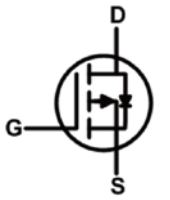
Description

The IRLML9303TRPBF-AK uses advanced Trench technology to provide excellent RDS(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.

Applications

- Battery protection
- Load switch
- Uninterruptible power supply



Equivalent Circuit

General Features

- V_{DS} = -30V I_D =-4.2A
- $R_{DS(ON)}$ < 50mΩ @ V_{GS}=10V


SOT23

Ordering information

Product ID	Pack	Marking	Qty(PCS)
IRLML9303TRPBF-AK	SOT23	3407	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-30	V
V_{GS}	Gate-Source Voltage	±12	V
I_D@T_A=25℃	Continuous Drain Current, VGS @ -10V[1]	-4.2	A
I_D@T_A=100℃	Continuous Drain Current, VGS @ -10V[1]	-2.6	A
I_{DM}	Pulsed Drain Current2	-16.8	A
P_D@T_A=25℃	Total Power Dissipation3	1	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	125	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case1	135	℃/W

Electrical Characteristics (T_A=25℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
On/Off States						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	---	---	V
$R_{DS(ON)}$	Drain-Source on-State Resistance[3]	V_{GS}=-10V , I_D=-4A	---	50	58	mΩ
		V_{GS}=-4.5V , I_D=-3A	---	62	75	
$V_{GS(th)}$	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =-250uA	-1	-1.5	-2.5	V
I_{DSS}	Drain-Source Leakage Current	V_{DS} = -30V, V_{GS} = 0V,	---	---	-1	uA
			---	---		
I_{GSS}	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS} = -15V, V_{GS} = 0V,f = 1.0MHz	---	520	---	pF
C_{oss}	Output Capacitance		---	70	---	
C_{rss}	Reverse Transfer Capacitance		---	60	---	
Q_g	Total Gate Charge (4.5V)	V_{GS}= -10V, V_{DS} = -15V, I_D = -4.1A	---	12	---	nC
Q_{gs}	Gate-Source Charge		---	3	---	
Q_{gd}	Gate-Drain Charge		---	2	---	
Switching Characteristics						
$T_{d(on)}$	Turn-On Delay Time	V_{GS}= -10V, V_{DS}= -15V , R_L= 15Ω,R_{GEN}= 2.5Ω	---	5	---	ns
T_r	Rise Time		---	28	---	
$T_{d(off)}$	Turn-Off Delay Time		---	30	---	
T_f	Fall Time		---	35	---	
Drain-Source Diode Characteristics and Maximum Ratings						
ISM	Maximum Pulsed Drain to Source Diode Forward Current		---	---	-16.4	A
IS	Continuous Source Current	I_S = -4.1A, V_{GS} = 0V	---	---	-4.1	A
VSD	Diode Forward Voltage[3]		---	---	-1.2	V

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 power dissipation is limited by 150℃ junction temperature

4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total-power dissipation.

