

## 1. Description

The IRLML0030TR uses advanced trench technology to provide excellent  $R_{DS(on)}$  with low gate charge. This device is suitable for use as a load switch or in PWM applications.

## 2. Features

- $V_{DS(V)}=30V$
- $R_{DS(ON)}<27m\Omega(V_{GS}=10V)$
- $R_{DS(ON)}<40m\Omega(V_{GS}=4.5V)$

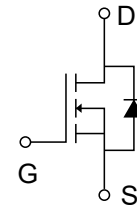
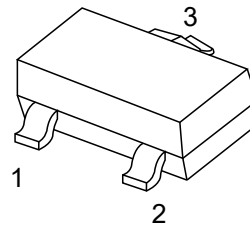
## 3. Benefits

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

## 4. Pinning information

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

SOT-23



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

Parameter		Symbol	Value	Units
Drain-Source Voltage		$V_{DS}$	30	V
Continuous Drain Current, $V_{GS} @ 10V$	$T_A=25^\circ C$	$I_D$	5.3	A
Continuous Drain Current, $V_{GS} @ 10V$	$T_A=70^\circ C$		4.3	
Pulsed Drain Current		$I_{DM}$	21	
Maximum Power Dissipation	$T_A=25^\circ C$	$P_D$	1.3	W
Maximum Power Dissipation	$T_A=70^\circ C$		0.8	
Linear Derating Factor			0.01	W/ $^\circ C$
Gate-to-Source Voltage		$V_{GS}$	$\pm 20$	V
Junction and Storage Temperature Range		$T_J, T_{STG}$	-55 to 150	$^\circ C$



## 6. Thermal resistance rating

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

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.



