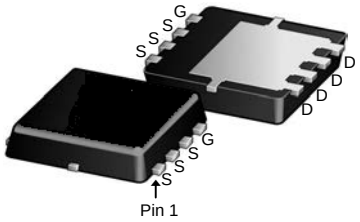
IRFH9310

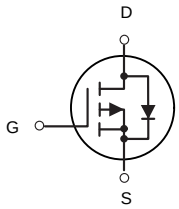
P-Channel Enhancement Mode MOSFET

Description

The IRFH9310 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.



DFN5X6-8L



P-Channel MOSFET

General Features

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

$R_{DS(ON)}$ < 4.5 mΩ V_{GS}=-10V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRFH9310	DFN5X6-8L	IRFH9310 XXXX	5000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	-90	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	-57	A
I_{DM}	Pulsed Drain Current[2]	-360	A
EAS	Single Pulse Avalanche Energy[3]	125	mJ
P_D@T_C=25℃	Total Power Dissipation[4]	60	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	55	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	2.08	℃/W

Electrical Characteristics (T_J = 25°C, unless otherwise noted)

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	V_{GS} = 0V, I_D = -250μA	-30	-	-	V
Gate-body Leakage current		I_{GSS}	V_{DS} = 0V, V_{GS} = ±20V	-	-	±100	nA
Zero Gate Voltage Drain Current	T_J=25°C	I_{DSS}	V_{DS} = -30V, V_{GS} = 0V	-	-	-1	μA
	T_J=100°C			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	V_{DS} = V_{GS}, I_D = -250μA	-1.0	-1.6	-2.5	V
Drain-Source On-Resistance[4]		$R_{DS(on)}$	V_{GS} = -10V, I_D = -30A	-	3.5	4.5	mΩ
			V_{GS} = -4.5V, I_D = -15A	-	4.8	6.2	
Forward Transconductance[4]		g_{fs}	V_{DS} = -10V, I_D = -30A	-	90	-	S
Input Capacitance		C_{iss}	V_{DS} = -15V, V_{GS} =0V, f =1MHz	-	5070	-	pF
Output Capacitance		C_{oss}		-	695	-	
Reverse Transfer Capacitance		C_{rss}		-	580	-	
Gate resistance		R_g	f =1MHz	-	4	-	Ω
Total Gate Charge		Q_g	V_{GS} = -10V,V_{DS} = -15V, I_D= -30A	-	146	-	nC
Gate-Source Charge		Q_{gs}		-	21.5	-	
Gate-Drain Charge		Q_{gd}		-	39	-	
Turn-On Delay Time		$t_{d(on)}$	V_{GS} = -10V, V_{DD} = -15V, R_G = 3Ω, I_D= -30A	-	23	-	ns
Rise Time		t_r		-	15	-	
Turn-Off Delay Time		$t_{d(off)}$		-	129	-	
Fall Time		t_f		-	28	-	
Diode Forward Voltage[4]		V_{SD}	I_S = -30A, V_{GS} = 0V	-	-	-1.2	V
Continuous Source Current	T_C=25°C	I_S	-	-	-	-90	A

Note :

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}$=150°C
2. The EAS data shows Max. rating . The test condition is V_{DD}= -25V, V_{GS}= -10V, L= 0.1mH, I_{AS}= -50A
3. The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper, The value in any given application depends on the user's specific board design.