Typical Characteristics

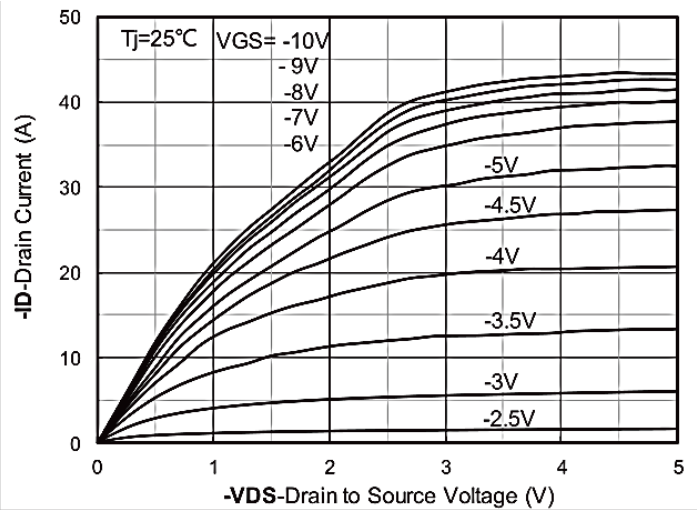


Figure 1. Output Characteristics

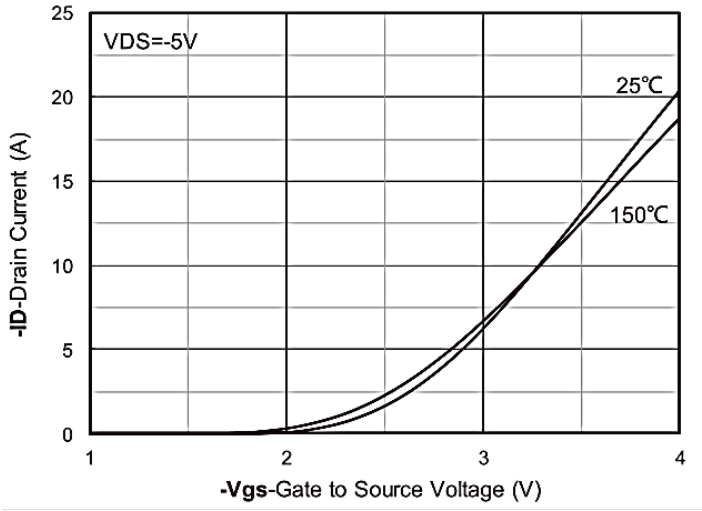


Figure 2. Transfer Characteristics

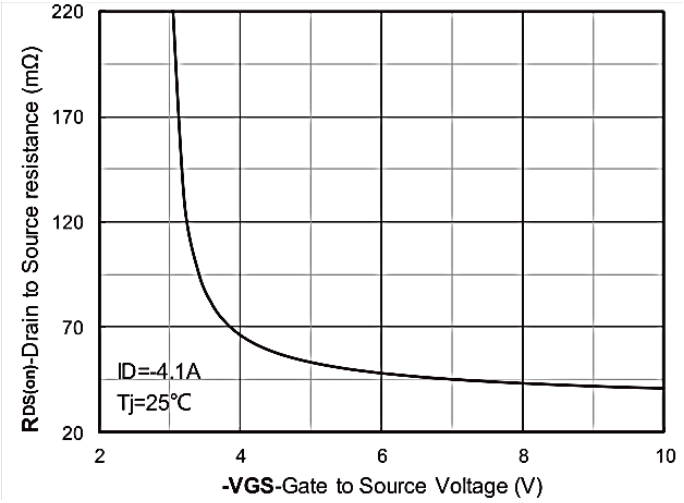


Figure 3. On-Resistance vs Gate to Source Voltage

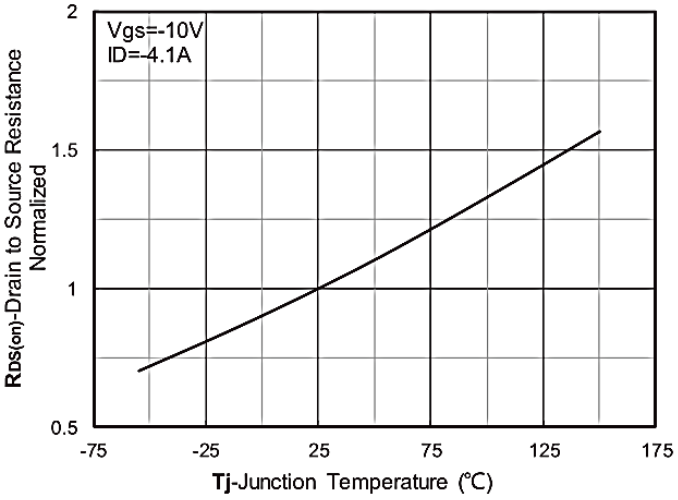


Figure 4.Normalized On-Resistance

