



The SI2304A 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.

General Features

$V_{DS} = 30V$ $I_D = 5.8A$

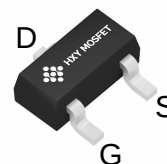
$R_{DS(ON)} < 30m\Omega$ @ $V_{GS}=10V$

Application

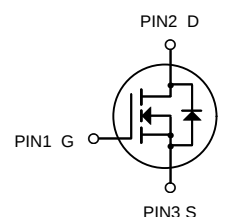
Battery protection

Load switch

Uninterruptible power supply



SOT-23



N-Channel MOSFET

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
SI2304A	SOT-23	A09T	3000

Absolute Maximum Ratings ($T_A=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Limit	Unit
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 12	V
I_D	Drain Current-Continuous	5.8	A
I_{DM}	Drain Current-Pulsed (Note 1)	30	A
P_D	Maximum Power Dissipation	1.4	W
T_J, T_{STG}	Operating Junction and Storage Temperature Range	-55 To 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient (Note 2)	89	$^{\circ}C/W$



Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	30	33	-	V
Zero Gate Voltage Drain Current	I_{DSS}	$V_{DS}=30V, V_{GS}=0V$	-	-	1	μA
Gate-Body Leakage Current	I_{GSS}	$V_{GS}=\pm 12V, V_{DS}=0V$	-	-	± 100	nA
Gate Threshold Voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	0.7	0.9	1.4	V
Drain-Source On-State Resistance	$R_{DS(on)}$	$V_{GS}=2.5V, I_D=4A$	-	41	55	m Ω
		$V_{GS}=4.5V, I_D=5A$	-	32	42	m Ω
		$V_{GS}=10V, I_D=5.8A$	-	28	30	m Ω
Forward Transconductance	g_{FS}	$V_{DS}=5V, I_D=5A$	10	-	-	S
Input Capacitance	C_{iss}	$V_{DS}=15V, V_{GS}=0V,$ $F=1.0MHz$	-	825	-	PF
Output Capacitance	C_{oss}		-	100	-	PF
Reverse Transfer Capacitance	C_{rss}		-	78	-	PF
Turn-on Delay Time	$t_{d(on)}$	$V_{DD}=15V, R_L=2.7\Omega$ $V_{GS}=10V, R_{GEN}=3\Omega$	-	3.3	-	nS
Turn-on Rise Time	t_r		-	4.8	-	nS
Turn-Off Delay Time	$t_{d(off)}$		-	26	-	nS
Turn-Off Fall Time	t_f		-	4	-	nS
Total Gate Charge	Q_g	$V_{DS}=15V, I_D=5.8A,$ $V_{GS}=4.5V$	-	10	-	nC
Gate-Source Charge	Q_{gs}		-	1.6	-	nC
Gate-Drain Charge	Q_{gd}		-	3.1	-	nC
Diode Forward Voltage ^(Note 3)	V_{SD}	$V_{GS}=0V, I_S=5.8A$	-	-	1.2	V
Diode Forward Current ^(Note 2)	I_S		-	-	5.8	A

Notes:

1. Repetitive Rating: Pulse width limited by maximum junction temperature.
2. Surface Mounted on FR4 Board, $t \leq 10$ sec.
3. Pulse Test: Pulse Width $\leq 300\mu s$, Duty Cycle $\leq 2\%$.
4. Guaranteed by design, not subject to production



