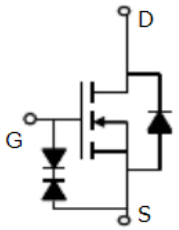
AP3416AI

20V N-Channel Enhancement Mode MOSFET

Description

The AP3416AI 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.

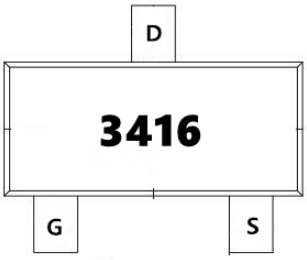


General Features

V_{DS} = 20V I_D =6.8A

$R_{DS(ON)}$ < 22mΩ @ V_{GS}=4.5V （Type:15mΩ）

ESD≥2500HBM



Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3416A	SOT23L	3416	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	6.8	A
I_D@T_A=70℃	Continuous Drain Current	6.0	A
I_{DM}	Pulsed Drain Current[2]	30	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.5	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

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ	Max	Units
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V, I_D=250μA	20	22		V
VGS(th)	Gate Threshold Voltage	V_{DS}= V_{GS}, I_D=250μA	0.50	0.65	1.0	V
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=4.5V, I_D=4A		15	22	mΩ
RDS(ON)	Static Drain-Source On-Resistance	V_{GS}=2.5V, I_D=3A		20	30	
IDSS	Zero Gate Voltage Drain Current	V_{DS}=20V,V_{GS}=0V			1	μA
IGSS	Gate-Body Leakage Current	V_{GS}=±10V, V_{DS}=0V			±100	nA
C_{iss}	Input Capacitance	V_{DS}=10V,V_{GS}=0V,f=1MHZ		780		pF
C_{oss}	Output Capacitance			140		
C_{rss}	Reverse Transfer Capacitance			80		
Q_g	Total Gate Charge	V_{GS}=4.5V,V_{DS}=10V,I_D=6.8A		11		nC
Q_{gs}	Gate-Source Charge			2.3		
Q_{gd}	Gate-Drain Charge			2.9		
tD(on)	Turn-on Delay Time	V_{GS}=4.5V, V_{DS}=10V, I_D=6.8A R_{GEN}=3Ω		9		ns
t_r	Turn-on Rise Time			30		
tD(off)	Turn-off Delay Time			35		
t_f	Turn-off fall Time			10		
V_{SD}	Diode Forward Voltage	I_S=6.8A,V_{GS}=0V			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