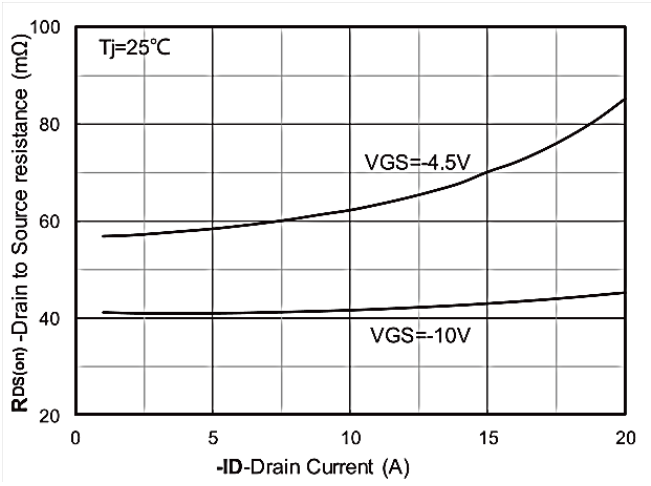


Figure 5. RDS(on) VS Drain Current

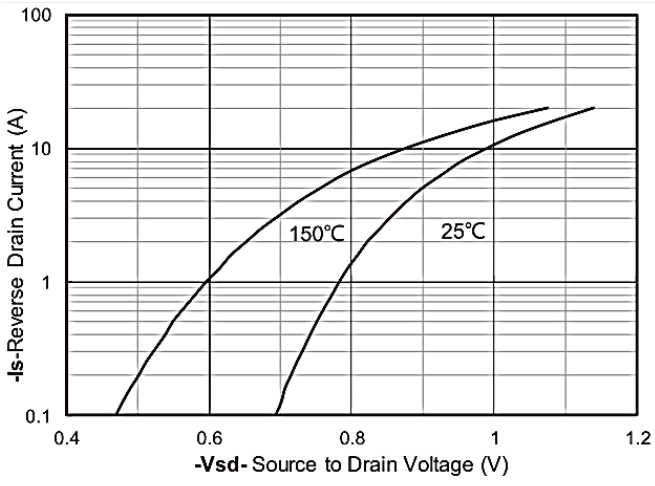


Figure 6. Forward characteristics of reverse diode

Typical Characteristics

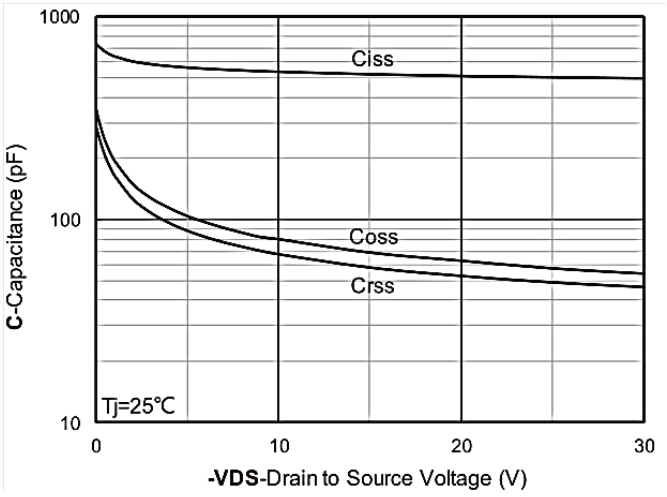


Figure 7. Capacitance Characteristics

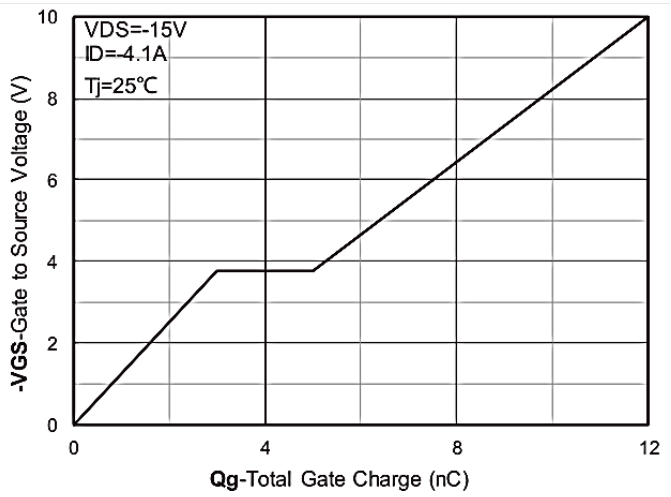


Figure 8. Gate Charge Characteristics

