AP2305AI

-20V P-Channel Enhancement Mode MOSFET

Description

The AP2305AI 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

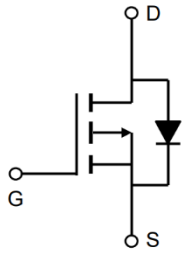
$R_{DS(ON)}$ < 35mΩ @ V_{GS}=-4.5V **(Type：27mΩ)**

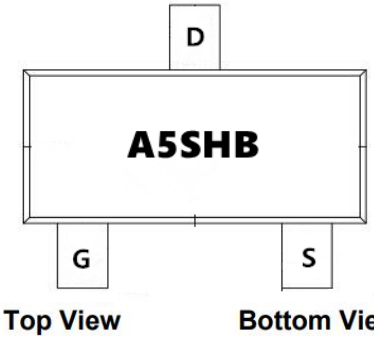
Application

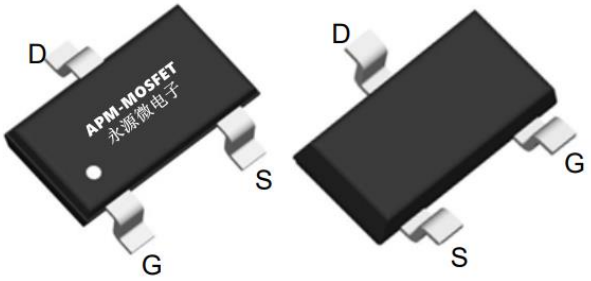
Battery protection

Load switch

Uninterruptible power supply







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2305AI	SOT23L	A5SHB	3000

Absolute Maximum Ratings (T_C=25℃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℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-6.8	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-5.9	A
I_{DM}	Pulsed Drain Current[2]	-22	A
P_D@T_A=25℃	Total Power Dissipation[3]	4.31	W
P_D@T_A=70℃	Total Power Dissipation[3]	0.84	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	125	℃/W
RθJC	Thermal resistance, junction-case	7.4	℃/W

Electrical Characteristics (T_J=25℃, 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
Qgs	Gate-Source Charge		-	1.3	-	
Qgd	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 inch^2 FR-4 board with 2OZ copper.

2、The data tested by pulsed , pulse width △ 300us , duty cycle △ 2%

3、The power dissipation is limited by 150℃ 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

