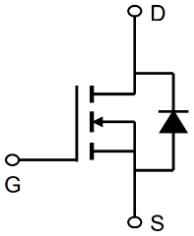
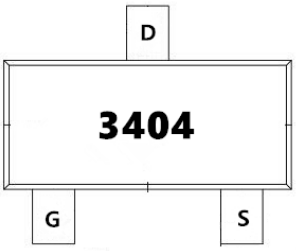
AP3404MI

30V N-Channel Enhancement Mode MOSFET

Description

The AP3404MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.





General Features

V_{DS} = 30V I_D =6A

$R_{DS(ON)}$ < 25mΩ @ V_{GS}=10V

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2313MI	SOT-23-3L	3404	3000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	±20	V
I_D@T_A=25°C	Continuous Drain Current	6	A
I_D@T_A=70°C	Continuous Drain Current	4.9	A
I_{DM}	Pulsed Drain Current[2]	20	A
P_D@T_A=25°C	Total Power Dissipation[3]	1	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]	125	°C/W
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	85	°C/W

Electrical Characteristics (T_C=25℃unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=250uA	30	32	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.029	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=5.8A	---	20	25	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=5A	---	28	32	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
△$V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.82	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=24V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=24V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±12V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=5A	---	25	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.5	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=5.8A	---	11.5	---	nC
Q_{gs}	Gate-Source Charge		---	1.6	---	
Qgd	Gate-Drain Charge		---	2.9	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3Ω I_D=5A	---	5	---	ns
T_r	Rise Time		---	47.	---	
Td(off)	Turn-Off Delay Time		---	26	---	
T_f	Fall Time		---	8	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	860	---	pF
Coss	Output Capacitance		---	84	---	
Crss	Reverse Transfer Capacitance		---	70	---	
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	5.8	A
V_{SD}	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%

