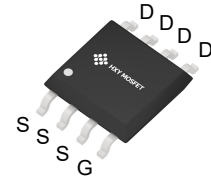




## Description

The IRF7831TRPBF 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.



SOP-8  
(SO-8)

## General Features

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

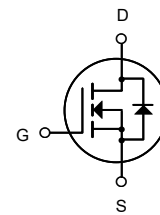
$R_{DS(ON)} < 4.5m\Omega @ V_{GS}=10V$

## Application

Battery protection

Load switch

Uninterruptible power supply



N-Channel MOSFET

## Ordering Information

Product ID	Pack	Brand	Qty(PCS)
IRF7831TRPBF	SOP-8(SO-8)	HXY MOSFET	3000

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

Symbol	Parameter	Limit	Unit
$V_{DS}$	Drain-Source Voltage	30	V
$V_{GS}$	Gate-Source Voltage	$\pm 20$	V
$I_D$	Drain Current-Continuous	30	A
$I_D(100^\circ C)$	Drain Current-Continuous( $T_C=100^\circ C$ )	21	A
$I_{DM}$	Pulsed Drain Current	120	A
$P_D$	Maximum Power Dissipation	1.4	W
$E_{AS}$	Single pulse avalanche energy	156	mJ
$T_J, T_{STG}$	Operating Junction and Storage Temperature Range	-55 To 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Case	90	$^\circ C/W$



**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	30	---	---	V
<b>I<sub>DSS</sub></b>	Zero Gate Voltage Drain Current	V <sub>GS</sub> =0V, V <sub>DS</sub> =30V	---	---	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	1.2	1.5	2.5	V
<b>R<sub>DS(on)</sub></b>	Drain-Source On Resistance <sup>4</sup>	V <sub>GS</sub> =10V, I <sub>D</sub> =10A	---	3.3	4.5	mΩ
		V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	---	4.6	5.5	mΩ
<b>C<sub>iss</sub></b>	Input Capacitance	V <sub>DS</sub> =15V, V <sub>GS</sub> =0V, f=1MHz	---	3100	---	pF
<b>C<sub>oss</sub></b>	Output Capacitance		---	370	--	
<b>C<sub>rss</sub></b>	Reverse Transfer Capacitance		---	286	---	
<b>t<sub>d(on)</sub></b>	Turn-On Delay Time	V <sub>DS</sub> =15V, I <sub>D</sub> =30A, R <sub>ENG</sub> =3Ω, V <sub>GS</sub> =10V	---	11	---	ns
<b>t<sub>r</sub></b>	Rise Time		---	30	---	ns
<b>t<sub>d(off)</sub></b>	Turn-Off Delay Time		---	49	---	ns
<b>t<sub>f</sub></b>	Fall Time		---	18	---	ns
<b>Q<sub>g</sub></b>	Total Gate Charge	V <sub>GS</sub> =10V, V <sub>DS</sub> =15V, I <sub>D</sub> =30A	---	24	---	nC
<b>Q<sub>gs</sub></b>	Gate-Source Charge		---	12	---	nC
<b>Q<sub>gd</sub></b>	Gate-Drain "Miller" Charge		---	13	---	nC
<b>V<sub>SD</sub></b>	Diode Forward Voltage	V <sub>GS</sub> =0V, I <sub>SD</sub> =30A	---	---	1.2	V
<b>I<sub>S</sub></b>	Continuous Drain Current	V <sub>D</sub> =V <sub>G</sub> =0V	---	---	30	A
<b>I<sub>SM</sub></b>	Pulsed Drain Current		---	---	120	A
<b>T<sub>rr</sub></b>	Reverse Recovery Time	I <sub>F</sub> =30A, T <sub>J</sub> =25	---	16	---	ns
<b>Q<sub>rr</sub></b>	Reverse Recovery Charge	°CdI/dt=100A/us	---	7	---	nC

**Notes:**

1. Computed continuous current assumes the condition of T<sub>J,Max</sub> while the actual continuous current depends on the thermal & electro-mechanical application board design
2. Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
3. EAS condition : T<sub>J</sub>=25°C, V<sub>DD</sub>=15V, V<sub>G</sub>=10V, L=0.5mH
4. Pulse Test: Pulse Width≤300μs, Duty Cycle≤0.5%



### Typical Characteristics

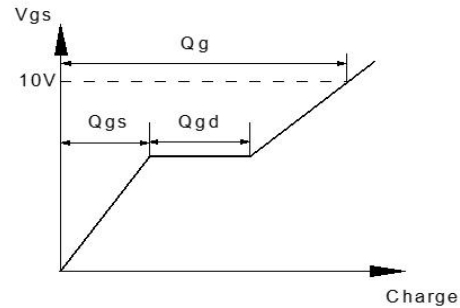
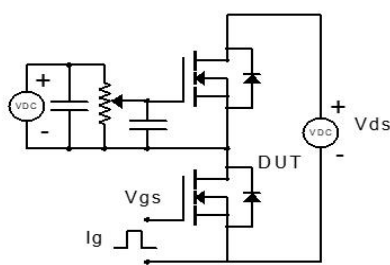


