

**DESCRIPTION**

The AM2302A is available in SOT-23S Package.

**APPLICATION**

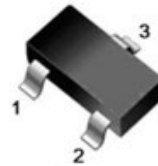
- Hand-Held Instruments
- Load Switch

**FEATURE**

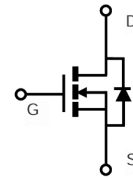
- $V_{DS}=20V$ ,  $I_D=5A$   
 $R_{DS(ON)}=30m\Omega$ (Typ.) @ $V_{GS}=4.5V$
- Fast Switch
- 1.8V Low Gate Drive Applications
- Improved dv/dt Capability
- High Power and Current Handling capability

**ORDERING INFORMATION**

Package Type	Part Number	
SOT-23S SPQ: 3,000pcs/Reel	E3S	AM2302AE3SR
		AM2302AE3SVR
Note	R: Tape & Reel V: Halogen free Package	
AiT provides all RoHS products		

**PIN DESCRIPTION**

SOT-23S



Pin#	Symbol	Function
1	G	Gate
2	S	Source
3	D	Drain

**ABSOLUTE MAXIMUM RATINGS**

$T_A=25^\circ C$  Unless otherwise noted

$V_{DSS}$ , Drain-Source Voltage	20V	
$V_{GSS}$ , Gate-Source Voltage	$\pm 10V$	
$I_D$ , Continuous Drain Current	$T_A=25^\circ C$	5A
	$T_A=70^\circ C$	4A
$I_{DM}^{(2)}$ , Pulsed Drain Current	20A	
$P_D^{(1)}$ , Power Dissipation	$T_A=25^\circ C$	1.3W
	$T_A=70^\circ C$	0.8W
$T_J$ , Operating Junction Temperature	$-55^\circ C \sim +150^\circ C$	
$T_{STG}$ , Storage Temperature Range	$-55^\circ C \sim +150^\circ C$	
$R_{\theta JA}^{(1)}$ , Thermal Resistance Junction to Ambient	$t \leq 10s^{(1)}$	95°C/W
	Steady-State <sup>(1) (3)</sup>	130°C/W

Stresses above may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated in the Electrical Characteristics are not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

(1) Surface mounted on FR4 board using 1 in2 pad size.

(2) Pulsed width limited by maximum junction temperature,  $T_{J(MAX)}=150^\circ C$  (initial temperature  $T_J=25^\circ C$ ).

(3) Using  $\leq 10s$  junction-to-ambient thermal resistance is based on  $T_{J(MAX)}=150^\circ C$ .



## ELECTRICAL CHARACTERISTICS

T<sub>A</sub>=25°C, unless otherwise noted.

