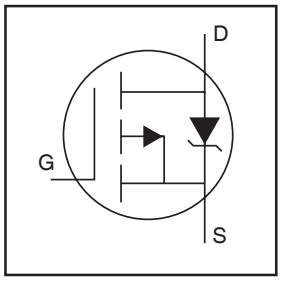
IRLML6402

LOW VOLTAGE MOSFET (P-CHANNEL)

Power MOSFET

- Ultra Low On-Resistance
- P-Channel MOSFET
- SOT-23 Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching
- Lead-Free
- Halogen-Free
- Marking: A2oHB



V_{DSS} = -20V

$R_{DS(on)}$ = 0.065Ω

Absolute Maximum Ratings

	Parameter	Max.	Units
V_{DS}	Drain- Source Voltage	-20	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ -4.5V	-3.7	A
I_D @ T_A= 70°C	Continuous Drain Current, V_{GS} @ -4.5V	-2.2	
I_{DM}	Pulsed Drain Current ①	-22	
P_D @T_A = 25°C	Power Dissipation	1.3	W
P_D @T_A = 70°C	Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
E_{AS}	Single Pulse Avalanche Energy④	11	mJ
V_{GS}	Gate-to-Source Voltage	± 12	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Maximum Junction-to-Ambient③	75	100	°C/W

Electrical Characteristics @ T_J = 25°C (unless otherwise specified)

	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-20	——	——	V	V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	——	-0.009	——	V/°C	Reference to 25°C, I_D = -1mA ②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	——	0.050	0.065	Ω	V_{GS} = -4.5V, I_D = -3.7A ②
		——	0.080	0.135		V_{GS} = -2.5V, I_D = -3.1A ②
$V_{GS(th)}$	Gate Threshold Voltage	-0.40	-0.55	-1.2	V	V_{DS} = V_{GS}, I_D = -250μA
g_{fs}	Forward Transconductance	6.0	——	——	S	V_{DS} = -10V, I_D = -3.7A ②
I_{DSS}	Drain-to-Source Leakage Current	——	——	-1.0	μA	V_{DS} = -20V, V_{GS} = 0V
		——	——	-25		V_{DS} = -20V, V_{GS} = 0V, T_J = 70°C
I_{GSS}	Gate-to-Source Forward Leakage	——	——	-100	nA	V_{GS} = -12V
	Gate-to-Source Reverse Leakage	——	——	100		V_{GS} = 12V
Q_g	Total Gate Charge	——	8.0	12	nC	I_D = -3.7A
Q_{gs}	Gate-to-Source Charge	——	1.2	1.8		V_{DS} = -10V
Q_{gd}	Gate-to-Drain ("Miller") Charge	——	2.8	4.2		V_{GS} = -5.0V ②
$t_{d(on)}$	Turn-On Delay Time	——	350	——	ns	V_{DD} = -10V
t_r	Rise Time	——	48	——		I_D = -3.7A
$t_{d(off)}$	Turn-Off Delay Time	——	588	——		R_G = 89Ω
t_f	Fall Time	——	381	——		R_D = 2.7Ω
C_{iss}	Input Capacitance	——	633	——	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	——	145	——		V_{DS} = -10V
C_{rss}	Reverse Transfer Capacitance	——	110	——		f = 1.0MHz

Source-Drain Ratings and Characteristics

	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	—	—	-1.3	A	MOSFET symbol showing the integral reverse p-n junction diode.
I_{SM}	Pulsed Source Current (Body Diode) ①	—	—	-22		
V_{SD}	Diode Forward Voltage	—	—	-1.2	V	T_J = 25°C, I_S = -1.0A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time	—	29	43	ns	T_J = 25°C, I_F = -1.0A
Q_{rr}	Reverse RecoveryCharge	—	11	17	nC	di/dt = -100A/μs ②

Notes:

① Repetitive rating; pulse width limited by max. junction temperature.

② Pulse width ≤ 400μs; duty cycle ≤ 2%.

③ Surface mounted on 1" square single layer 1oz. copper FR4 board, steady state.

④ Starting T_J = 25°C, L = 1.65mH R_G = 25Ω, I_{AS} = -3.7A.

