

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



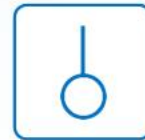
MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	IRLML0040
▶ Overseas	Part Number	IRLML0040
▶ Equivalent	Part Number	IRLML0040

EV is the abbreviation of name EVVO

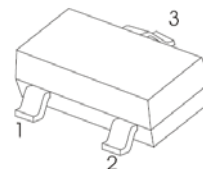
FEATURES

- $V_{DS} (V) = 30V$
- $R_{DS(ON)} < 30m\Omega$ ($V_{GS} = 10V$)
- $R_{DS(ON)} < 33m\Omega$ ($V_{GS} = 4.5V$)

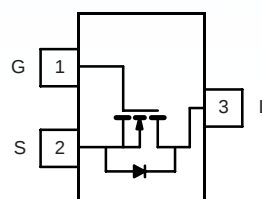
APPLICATIONS

- DC/DC Converter

SOT - 23



1. GATE
2. SOURCE
3. DRAIN



ABSOLUTE MAXIMUM RATINGS $T_A = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

Parameter	Symbol	Limit	Unit
Drain-Source Voltage	V_{DS}	30	V
Gate-Source Voltage	V_{GS}	± 20	
Continuous Drain Current ($T_J = 150\text{ }^{\circ}\text{C}$)	$T_C = 25\text{ }^{\circ}\text{C}$	6.5 ^a	A
	$T_C = 70\text{ }^{\circ}\text{C}$	6.0	
	$T_A = 25\text{ }^{\circ}\text{C}$	5.3	
	$T_A = 70\text{ }^{\circ}\text{C}$	5.0	
Pulsed Drain Current	I_{DM}	25	
Continuous Source-Drain Diode Current	$T_C = 25\text{ }^{\circ}\text{C}$	1.4	
	$T_A = 25\text{ }^{\circ}\text{C}$	0.9 ^{b, c}	
Maximum Power Dissipation	$T_C = 25\text{ }^{\circ}\text{C}$	1.7	W
	$T_C = 70\text{ }^{\circ}\text{C}$	1.1	
	$T_A = 25\text{ }^{\circ}\text{C}$	1.1 ^{b, c}	
	$T_A = 70\text{ }^{\circ}\text{C}$	0.7 ^{b, c}	
Operating Junction and Storage Temperature Range	T_J, T_{stg}	- 55 to 150	$^{\circ}\text{C}$
Soldering Recommendations (Peak Temperature) ^{d, e}		260	

THERMAL RESISTANCE RATINGS

Parameter		Symbol	Typical	Maximum	Unit
Maximum Junction-to-Ambient ^{b, d}	$t \leq 5\text{ s}$	R_{thJA}	90	115	$^{\circ}\text{C/W}$
Maximum Junction-to-Foot (Drain)	Steady State	R_{thJF}	60	75	

Notes:

- Package limited
- Surface Mounted on 1" x 1" FR4 board.
- $t = 5\text{ s}$.
- Maximum under steady state conditions is $130\text{ }^{\circ}\text{C/W}$.

