

1. Description

The IRLML6402TR uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a load switch or in PWM applications.

2.2 Features

- P-Channel MOSFET
- SOT-23 Footprint
- Available in Tape and Reel

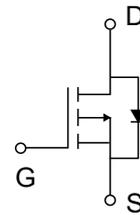
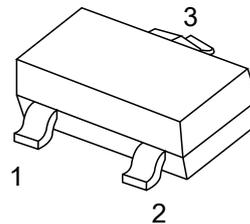
2.1 Features

- $V_{DS(V)} = -20V$
- $R_{DS(ON)} < 65m\Omega (V_{GS} = -4.5V)$
- $R_{DS(ON)} < 135m\Omega (V_{GS} = -2.5V)$

3. Pinning information

Pin	Symbol	Description
1	G	GATE
2	S	SOURCE
3	D	DRAIN

SOT-23



4. Maximum ratings ($T_A = 25^\circ C$ unless otherwise noted)

Parameter	Symbol	Value	Units	
Drain-Source Voltage	V_{DS}	-20	V	
Gate-Source Voltage	V_{GS}	± 12		
Continuous Drain Current, $V_{GS} = 4.5V$	I_D	$T_A = 25^\circ C$	-3.7	A
Continuous Drain Current, $V_{GS} = 4.5V$		$T_A = 70^\circ C$	-2.2	
Pulsed Drain Current ^a	I_{DM}		-30	
Power Dissipation	P_D	$T_A = 25^\circ C$	1.3	W
Power Dissipation		$T_A = 70^\circ C$	0.8	
Single Pulse Avalanche Energy ^b	E_{AS}		11	mJ



Thermal Resistance.Junction- to-Ambient	R_{thJA}	100	°C/W
Linear Derating Factor		0.01	W/°C
Junction Temperature	T_J	150	°C
Junction and Storage Temperature Range	T_{STG}	-55 to 150	

Notes:

- a.Repetitive Rating :Pulse width limited by maximum junction temperature.
- b.Starting $T_J=25^{\circ}\text{C}$, $L=1.65\text{mH}$, $R_G=25\Omega$, $I_{AS}=-3.7\text{A}$.



5. Electrical Characteristics $T_A=25^\circ\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{DSS}	$I_D=-250\mu\text{A}$, $V_{GS}=0\text{V}$	-20			V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$			-1	μA
		$V_{DS}=-20\text{V}$, $V_{GS}=0\text{V}$, $T_J=70^\circ\text{C}$			-25	
Gate-source leadage	I_{GSS}	$V_{GS}=\pm 12\text{V}$			± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-250\mu\text{A}$	-0.4	-0.55	-0.95	V
Static Drain-Source On-Resistance	$R_{DS(on)}$	$V_{GS}=-4.5\text{V}$, $I_D=-3.7\text{A}$		50	65	m Ω
		$V_{GS}=-2.5\text{V}$, $I_D=-3.1\text{A}$		70	135	
Forward Transconductance	g_{FS}	$V_{DS}=-10\text{V}$, $I_D=-3.7\text{A}$	6			S
Input Capacitance	C_{iss}	$V_{DS}=-10\text{V}$		633		pF
Output Capacitance	C_{oss}	$V_{GS}=0\text{V}$		145		
Reverse Transfer Capacitance	C_{rss}	$f=1\text{MHz}$		110		
Total Gate Charge	Q_g	$V_{DS}=-10\text{V}$		8	12	nC
Gate Source Charge	Q_{gs}	$V_{GS}=-5\text{V}$		1.2	1.8	
Gate Drain Charge	Q_{gd}	$I_D=-3.7\text{A}$		2.8	4.2	
Turn-On DelayTime	$t_{D(on)}$	$I_D=-3.7\text{A}$		350		ns
Rise time	t_r	$V_{DD}=-10\text{V}$		48		
Turn-off delay time	$t_{D(off)}$	$R_D=2.7\Omega$		588		
Fall time	t_f	$R_G=89\Omega$		381		
Reverse recovery time	t_{rr}	$T_J=25^\circ\text{C}$, $I_F=-1\text{A}$		29	43	ns
Reverse recovery charge	Q_{rr}	$di/dt=-100\text{A}/\mu\text{s} * 2$		11	17	nC
Continuous source current	I_S	MOSFET symbol			-1.3	A
Pulsed source current *1	I_{SM}	showing the integral reverse-p-n junction diode.			-22	
Diode forward voltage	V_{SD}	$T_J=25^\circ\text{C}$, $V=0\text{V}$, $I_S=-1\text{A} * 2$			-1.2	V

