

30V N-Channel Enhancement Mode MOSFET

Description

The AP3400AI 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

$V_{DS} = 30V$ $I_D = 6.2A$

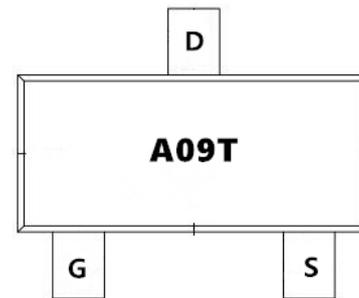
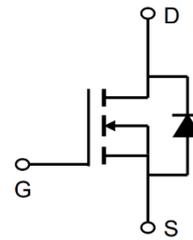
$R_{DS(ON)} < 28m\Omega$ @ $V_{GS}=10V$ (Type:20m Ω)

Application

Lithium battery protection

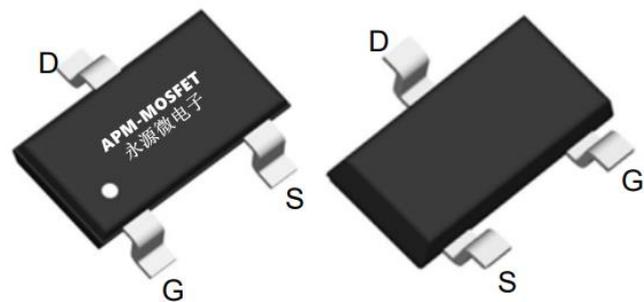
Wireless impact

Mobile phone fast charging



Top View

Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3400AI	SOT23L	A09T	3000

Absolute Maximum Ratings ($T_C=25^\circ\text{C}$ unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	± 12	V
ID@TA=25°C	Continuous Drain Current	6.2	A
ID@TA=70°C	Continuous Drain Current	4.9	A
IDM	Pulsed Drain Current ²	20	A
PD@TA=25°C	Total Power Dissipation ³	1	W
TSTG	Storage Temperature Range	-55 to 150	°C
TJ	Operating Junction Temperature Range	-55 to 150	°C
R θ JA	Thermal Resistance Junction-ambient ¹	125	°C/W



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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	33	---	V
$\Delta BVDSS/\Delta T_J$	BVDSS Temperature Coefficient	Reference to 25°C , $I_D=1\text{mA}$	---	0.029	---	$V/^\circ\text{C}$
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=5.8A$	---	20	28	$\text{m}\Omega$
		$V_{GS}=4.5V, I_D=5A$	---	24	32	$\text{m}\Omega$
		$V_{GS}=2.5V, I_D=4A$	---	31	55	$\text{m}\Omega$
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	0.5	0.85	1.2	V
$\Delta V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-2.82	---	$\text{mV}/^\circ\text{C}$
IDSS	Drain-Source Leakage Current	$V_{DS}=24V, V_{GS}=0V, T_J=25^\circ\text{C}$	---	---	1	μA
		$V_{DS}=24V, V_{GS}=0V, T_J=55^\circ\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 12V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=5A$	---	25	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.5	---	Ω
Qg	Total Gate Charge (4.5V)	$V_{DS}=15V, V_{GS}=4.5V, I_D=5.8A$	---	11.5	---	nC
Qgs	Gate-Source Charge		---	1.6	---	
Qgd	Gate-Drain Charge		---	2.9	---	
Td(on)	Turn-On Delay Time	$V_{DD}=15V, V_{GS}=10V, R_G=3\Omega, I_D=5A$	---	5	---	ns
Tr	Rise Time		---	47.	---	
Td(off)	Turn-Off Delay Time		---	26	---	
Tf	Fall Time		---	8	---	
Ciss	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	---	860	---	pF
Coss	Output Capacitance		---	84	---	
Crss	Reverse Transfer Capacitance		---	70	---	
Is	Continuous Source Current ^{1,4}	$V_G=V_D=0V, \text{Force Current}$	---	---	5.8	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=1A, T_J=25^\circ\text{C}$	---	---	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 $\leq 300\mu\text{s}$, 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.

