

1.Description

The IRLML2402TR uses advanced trench technology to provide excellent $R_{DS(on)}$ with low gate charge. This device is suitable for use as a loads witch or in PWM applications.

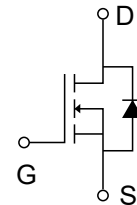
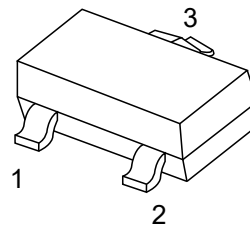
2.Features

- $V_{DS(V)}=20V$
- $I_D=1.2A(T_A=25^{\circ}C)$
- $Q_g(\text{typical})=2.6nC$
- $R_{DS(ON)}<250m\Omega(V_{GS}=4.5V)$

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
Continuous Drain Current, V_{GS} @ 4.5V	$T_A=25^{\circ}C$	I_D	1.2	A
Continuous Drain Current, V_{GS} @ 4.5V	$T_A=70^{\circ}C$		0.95	
Pulsed Drain Current ①		I_{DM}	7.4	
Power Dissipation	$T_A=25^{\circ}C$	P_D	540	mW
Linear Derating Factor			4.3	mW/ $^{\circ}C$
Gate-to-Source Voltage		V_{GS}	± 12	V
Peak Diode Recovery dv/dt ②		dv/dt	5	V/ns
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	$^{\circ}C$

5.Thermal resist ance rating

Parameter	Symbol	Typ	Max	Units
Maximum Junction-to-Ambient ④	$R_{\theta JA}$		230	$^{\circ}C/W$



6. Electrical Characteristics $T_J=25^{\circ}\text{C}$

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}$, $V_{GS}=0\text{V}$	20			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=1\text{mA}$, Reference to 25°C		0.024		V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}$, $I_D=0.93\text{A}$ ③			250	m Ω
		$V_{GS}=2.7\text{V}$, $I_D=0.47$ ③			350	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=250\mu\text{A}$	0.7			V
Forward Transconductance	g_{fs}	$V_{DS}=10\text{V}$, $I_D=0.47$	1.3			S
Drain-to-Source Leakage Current	I_{DSS}	$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$			1	μA
		$V_{DS}=16\text{V}$, $V_{GS}=0\text{V}$, $T_J=125^{\circ}\text{C}$			25	
Gate-to-Source Forward Leakage	I_{GSS}	$V_{GS}=-12\text{V}$			-100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=12\text{V}$			100	
Total Gate Charge	Q_g	$I_D=0.93\text{A}$		2.6	3.9	nC
Gate-to-Source Charge	Q_{gs}	$V_{DS}=16\text{V}$		0.41	0.62	
Gate-to-Drain ("Miller") Charge	Q_{gd}	$V_{GS}=4.5\text{V}$, See Fig.6 and 9 ③		1.1	1.7	
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=10\text{V}$		2.5		ns
Rise Time	t_r	$I_D=0.93\text{A}$		9.5		
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6.2\Omega$		9.7		
Fall Time	t_f	$R_D=11\Omega$, See Fig.10 ③		4.8		pF
Input Capacitance	C_{iss}	$V_{GS}=0\text{V}$		110		
Output Capacitance	C_{oss}	$V_{DS}=15\text{V}$		51		
Reverse Transfer Capacitance	C_{rss}	$f=1\text{MHz}$, See Fig.5		25		



Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	I_S	MOSFET symbol showing the integral reverse p-n junction diode.			0.54	A
Pulsed Source Current (Body Diode) ①	I_{SM}				7.4	
Diode Forward Voltage	V_{SD}		$T_J=25^{\circ}\text{C}, I_S=0.93\text{A}, V_{GS}=0\text{V}$ ③		1.2	V
Reverse Recovery Time	t_{rr}	$T_J=25^{\circ}\text{C}, I_F=0.93\text{A}$			25	38
Reverse Recovery Charge	Q_{rr}	$di/dt=100\text{A}/\mu\text{s}$ ③			16	24
						nC

