

Description

The IRLML6402 uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.

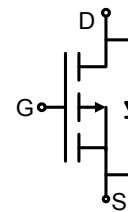
Dimensions SOT-23



General Features

- $V_{DS} = -20V$ $I_D = -2.3A$
- $R_{DS(ON)} < 150m\Omega @ V_{GS} = -4.5V$

Pin Configuration



Application

- Battery protection
- Load switch
- Uninterruptible power supply

Package Marking and Ordering Information

| Device | Device Marking | Device Package | Reel Size | Tape width | Quantity |
|-----------|----------------|----------------|-----------|------------|------------|
| IRLML6402 | A1SHB | SOT-23 | Ø180mm | 8 mm | 3000 units |

Absolute Maximum Ratings (TC=25°C unless otherwise noted)

| Symbol | Parameter | Rating | Units |
|-----------------|---|------------|-------|
| V_{DS} | Drain-Source Voltage | -20 | V |
| V_{GS} | Gate-Source Voltage | ±12 | V |
| I_D | Drain Current-Continuous | -2.3 | A |
| I_{DM} | Drain Current -Pulsed ^(Note 1) | -10 | A |
| P_D | Maximum Power Dissipation | 0.7 | W |
| T_J, T_{STG} | Operating Junction and Storage Temperature Range | -55 To 150 | °C |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient ^(Note 2) | 178 | °C/W |

Electrical Characteristics (T_J=25°C, unless otherwise noted)

| Symbol | Parameter | Condition | Min | Typ | Max | Unit |
|---------------------|---|--|------|------|------|------|
| BV _{DSS} | Drain-Source Breakdown Voltage | V _{GS} =0V I _D =-250μA | -20 | | - | V |
| I _{DSS} | Zero Gate Voltage Drain Current | V _{DS} =-20V, V _{GS} =0V | - | - | -1 | μA |
| I _{GSS} | Gate-Body Leakage Current | V _{GS} =±12V, V _{DS} =0V | - | - | ±100 | nA |
| V _{GS(th)} | Gate Threshold Voltage | V _{DS} =V _{GS} , I _D =-250μA | -0.5 | -0.7 | -1.2 | V |
| R _{DS(on)} | Drain-Source On-State Resistance | V _{GS} =-4.5V, I _D =-2 A | - | 135 | 165 | mΩ |
| | | V _{GS} =-2.5V, I _D =-1.8A | - | 150 | 185 | mΩ |
| g _{FS} | Forward Transconductance | V _{DS} =-5V, I _D =-2A | 4 | - | - | S |
| C _{ISS} | Input Capacitance | V _{DS} =-10V, V _{GS} =0V, F=1.0MHz | - | 290 | - | PF |
| C _{OSS} | Output Capacitance | | - | 60 | - | PF |
| C _{RSS} | Reverse Transfer Capacitance | | - | 34 | - | PF |
| t _{d(on)} | Turn-on Delay Time | V _{DD} =-10V, R _L =5Ω V _{GS} =- 4.5V, R _{GEN} =3Ω | - | 10 | - | nS |
| t _r | Turn-on Rise Time | | - | 5.0 | - | nS |
| t _{d(off)} | Turn-Off Delay Time | | - | 21 | - | nS |
| t _f | Turn-Off Fall Time | | - | 7 | - | nS |
| Q _g | Total Gate Charge | V _{DS} =-10V, I _D =-2A, V _{GS} =-4.5V | - | 3.0 | - | nC |
| Q _{gs} | Gate-Source Charge | | - | 0.5 | - | nC |
| Q _{gd} | Gate-Drain Charge | | - | 0.8 | - | nC |
| V _{SD} | Diode Forward Voltage ^(Note 3) | V _{GS} =0V, I _S =-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 Characteristics

