UMW AO6402A

30V N-Channel MOSFET

1.Description

The AO6402A uses advanced trench technology to provide excellent $R_{DS(ON)}$ and low gate charge. This device is suitable for use as a load switch or in PWM applications.

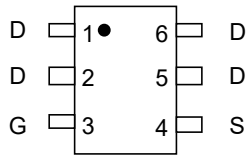
2.Features

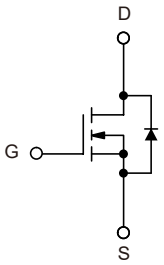
- $V_{DS\ (V)}$=30V
- I_D=7.5A(V_{GS}=10V)
- $R_{DS(ON)}$<24mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<35mΩ(V_{GS}=4.5V)

3.Pinning information

Pin	Symbol	Description
3	G	GATE
4	S	SOURCE
1,2,5,6	D	DRAIN

SOT23-6





4.Absolute Maximum Ratings T_A= 25°C

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	30	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current [A,F]	T_A=25°C	I_D	7.5	A
	T_A=70°C		6	
Pulsed Drain Current [B]		I_{DM}	64	
Power Dissipation	T_A=25°C	P_D	2	W
	T_A=70°C		1.28	W
Junction and Storage Temperature Range		T_J, T_{STG}	-55 to 150	°C

5.Thermal Characteristics

Parameter		Symbol	Typ	Max	Units
Maximum Junction-to-Ambient [A]	t ≤ 10s	$R_{\theta JA}$	48	62.5	°C/W
Maximum Junction-to-Ambient [A]	Steady-State		74	110	°C/W
Maximum Junction-to-Lead [C]	Steady-State	$R_{\theta JL}$	54	68	°C/W

6.Electrical Characteristic (T_J=25°C unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
STATIC PARAMETERS						
Drain-Source Breakdown Voltage	BV_{DSS}	I_D=250μA, V_{GS}=0V	30			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=30V, V_{GS}=0V			1	μA
		T_J=55°C			5	μA
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±20V			100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	1.5	2.1	2.6	V
On state drain current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	64			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=7.5A		17.3	24	mΩ
		V_{GS}=4.5V, I_D=5.6A		25	35	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=7.5A		20		S
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.75	1	V
Maximum Body-Diode Continuous Current	I_S				2.5	A
DYNAMIC PARAMETERS						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=15V, f=1MHz		373	448	pF
Output Capacitance	C_{oss}			67		pF
Reverse Transfer Capacitance	C_{rss}			41		pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz		2	2.8	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_g(10V)	V_{GS}=10V, V_{DS}=15V, I_D=7.5A		7.2	11	nC
Total Gate Charge	Q_g(4.5V)			3.5	5	nC
Gate Source Charge	Q_{gs}			1.3		nC
Gate Drain Charge	Q_{gd}			1.7		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS}=10V, V_{DS}=15V, R_L=2Ω,R_{GEN}=3Ω		4.5	6.5	ns
Turn-On Rise Time	t_r			2.7	4.5	ns
Turn-Off DelayTime	$t_{D(off)}$			14.9	23	ns
Turn-Off Fall Time	t_f			2.9	5.5	ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=7.5A, dI/dt=100A/μs		10.5	12.6	ns
Body Diode Reverse Recovery Charge	Q_{rr}	I_F=7.5A, dI/dt=100A/μs		4.5	5.4	nC

A: The value of $R_{\theta JA}$ is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The value in any given application depends on the user's specific board design. The current rating is based on the t ≤ 10s thermal resistance rating.

B: Repetitive rating, pulse width limited by junction temperature.

C. The $R_{\theta JA}$ is the sum of the thermal impedence from junction to lead $R_{\theta JL}$ and lead to ambient.

D. The static characteristics in Figures 1 to 6 are obtained using <300 μs pulses, duty cycle 0.5% max.

E. These tests are performed with the device mounted on 1 in^2 FR-4 board with 2oz. Copper, in a still air environment with T_A=25°C. The SOA curve provides a single pulse rating.

F.The current rating is based on the t ≤ 10s thermal resistance rating.

