

Description

The SX2305AI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = -20V$ $I_D = -6.8A$

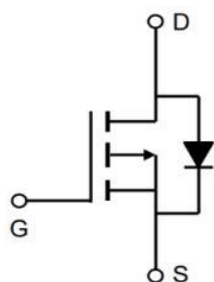
$R_{DS(ON)} < 35m\Omega$ @ $V_{GS} = -4.5V$

Application

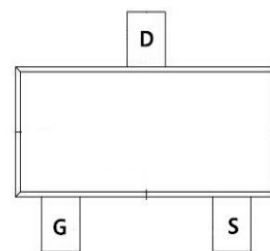
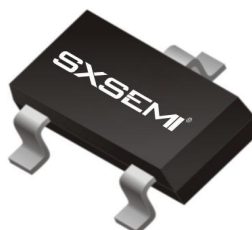
Battery protection

Load switch

Uninterruptible power supply



SOT-23



Absolute Maximum Ratings ($T_c = 25^\circ C$ unless otherwise noted)

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	-20	V
V_{GS}	Gate-Source Voltage	± 12	V
$I_D @ T_A = 25^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-6.8	A
$I_D @ T_A = 70^\circ C$	Continuous Drain Current, $V_{GS} @ -4.5V^1$	-5.9	A
I_{DM}	Pulsed Drain Current ²	-22	A
$P_D @ T_A = 25^\circ C$	Total Power Dissipation ³	4.31	W
$P_D @ T_A = 70^\circ C$	Total Power Dissipation ³	0.84	W
T_{STG}	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	125	$^\circ C/W$
$R_{\theta JC}$	Thermal resistance, junction-case	7.4	$^\circ C/W$

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = -250μA	-20	-24	-	V
IGSS	Gate-Body Leakage	V _{DS} = 0V, V _{GS} = ±10V	-	-	±10	μA
IDSS	Zero Gate Voltage Drain Current	V _{DS} = -20V, V _{GS} = 0V	-	-	-1	μA
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = -250μA	-0.3	-0.65	-1	V
RDS(on)	Drain-Source on-Resistance ³	V _{GS} = -4.5V, I _D = -4A	-	27	35	mΩ
		V _{GS} = -2.5V, I _D = -4A	-	36	45	
		V _{GS} = -1.8V, I _D = -2A	-	49	60	
Ciss	Input Capacitance	V _{GS} = 0V, V _{DS} = -10V, f=1MHz	-	1000	-	pF
Coss	Output Capacitance		-	120	-	
Crss	Reverse Transfer Capacitance		-	100	-	
Q _g	Total Gate Charge	V _{GS} = -4.5V, V _{DS} = -10V, I _D = -4A	-	12	-	nC
Q _{gs}	Gate-Source Charge		-	1.3	-	
Q _{gd}	Gate-Drain Charge		-	4.5	-	
td(on)	Turn-on Delay Time	V _{DS} = -10V, V _{GS} = -4.5V, I _D = -4A, R _G = 3Ω	-	12	-	ns
t _r	Rise Time		-	10	-	
td(off)	Turn-off Delay Time		-	19	-	
t _f	Fall Time		-	25	-	
VDS	Body Diode voltage ³	I _S = -1A, V _{GS} =0V	-	-	-1	V
IS	Continuous Source Current		-	-	-4	A

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width Δ300us , duty cycle Δ2%
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

