

20V N-Channel Enhancement Mode MOSFET

Description

The AP2300BI 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

$V_{DS} = 20V$ $I_D = 2.8A$

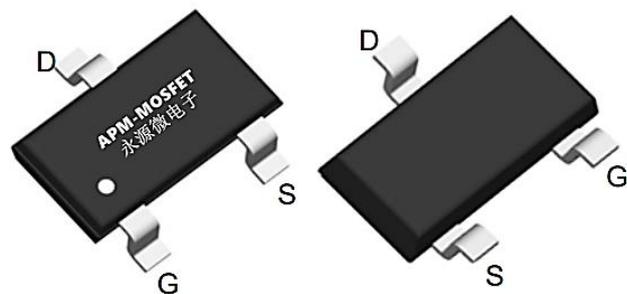
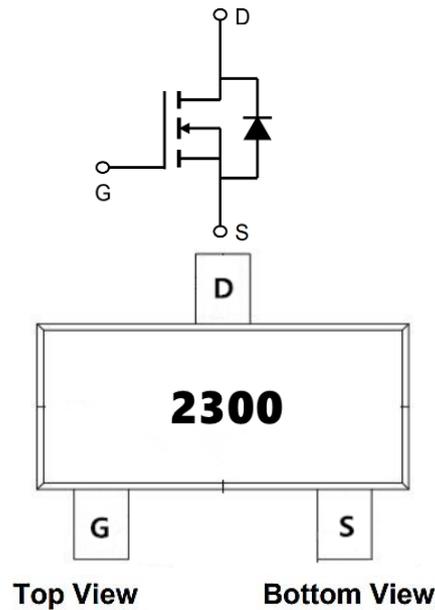
$R_{DS(ON)} < 55m\Omega$ @ $V_{GS}=10V$ (Type: 48m Ω)

Application

Battery protection

Load switch

Uninterruptible power suppl



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2300BI	SOT23L	2300	3000

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, $V_{GS} @ 4.5V^1$	2.8	A
$I_D@T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 4.5V^1$	1.6	A
I_{DM}	Pulsed Drain Current ²	7.4	A
$P_D@T_A=25^\circ C$	Total Power Dissipation ³	0.9	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 ¹	90	$^\circ C/W$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	20	22	-	V
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=20V, V_{GS}=0V,$	-	-	1.0	μA
IGSS	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 12V$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	0.4	0.6	1.2	V
RDS(on)	Static Drain-Source on-Resistance note2	$V_{GS}=4.5V, I_D=2A$	-	48	55	m Ω
		$V_{GS}=2.5V, I_D=1.5A$	-	54	70	
C _{iss}	Input Capacitance	$V_{DS}=10V, V_{GS}=0V, f=1.0\text{MHz}$	-	184	-	pF
C _{oss}	Output Capacitance		-	38	-	pF
C _{rss}	Reverse Transfer Capacitance		-	28	-	pF
Q _g	Total Gate Charge	$V_{DS}=10V, I_D=3A, V_{GS}=4.5V$	-	2.7	-	nC
Q _{gs}	Gate-Source Charge		-	0.4	-	nC
Q _{gd}	Gate-Drain("Miller") Charge		-	0.5	-	nC
td(on)	Turn-on Delay Time	$V_{DS}=10V, I_D=3A, R_{GEN}=3\Omega, V_{GS}=4.5V$	-	2.3	-	ns
t _r	Turn-on Rise Time		-	3.1	-	ns
td(off)	Turn-off Delay Time		-	9.2	-	ns
t _f	Turn-off Fall Time		-	2.5	-	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	$V_{GS}=0V, I_S=3A$	-	-	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 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.

