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IRFH9310TRPBF-MS

Product specification

Description

The IRFH9310TRPBF-MS 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.

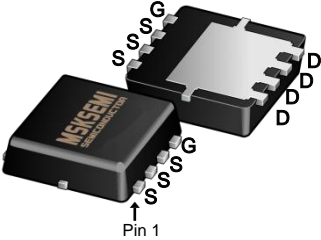
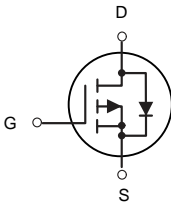

Features

- $V_{DS} = -30V$ $I_D = -90A$
- $R_{DS(ON)} < 4.5m\Omega$ $V_{GS} = -10V$

Application

- Battery protection
- Load switch
- Uninterruptible power supply

Reference News

DFN5X6-8L	P-Channel MOSFET	Marking
		

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	± 20	V
$I_{D@T_c=25^\circ C}$	Continuous Drain Current, V_{GS} @ 10V ¹	-90	A
$I_{D@T_c=100^\circ C}$	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
$P_{D@T_c=25^\circ C}$	Total Power Dissipation ⁴	60	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	55	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	2.08	$^\circ C/W$

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

Parameter		Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Drain-Source Breakdown Voltage		$V_{(BR)DSS}$	$V_{GS} = 0V, I_D = -250\mu A$	-30	-	-	V
Gate-body Leakage current		I_{GSS}	$V_{DS} = 0V, V_{GS} = \pm 20V$	-	-	± 100	nA
Zero Gate Voltage Drain Current	$T_J=25^\circ\text{C}$	I_{DSS}	$V_{DS} = -30V, V_{GS} = 0V$	-	-	-1	μA
	$T_J=100^\circ\text{C}$			-	-	-100	
Gate-Threshold Voltage		$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = -250\mu A$	-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	m Ω
			$V_{GS} = -4.5V, I_D = -15A$	-	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		$t_{d(on)}$	$V_{GS} = -10V, V_{DD} = -15V, R_G = 3\Omega, I_D = -30A$	-	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	$T_C=25^\circ\text{C}$	I_S	-	-	-	-90	A

Note :

1. Repetitive rating, pulse width limited by junction temperature $T_{J(MAX)}=150^\circ\text{C}$
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

