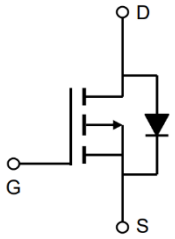
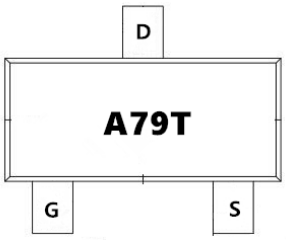
AP3407AI

-30V P-Channel Enhancement Mode MOSFET

Description

The AP3407AI 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 =-4.2A

$R_{DS(ON)}$ < 65mΩ @ V_{GS}=-10V

Application

Lithium battery protection
Wireless impact
Mobile phone fast charging

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3407AI	SOT-23	A79T	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℃	Continuous Drain Current, V_{GS} @ -10V[1]	-4.2	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ -10V[1]	-3.1	A
I_{DM}	Pulsed Drain Current[2]	-17	A
P_D@T_A=25℃	Total Power Dissipation[3]	1.32	W
P_D@T_A=70℃	Total Power Dissipation[3]	0.84	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
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1] (t ≤10s)	95	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	80	℃/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V_{GS}=0V , I_D=-250uA	-30	-36	---	V
△BVDSS/△TJ	BV_{DSS} Temperature Coefficient	Reference to 25℃ , I_D=-1mA	---	-0.023	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=-10V , I_D=-3A	---	50	65	mΩ
		V_{GS}=-4.5V , I_D=-2A	---	65	90	
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		---	4	---	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}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=-5V , I_D=-3A	---	11	---	S
Q_g	Total Gate Charge (-4.5V)	V_{DS}=-15V , V_{GS}=-4.5V , I_D=-3A	---	6.4	9.0	nC
Q_{gs}	Gate-Source Charge		---	2.3	3.2	
Q_{gd}	Gate-Drain Charge		---	1.9	2.7	
Td(on)	Turn-On Delay Time	V_{DD}=-15V , V_{GS}=-10V , R_G=3.3Ω I_D=-3A	---	2.8	5.6	ns
T_r	Rise Time		---	8.4	15.1	
Td(off)	Turn-Off Delay Time		---	39	78.0	
T_f	Fall Time		---	6	12.0	
C_{iss}	Input Capacitance	V_{DS}=-15V , V_{GS}=0V , f=1MHz	---	583	816	pF
Coss	Output Capacitance		---	100	140	
Crss	Reverse Transfer Capacitance		---	80	112	
I_S	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	-3.3	A
ISM	Pulsed Source Current[2,4]		---	---	-17	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=-1A , T_J=25℃	---	---	-1	V
t_{rr}	Reverse Recovery Time	IF=-3A , dI/dt=100A/μs , T_J=25℃	---	7.8	---	nS
Q_{rr}	Reverse Recovery Charge		---	2.5	---	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 ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