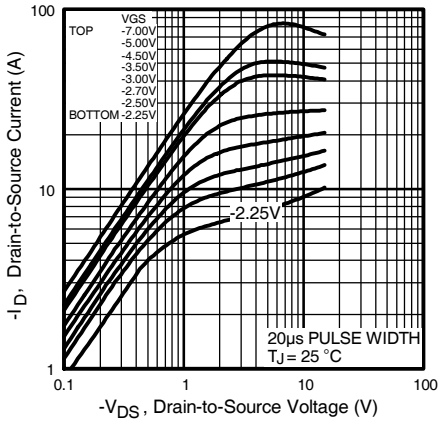


Fig 1. Typical Output Characteristics

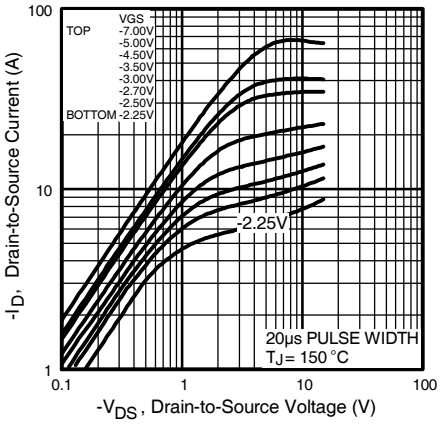


Fig 2. Typical Output Characteristics

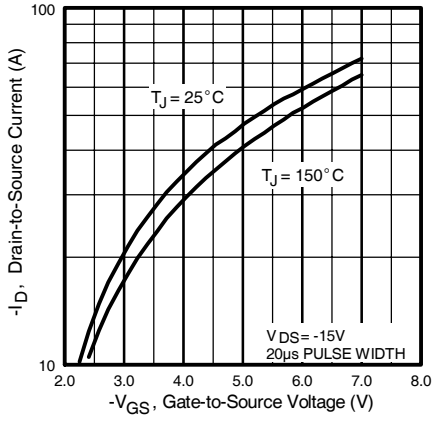


Fig 3. Typical Transfer Characteristics

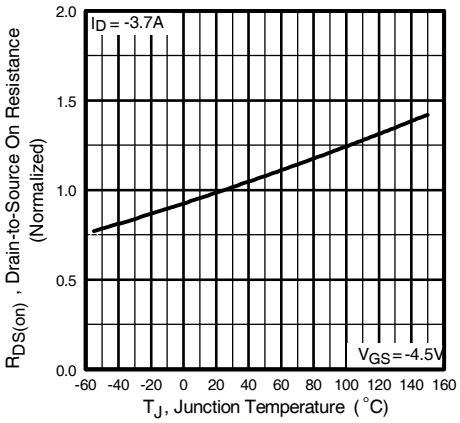


Fig 4. Normalized On-Resistance Vs. Temperature

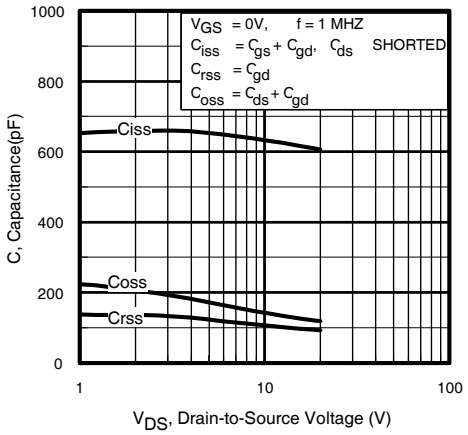


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

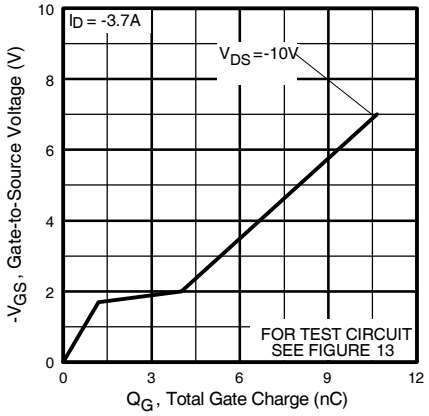


