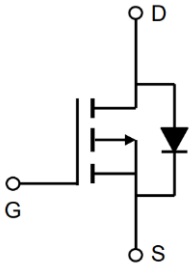
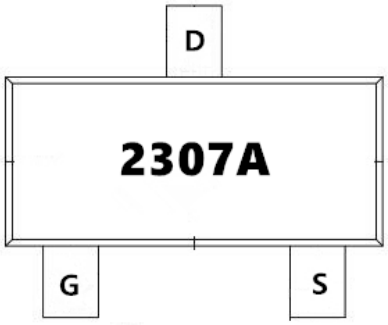
AP2307AI

-20V P-Channel Enhancement Mode MOSFET

Description

The AP2307AI 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 =−7A

$R_{DS(ON)}$ < 25mΩ @ V_{GS}=−4.5V (Type:20mΩ)

Application

Quick charge

electronic cigarette

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2307AI	SOT23L	2307A	3000

Absolute Maximum Ratings (T_A=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°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-7	A
I_D@T_A=70°C	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4.8	A
I_{DM}	Pulsed Drain Current[2]	-23.8	A
P_D@T_A=25°C	Total Power Dissipation[3]	2	W
T_{STG}	Storage Temperature Range	-55 to 150	°C
T_J	Operating Junction Temperature Range	-55 to 150	°C
$R_{\theta JA}$	Thermal Resistance Junction-ambient [1]	62.5	°C/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	80	°C/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D= -250μA	-20	-22	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}= -20V, V_{GS}=0V,	-	-	-1	μA
IGSS	Gate to Body Leakage Current	V_{DS}=0V, V_{GS}= ±12V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D= -250μA	-0.5	-0.7	-1.2	V
RDS(on)	Static Drain-Source on-Resistance note2	V_{GS}= -4.5V, I_D= -6A	-	20	25	mΩ
		V_{GS}= -2.5V, I_D= -5A	-	28	35	
C_{iss}	Input Capacitance	V_{DS}= -10V, V_{GS}=0V, f=1.0MHz	-	2000	-	pF
Coss	Output Capacitance		-	242	-	pF
Crss	Reverse Transfer Capacitance		-	231	-	pF
Q_g	Total Gate Charge	V_{DS}= -10V, I_D= -3A, V_{GS}= -4.5V	-	15.3	-	nC
Q_{gs}	Gate-Source Charge		-	2.2	-	nC
Q_{gd}	Gate-Drain(“Miller”) Charge		-	4.4	-	nC
td(on)	Turn-on Delay Time	V_{DD} = -10V, I_D= -7A, V_{GS}= -4.5V, R_{GEN}=2.5Ω	-	10	-	ns
t_r	Turn-on Rise Time		-	31	-	ns
td(off)	Turn-off Delay Time		-	28	-	ns
t_f	Turn-off Fall Time		-	8	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-7	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-28	A
VSD	Drain to Source Diode Forward Voltage	V_{GS}=0V, I_S= -7A	-	-0.8	-1.2	V