*1 Repetitive rating, pulse width limited by max. junction temperature.

* 2 Pulse width $\leq 400\mu\text{s}$, Duty cycle $\leq 2\%$.

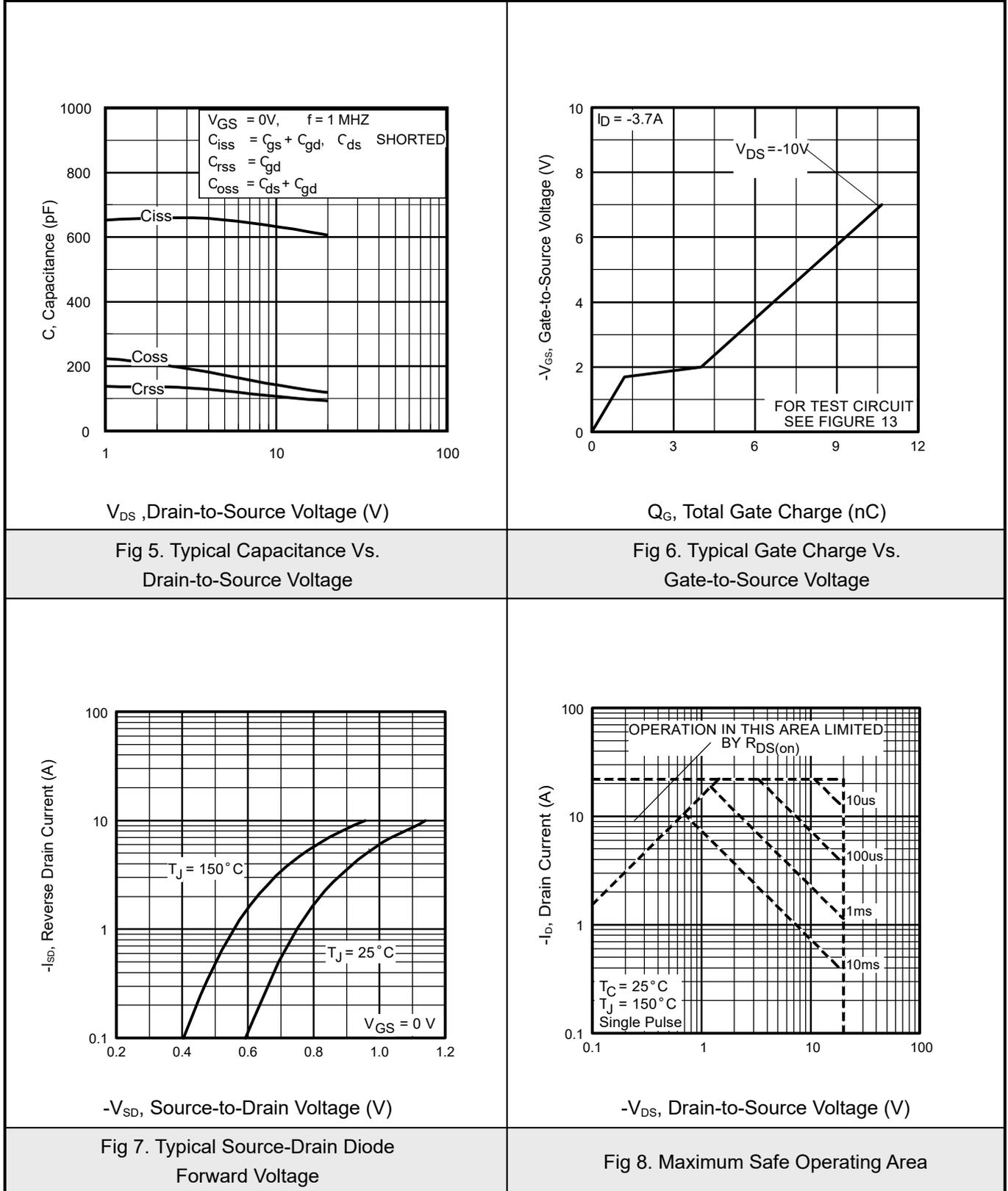


6.1 Typical Characteristics

<p style="text-align: center;">-V_{DS}, Drain-to-Source Voltage (V)</p>	<p style="text-align: center;">-V_{DS}, Drain-to-Source Voltage (V)</p>
<p>Fig 1. Typical Output Characteristics</p>	<p>Fig 2. Typical Output Characteristics</p>
<p style="text-align: center;">-V_{GS}, Gate-to-Source Voltage (V)</p>	<p style="text-align: center;">T_J, Junction Temperature ($^{\circ}C$)</p>
<p>Fig 3. Typical Transfer Characteristics</p>	<p>Fig 4. Normalized On-Resistance vs. Temperature</p>

