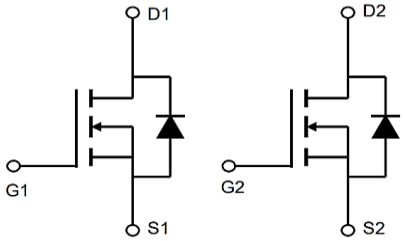
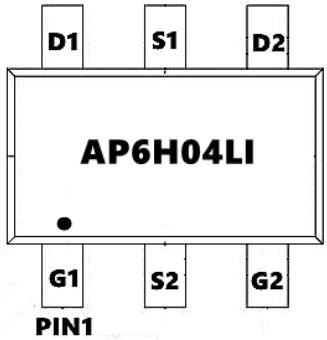
AP6H04LI

40V N+N-Channel Enhancement Mode MOSFET

Description

The AP6H04LI 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}=40V I_D =6.3A

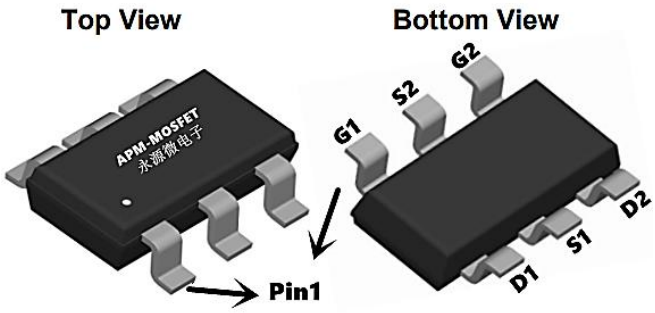
$R_{DS(ON)}$ < 38mΩ @ V_{GS}=10V （**Type：28mΩ**）

Application

Wireless charging

Boost driver

Brushless motor



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP6H04LI	SOT23-6L	AP6H04LI	3000

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

Symbol	Parameter	Value	Unit
VDS	Drain-Source Voltage	40	V
VGS	Gate-Source Voltage	±20	V
I_D@T_A=25℃	Continuous Drain Current[1]	6.3	A
I_D@T_A=70℃	Continuous Drain Current[1]	4.2	A
IDM	Pulsed Drain Current[2]	30	A
EAS	Single Pulse Avalanche Energy[3]	31	mJ
P_D@T_A=25℃	Total Power Dissipation[4]	1.9	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
R_{θ}JA	Thermal Resistance Junction-ambient[1](t≤10s)	125	℃/W
R_{θ}JC	Thermal Resistance Junction-ambient[1]	60	℃/W

N-Channel 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	40	---	---	V
△BVDSS/△TJ	BVDSS Temperature Coefficient	Reference to 25℃ , I_D=1mA	---	0.032	---	V/℃
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=4A	---	28	38	mΩ
		V_{GS}=4.5V , I_D=3A	---	40	50	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.0	1.5	2.5	V
$\triangle V_{GS(th)}$	$V_{GS(th)}$ Temperature Coefficient		---	-4.5	---	mV/℃
IDSS	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , 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=4A	---	8	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	2.4	4.8	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=3A	---	5	---	nC
Qgs	Gate-Source Charge		---	1.54	---	
Qgd	Gate-Drain Charge		---	1.84	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3 I_D=1A	---	7.8	---	ns
T_r	Rise Time		---	2.1	---	
Td(off)	Turn-Off Delay Time		---	29	---	
T_f	Fall Time		---	2.1	---	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	452	---	pF
Coss	Output Capacitance		---	51	---	
Crss	Reverse Transfer Capacitance		---	38	---	
IS	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	4.5	A
ISM	Pulsed Source Current[2,4]		---	---	14	A
VSD	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