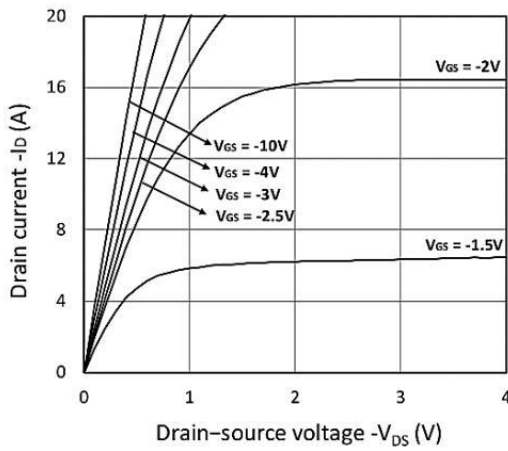


Figure 1. Output Characteristics

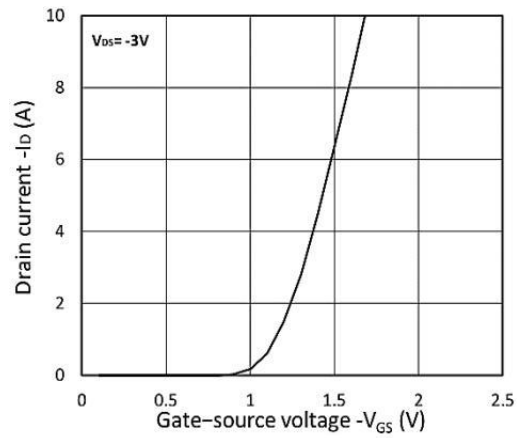


Figure 2. Transfer Characteristics

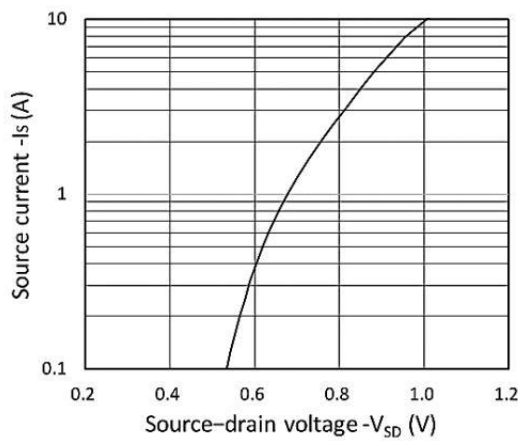


Figure 3. Forward Characteristics of Reverse

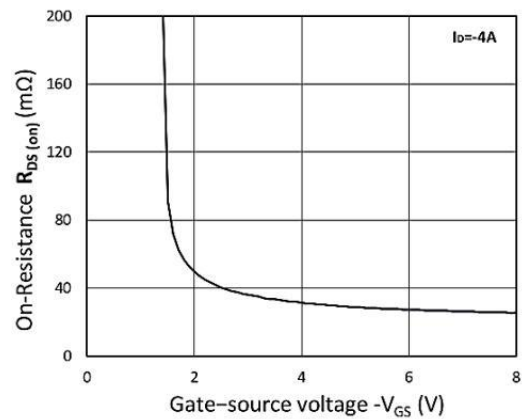


Figure 4. R_DS(on) vs. V_GS

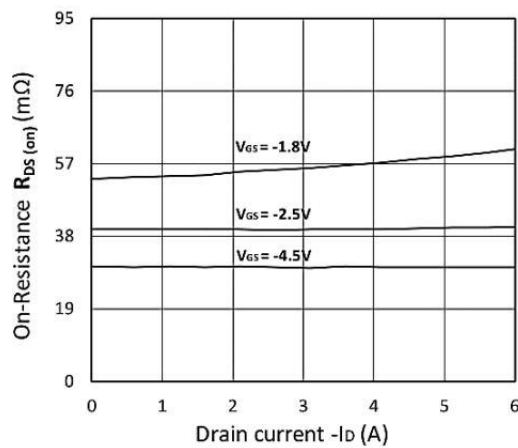


Figure 5. R_DS(on) vs. I_D

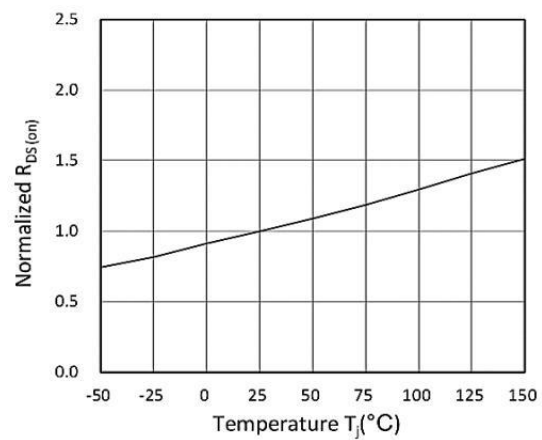


Figure 6. Normalized R_DS(on) vs. Temperature

Typical Characteristics

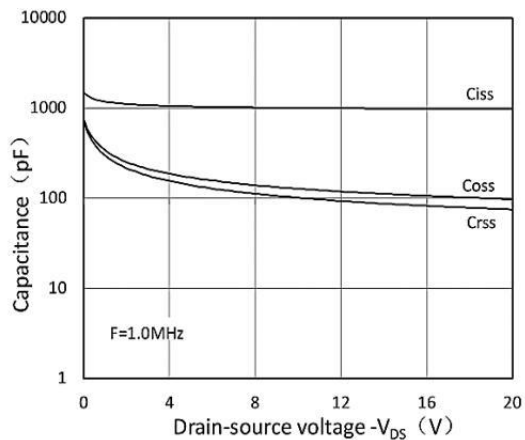


Figure 7. Capacitance Characteristics

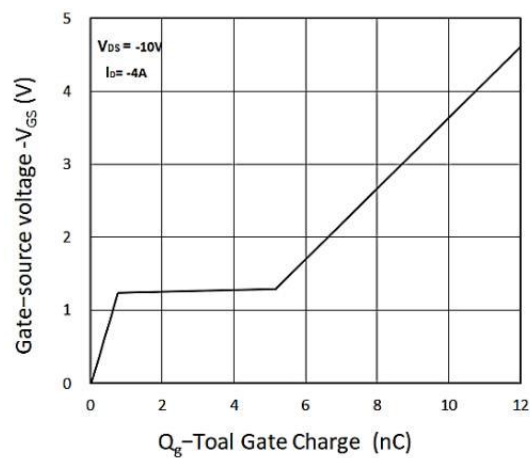


