



## Description

The IRLR3705ZPBF 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.



TO-252-2L

## General Features

$V_{DS} = 60V$   $I_D = 80A$

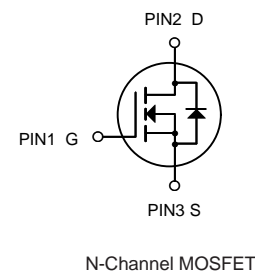
$R_{DS(ON)} < 8.3 m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



## Package Marking and Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRLR3705ZPBF	TO-252-2L	HXY MOSFET	2500

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

Symbol	Parameter	Rating	Units
$V_{DS}$	Drain-Source Voltage	60	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D @ T_C=25^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	80	A
$I_D @ T_C=100^\circ\text{C}$	Continuous Drain Current, $V_{GS} @ 10V^1$	40	A
$I_{DM}$	Pulsed Drain Current <sup>2</sup>	255	A
$I_{AS}$	Avalanche Current	23	A
$P_D @ T_C=25^\circ\text{C}$	Total Power Dissipation <sup>4</sup>	100	W
$T_{STG}$	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-Ambient <sup>1</sup>	62.5	$^\circ\text{C/W}$



**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Units
BV <sub>DSS</sub>	Drain-Source Breakdown Voltage	V <sub>GS</sub> =0V, I <sub>D</sub> =250uA	60	-	-	V
R <sub>DS(ON)</sub>	Static Drain-Source On-Resistance <sup>2</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =45A	-	6	8.3	mΩ
		V <sub>GS</sub> =6V, I <sub>D</sub> =30A	-	13	17	mΩ
V <sub>GS(th)</sub>	Gate Threshold Voltage	V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA	1	1.4	3	V
g <sub>fs</sub>	Forward Transconductance	V <sub>DS</sub> =10V, I <sub>D</sub> =30A	-	71	-	S
I <sub>DSS</sub>	Drain-Source Leakage Current	V <sub>DS</sub> =60V, V <sub>GS</sub> =0V	-	-	10	uA
	Drain-Source Leakage Current (T <sub>j</sub> =125°C)	V <sub>DS</sub> =48V, V <sub>GS</sub> =0V	-	-	250	uA
I <sub>GSS</sub>	Gate-Source Leakage	V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V	-	-	±100	nA
Q <sub>g</sub>	Total Gate Charge	I <sub>D</sub> =30A	-	33	45	nC
Q <sub>gs</sub>	Gate-Source Charge	V <sub>DS</sub> =48V	-	5	-	nC
Q <sub>gd</sub>	Gate-Drain ("Miller") Charge	V <sub>GS</sub> =4.5V	-	21	-	nC
t <sub>d(on)</sub>	Turn-on Delay Time	V <sub>DS</sub> =30V	-	10	-	ns
t <sub>r</sub>	Rise Time	I <sub>D</sub> =30A	-	43	-	ns
t <sub>d(off)</sub>	Turn-off Delay Time	R <sub>G</sub> =3.3Ω	-	47	-	ns
t <sub>f</sub>	Fall Time	V <sub>GS</sub> =10V	-	80	-	ns
C <sub>iss</sub>	Input Capacitance		-	2680	3300	pF
C <sub>oss</sub>	Output Capacitance	V <sub>GS</sub> =0V	-	260	-	pF
C <sub>rss</sub>	Reverse Transfer Capacitance	V <sub>DS</sub> =25V f=1.0MHz	-	180	-	pF
V <sub>SD</sub>	Forward On Voltage <sup>2</sup>	I <sub>S</sub> =45A, V <sub>GS</sub> =0V	-	-	1.3	V
t <sub>rr</sub>	Reverse Recovery Time	I <sub>S</sub> =10A, V <sub>GS</sub> =0V, dI/dt=100A/μs	-	30	-	ns
Q <sub>rr</sub>	Reverse Recovery Charge		-	18	-	nC