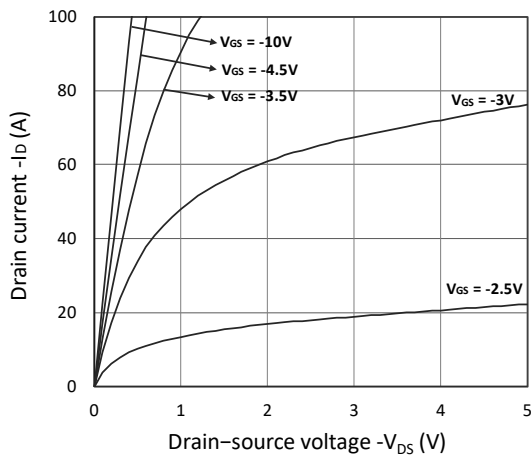


Figure 1. Output Characteristics

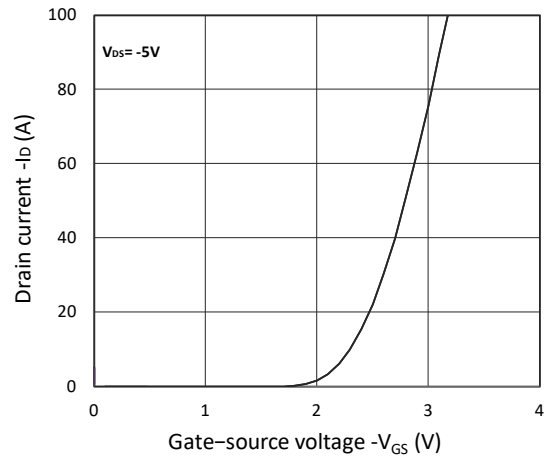


Figure 2. Transfer Characteristics

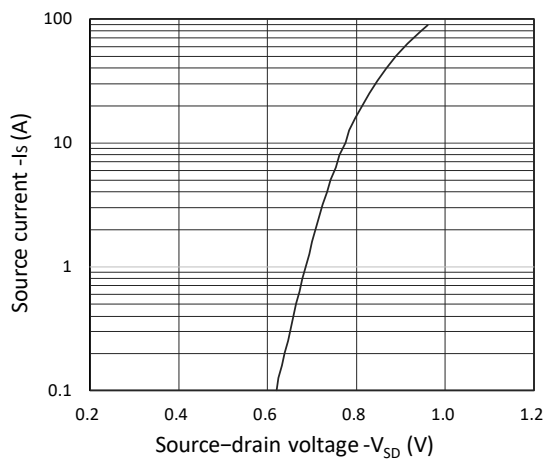


Figure 3. Forward Characteristics of Reverse

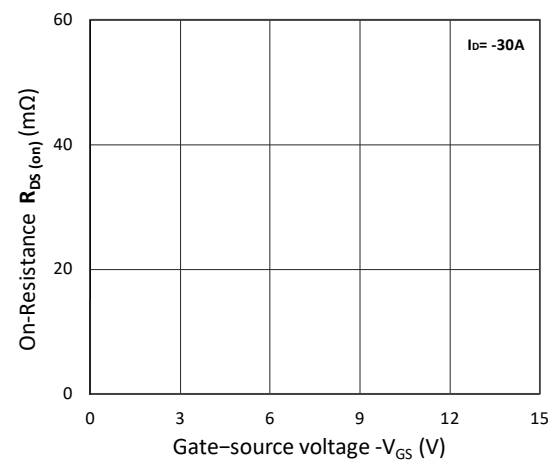


Figure 4. $R_{DS(on)}$ vs. V_{GS}

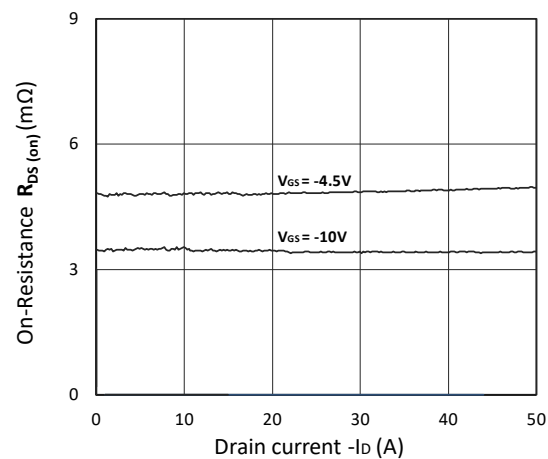


