AP2305CI

-20V P-Channel Enhancement Mode MOSFET

Description

The AP2305CI 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 =-6.0A

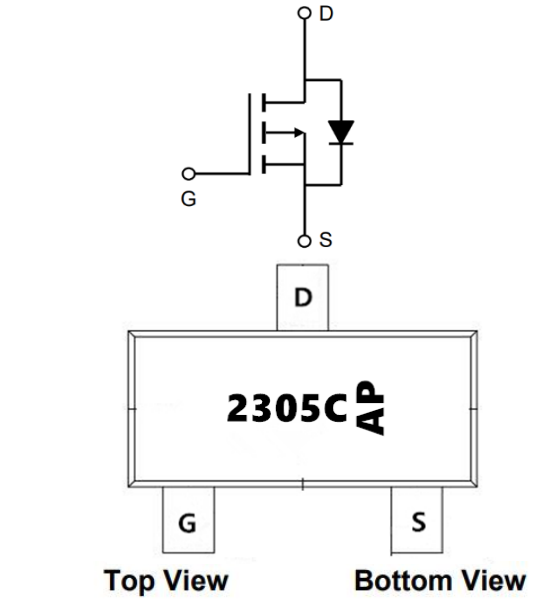
$R_{DS(ON)}$ < 40mΩ @ V_{GS}=-4.5V **(Type：33mΩ)**

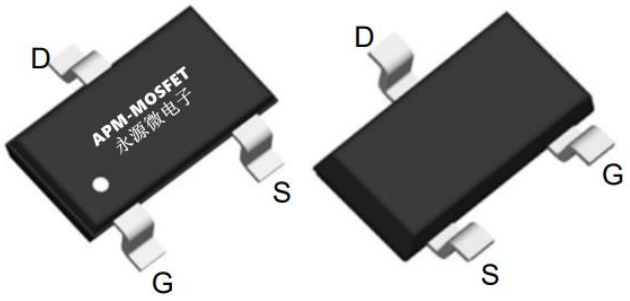
Application

Battery protection

Load switch

Uninterruptible power supply





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2305CI	SOT23L	2305C-AP	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]	-6.0	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -4.5V[1]	-4.5	A
I_{DM}	Pulsed Drain Current[2]	-18	A
P_D@T_A=25℃	Total Power Dissipation[3]	3.81	W
P_D@T_A=70℃	Total Power Dissipation[3]	0.74	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	6.8	℃/W

-20V P-Channel Enhancement Mode MOSFET

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	I_D = -250μA, V_{GS} = 0V	-20	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = -20V, V_{GS} = 0V	-	-	1.0	μA
IGSS	Gate-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	-0.6	-1.0	V
RDS(ON)	Static Drain-Source ON-Resistance(3)	V_{GS} = -4.5V, I_D = -4A	-	33	40	mΩ
		V_{GS} = -2.5V, I_D = -3A	-	40	66	mΩ
Ciss	Input Capacitance	V_{GS} = 0V, V_{DS} = -10V, f = 1MHz	-	534	-	pF
Coss	Output Capacitance		-	62	-	pF
Crss	Reverse Transfer Capacitance		-	50	-	pF
Q_g	Total Gate Charge	V_{GS} = 0 to -4.5V V_{DS} = -10V, I_D = -2A	-	5.6	-	nC
Q_{gs}	Gate Source Charge		-	1	-	nC
Q_{gd}	Gate Drain("Miller") Charge		-	1	-	nC
td(on)	Turn-On DelayTime	V_{GS} = -4.5V, V_{DD} = -10V I_D= -2A, R_{GEN} = 3Ω	-	5	-	ns
t_r	Turn-On Rise Time		-	21	-	ns
td(off)	Turn-Off DelayTime		-	110	-	ns
t_f	Turn-Off Fall Time		-	239	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-3	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-12	A
VSD	Drain to Source Diode Forward Voltage	V_{GS} = 0V, I_S = -4.2A	-	-	-1.2	V
trr	Body Diode Reverse Recovery Time	I_F = -2A, di/dt = 100A/us	-	64	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	10	-	nC

