

# EVVOSEMI<sup>®</sup>

THINK CHANGE DO



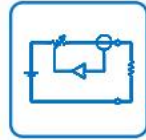
ESD



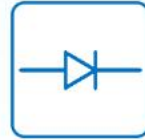
TVS



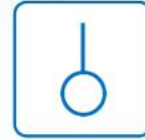
MOS



LDO



Diode



Sensor



DC-DC

## Product Specification

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

EV is the abbreviation of name EVVO

**P-CHANNEL MOSFET**

**FEATURES**

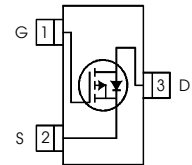
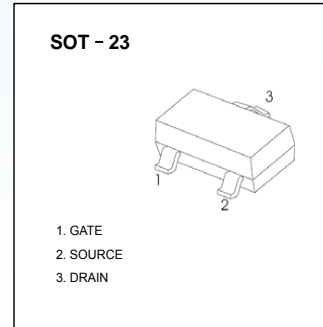
- $V_{DS} (V) = -30V$
- $R_{DS(ON)} < 64m\ \Omega$  ( $V_{GS} = -10V$ )
- $R_{DS(ON)} < 103m\ \Omega$  ( $V_{GS} = -4.5V$ )

**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
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-3.6	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	-2.9	
$I_{DM}$	Pulsed Drain Current	-15	
$P_D @ T_A = 25^\circ C$	Maximum Power Dissipation	1.3	W
$P_D @ T_A = 70^\circ C$	Maximum Power Dissipation	0.8	
	Linear Derating Factor	0.01	
$V_{GS}$	Gate-to-Source Voltage	$\pm 20$	V
$T_J, T_{STG}$	Junction and Storage Temperature Range	-55 to + 150	$^\circ C$

**Thermal Resistance**

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

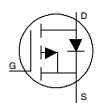
**Notes:**

- ① Repetitive rating; pulse width limited by max. junction temperature.
- ② Pulse width  $\leq 400\mu s$ ; duty cycle  $\leq 2\%$ .
- ③ Surface mounted on 1 in square Cu board

**P-CHANNEL MOSFET**
**Electric Characteristics @ T<sub>J</sub> = 25°C (unless otherwise specified)**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
V <sub>(BR)DSS</sub>	Drain-to-Source Breakdown Voltage	-30			V	V <sub>GS</sub> = 0V, I <sub>D</sub> = -250μA
ΔV <sub>(BR)DSS</sub> /ΔT <sub>J</sub>	Breakdown Voltage Temp. Coefficient		0.02		V/°C	Reference to 25°C, I <sub>D</sub> = -1mA
R <sub>DS(on)</sub>	Static Drain-to-Source On-Resistance		51	64	mΩ	V <sub>GS</sub> = -10V, I <sub>D</sub> = -3.6A ②
			82	103		V <sub>GS</sub> = -4.5V, I <sub>D</sub> = -2.9A ②
V <sub>GS(th)</sub>	Gate Threshold Voltage	-1.3		-2.4	V	V <sub>DS</sub> = V <sub>GS</sub> , I <sub>D</sub> = -10μA
I <sub>DSS</sub>	Drain-to-Source Leakage Current			1	μA	V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V
				150		V <sub>DS</sub> = -24V, V <sub>GS</sub> = 0V, T <sub>J</sub> = 125°C
I <sub>GSS</sub>	Gate-to-Source Forward Leakage			-100	nA	V <sub>GS</sub> = -20V
	Gate-to-Source Reverse Leakage			100		V <sub>GS</sub> = 20V
R <sub>G</sub>	Internal Gate Resistance		12		Ω	
g <sub>fs</sub>	Forward Transconductance	5.0			S	V <sub>DS</sub> = -10V, I <sub>D</sub> = -3.6A
Q <sub>g</sub>	Total Gate Charge		4.8		nC	I <sub>D</sub> = -3.6A
Q <sub>gs</sub>	Gate-to-Source Charge		1.2			V <sub>DS</sub> = -15V
Q <sub>gd</sub>	Gate-to-Drain ("Miller") Charge		2.5			V <sub>GS</sub> = -4.5V ②
t <sub>d(on)</sub>	Turn-On Delay Time		9.6		ns	V <sub>DD</sub> = -15V ②
t <sub>r</sub>	Rise Time		19			I <sub>D</sub> = -1A
t <sub>d(off)</sub>	Turn-Off Delay Time		16			R <sub>G</sub> = 6.8Ω
t <sub>f</sub>	Fall Time		15			V <sub>GS</sub> = -4.5V
C <sub>iss</sub>	Input Capacitance		388		pF	V <sub>GS</sub> = 0V
C <sub>oss</sub>	Output Capacitance		93			V <sub>DS</sub> = -25V
C <sub>rss</sub>	Reverse Transfer Capacitance		65			f = 1.0KHz