Figure 8. Gate Charge Characteristics

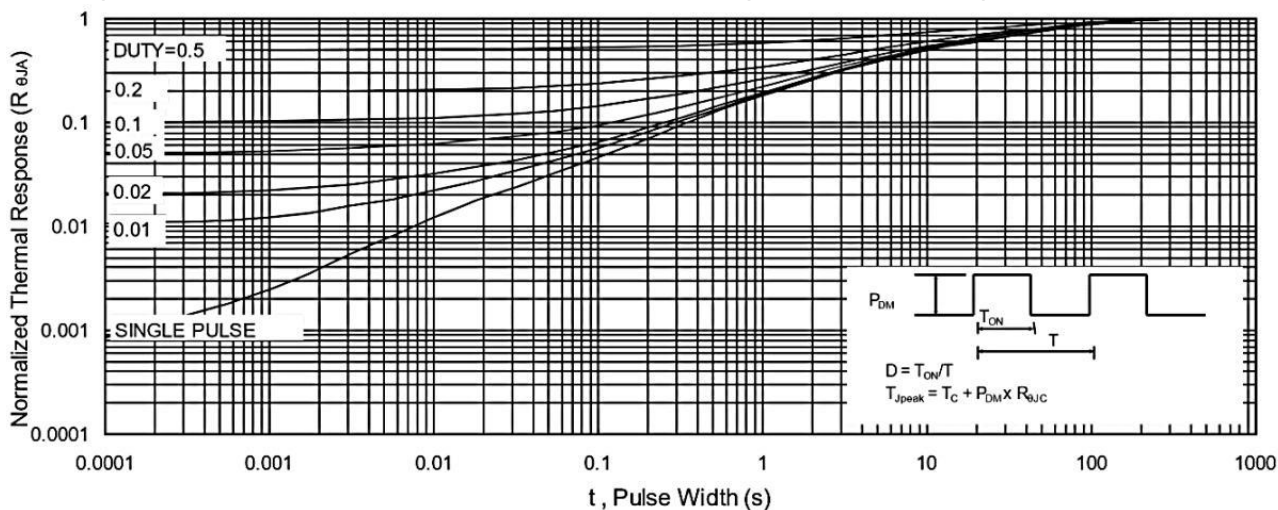


Figure 9 Normalized Maximum Transient Thermal Impedance

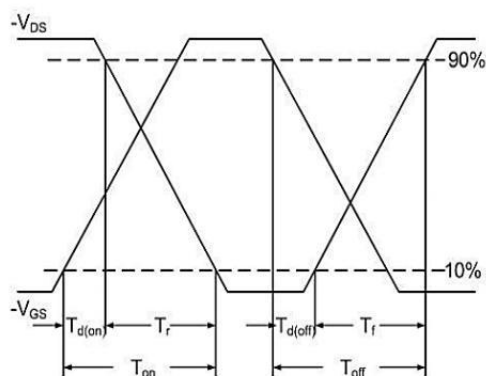


Figure.10 Switching Time Waveform

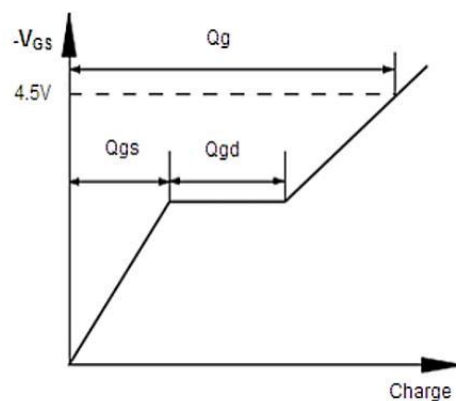
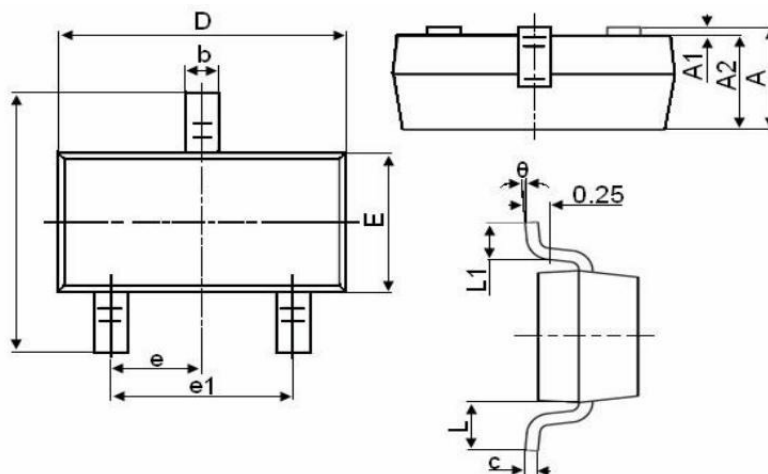


Figure.11 Gate Charge Waveform

Package Mechanical Data-SOT23-Single



Symbol	Dimensions in Millimeters	
	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	0.950TYP	
e1	1.800	2.000
L	0.550REF	
L1	0.300	0.500
θ	0°	8°

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
TAPING	SOT23		3000