## Typical Performance Characteristics

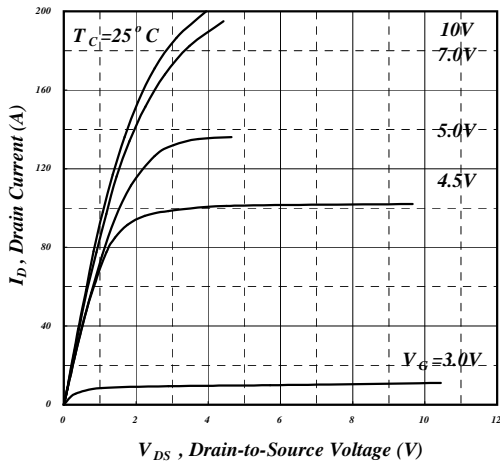


Fig 1. Typical Output Characteristics

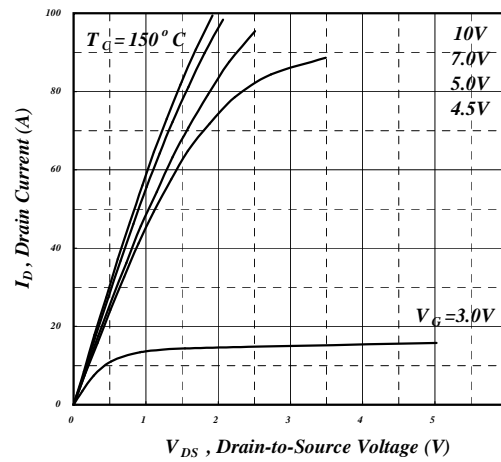


Fig 2. Typical Output Characteristics

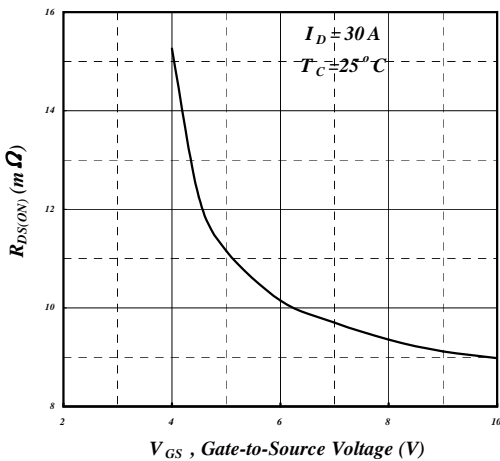


Fig 3. On-Resistance v.s. Gate Voltage

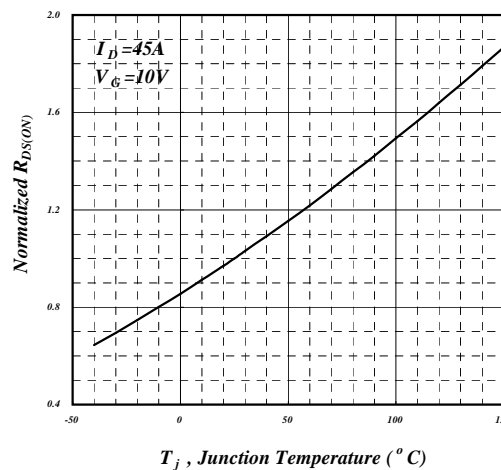


Fig 4. Normalized On-Resistance v.s. Junction Temperature

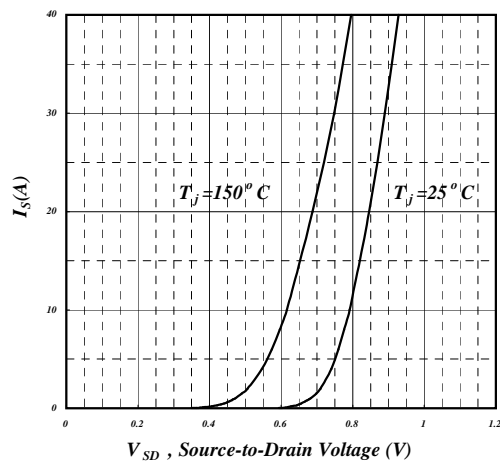


Fig 5. Forward Characteristic of Reverse Diode

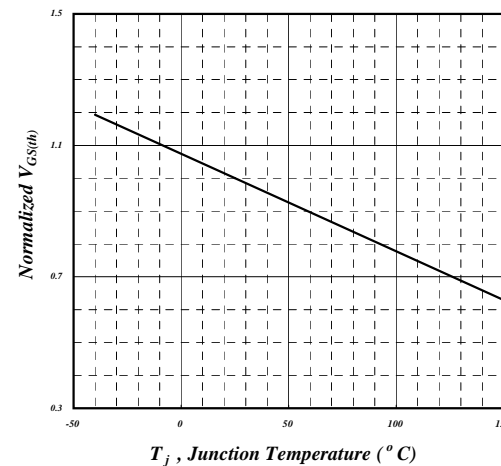


Fig 6. Gate Threshold Voltage v.s. Junction Temperature

