## Description

The IRLML5203TRPBF uses advanced trench technology to provide excellent $R_{DS(ON)}$, This device is suitable for use as a load switch or in PWM applications.


**SOT-23**

## General Features

$V_{DS}$ = -30V,$I_D$ = -4.2A

$R_{DS(ON)}$ < 55mΩ @ $V_{GS}$=-10V

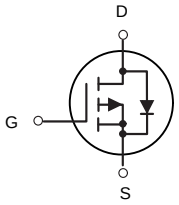
$R_{DS(ON)}$ < 75mΩ @ $V_{GS}$=-4.5V

## Application

Battery protection

Load switch

Uninterruptible power supply




P-Channel MOSFET

## Package Marking and Ordering Information

| Product ID | Pack | Marking | Qty(PCS) |
|---|---|---|---|
| IRLML5203TRPBF | SOT-23 | A19T | 3000 |

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

| Symbol | Parameter | Limit | Unit |
|---|---|---|---|
| $V_{DS}$ | Drain-Source Voltage | -30 | V |
| $V_{GS}$ | Gate-Source Voltage | ±12 | V |
| $I_D$ | Drain Current-Continuous | -4.2 | A |
| $I_{DM}$ | Drain Current-Pulsed (Note 1) | -30 | A |
| $P_D$ | Maximum Power Dissipation | 1.2 | W |
| $T_J$,$T_{STG}$ | Operating Junction and Storage Temperature Range | -55 To 150 | ℃ |
| $R_{\theta JA}$ | Thermal Resistance,Junction-to-Ambient (Note 2) | 104 | ℃/W |

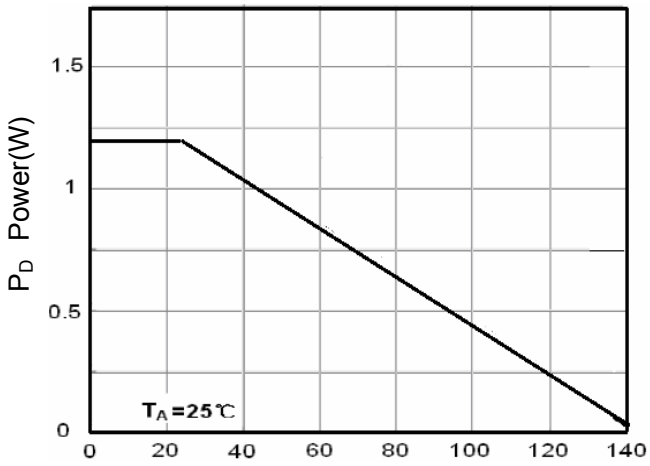
## Electrical Characteristics (TA=25℃unless otherwise noted)

| Parameter | Symbol | Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Drain-Source Breakdown Voltage | $BV_{DSS}$ | $V_{GS}$=0V $I_D$=-250μA | -30 | | - | V |
| Zero Gate Voltage Drain Current | $I_{DSS}$ | $V_{DS}$=-24V,$V_{GS}$=0V | - | - | -1 | μA |
| Gate-Body Leakage Current | $I_{GSS}$ | $V_{GS}$=±10V,$V_{DS}$=0V | - | - | ±100 | nA |
| Gate Threshold Voltage | $V_{GS(th)}$ | $V_{DS}$=$V_{GS}$,$I_D$=-250μA | -0.7 | -1 | -1.3 | V |
| Drain-Source On-State Resistance | $R_{DS(ON)}$ | $V_{GS}$=-10V, $I_D$=-4.2A | - | 45 | 55 | mΩ |
| | | $V_{GS}$=-4.5V, $I_D$=-4A | - | 56 | 75 | mΩ |
| | | $V_{GS}$=-2.5V, $I_D$=-1A | | 72 | 90 | mΩ |
| Forward Transconductance | $g_{FS}$ | $V_{DS}$=-5V,$I_D$=-4.2A | - | 10 | - | S |
| Input Capacitance | $C_{lss}$ | $V_{DS}$=-15V,$V_{GS}$=0V, F=1.0MHz | - | 880 | - | PF |
| Output Capacitance | $C_{oss}$ | | - | 105 | - | PF |
| Reverse Transfer Capacitance | $C_{rss}$ | | - | 65 | - | PF |
| Turn-on Delay Time | $t_{d(on)}$ | $V_{DD}$=-15V,$I_D$=-4.2A $V_{GS}$=-10V,$R_{GEN}$=6Ω | - | 7 | - | nS |
| Turn-on Rise Time | $t_r$ | | - | 3 | - | nS |
| Turn-Off Delay Time | $t_{d(off)}$ | | - | 30 | - | nS |
| Turn-Off Fall Time | $t_f$ | | - | 12 | - | nS |
| Total Gate Charge | $Q_g$ | $V_{DS}$=-15V,$I_D$=-4.2A,$V_{GS}$=-4.5V | - | 8.5 | - | nC |
| Gate-Source Charge | $Q_{gs}$ | | - | 1.8 | - | nC |
| Gate-Drain Charge | $Q_{gd}$ | | - | 2.7 | - | nC |
| **Drain-Source Diode Characteristics** | | | | | | |
| Diode Forward Voltage (Note 3) | $V_{SD}$ | $V_{GS}$=0V,$I_S$=-4.2A | - | - | -1.2 | V |