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

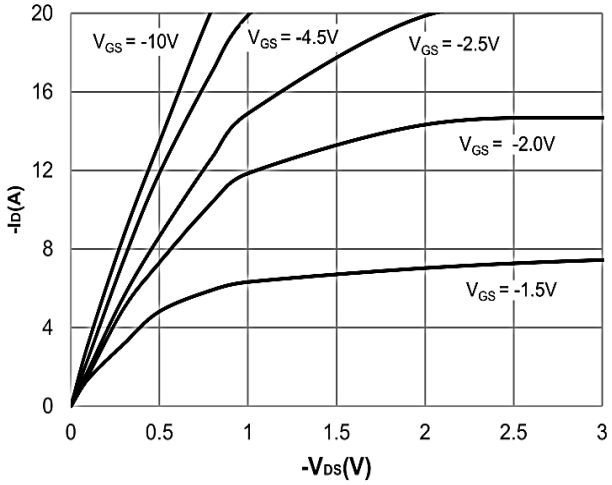


Figure 1: Output Characteristics

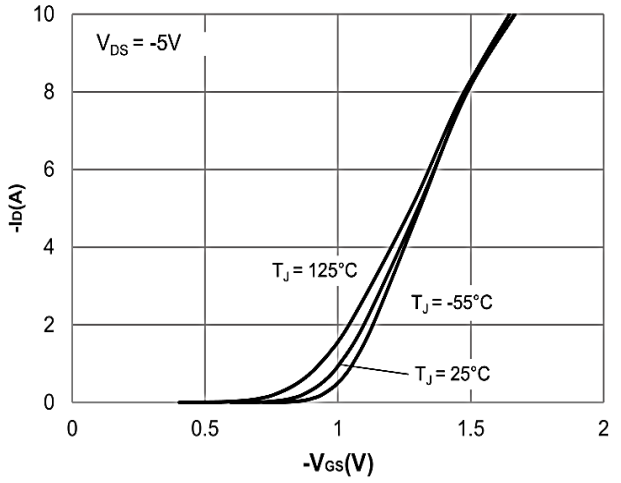


Figure 2: Typical Transfer Characteristics

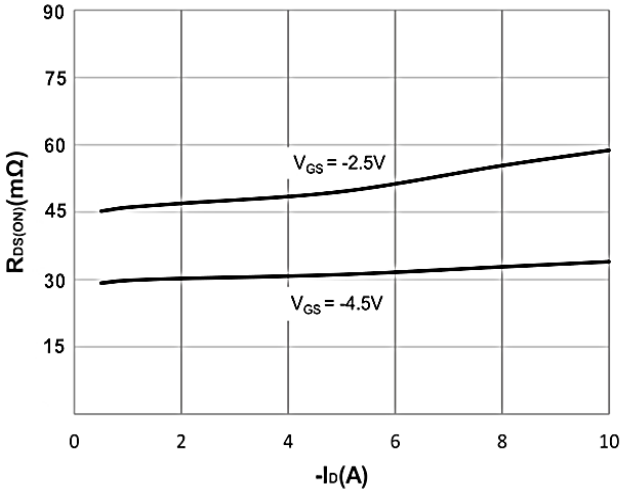


Figure 3: On-resistance vs. Drain Current

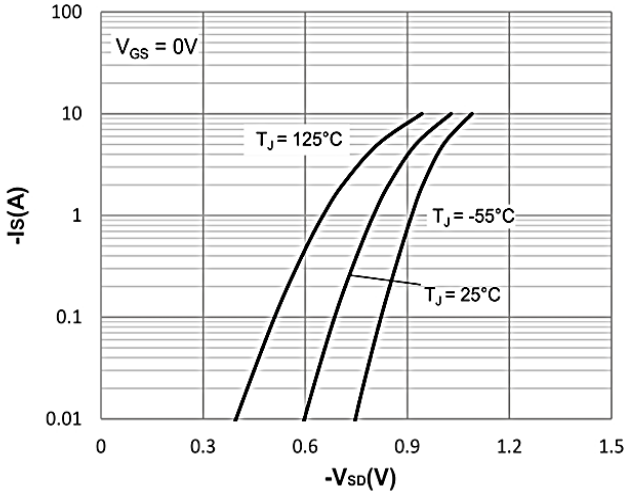


Figure 4: Body Diode Characteristics

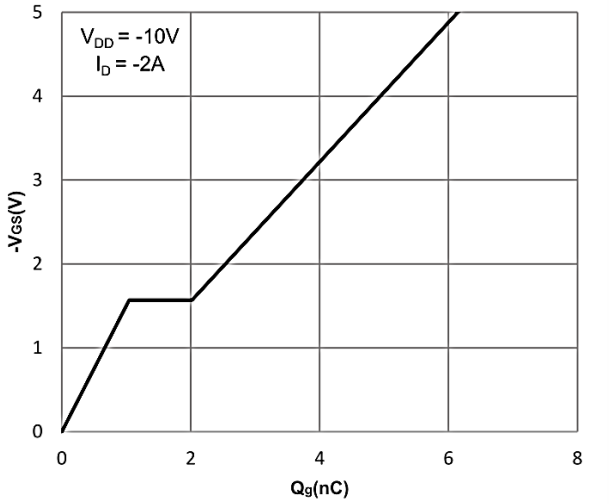