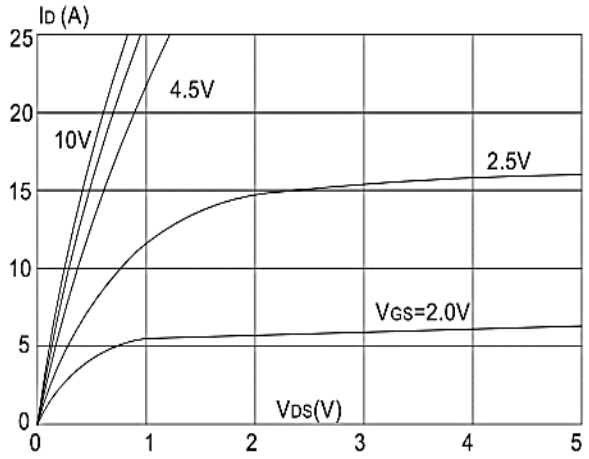


Figure1: Output Characteristics

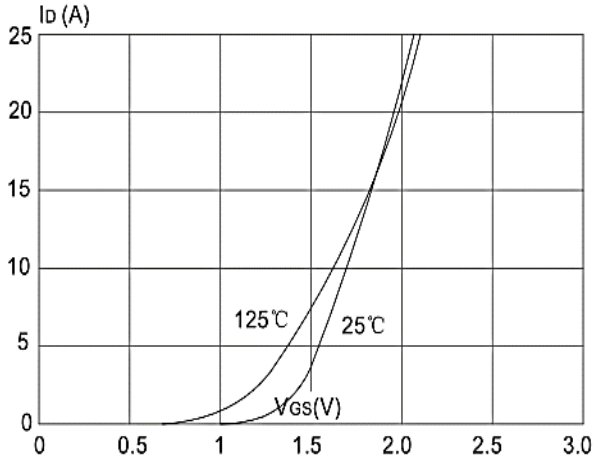


Figure 2: Typical Transfer Characteristics

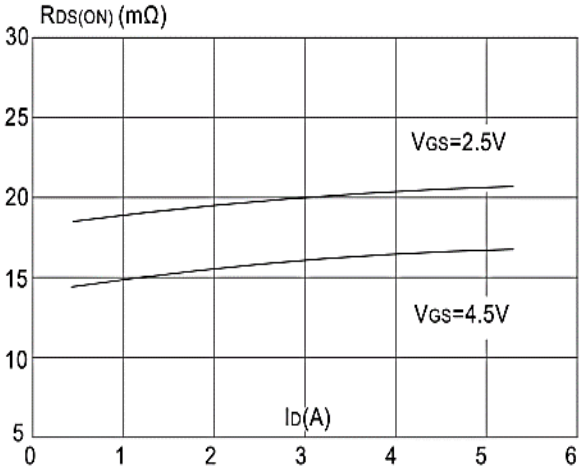


Figure 3:On-resistance vs. Drain Current

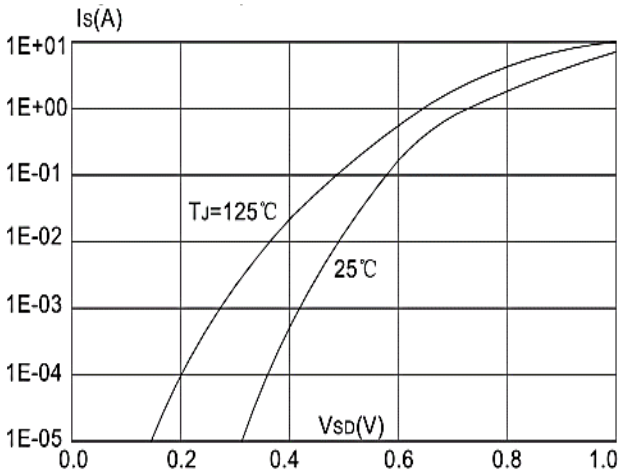


Figure 4: Body Diode Characteristics

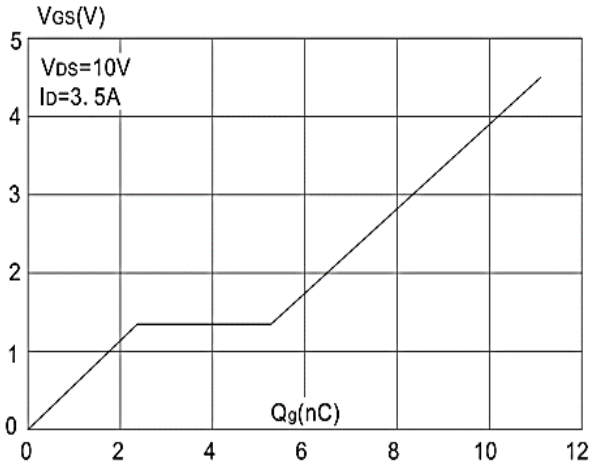


