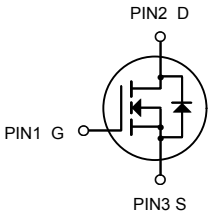
Description

The IRLML2502TRPBF 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.

SOT23



N-Channel MOSFET

General Features

V_{DS} = 20V I_D =6 A

$R_{DS(ON)}$ < 27mΩ @ V_{GS}=4.5V

Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
IRLML2502TRPBF	SOT23	AE9T	3000

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Symbol	Parameter		Limit	Unit
V_{DS}	Drain-Source Voltage		20	V
V_{GS}	Gate-Source Voltage		±12	V
I_D	Continuous Drain Current	T_A =25℃	6	A
		T_A =70℃	3.6	
I_{DM}	Drain Current-Pulsed (Note 1)		15	A
P_D	Maximum Power Dissipation		1.25	W
T_J,T_{STG}	Operating Junction and Storage Temperature Range		-55 To 150	℃
$R_{\theta JA}$	Thermal Resistance,Junction-to-Ambient (Note 2)		100	℃/W

Electrical Characteristics (T_A=25℃unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	V_{GS}=0V I_D=250μA	20	22.5	-	V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V,V_{GS}=0V	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	V_{GS}=±12V,V_{DS}=0V	-	-	±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS},I_D=250μA	0.5	0.65	1.0	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=4.0 A	-	22	27	mΩ
		V_{GS}=2.5V, I_D=4.5A	-	28	40	mΩ
Forward Transconductance	g_{FS}	V_{DS}=10V,I_D=4A	-	10	-	S
Input Capacitance	C_{lss}	V_{DS}=8V,V_{GS}=0V, F=1.0MHz	-	500	-	PF
Output Capacitance	C_{oss}		-	295	-	PF
Reverse Transfer Capacitance	C_{rss}		-	96	-	PF
Turn-on Delay Time	$t_{d(on)}$	V_{DD}=10V,I_D=1A V_{GS}=4.5V,R_{GEN}=6Ω	-	11	-	nS
Turn-on Rise Time	t_r		-	30	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	35	-	nS
Turn-Off Fall Time	t_f		-	10	-	nS
Total Gate Charge	Q_g	V_{DS}=10V,I_D=3A,V_{GS}=4.5V	-	10	15	nC
Gate-Source Charge	Q_{gs}		-	2.3	-	nC
Gate-Drain Charge	Q_{gd}		-	2.9	-	nC
Diode Forward Voltage (Note 3)	V_{SD}	V_{GS}=0V,I_S=1A	-	-	1.2	V
Diode Forward Current (Note 2)	I_S		-	-	4.5	A

