



Description

The IRFR3709ZTRPBF 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

$V_{DS} = 30V$ $I_D = 80 A$

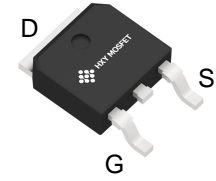
$R_{DS(ON)} < 6.8m\Omega @ V_{GS}=10V$

Application

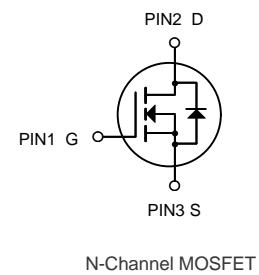
Battery protection

Load switch

Uninterruptible power supply



**TO-252-2L
(TO-252-2(DPAK))**



Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRFR3709ZTRPBF	TO-252-2L(TO-252-2(DPAK))	HXY MOSFET	2500

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
I_D	Drain Current – Continuous ($T_C=25^\circ\text{C}$)	80	A
	Drain Current – Continuous ($T_C=100^\circ\text{C}$)	51	A
I_{DM}	Drain Current – Pulsed ¹	320	A
EAS	Single Pulse Avalanche Energy ²	88	mJ
IAS	Single Pulse Avalanche Current ²	42	A
P_D	Power Dissipation ($T_C=25^\circ\text{C}$)	54	W
	Power Dissipation – Derate above 25°C	0.43	W/ $^\circ\text{C}$
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ\text{C}$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ\text{C}$
$R_{\theta JA}$	Thermal Resistance Junction to ambient	62	$^\circ\text{C}/\text{W}$
$R_{\theta JC}$	Thermal Resistance Junction to Case	2.3	$^\circ\text{C}/\text{W}$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	---	---	V
$\Delta BVDSS/\Delta T_J$	BV_{DSS} Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.04	---	$V/^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=125^\circ\text{C}$	---	---	10	μA
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
RDS(ON)	Static Drain-Source On-Resistance ³	$V_{GS}=10V, I_D=20A$	---	5	6.8	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=10A$	---	6.5	9	$\text{m}\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1	1.6	2.5	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4	---	$\text{mV}/^\circ\text{C}$
gfs	Forward Transconductance	$V_{DS}=10V, I_D=10A$	---	18	---	S
Q_g	Total Gate Charge ^{3,4}	$V_{DS}=15V, V_{GS}=4.5V, I_D=20A$	---	11.1	---	nC
Q_{gs}	Gate-Source Charge ^{3,4}		---	1.85	---	
Q_{gd}	Gate-Drain Charge ^{3,4}		---	6.8	---	
$T_{d(on)}$	Turn-On Delay Time ^{3,4}	$V_{DD}=15V, V_{GS}=10V, R_G=3.3\Omega$ $I_D=15A$	---	7.5	---	ns
T_r	Rise Time ^{3,4}		---	14.5	---	
$T_{d(off)}$	Turn-Off Delay Time ^{3,4}		---	35.2	---	
T_f	Fall Time ^{3,4}		---	9.6	---	
Ciss	Input Capacitance	$V_{DS}=25V, V_{GS}=0V, F=1\text{MHz}$	---	1160	---	pF
Coss	Output Capacitance		---	200	---	
Crss	Reverse Transfer Capacitance		---	180	---	
R_g	Gate resistance		$V_{GS}=0V, V_{DS}=0V, F=1\text{MHz}$	---	2.5	
EAS	Single Pulse Avalanche Energy	$V_{DD}=25V, L=0.1\text{mH}, I_{AS}=20A$	20	---	---	mJ
IS	Continuous Source Current	$V_G=V_D=0V$, Force Current	---	---	80	A
ISM	Pulsed Source Current ³		---	---	320	A
VSD	Diode Forward Voltage ³	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	1	V
trr	Reverse Recovery Time	$V_{GS}=0V, I_S=1A, di/dt=100A/\mu\text{s}$ $T_J=25^\circ\text{C}$	---	---	---	ns
Q_{rr}	Reverse Recovery Charge		---	---	---	nC



