



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.



TO252-2L

General Features

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

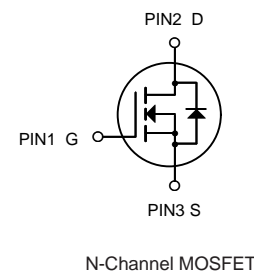
$R_{DS(ON)} < 6.8m\Omega @ V_{GS}=10V$

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRFR3709ZTRPBF	TO252-2L	RFR3709 XXXX	2500

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	Drain Current – Continuous ($T_C=25^\circ C$)	80	A
	Drain Current – Continuous ($T_C=100^\circ C$)	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 ($T_C=25^\circ C$)	54	W
	Power Dissipation – Derate above $25^\circ C$	0.43	W/ $^\circ C$
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 to ambient	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction to Case	2.3	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	30	---	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.04	---	V/°C
IDSS	Drain-Source Leakage Current	V _{DS} =30V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =24V, V _{GS} =0V, T _J =125°C	---	---	10	uA
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
RDS(ON)	Static Drain-Source On-Resistance ³	V _{GS} =10V, I _D =20A	---	5	6.8	mΩ
		V _{GS} =4.5V, I _D =10A	---	6.5	9	mΩ
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1	1.6	2.5	V
ΔV _{GS(th)}	V _{GS(th)} Temperature Coefficient		---	-4	---	mV/°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	---	
Td(on)	Turn-On Delay Time ^{3,4}	V _{DD} =15V, V _{GS} =10V, R _G =3.3Ω I _D =15A	---	7.5	---	ns
T _r	Rise Time ^{3,4}		---	14.5	---	
Td(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=1MHz	---	1160	---	pF
Coss	Output Capacitance	V _{GS} =0V, V _{DS} =0V, F=1MHz	---	200	---	Ω
Crss	Reverse Transfer Capacitance		---	180	---	
R _g	Gate resistance		---	2.5	---	
EAS	Single Pulse Avalanche Energy	V _{DD} =25V, L=0.1mH, IAS=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°C	---	---	1	V
trr	Reverse Recovery Time	VGS=0V, IS=1A, di/dt=100A/μs T _J =25°C	---	---	---	ns
Q _{rr}	Reverse Recovery Charge		---	---	---	nC