Figure 1: Gate Charge Test Circuit & Waveform

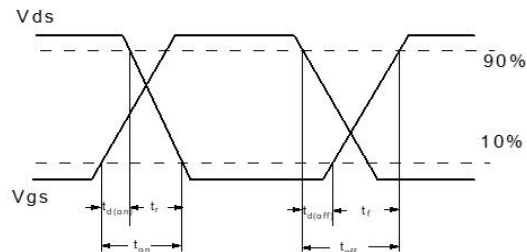
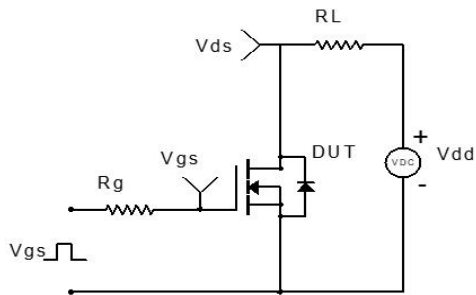


Figure 2: Resistive Switching Test Circuit & Waveform

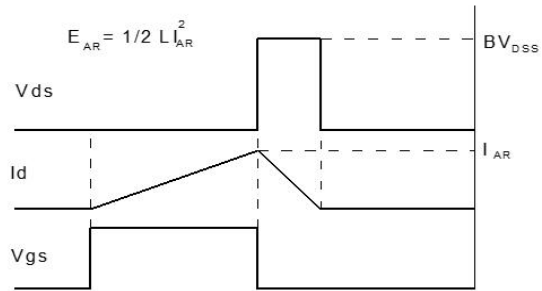
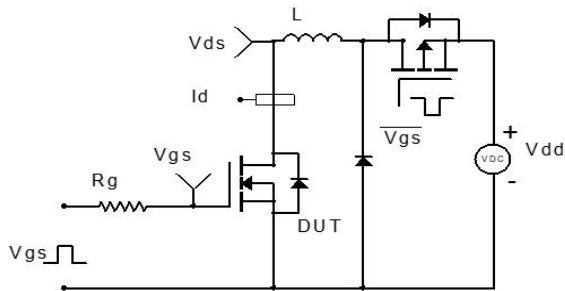


Figure 3: Unclamped Inductive Switching Test Circuit & Waveform

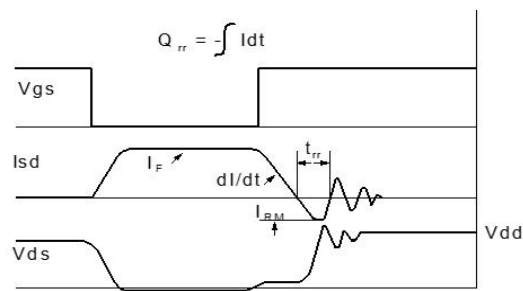
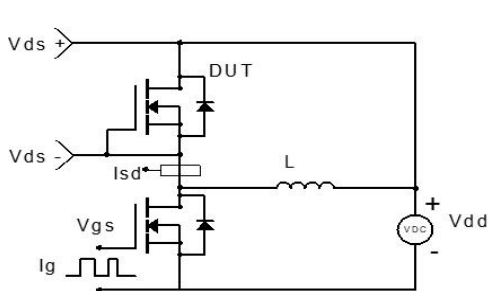
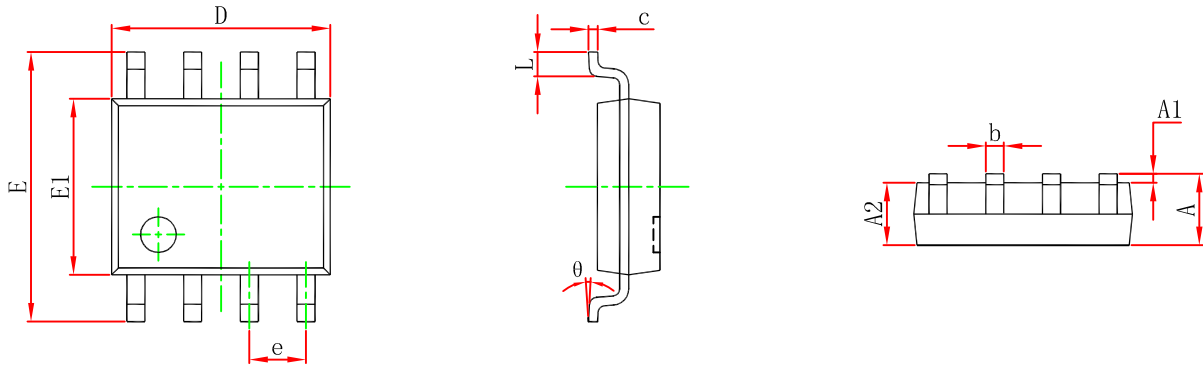


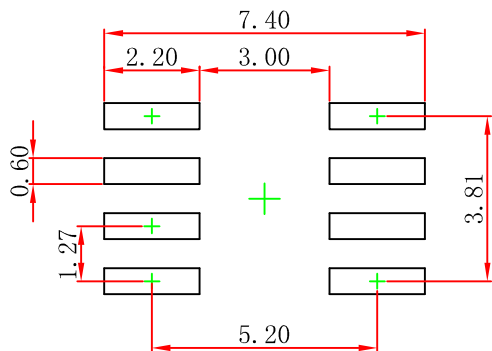
Figure 4: Diode Recovery Test Circuit & Waveform



### 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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