**Notes:**

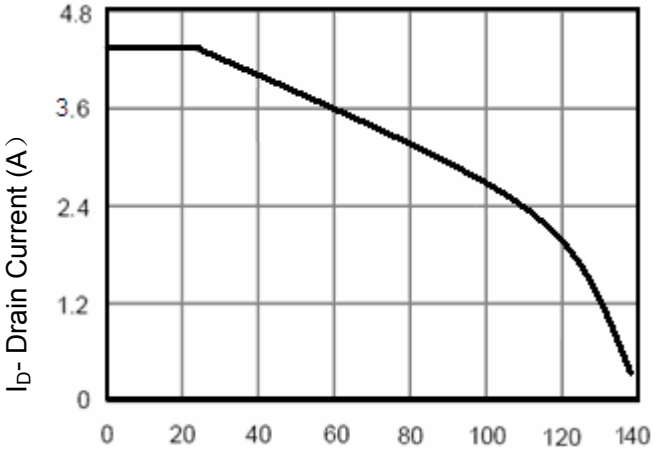
1、Repetitive Rating: Pulse width limited by maximum junction temperature.
2、Surface Mounted on FR4 Board, t ≤ 10 sec.
3、Pulse Test: Pulse Width ≤ 300μs, Duty Cycle ≤ 2%.
4、Guaranteed by design, not subject to production

## Typical Electrical and Thermal Characteristics



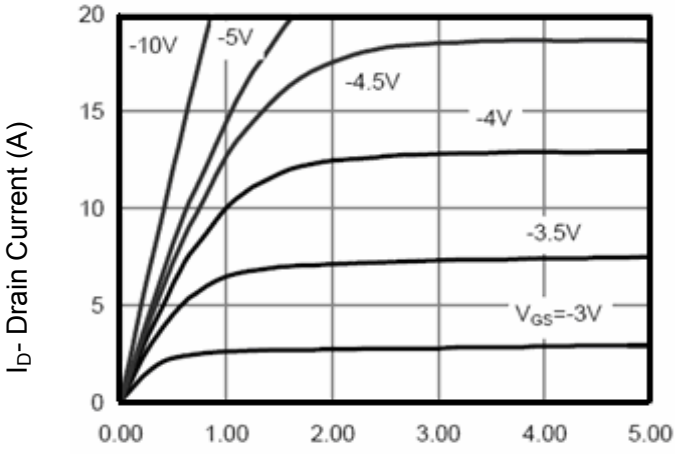

$T_J$-Junction Temperature(℃)

Figure 1 Power Dissipation



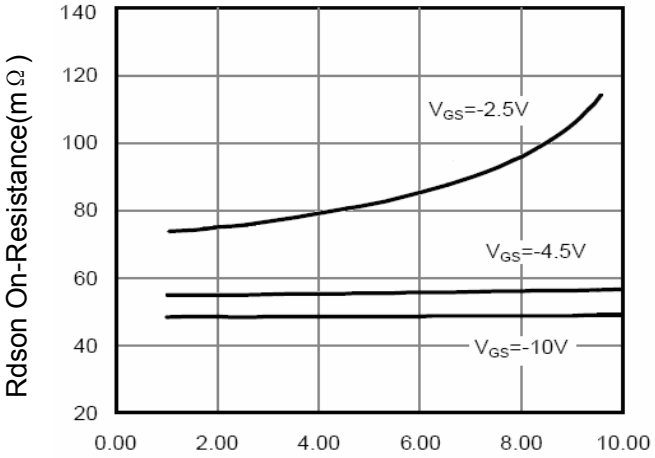

$T_J$-Junction Temperature(℃)