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

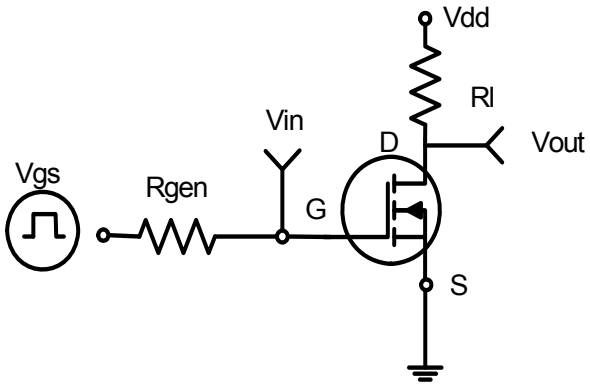


Figure 1:Switching Test Circuit

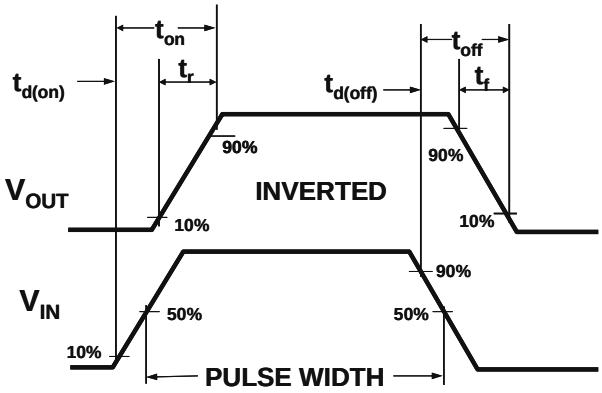


Figure 2:Switching Waveforms

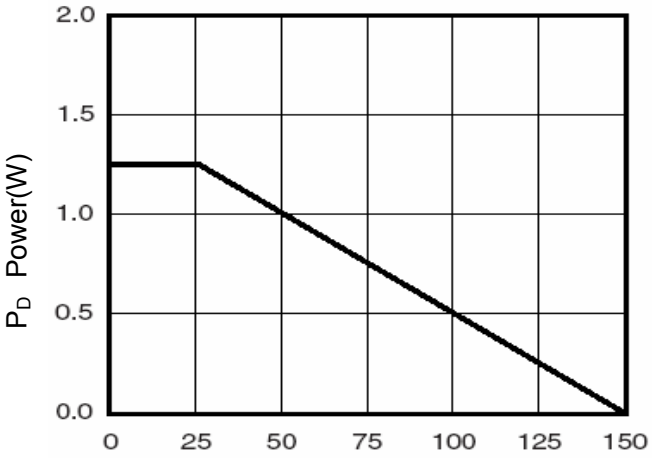


Figure 3 Power Dissipation

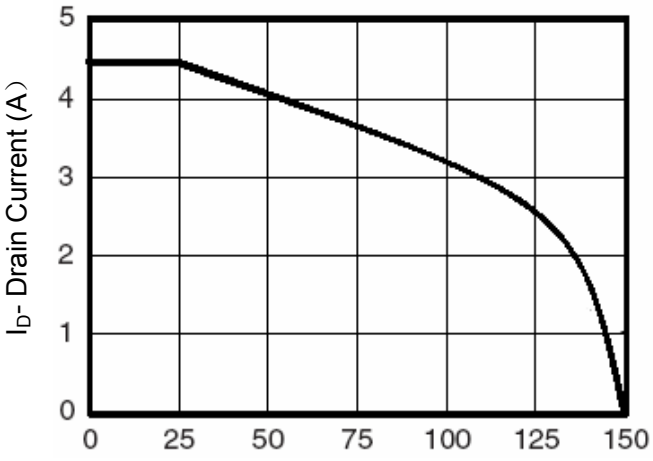