Figure 5: Gate Charge Characteristics

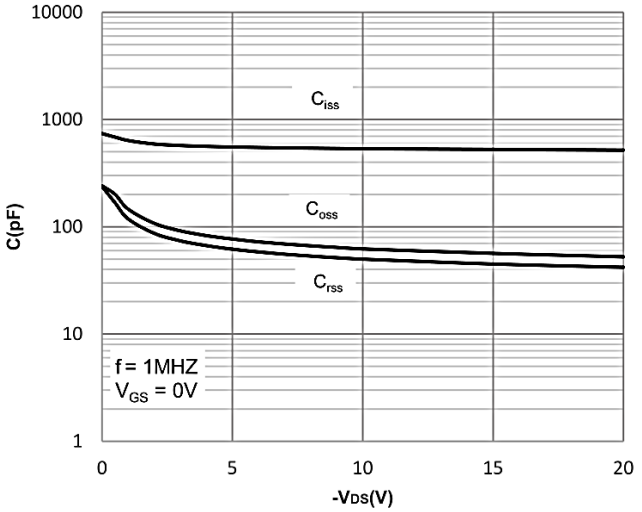


Figure 6: Capacitance Characteristics

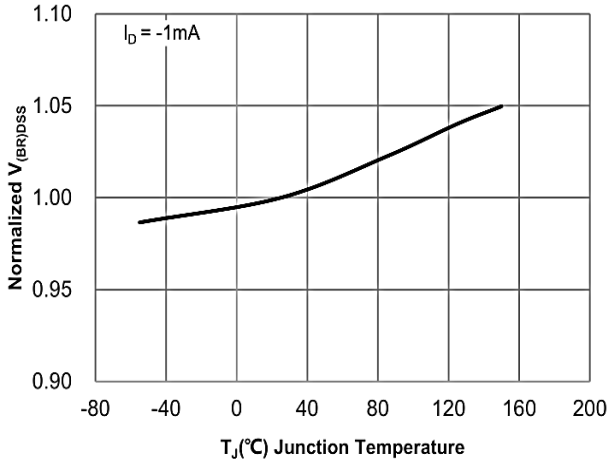


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

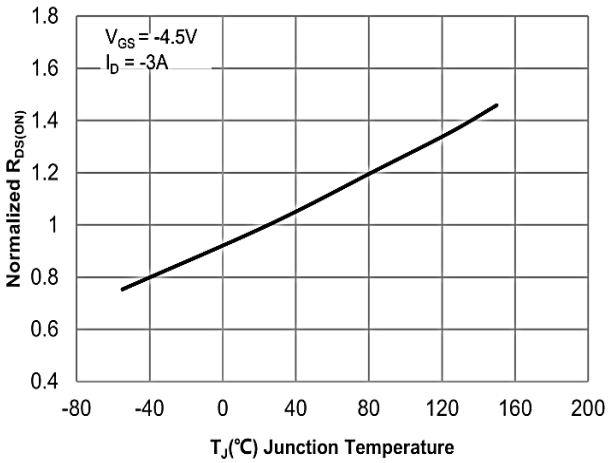


Figure 8: Normalized on Resistance vs. Junction Temperature

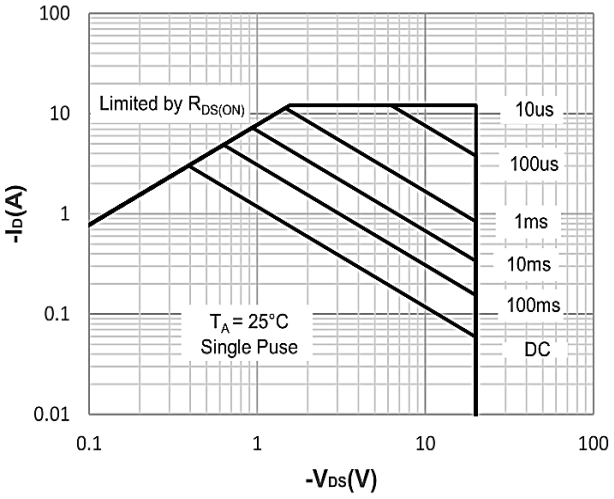


Figure 9: Maximum Safe Operating Area