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 ≦ 300us , duty cycle ≦ 2%

3、The power dissipation is limited by 150℃ junction temperature

4、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

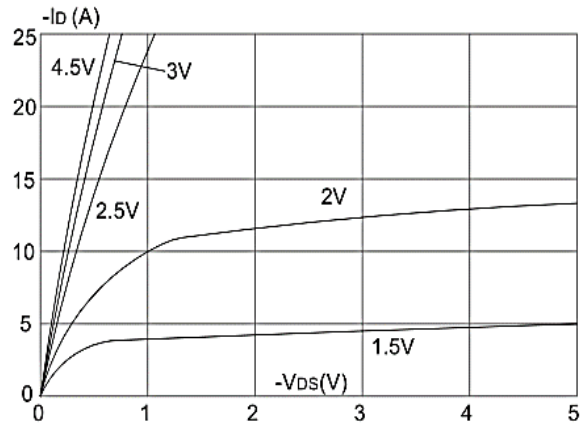

Figure1: Output Characteristics

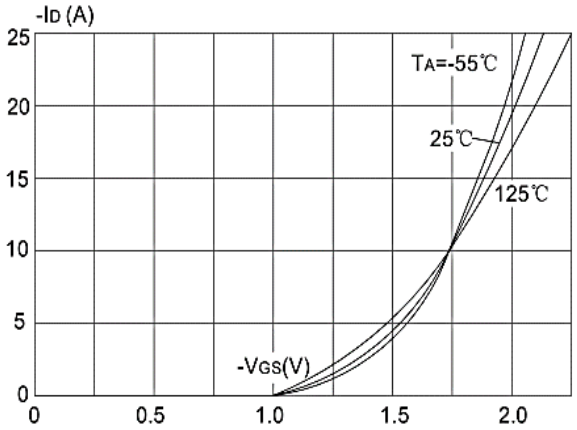

Figure 2: Typical Transfer Characteristics

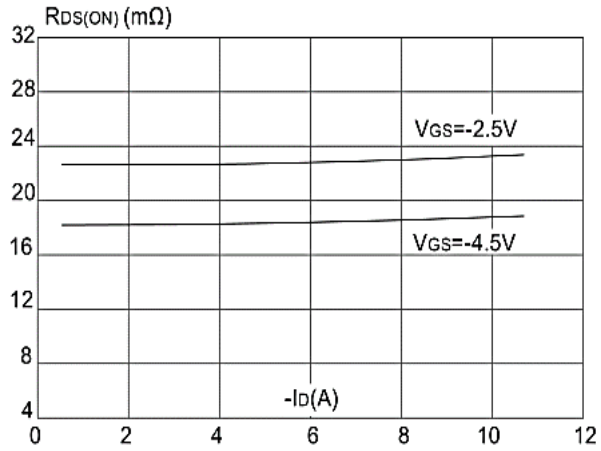

Figure 3:On-resistance vs. Drain Current

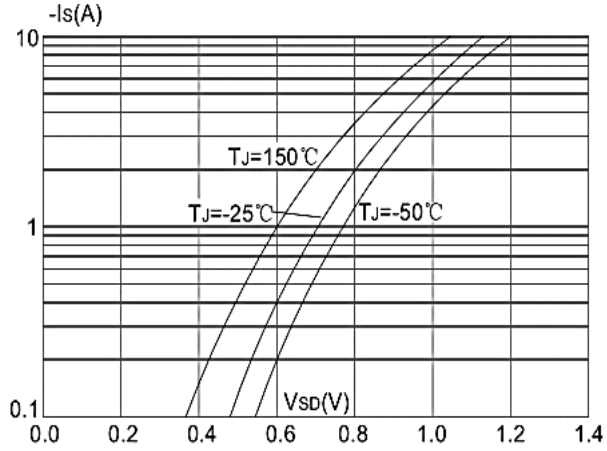

