AP2312BI

20V N-Channel Enhancement Mode MOSFET

Description

The AP2312BI 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

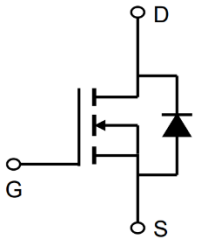
V_{DS}=20V I_D =6.2A

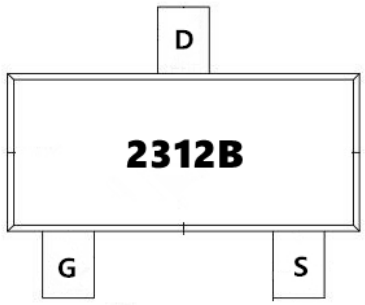
$R_{DS(ON)}$ < 20mΩ @ V_{GS}=4.5V （**Type：16mΩ**）

Application

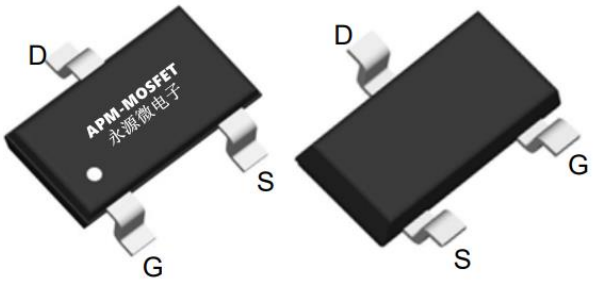
Lithium battery protection

Mobile phone fast charging





Top View Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2312BI	SOT23L	2312B	3000

Absolute Maximum Ratings (T_A=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	20	V
VGS	Gate-Source Voltage	±12	V
ID@TA=25℃	Continuous Drain Current1	6.2	A
ID@TA=70℃	Continuous Drain Current1	4.1	A
IDM	Pulsed Drain Current2	24	A
PD@TA=25℃	Total Power Dissipation3	1.5	W
TSTG	Storage Temperature Range	-55 to 150	℃
TJ	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-ambient [1]	85	℃/W

Electrical Characteristics (T_J=25 ℃, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	20	22	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=5A		16	20	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=2.5V , I_D=4A		22	30	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.7	1.2	V
IDSS	Drain-Source Leakage Current	V_{DS}=16V , V_{GS}=0V , T_J=25℃	---	---	1	uA
IGSS	Gate-Source Leakage Current	V_{GS}=±8V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=3.5A	---	20	---	S
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=7A	---	11.4	---	nC
Qgs	Gate-Source Charge		---	1.6	---	
Qgd	Gate-Drain Charge		---	2.9	---	
Td(on)	Turn-On Delay Time	V_{DD}=10V , V_{GS}=4.5V , R_G=3.3 I_D=5A	---	5	---	ns
T_r	Rise Time		---	32.4	---	
Td(off)	Turn-Off Delay Time		---	28	---	
T_f	Fall Time		---	9	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	863	---	pF
Coss	Output Capacitance		---	87	---	
Crss	Reverse Transfer Capacitance		---	71	---	
IS	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	6	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.2	V

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%
4、The power dissipation is limited by 175℃ junction temperature
5、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