Typical Characteristics

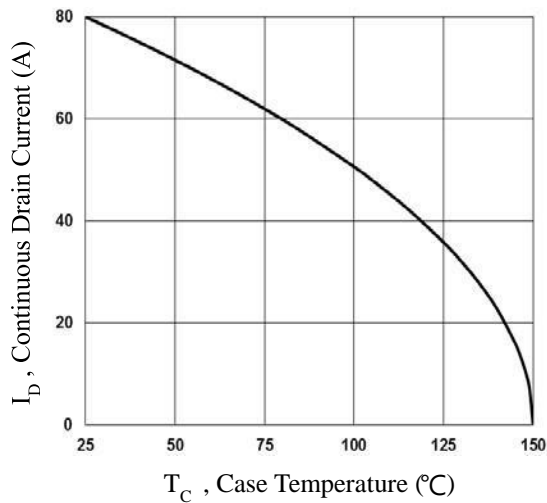


Fig.1 Continuous Drain Current vs. T_C

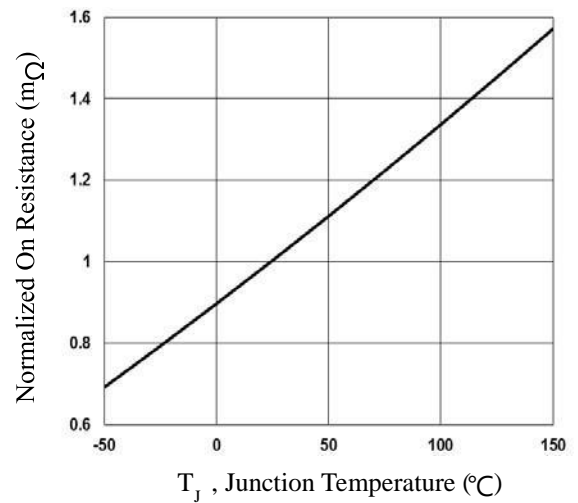


Fig.2 Normalized $R_{DS(on)}$ vs. T_J

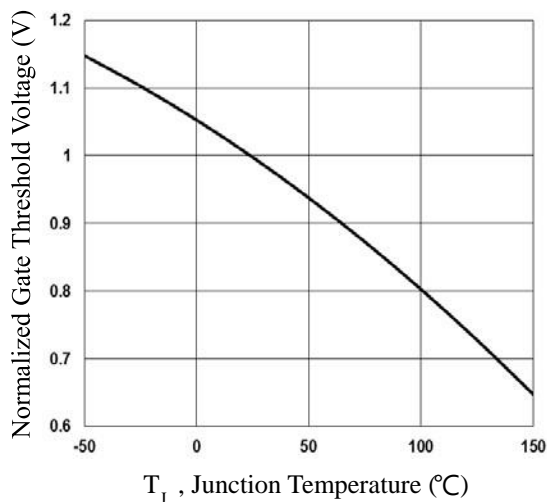


Fig.3 Normalized V_{th} vs. T_J

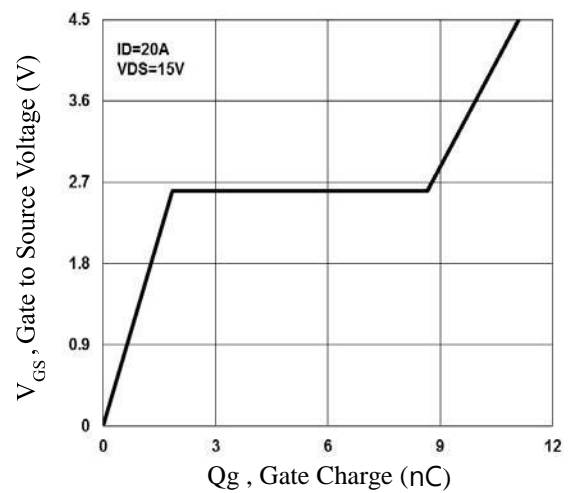


Fig.4 Gate Charge Waveform