**Source - Drain Ratings and Characteristics**

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I <sub>S</sub>	Continuous Source Current (Body Diode)			-1.3	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I <sub>SM</sub>	Pulsed Source Current (Body Diode) ①			-15		
V <sub>SD</sub>	Diode Forward Voltage			-1.2	V	T <sub>J</sub> = 25°C, I <sub>S</sub> = -1.3A, V <sub>GS</sub> = 0V ②
t <sub>rr</sub>	Reverse Recovery Time		14	21	ns	T <sub>J</sub> = 25°C, V <sub>R</sub> = -24V, I <sub>F</sub> = -1.3A
Q <sub>rr</sub>	Reverse Recovery Charge		7.2	11	nC	di/dt = 100A/μs ②

P-CHANNEL MOSFET

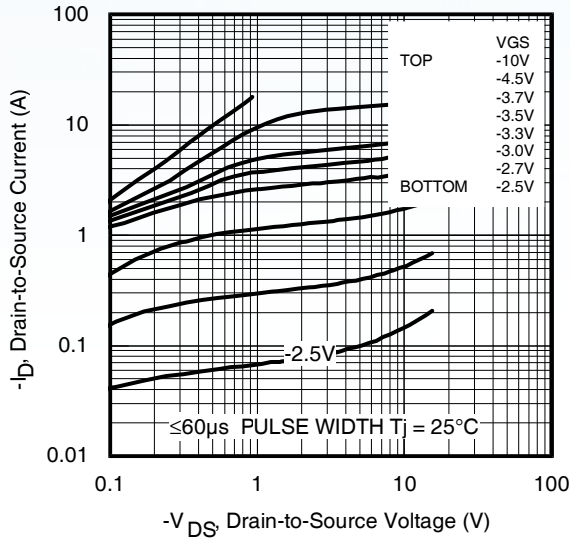


Fig 1. Typical Output Characteristics

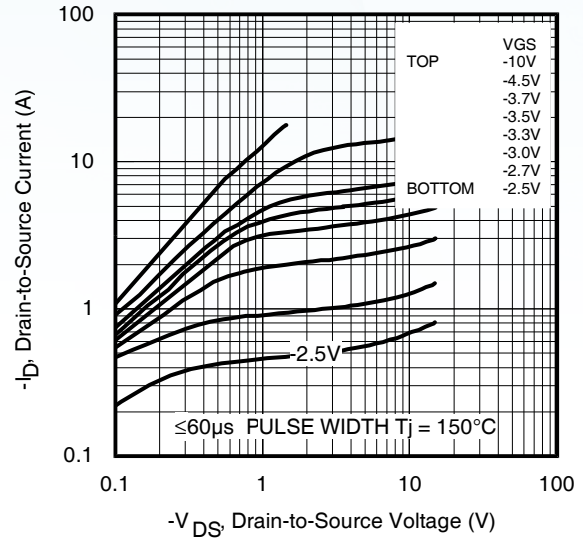


Fig 2. Typical Output Characteristics

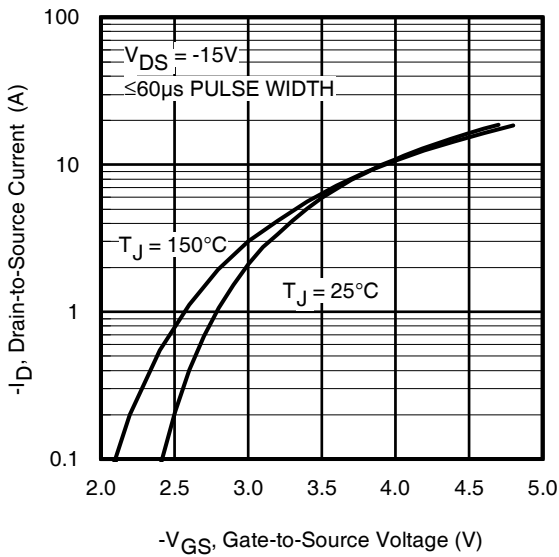


Fig 3. Typical Transfer Characteristics

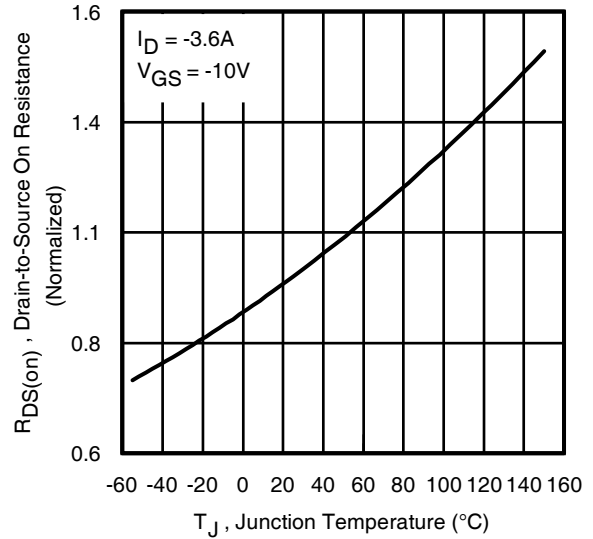


Fig 4. Normalized On-Resistance Vs. Temperature

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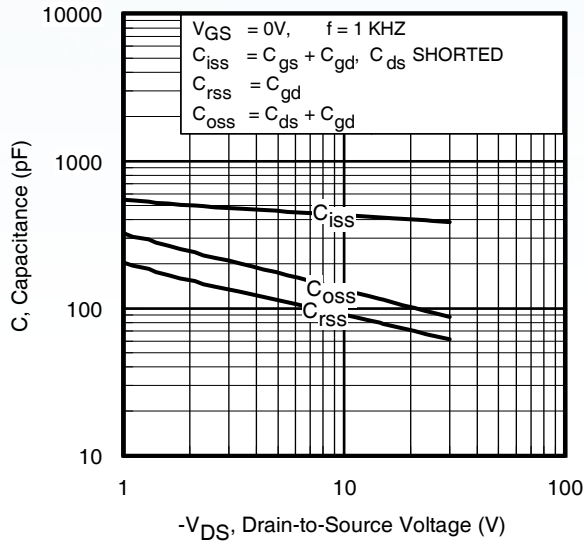