Typical Electrical and Thermal Characteristics

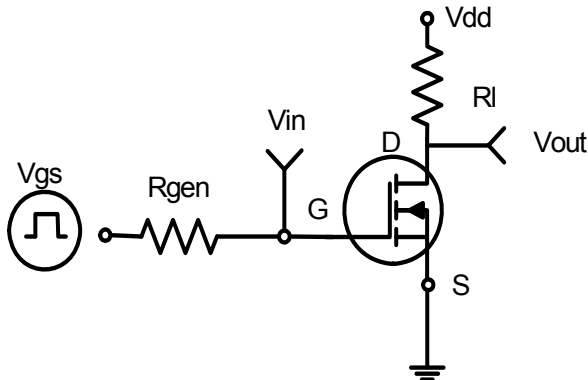


Figure 1: Switching Test Circuit

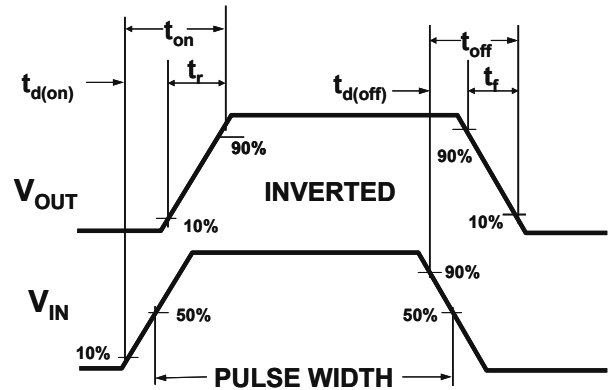


Figure 2: Switching Waveforms

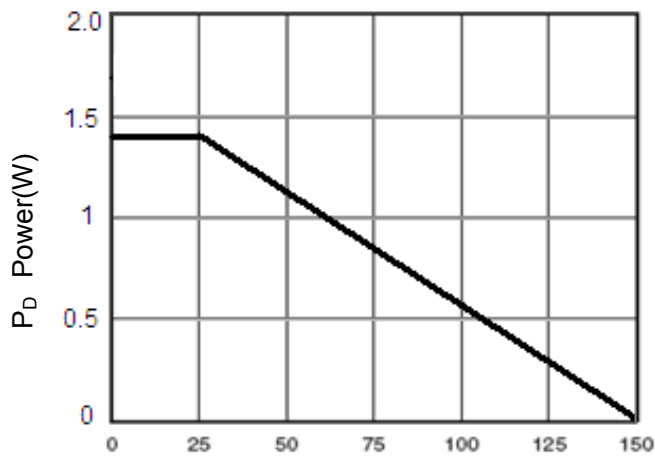


Figure 3 Power Dissipation

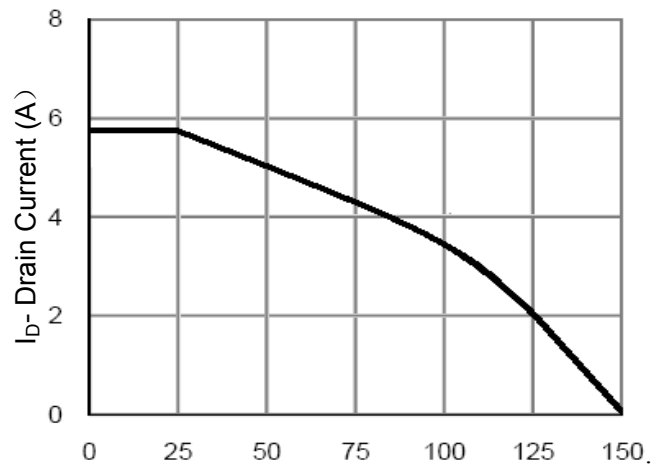


Figure 4 Drain Current

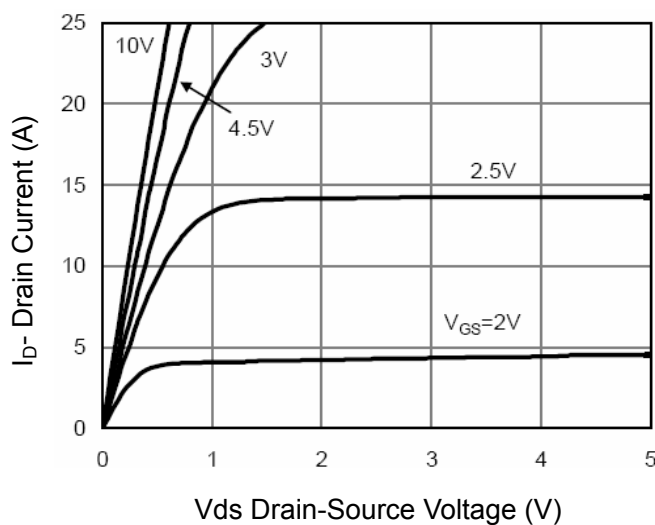


Figure 5 Output Characteristics