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

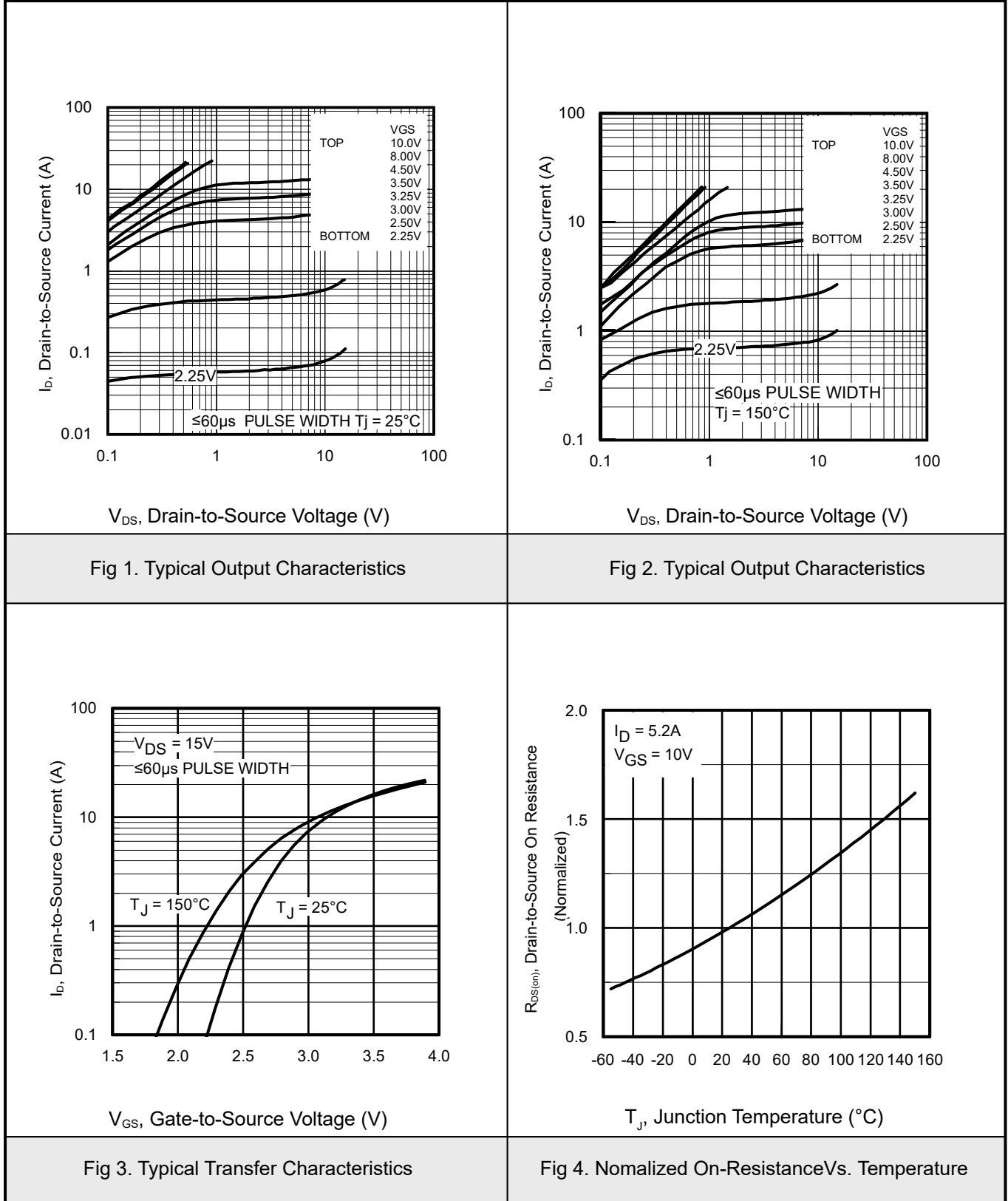
Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	$V_{(BR)DSS}$	$I_D=250\mu\text{A}, V_{GS}=0\text{V}$	30			V
Breakdown Voltage Temp. Coefficient	$\Delta V_{(BR)DSS}/\Delta T_J$	$I_D=1\text{mA}, \text{Reference to } 25^{\circ}\text{C}$		0.02		V/ $^{\circ}\text{C}$
Static Drain-to-Source On-Resistance	$R_{DS(ON)}$	$V_{GS}=4.5\text{V}, I_D=4.2\text{A}$ ②		33	40	m $\Omega$
		$V_{GS}=10\text{V}, I_D=5.2\text{A}$ ②		22	27	
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=25\mu\text{A}$	1.3	1.7	2.3	V
Drain-to-Source Leakage Current	$I_{DSS}$	$V_{DS}=24\text{V}, V_{GS}=0\text{V}$			1	$\mu\text{A}$
		$V_{DS}=24\text{V}, V_{GS}=0\text{V}, T_J=125^{\circ}\text{C}$			150	
Gate-to-Source Forward Leakage	$I_{GSS}$	$V_{GS}=20\text{V}$			100	nA
Gate-to-Source Reverse Leakage		$V_{GS}=-20\text{V}$			-100	
Internal Gate Resistance	$R_G$			2.3		$\Omega$
Forward Transconductance	$g_{fs}$	$V_{DS}=10\text{V}, I_D=5.2\text{A}$	9.5			S
Total Gate Charge	$Q_g$	$V_{DS}=15\text{V}$		2.6		nC
Gate-to-Source Charge	$Q_{gs}$	$V_{GS}=4.5\text{V}$ ②		0.8		
Gate-to-Drain ("Miller") Charge	$Q_{gd}$	$I_D=5.2\text{A}$		1.1		
Turn-On Delay Time	$t_{D(on)}$	$V_{DD}=15\text{V}$ ②		5.2		ns
Rise Time	$t_r$	$I_D=1\text{A}$		4.4		
Turn-Off Delay Time	$t_{D(off)}$	$R_G=6.8\Omega$		7.4		
Fall Time	$t_f$	$V_{GS}=4.5\text{V}$		4.4		
Input Capacitance	$C_{iss}$	$V_{GS}=0\text{V}$		382		pF
Output Capacitance	$C_{oss}$	$V_{DS}=15\text{V}$		84		
Reverse Transfer Capacitance	$C_{rss}$	$f=1\text{MHz}$		39		



