UMW SI2312A

20V N-Channel MOSFET

1.Description

The UMW SI2312A 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 Battery protection or in other Switching application.

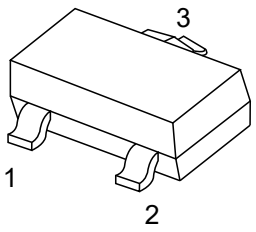
2.Features

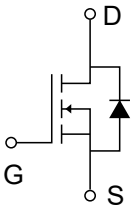
- $V_{DS(V)}$=20V
- I_D=6A
- $R_{DS(ON)}$<26mΩ(V_{GS}=4.5V)
- $R_{DS(ON)}$<33mΩ(V_{GS}=2.5V)
- $R_{DS(ON)}$<50mΩ(V_{GS}=1.8V)

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

Parameter		Symbol	Max	Units
Drain-Source Voltage		V_{DS}	20	V
Gate-Source Voltage		V_{GS}	±8	
Continuous Drain Current	T_C=25°C	I_D	6[a]	A
	T_C=70°C		5[b,c]	
Pulsed Drain Current		I_{DM}	15	
Avalanche Current	L=0.1mH	I_{AS}	15	
Single Avalanche Energy		E_{AS}	11.25	mJ
Power Dissipation	T_C=25°C	P_D	1.25	W
	T_A=70°C		0.8	

Thermal Resistance.Junction- to-Ambient	t≤5 sec	R_{thJA}	100	°C/W
	Steady State		166	
Thermal Resistance.Junction-to-Foot		R_{thJF}	50	
Junction Temperature		T_J	150	°C
Storage Temperature Range		T_{STG}	-55 to 150	

Notes:

a. Package limited

b. Surface Mounted on 1" x 1" FR4 board.

c. t = 5 s.

d. Maximum under steady state conditions is 125 °C/W.

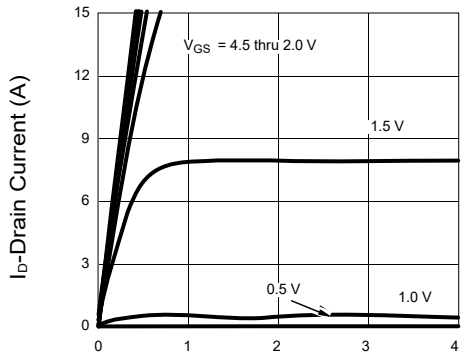
e. Based on T_C = 25 °C.

5.Electrical Characteristics T_A= 25°C

Parameter	Symbol	Conditions	Min	Typ	Max	Units
Drain-Source Breakdown Voltage	V_{DSS}	I_D=250μA, V_{GS}=0V	20			V
Zero Gate Voltage Drain Current	I_{DSS}	V_{DS}=20V, V_{GS}=0V			1	μA
		V_{DS}=20V, V_{GS}=0V, T_A=70°C			75	
Gate-Body leakage current	I_{GSS}	V_{DS}=0V, V_{GS}=±8V			±100	nA
Gate Threshold Voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250μA	0.45	0.65	0.85	V
On-State Drain Current *1	$I_{D(ON)}$	V_{DS}≥10V, V_{GS}=4.5V	15			A
Static Drain-Source On-Resistance *1	$R_{DS(ON)}$	V_{GS}=4.5V, I_D=5A			26	mΩ
		V_{GS}=2.5V, I_D=4.5A			33	
		V_{GS}=1.8V, I_D=4A			50	
Forward Transconductance	g_{FS}	V_{DS}=15V, I_D=5A		40		S
Total Gate Charge	Q_g	V_{GS}=4.5V, V_{DS}=10V, I_D=5A		11.2	14	nC
Gate Source Charge	Q_{gs}			1.4		
Gate Drain Charge	Q_{gd}			2.2		
Turn-On DelayTime	$t_{D(on)}$	I_D=1A, V_{DS}=10V V_{GEN}=4.5V R_L=10Ω, R_G=6Ω		15	25	ns
Turn-On Rise Time	t_r			40	60	
Turn-Off DelayTime	$t_{D(off)}$			48	70	
Turn-Off Fall Time	t_f			31	45	
Body Diode Reverse Recovery Time	t_{rr}	I_F=1A, dI/dt=100A/μs		13	25	
Maximum Body-Diode Continuous Current	I_S				1	A
Diode Forward Voltage	V_{SD}	I_S=1A, V_{GS}=0V		0.8	1.2	V

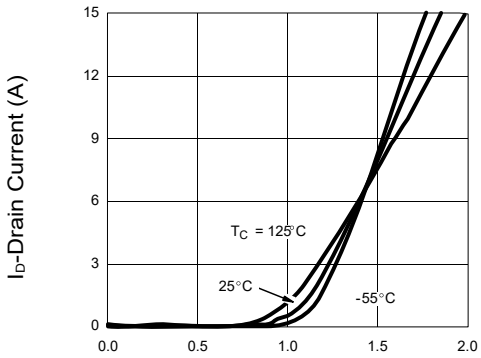
*1 Pulse test: PW ≤ 300u s duty cycle≤ 2%.