Figure 2 Drain Current



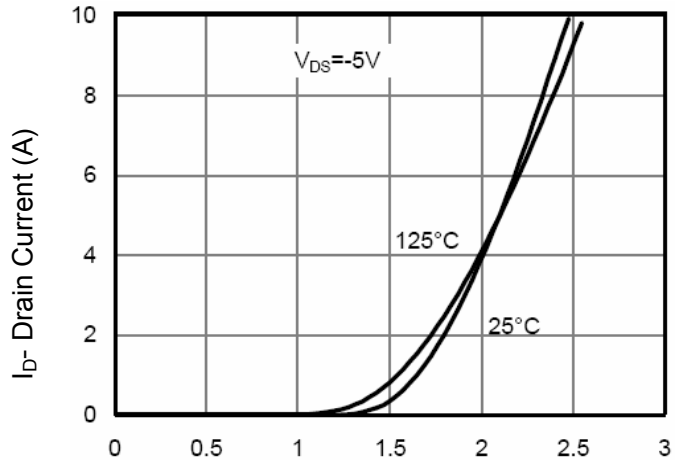

Vds Drain-Source Voltage (V)

Figure 3 Output Characteristics



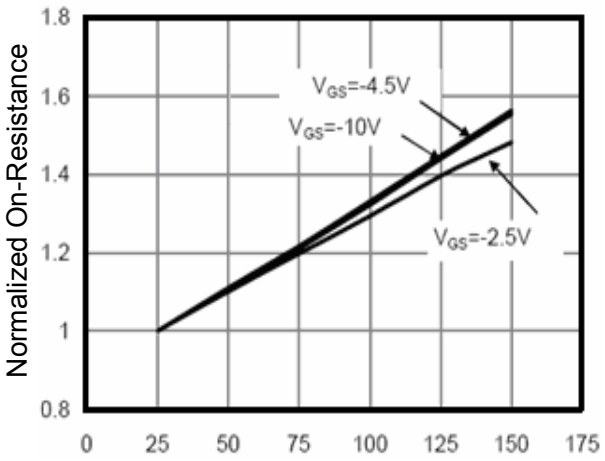

$I_D$- Drain Current (A)

Figure 4 Drain-Source On-Resistance



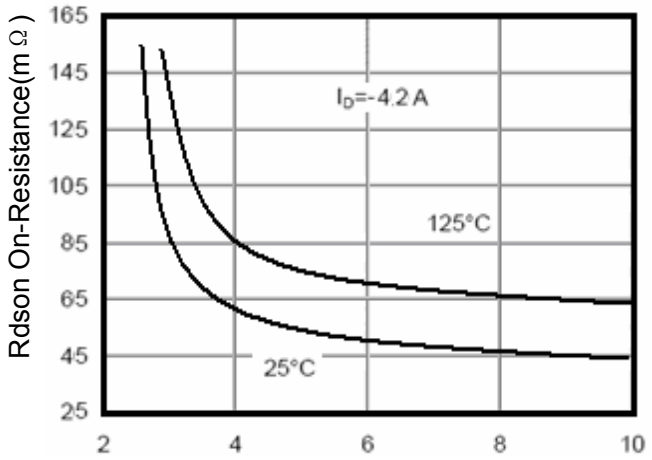

Vgs Gate-Source Voltage (V)