Figure 5. $R_{DS(on)}$ vs. I_D

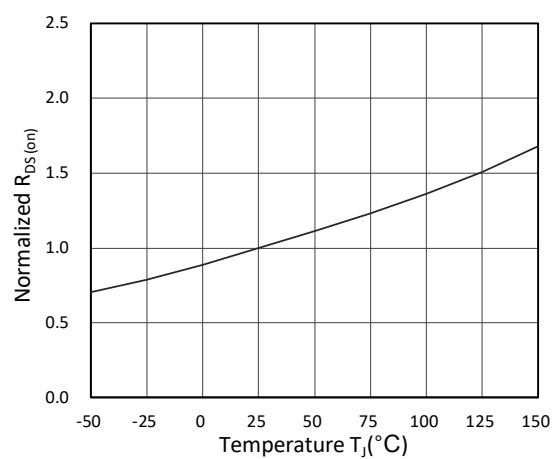


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature

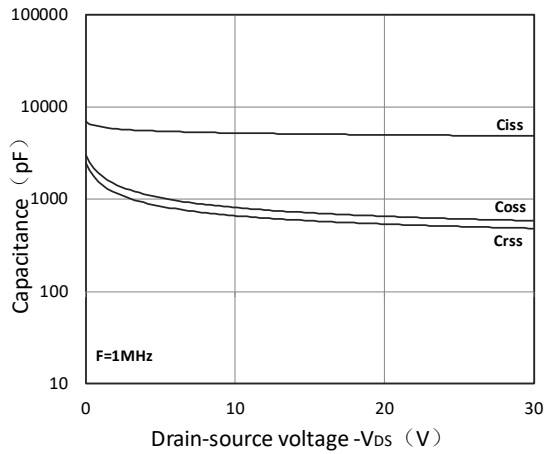


Figure 7. Capacitance Characteristics

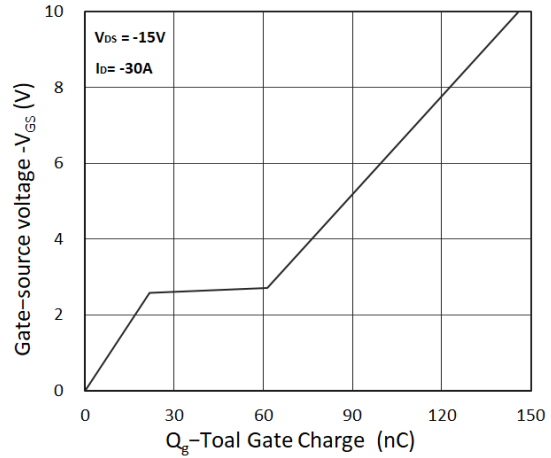


Figure 8. Gate Charge Characteristics

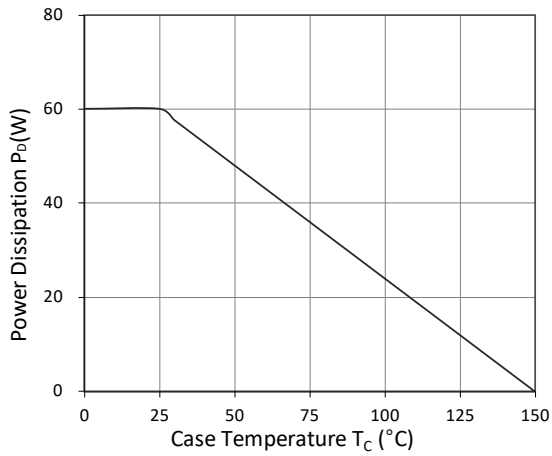