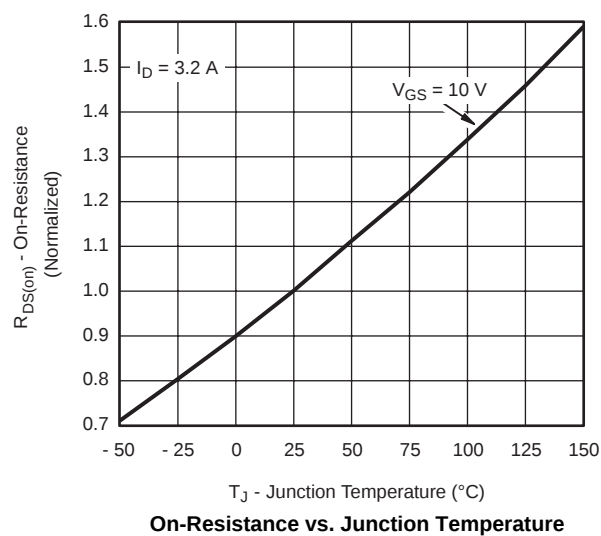
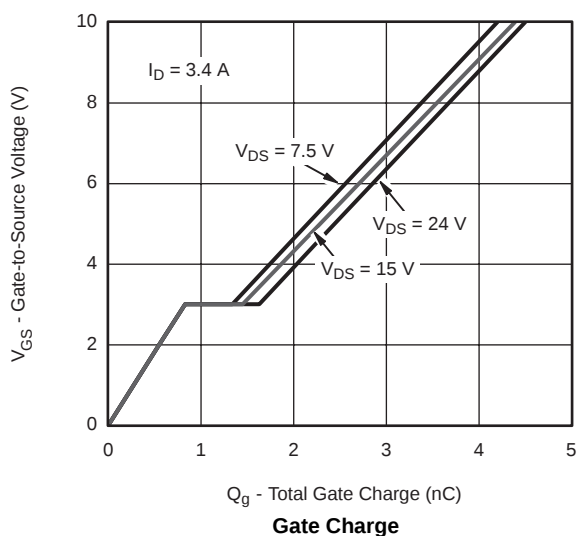
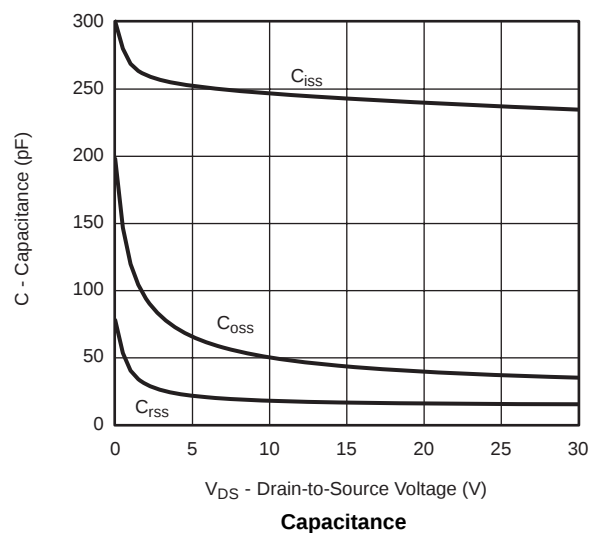
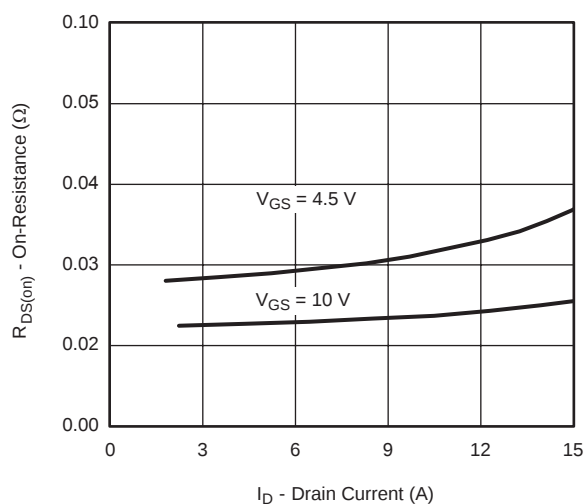
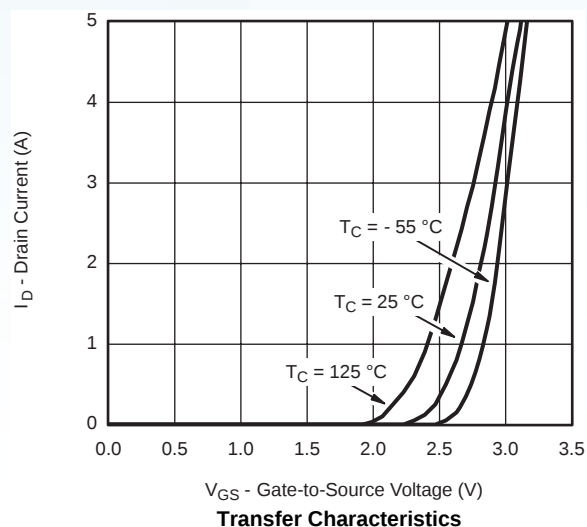
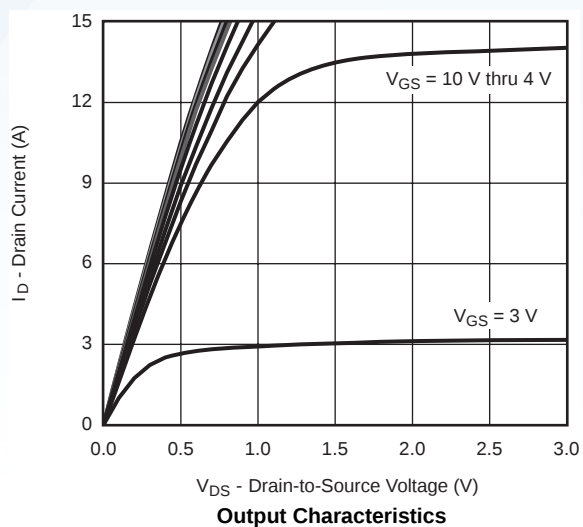
SPECIFICATIONS $T_J = 25\text{ }^{\circ}\text{C}$, unless otherwise noted