Figure 5: Gate Charge Characteristics

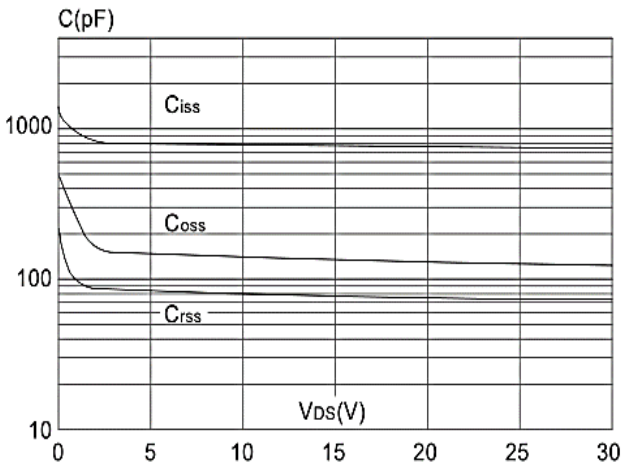


Figure 6: Capacitance Characteristics

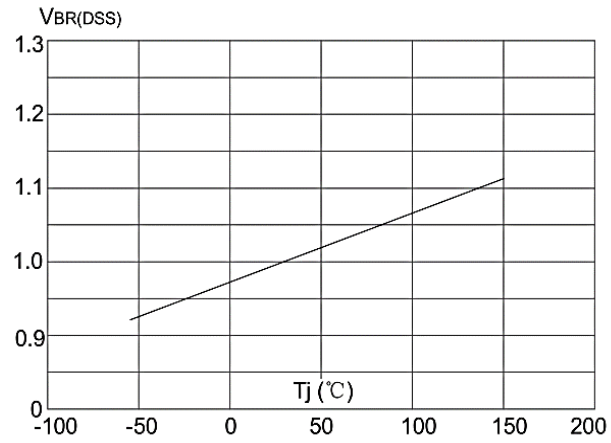


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

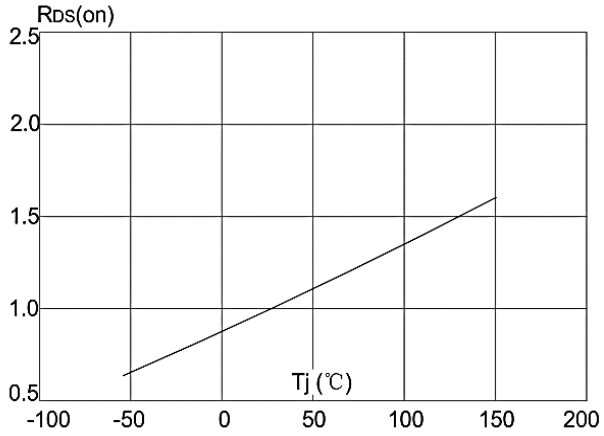


Figure 8: Normalized on Resistance vs Junction Temperature

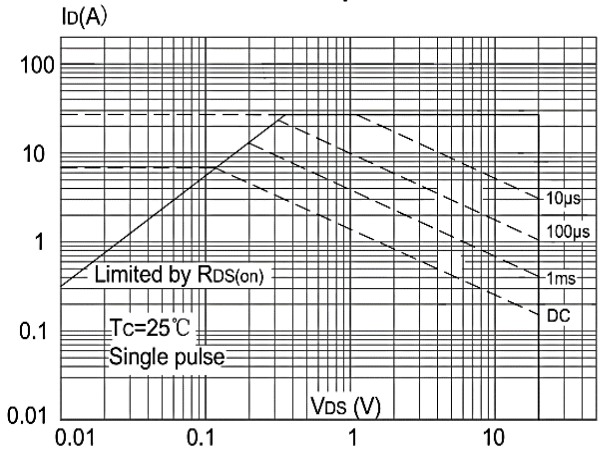