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

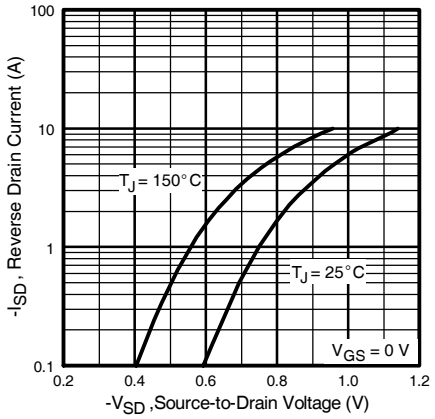


Fig 7. Typical Source-Drain Diode Forward Voltage

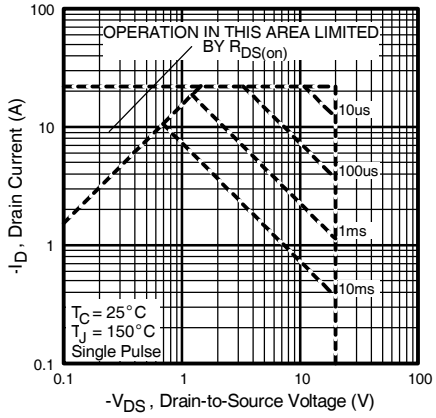


Fig 8. Maximum Safe Operating Area

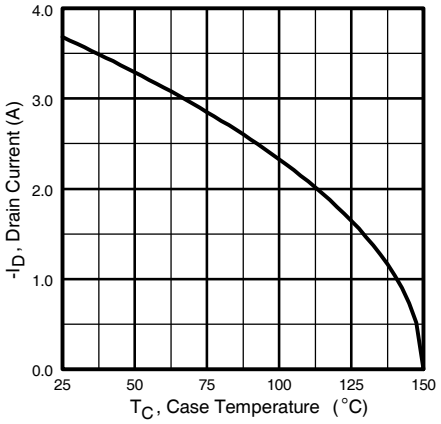


Fig 9. Maximum Drain Current Vs. Case Temperature

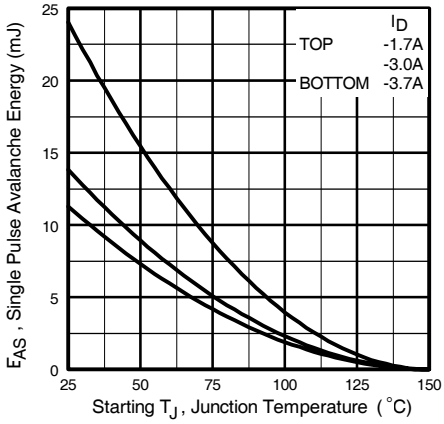


Fig 10. Maximum Avalanche Energy Vs. Drain Current

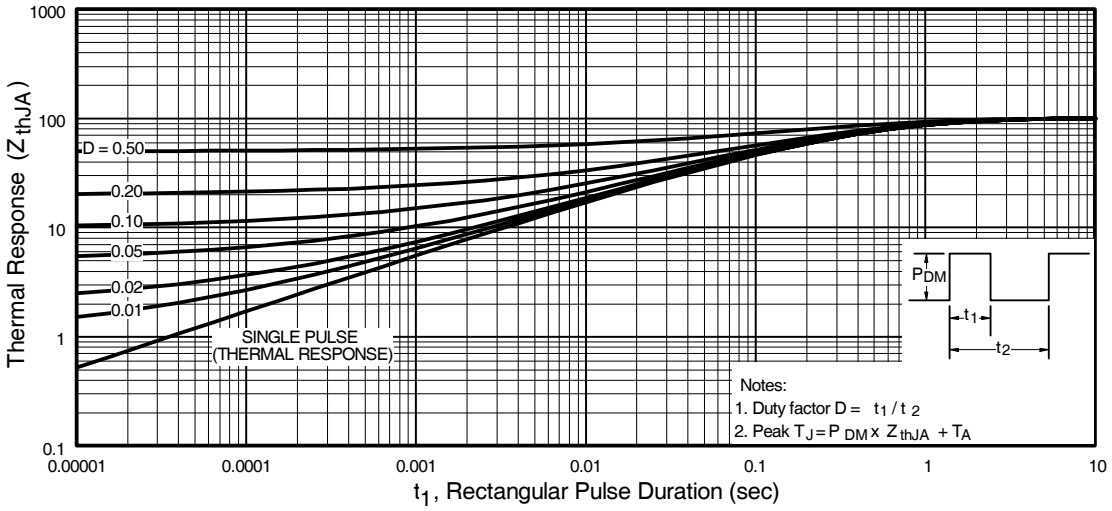


