UMW AO3442A

100V N-Channel MOSFET

1.Description

The AO3442A combines advanced trench MOSFET technology with a low resistance package to provideextremely low $R_{DS(ON)}$. This device is ideal for boostconverters and synchronous rectifiers for consumer,telecom, industrial power supplies and LED backlighting.

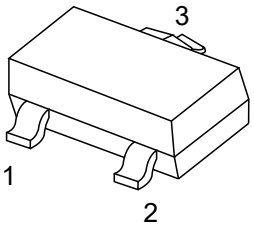
2.Features

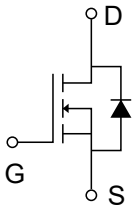
- V_{DS}=100V
- I_D=1A
- $R_{DS(ON)}$ <514mΩ(V_{GS}=10V)
- $R_{DS(ON)}$<554mΩ (V_{GS}=4.5V)

3.Pinning information

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

SOT-23





4.Absolute Maximum Ratings T_A=25°C unless otherwise noted

Parameter		Symbol	Maximum	Units
Drain-Source Voltage		V_{DS}	100	V
Gate-Source Voltage		V_{GS}	±20	V
Continuous Drain Current	T_A=25°C	I_D	1	A
	T_A=70°C		0.8	
Pulsed Drain Current [C]		I_{DM}	4	
Power Dissipation [B]	T_A=25°C	P_D	1.4	W
	T_A=70°C		0.9	
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	$R_{\theta JA}$	70	90	°C/W
Maximum Junction-to-Ambient [A D]	Steady-State		100	125	°C/W
Maximum Junction-to-Lead	Steady-State	$R_{\theta JL}$	63	80	°C/W

6.Electrical Characteristics (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	100			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=100V, V_{GS}=0V			1	μA
		T_J=55°C			5	
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	1.7	2.3	2.9	V
On state drain current	$I_{D(ON)}$	V_{GS}=10V, V_{DS}=5V	4			A
Static Drain-Source On-Resistance	$R_{DS(ON)}$	V_{GS}=10V, I_D=1A		514	630	mΩ
		V_{GS}=10V, I_D=1A T_J=125°C		983	1200	
		I_D=0.8A, V_{GS}=4.5V		554	720	mΩ
Forward Transconductance	g_{FS}	V_{DS}=5V, I_D=1A		2.8		S
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.9	1.2	V
Maximum Body-Diode Continuous Current [G]	I_S				1	A
DYNAMIC PARAMETERS						
Input Capacitance	C_{iss}	V_{GS}=0V, V_{DS}=50V, f=1MHz		100		pF
Output Capacitance	C_{oss}			13		pF
Reverse Transfer Capacitance	C_{rss}			5		pF
Gate resistance	R_g	V_{GS}=0V, V_{DS}=0V, f=1MHz	2.5	5	7.5	Ω
SWITCHING PARAMETERS						
Total Gate Charge	Q_g(10V)	V_{GS}=10V, V_{DS}=50V I_D=1A		2.8	6	nC
Total Gate Charge	Q_g(4.5V)			1.5	3	nC
Gate Source Charge	Q_{gs}			0.4		nC
Gate Drain Charge	Q_{gd}			0.8		nC
Turn-On DelayTime	$t_{D(on)}$	V_{GS}=10V, V_{DS}=50V R_L=50Ω,R_{GEN}=3Ω		5		ns
Turn-On Rise Time	t_r			4		ns
Turn-Off DelayTime	$t_{D(off)}$			12		ns
Turn-Off Fall Time	t_f			5		ns
Body Diode Reverse Recovery Time	t_{rr}	I_F=5.6A, dI/dt=100A/μs		52		ns

Body Diode Reverse Recovery Charge	Q_{rr}	I_F=5.6A, dI/dt=100A/μs		60		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.

B. The power dissipation P_D is based on $T_{J(MAX)}$=150°C, using ≤ 10s junction-to-ambient thermal resistance.

C. Repetitive rating, pulse width limited by junction temperature TJ(MAX)=150°C. Ratings are based on low frequency and duty cycles to keep initial T_J=25°C.