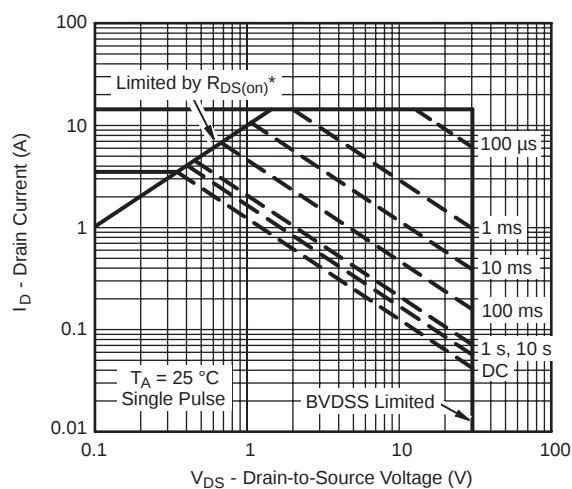
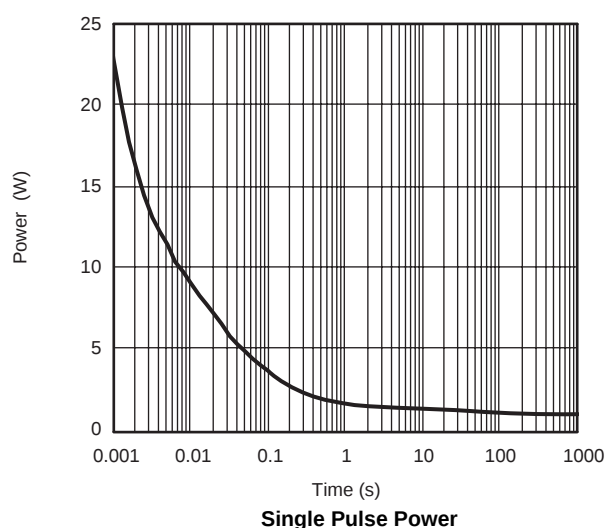
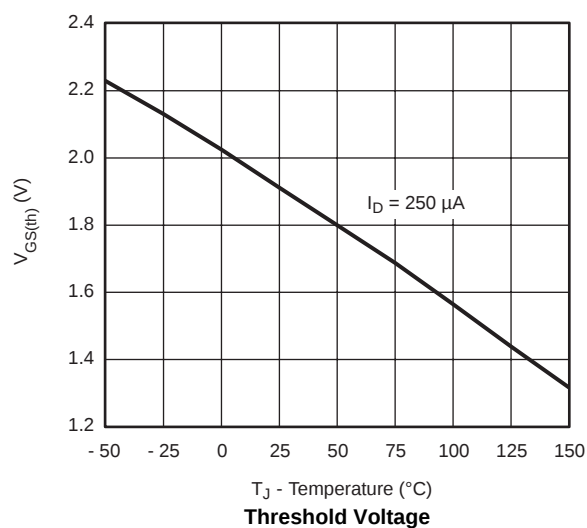
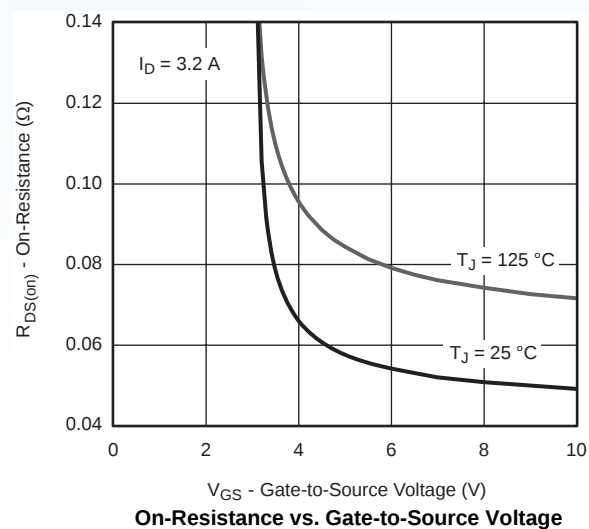
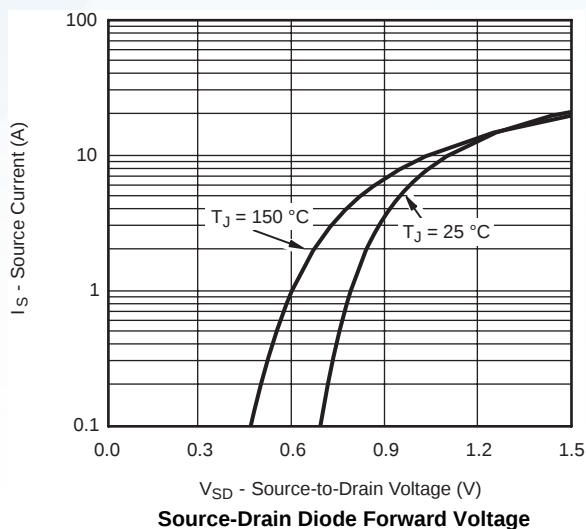
Parameter	Symbol	Test Conditions	Min.	Typ.	Max.	Unit
Static						
Drain-Source Breakdown Voltage	V _{DS}	V _{GS} = 0 V, I _D = 250 μA	30			V
V _{DS} Temperature Coefficient	ΔV _{DS} /T _J	I _D = 250 μA		31		mV/°C
V _{GS(th)} Temperature Coefficient	ΔV _{GS(th)} /T _J			- 5		
Gate-Source Threshold Voltage	V _{GS(th)}	V _{DS} = V _{GS} , I _D = 250 μA	0.7	1.1	2.0	V
Gate-Source Leakage	I _{GSS}	V _{DS} = 0 V, V _{GS} = ± 20 V			± 100	nA
Zero Gate Voltage Drain Current	I _{DSS}	V _{DS} = 30 V, V _{GS} = 0 V			1	μA
		V _{DS} = 30 V, V _{GS} = 0 V, T _J = 55 °C			10	
On-State Drain Current ^a	I _{D(on)}	V _{DS} ≥ 5 V, V _{GS} = 10 V	10			A
Drain-Source On-State Resistance ^a	R _{DS(on)}	V _{GS} = 10 V, I _D = 3.2 A			30	mΩ
		V _{GS} = 4.5 V, I _D = 2.8 A			33	
Forward Transconductance ^a	g _{fs}	V _{DS} = 15 V, I _D = 4.8 A		11		S
Dynamic ^b						
Input Capacitance	C _{iss}	V _{DS} = 15 V, V _{GS} = 0 V, f = 1 MHz		335		pF
Output Capacitance	C _{oss}			45		
