



## Description

The IRF7104TRPBF uses advanced trench technology and design to provide excellent  $R_{DS(ON)}$  with low gate charge. It can be used in a wide variety of applications.

## General Features

$V_{DS} = -20V, I_D = -4A$

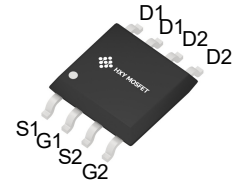
$R_{DS(ON)} < 95m\Omega @ V_{GS} = -4.5V$

$R_{DS(ON)} < 110m\Omega @ V_{GS} = -2.5V$

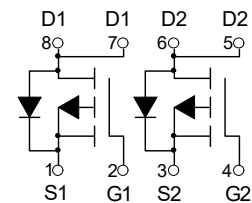
## Application

PWM application

Load switch



SOP-8  
(SO-8)



Dual P-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRF7104TRPBF	SOP-8(SO-8)	HXY MOSFET	3000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	-20	V
$V_{GS}$	Gate-Source Voltage	$\pm 12$	V
$I_D$	Drain Current-Continuous	-4	A
$I_{DM}$	Drain Current-Pulsed (Note 1)	-20	A
$P_D$	Maximum Power Dissipation	2.0	W
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	62.5	$^\circ C/W$



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
$BV_{DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=-250\mu A$	-20	---	---	V
$\Delta BV_{DSS}/\Delta T_J$	BVDSS Temperature Coefficient	Reference to $25^\circ\text{C}$ , $I_D=-1\text{mA}$	---	-0.02	---	V/ $^\circ\text{C}$
$R_{DS(ON)}$	Static Drain-Source On-Resistance <sup>2</sup>	$V_{GS}=-4.5V, I_D=-5.8A$	---	85	95	m $\Omega$
		$V_{GS}=-2.5V, I_D=-3.5A$	---	95	110	
$V_{GS(th)}$	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=-250\mu A$	-0.6	-1.1	-1.7	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	4.32	---	mV/ $^\circ\text{C}$
$I_{DSS}$	Drain-Source Leakage Current	$V_{DS}=-16V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	-1	$\mu\text{A}$
		$V_{DS}=-16V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	-5	
$I_{GSS}$	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	$\pm 100$	nA
gfs	Forward Transconductance	$V_{DS}=-5V, I_D=-3A$	---	5.5	---	S
$R_g$	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	24	48	$\Omega$
$Q_g$	Total Gate Charge (-4.5V)	$V_{DS}=-16V, V_{GS}=-4.5V, I_D=-5.8A$	---	10.6	15	nC
$Q_{gs}$	Gate-Source Charge		---	1.0	---	
$Q_{gd}$	Gate-Drain Charge		---	2.0	---	
$T_{d(on)}$	Turn-On Delay Time	$V_{DD}=-15V, V_{GS}=-10V, R_G=6\Omega$ $I_D=-1A, R_G=10\Omega$	---	10	12	ns
$T_r$	Rise Time		---	4.9	6	
$T_{d(off)}$	Turn-Off Delay Time		---	22	42	
$T_f$	Fall Time		---	3	9	
$C_{iss}$	Input Capacitance	$V_{DS}=-15V, V_{GS}=0V, f=1\text{MHz}$	---	325	---	$\mu\text{F}$
$C_{oss}$	Output Capacitance		---	60	---	
$C_{riss}$	Reverse Transfer Capacitance		---	30	---	
$I_S$	Continuous Source Current <sup>1,4</sup>	$V_G=V_D=0V$ , Force Current	---	---	-2.0	A
$I_{SM}$	Pulsed Source Current <sup>2,4</sup>		---	---	-20	A
$V_{SD}$	Diode Forward Voltage <sup>2</sup>	$V_{GS}=0V, I_S=-1.7A, T_J=25^\circ\text{C}$	---	---	-1	V

Note :

- 1.The data tested by surface mounted on a 1 inch<sup>2</sup>FR-4 board with 2OZ copper,t<10sec.
- 2.The data tested by pulsed , pulse width  $\leq 300\mu\text{s}$  , duty cycle  $\leq 2\%$
- 3.The power dissipation is limited by  $150^\circ\text{C}$  junction temperature
- 4.The data is theoretically the same as  $I_D$  and  $I_{DM}$  , in real applications , should be limited by total power dissipation.