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

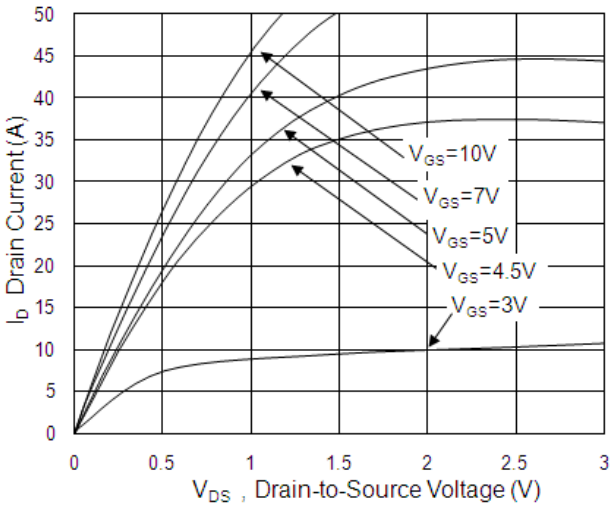


Fig.1 Typical Output Characteristics

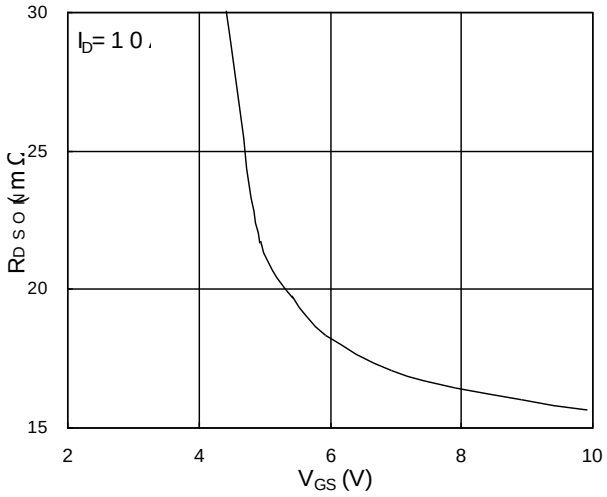


Fig.2 On-Resistance vs. Gate-Source

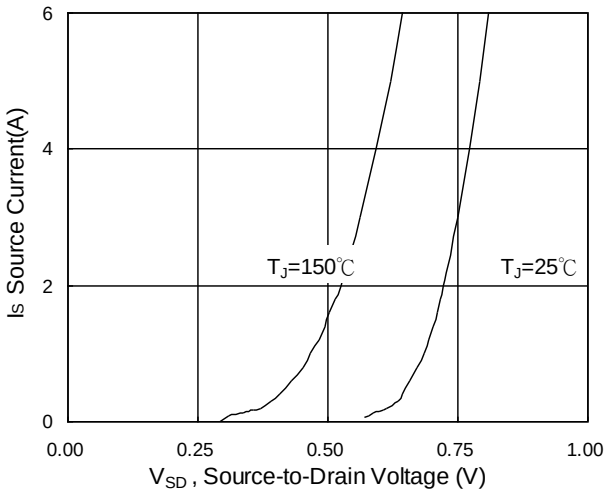


Fig.3 Forward Characteristics Of Reverse

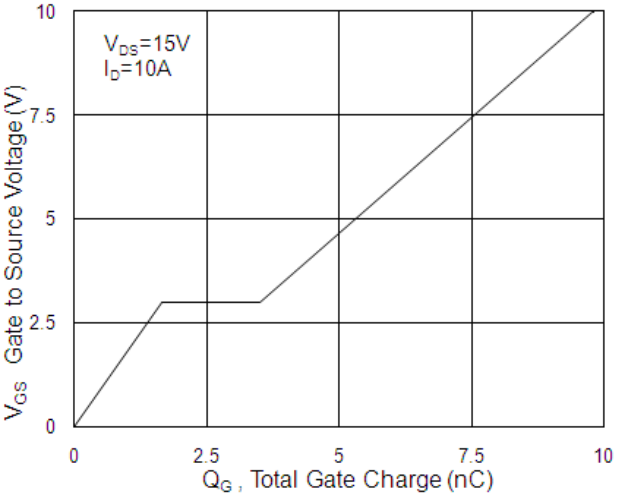


Fig.4 Gate-Charge Characteristics

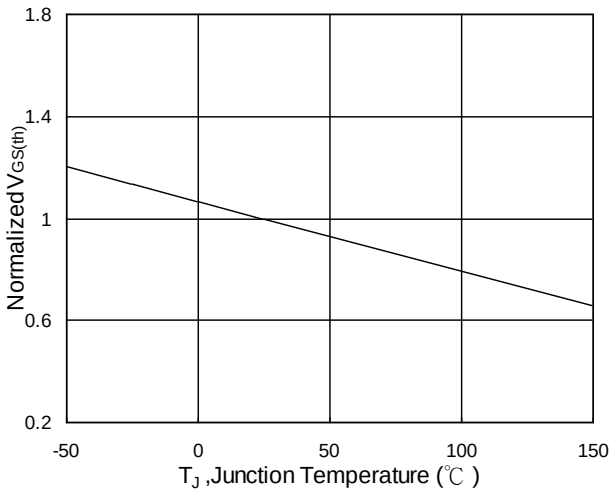


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

