EVVOSEMI®
THINK CHANGE DO

ESD TVS MOS LDO Diode Sensor DC-DC

Product Specification

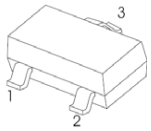
Domestic Part Number	IRLML9301
Overseas Part Number	IRLML9301
Equivalent Part Number	IRLML9301

P-CHANNEL MOSFET

FEATURES

- $V_{DS\ (V)}$ = -30V
- $R_{DS(ON)}$ < 64mΩ (V_{GS} = -10V)
- $R_{DS(ON)}$ < 103mΩ (V_{GS} = -4.5V)

SOT - 23



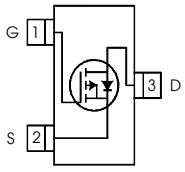
1. GATE
2. SOURCE
3. DRAIN

Application(s)

- System/Load Switch

Benefits

- Lower switching losses
- Multi-vendor compatibility
- Easier manufacturing
- Environmentally friendly
- Increased reliability



Symbol	Parameter	Max.	Units
V_{DS}	Drain-Source Voltage	-30	V
I_D @ T_A = 25°C	Continuous Drain Current, V_{GS} @ 10V	-3.6	A
I_D @ T_A = 70°C	Continuous Drain Current, V_{GS} @ 10V	-2.9	
I_{DM}	Pulsed Drain Current	-15	
P_D @T_A = 25°C	Maximum Power Dissipation	1.3	W
P_D @T_A = 70°C	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	W/°C
V_{GS}	Gate-to-Source Voltage	± 20	V
T_J, T_{STG}	Junction and Storage Temperature Range	-55 to + 150	°C

Thermal Resistance

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JA}$	Junction-to-Ambient ③		100	°C/W
$R_{\theta JA}$	Junction-to-Ambient (t<10s) ④		99	

Notes:

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

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

③ Surface mounted on 1 in square Cu board

P-CHANNEL MOSFET

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

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	-30			V	V_{GS} = 0V, I_D = -250μA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient		0.02		V/°C	Reference to 25°C, I_D = -1mA
$R_{DS(on)}$	Static Drain-to-Source On-Resistance		51	64	mΩ	V_{GS} = -10V, I_D = -3.6A ②
			82	103		V_{GS} = -4.5V, I_D = -2.9A ②
$V_{GS(th)}$	Gate Threshold Voltage	-1.3		-2.4	V	V_{DS} = V_{GS}, I_D = -10μA
I_{DSS}	Drain-to-Source Leakage Current			1	μA	V_{DS} =-24V, V_{GS} = 0V
				150		V_{DS} = -24V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage			-100	nA	V_{GS} = -20V
	Gate-to-Source Reverse Leakage			100		V_{GS} = 20V
R_G	Internal Gate Resistance		12		Ω	
gfs	Forward Transconductance	5.0			S	V_{DS} = -10V, I_D =-3.6A
Q_g	Total Gate Charge		4.8		nC	I_D = -3.6A
Q_{gs}	Gate-to-Source Charge		1.2			V_{DS} =-15V
Q_{gd}	Gate-to-Drain ("Miller") Charge		2.5			V_{GS} = -4.5V ②
$t_{d(on)}$	Turn-On Delay Time		9.6		ns	V_{DD} =-15V②
t_r	Rise Time		19			I_D = -1A
$t_{d(off)}$	Turn-Off Delay Time		16			R_G = 6.8Ω
t_f	Fall Time		15			V_{GS} = -4.5V
C_{iss}	Input Capacitance		388		pF	V_{GS} = 0V
C_{oss}	Output Capacitance		93			V_{DS} = -25V
C_{rss}	Reverse Transfer Capacitance		65			f = 1.0KHz

Source - Drain Ratings and Characteristics

Symbol	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			-15		
V_{SD}	Diode Forward Voltage			-1.2	V	T_J = 25°C, I_S = -1.3A, V_{GS} = 0V ②
t_{rr}	Reverse Recovery Time		14	21	ns	T_J = 25°C, V_R = -24V, I_F=-1.3A
Q_{rr}	Reverse Recovery Charge		7.2	11	nC	di/dt = 100A/μs ②