Figure 4 Drain Current

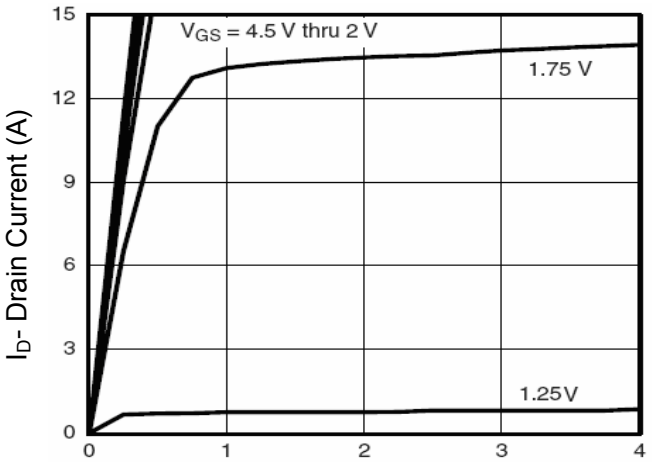


Figure 5 Output Characteristics

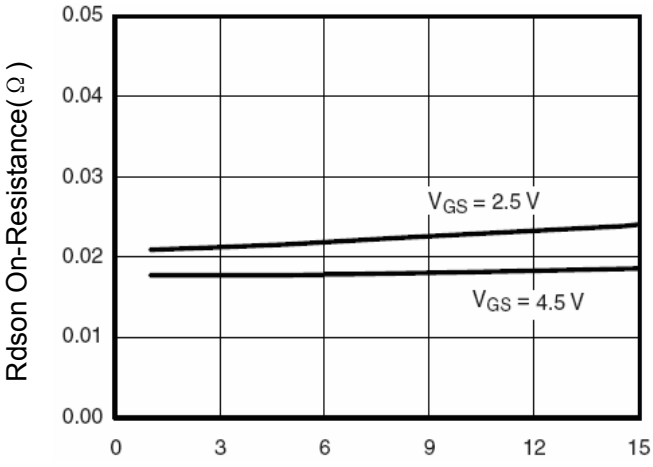


Figure 6 Drain-Source On-Resistance

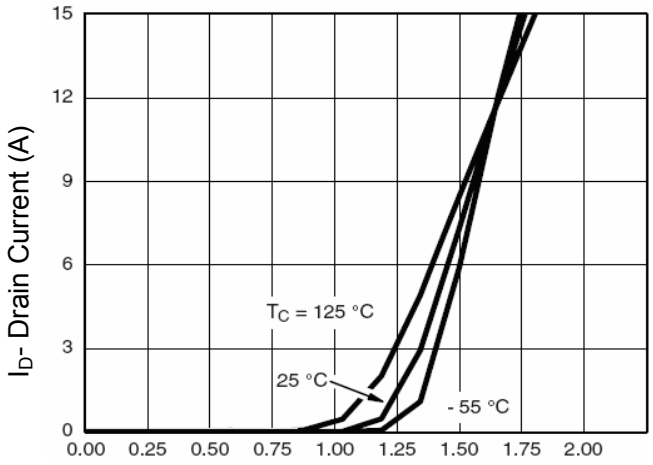


Figure 7 Transfer Characteristics

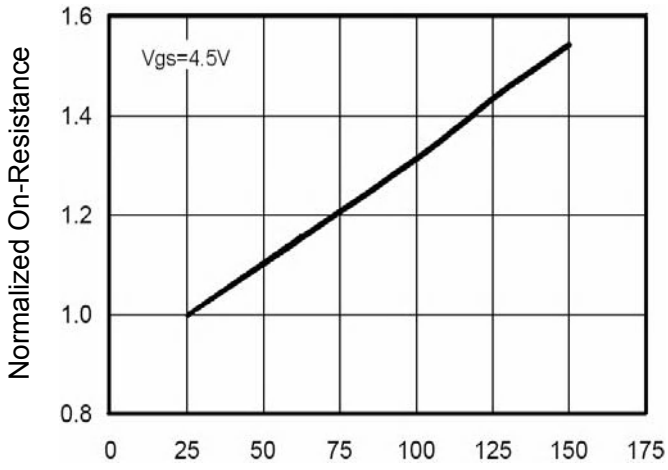


Figure 8 Drain-Source On-Resistance