Reverse Transfer Capacitance	C _{rss}			17		
Total Gate Charge	Q _g	V _{DS} = 15 V, V _{GS} = 10 V, I _D = 3.4 A		4.5	6.7	nC
		V _{DS} = 15 V, V _{GS} = 4.5 V, I _D = 3.4 A		2.1	3.2	
Gate-Source Charge	Q _{gs}			0.85		
Gate-Drain Charge	Q _{gd}			0.65		
Gate Resistance	R _g	f = 1 MHz	0.8	4.4	8.8	Ω
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 5.6 Ω I _D ≅ 2.7 A, V _{GEN} = 4.5 V, R _g = 1 Ω		12	20	ns
Rise Time	t _r			50	75	
Turn-Off Delay Time	t _{d(off)}			12	20	
Fall Time	t _f			22	35	
Turn-On Delay Time	t _{d(on)}	V _{DD} = 15 V, R _L = 5.6 Ω I _D ≅ 2.7 A, V _{GEN} = 10 V, R _g = 1 Ω		5	10	
Rise Time	t _r			12	20	
Turn-Off Delay Time	t _{d(off)}			10	15	
Fall Time	t _f			5	10	
Drain-Source Body Diode Characteristics						
Continuous Source-Drain Diode Current	I _S	T _C = 25 °C			1.4	A
Pulse Diode Forward Current	I _{SM}				15	
Body Diode Voltage	V _{SD}	I _S = 2.7 A, V _{GS} = 0 V		0.8	1.2	V
Body Diode Reverse Recovery Time	t _{rr}	I _F = 2.7 A, dI/dt = 100 A/μs, T _J = 25 °C		10	20	ns
Body Diode Reverse Recovery Charge	Q _{rr}			5	10	nC
Reverse Recovery Fall Time	t _a			6		ns
Reverse Recovery Rise Time	t _b			4		