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Typical Characteristics

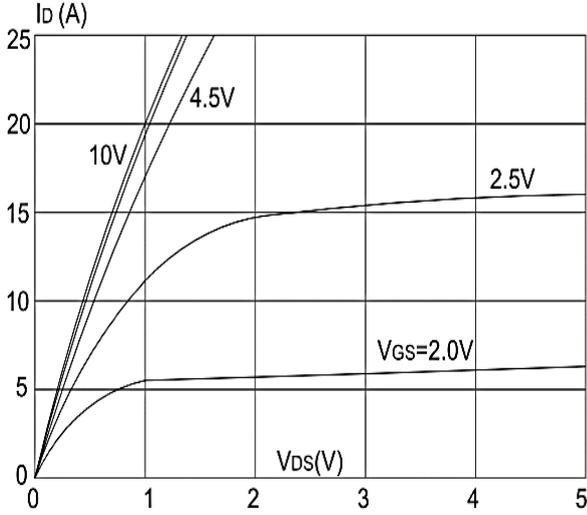


Figure 1: Output Characteristics

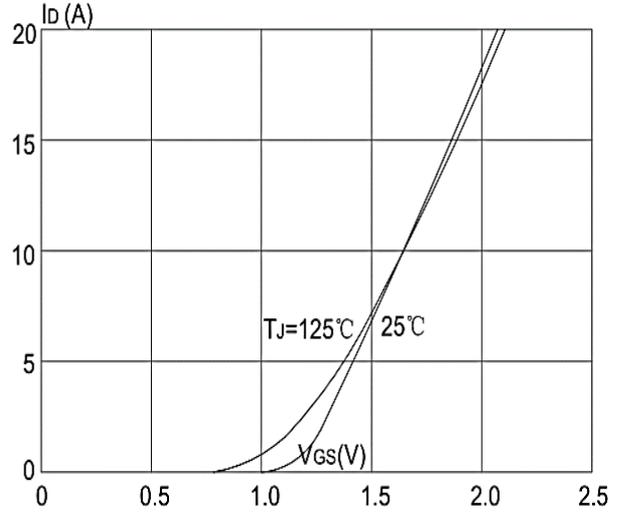


Figure 2: Typical Transfer Characteristics

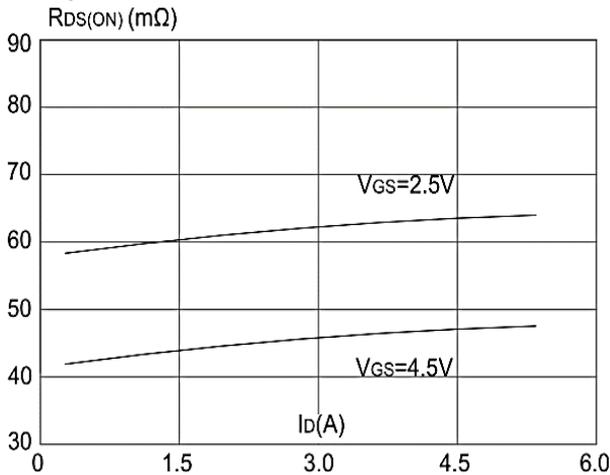


Figure 3: On-resistance vs. Drain Current

