



SOT-23-3L Plastic-Encapsulate Mosfets

IRLML6401TRPBF-ALJ P-Channel Power Mosfet

Features

- Ultra Low On-Resistance
- P-Channel MOSFET
- SOT-23-3L Footprint
- Low Profile (<1.1mm)
- Available in Tape and Reel
- Fast Switching
- 1.8V Gate Rated
- Lead-Free
- Halogen-Free

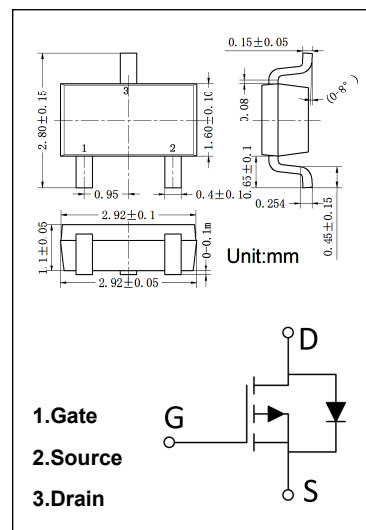
Marking: 6401

Absolute Maximum Ratings

Symbol	Parameter	Max	Unit
V_{DS}	Drain- Source Voltage	-12	V
$I_D @ T_A = 25^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ -4.5\text{V}$	-4.3	A
$I_D @ T_A = 70^{\circ}\text{C}$	Continuous Drain Current, $V_{GS} @ -4.5\text{V}$	-3.4	
I_{DM}	Pulsed Drain Current ¹⁾	-34	
$P_D @ T_A = 25^{\circ}\text{C}$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^{\circ}\text{C}$	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/ $^{\circ}\text{C}$
E_{AS}	Single Pulse Avalanche Energy ⁴⁾	33	mJ
V_{GS}	Gate-to-Source Voltage	± 8.0	V
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 150	$^{\circ}\text{C}$

Thermal Resistance

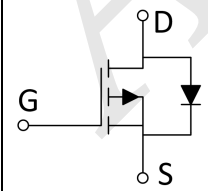
Symbol	Parameter	Typ	Max	Unit
$R_{\theta JA}$	Maximum Junction-to-Ambient ^③	75	100	$^{\circ}\text{C/W}$



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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
V _{(BR)DSS}	Drain-to-Source breakdown voltage	V _{GS} = 0V, I _D = -250μA	-12			V
ΔV _{(BR)DSS} /ΔT _J	Breakdown voltage temp. Coefficient	Reference to 25°C, I _D = -1mA		-0.007		V/°C
R _{DS(on)}	Static drain-to-source on-resistance	V _{GS} = -4.5V, I _D = -4.3A ²⁾			50	mΩ
		V _{GS} = -2.5V, I _D = -2.5A ²⁾			85	mΩ
		V _{GS} = -1.8V, I _D = -2.0A ²⁾			125	mΩ
V _{GS(th)}	Gate threshold voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.4	-0.55	-0.95	V
g _{fs}	Forward Trans conductance	V _{DS} = -10V, I _D = -4.3A	8.6			S
I _{DSS}	Drain-to-Source leakage current	V _{DS} = -12V, V _{GS} = 0V			-1.0	μA
		V _{DS} = -9.6V, V _{GS} = 0V, T _J = 55°C			-25	μA
I _{GSS}	Gate-to-Source forward leakage	V _{GS} = -8V			-100	nA
	Gate-to-Source reverse leakage	V _{GS} = 8V			100	nA
Q _g	Total Gate Charge	I _D = -4.3A, V _{DS} = -10V V _{GS} = -5.0V ²⁾		10	15	nC
Q _{gs}	Gate-to-Source Charge			1.4	2.1	
Q _{gd}	Gate-to-Drain ("Miller") Charge			2.6	3.9	
t _{d(on)}	Turn-On Delay Time	V _{DD} = -6.0V, I _D = -1.0A R _G = 89Ω, R _D = 6.0Ω ²⁾		11		ns
t _r	Rise Time			32		
t _{d(off)}	Turn-Off Delay Time			250		
t _f	Fall Time			210		
C _{iss}	Input Capacitance	V _{GS} = 0V		830		pF
C _{oss}	Output Capacitance	V _{DS} = -10V		180		
C _{rss}	Reverse Transfer Capacitance	f = 1.0MHz		125		

