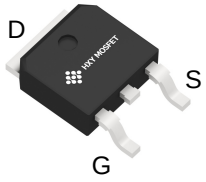
# IRLR3410TRPBF

N-Channel Enhancement Mode MOSFET

## Description

The IRLR3410TRPBF uses advanced trench technology and design to provide excellent $R_{DS(ON)}$ with low gat e charge. It can be used in a wide variety of applications.

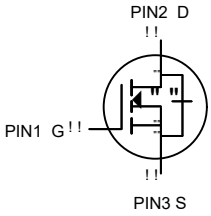



**TO-252-2L**
**(TO-252-2(DPAK))**

## General Features

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

$R_{DS(ON)}$ <112mΩ @ $V_{GS}$=10V




N-Channel MOSFET

## Application

Power switch

DC/DC converters

## Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| IRLR3410TRPBF | TO-252-2L(TO-252-2(DPAK)) | 15N10D XXX YYYY | 2500 |

## Absolute Maximum Ratings ($T_C$=25℃unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | 100 | V |
| $V_{GS}$ | Gate-Source Voltage | ±20 | V |
| $I_D$@$T_C$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 15 | A |
| $I_D$@$T_C$=100℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 7.7 | A |
| $I_D$@$T_A$=25℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 3 | A |
| $I_D$@$T_A$=70℃ | Continuous Drain Current, $V_{GS}$ @ 10V[1] | 2.4 | A |
| $I_{DM}$ | Pulsed Drain Current[2] | 24 | A |
| EAS | Single Pulse Avalanche Energy[3] | 6.1 | mJ |
| $I_{AS}$ | Avalanche Current | 11 | A |
| $P_D$@$T_C$=25℃ | Total Power Dissipation[3] | 34.7 | W |
| $P_D$@$T_A$=25℃ | Total Power Dissipation[3] | 2 | W |
| $T_{STG}$ | Storage Temperature Range | -55 to 150 | ℃ |
| $T_J$ | Operating Junction Temperature Range | -55 to 150 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance Junction-ambient [1] | 62 | ℃/W |
| $R_{\theta JC}$ | Thermal Resistance Junction-Case[1] | 3.6 | ℃/W |

## Electrical Characteristics ($T_J$=25 ℃, unless otherwise noted)

| Symbol | Parameter | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $BV_{DSS}$ | Drain-Source Breakdown Voltage | $V_{GS}$=0V , $I_D$=250uA | 100 | --- | --- | V |
| △ $BV_{DSS}$/△ $T_J$ | BVDSS Temperature Coefficient | Reference to 25℃ , $I_D$=1mA | --- | 0.098 | --- | V/℃ |
| $R_{DS(ON)}$ | Static Drain-Source On-Resistance[2] | $V_{GS}$=10V , $I_D$=10A | --- | 100 | 112 | mΩ |
| | | $V_{GS}$=4.5V , $I_D$=8A | --- | 117 | 130 | mΩ |
| $V_{GS(th)}$ | Gate Threshold Voltage | $V_{GS}$=$V_{DS}$ , $I_D$ =250uA | 1.0 | --- | 2.5 | V |
| | | | | | | |
| △ $V_{GS(th)}$ | $V_{GS(th)}$ Temperature Coefficient | | --- | -4.57 | --- | mV/℃ |
| $I_{DSS}$ | Drain-Source Leakage Current | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=25℃ | --- | --- | 1 | uA |
| | | $V_{DS}$=80V , $V_{GS}$=0V , $T_J$=55℃ | --- | --- | 5 | |
| $I_{GSS}$ | Gate-Source Leakage Current | $V_{GS}$=±20V , $V_{DS}$=0V | --- | --- | ±100 | nA |
| gfs | Forward Transconductance | $V_{DS}$=5V , $I_D$=10A | --- | 13 | --- | S |
| $R_g$ | Gate Resistance | $V_{DS}$=0V , $V_{GS}$=0V , f=1MHz | --- | 2 | --- | Ω |
| $Q_g$ | Total Gate Charge (10V) | $V_{DS}$=80V , $V_{GS}$=10V , $I_D$=10A | --- | 26.2 | --- | nC |
| $Q_{gs}$ | Gate-Source Charge | | --- | 4.6 | --- | |
| $Q_{gd}$ | Gate-Drain Charge | | --- | 5.1 | --- | |
| $T_{d(on)}$ | Turn-On Delay Time | $V_{DD}$=50V , $V_{GS}$=10V , $R_G$=3.3 $I_D$=10A | --- | 4.2 | --- | ns |
| $T_r$ | Rise Time | | --- | 8.2 | --- | |
| $T_{d(off)}$ | Turn-Off Delay Time | | --- | 35.6 | --- | |
| $T_f$ | Fall Time | | --- | 9.6 | --- | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$=15V , $V_{GS}$=0V , f=1MHz | --- | 1535 | --- | pF |
| $C_{oss}$ | Output Capacitance | | --- | 60 | --- | |
| $C_{rss}$ | Reverse Transfer Capacitance | | --- | 37 | --- | |
| $I_S$ | Continuous Source Current[1,5] | $V_G$=$V_D$=0V , Force Current | --- | --- | 12 | A |
| $I_{SM}$ | Pulsed Source Current[2,5] | | --- | --- | 24 | A |
| $V_{SD}$ | Diode Forward Voltage[2] | $V_{GS}$=0V , $I_S$=1A , $T_J$=25℃ | --- | --- | 1.2 | V |
| $t_{rr}$ | Reverse Recovery Time | $I_F$=10A , dI/dt=100A/μs , $T_J$=25℃ | --- | 37 | --- | nS |
| $Q_{rr}$ | Reverse Recovery Charge | | --- | 27.3 | --- | nC |