6.1Typical Characterisitics



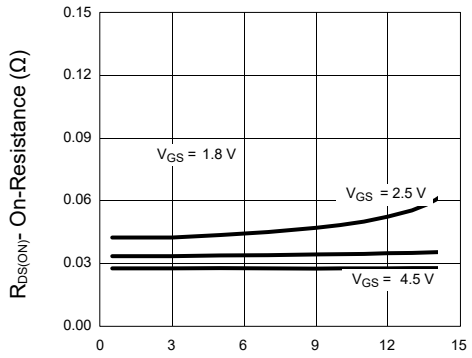
V_{DS} - Drain-to-Source Voltage (V)

Output Characteristics



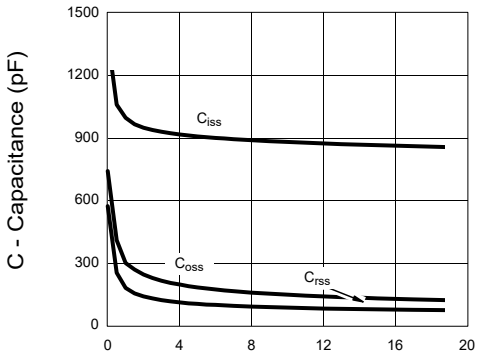
V_{GS} - Gate-to-Source Voltage (V)

Transfer Characteristics



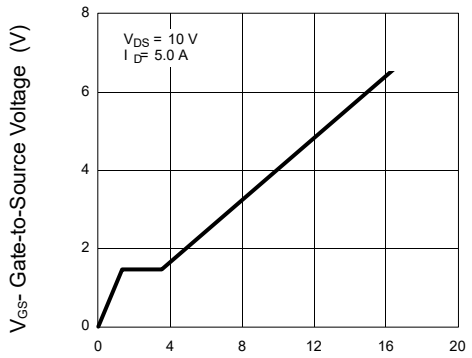
I_D-Drain Current (A)

On-Resistance vs. Drain Current



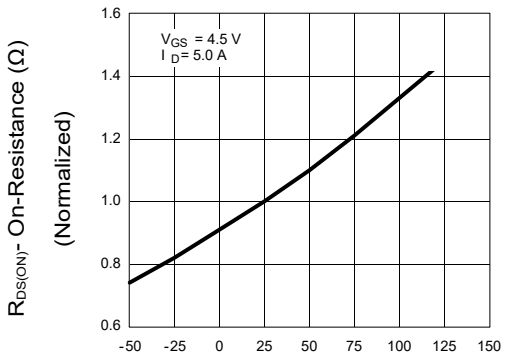
V_{DS} - Drain-to-Source Voltage (V)

Capacitance



Q_g - Total Gate Charge (nC)

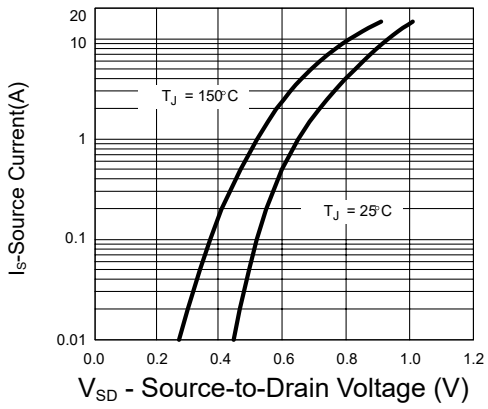
Gate Charge



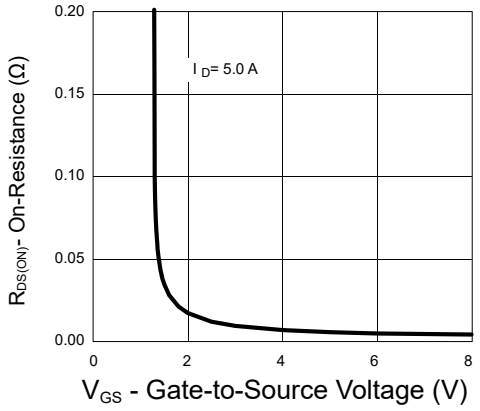
T_J - Junction Temperature (°C)