Figure 9: Maximum Safe Operating Area vs. Case Temperature

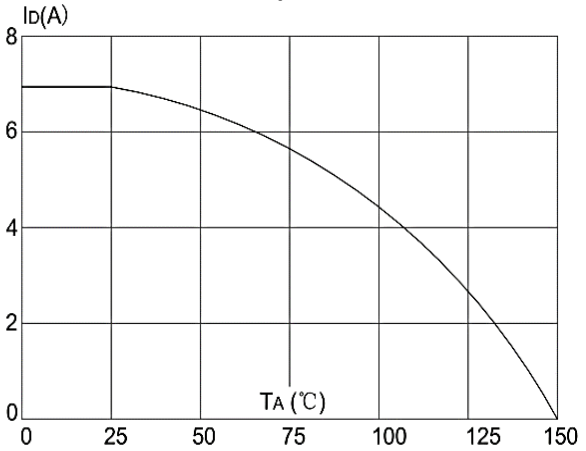


Figure 10: Maximum Continuous Drain Current

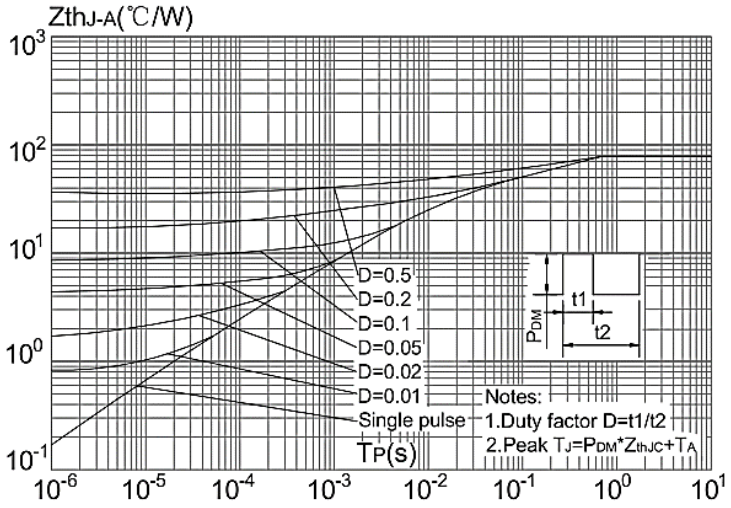
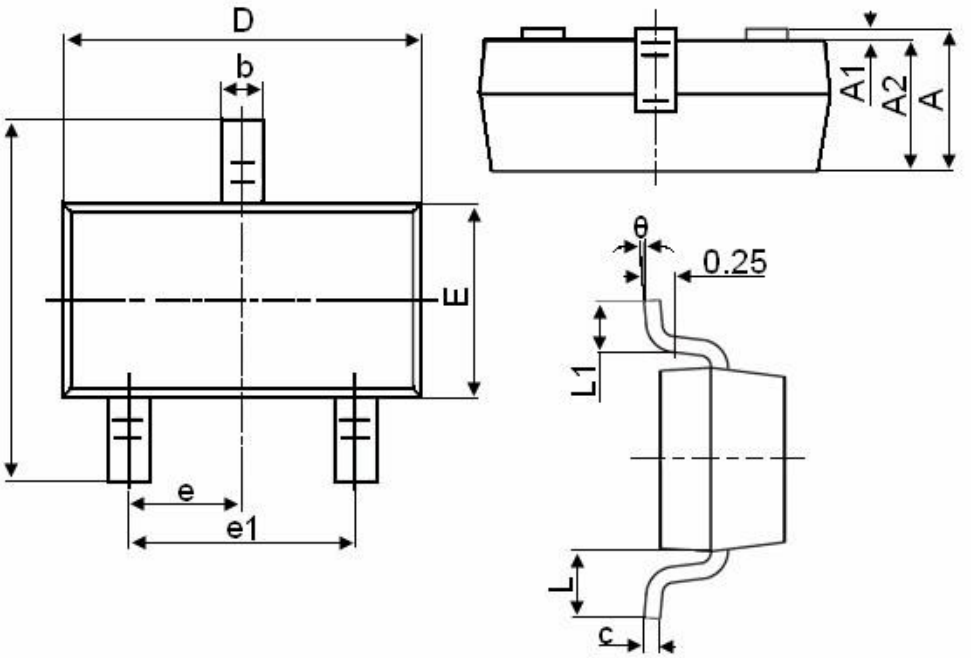


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

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	2020/9/11	Initial release