P-CHANNEL MOSFET

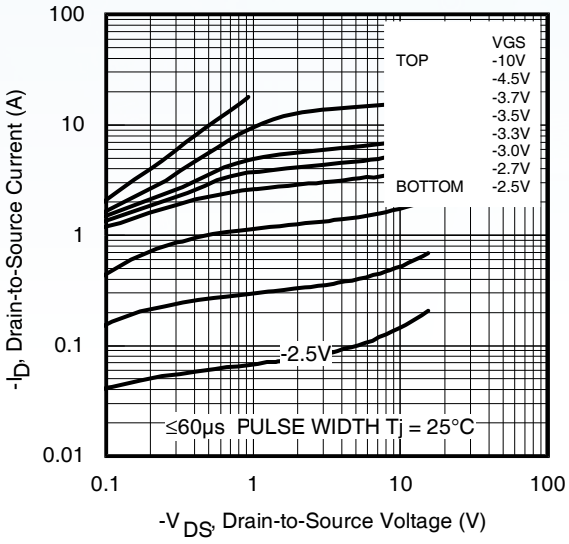


Fig 1. Typical Output Characteristics

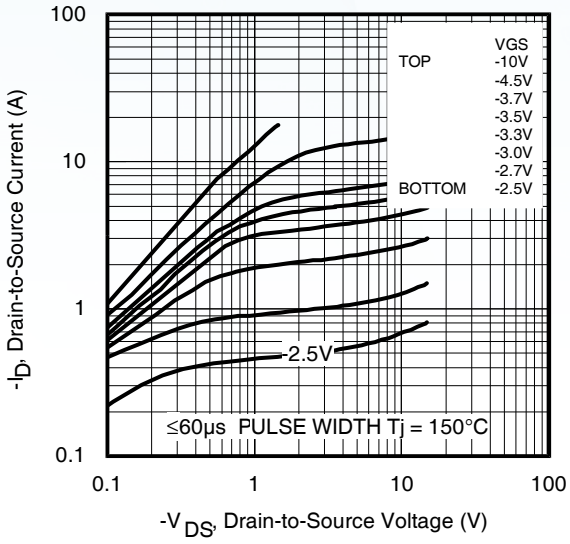


Fig 2. Typical Output Characteristics

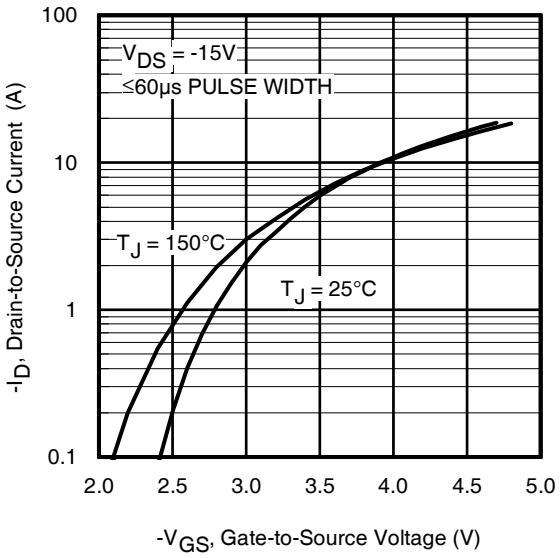


Fig 3. Typical Transfer Characteristics

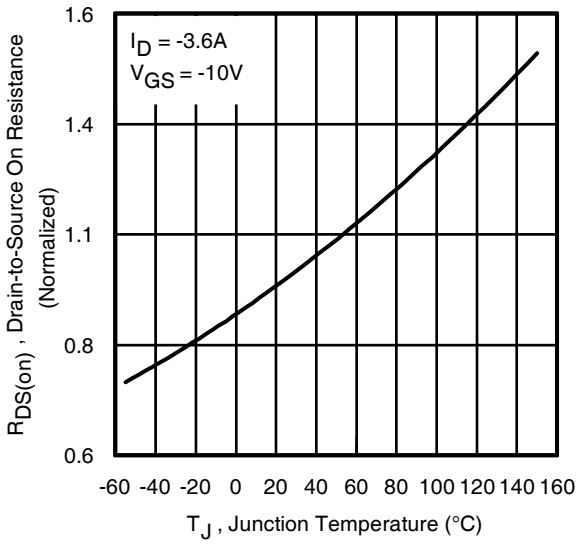


Fig 4. Normalized On-Resistance Vs. Temperature

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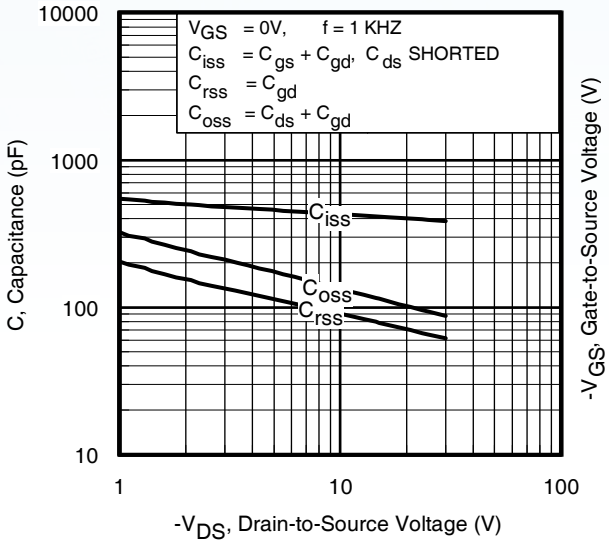

Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

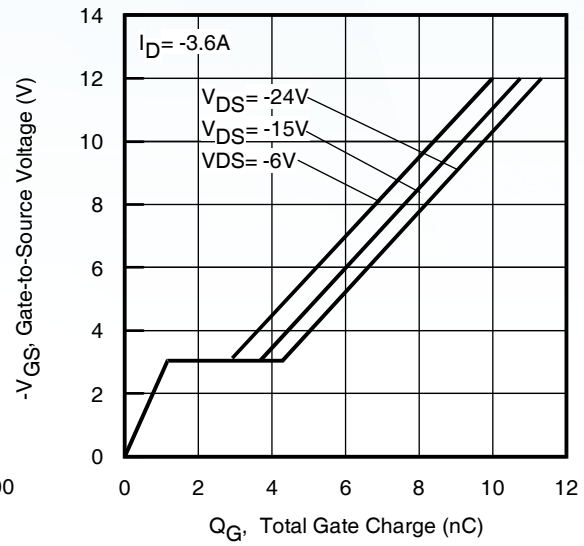

Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

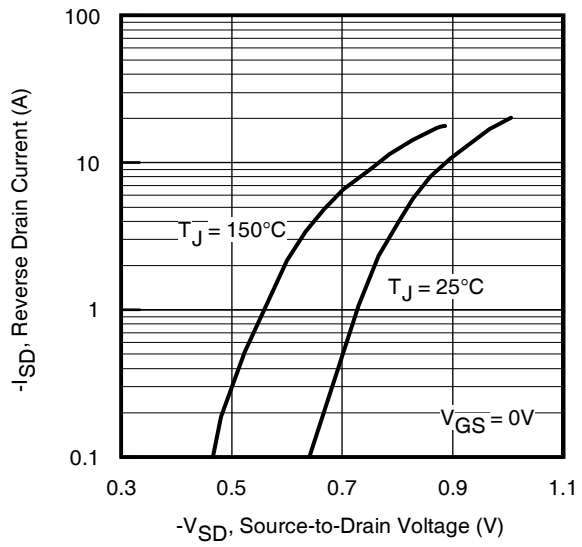

Fig 7. Typical Source-Drain Diode Forward Voltage

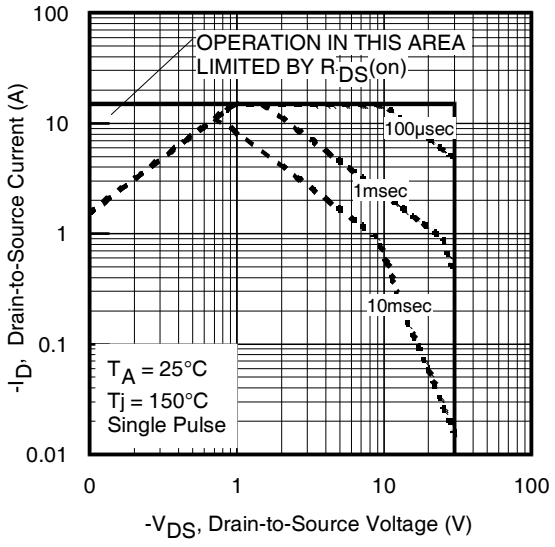

Fig 8. Maximum Safe Operating Area

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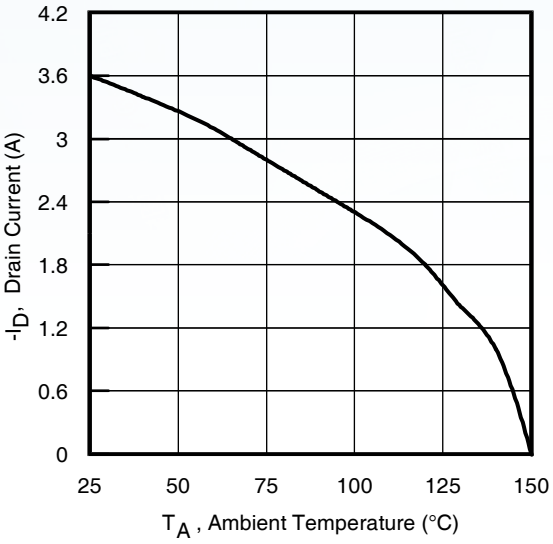