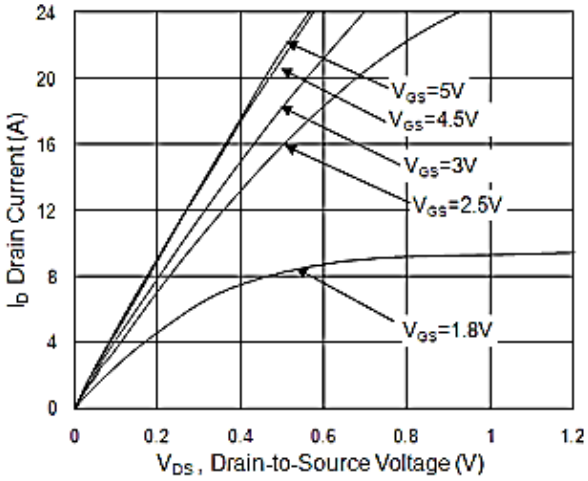


Fig.1 Typical Output Characteristics

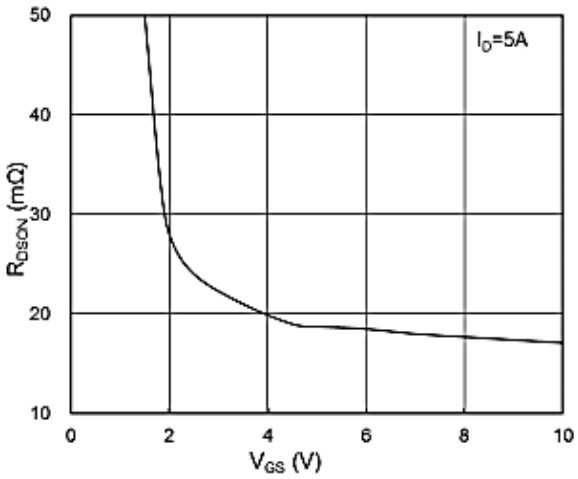


Fig.2 On-Resistance vs. Gate-Source Voltage

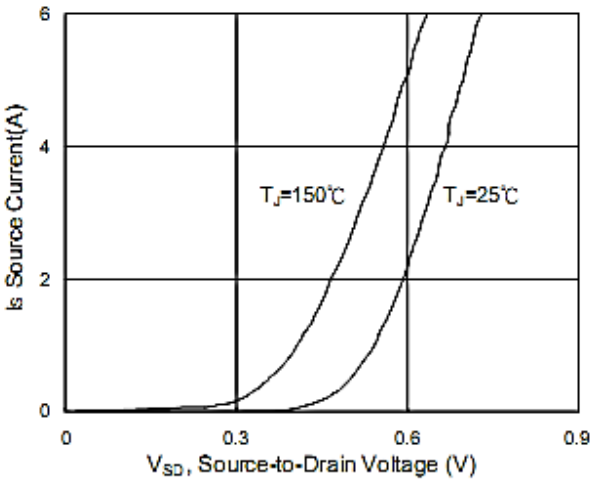


Fig.3 Forward Characteristics of Reverse

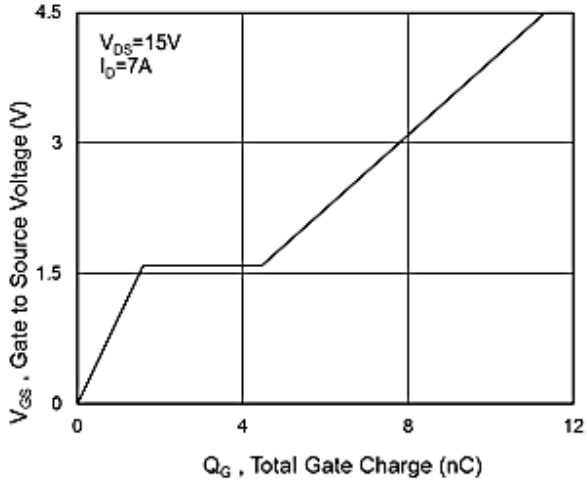


Fig.4 Gate-Charge Characteristics

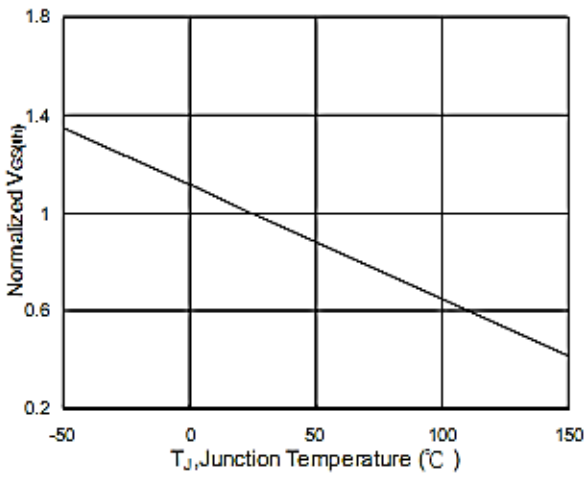