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

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

F. These curves are based on the junction-to-ambient thermal impedence which is measured with the device mounted on 1in^2 FR-4 board with 2oz. Copper, assuming a maximum junction temperature of $T_{J(MAX)}$=150°C. The SOA curve provides a single pulse rating.

7.1Typical Electrical And Thermal Characteristics

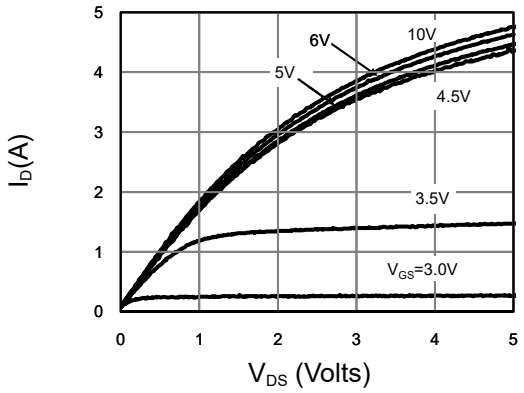


Fig 1: On-Region Characteristics (Note E)

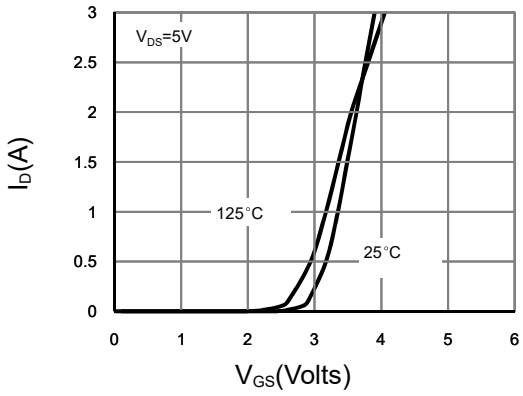


Figure 2: Transfer Characteristics (Note E)

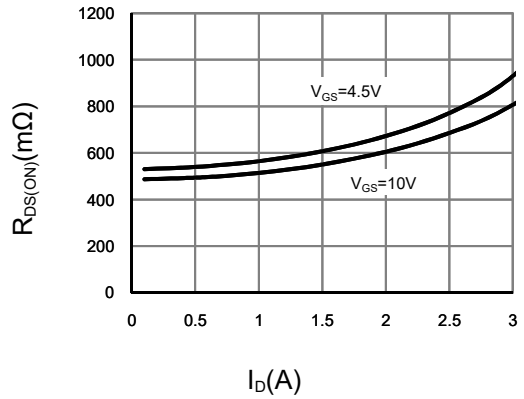


Figure 3: On-Resistance vs. Drain Current and Gate Voltage (Note E)

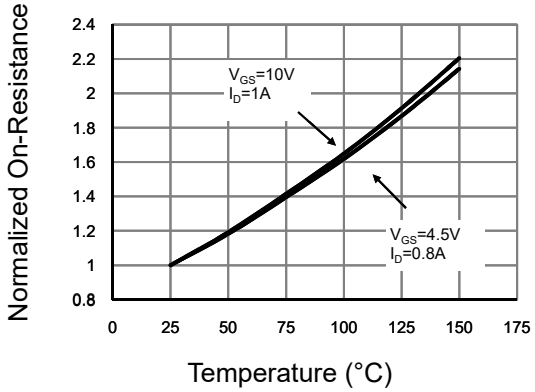


Figure 4: On-Resistance vs. Junction Temperature (Note E)