Figure 5 Transfer Characteristics



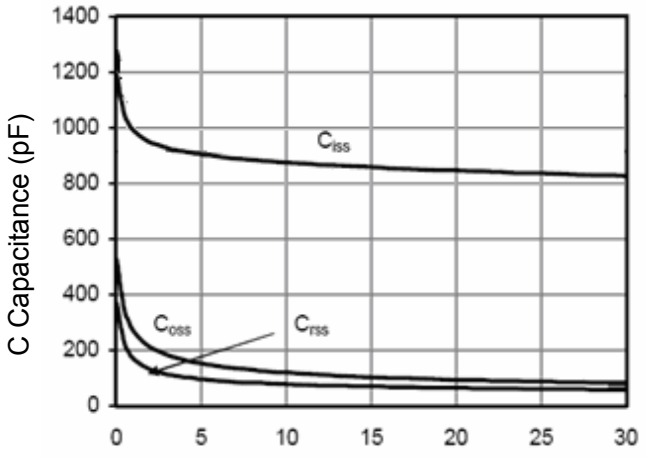

$T_J$-Junction Temperature(℃)

Figure 6 Drain-Source On-Resistance



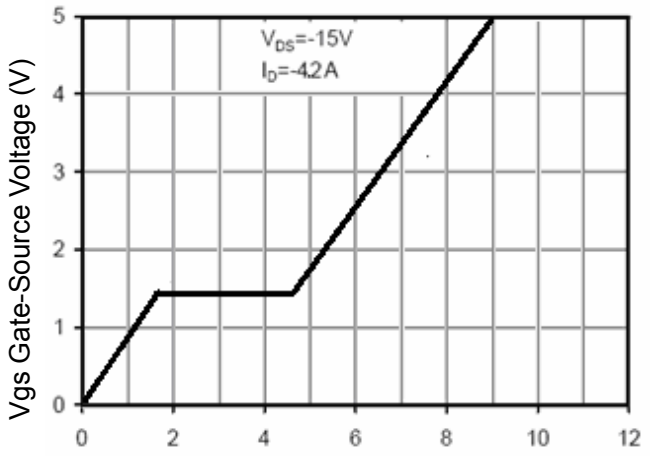

Vgs Gate-Source Voltage (V)

Figure 7 Rdson vs Vgs



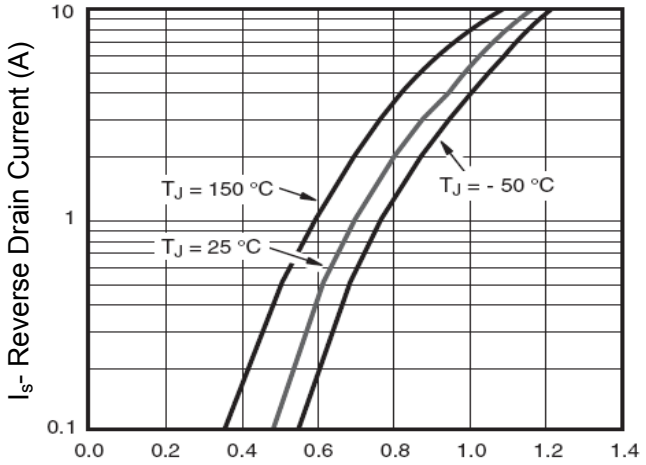

Vds Drain-Source Voltage (V)