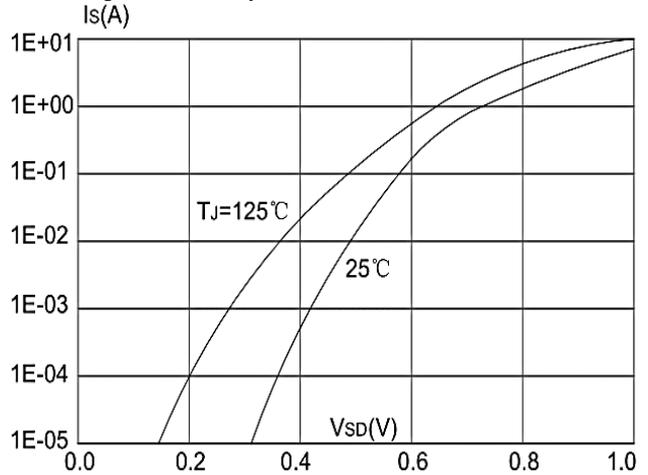


Figure 4: Body Diode Characteristics

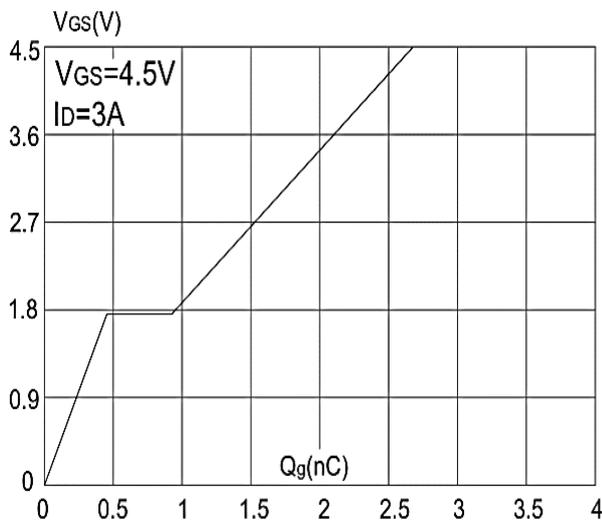


Figure 5: Gate Charge Characteristics

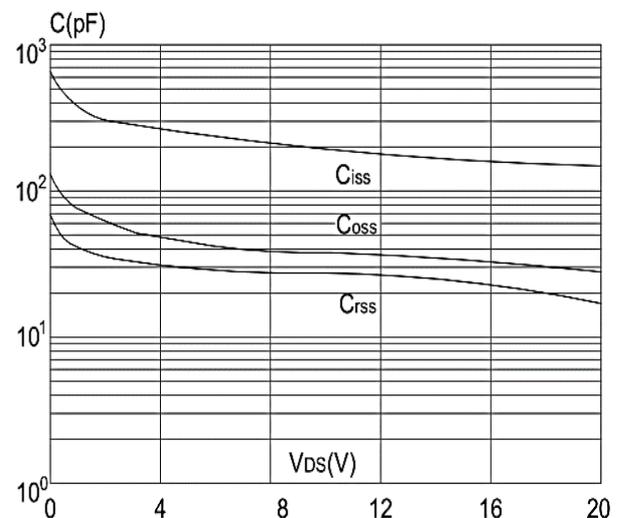


Figure 6: Capacitance Characteristics



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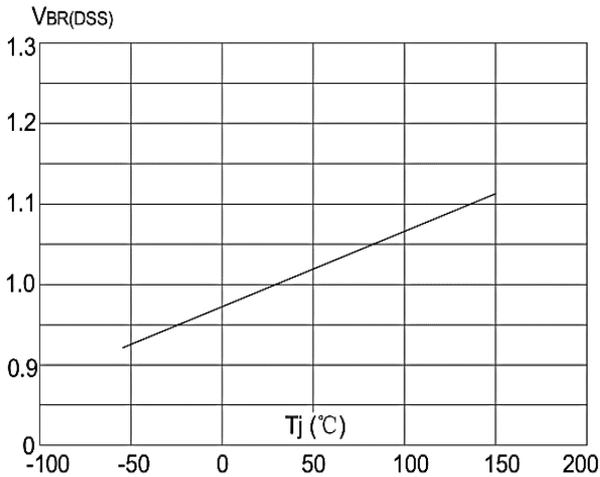