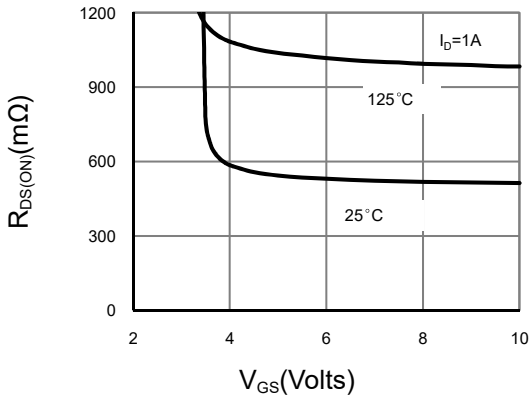


Figure 5: On-Resistance vs. Gate-Source Voltage (Note E)

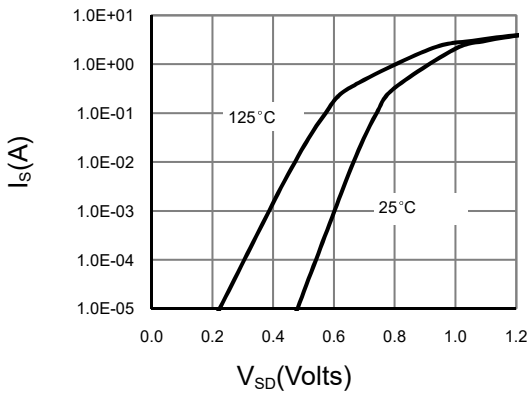


Figure 6: Body-Diode Characteristics(Note E)

7.2Typical Electrical And Thermal Characteristics

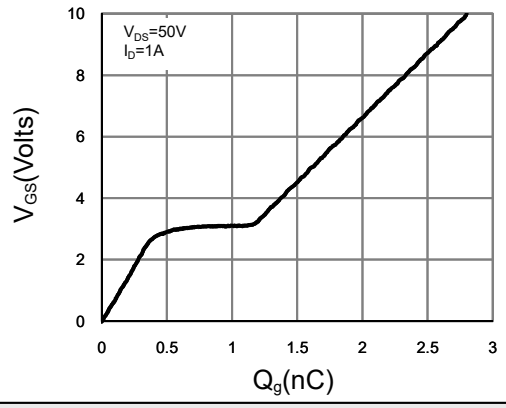


Figure 7: Gate-Charge Characteristics

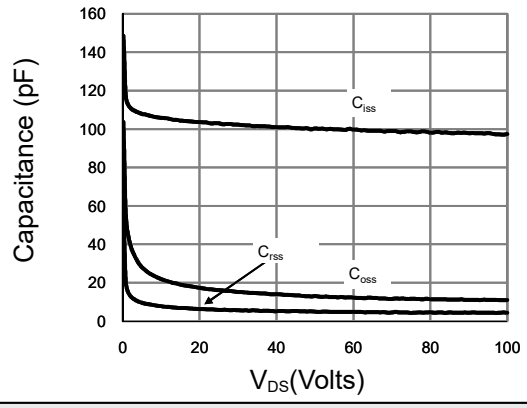


Figure 8: Capacitance Characteristics

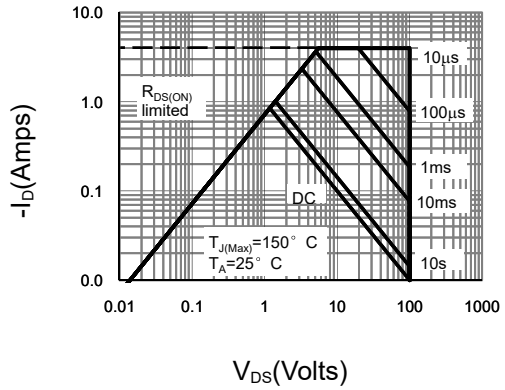


Figure 9: Maximum Forward Biased Safe Operating Area (Note F)

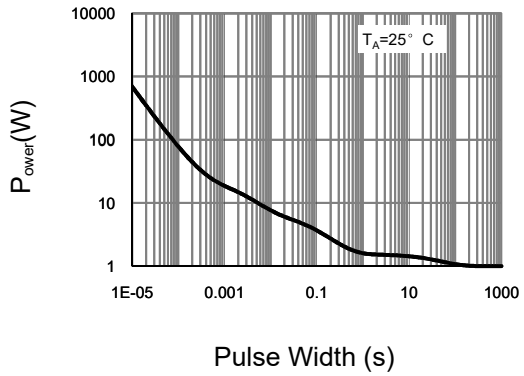


Figure 10: Single Pulse Power Rating Junction-to -Ambient (Note F)