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

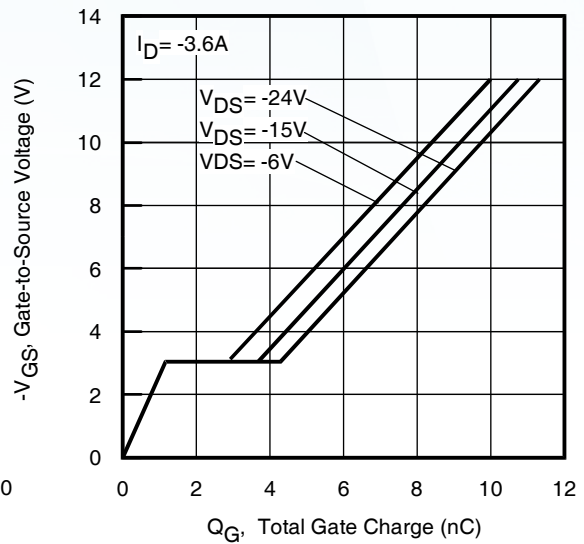


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

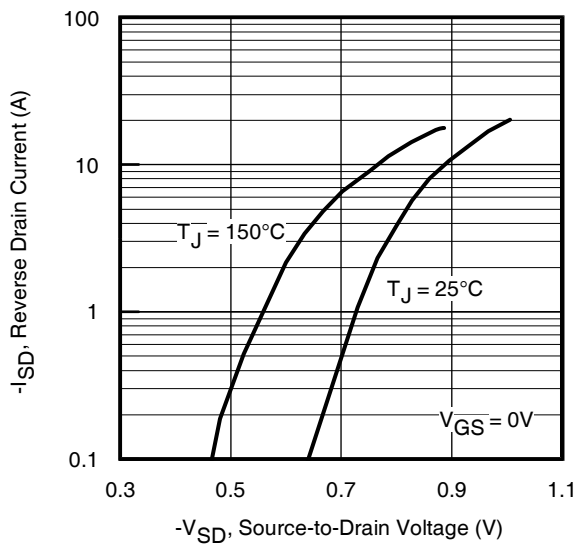


Fig 7. Typical Source-Drain Diode Forward Voltage

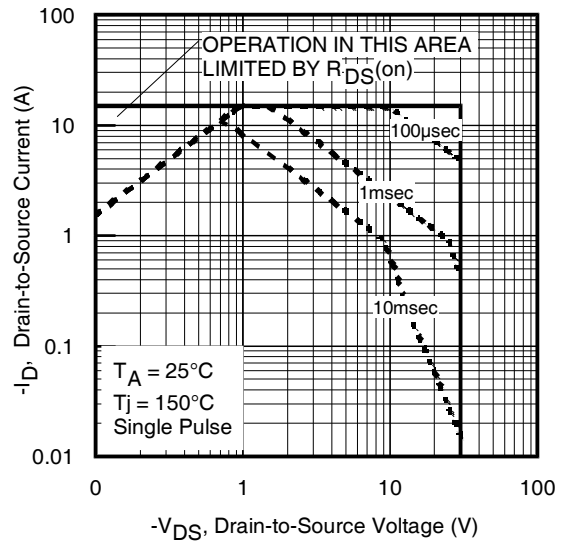


Fig 8. Maximum Safe Operating Area

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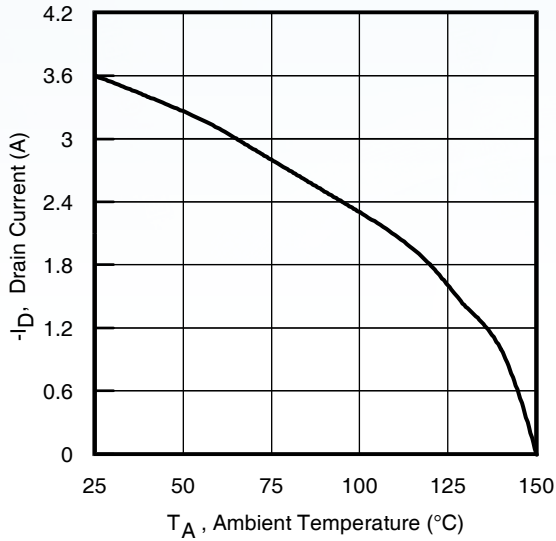