Note :

1.The data tested by surface mounted on a 1 inch$^2$ FR-4 board with 2OZ copper.

2.The data tested by pulsed , pulse width ≦ 300us , duty cycle ≦ 2%

3.The EAS data shows Max. rating . The test condition is $V_{DD}$=25V,$V_{GS}$=10V,L=0.1mH,$I_{AS}$=11A

4.The power dissipation is limited by 150℃ junction temperature

5 .The data is theoretically the same as $I_D$ and $I_{DM}$ , in real applications , should be limited by total power dissipation.

## Typical Characteristics

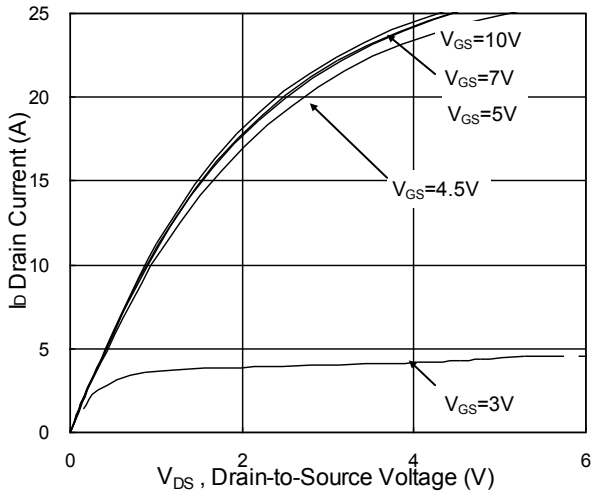



**Fig.1 Typical Output Characteristics**

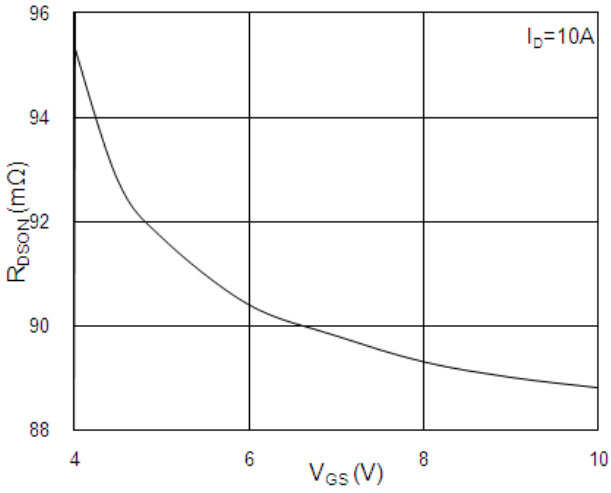



**Fig.2 On-Resistance vs. Gate-Source**

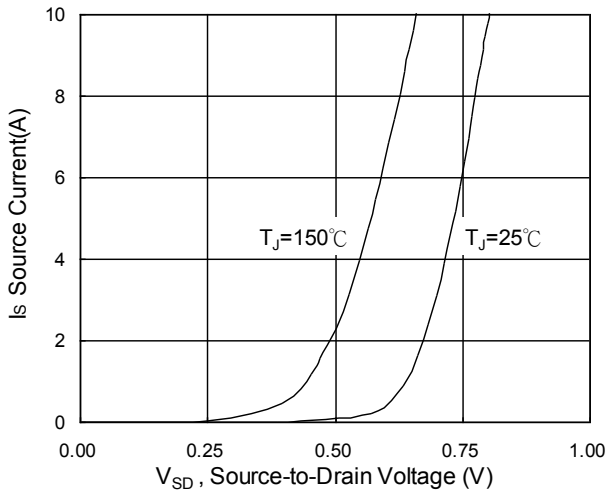



**Fig.3 Forward Characteristics Of Reverse**

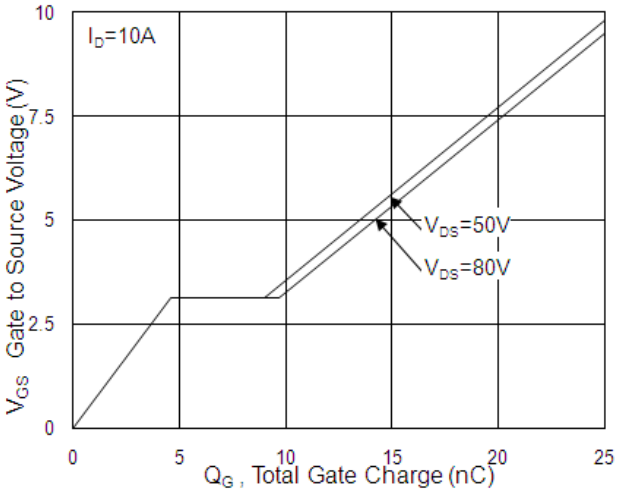