Source-Drain Ratings and Characteristics						
Continuous Source Current (Body Diode)	$I_S$	MOSFET symbol showing the integral reverse p-n junction diode.			1.6	A
Pulsed Source Current (Body Diode) ①	$I_{SM}$				21	
Diode Forward Voltage	$V_{SD}$	$T_J=25^\circ\text{C}, I_S=5.8\text{A}, V_{GS}=0\text{V}$ ②			1	V
Reverse Recovery Time	$t_{rr}$	$T_J=25^\circ\text{C}, V_R=20\text{V}, I_F=5.8\text{A}$		11	17	ns
Reverse Recovery Charge	$Q_{rr}$	$dI/dt=100\text{A}/\mu\text{s}$ ②		4	6	nC

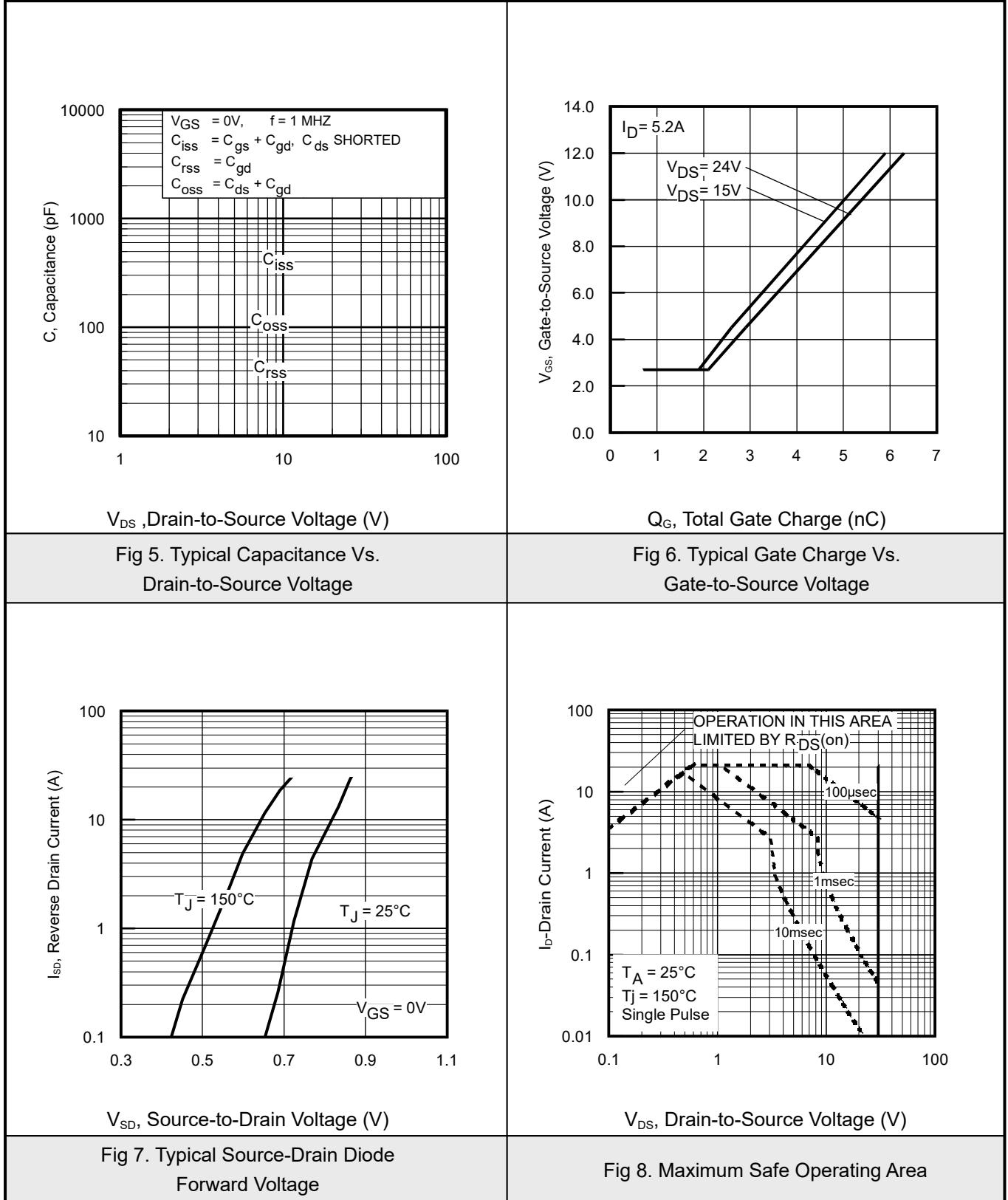


## 8.1 Typical Characteristics



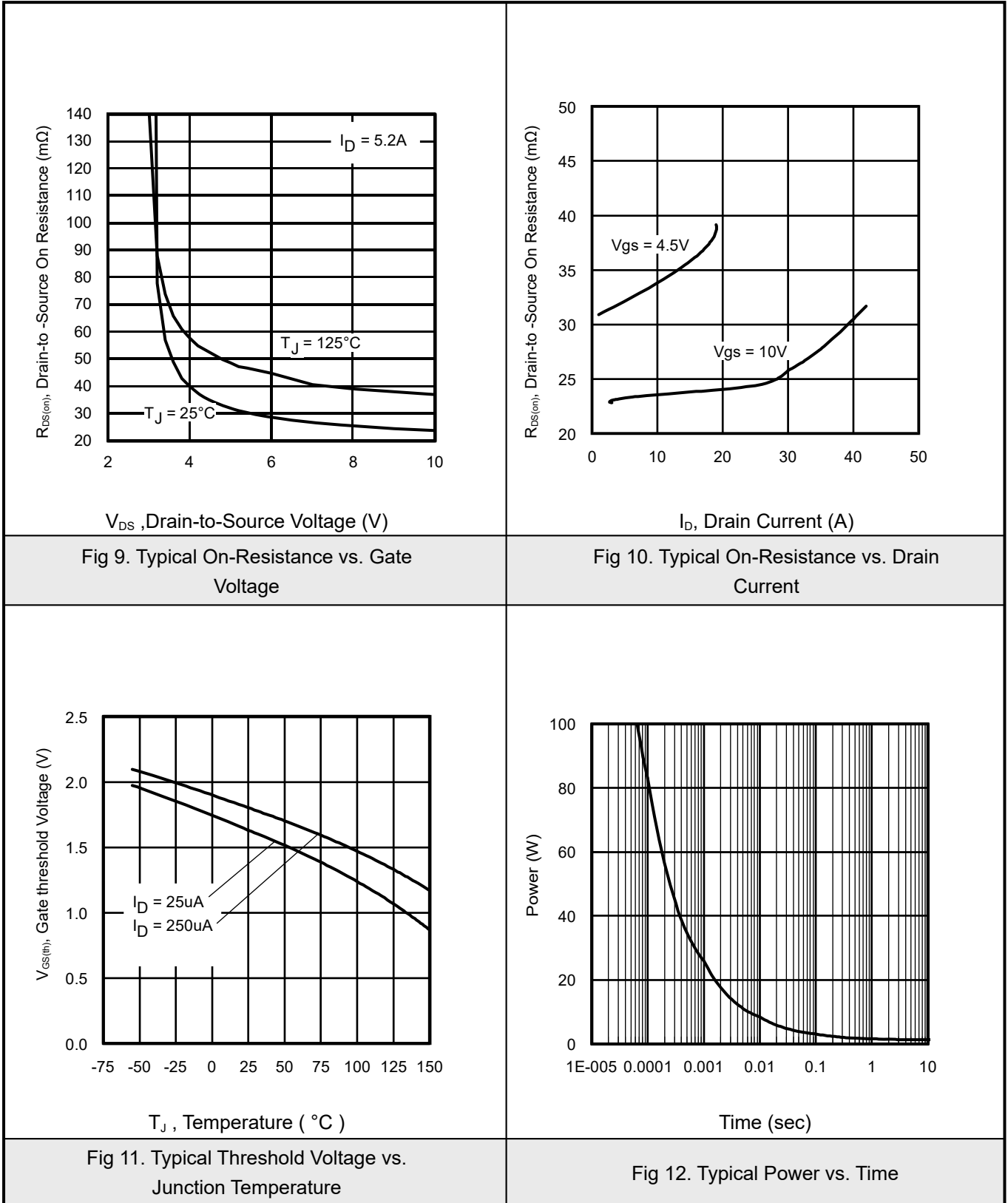


## 8.2 Typical Characteristics





## 8.3 Typical Characteristics





## 8.4 Typical Characteristics

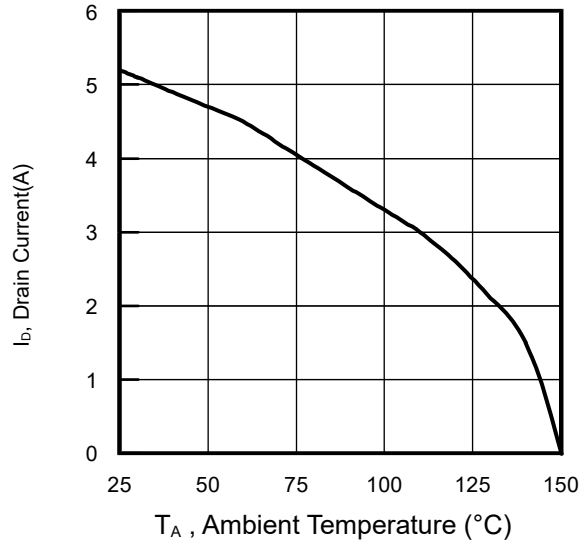


Fig 13. Maximum Drain Current vs. Ambient Temperature

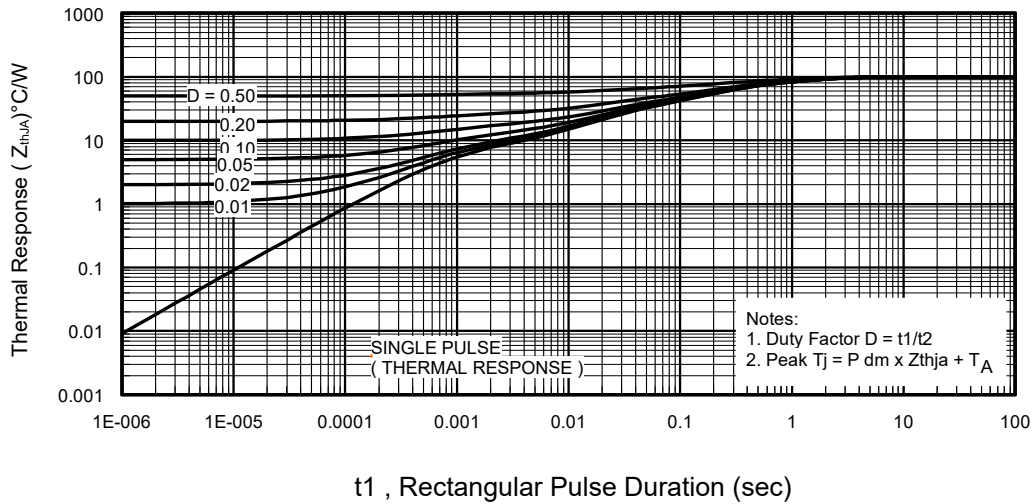