Notes:

a. Pulse test; pulse width $\leq 300\text{ }\mu\text{s}$, duty cycle $\leq 2\%$

b. Guaranteed by design, not subject to production testing.

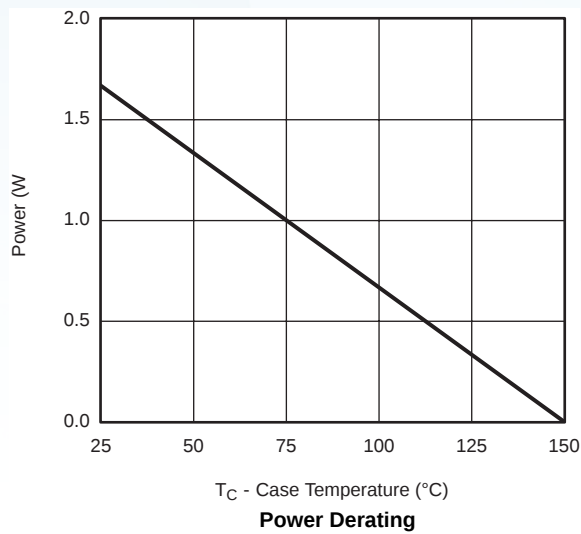
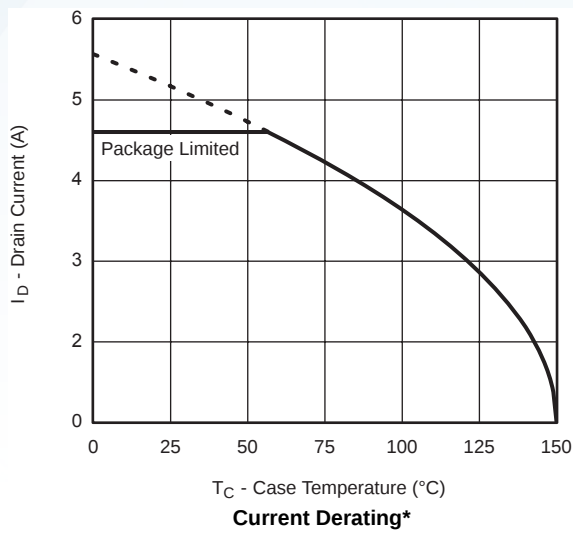
TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted


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* $V_{GS} > \text{minimum } V_{GS} \text{ at which } R_{DS(on)} \text{ is specified}$