7.1Typical characteristic

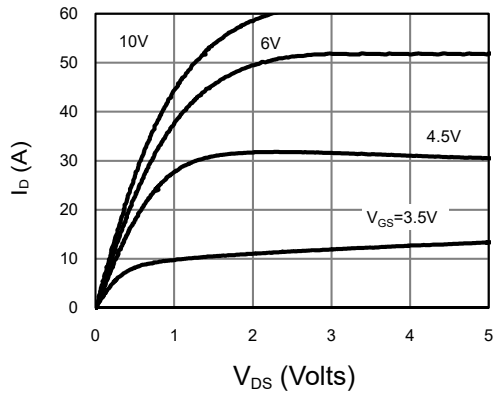


Figure 1: On-Region Characteristics

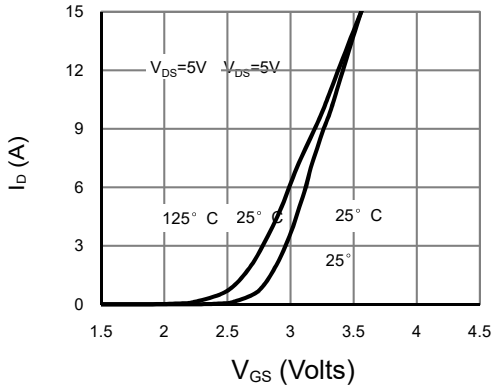


Figure 2: Transfer Characteristics

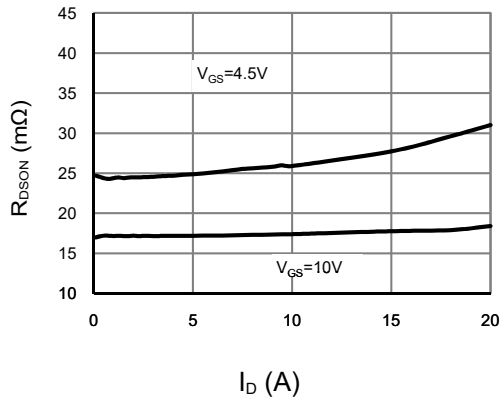


Figure 3: On-Resistance vs. Drain Current and Gate Voltage

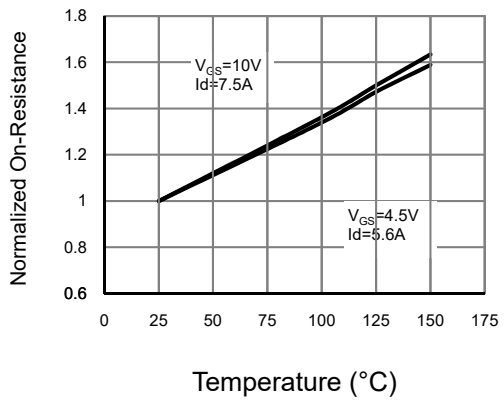


Figure 4: On-Resistance vs. Junction Temperature

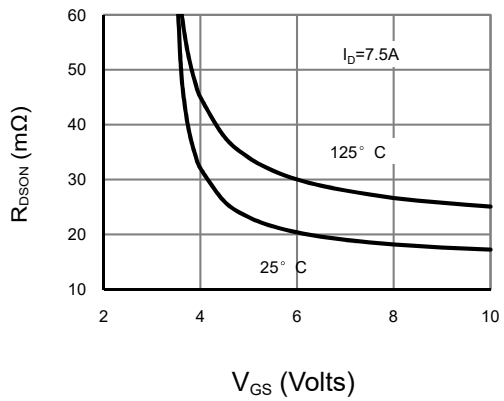


Figure 5: On-Resistance vs. Gate-Source Voltage