Figure 8 Capacitance vs Vds



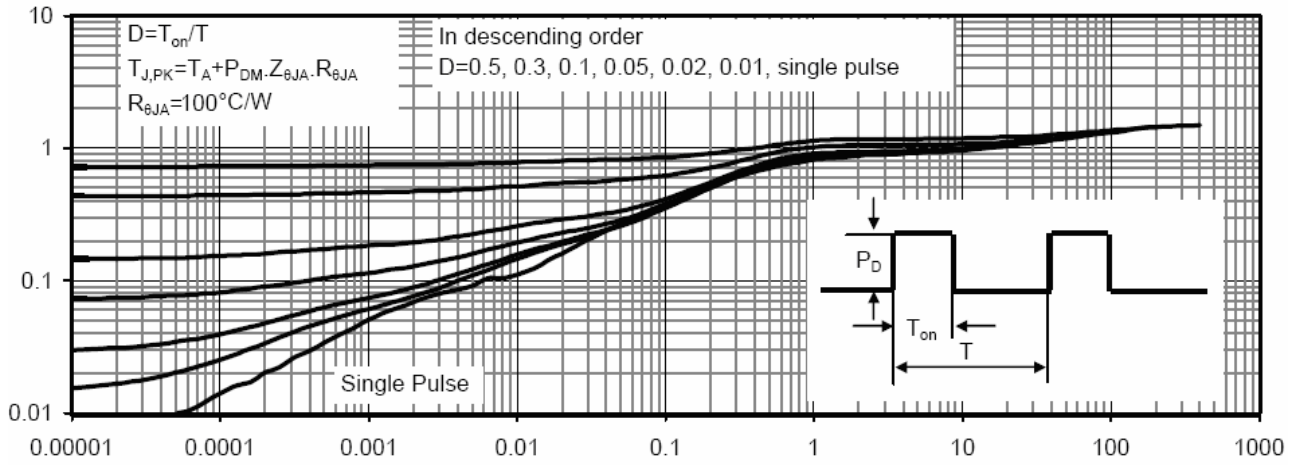

Qg Gate Charge (nC)

Figure 9 Gate Charge




Vsd Source-Drain Voltage (V)

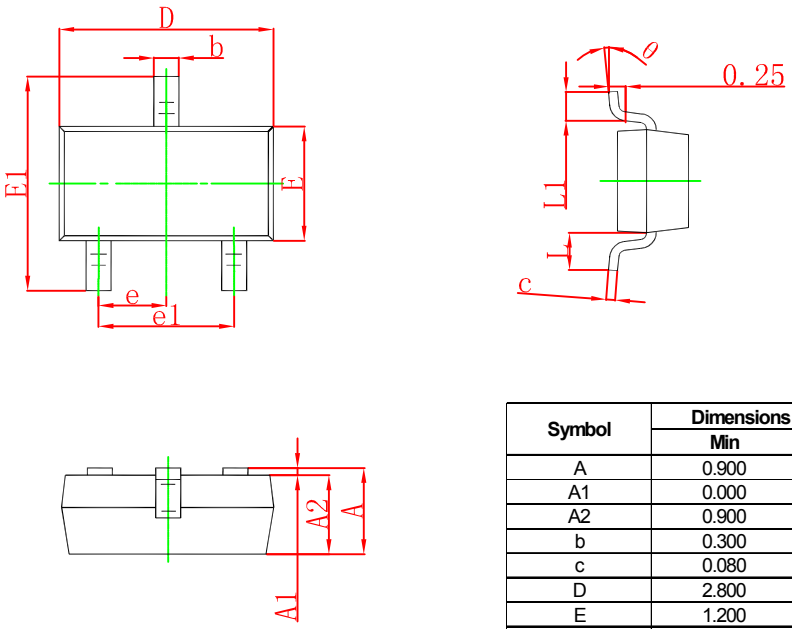
Figure 10 Source- Drain Diode Forward




Square Wave Pluse Duration(sec)

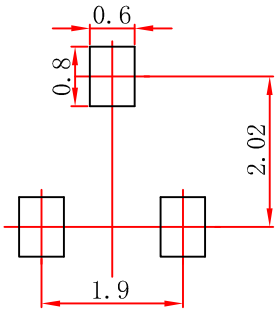
**Figure 14 Normalized Maximum Transient Thermal Impedance**

## SOT-23 Package Outline Dimensions




| Symbol | Dimensions In Millimeters | | Dimensions In Inches | |
|---|---|---|---|---|
| | Min | Max | Min | Max |
| A | 0.900 | 1.150 | 0.035 | 0.045 |
| A1 | 0.000 | 0.100 | 0.000 | 0.004 |
| A2 | 0.900 | 1.050 | 0.035 | 0.041 |
| b | 0.300 | 0.500 | 0.012 | 0.020 |
| c | 0.080 | 0.150 | 0.003 | 0.006 |
| D | 2.800 | 3.000 | 0.110 | 0.118 |
| E | 1.200 | 1.400 | 0.047 | 0.055 |
| E1 | 2.250 | 2.550 | 0.089 | 0.100 |
| e | 0.950 TYP | | 0.037 TYP | |
| e1 | 1.800 | 2.000 | 0.071 | 0.079 |
| L | 0.550 REF | | 0.022 REF | |
| L1 | 0.300 | 0.500 | 0.012 | 0.020 |
| θ | 0° | 8° | 0° | 8° |

## SOT-23 Suggested Pad Layout




Note:
1.Controlling dimension:in millimeters.
2.General tolerance:± 0.05mm.
3.The pad layout is for reference purposes only.

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