Fig 9. Maximum Drain Current Vs. Ambient Temperature

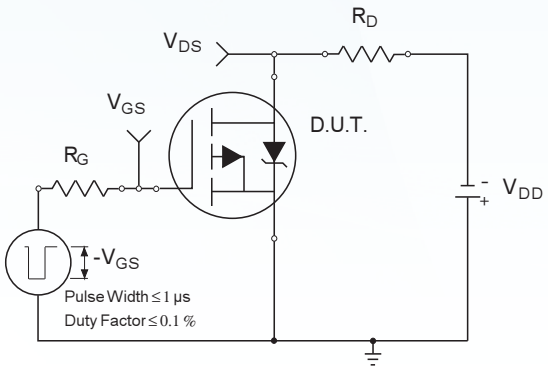

Fig 10a. Switching Time Test Circuit

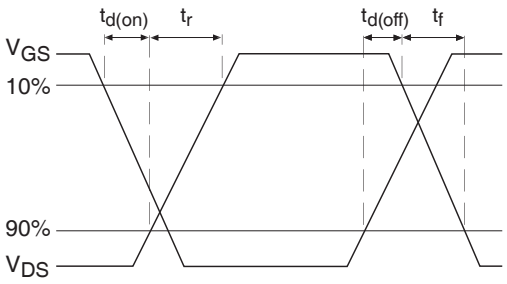

Fig 10b. Switching Time Waveforms

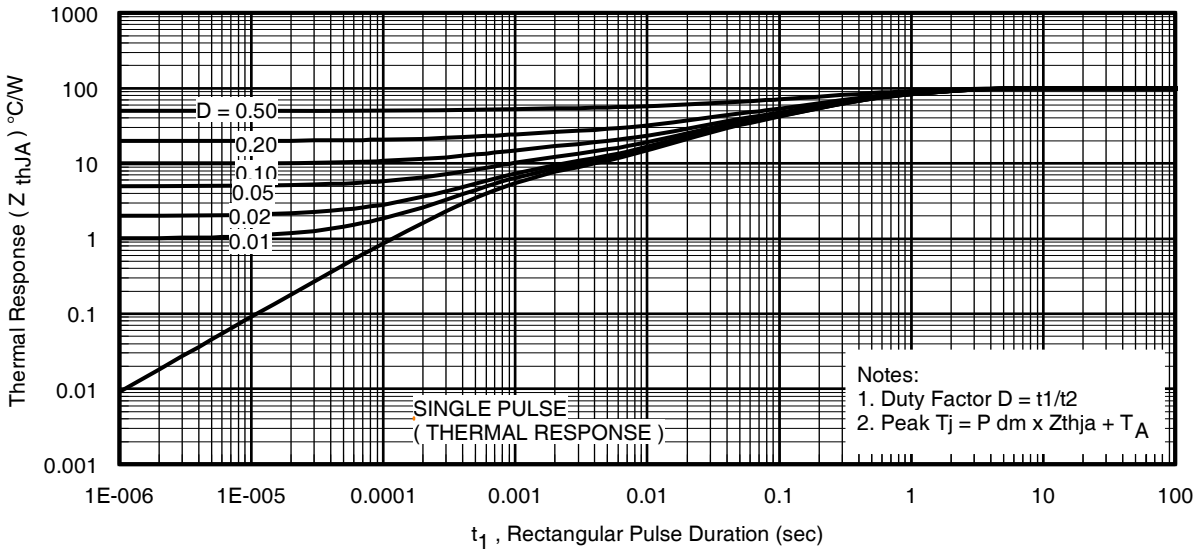

Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

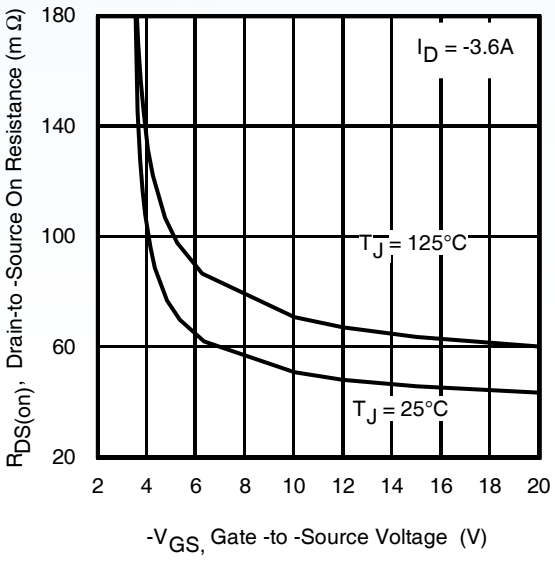

Fig 12. Typical On-Resistance Vs. Gate Voltage