Source-Drain Ratings and Characteristics

Symbol	Parameter	Test Conditions	Min	Typ	Max	Unit
I _S	Continuous Source Current (Body Diode)	MOSFET symbol showing the integral reverse P-N junction diode 			-1.3	A
I _{SM}	Pulsed Source Current (Body Diode) ¹⁾				-34	
V _{SD}	Diode Forward Voltage	T _J = 25°C, I _S = -1.3A, V _{GS} = 0V ²⁾			-1.2	V
t _{rr}	Reverse Recovery Time	T _J = 25°C, I _F = -1.3A, di/dt = -100A/μs ²⁾		22	33	ns
Q _{rr}	Reverse Recovery Charge			8.0	12	nC

Notes:

1. Repetitive rating; pulse width limited by max. Junction temperature.
2. Pulse width ≤ 300μs; duty cycle ≤ 2%.
3. Surface mounted on 1" square single layer 1 oz. copper FR4 board, steady state.
4. Starting T_J = 25°C, L = 3.5mH, R_G = 25Ω, I_{AS} = -4.3A.

Typical Characteristics

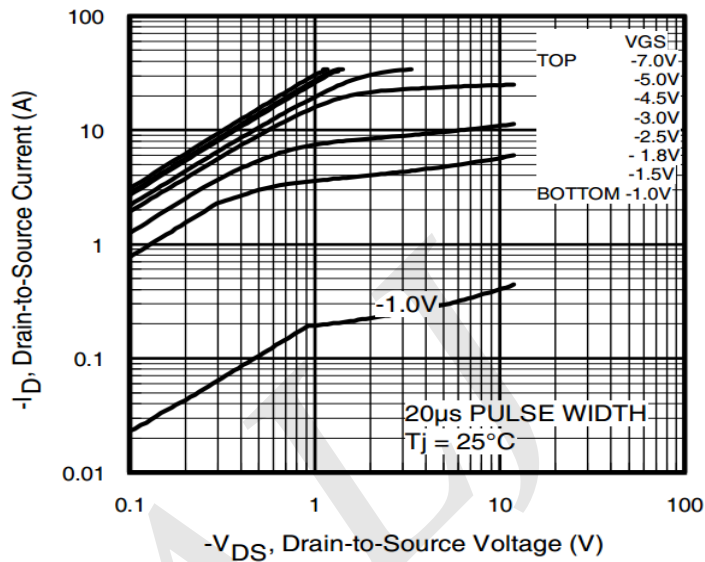


Fig 1. Typical Output Characteristics

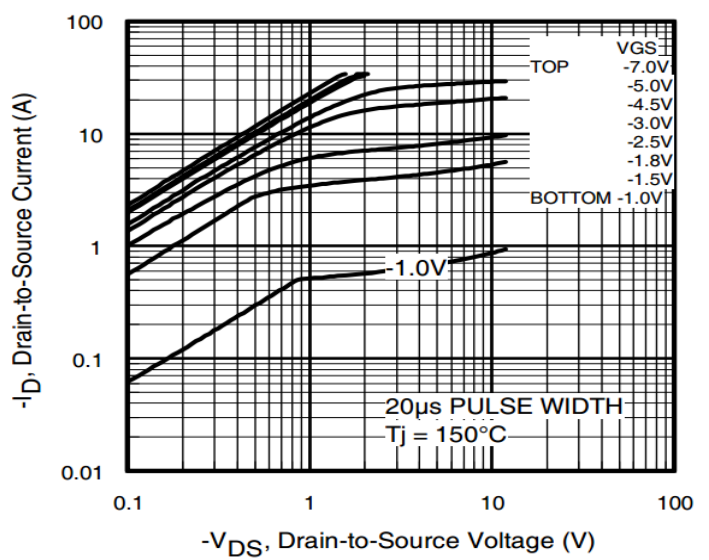


Fig 2. Typical Output Characteristics

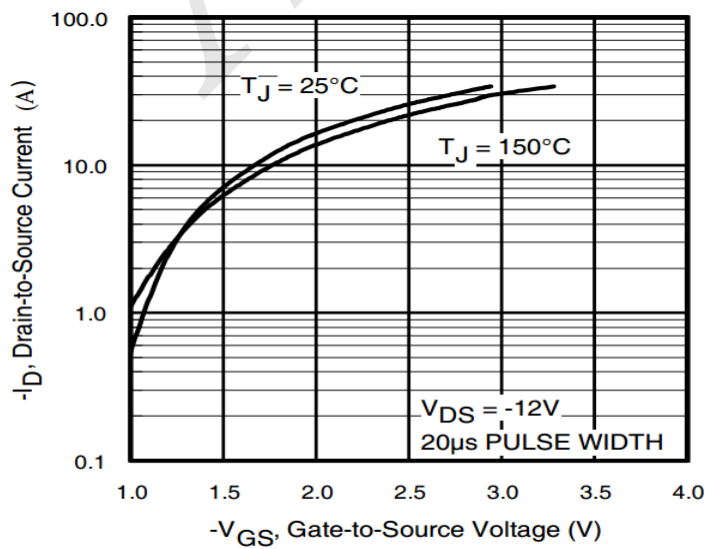


Fig 3. Typical Transfer Characteristics

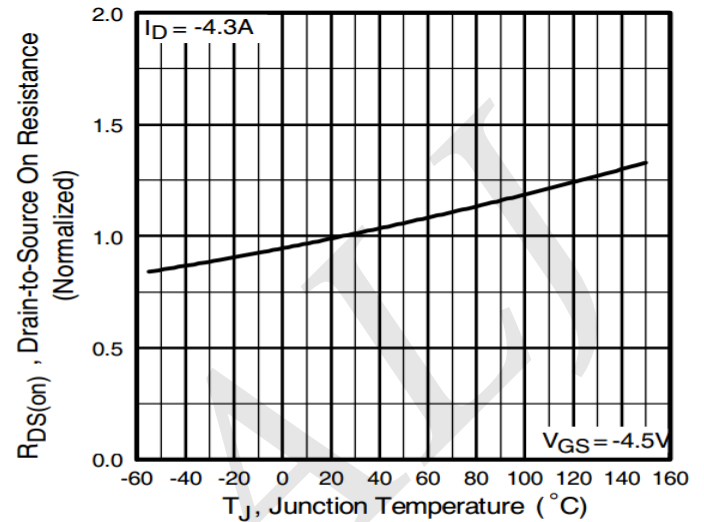


Fig 4. Normalized On-Resistance Vs. Temperature

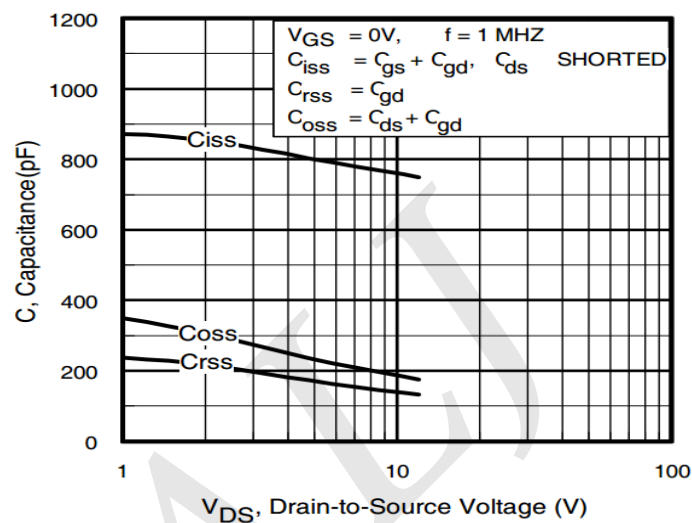


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

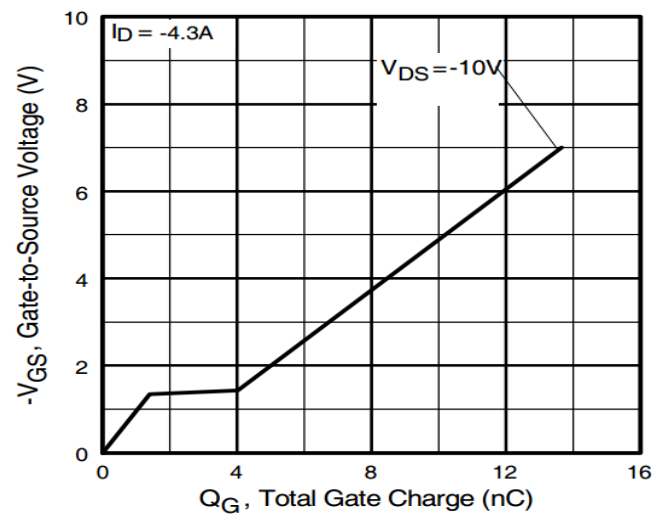


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

Typical Characteristics (Cont.)