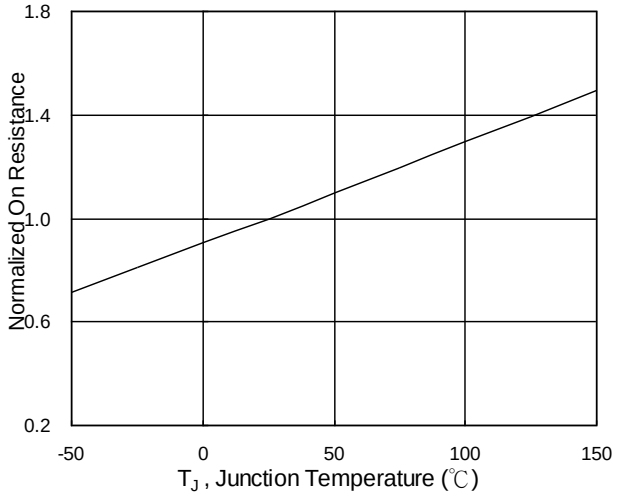


Fig.6 Normalized R_{DSON} vs. T_J

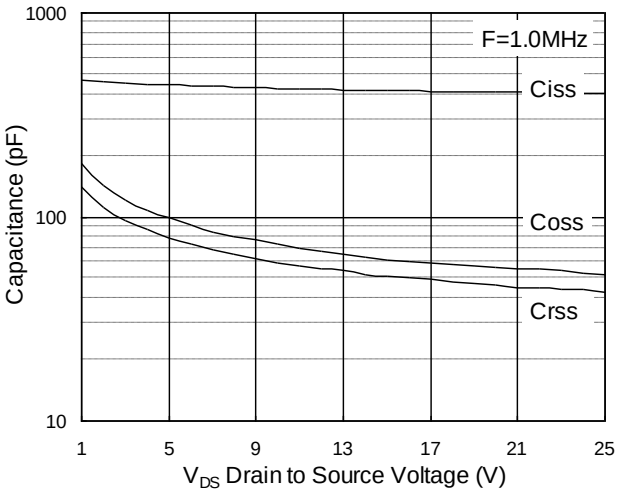


Fig.7 Capacitance

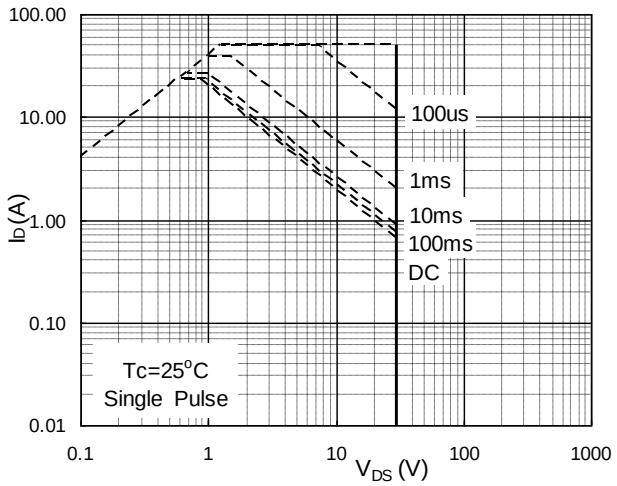


Fig.8 Safe Operating Area

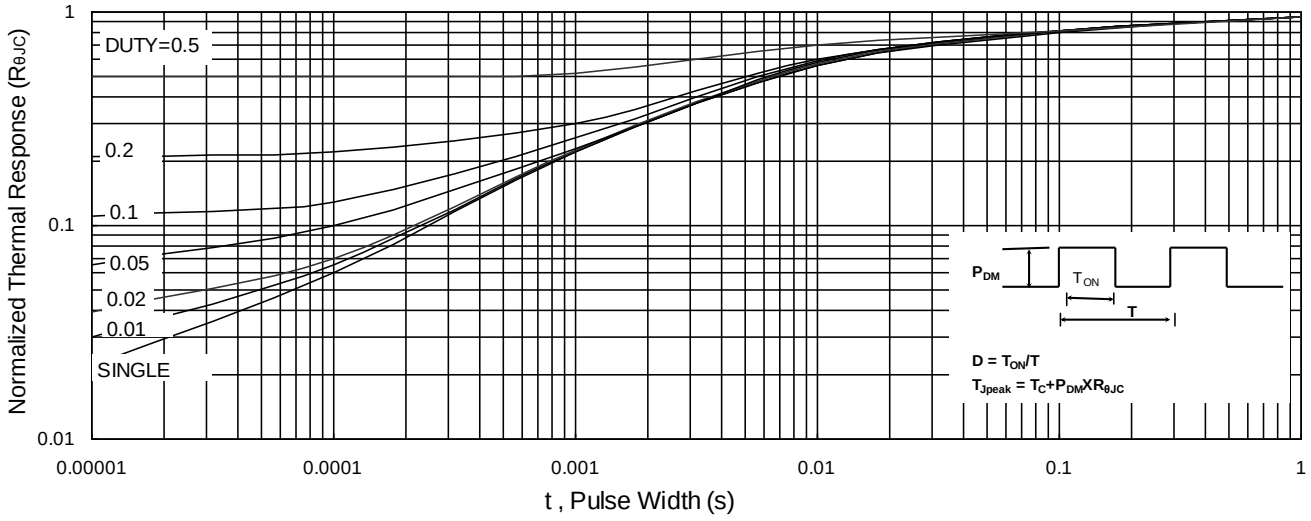


Fig.9 Normalized Maximum Transient Thermal Impedance

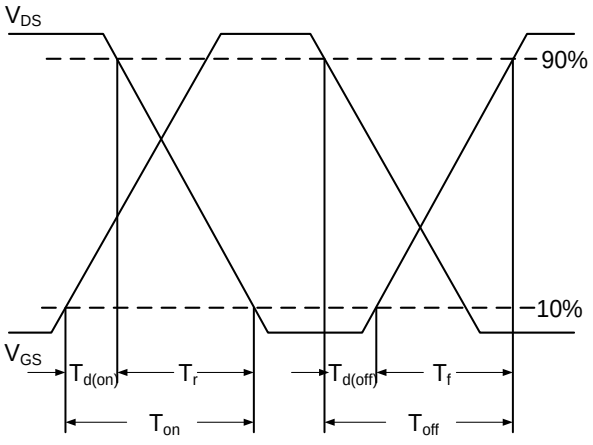


Fig.10 Switching Time Waveform

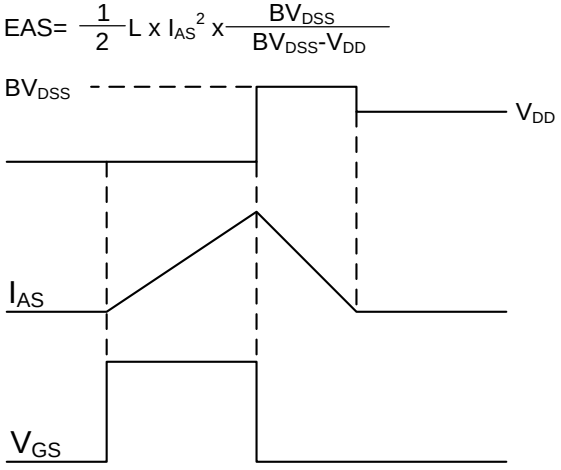
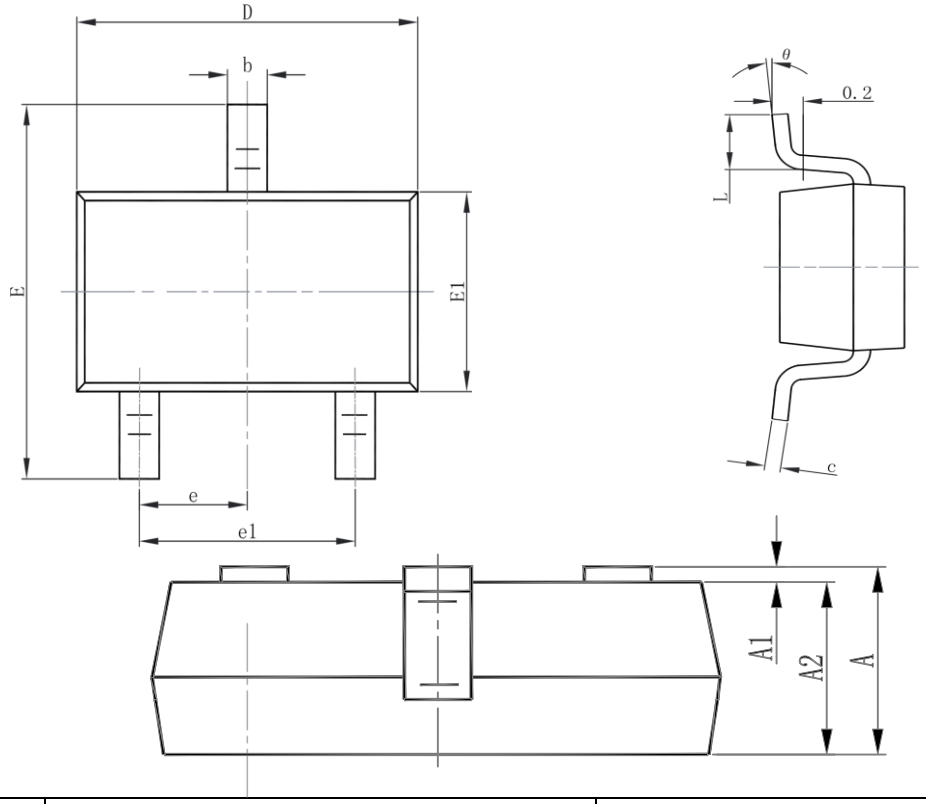


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-SOT23-3



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min.	Max.	Min.	Max.
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E1	1.500	1.700	0.059	0.067
E	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°

30V N-Channel Enhancement Mode MOSFET

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Edition	Date	Change
Rve3.8	2018/1/31	Initial release
Rve3.9	2020/8/01	Reduce RDS(on)