Fig 9. Maximum Drain Current Vs. Ambient Temperature

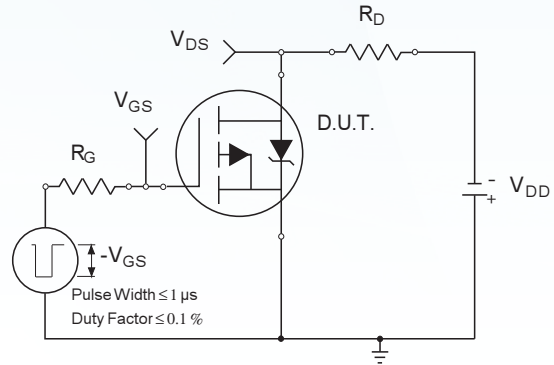


Fig 10a. Switching Time Test Circuit

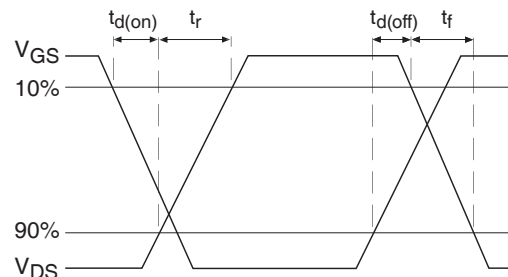


Fig 10b. Switching Time Waveforms

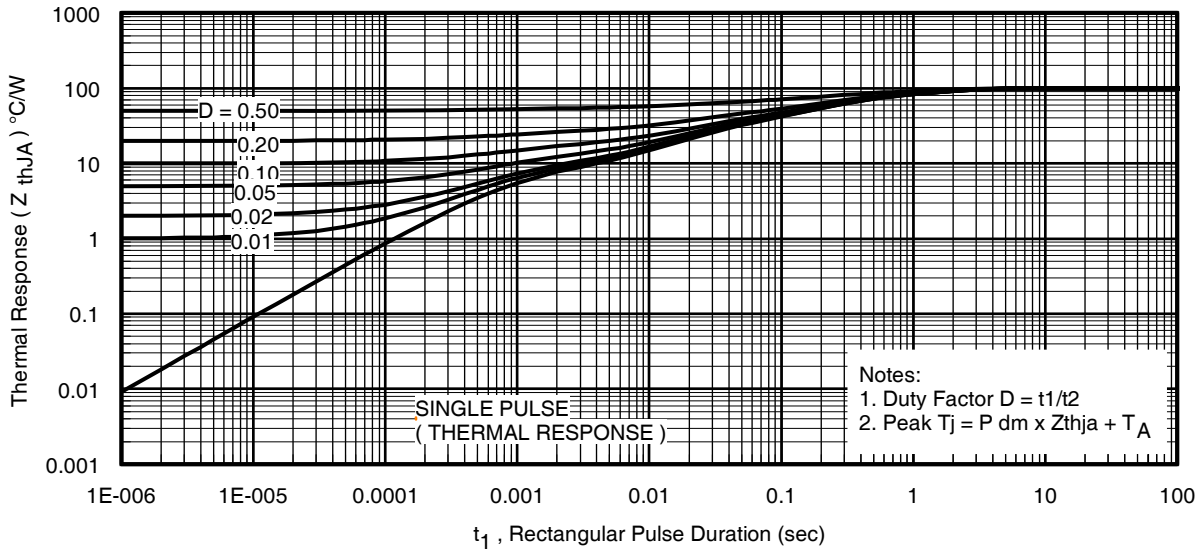


Fig 11. Typical Effective Transient Thermal Impedance, Junction-to-Ambient

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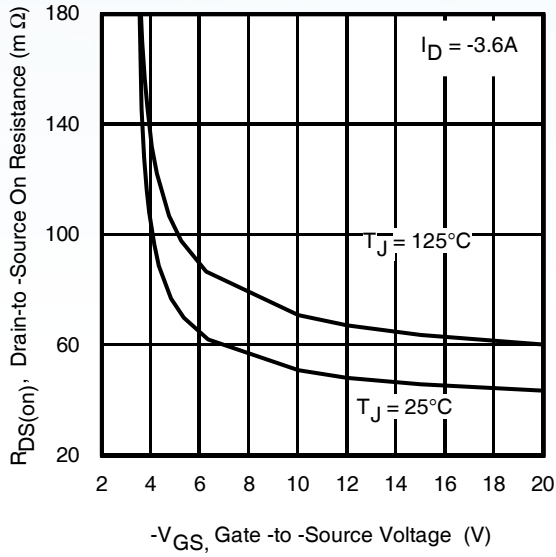


