



## Description

The IRFR5410TRRPBF 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

$V_{DS} = -100V$   $I_D = -15A$

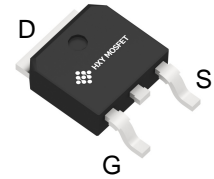
$R_{DS(ON)} < 170m\Omega$  @  $V_{GS} = -10V$

## Application

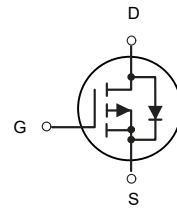
Brushless motor

Load switch

Uninterruptible power supply



TO-252-2L  
(DPAK)



P-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRFR5410TRRPBF	TO-252-2L(DPAK)	HXY MOSFET	2500

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	-100	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-15	A
$I_D @ T_C = 100^\circ C$	Continuous Drain Current, $V_{GS} @ -10V$	-10.5	A
$I_{DM}$	Pulsed Drain Current	-60	A
EAS	Single Pulse Avalanche Energy	46	mJ
$P_D @ T_C = 25^\circ C$	Total Power Dissipation	34	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	62	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	3.7	$^\circ C/W$



**Electrical Characteristics (T<sub>J</sub> =25 °C, unless otherwise noted)**

Symbol	Parameter	Conditions	Min	Typ	Max	Units
<b>BV<sub>DSS</sub></b>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	-100	---	---	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =-100V	---	---	-1	μA
<b>I<sub>GSS</sub></b>	Gate-Source Leakage Current	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0A	---	---	±100	nA
<b>V<sub>GS(th)</sub></b>	Gate-Source Threshold Voltage	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	-1.1	-1.6	-2.2	V
<b>R<sub>DS(on)</sub></b>	Drain-Source On Resistance <sup>3</sup>	V <sub>GS</sub> =-10V, I <sub>D</sub> =-5A	---	140	170	mΩ
		V <sub>GS</sub> =-4.5V, I <sub>D</sub> =-4A	---	150	190	mΩ
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>DS</sub> =-25V, V <sub>GS</sub> =0V, f=1MHz	---	2448	---	pF
<b>C<sub>oss</sub></b>	Output Capacitance		---	69	--	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		---	54	---	
<b>t<sub>d(on)</sub></b>	Turn-On Delay Time	V <sub>DS</sub> =-50V, I <sub>D</sub> =-6.5A, R <sub>ENG</sub> =10Ω, V <sub>GS</sub> =-10V	---	23	---	ns
<b>t<sub>r</sub></b>	Rise Time		---	31.5	---	ns
<b>t<sub>d(off)</sub></b>	Turn-Off Delay Time		---	60.9	---	ns
<b>t<sub>f</sub></b>	Fall Time		---	54	---	ns
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =-10V,	---	47	---	nC
<b>Q<sub>gs</sub></b>	Gate-Source Charge	V <sub>DS</sub> =-50V,	---	4.5	---	nC
<b>Q<sub>gd</sub></b>	Gate-Drain "Miller" Charge	I <sub>D</sub> =-10A	---	5.7	---	nC
<b>V<sub>SD</sub></b>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =-5A	---	---	-1.2	V
<b>I<sub>S</sub></b>	Continuous Drain Current	V <sub>D</sub> =V <sub>G</sub> =0V	---	---	-15	A
<b>I<sub>SM</sub></b>	Pulsed Drain Current		---	---	-60	A

**Notes:**

1. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
2. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=-50V, V<sub>G</sub>=10V, L=0.5mH
3. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