Parameter	Symbol	Conditions	Min	Typ.	Max	Unit
<b>Static Parameters</b>						
Drain-Source Breakdown Voltage	BV <sub>DSS</sub>	V <sub>GS</sub> =0V, I <sub>D</sub> =250μA	20	-	-	V
Gate Threshold Voltage	V <sub>GS(th)</sub>	V <sub>GS</sub> =V <sub>DS</sub> , I <sub>D</sub> =250μA	0.4	0.6	1	V
Gate Leakage Current	I <sub>GSS</sub>	V <sub>GS</sub> = ±10V, V <sub>DS</sub> = 0V	-	-	±100	nA
Zero Gate Voltage Drain Current	I <sub>DSS</sub>	V <sub>DS</sub> = 20V, V <sub>GS</sub> =0V, T <sub>J</sub> =25°C	-	-	1	μA
		V <sub>DS</sub> = 16V, V <sub>GS</sub> =0V, T <sub>J</sub> =75°C	-	-	10	
Drain-Source On-Resistance <sup>(1)</sup>	R <sub>DS(ON)</sub>	V <sub>GS</sub> =4.5V, I <sub>D</sub> =5A	-	30	35	mΩ
		V <sub>GS</sub> =2.5V, I <sub>D</sub> =3A	-	38	45	
		V <sub>GS</sub> =1.8V, I <sub>D</sub> =2A	-	50	60	
Forward Transconductance	G <sub>fs</sub>	V <sub>DS</sub> =5V, I <sub>D</sub> =4A	-	4	-	S
<b>Diode Characteristics</b>						
Diode Continuous Forward Current	I <sub>S</sub>	-	-	-	2.5	A
Diode Forward Voltage <sup>(1)</sup>	V <sub>SD</sub>	V <sub>GS</sub> =0V, I <sub>S</sub> =1A,	-	-	1	V
<b>Dynamic and Switching Parameters <sup>(2)</sup></b>						
Total Gate Charge	Q <sub>g</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =4.5V I <sub>D</sub> =5A	-	5.7	8.0	nC
Gate-Source Charge	Q <sub>gs</sub>		-	0.8	1.1	
Gate-Drain Charge	Q <sub>gd</sub>		-	1.5	2.1	
Input Capacitance	C <sub>iss</sub>	V <sub>DS</sub> =10V, V <sub>GS</sub> =0V, f=1MHz	-	305	-	pF
Output Capacitance	C <sub>oss</sub>		-	52	-	
Reverse Transfer Capacitance	C <sub>rss</sub>		-	43	-	
Turn-on Time	t <sub>d(on)</sub>	V <sub>DD</sub> =10V, V <sub>GEN</sub> =4.5V R <sub>G</sub> =6Ω, I <sub>D</sub> =1A	-	3	6	ns
	t <sub>r</sub>		-	7.8	15	
Turn-Off Time	t <sub>d(off)</sub>		-	12	23	
	T <sub>f</sub>		-	5.4	10	

(1) Pulse test width ≤300μs and duty cycle ≤ 2%.

(2) Guaranteed by design, not subject to production testing.