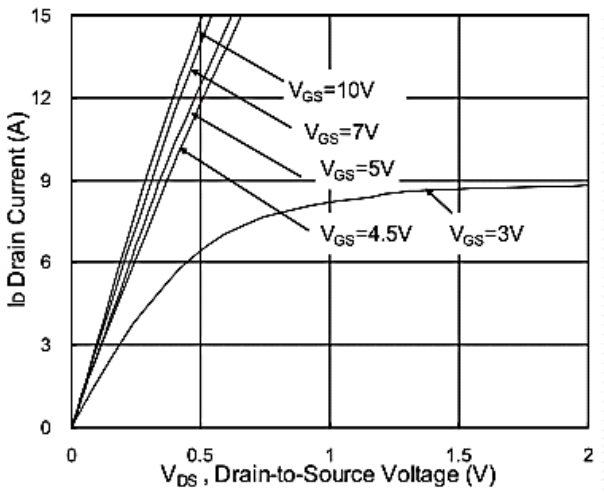


Fig.1 Typical Output Characteristics

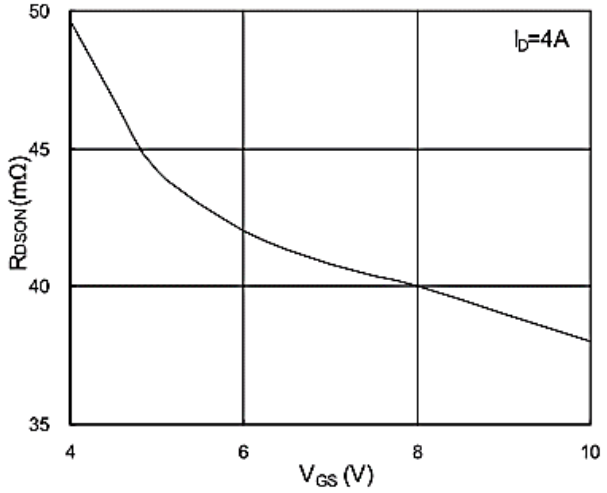


Fig.2 On-Resistance vs. Gate-Source

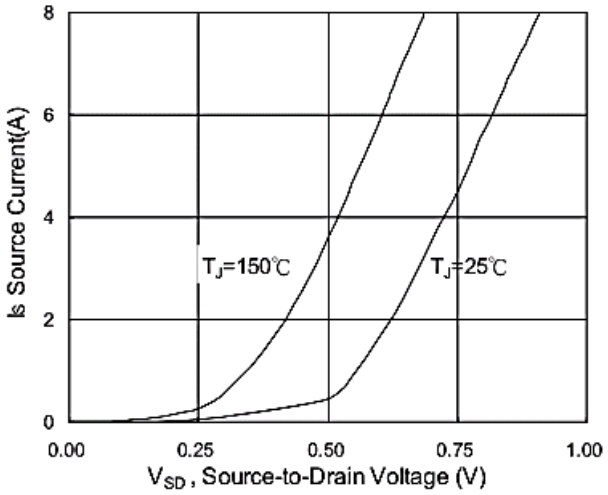


Fig.3 Forward Characteristics Of Reverse

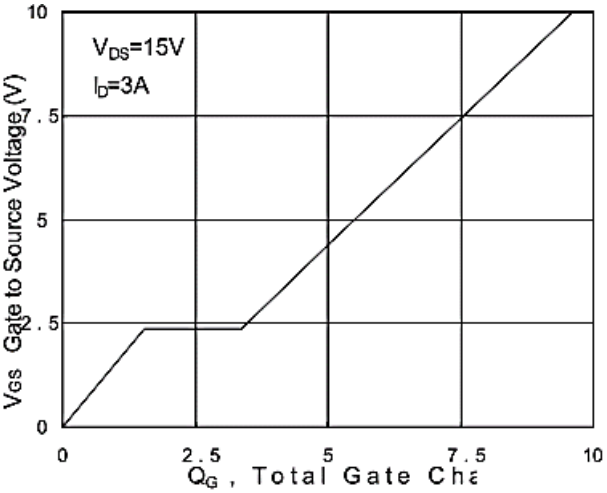


Fig.4 Gate-Charge Characteristics