### P-Channel Typical Characteristics

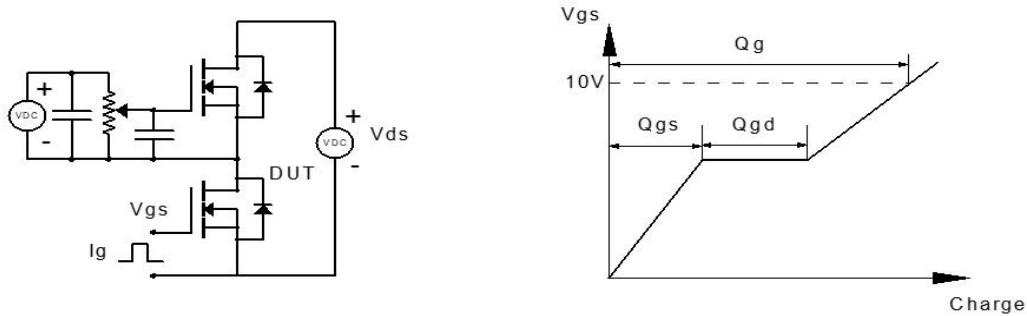


Figure 1: Gate Charge Test Circuit & Waveform

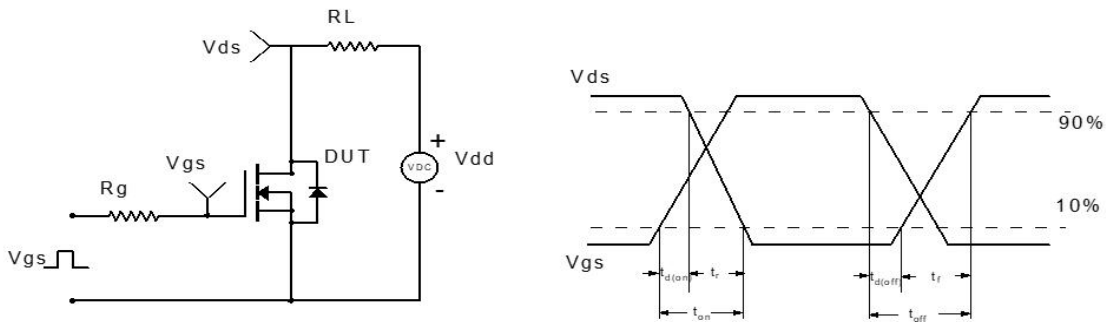


Figure 2: Resistive Switching Test Circuit & Waveform

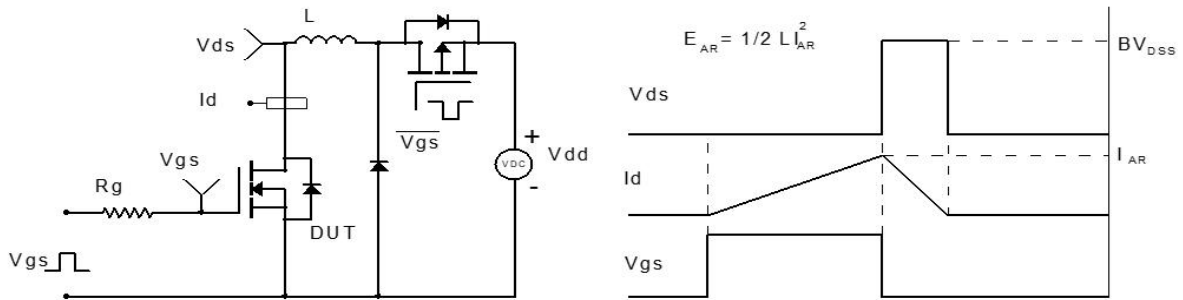


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

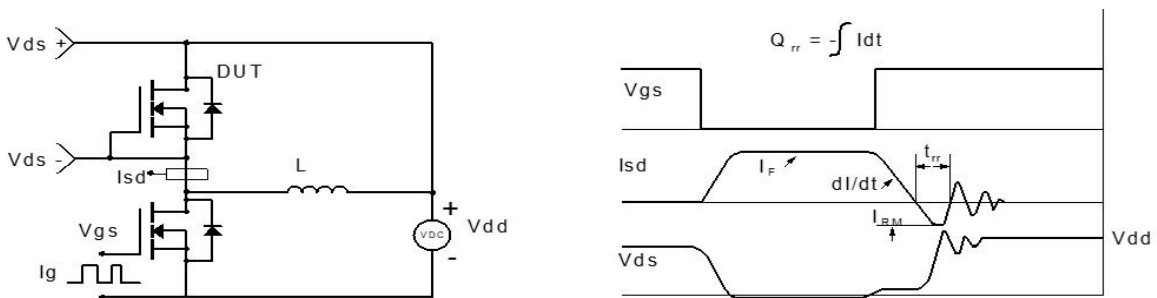
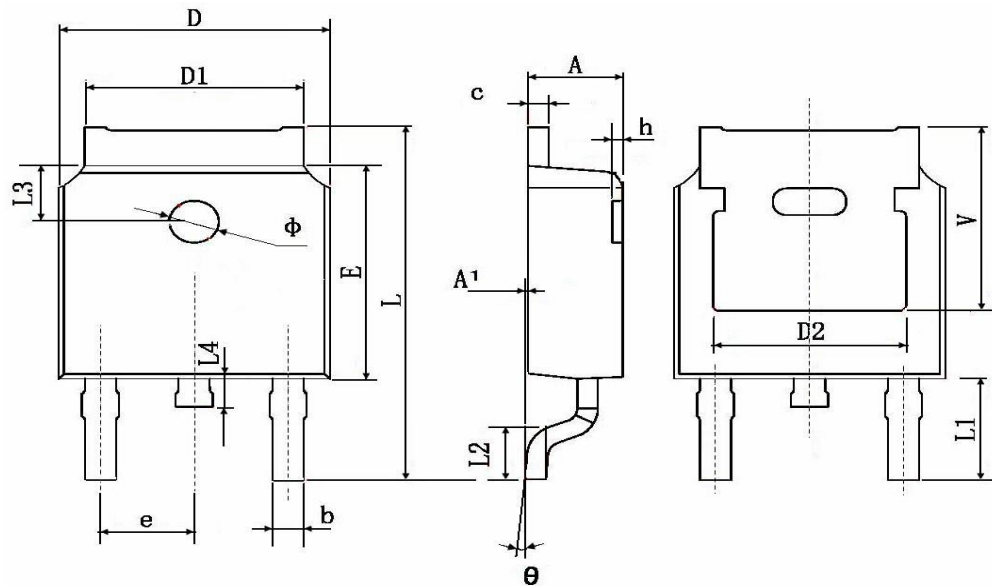


Figure 4: Diode Recovery Test Circuit & Waveform



## TO 252-2L(DPAK) 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	4.830 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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