Fig.5 $V_{GS(th)}$ vs. T_J

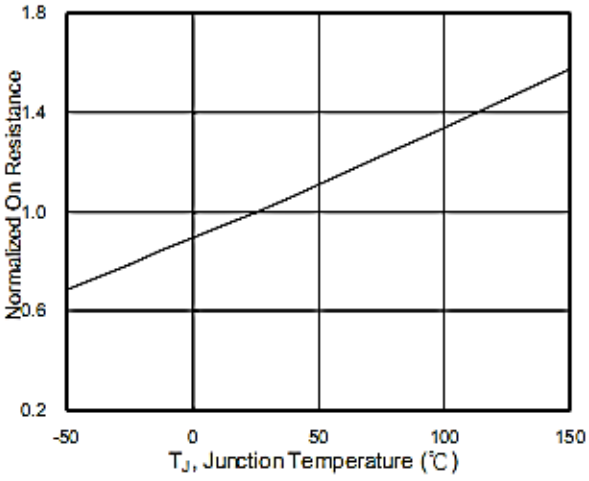


Fig.6 Normalized R_{DSON} vs. T_J

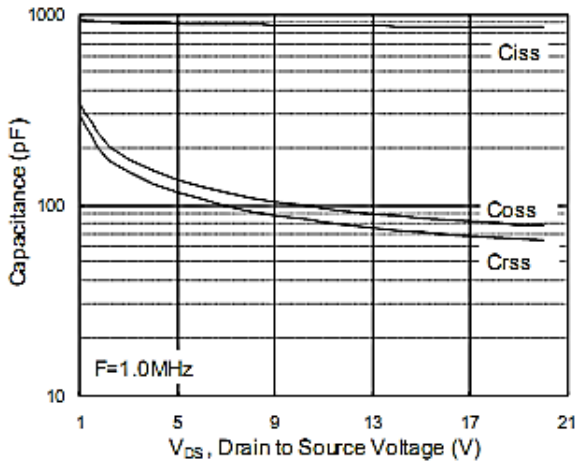


Fig.7 Capacitance

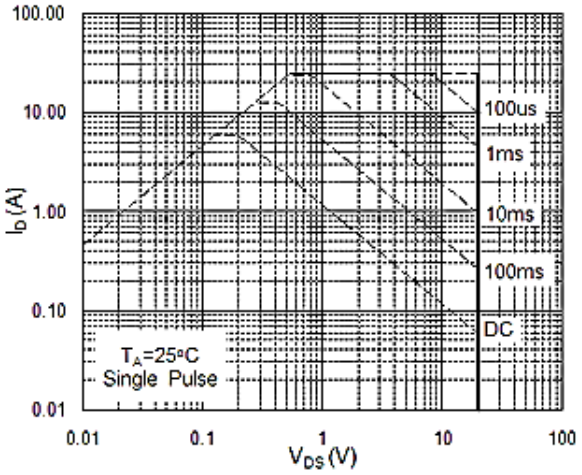


Fig.8 Safe Operating Area

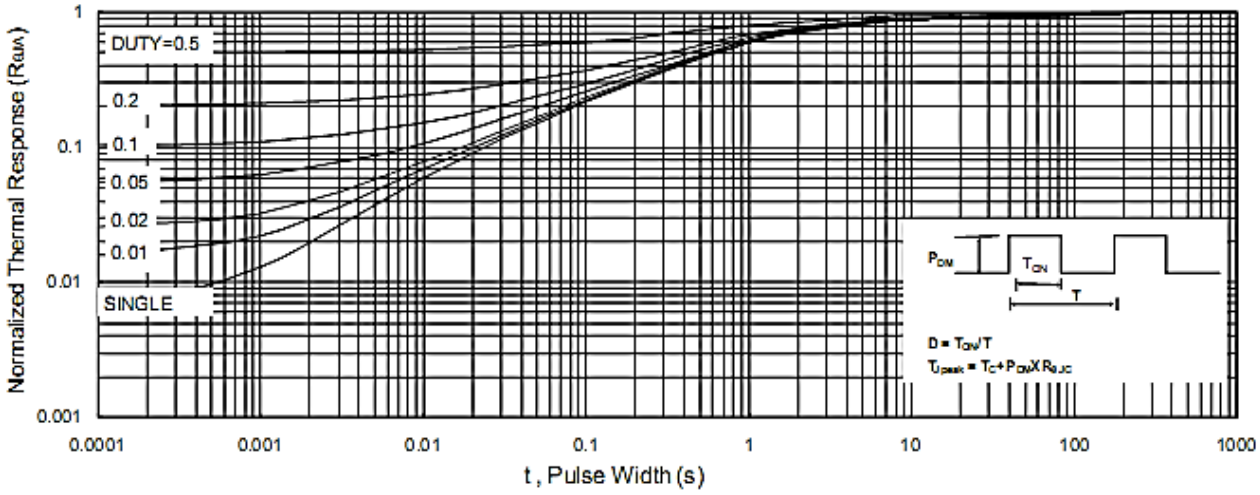


Fig.9 Normalized Maximum Transient Thermal Impedance

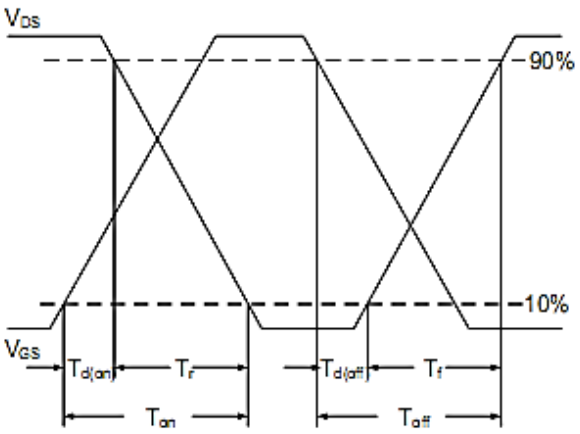