Typical Characteristics

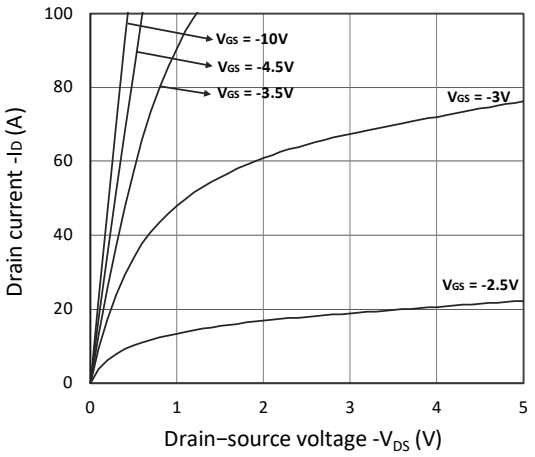


Figure 1. Output Characteristics

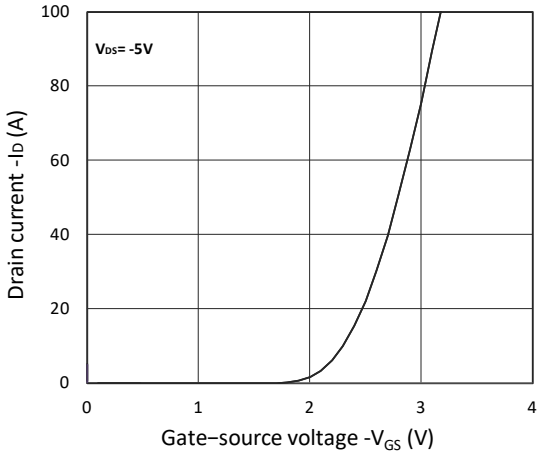


Figure 2. Transfer Characteristics

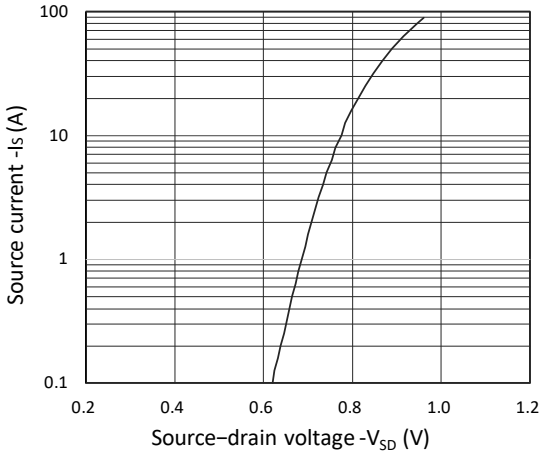


Figure 3. Forward Characteristics of Reverse

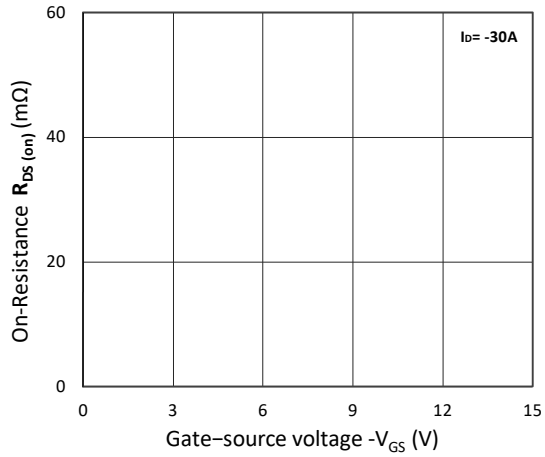


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

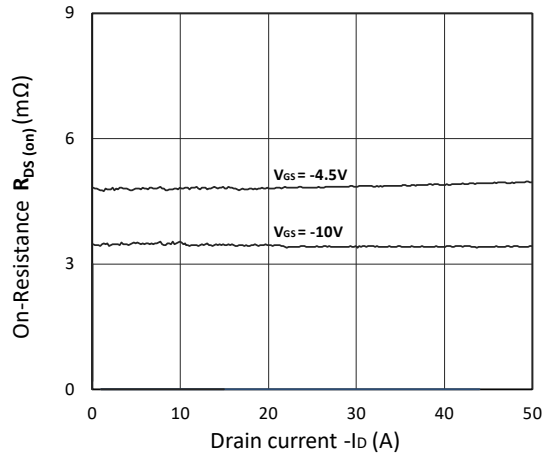


Figure 5. $R_{DS(ON)}$ vs. I_D