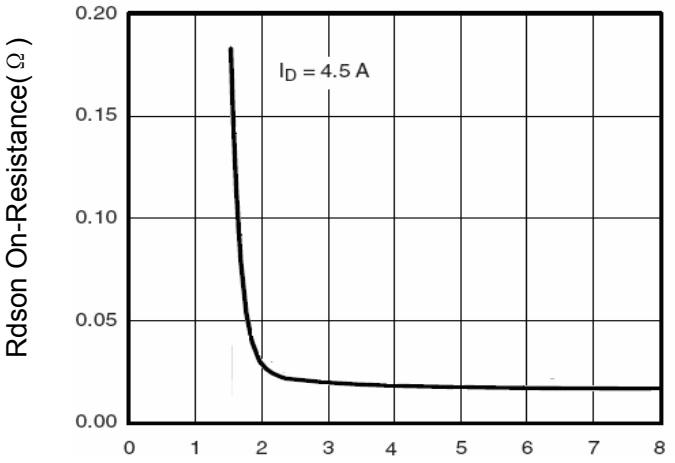


Figure 9 Rdson vs. Vgs

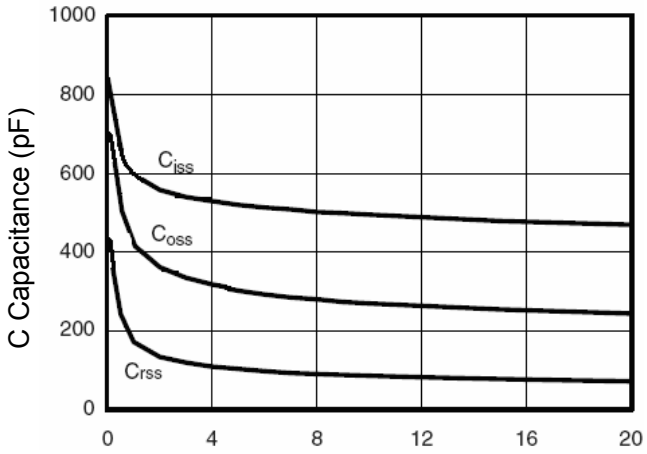


Figure 10 Capacitance vs Vds

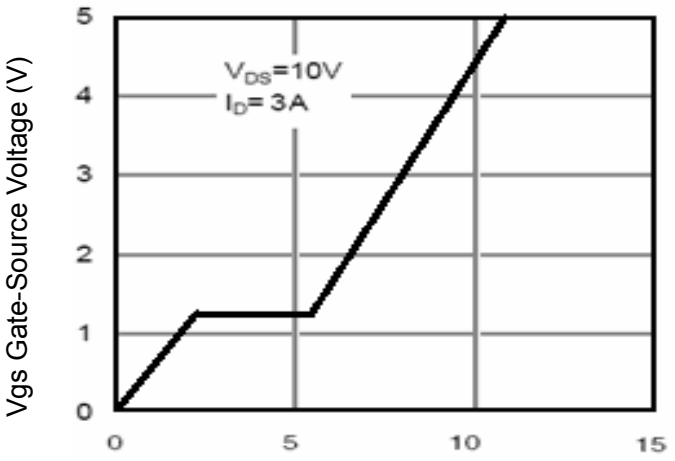


Figure 11 Gate Charge

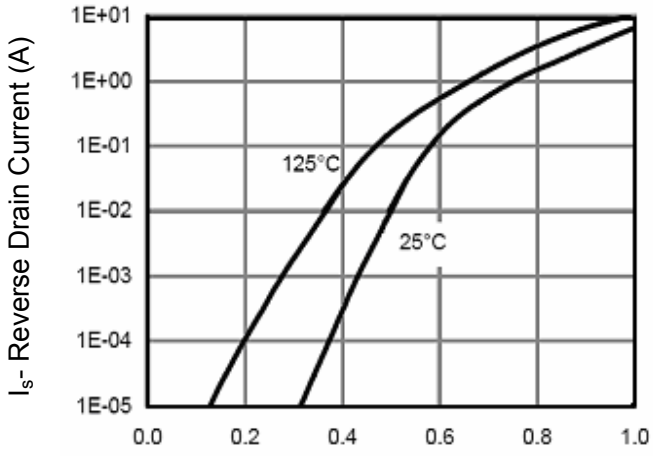


Figure 12 Source- Drain Diode Forward

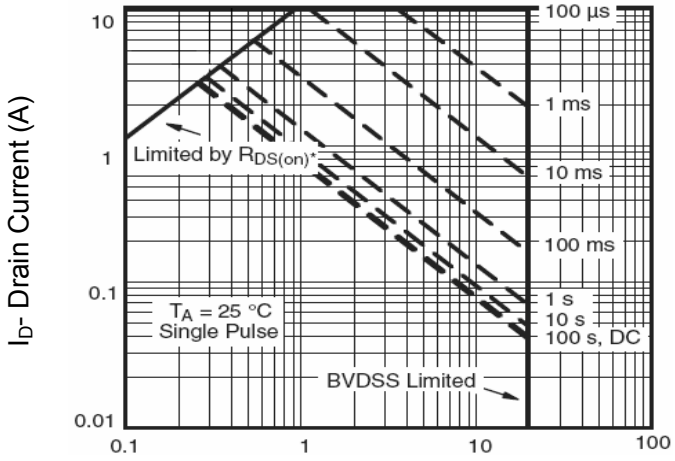