### Typical Characteristics

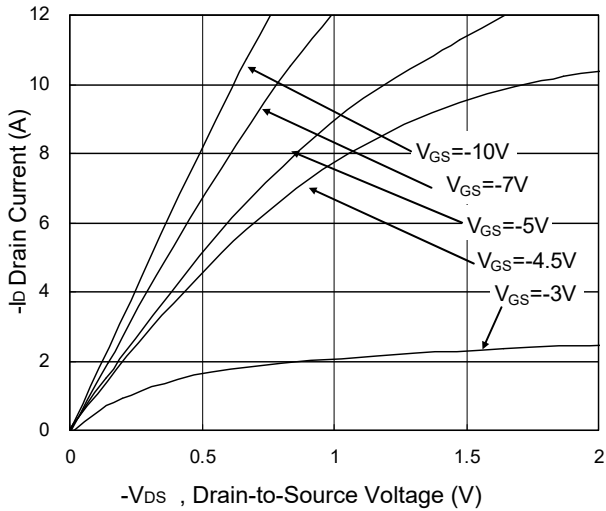


Fig.1 Typical Output Characteristics

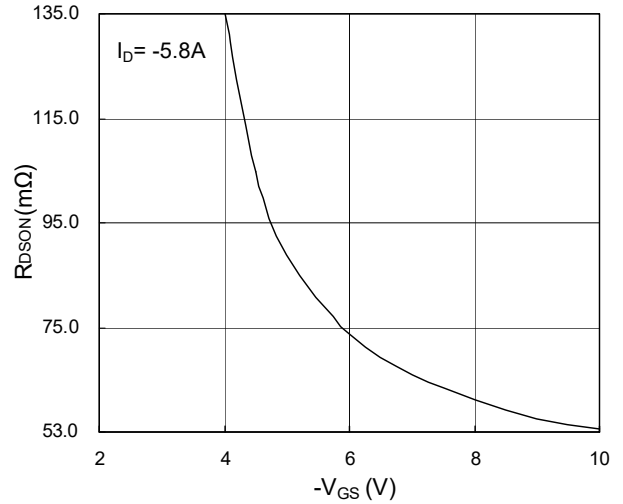


Fig.2 On-Resistance vs. G-S Voltage

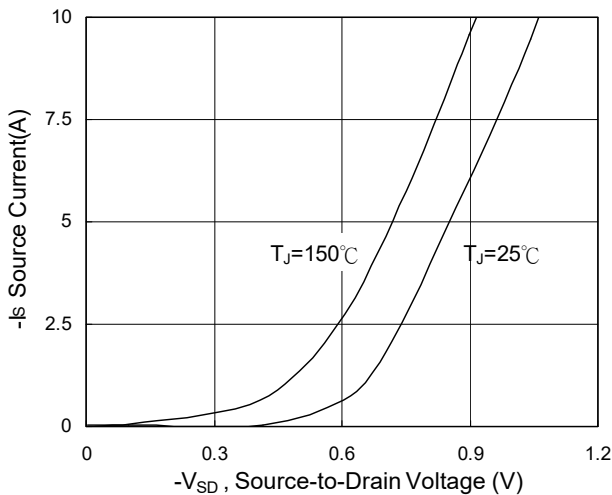


Fig.3 Forward Characteristics of Reverse

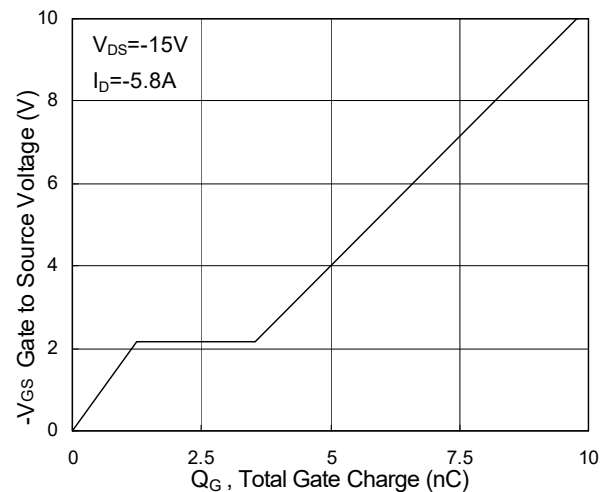


Fig.4 Gate-Charge Characteristics

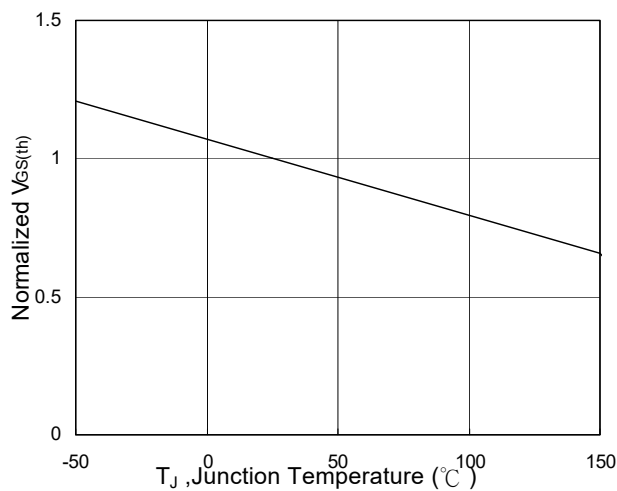