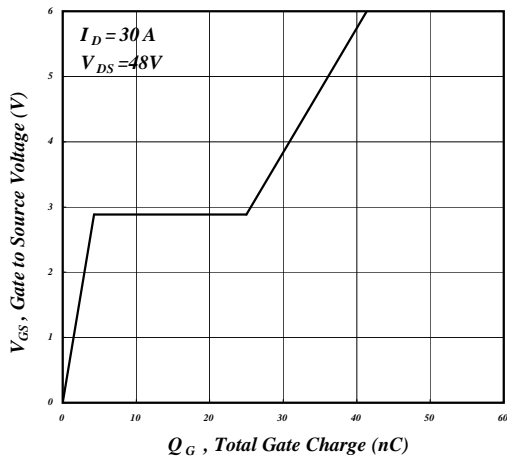


Fig 7. Gate Charge Characteristics

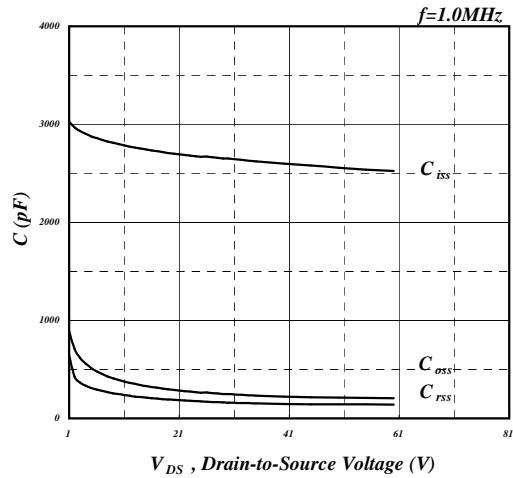


Fig 8. Typical Capacitance Characteristics

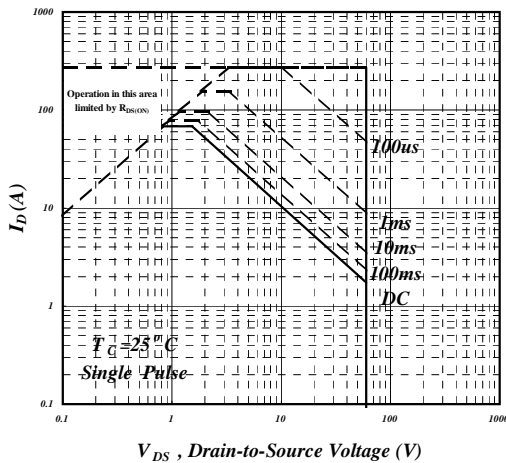


Fig 9. Maximum Safe Operating Area

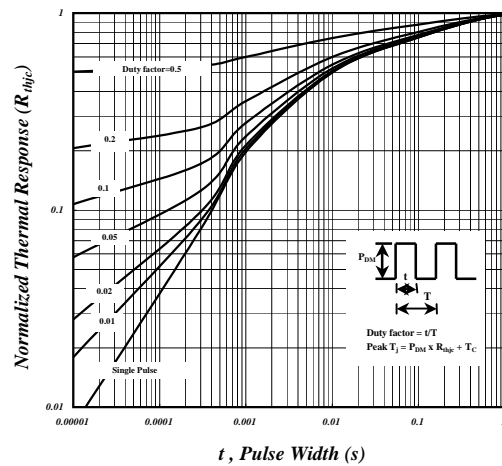


Fig 10. Effective Transient Thermal Impedance

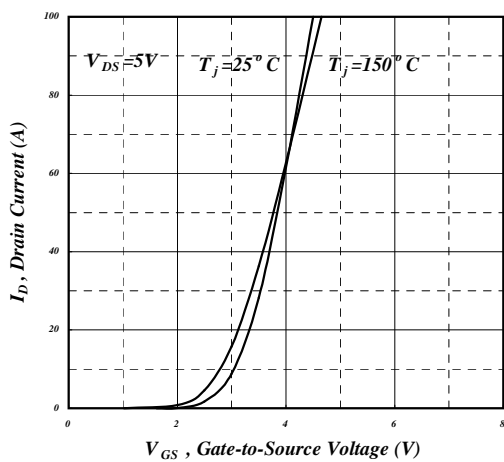


Fig 11. Transfer Characteristics

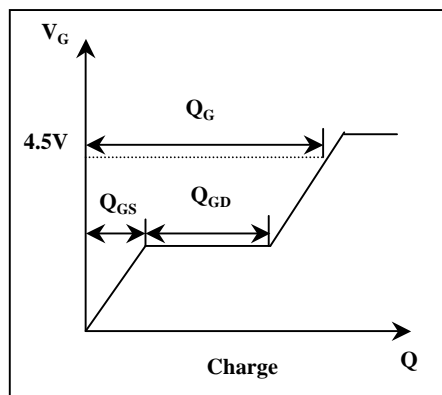


Fig 12. Gate Charge Waveform





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