Typical Characteristics

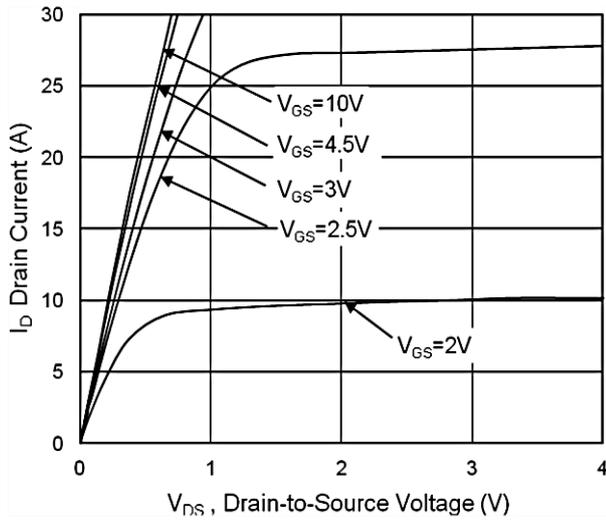


Fig.1 Typical Output Characteristics

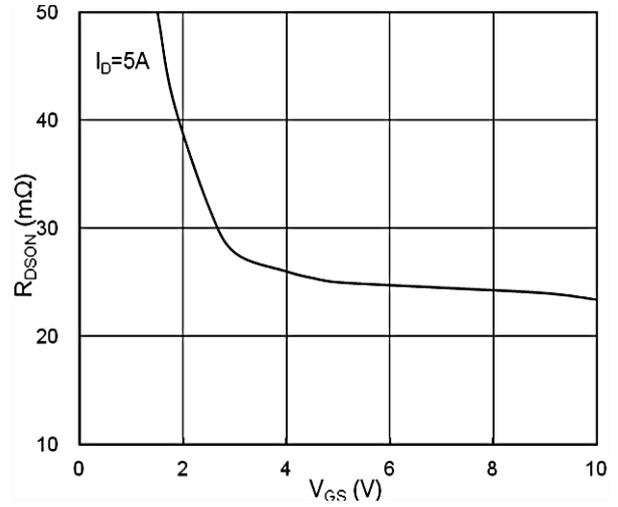


Fig.2 On-Resistance vs. Gate-Source

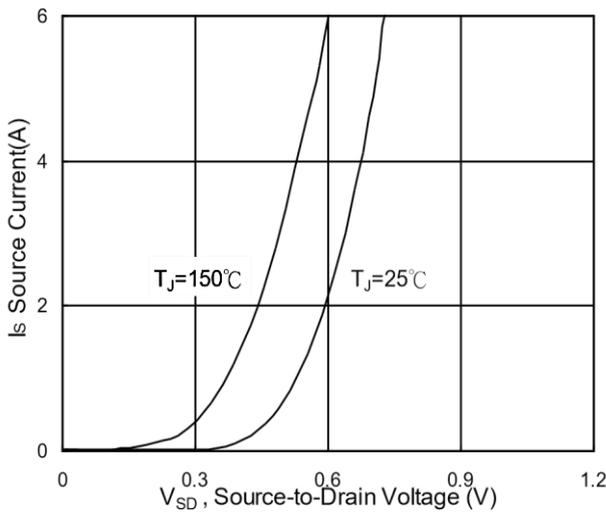


Fig.3 Forward Characteristics Of Reverse

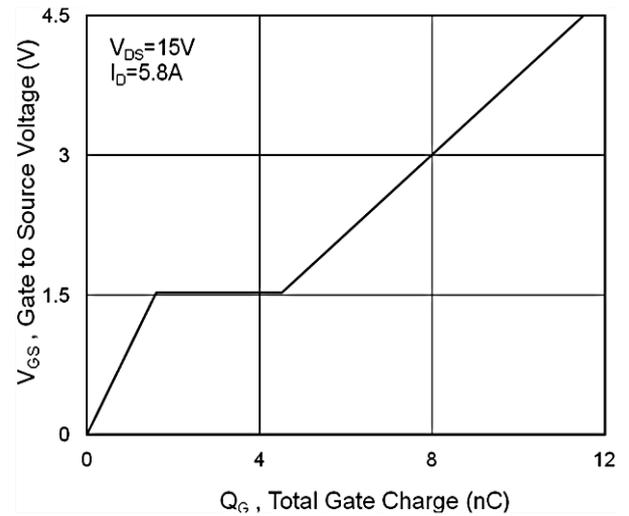