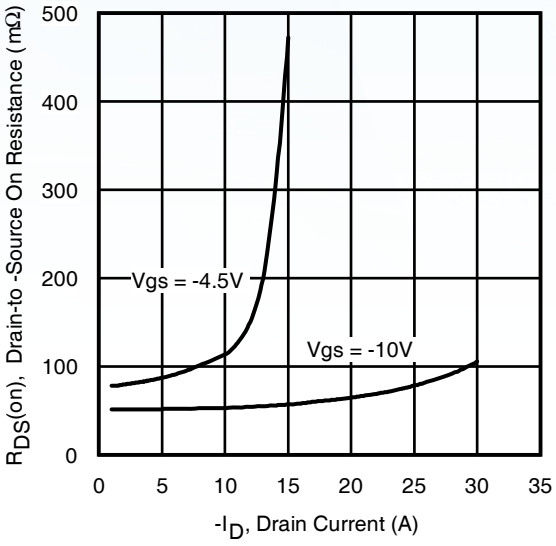

Fig 13. Typical On-Resistance Vs. Drain Current

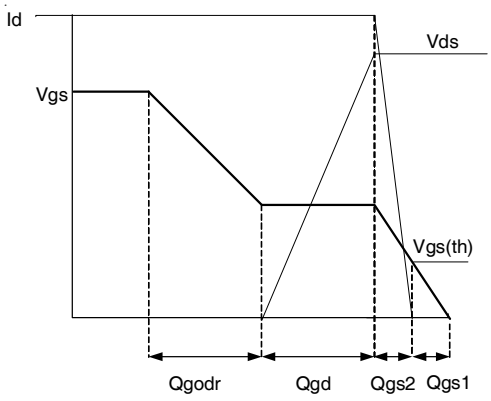

Fig 14a. Gate Charge Waveform

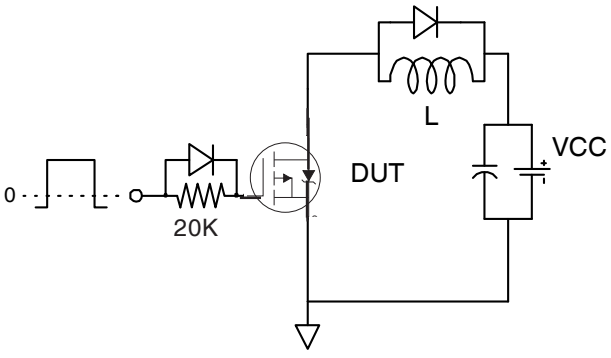

Fig 14b. Gate Charge Test Circuit

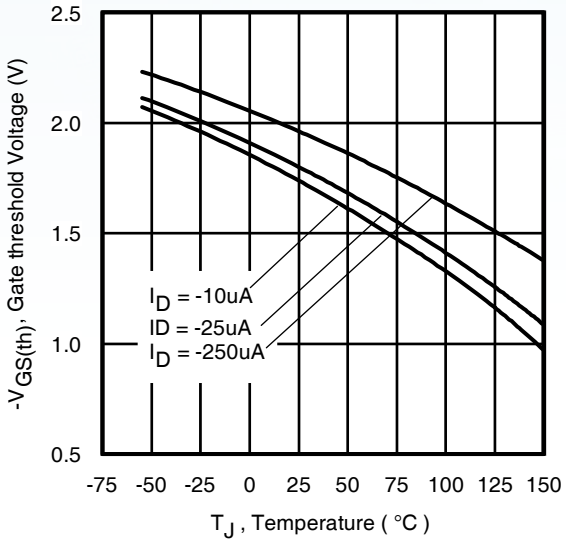

Fig 15. Typical Threshold Voltage Vs. Junction Temperature

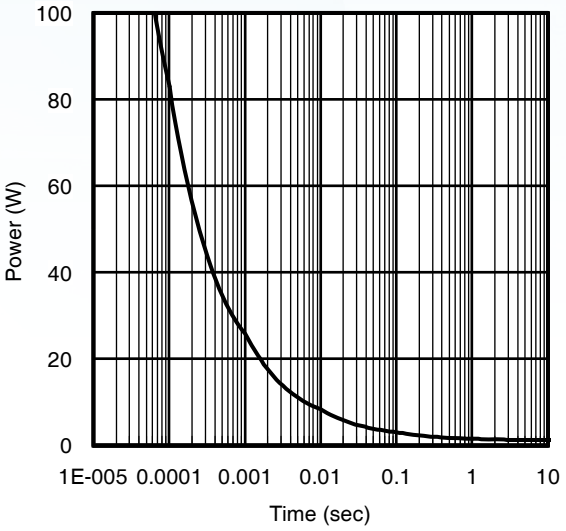

Fig 16. Typical Power Vs. Time