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

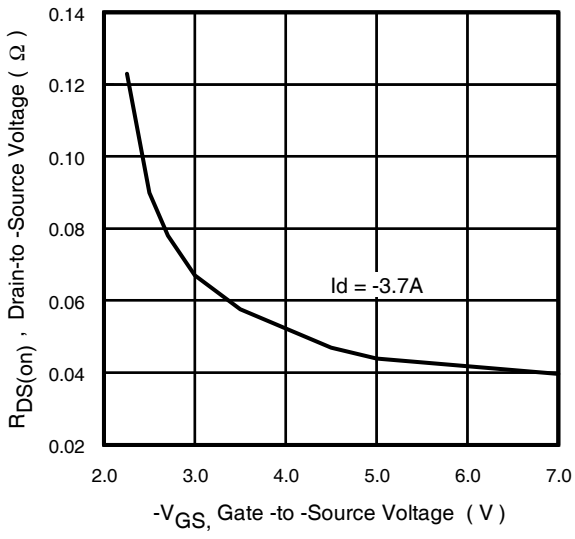


Fig 12. Typical On-Resistance Vs. Gate Voltage

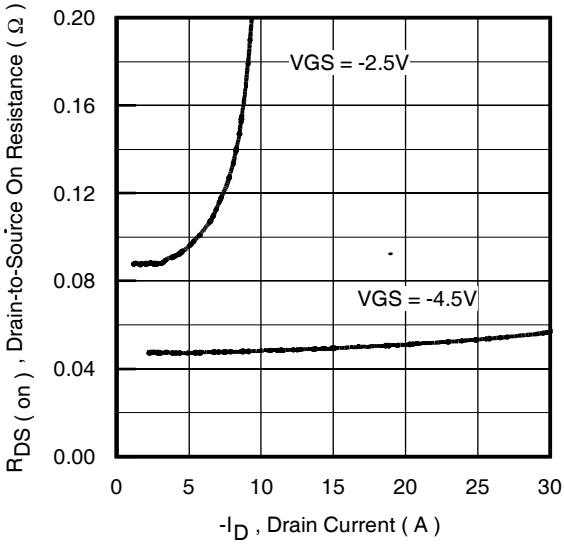
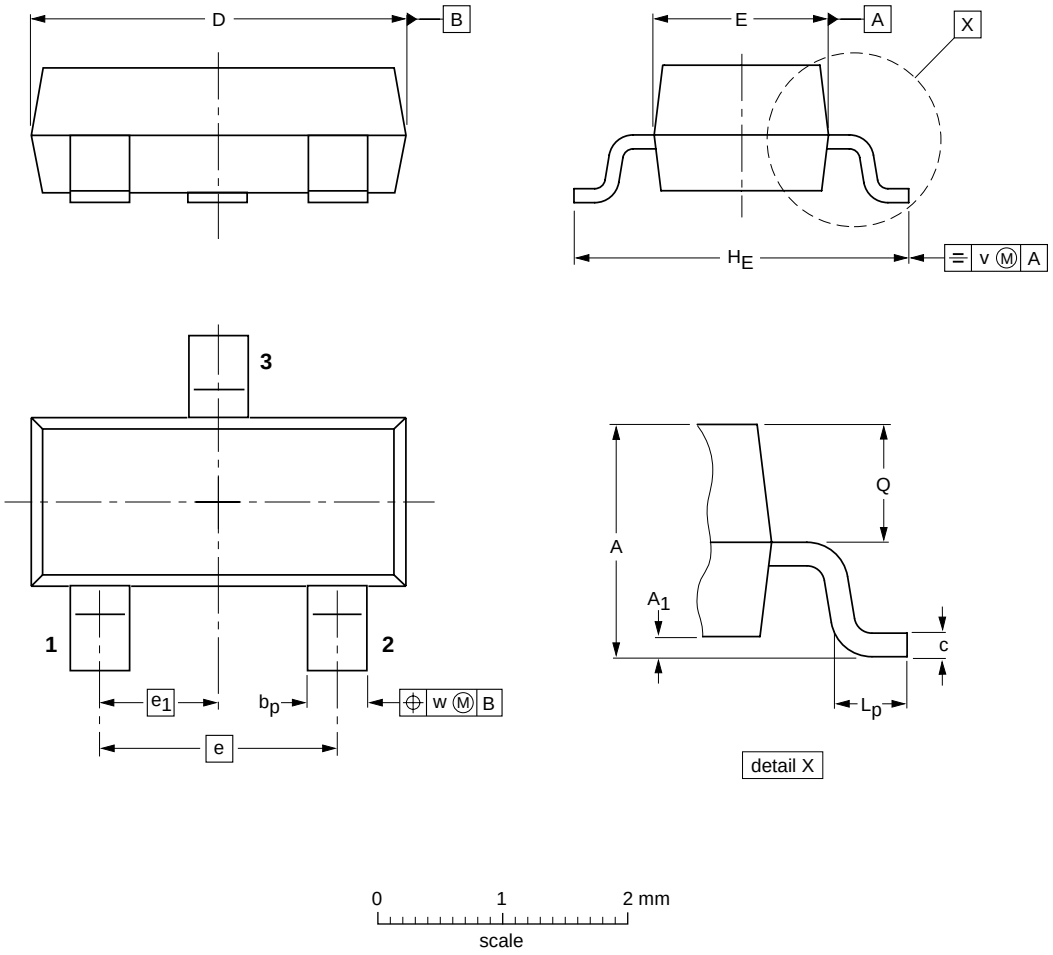


Fig 13. Typical On-Resistance Vs. Drain Current

■ SOT-23



DIMENSIONS (mm are the original dimensions)

UNIT	A	A_1 max.	b_p	c	D	E	e	e_1	H_E	L_p	Q	v	w
mm	1.1 0.9	0.1	0.48 0.38	0.15 0.09	3.0 2.8	1.4 1.2	1.9	0.95	2.5 2.1	0.45 0.15	0.55 0.45	0.2	0.1