Notes:

① Repetitive rating; pulse width limited by max. junction temperature. (See fig.11)

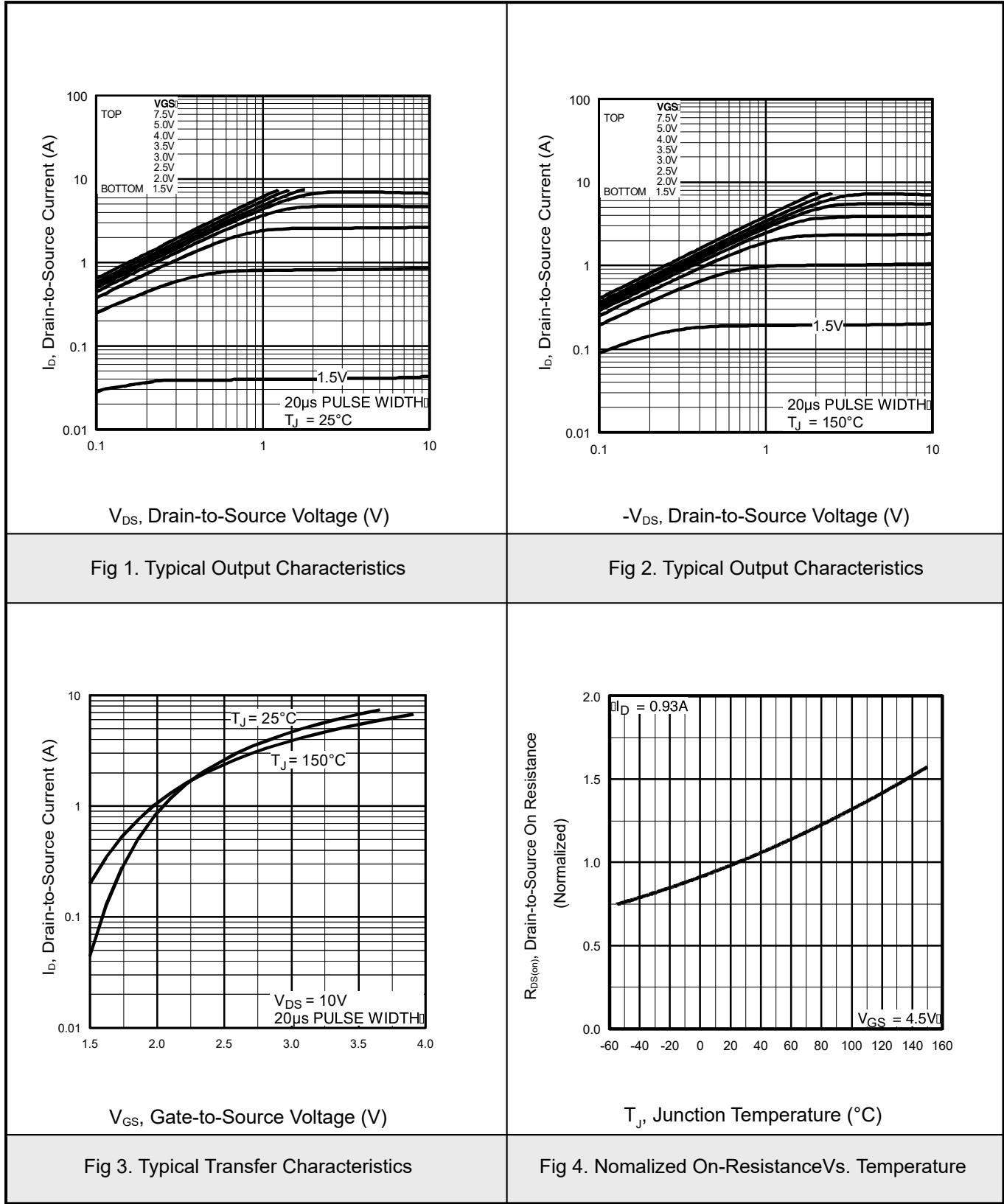
② $I_{SD} \leq 0.93\text{A}$, $di/dt \leq 90\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DSS}$, $T_J \leq 150^{\circ}\text{C}$.