Figure 4: Body Diode Characteristics

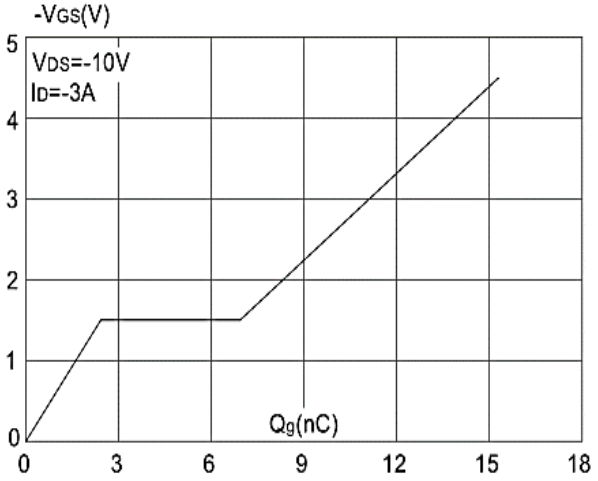

Figure 5: Gate Charge Characteristics

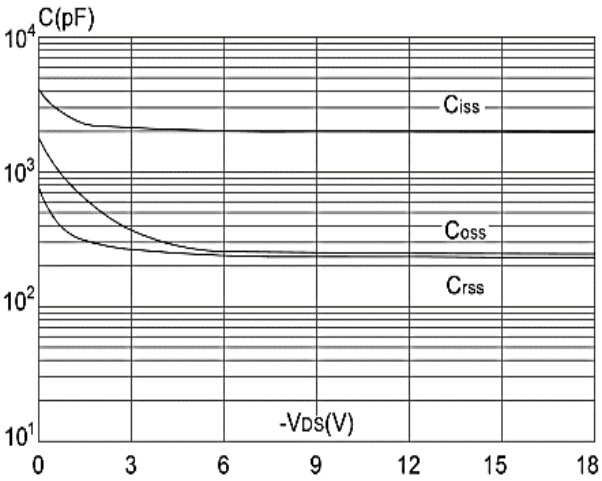

Figure 6: Capacitance Characteristics

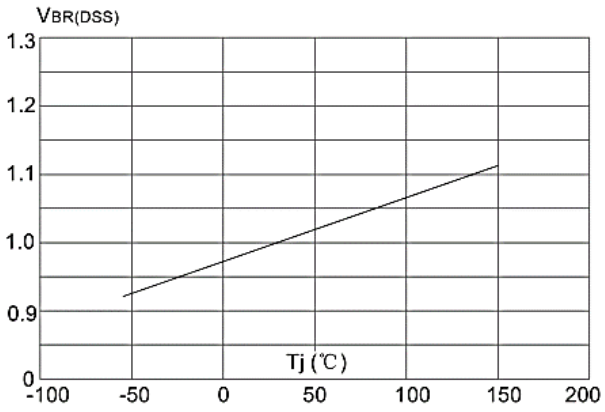

Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

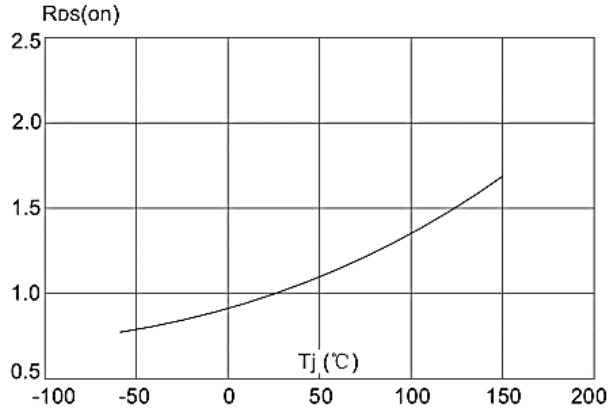

Figure 8: Normalized on Resistance vs Junction Temperature

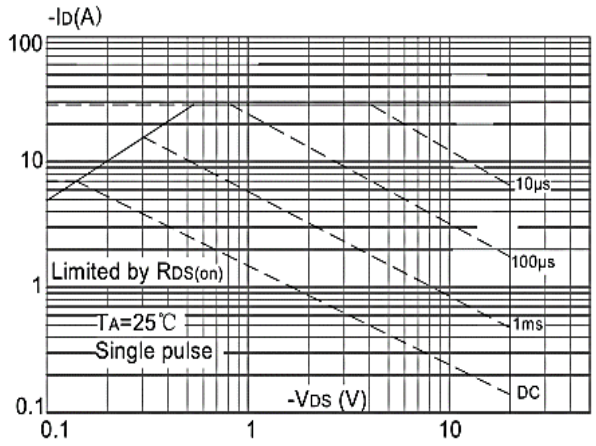

Figure 9: Maximum Safe Operating Area vs. Case Temperature