## TYPICAL PERFORMANCE CHARACTERISTICS

Fig 1. Output Characteristics

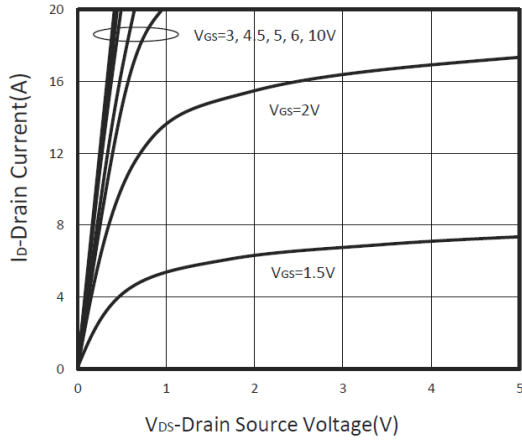


Fig 2. Drain-Source on Resistance

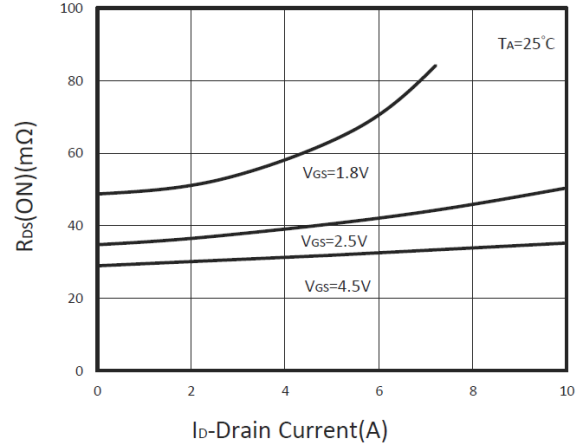


Fig 3. Gate Charge

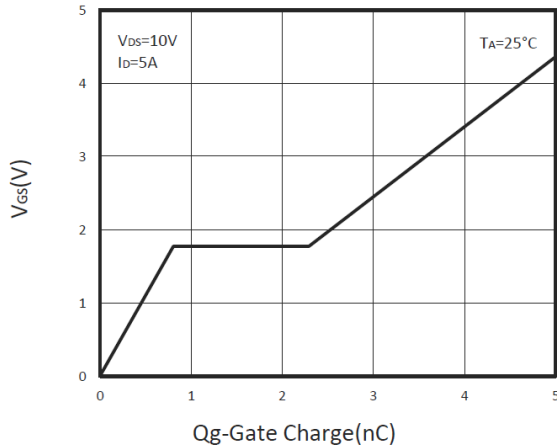


Fig 4. Capacitance

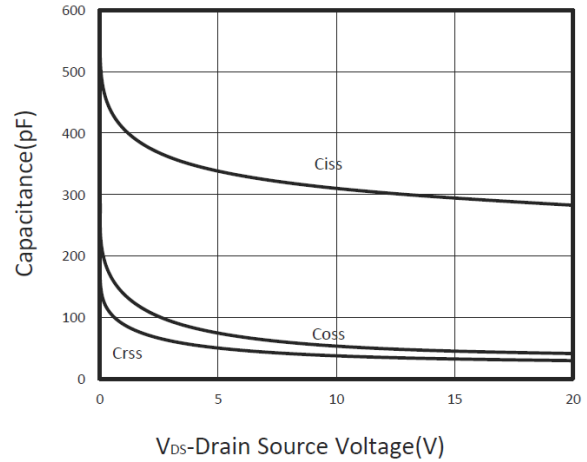


Fig 5. Gate Threshold Voltage

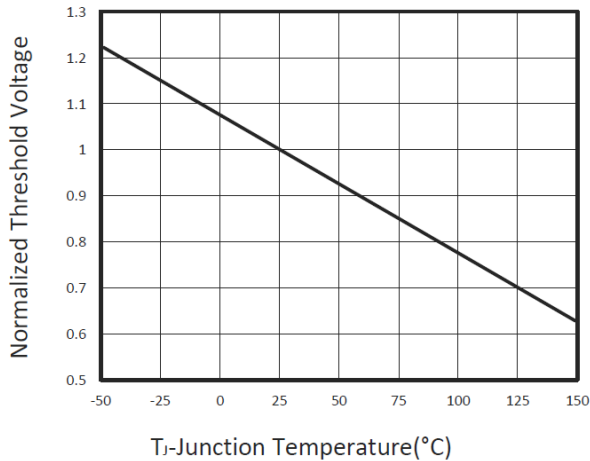


Fig 6. Power Dissipation

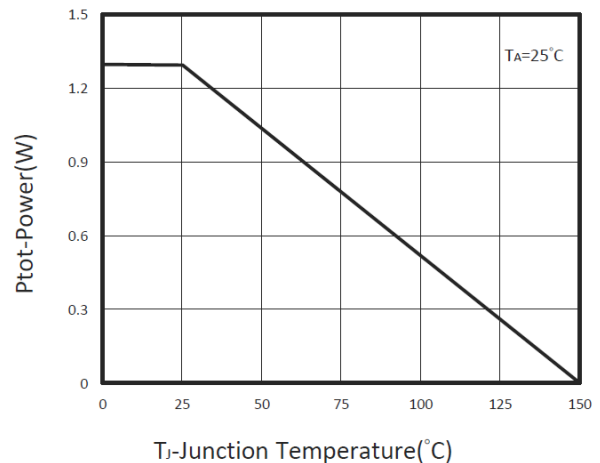