Figure 9. Power Dissipation

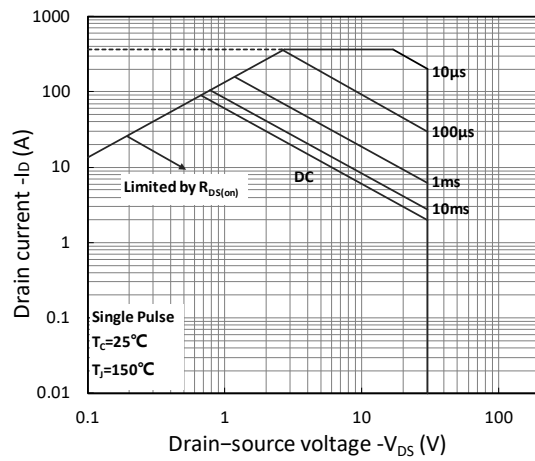


Figure 10. Safe Operating Area

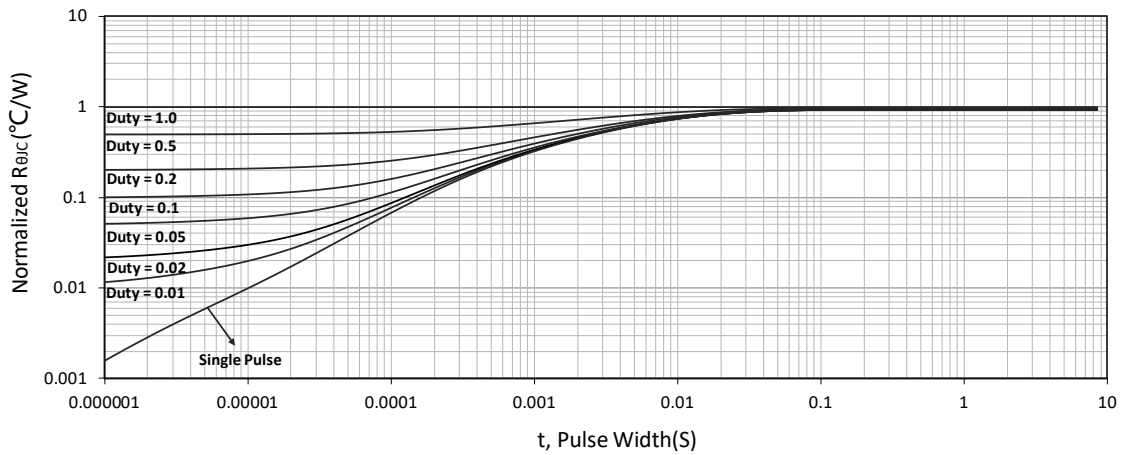


Figure 11. Normalized Maximum Transient Thermal Impedance

Test Circuit

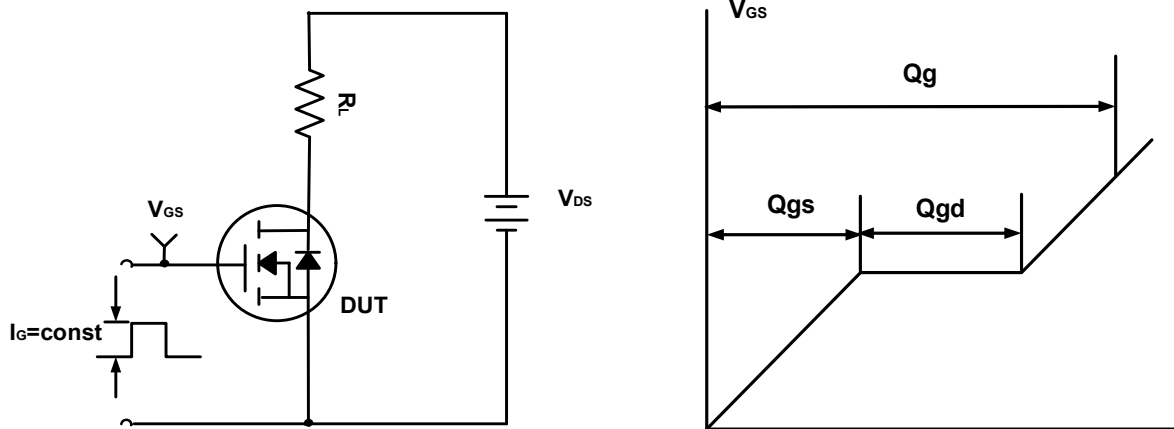


Figure A. Gate Charge Test Circuit & Waveforms

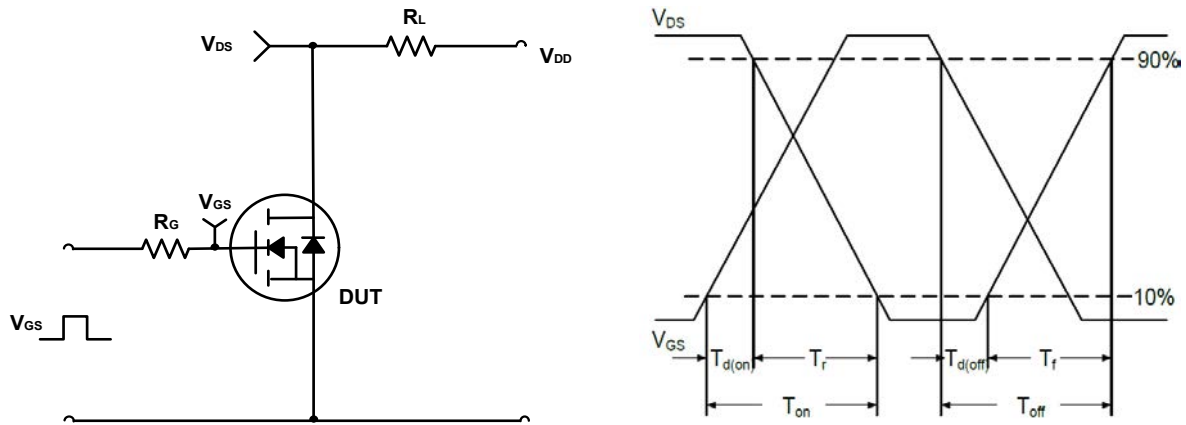