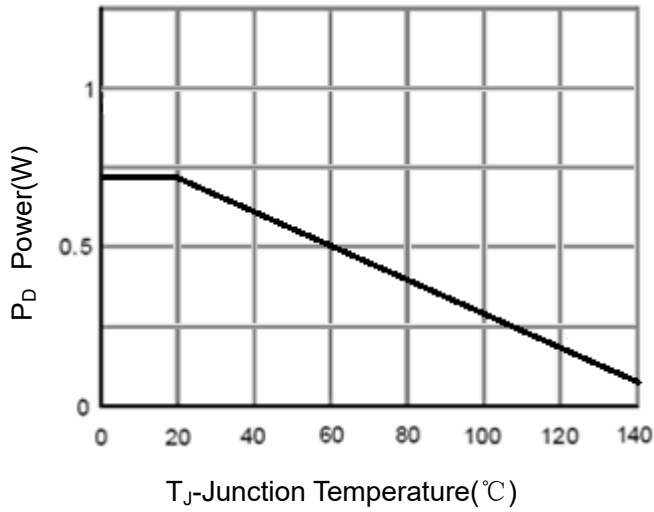


Figure 1 Power Dissipation

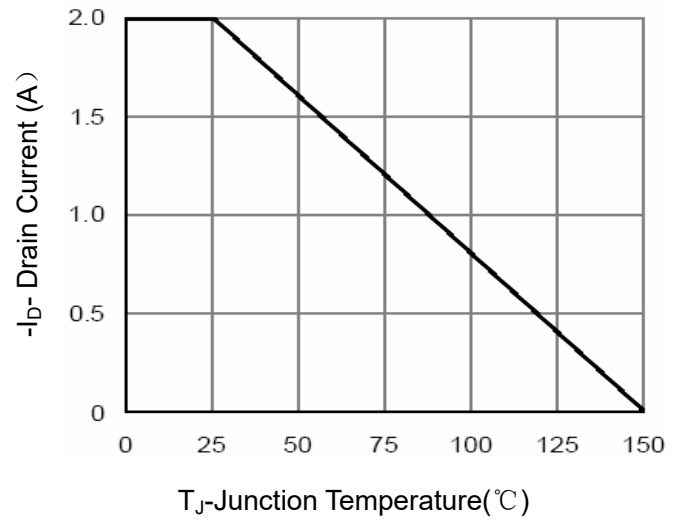


Figure 2 Drain Current

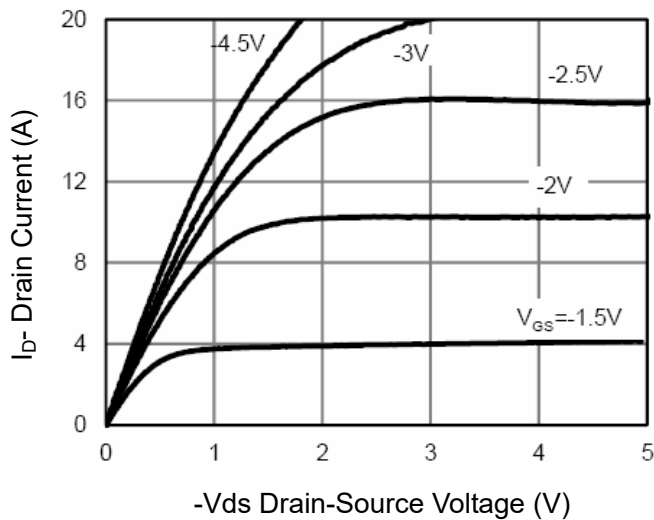


Figure 3 Output Characteristics

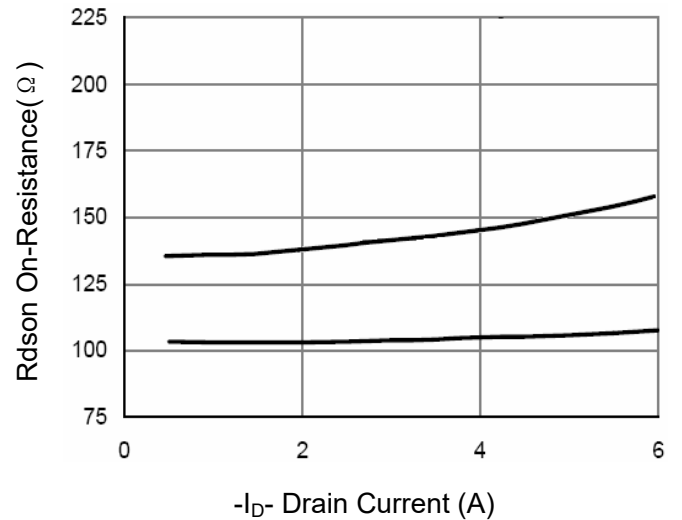


Figure 4 Drain-Source On-Resistance

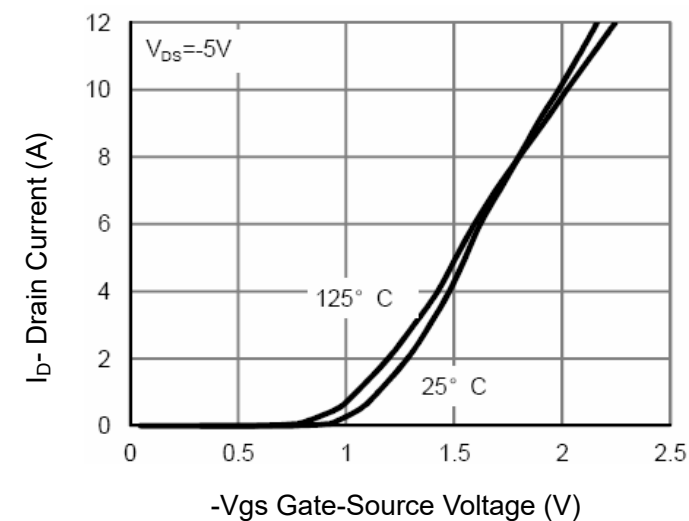