Fig 7. Gate Threshold Voltage

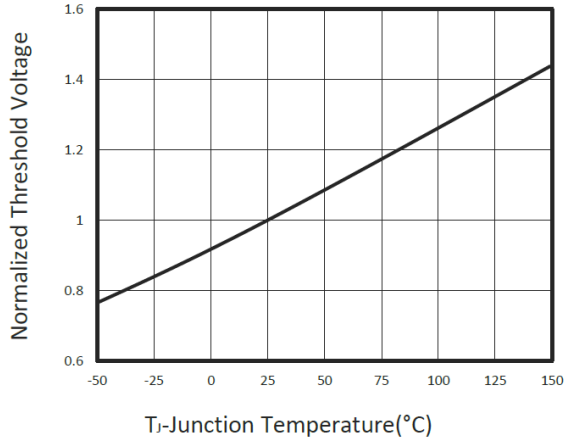


Fig 8. Drain Current vs. T<sub>J</sub>

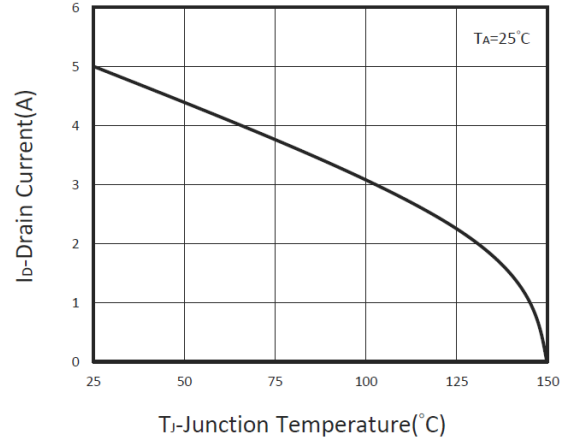


Fig 9. Maximum Safe Operation Area

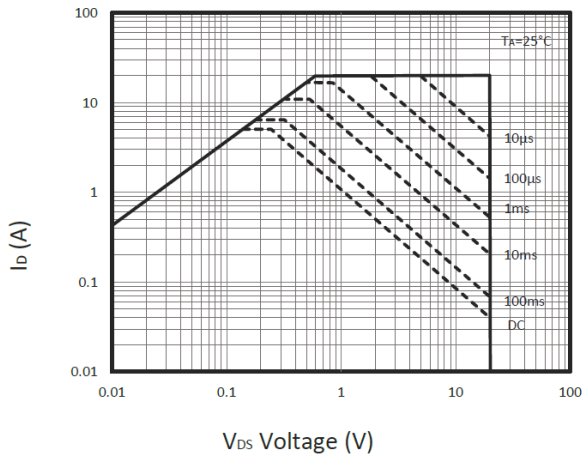


Fig 10. Thermal Transient Impedance

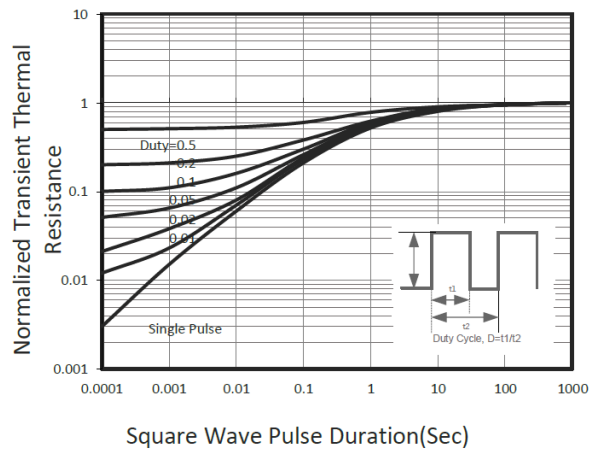


Fig 11. Gate Charge Waveform

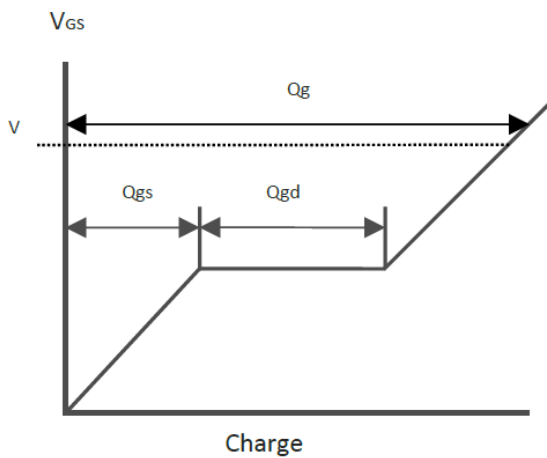
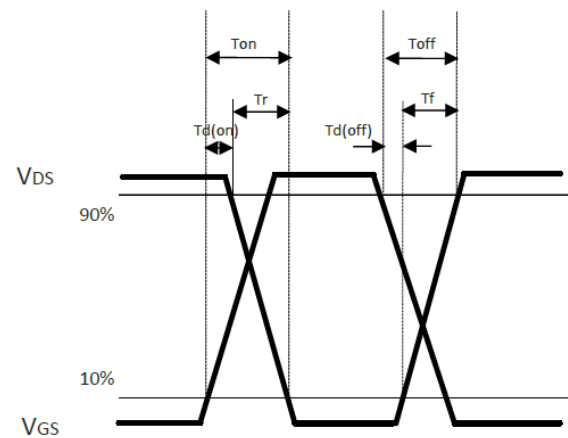