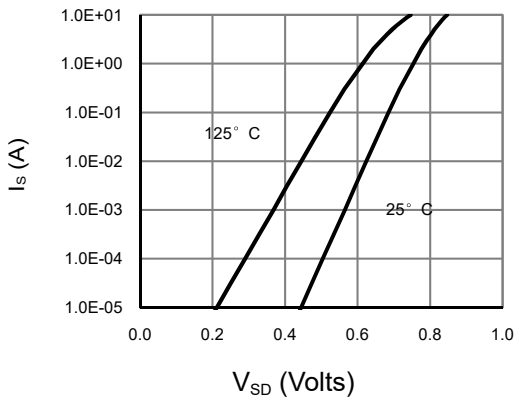


Figure 6: Body-Diode Characteristics

7.2Typical characteristic

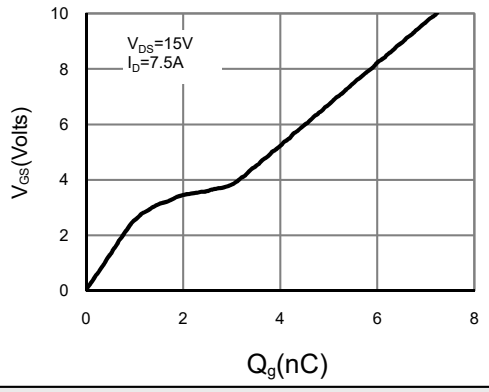


Figure 7: Gate-Charge Characteristics

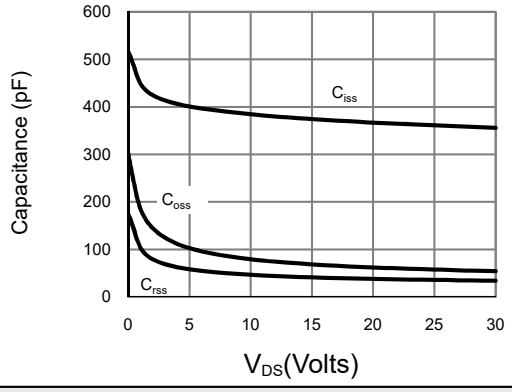


Figure 8: Capacitance Characteristics

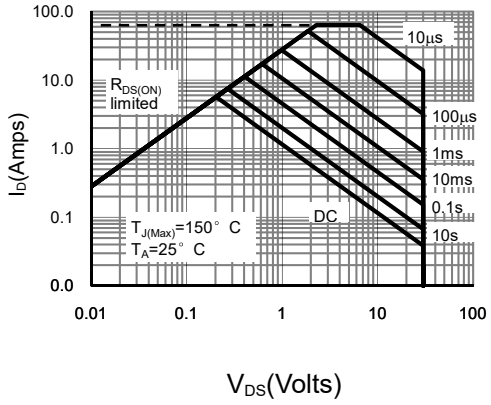


Figure 9: Maximum Forward Biased Safe Operating Area (Note E)

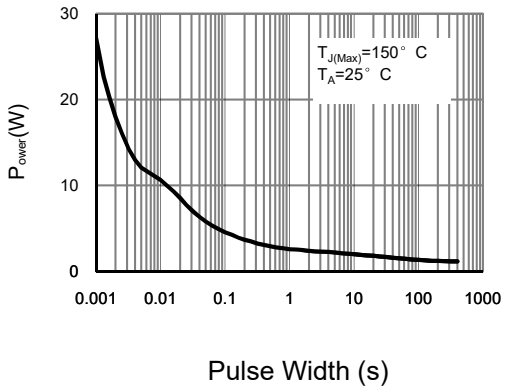


Figure 10: Single Pulse Power Rating Junction-to -Ambient (Note E)