**Fig.4 Gate-Charge Characteristics**

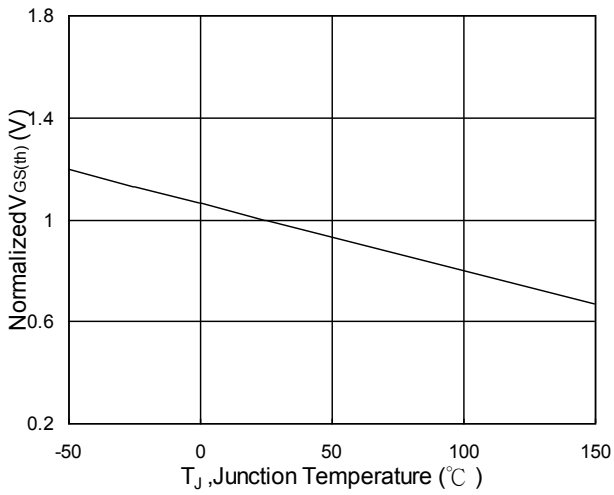



**Fig.5 Normalized $V_{GS(th)}$ vs. $T_J$**

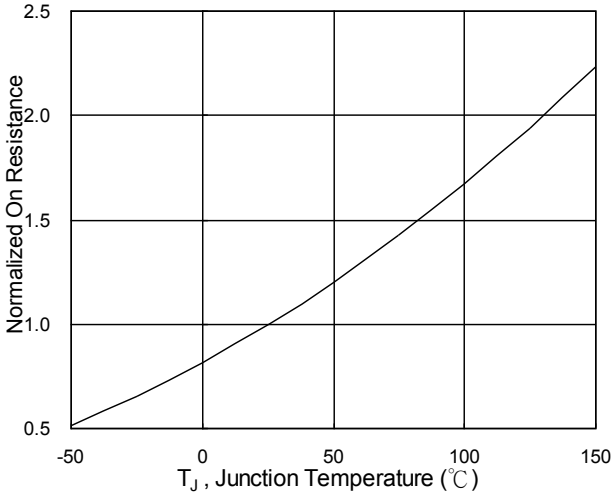



**Fig.6 Normalized $R_{DSON}$ vs. $T_J$**

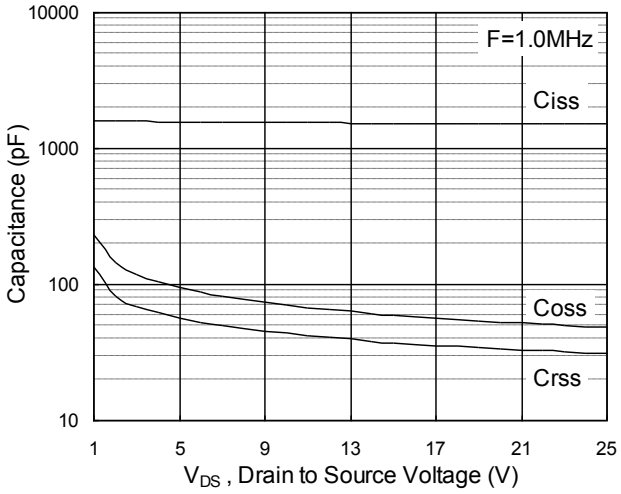



**Fig.7 Capacitance**

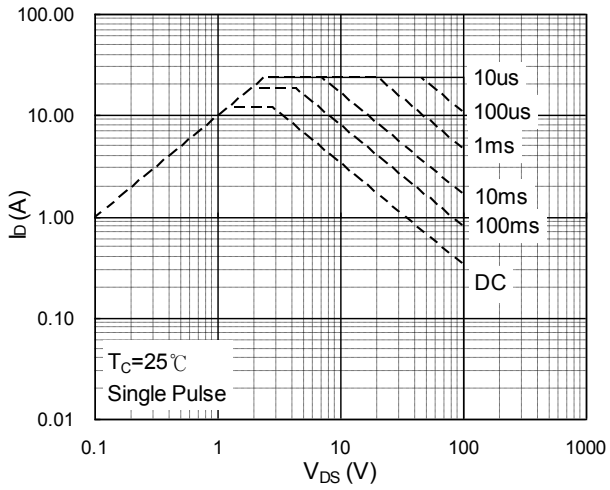



**Fig.8 Safe Operating Area**

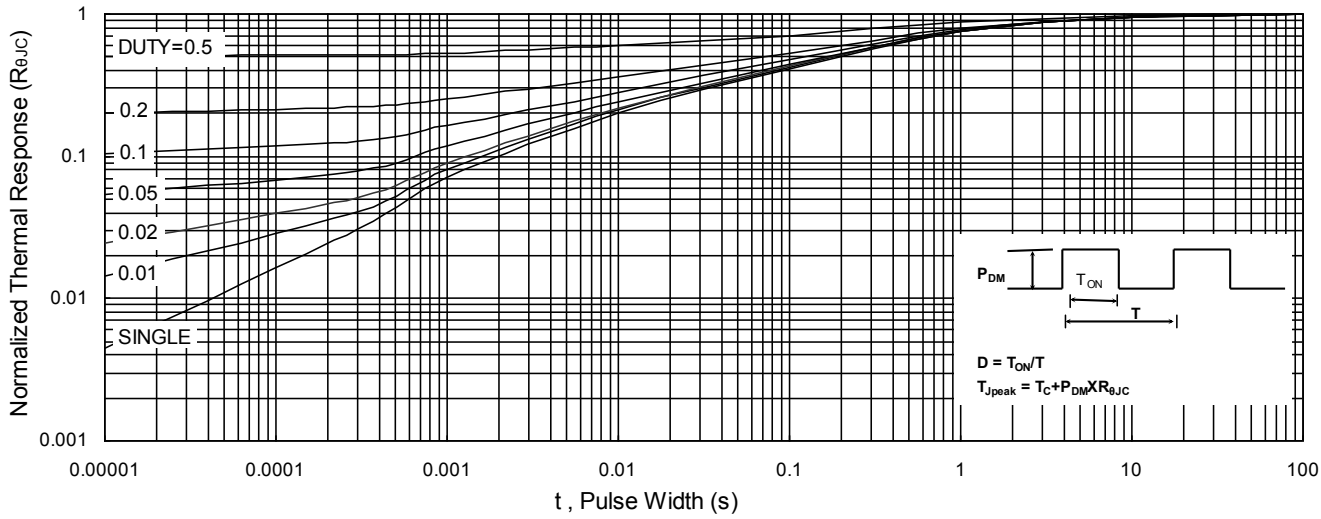