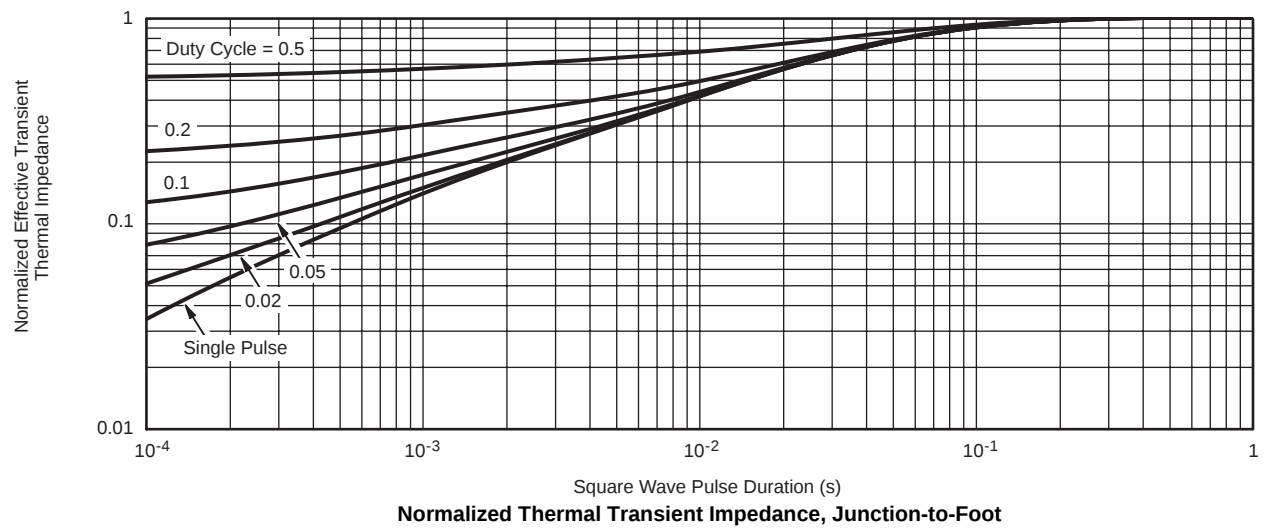
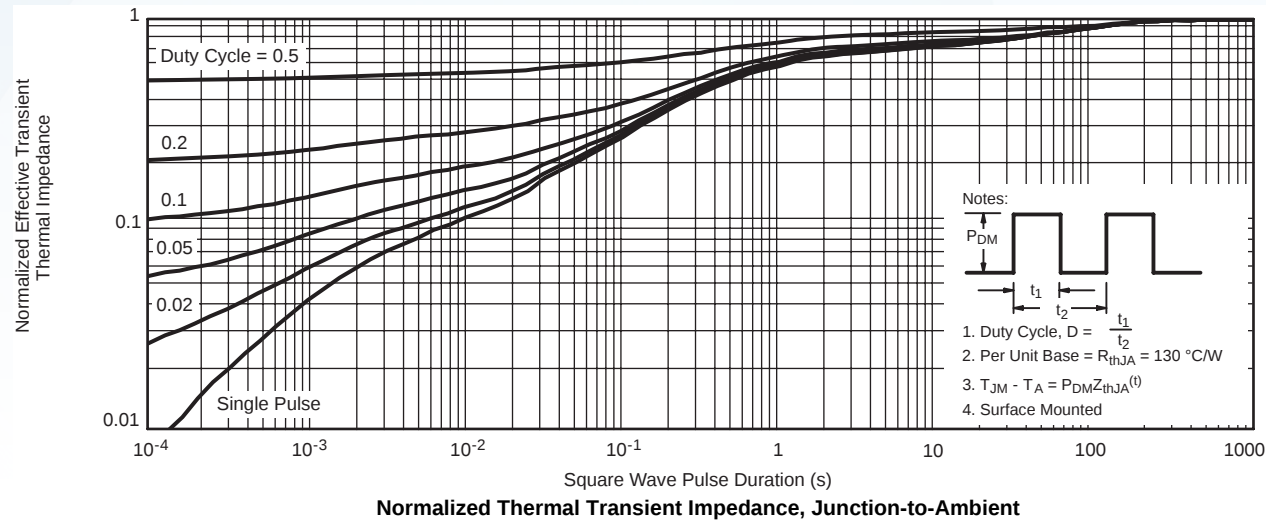
Safe Operating Area, Junction-to-Ambient

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted

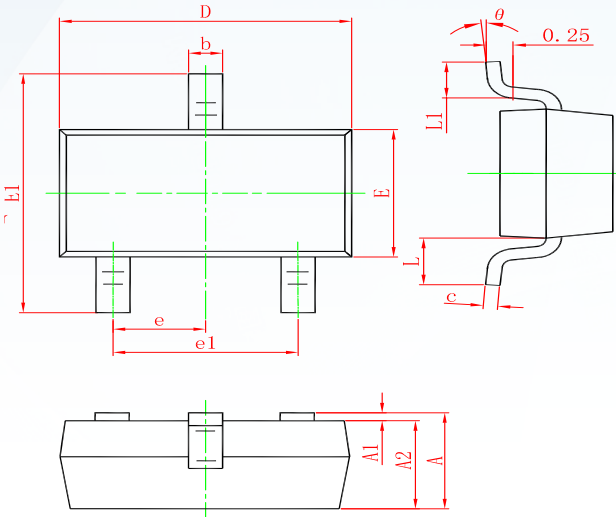


* The power dissipation P_D is based on $T_{J(max)} = 150$ °C, using junction-to-case thermal resistance, and is more useful in settling the upper dissipation limit for cases where additional heatsinking is used. It is used to determine the current rating, when this rating falls below the package limit.

TYPICAL CHARACTERISTICS 25 °C, unless otherwise noted



SOT-23 PACKAGE OUTLINE DIMENSIONS



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°

Ordering information

Order code	Package	Baseqty	Deliverymode
IRLML0040	SOT-23	3000	Tape and reel

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