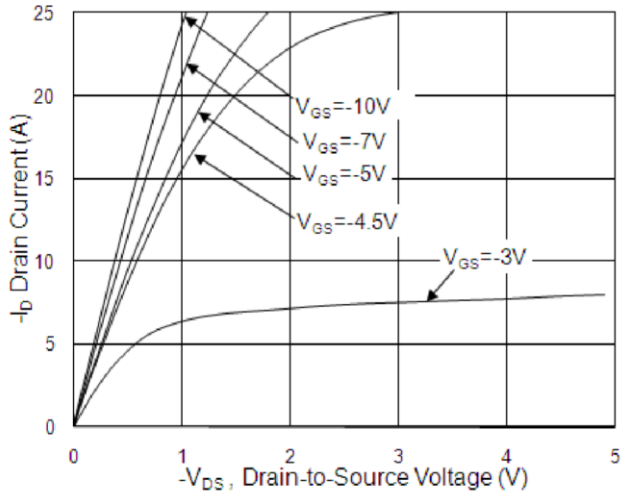


Fig.1 Typical Output Characteristics

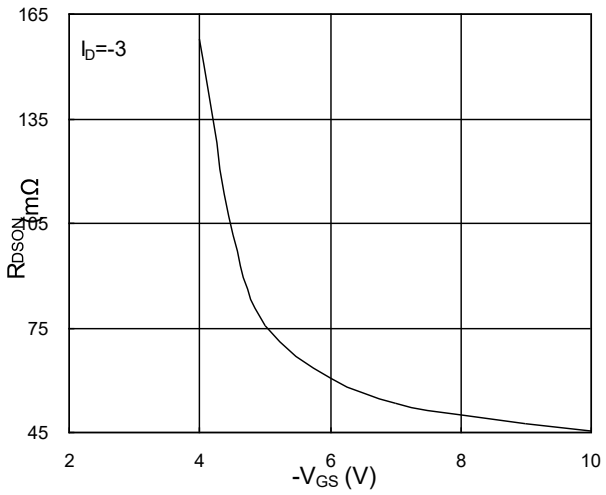


Fig.2 On-Resistance v.s Gate-Source

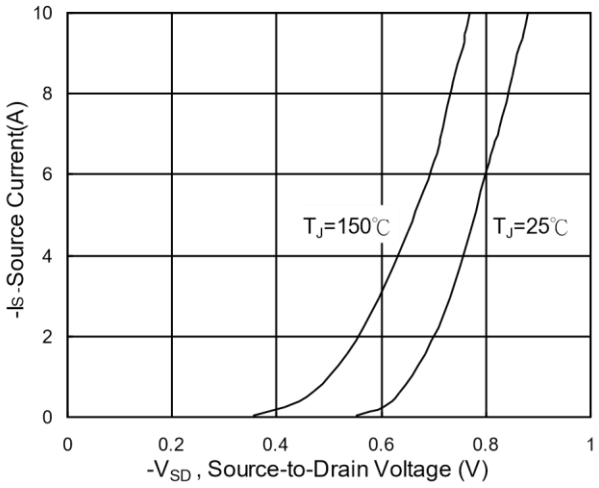


Fig.3 Forward Characteristics of Reverse

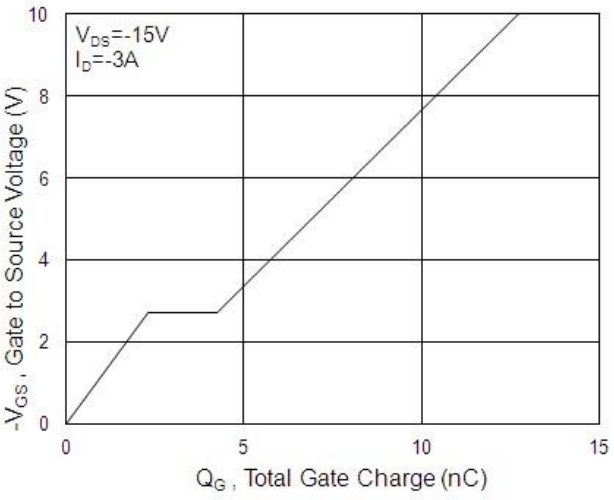


Fig.4 Gate-Charge Characteristics

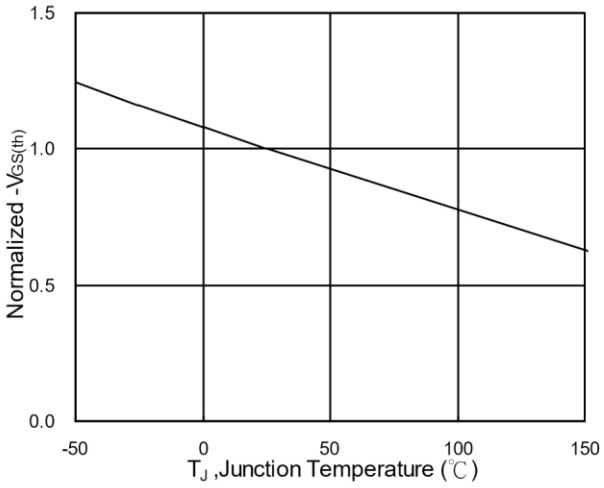