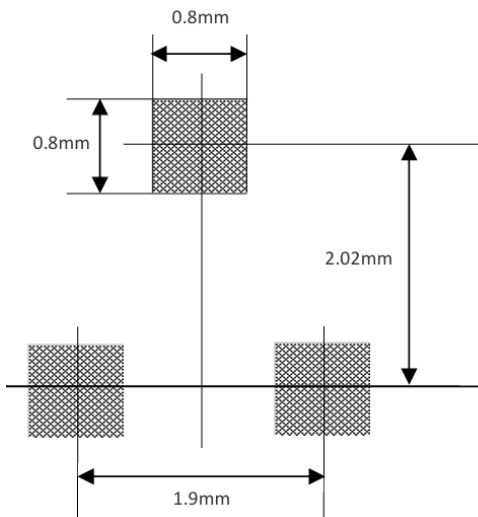
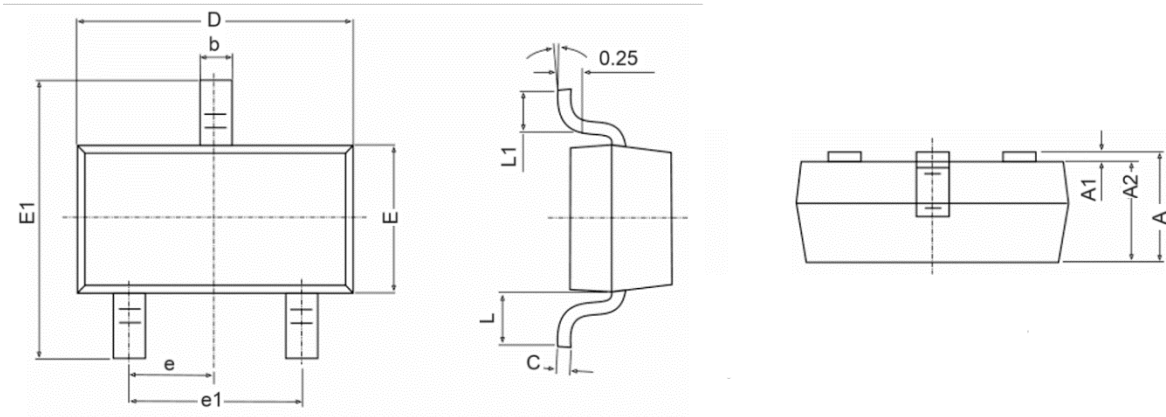
Fig 12. Switching Time Waveform





## PACKAGE INFORMATION

Dimension in SOT-23S (Unit: mm)



Recommended Land Pattern

Symbol	Millimeters (mm)	
	Min.	Max.
A	0.900	1.150
A1	0.000	0.100
A2	0.900	1.050
b	0.300	0.500
c	0.080	0.150
D	2.800	3.000
E	1.200	1.400
E1	2.250	2.550
e	0.950 BSC	
e1	1.800	2.000
L	0.550 BSC	
L1	0.300	0.500
θ	0°	8°



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