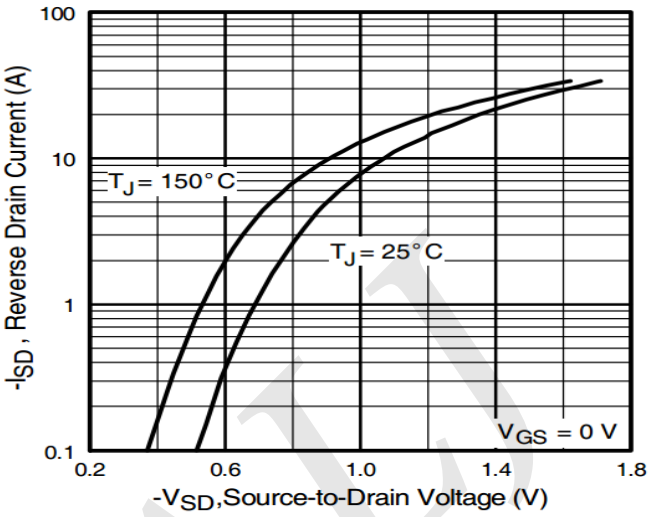


Fig 7. Typical Source-Drain Diode Forward Voltage

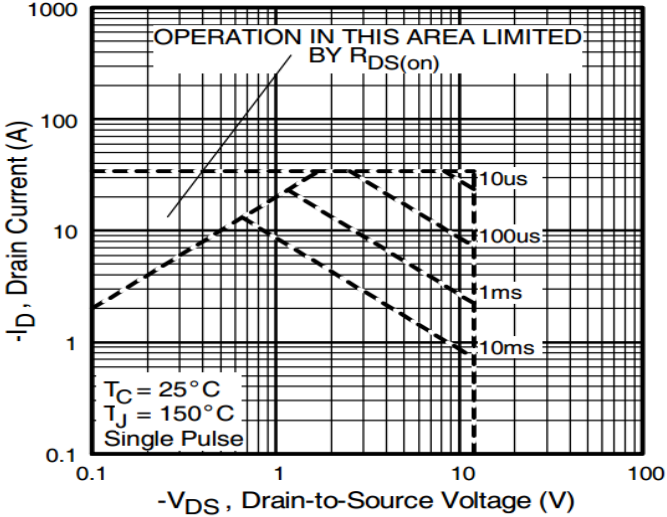


Fig 8. Maximum Safe Operating Area

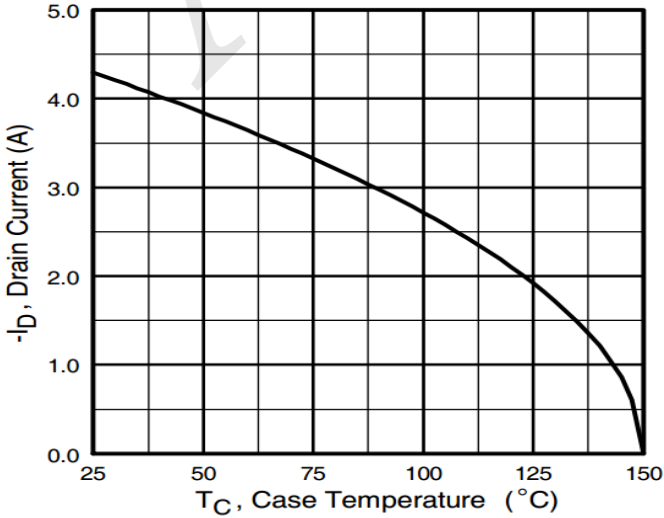


Fig 9. Maximum Drain Current Vs. Case Temperature