Fig 12. Typical On-Resistance Vs. Gate Voltage

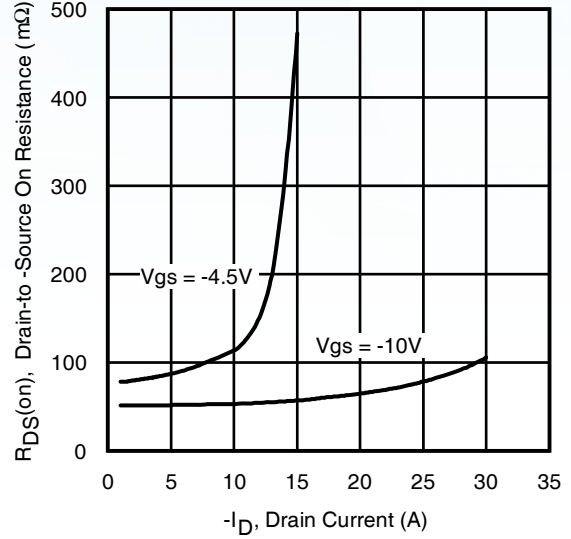


Fig 13. Typical On-Resistance Vs. Drain Current

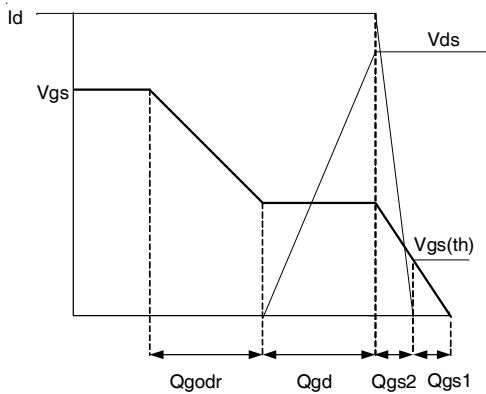


Fig 14a. Gate Charge Waveform

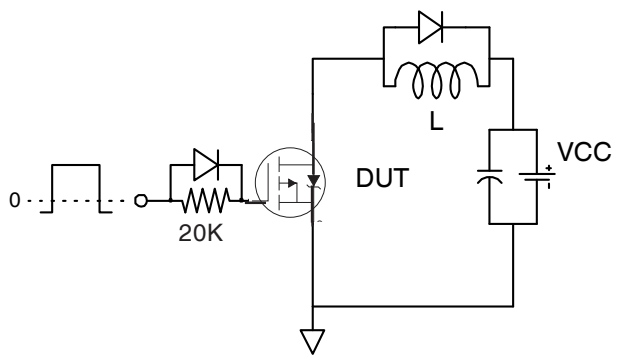


Fig 14b. Gate Charge Test Circuit

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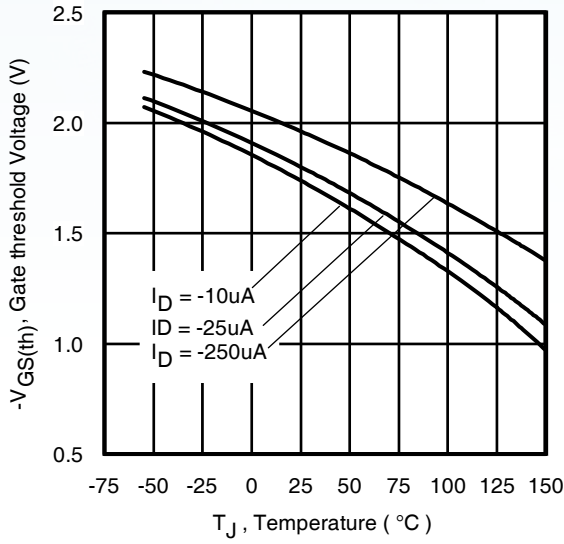


Fig 15. Typical Threshold Voltage Vs. Junction Temperature

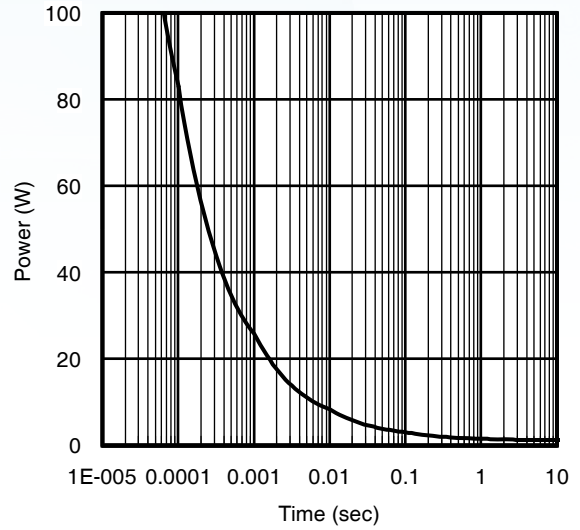
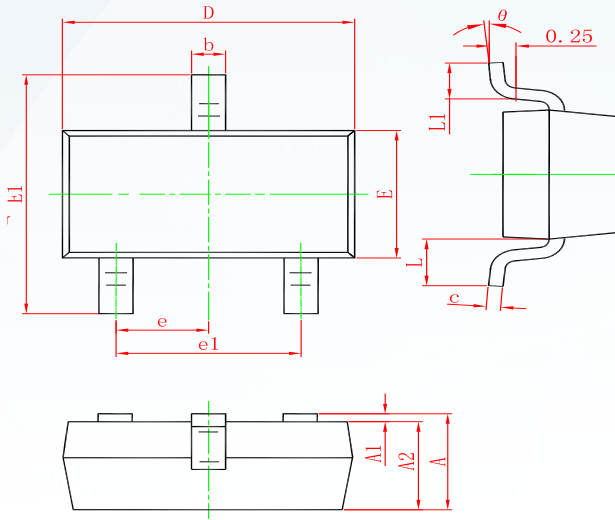


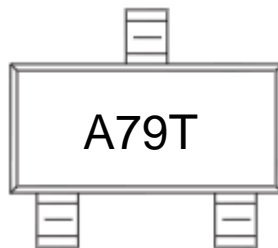
Fig 16. Typical Power Vs. Time

**P-CHANNEL MOSFET**



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

## Disclaimer

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