Fig.4 Gate-Charge Characteristics

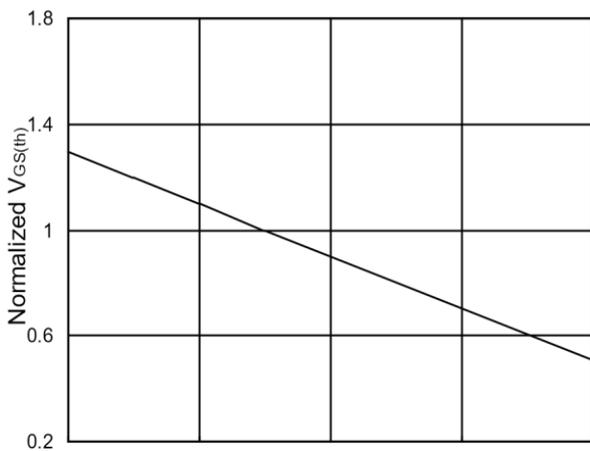


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

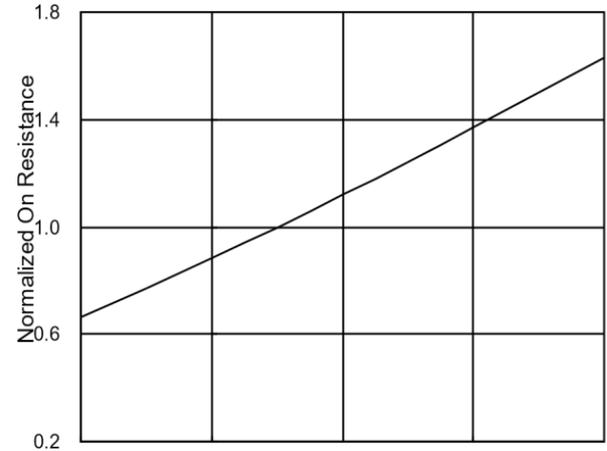


Fig.6 Normalized $R_{DS(on)}$ vs. T_J

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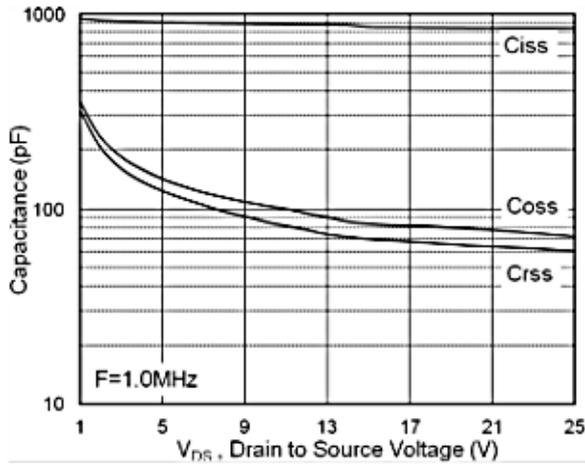