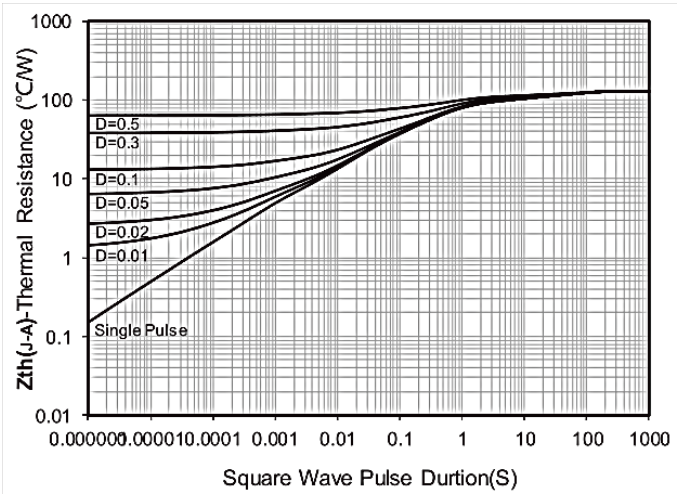


Figure 9. Maximum Transient Thermal Impedance

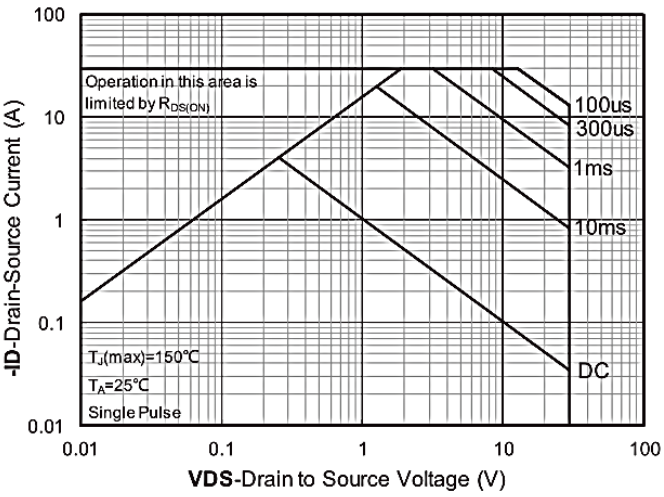
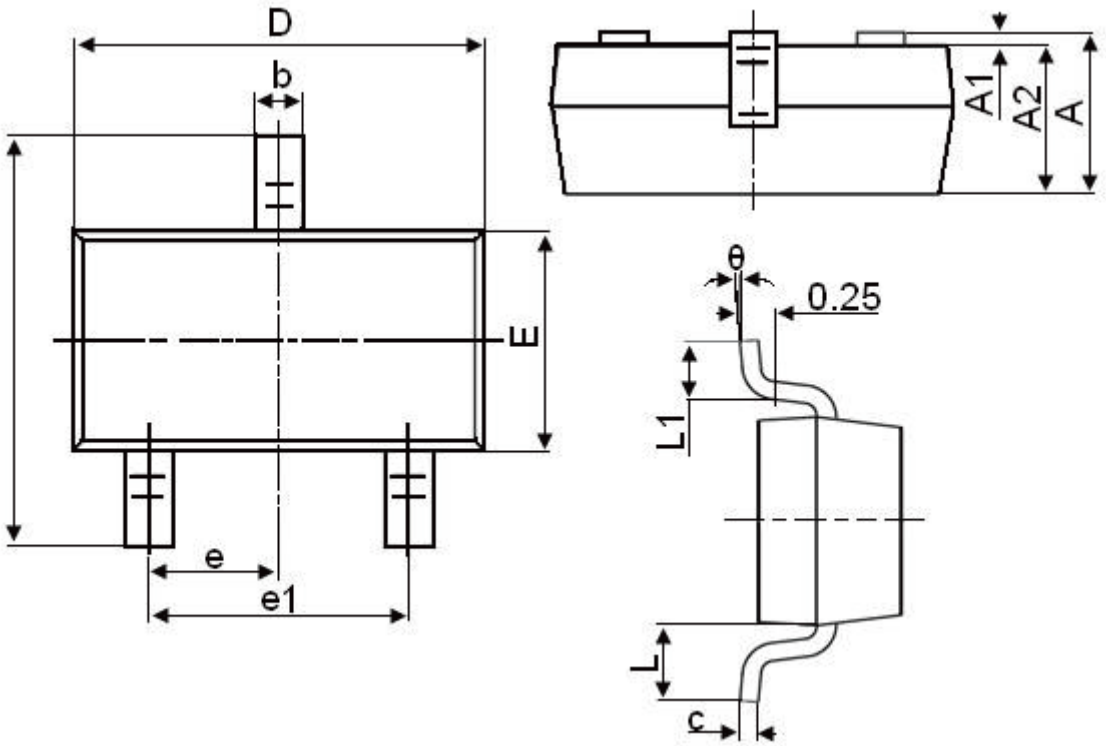


Figure 10. Safe Operation Area

SOT23 Package Outline Dimensions



Symbol	Dimensions in Millimeters	
	mm	
	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°