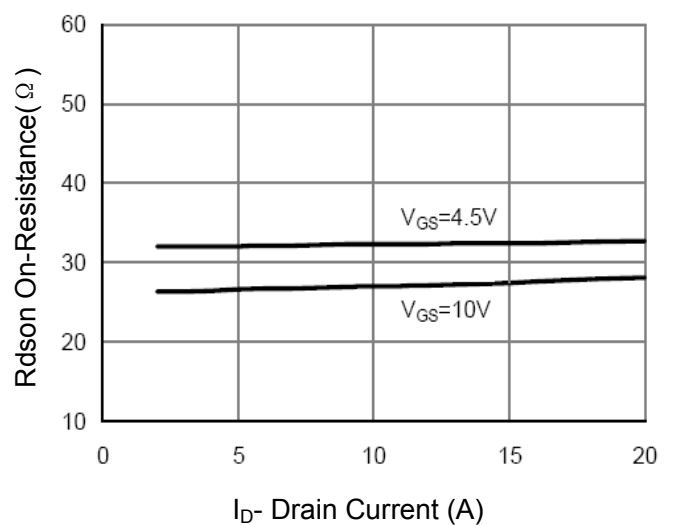


Figure 6 Drain-Source On-Resistance

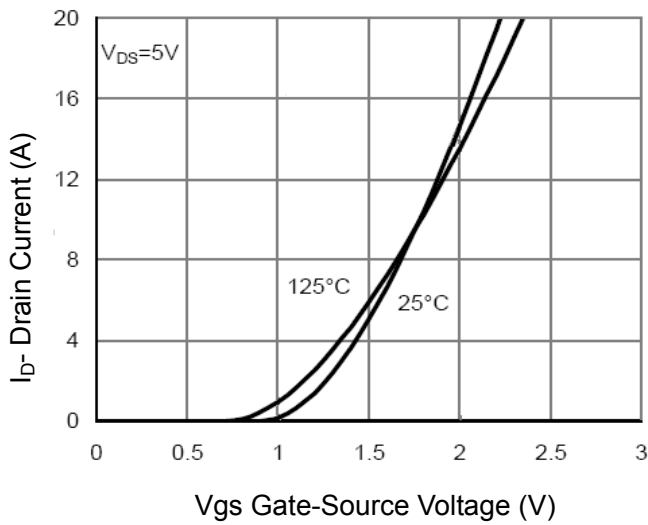


Figure 7 Transfer Characteristics

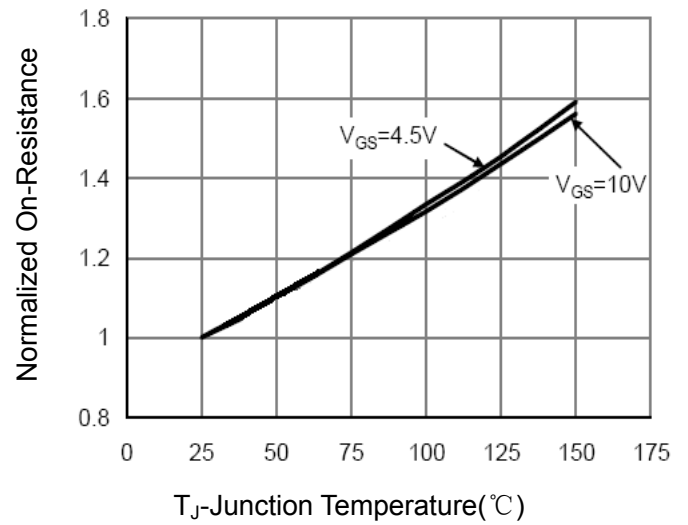


Figure 8 Drain-Source On-Resistance

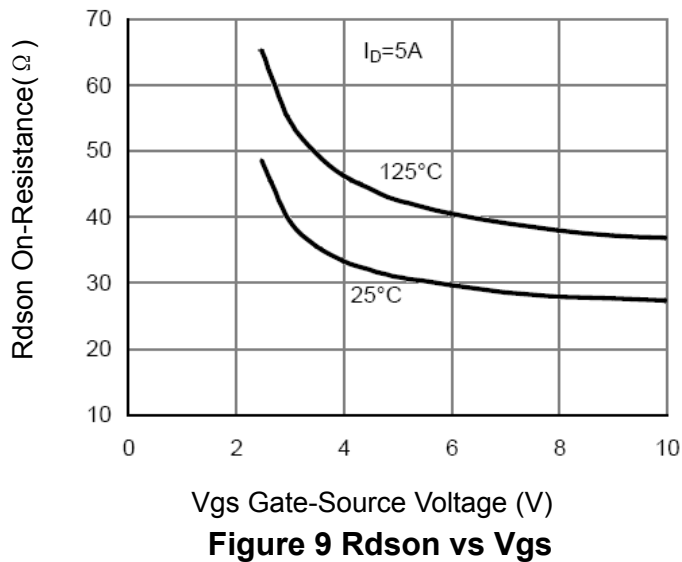


Figure 9 Rdson vs VGS

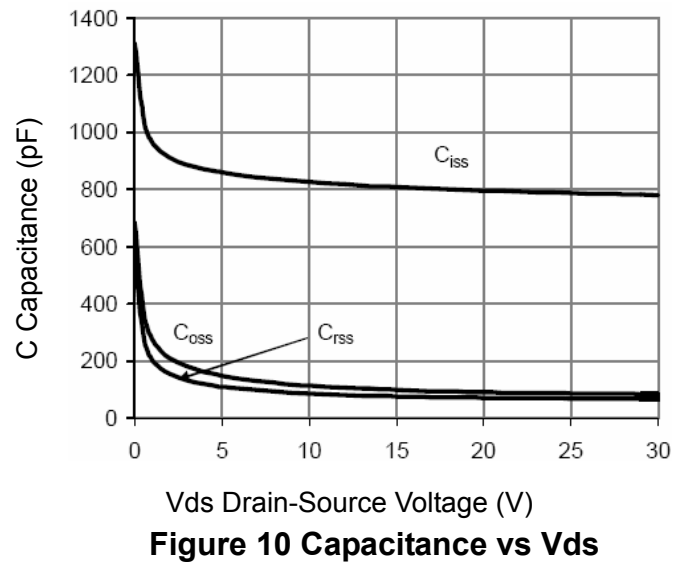


Figure 10 Capacitance vs Vds