**Fig.9 Normalized Maximum Transient Thermal Impedance**

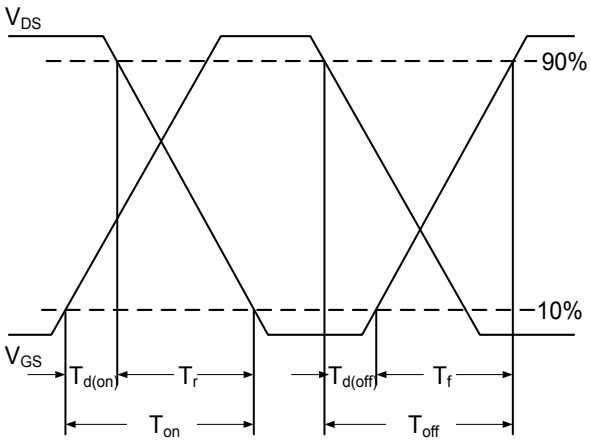



**Fig.10 Switching Time Waveform**

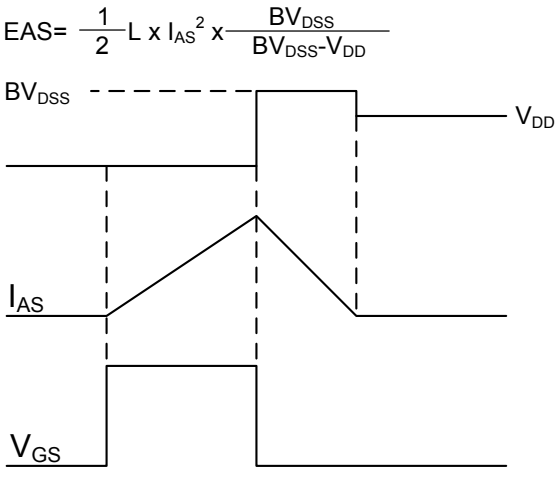
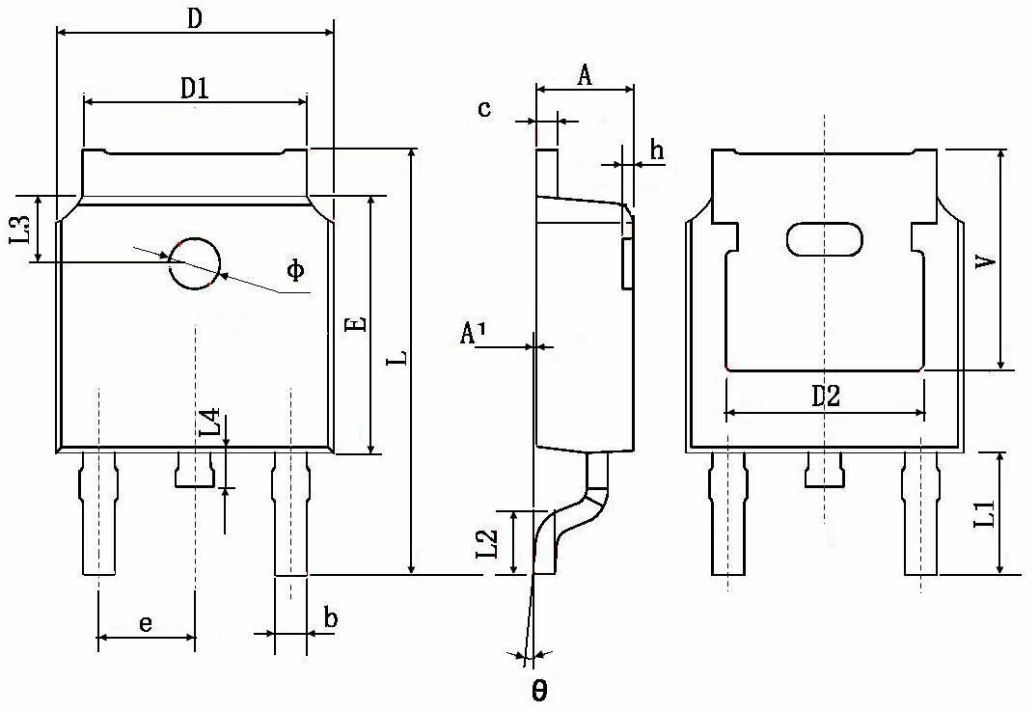



**Fig.11 Unclamped Inductive Switching Waveform**

## TO-252-2L(TO-252-2(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 | 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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