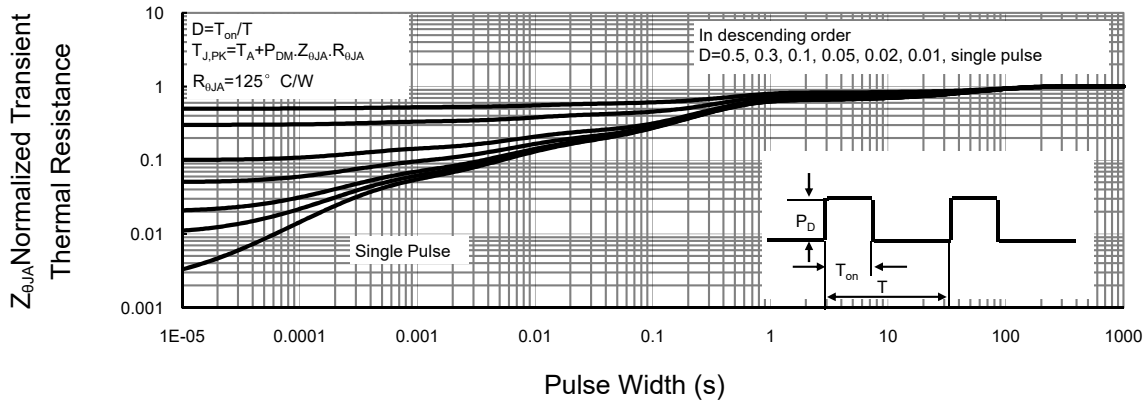
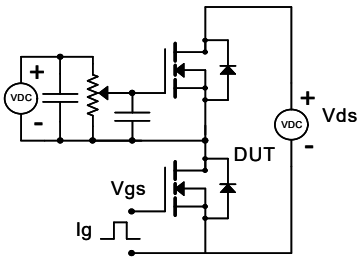
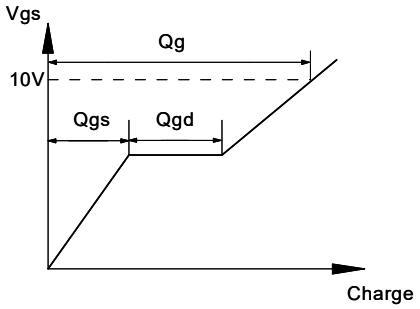


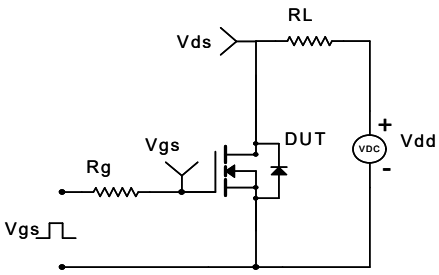
Figure 11: Normalized Maximum Transient Thermal Impedance (Note F)

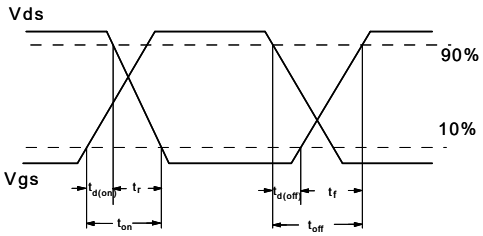
Gate Charge Test Circuit & Waveform



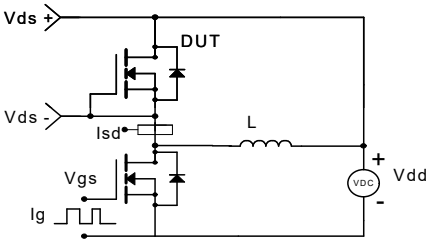


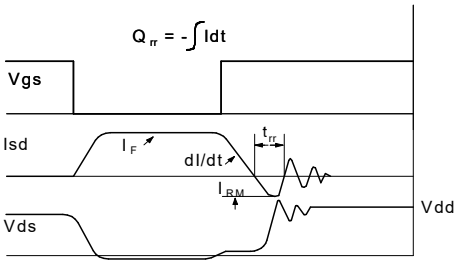
Resistive Switching Test Circuit & Waveforms