③ Pulse width $\leq 300\mu\text{s}$; duty cycle $\leq 2\%$.

④ Surface mounted on FR-4 board, $t \leq 5\text{sec}$.

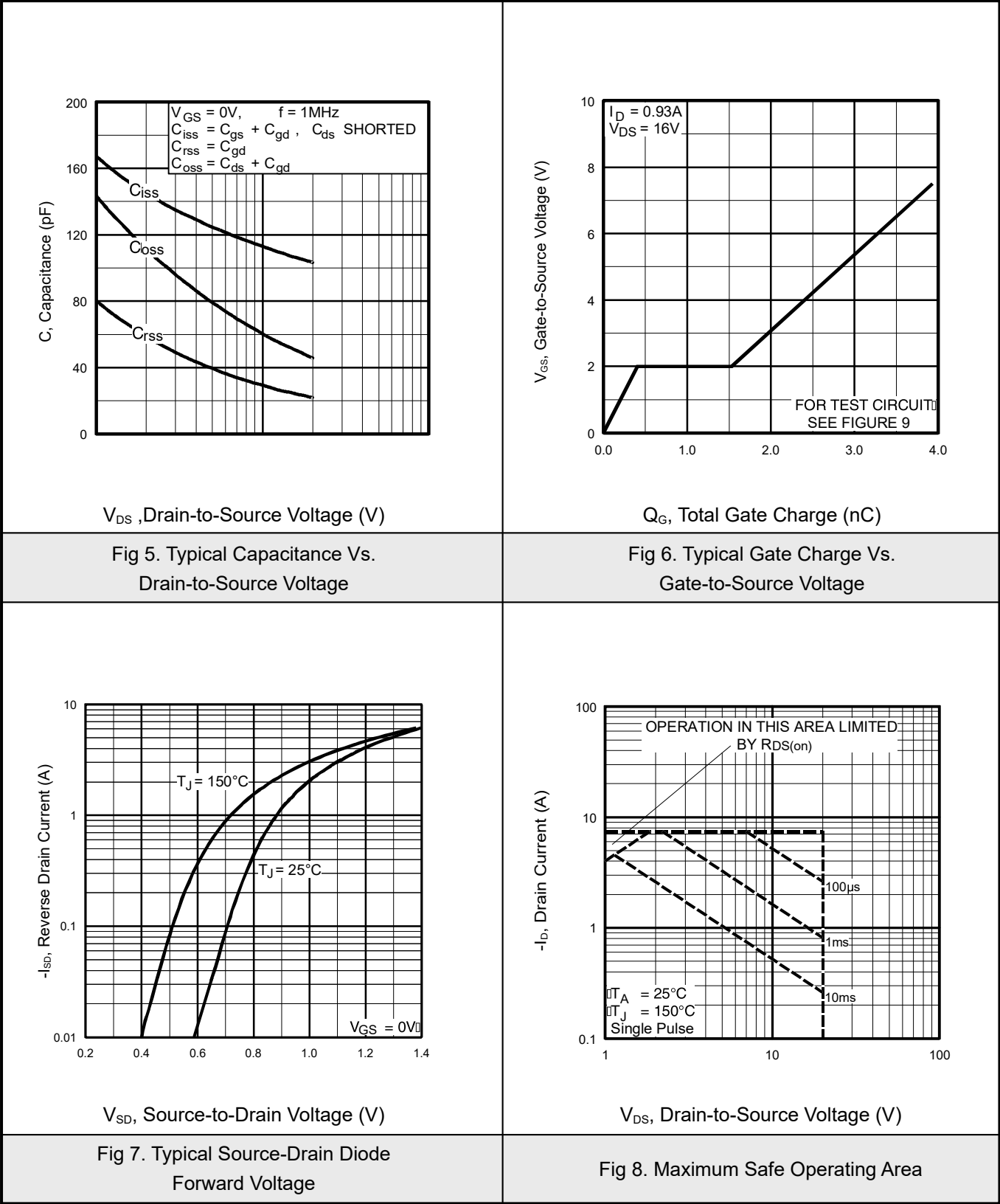


7.1 Typical Characteristics





7.2Typical Characteristics





7.3 Typical Characteristics

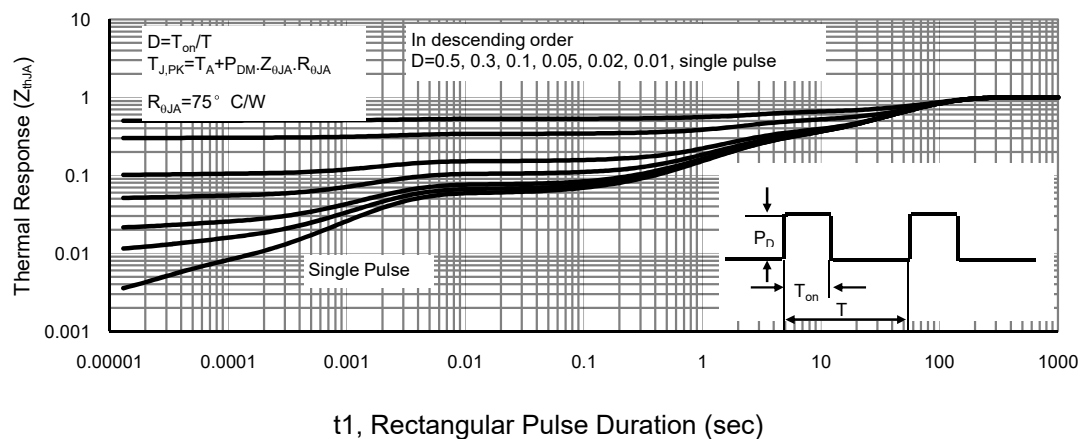


Figure 9. Maximum Effective Transient Thermal Impedance, Junction-to-Ambient



7.4 Typical Characteristics

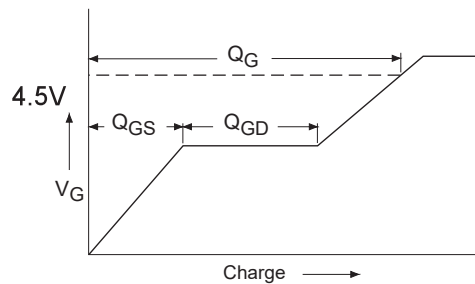


Fig 10a. Basic Gate Charge Waveform

