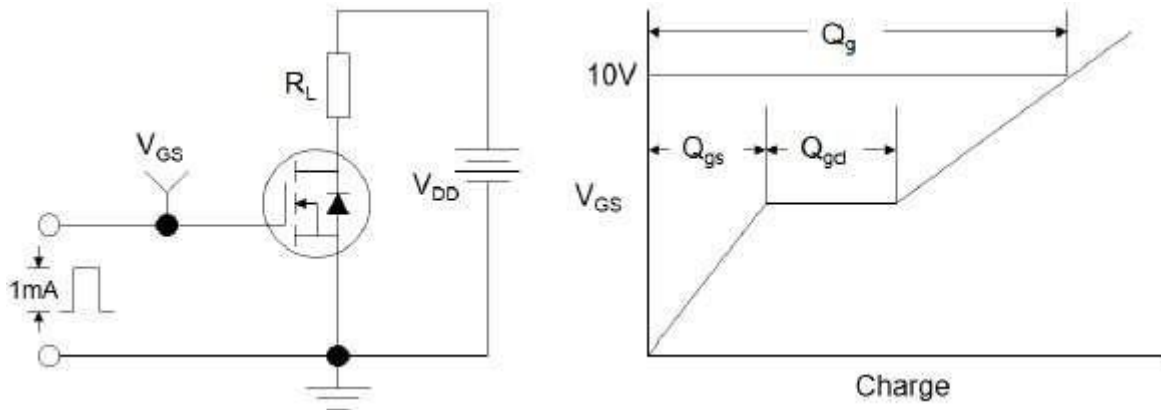


Figure1:Gate Charge Test Circuit & Waveform

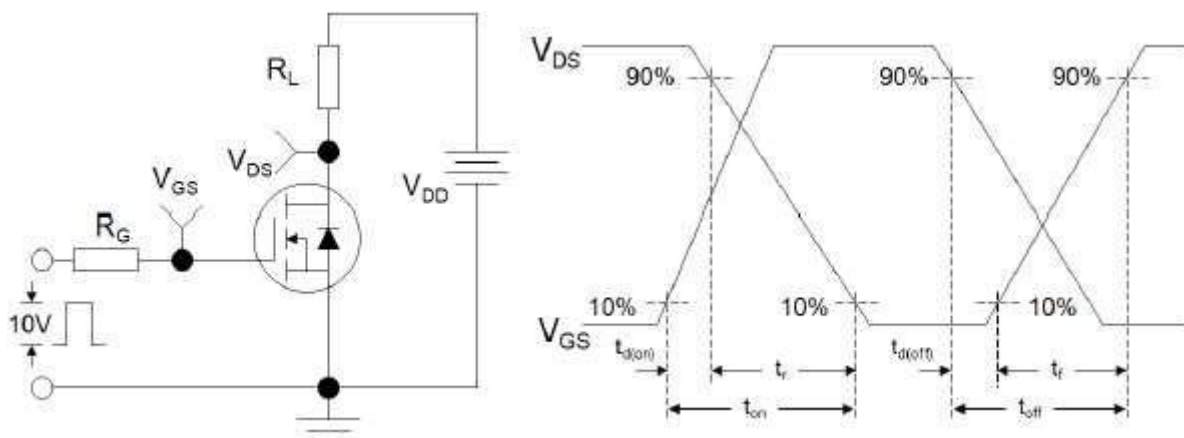


Figure 2: Resistive Switching Test Circuit & Waveforms

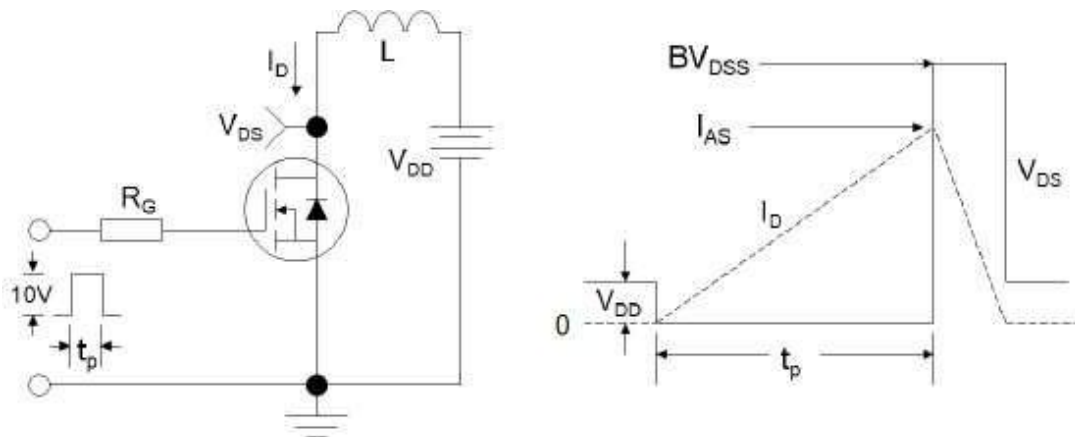
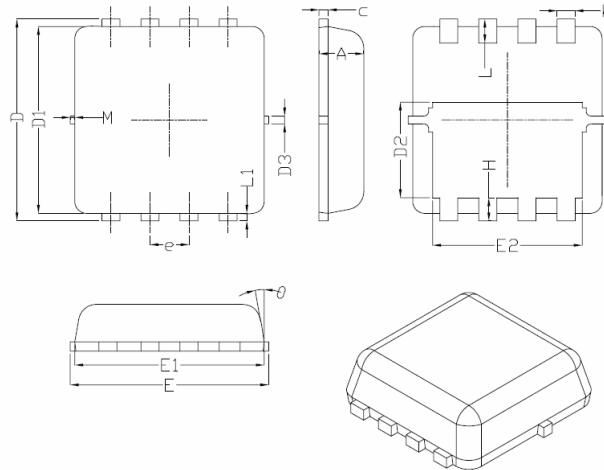


Figure 3:Unclamped Inductive Switching Test Circuit & Waveforms



## DFN3X3-8L(PowerDI3333-8) 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
θ		10°	12°



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