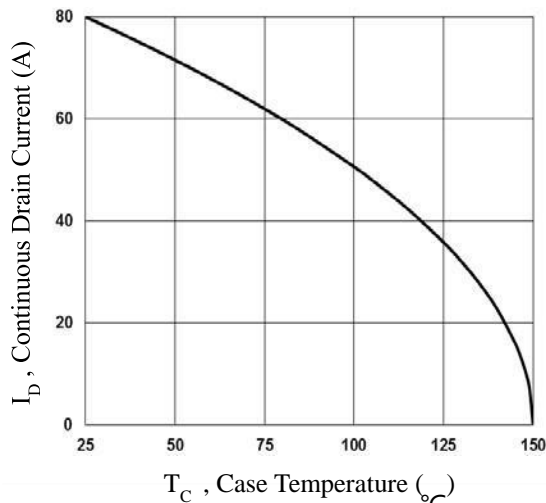


Fig.1 Continuous Drain Current vs. Tc

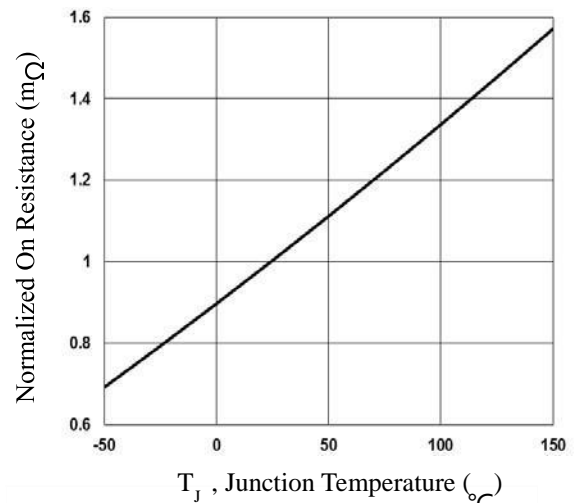


Fig.2 Normalized RDS(on) vs. Tj

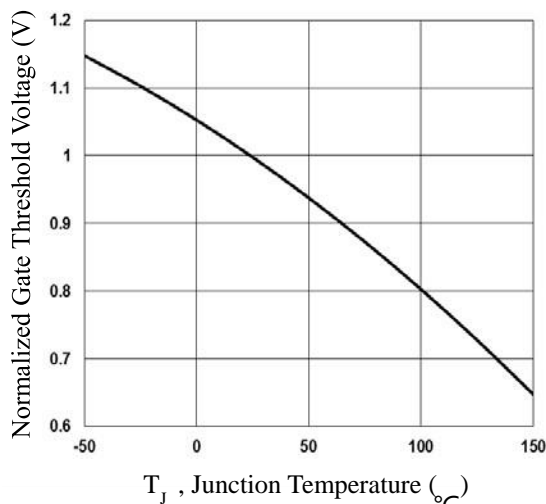


Fig.3 Normalized Vth vs. Tj

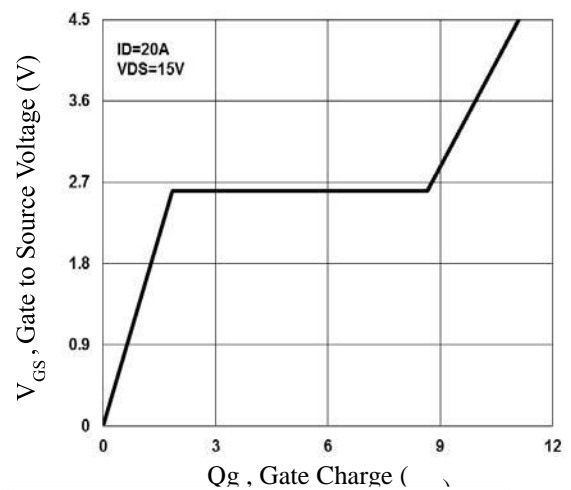


Fig.4 Gate Charge Waveform

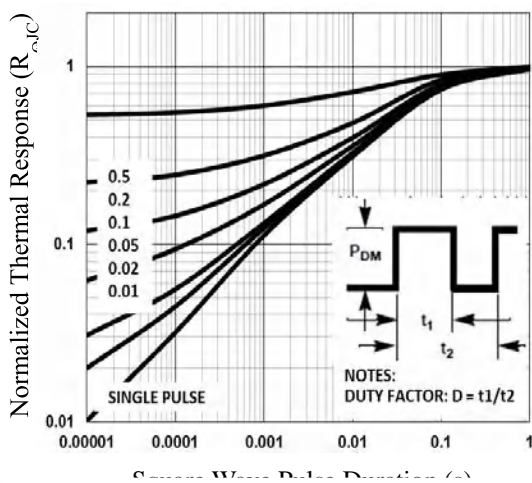


Fig.5 Normalized Transient Impedance

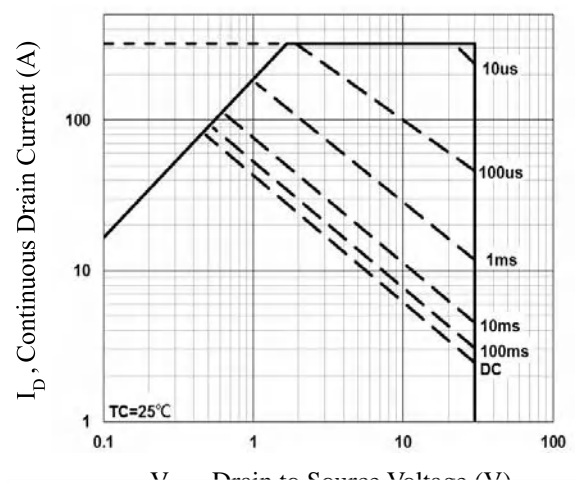


Fig.6 Maximum Safe Operation Area

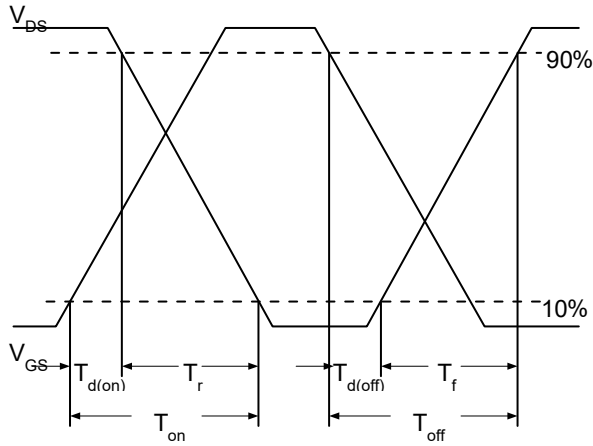


Fig.7 Switching Time Waveform

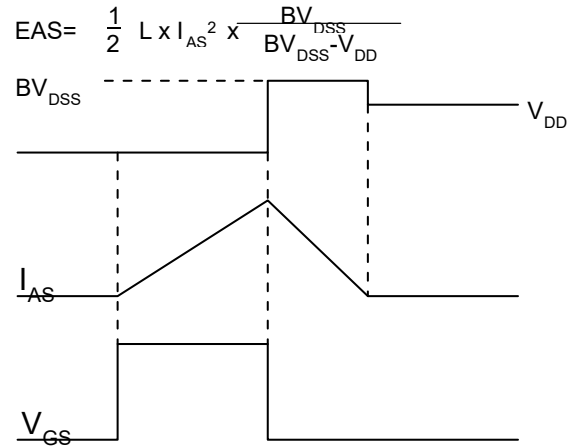
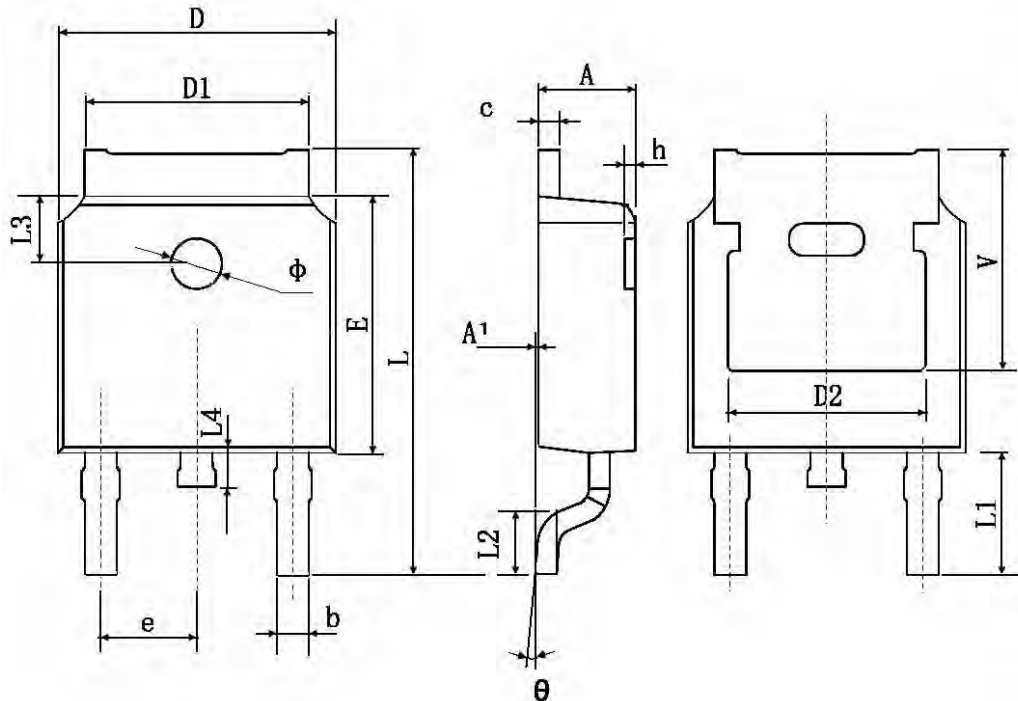


Fig.8 EAS Waveform



TO252-2L Package Information



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	2.200	2.400	0.087	0.094
A1	0.000	0.127	0.000	0.005
b	0.660	0.860	0.026	0.034
c	0.460	0.580	0.018	0.023
D	6.500	6.700	0.256	0.264
D1	5.100	5.460	0.201	0.215
D2	0.483 TYP.		0.190 TYP.	
E	6.000	6.200	0.236	0.244
e	2.186	2.386	0.086	0.094
L	9.800	10.400	0.386	0.409
L1	2.900 TYP.		0.114 TYP.	
L2	1.400	1.700	0.055	0.067
L3	1.600 TYP.		0.063 TYP.	
L4	0.600	1.000	0.024	0.039
Φ	1.100	1.300	0.043	0.051
θ	0°	8°	0°	8°
h	0.000	0.300	0.000	0.012
V	5.350 TYP.		0.211 TYP.	



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