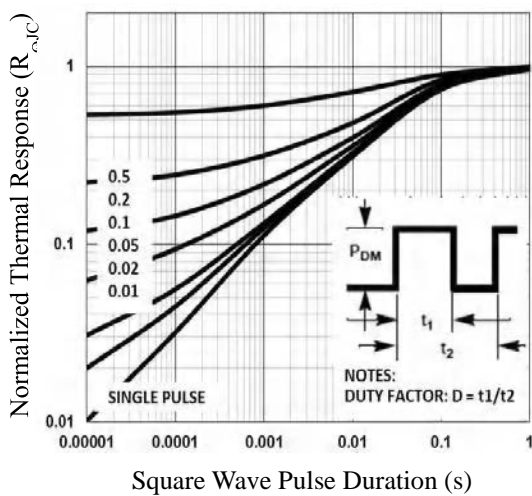


Fig.5 Normalized Transient Impedance

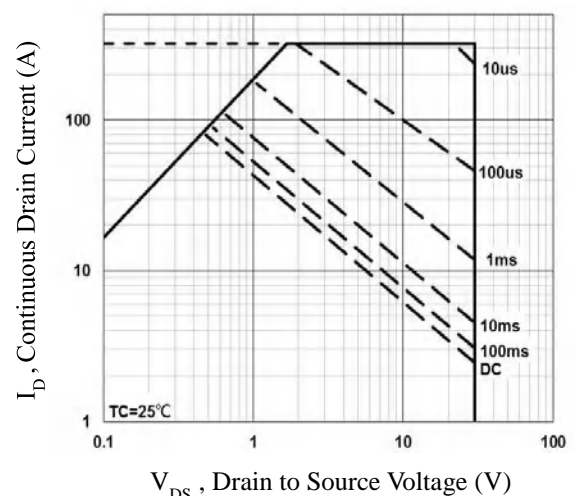


Fig.6 Maximum Safe Operation Area

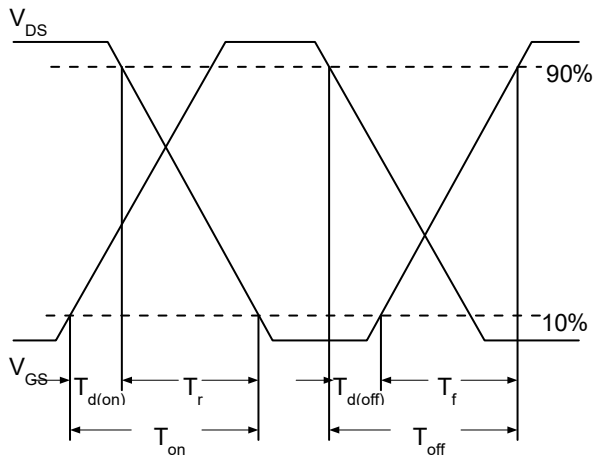


Fig.7 Switching Time Waveform

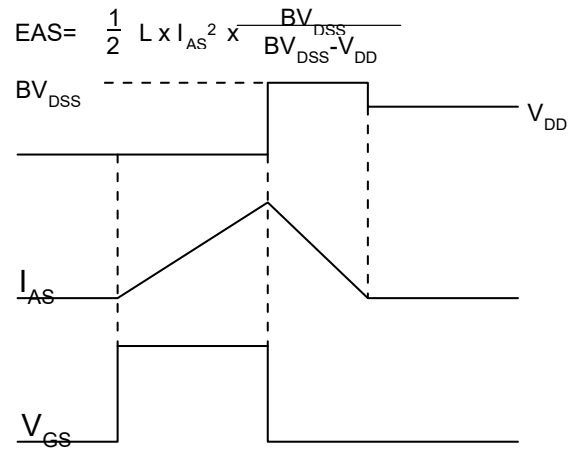


Fig.8 EAS Waveform



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