Fig 14. Typical Effective Transient Thermal Impedance, Junction-to-Ambient





## 8.5 Typical Characteristics

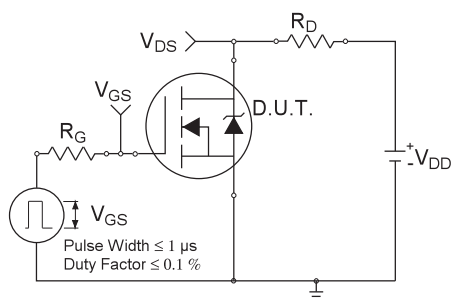


Fig 15a. Switching Time Test Circuit

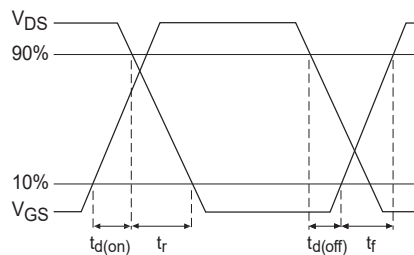


Fig 15b. Switching Time Waveforms

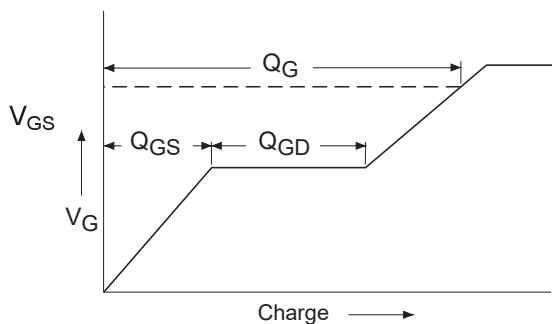


Fig 16a. Basic Gate Charge Waveform

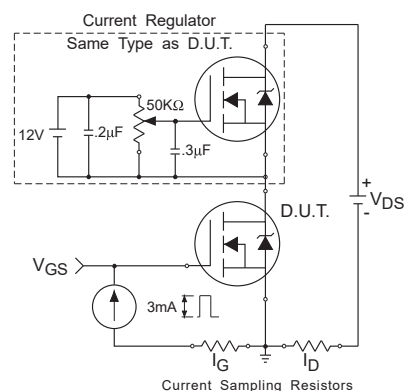