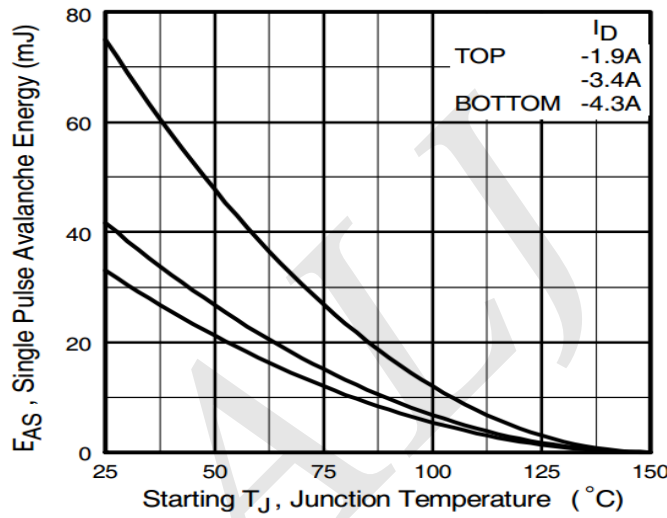


Fig 10. Maximum Avalanche Energy Vs. Drain Current

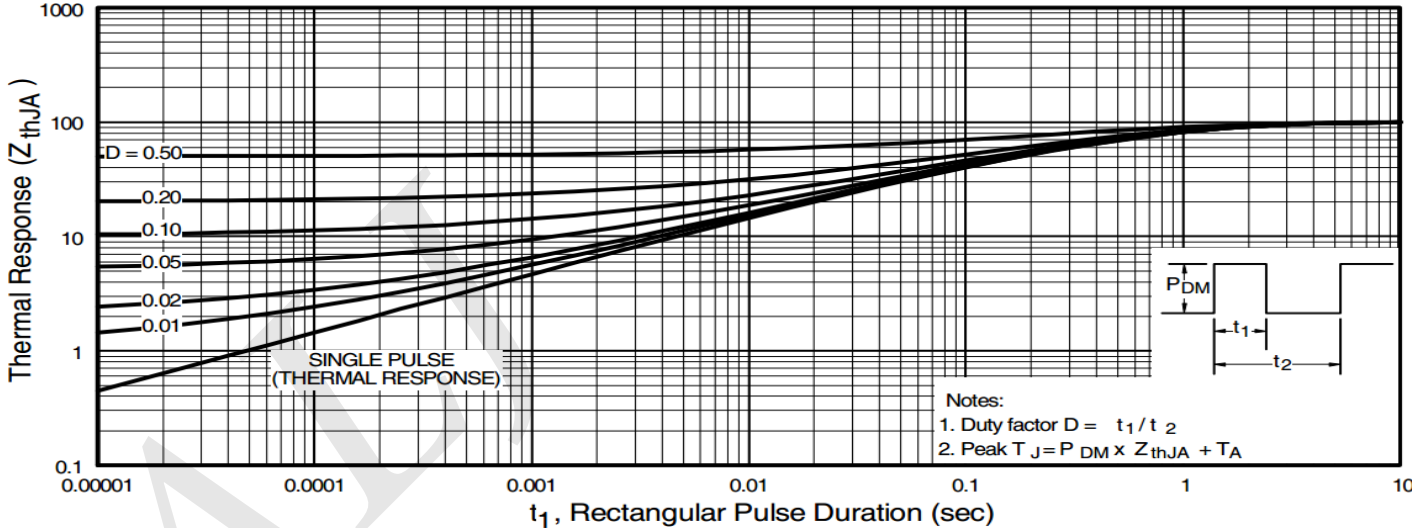


Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Typical Characteristics (Cont.)