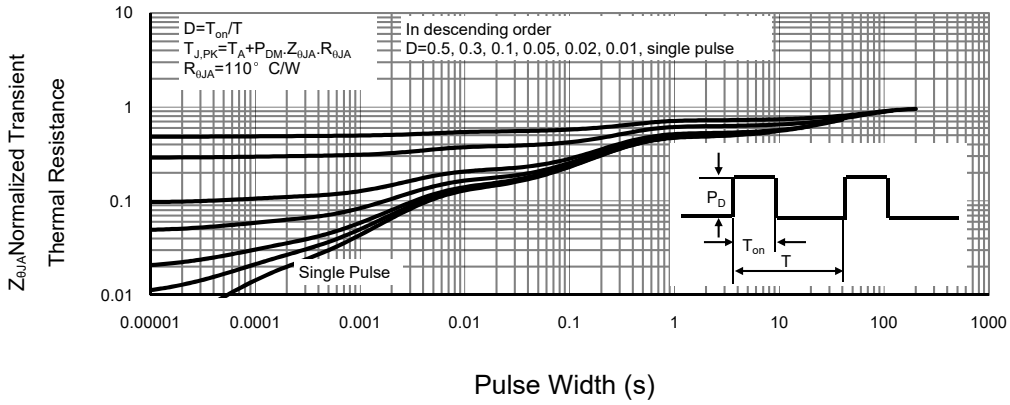
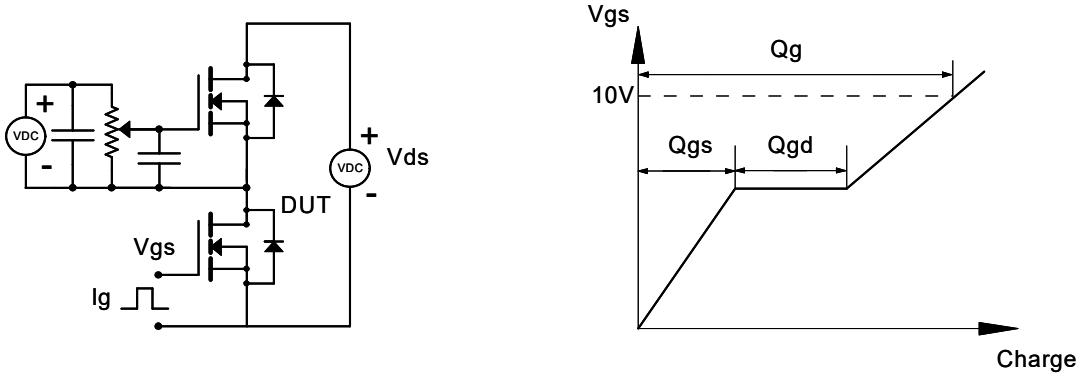
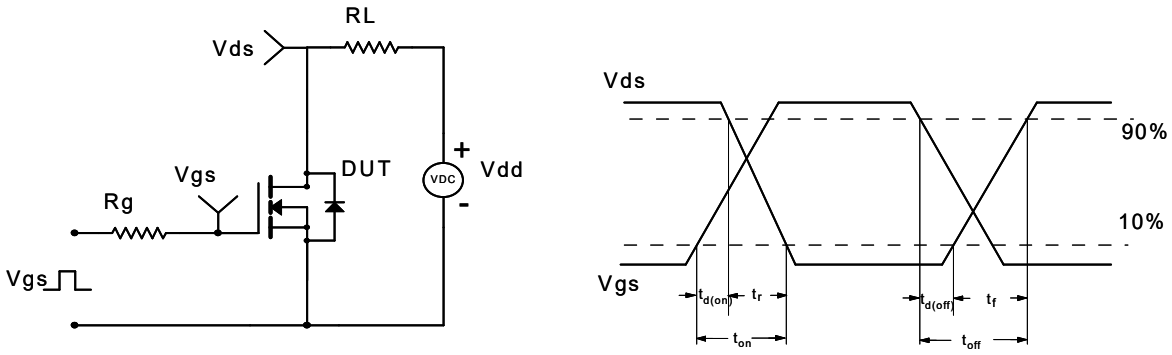