Fig.10 Switching Time Waveform

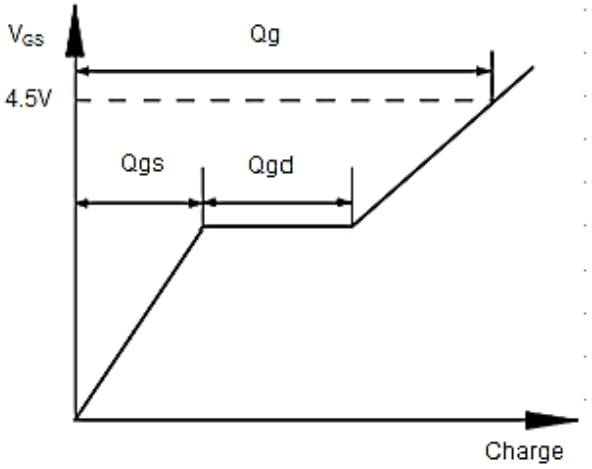
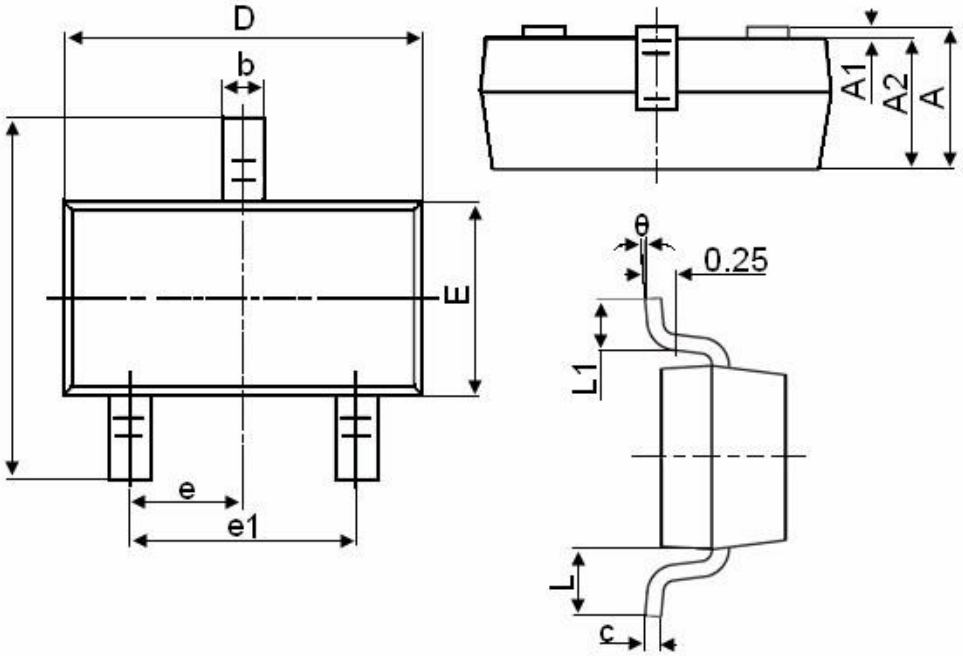


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-XC-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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20V N-Channel Enhancement Mode MOSFET

Edition	Date	Change
Rve1.0	2020/1/31	Initial release