Figure 13 Safe Operation Area

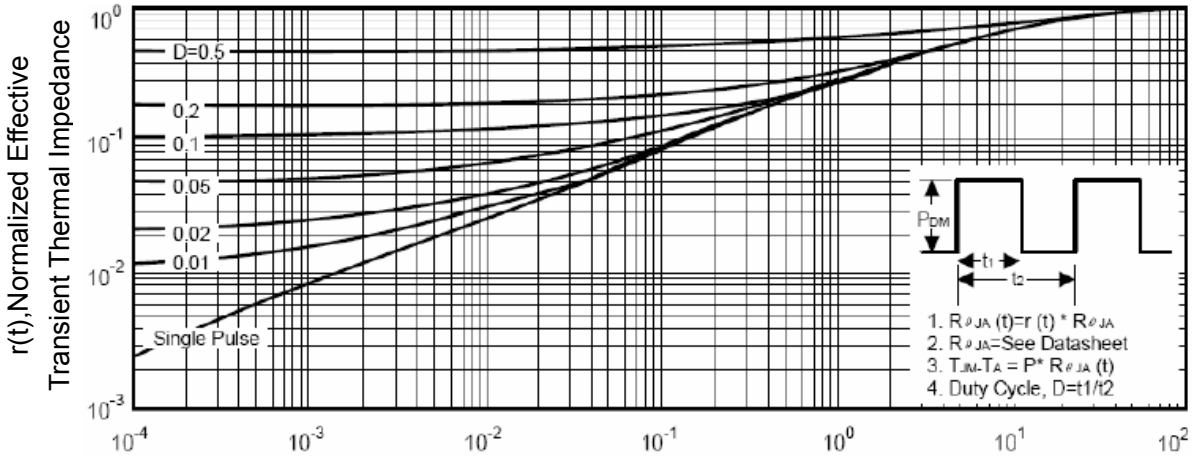
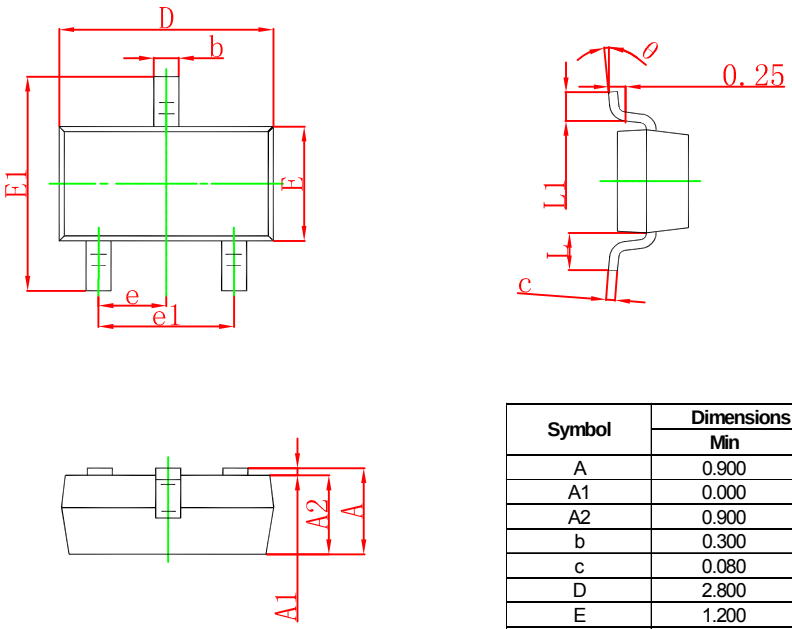


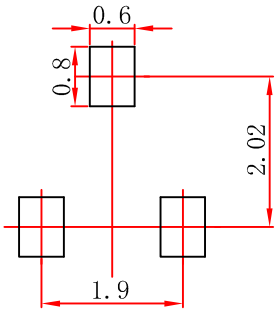
Figure 14 Normalized Maximum Transient Thermal Impedance

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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