Figure 5 Transfer Characteristics

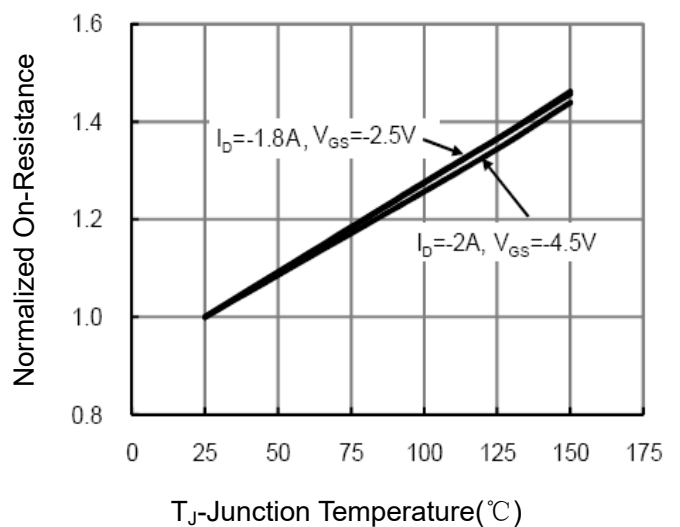


Figure 6 Drain-Source On-Resistance

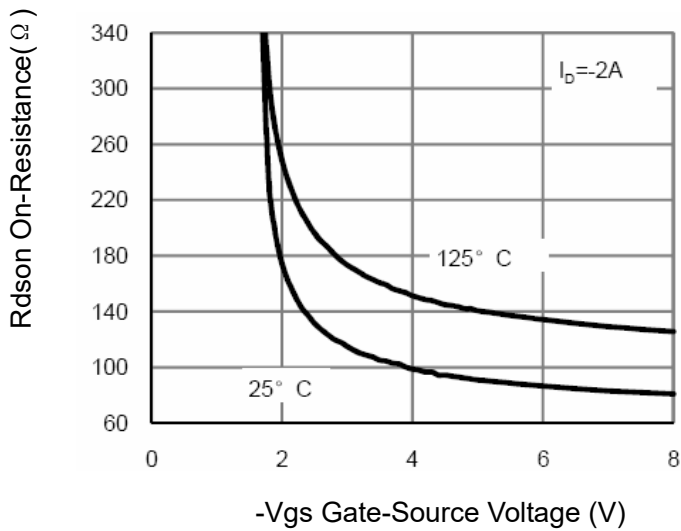


Figure 7 Rdson vs Vgs

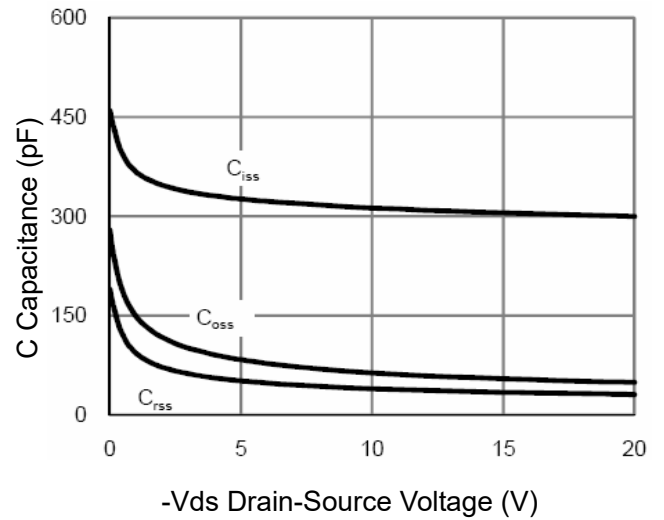


Figure 8 Capacitance vs Vds

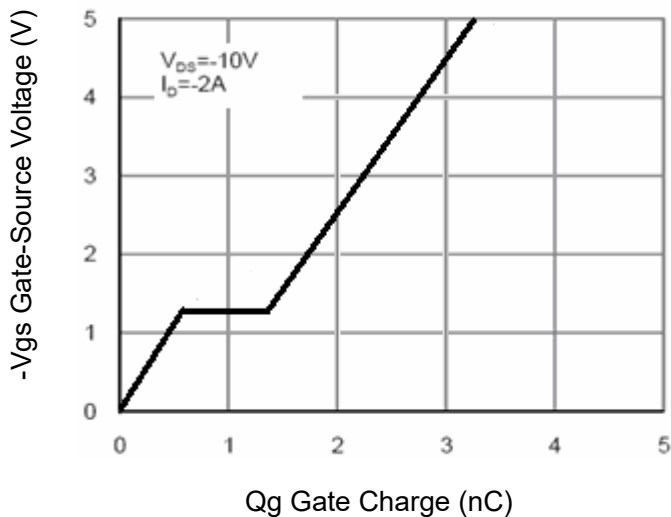