On-Resistance vs. Junction Temperature

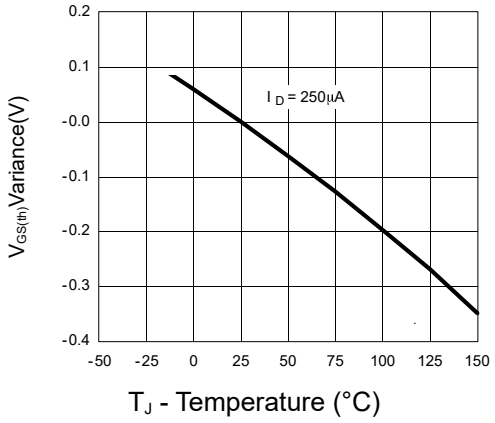
6.2Typical Characterisitics



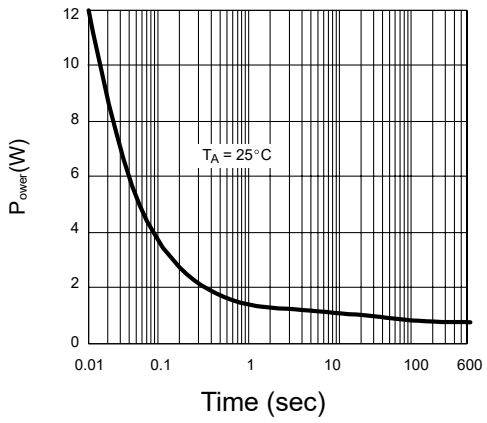
Source-Drain Diode Forward Voltage



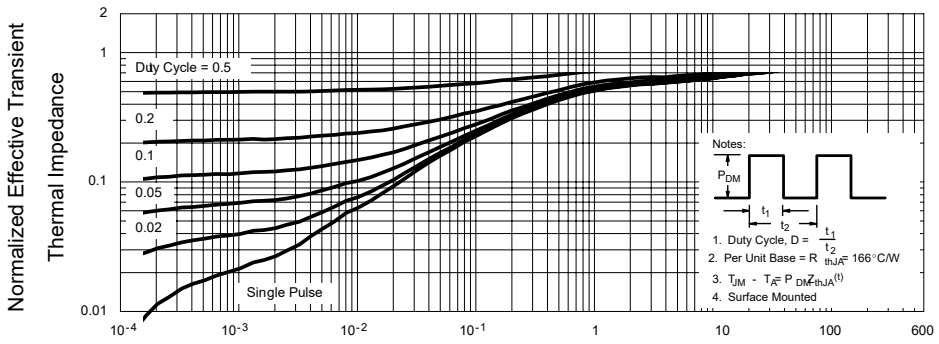
On-Resistance vs. Gate-to-Source Voltage



Threshold Voltage

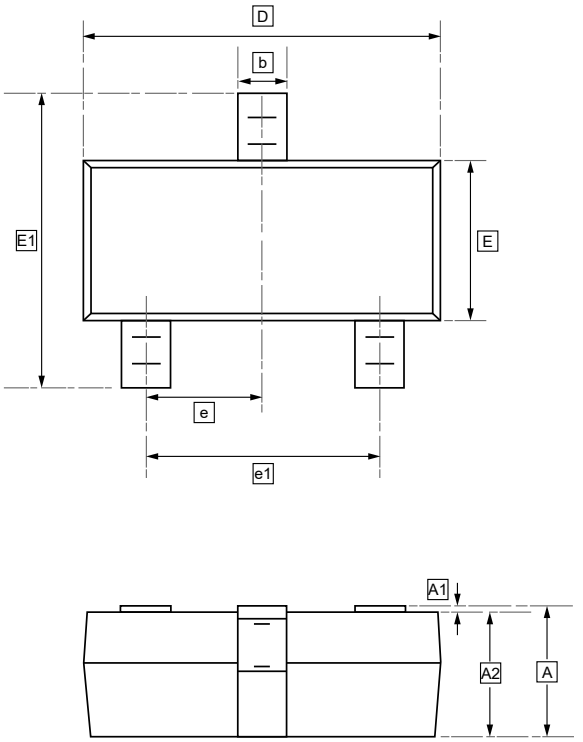


Single Pulse Power



Normalized Thermal Transient Impedance, Junction-to-Ambient

7.SOT-23 Package Outline Dimensions

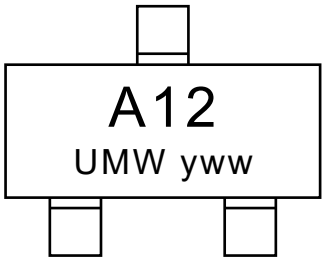


DIMENSIONS (mm are the original dimensions)

Symbol	A	A1	A2	b	C	D	E	E1	e	e1	L	L1
Min	0.90	0.00	0.90	0.30	0.08	2.80	1.20	2.25	0.95	1.80	0.55	0.30
Max	1.15	0.10	1.05	0.50	0.15	3.00	1.40	2.55	TYP.	2.00	REF	0.50

Symbol	F	θ	θ1
Min	0.25	0°	2°
Max		8°	12°

8.Ordering information



yww: Batch Code

Order Code	Package	Base QTY	Delivery Mode
UMW SI2312A	SOT-23	3000	Tape and reel

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