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

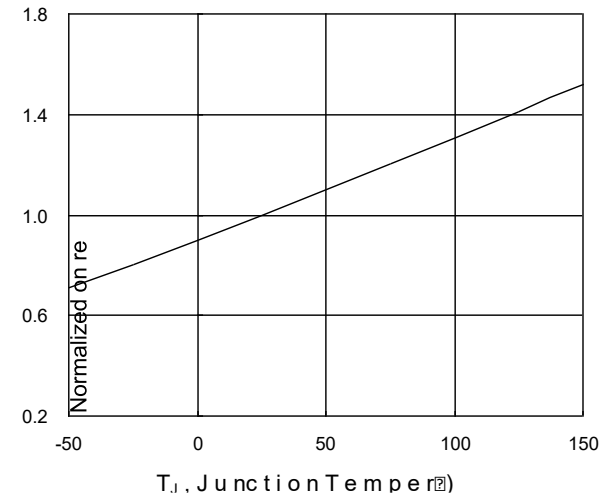


Fig.6 Normalized R_{DSON} vs T_J

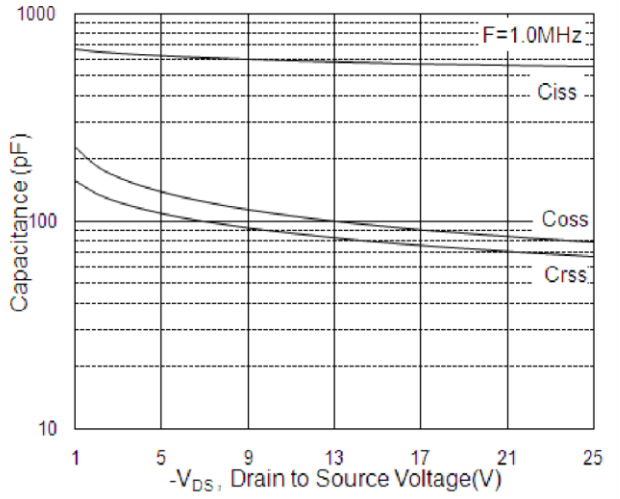


Fig.7 Capacitance

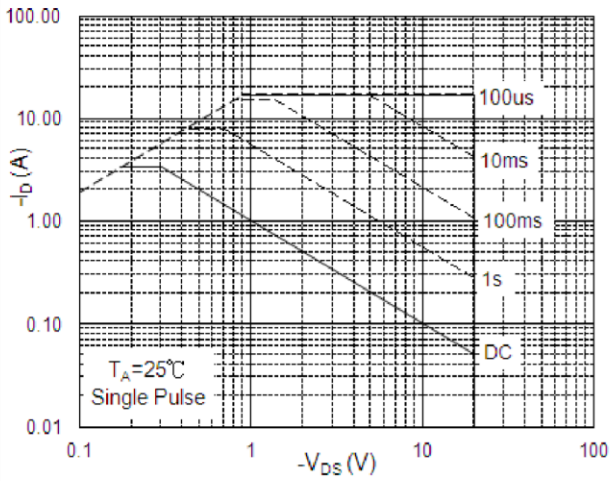


Fig.8 Safe Operating Area

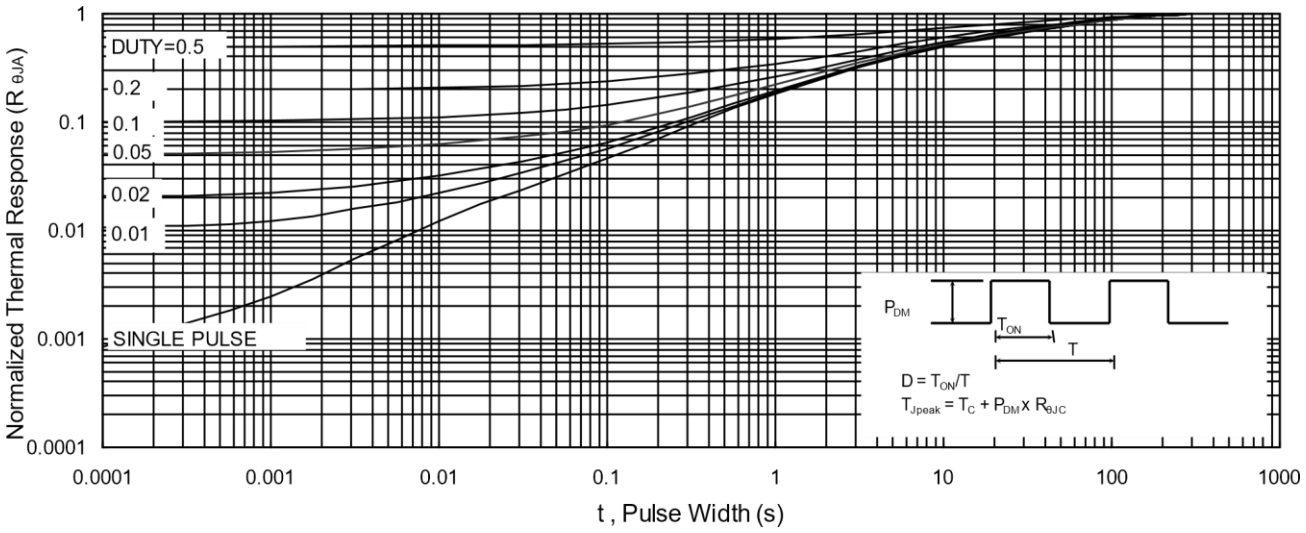


Fig.9 Normalized Maximum Transient Thermal Impedance