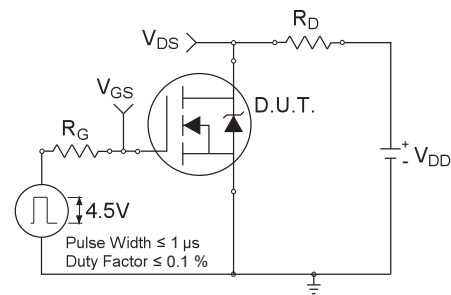


Fig 10a. Switching Time Test Circuit

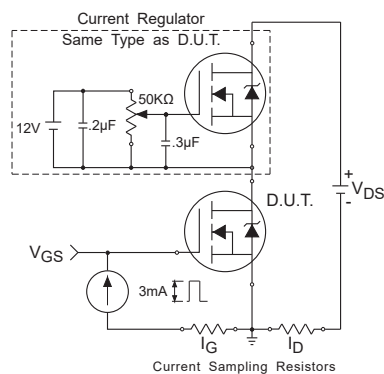


Fig 11a. Gate Charge Test Circuit

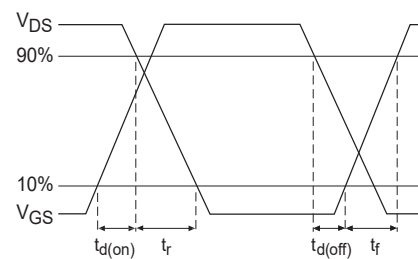
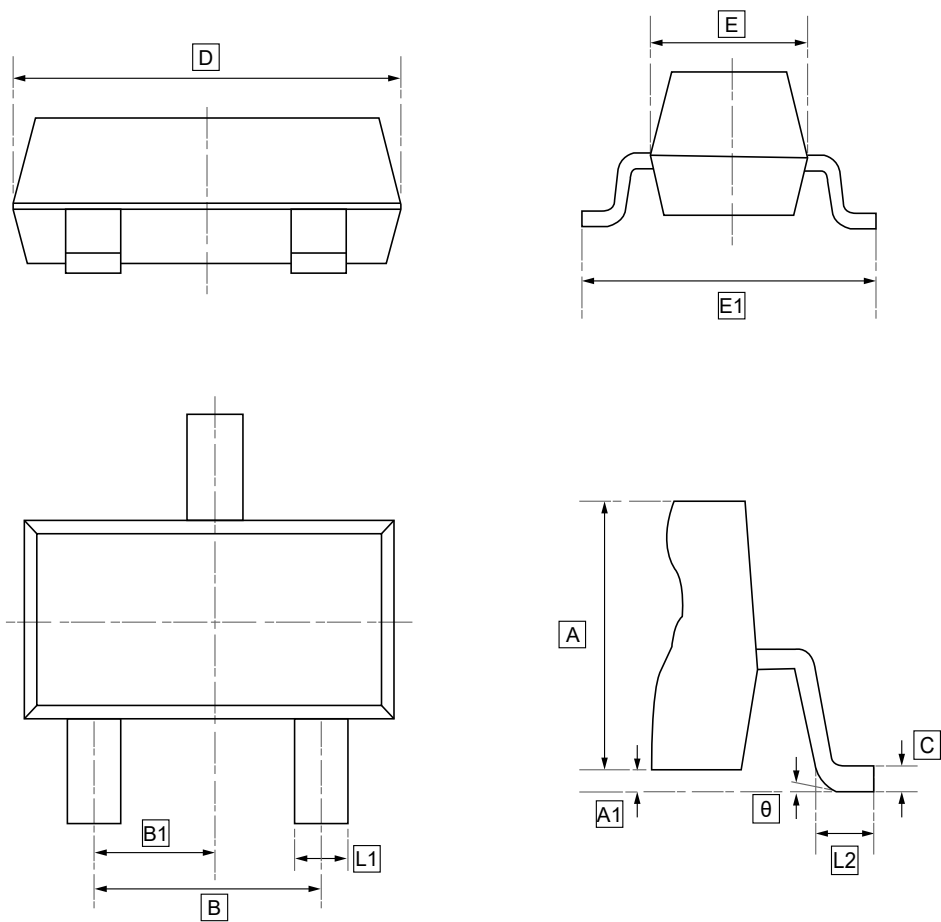


Fig 11b. Switching Time Waveforms



8.SOT-23 Package Outline Dimensions

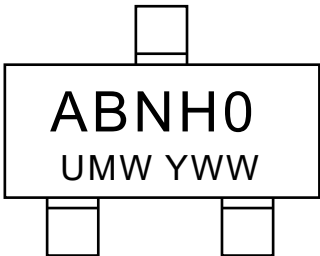


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	L1	L2	C	D	E	E1	B	B1	θ
Min	1.050	0.000	0.300	0.350	0.100	2.820	1.500	2.700	1.800	0.950	0°
Max	1.150	0.100	0.500	0.550	0.200	3.020	1.700	2.900	2.000	TYP	8°



9.Ordering information



YWW: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML2402TR	SOT-23	3000	Tape and reel



10.Disclaimer

UMW reserves the right to make changes to all products, specifications. Customers should obtain the latest version of product documentation and verify the completeness and currency of the information before placing an order.

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