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

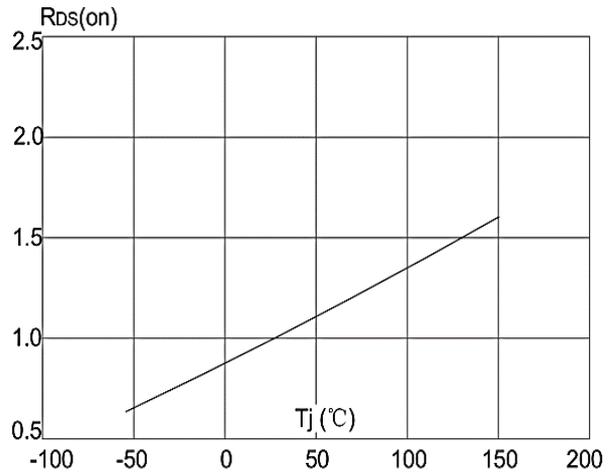


Figure 8: Normalized on Resistance vs. Junction Temperature

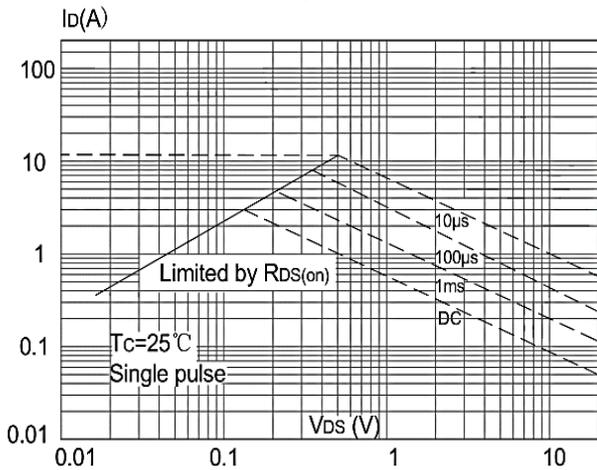


Figure 9: Maximum Safe Operating Area

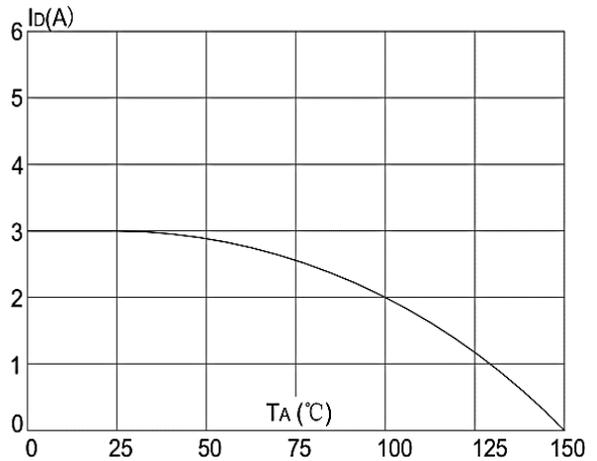


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

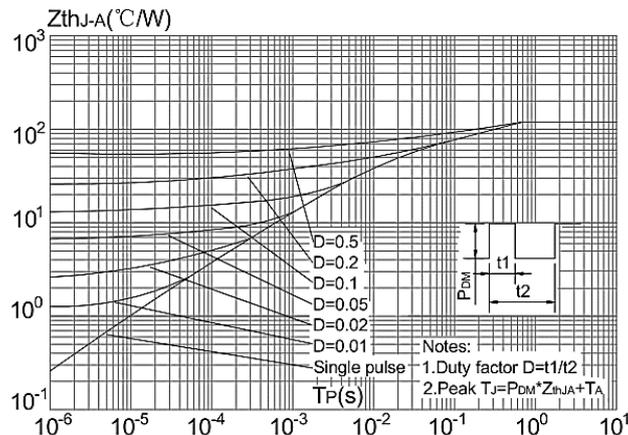
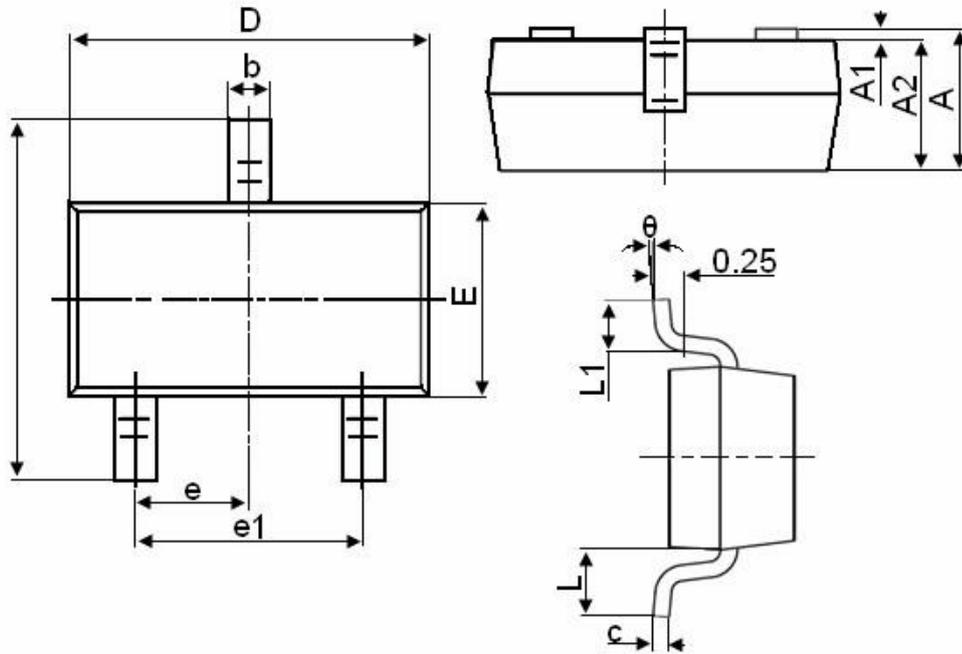


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

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	2022/1/1	Initial release
Rve1.1	2023/2/17	Reduce RDS(on)

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