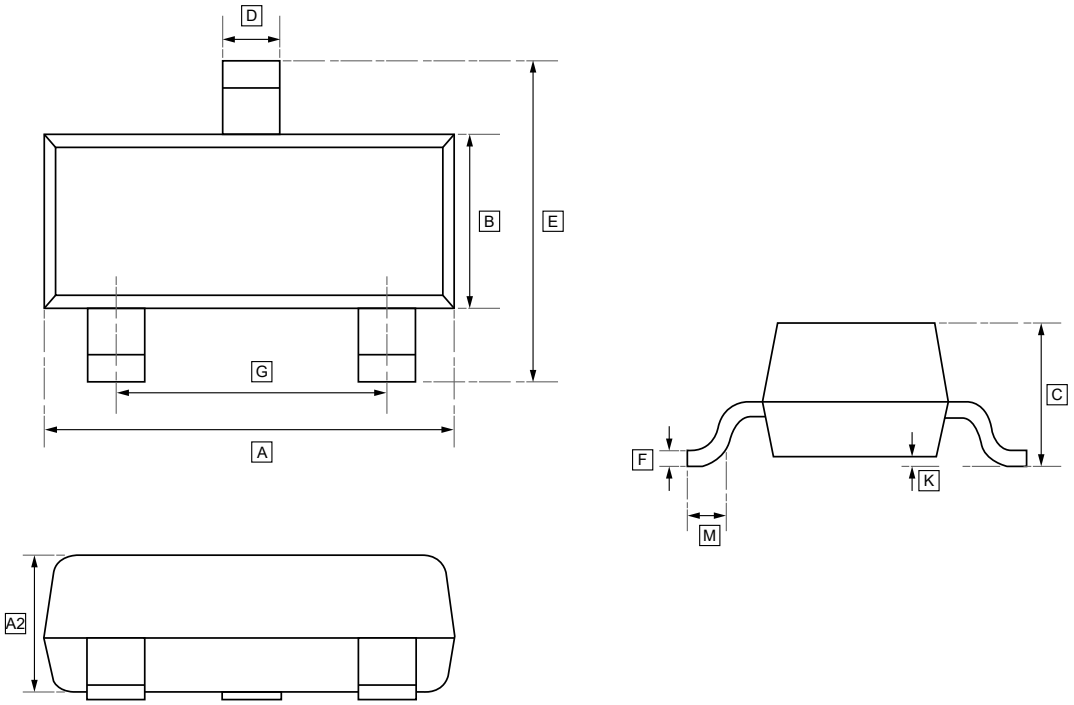


Diode Recovery Test Circuit & Waveforms





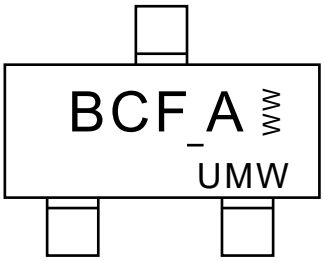
8.SOT-23 Package Outline Dimensions



DIMENSIONS (mm are the original dimensions)

Symbol	A	B	C	D	E	G	K	M	A2	F
Min	2.80	1.20	0.90	0.32	2.25	1.80	0.00	0.30	0.95	0.095
Max	3.04	1.40	1.10	0.55	2.55	2.00	0.10	-	1.05	0.115

9.Ordering information



WW: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW AO3442A	SOT-23	3000	Tape and reel

10.Disclaimer

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