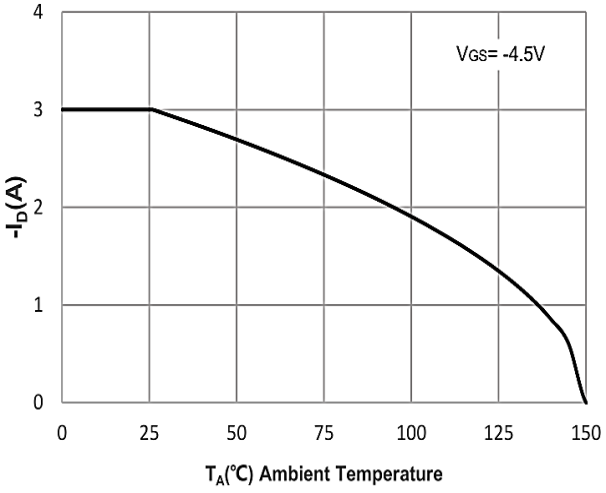


Figure 10: Maximum Continuous Drian Current vs. Case Temperature

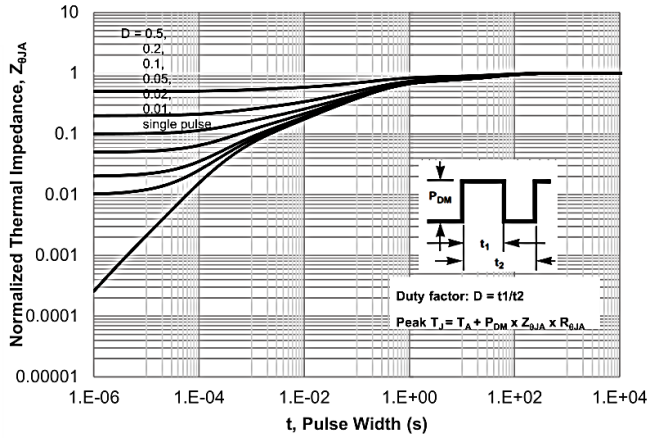


Figure 11: Normalized Maximum Transient Thermal Impedance

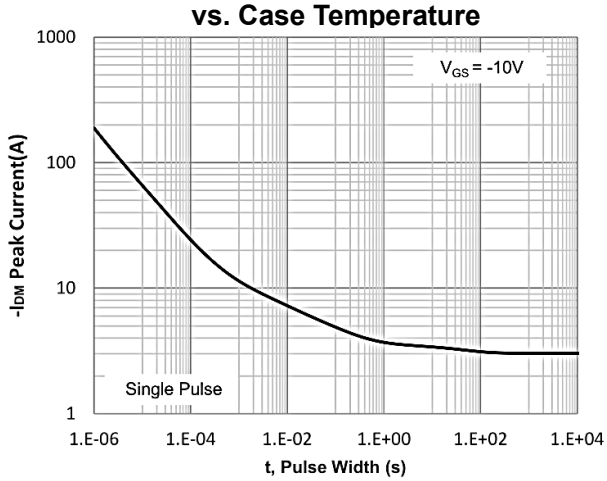
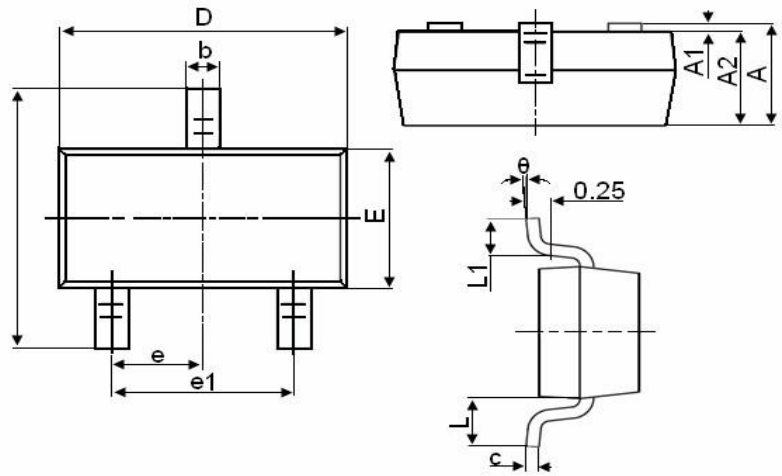


Figure 12: Peak Current Capacity

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	2023/4/31	Initial release