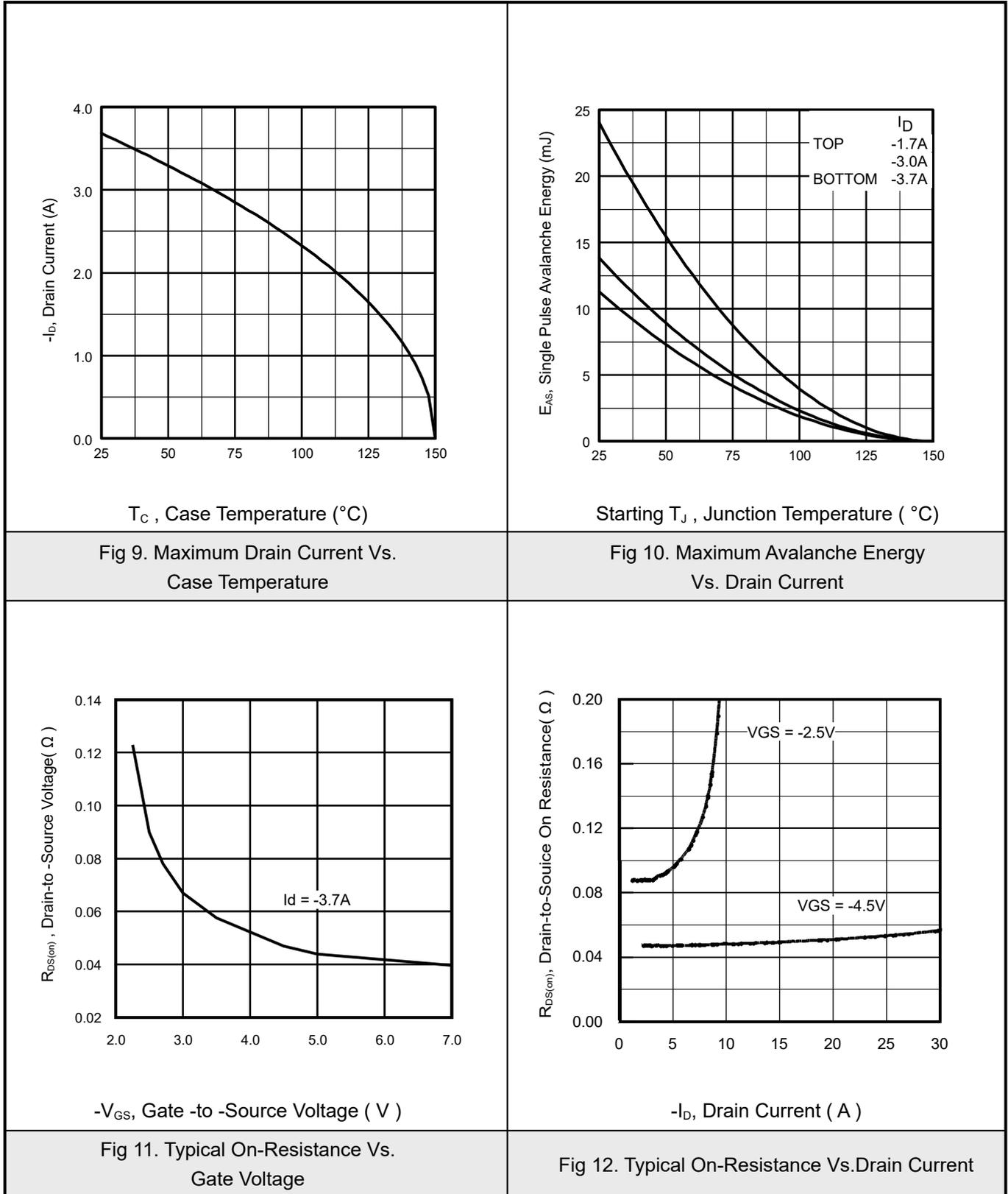


6.2 Typical Characteristics





6.3 Typical Characteristics





6.4 Typical Characteristics

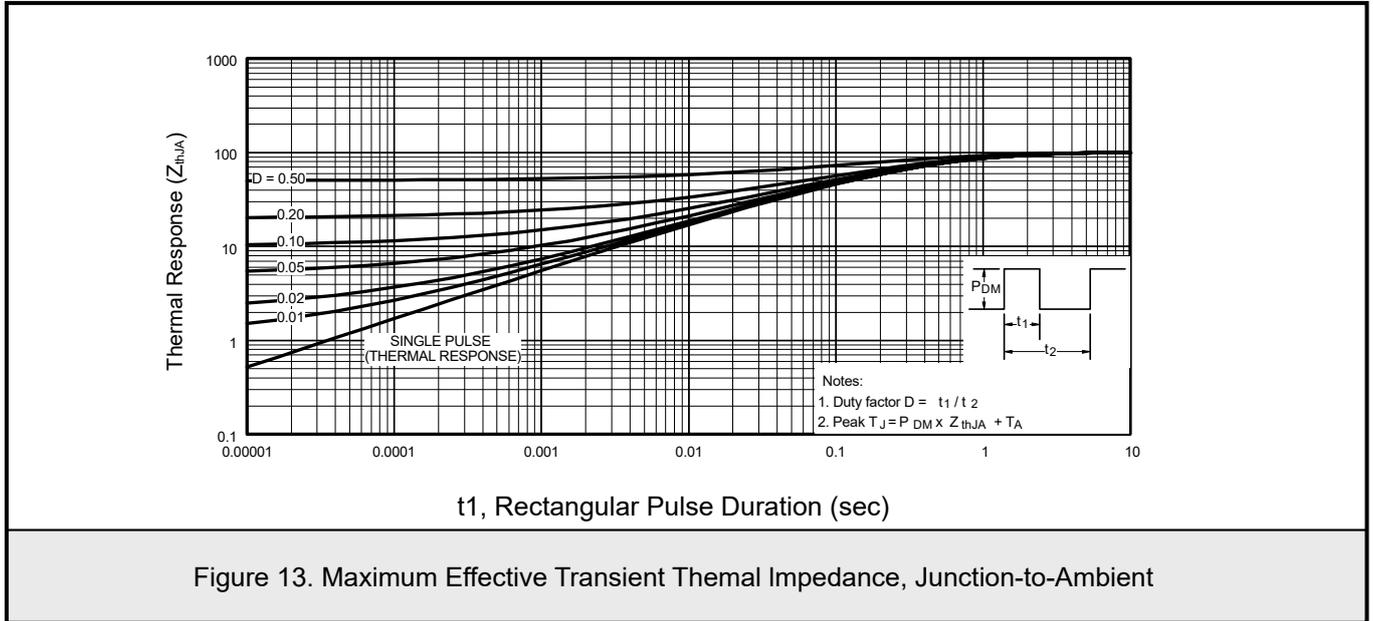
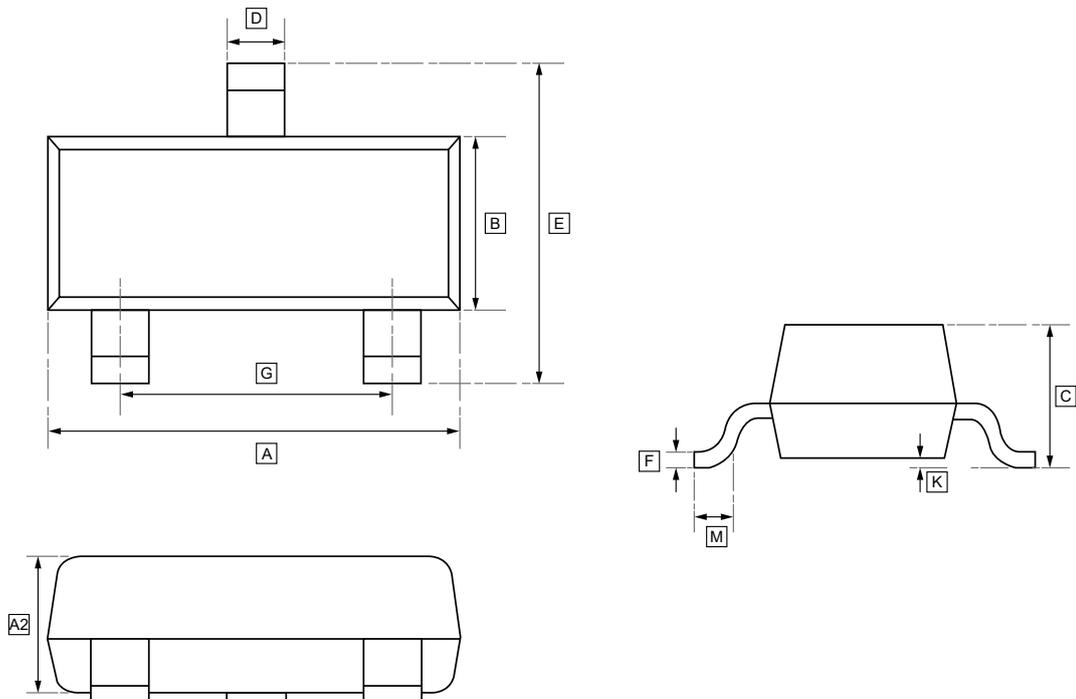


Figure 13. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



7.SOT-23 Package Outline Dimensions

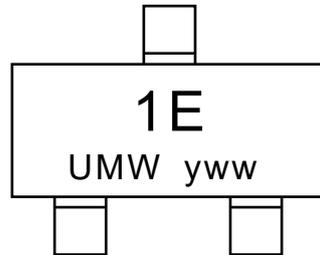


DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	G	K	M	A2	F
Min	2.85	1.20	0.90	0.40	2.25	1.80	0.00	0.30	0.95	0.095
Max	3.04	1.40	1.10	0.50	2.55	2.00	0.10	-	1.05	0.115



8. Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML6402TR	SOT-23	3000	Tape and reel



9. Disclaimer

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