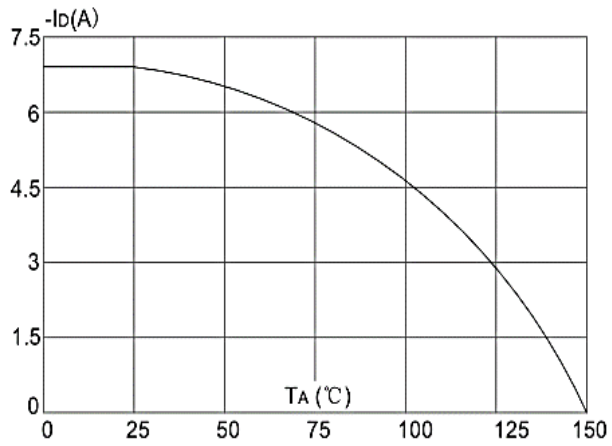

Figure 10: Maximum Continuous Drain Current

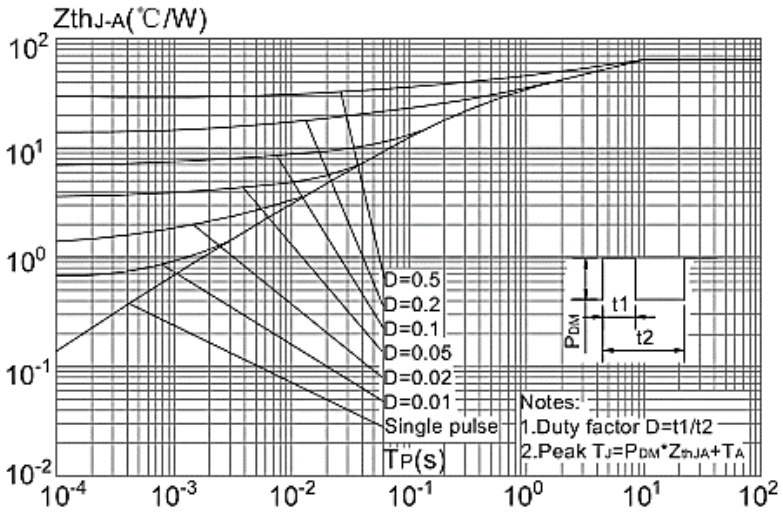

Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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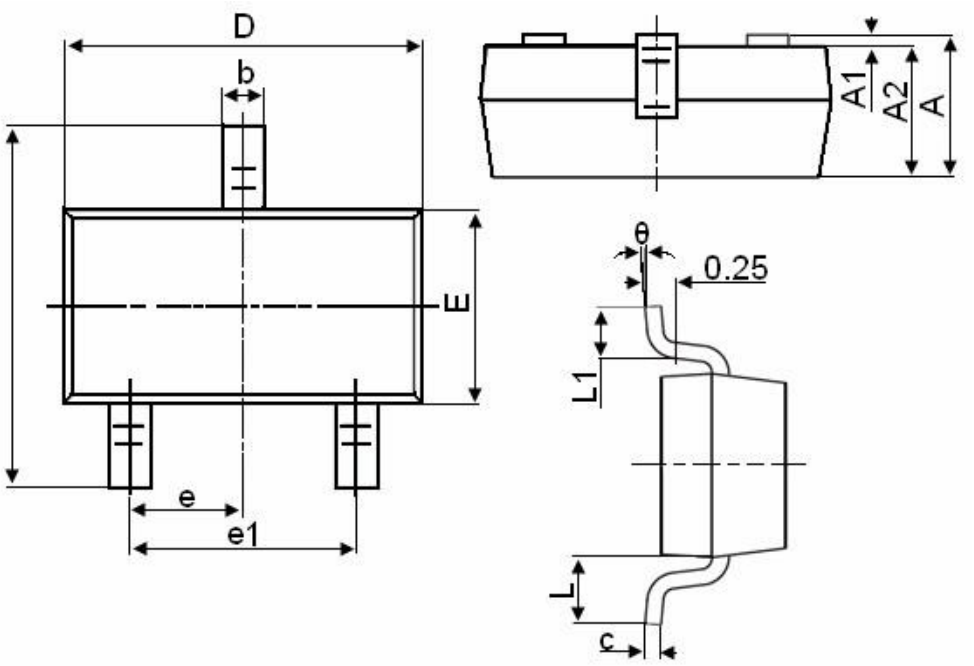
Package Mechanical Data-SOT23-XC-Single



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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Edition	Date	Change
Rve1.0	2020/12/20	Initial release