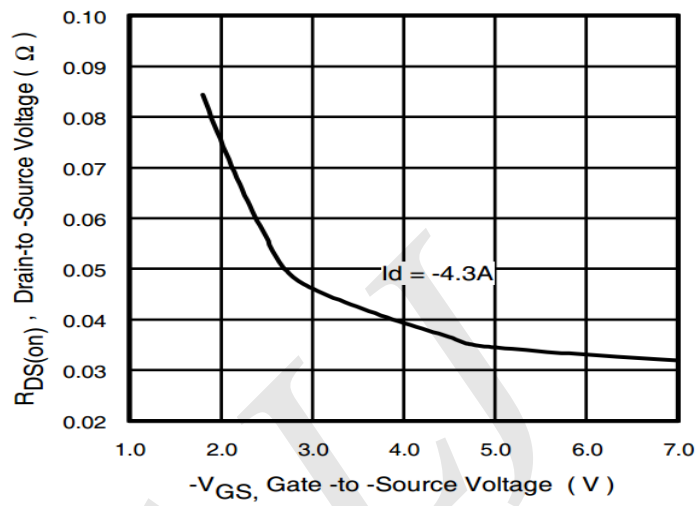


Fig 12. Typical On-Resistance Vs. Gate Voltage

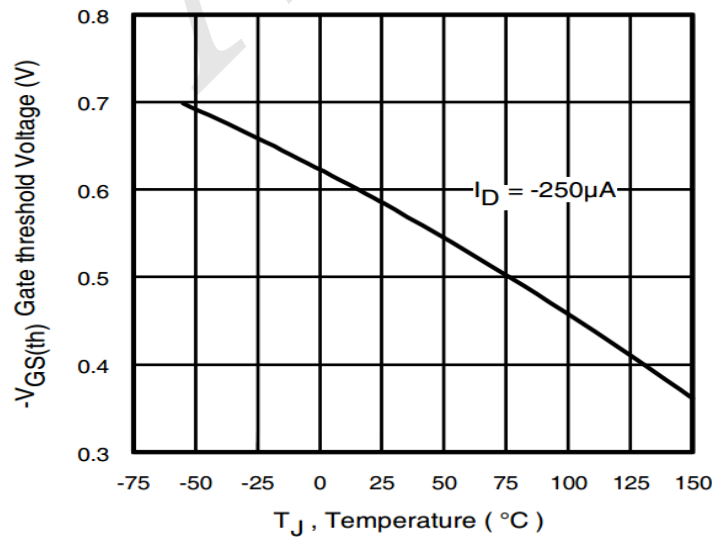


Fig 14. Typical Threshold Voltage Vs. Junction Temperature

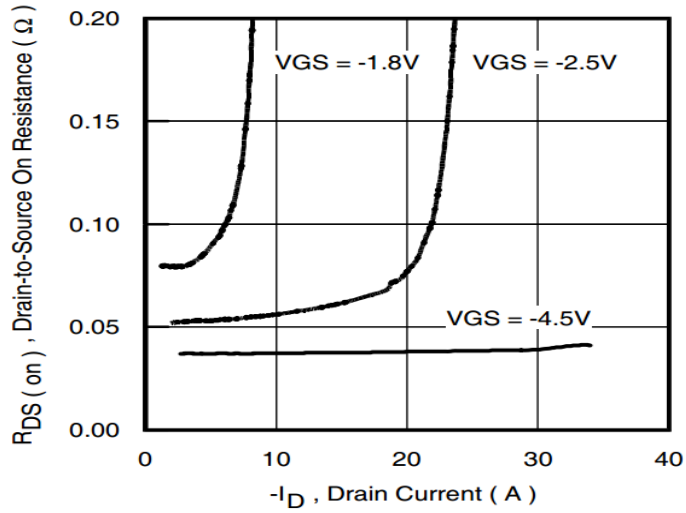


Fig 13. Typical On-Resistance Vs. Drain Current