Figure B. Switching Test Circuit & Waveforms

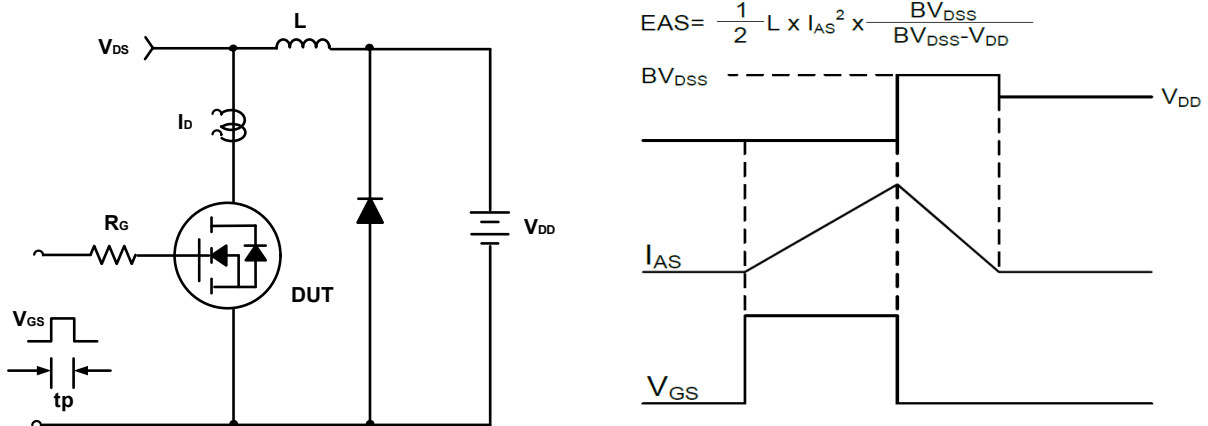
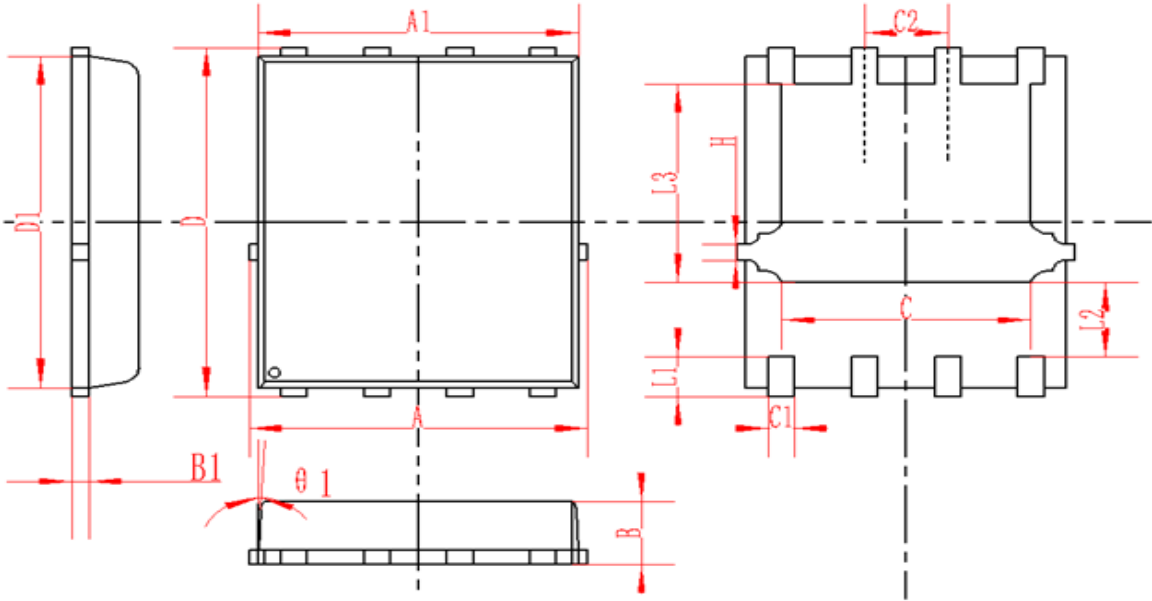


Figure C. Unclamped Inductive Switching Circuit & Waveforms

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

REEL SPECIFICATION

P/N	PKG	QTY
IRFH9310TRPBF-MS	DFN5X6-8L	5000

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