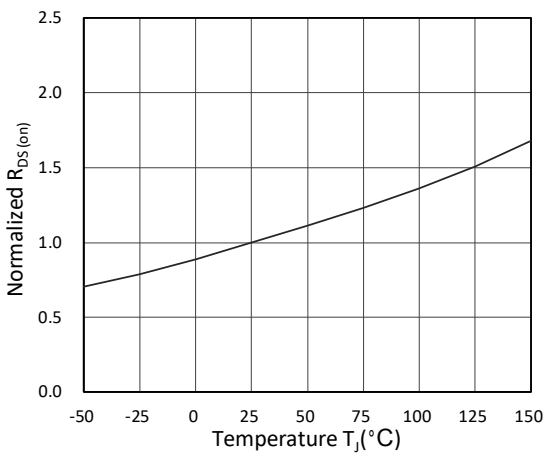


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

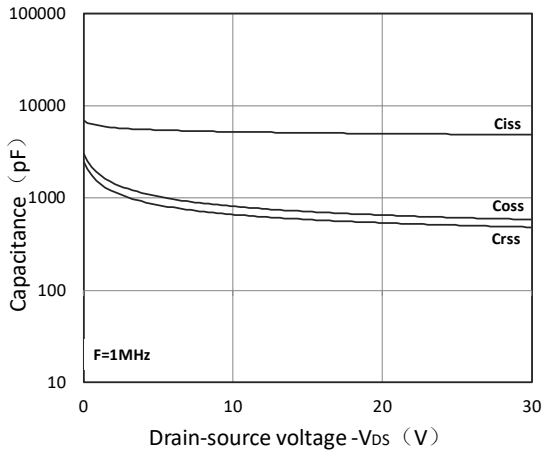


Figure 7. Capacitance Characteristics

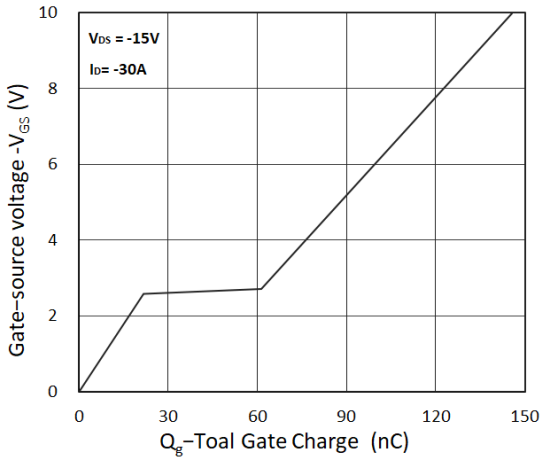


Figure 8. Gate Charge Characteristics

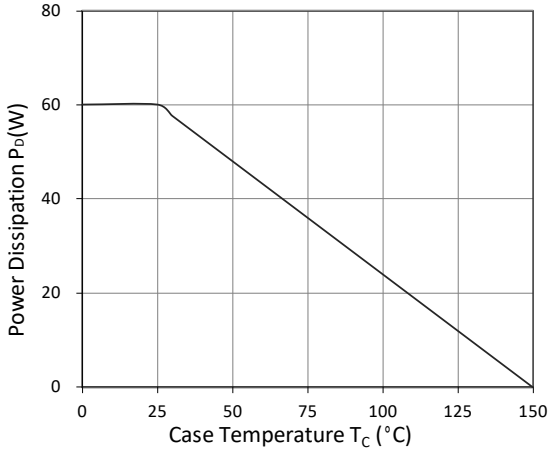


Figure 9. Power Dissipation

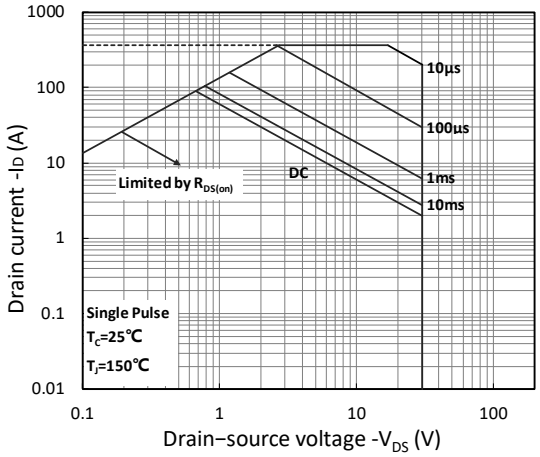


Figure10. Safe Operating Area

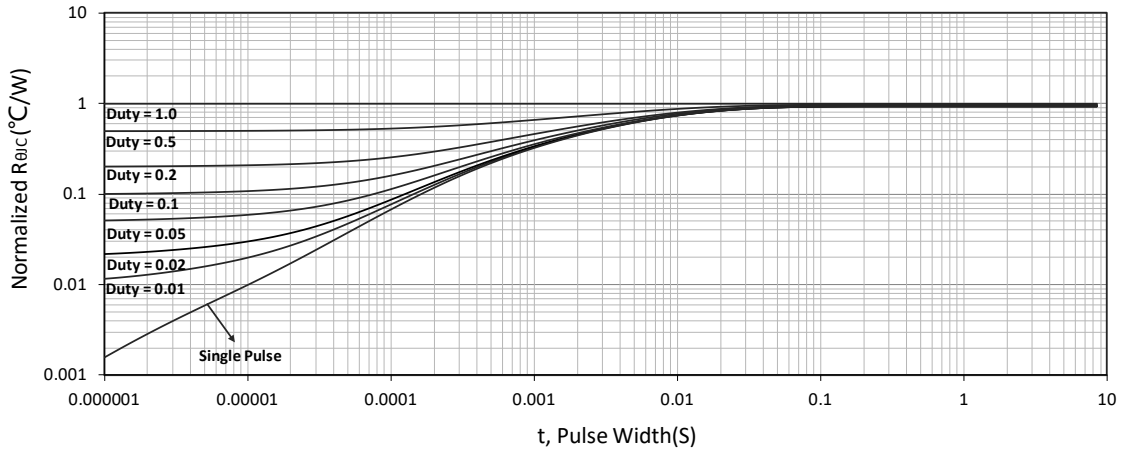