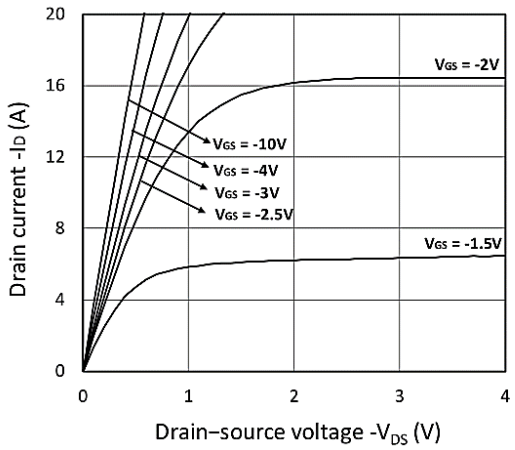


Figure 1. Output Characteristics

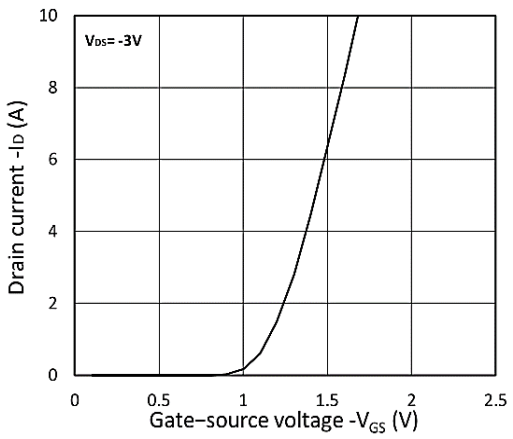


Figure 2. Transfer Characteristics

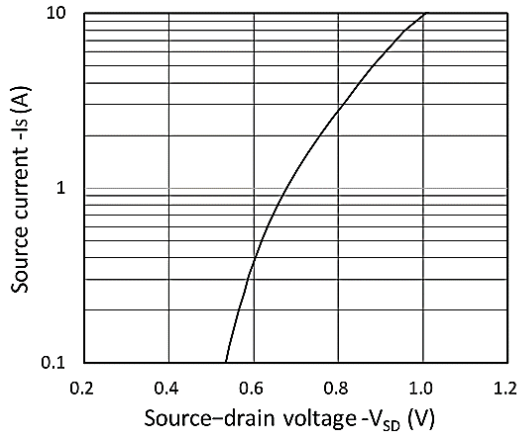


Figure 3. Forward Characteristics of Reverse

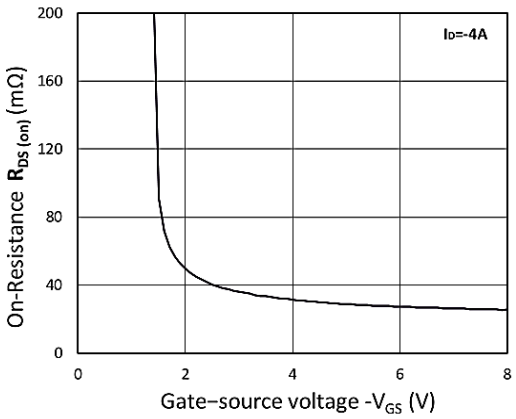


Figure 4. RDS(ON) vs. VGS

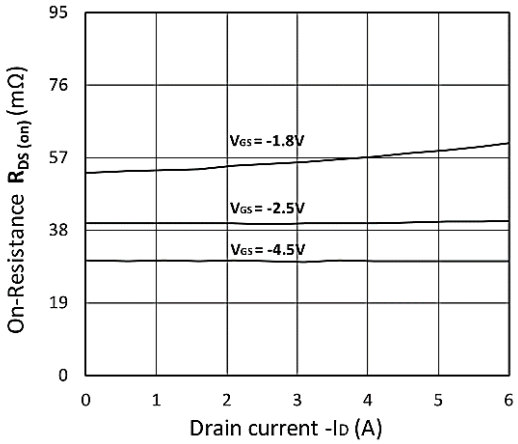


Figure 5. RDS(ON) vs. ID

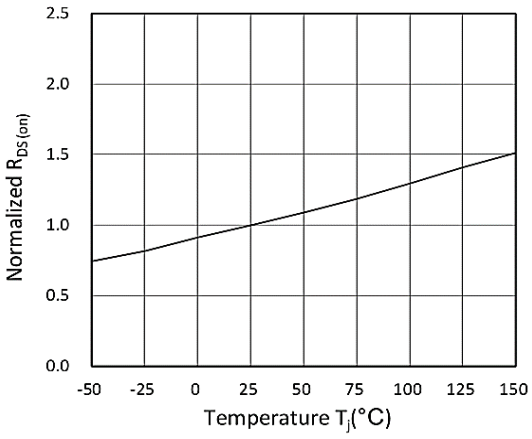


Figure 6. Normalized RDS(on) vs. Temperature

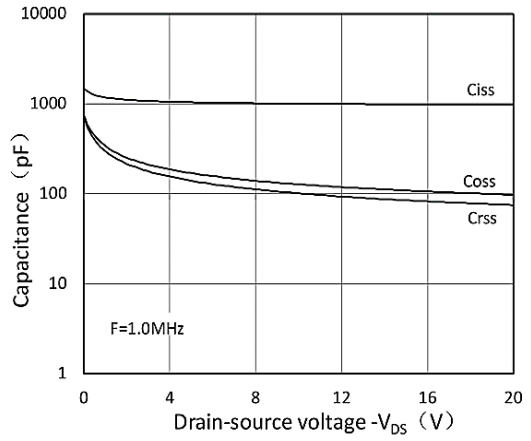


Figure 7. Capacitance Characteristics

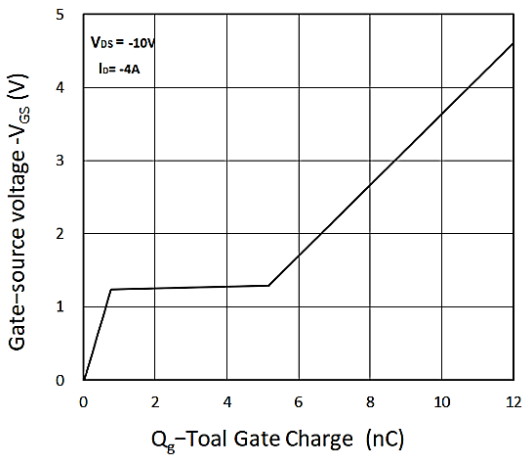


Figure 8. Gate Charge Characteristics