Figure 11: Normalized Maximum Transient Thermal Impedance

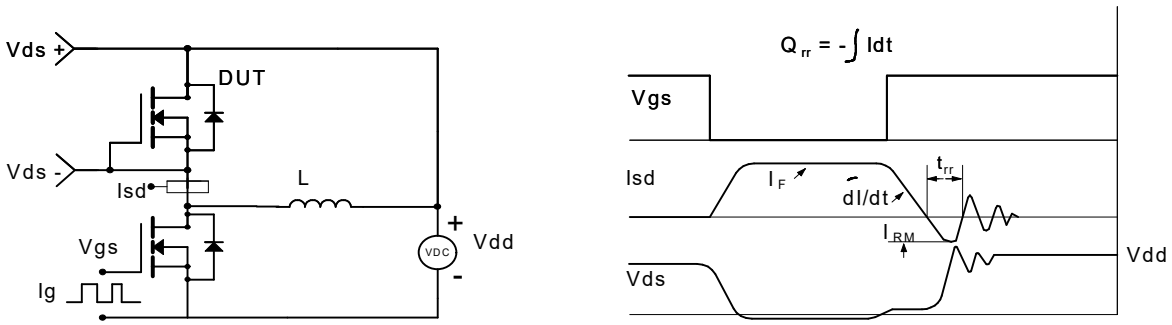
7.3Typical characteristic



Gate Charge Test Circuit & Waveform

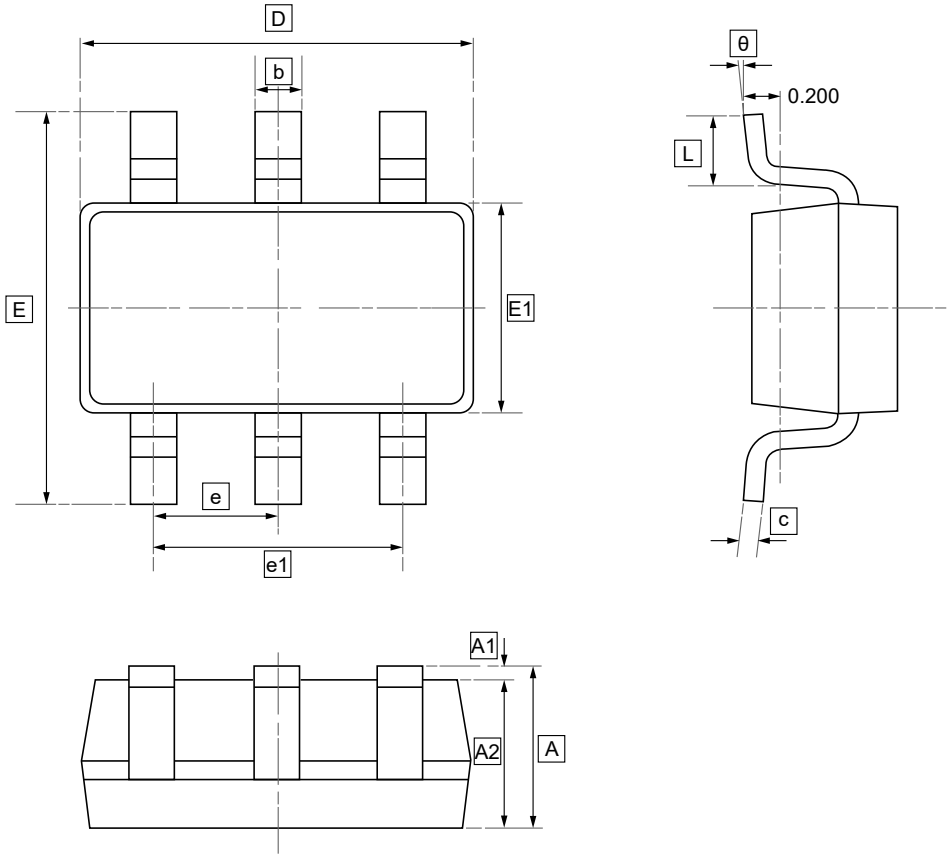


Resistive Switching Test Circuit & W aveforms



Diode Recovery Test Circuit & W aveforms

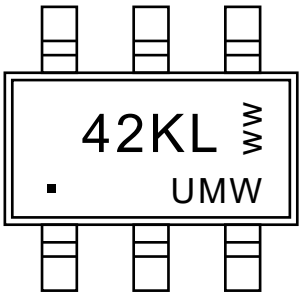
8.SOT23-6 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	c	D	E1	E	e	e1	L	θ
Min	1.050	0.000	1.050	0.300	0.100	2.820	1.500	2.650	0.950	1.800	0.300	0°
Max	1.250	0.100	1.150	0.500	0.200	3.020	1.700	2.950	BSC	2.000	0.600	8°

9.Ordering information



ww: Week Code

Order Code	Package	Base QTY	Delivery Mode
UMW AO6402A	SOT23-6	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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