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

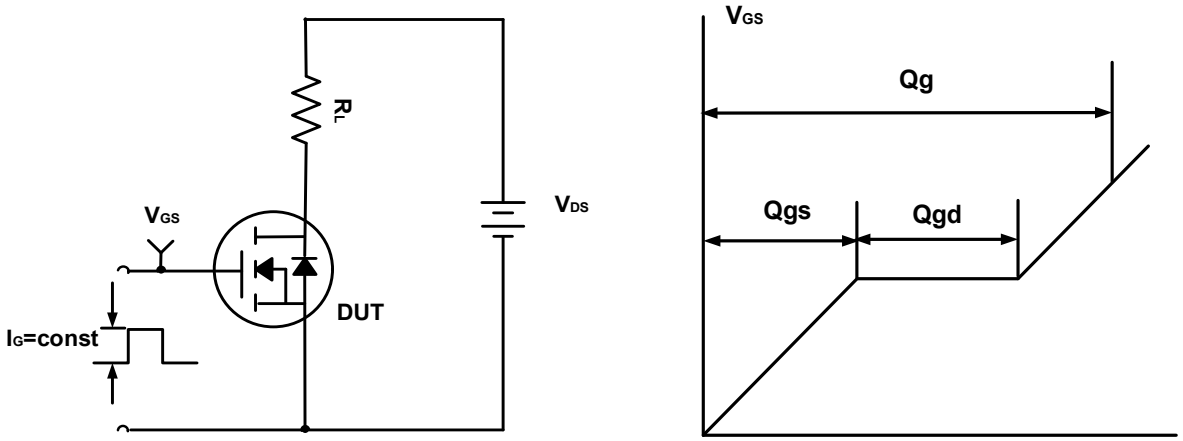


Figure A. Gate Charge Test Circuit & Waveforms

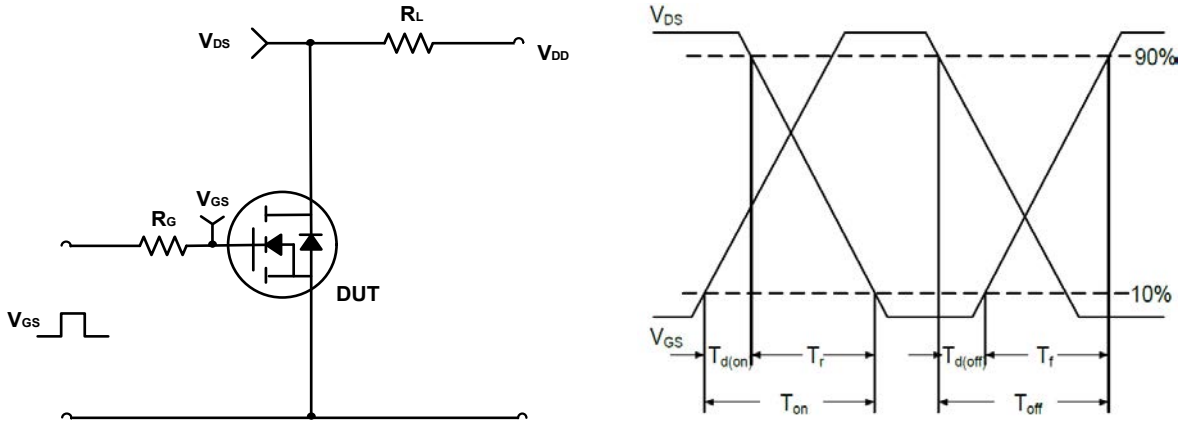


Figure B. Switching Test Circuit & Waveforms

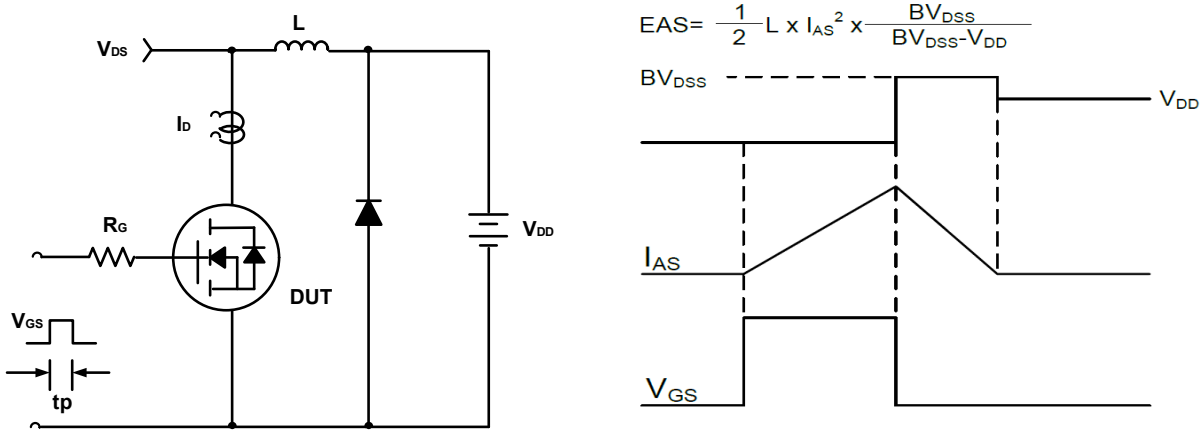
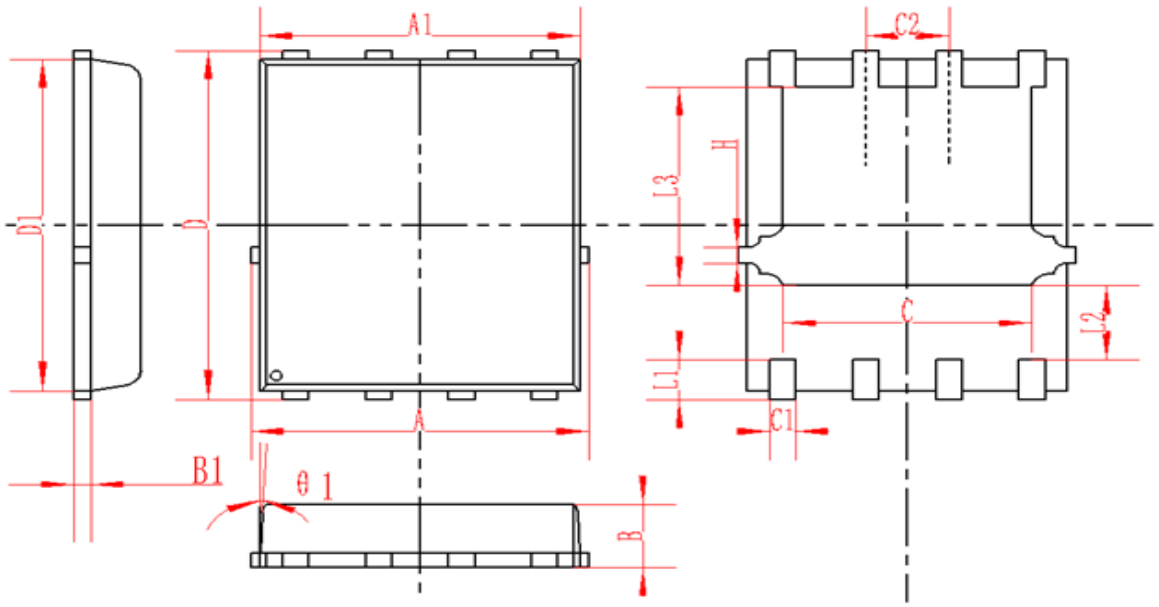


Figure C. Unclamped Inductive Switching Circuit & Waveforms

DFN5X6-8L Package Information



SYMBOL	MM			INCH		
	MIN	NOM	MAX	MIN	NOM	MAX
A	4.95	5	5.05	0.195	0.197	0.199
A1	4.82	4.9	4.98	0.190	0.193	0.196
D	5.98	6	6.02	0.235	0.236	0.237
D1	5.67	5.75	5.83	0.223	0.226	0.230
B	0.9	0.95	1	0.035	0.037	0.039
B1	0.254REF			0.010REF		
C	3.95	4	4.05	0.156	0.157	0.159
C1	0.35	0.4	0.45	0.014	0.016	0.018
C2	1.27TYP			0.5TYP		
θ1	8°	10°	12°	8°	10°	12°
L1	0.63	0.64	0.65	0.025	0.025	0.026
L2	1.2	1.3	1.4	0.047	0.051	0.055
L3	3.415	3.42	3.425	0.134	0.135	0.135
H	0.24	0.25	0.26	0.009	0.010	0.010