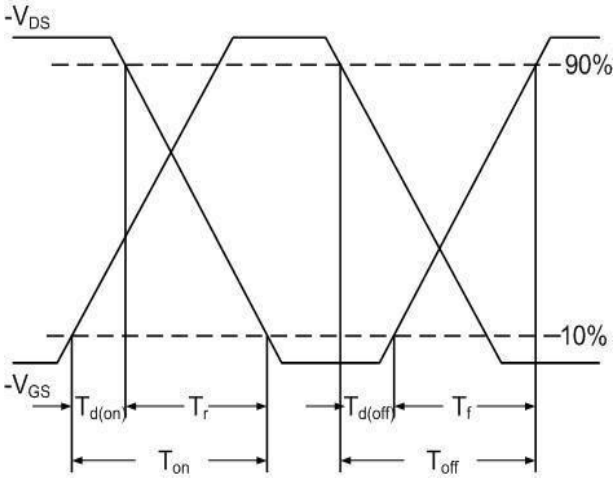


Fig.10 Switching Time Waveform

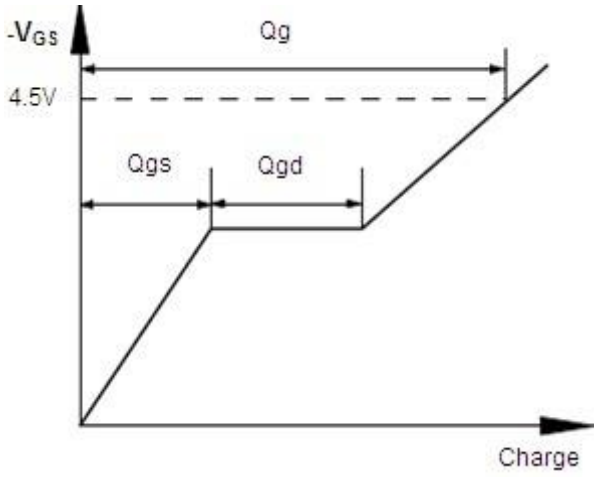
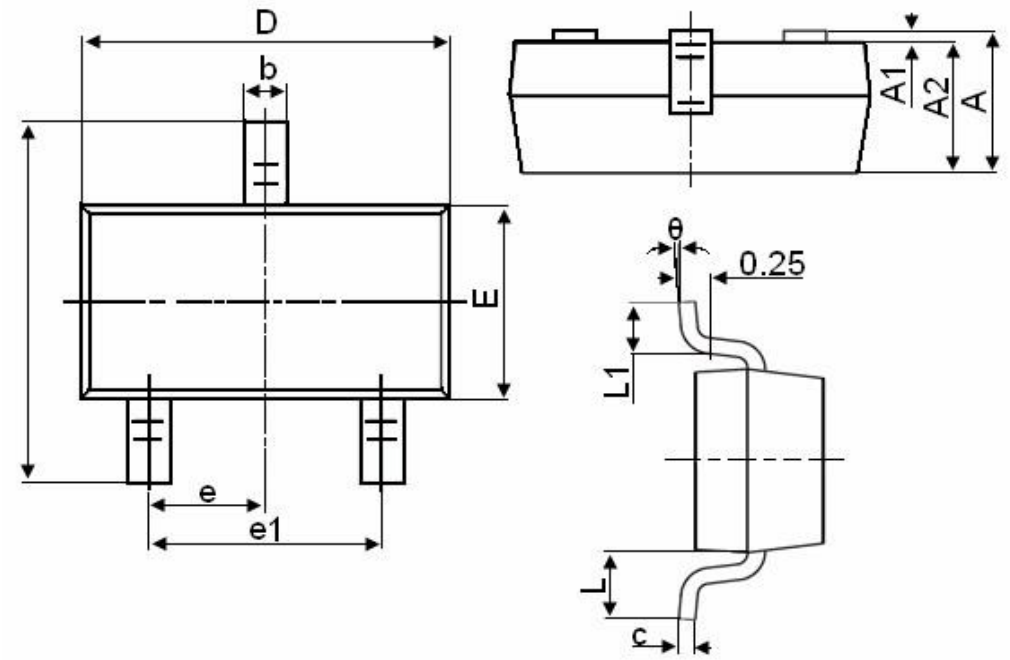


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT-23-XC



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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