Fig.5 Normalized V<sub>GS(th)</sub> vs. T<sub>J</sub>

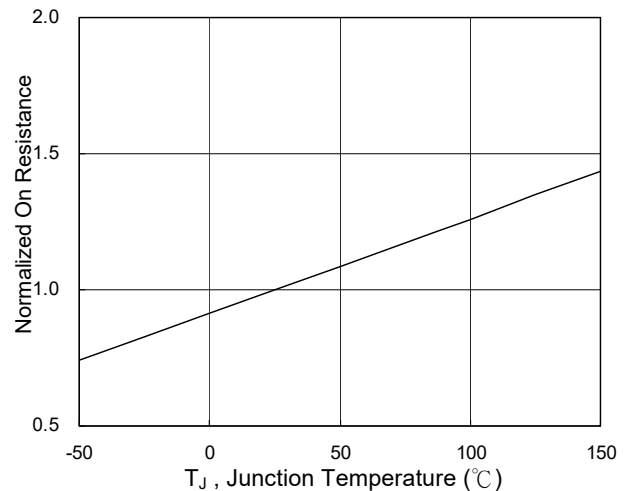


Fig.6 Normalized R<sub>DS(on)</sub> vs. T<sub>J</sub>

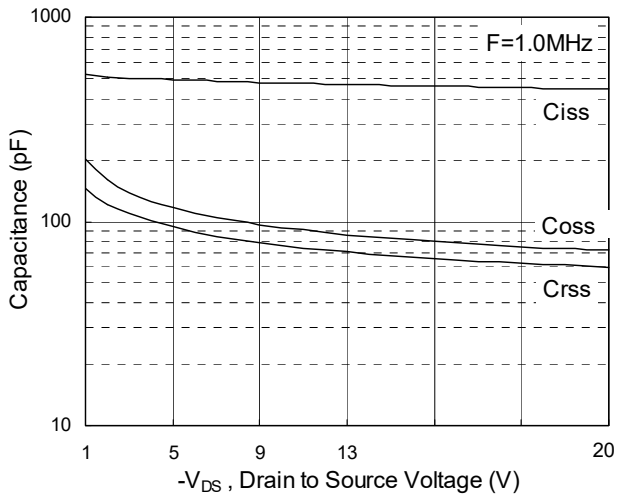


Fig.7 Capacitance

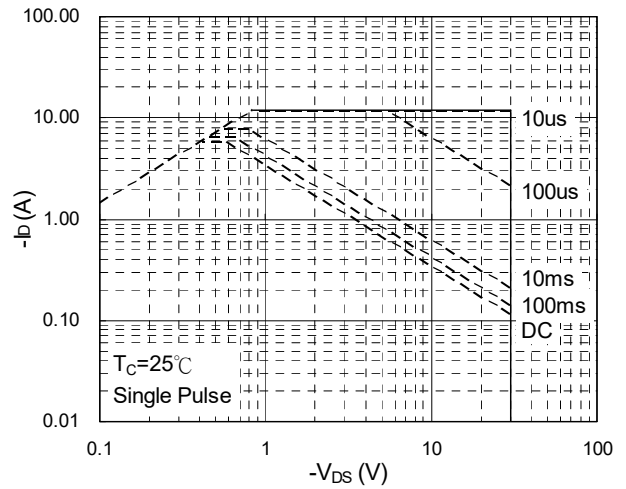


Fig.8 Safe Operating Area

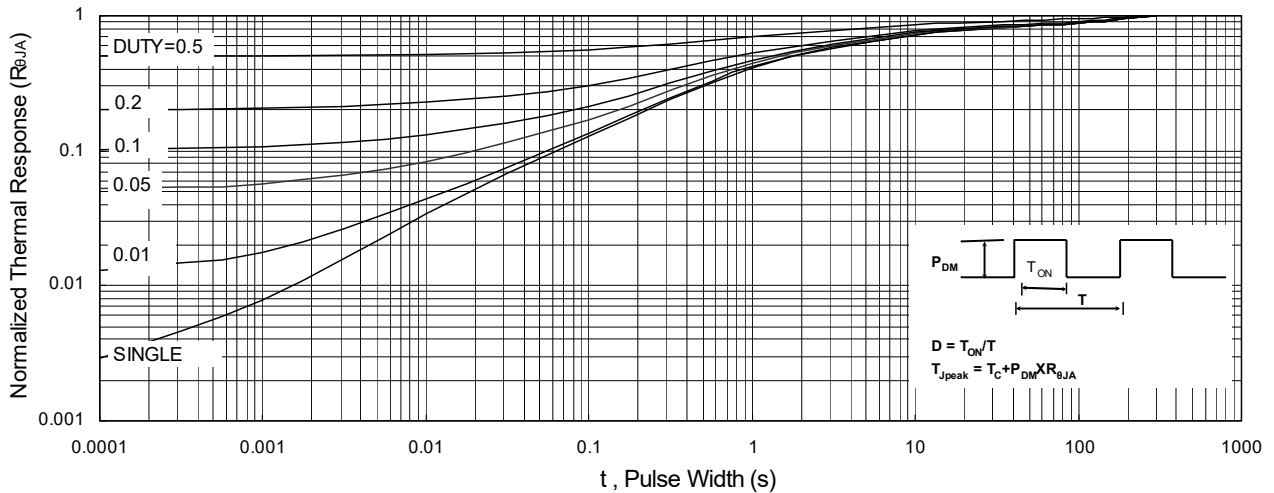


Fig.9 Normalized Maximum Transient Thermal Impedance