Figure 9 Gate Charge

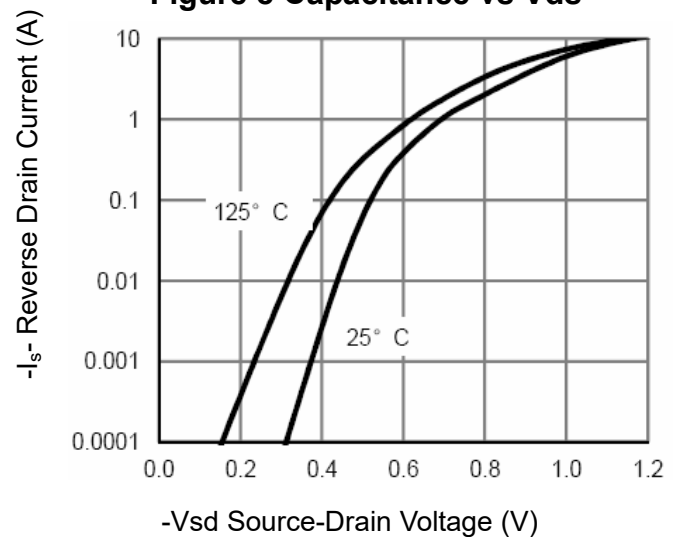


Figure 10 Source- Drain Diode Forward

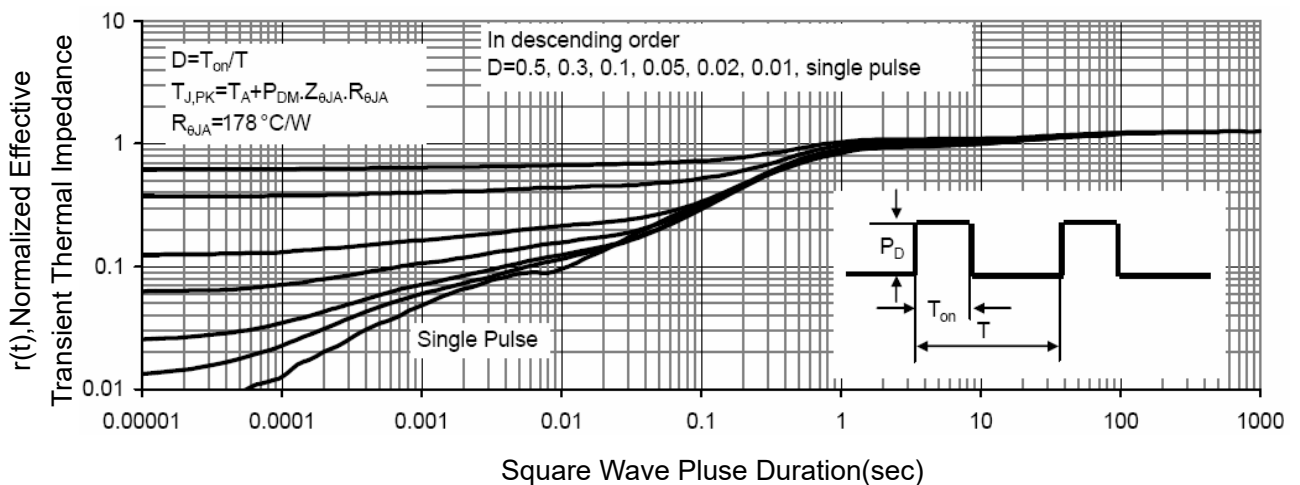
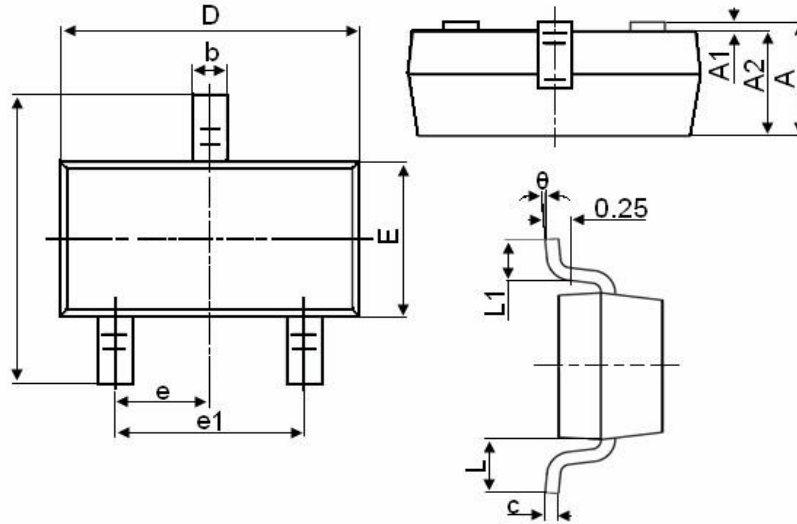


Figure 11 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data:SOT-23



| Symbol | Dimensions in Millimeters | |
|--------|---------------------------|-------|
| | MIN. | MAX. |
| A | 0.900 | 1.150 |
| A1 | 0.000 | 0.100 |
| A2 | 0.900 | 1.050 |
| b | 0.300 | 0.500 |
| c | 0.080 | 0.150 |
| D | 2.800 | 3.000 |
| E | 1.200 | 1.400 |
| E1 | 2.250 | 2.550 |
| e | 0.950TYP | |
| e1 | 1.800 | 2.000 |
| L | 0.550REF | |
| L1 | 0.300 | 0.500 |
| θ | 0° | 8° |