Fig.7 Capacitance

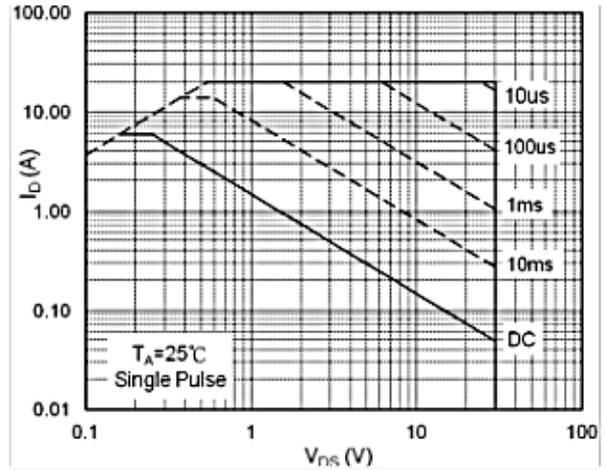


Fig.8 Safe Operating Area

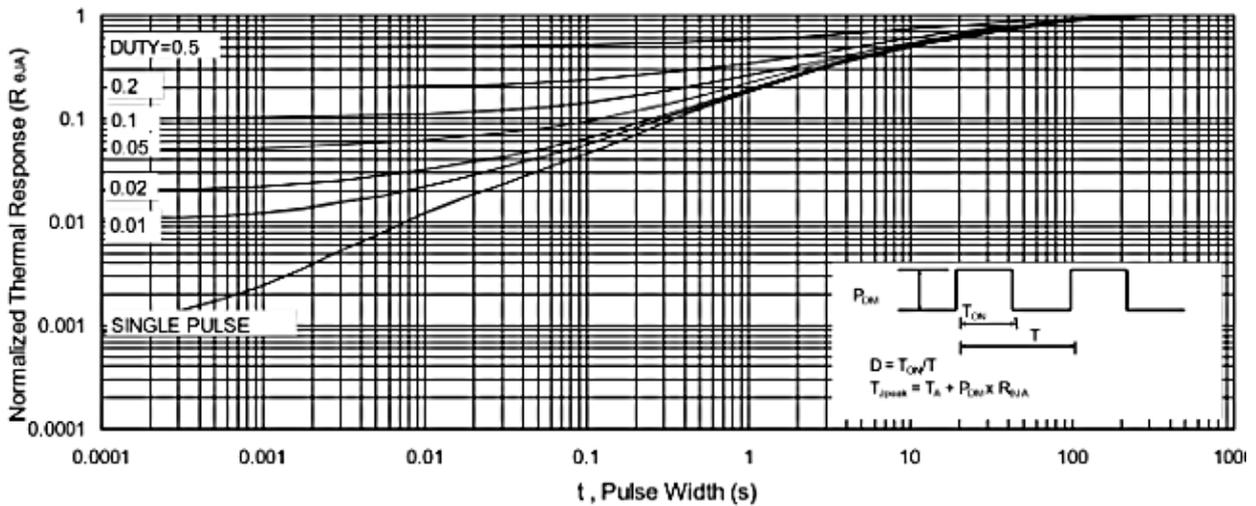


Fig.9 Normalized Maximum Transient Thermal Impedance

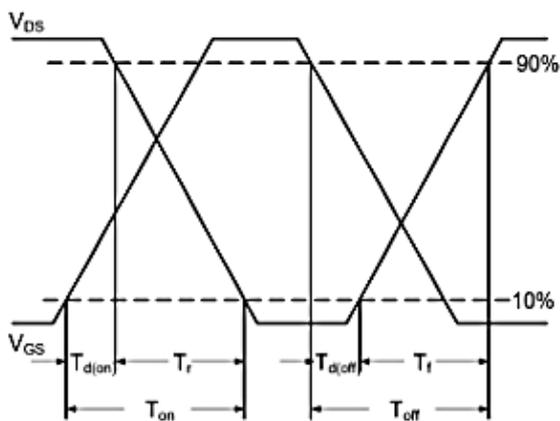


Fig.10 Switching Time Waveform

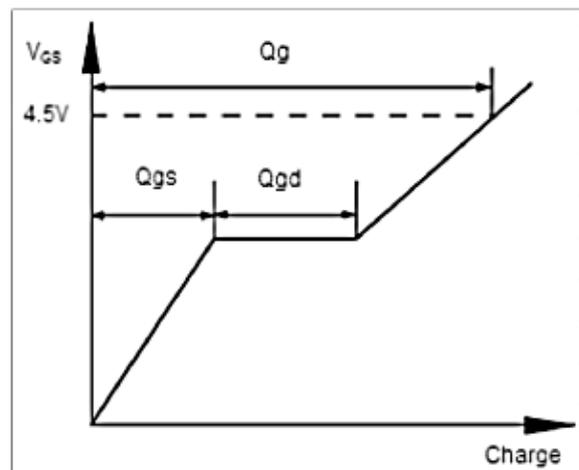
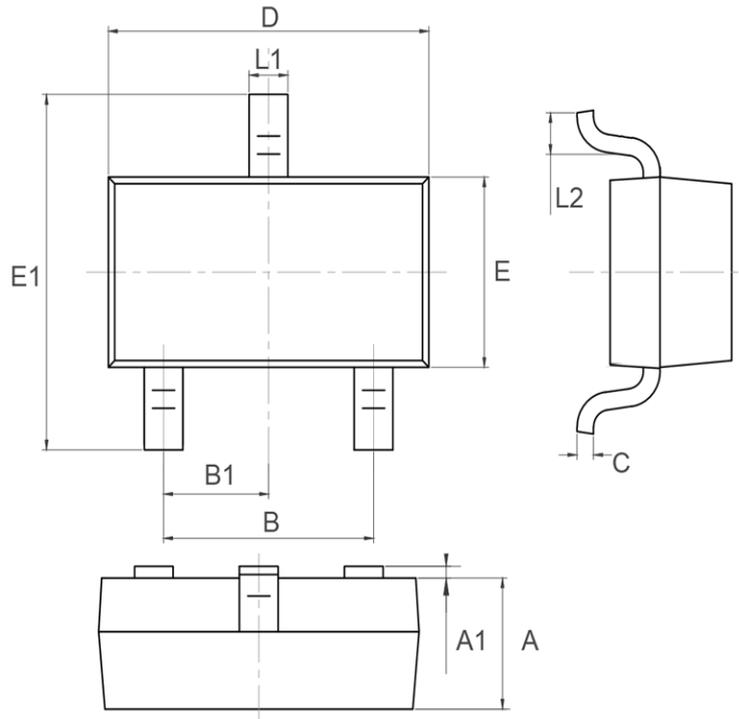


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23L-Single



Symbol	Dim in mm		
	Min	Typ	Max
A	0.9	1	1.1
A1	0	0.05	0.1
B	1.8	1.9	2
B1	0.95TYP		
C	0.08	0.115	0.15
D	2.8	2.9	3
E	1.2	1.3	1.4
E1	2.25	2.4	2.55
L1	0.3	0.4	0.5
L2	0.2	0.35	0.5

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Edition	Date	Change
REV3.0	2019/4/10	Initial release
REV3.1	2020/3/25	Reduce RDS(on)
REV3.2	2025/11/21	Chang LOGO

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