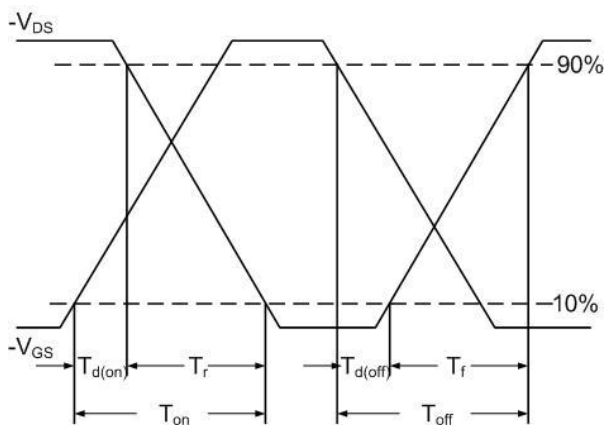


Fig.10 Switching Time Waveform

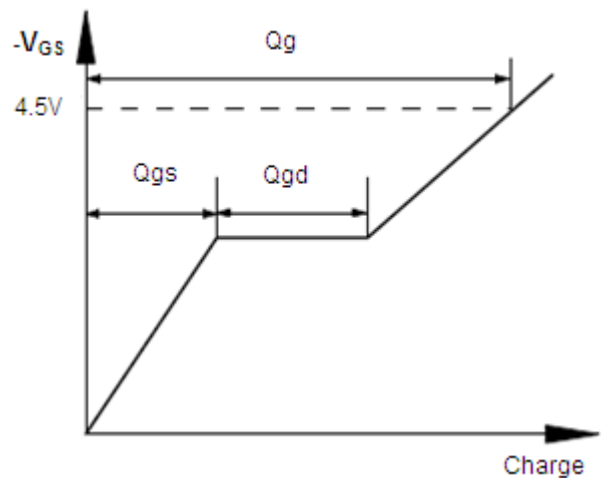
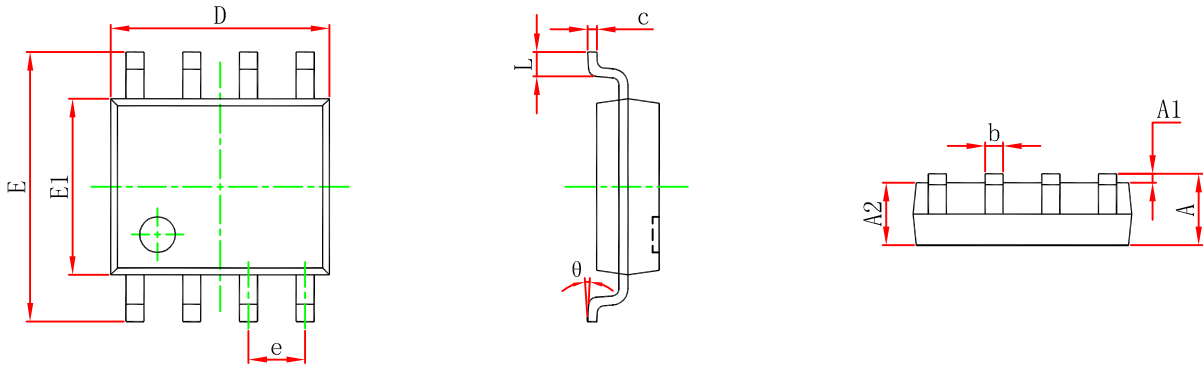


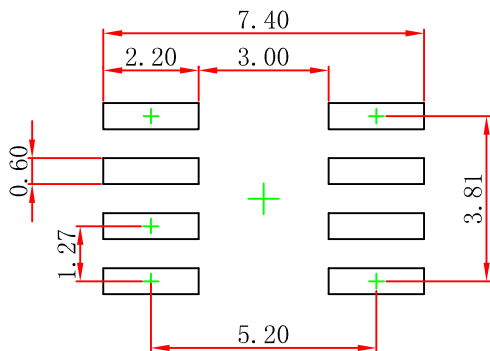
Fig.11 Gate Charge Waveform



### SOP-8(SO-8) Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.350	1.750	0.053	0.069
A1	0.100	0.250	0.004	0.010
A2	1.350	1.550	0.053	0.061
b	0.330	0.510	0.013	0.020
c	0.170	0.250	0.007	0.010
D	4.800	5.000	0.189	0.197
e	1.270 (BSC)		0.050 (BSC)	
E	5.800	6.200	0.228	0.244
E1	3.800	4.000	0.150	0.157
L	0.400	1.270	0.016	0.050
θ	0°	8°	0°	8°



Note:  
 1. Controlling dimension: in millimeters.  
 2. General tolerance:  $\pm 0.05\text{mm}$ .  
 3. The pad layout is for reference purposes only.



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