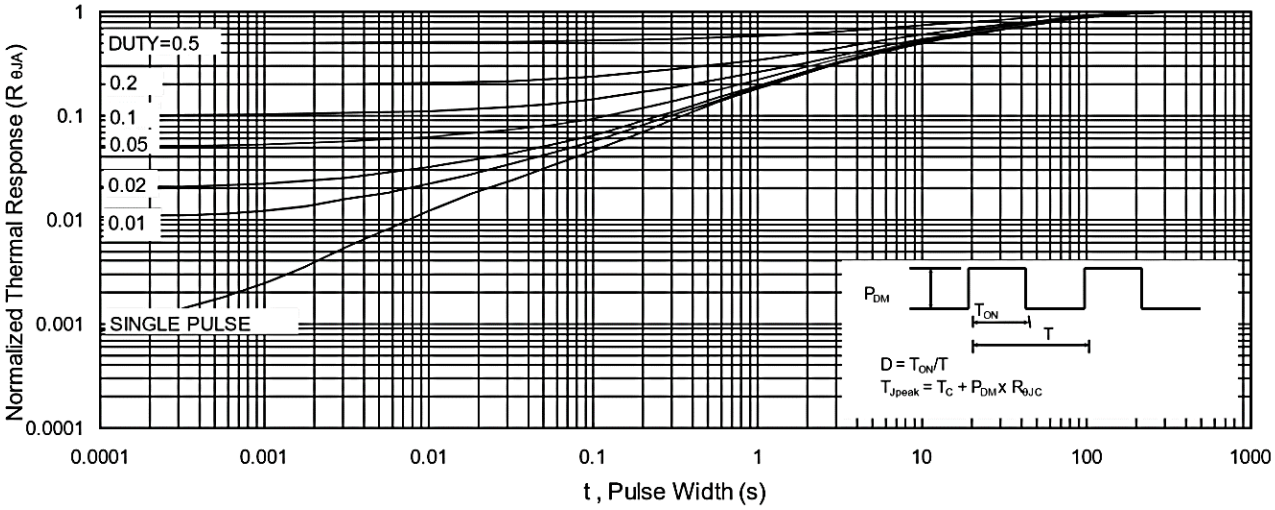


Figure 9 Normalized Maximum Transient Thermal Impedance

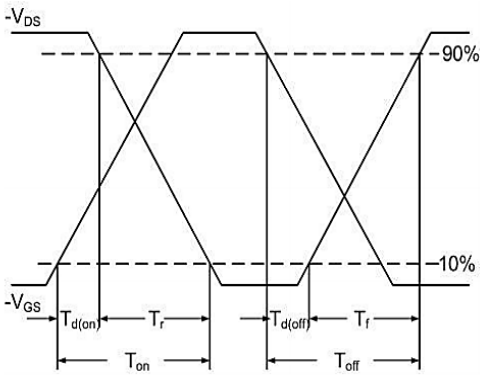


Figure.10 Switching Time Waveform

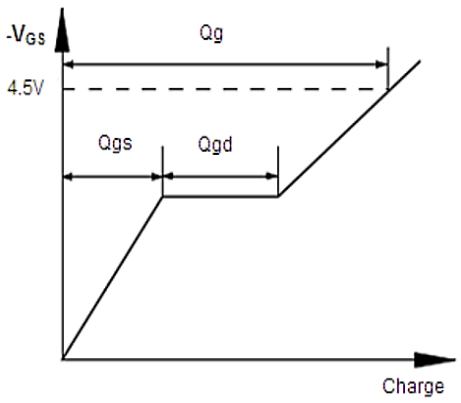
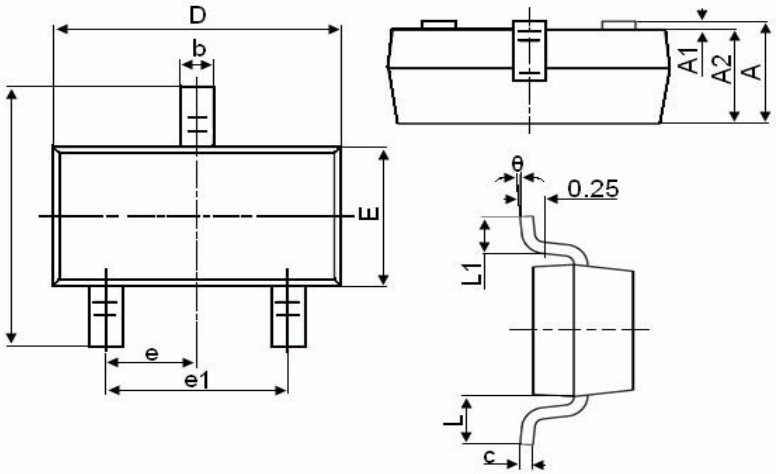


Figure.11 Gate Charge Waveform

Package Mechanical Data-SOT23L-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°

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AP2305AI

-20V P-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2021/4/31	Initial release
Rve1.1	2022/7/12	Reduce RDS

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