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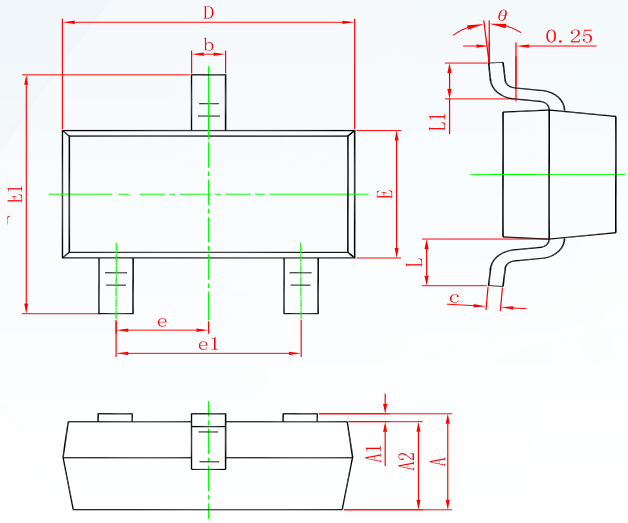
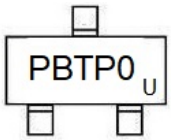


Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP.		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°

Marking



Ordering information

Order code	Package	Baseqty	Deliverymode
IRLML9301	SOT-23	3000	Tape and reel

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