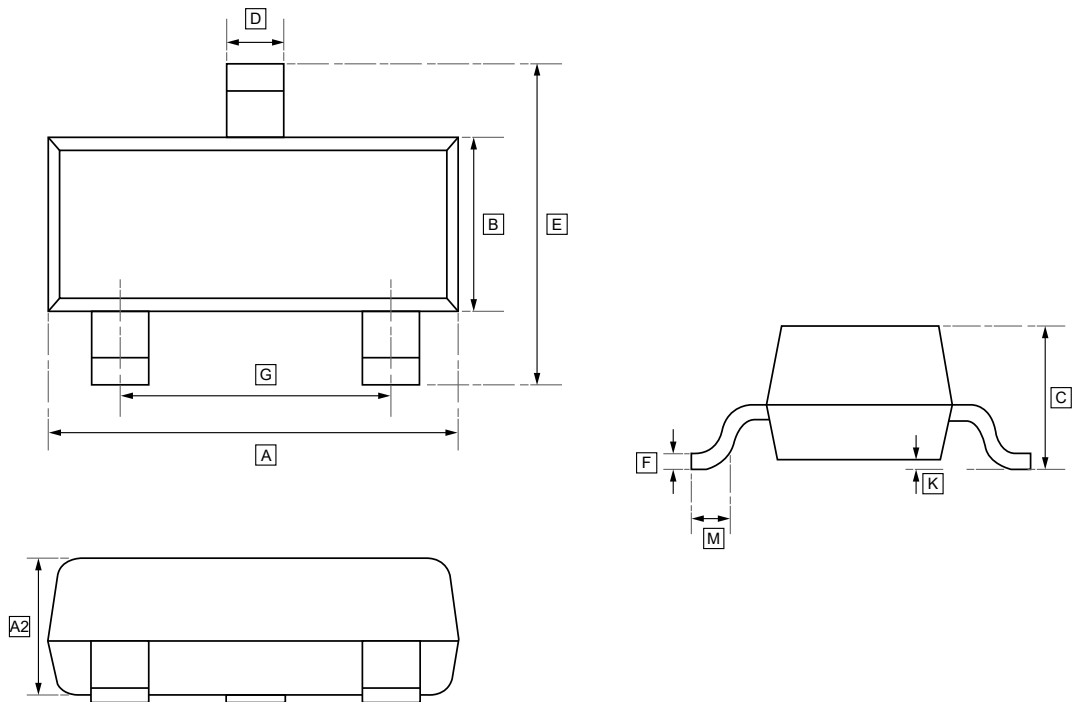


Fig 16b. Gate Charge Test Circuit



## 9.SOT-23 Package Outline Dimensions

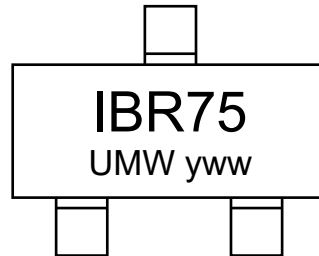


### DIMENSIONS (mm are the original dimensions)

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



## 10. Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW IRLML0030TR	SOT-23	3000	Tape and reel



## 11. Disclaimer

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