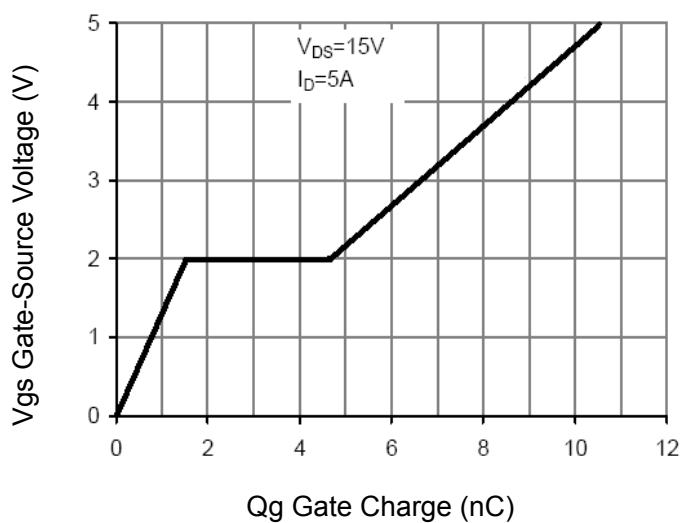


Figure 11 Gate Charge

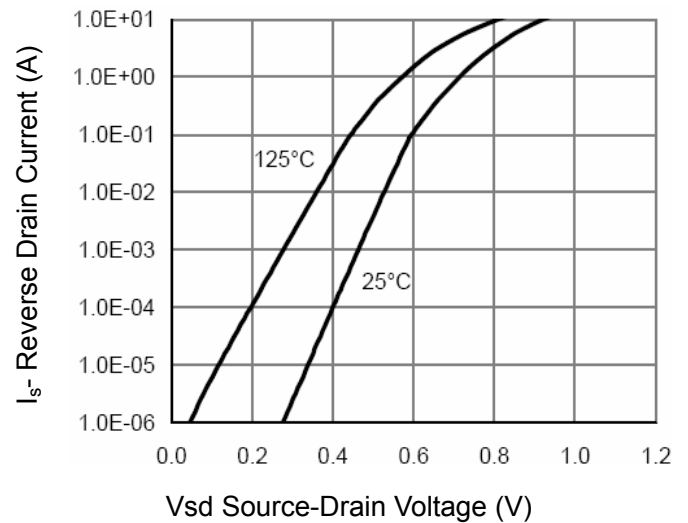
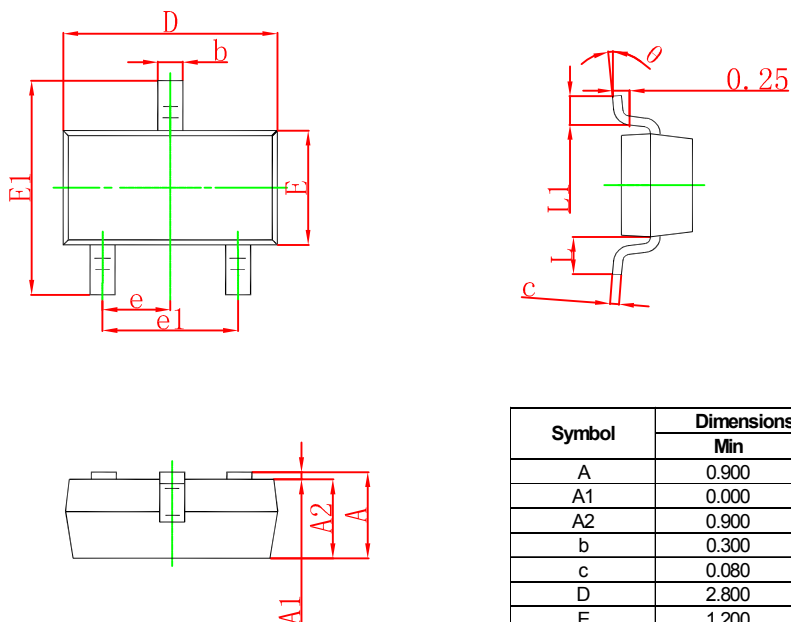


Figure 12 Source- Drain Diode Forward



SOT-23 Package Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	0.900	1.150	0.035	0.045
A1	0.000	0.100	0.000	0.004
A2	0.900	1.050	0.035	0.041
b	0.300	0.500	0.012	0.020
c	0.080	0.150	0.003	0.006
D	2.800	3.000	0.110	0.118
E	1.200	1.400	0.047	0.055
E1	2.250	2.550	0.089	0.100
e	0.950 TYP		0.037 TYP	
e1	1.800	2.000	0.071	0.079
L	0.550 REF		0.022 REF	
L1	0.300	0.500	0.012	0.020
θ	0°	8°	0°	8°

SOT-23 Suggested Pad Layout



Note:
1. Controlling dimension: in millimeters.
2. General tolerance: $\pm 0.05\text{mm}$.
3. The pad layout is for reference purposes only.



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