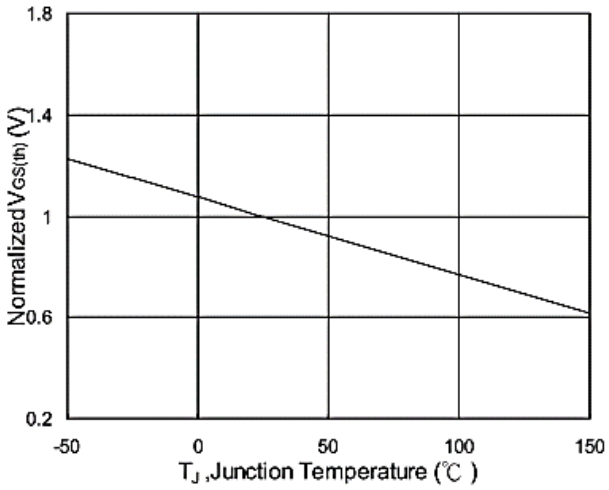


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

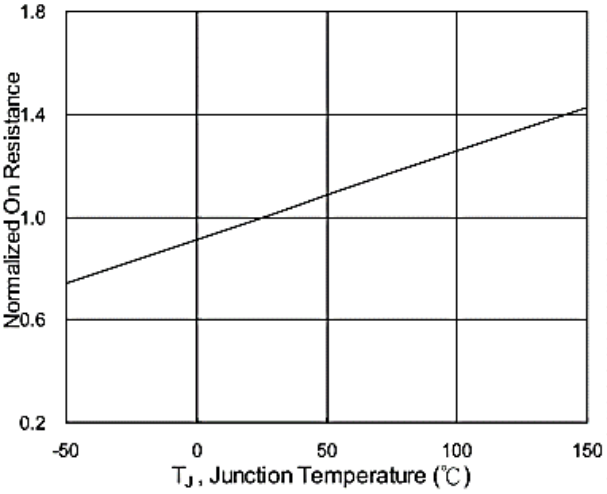


Fig.6 Normalized R_{DSON} vs. T_J

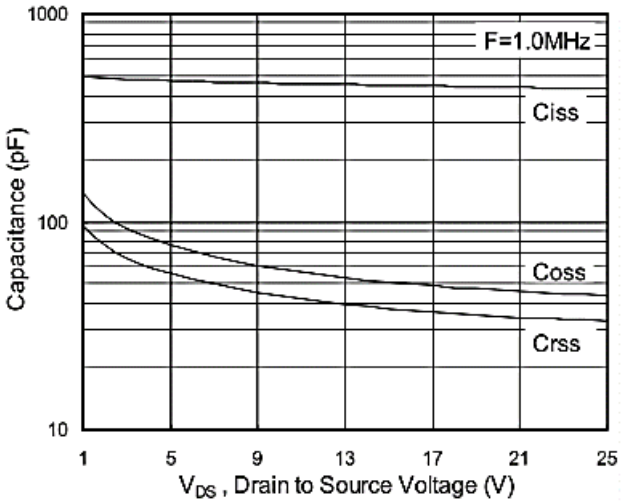


Fig.7 Capacitance

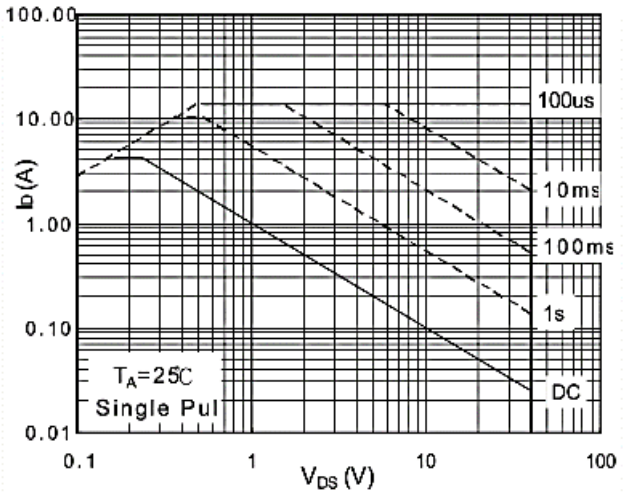


Fig.8 Safe Operating Area

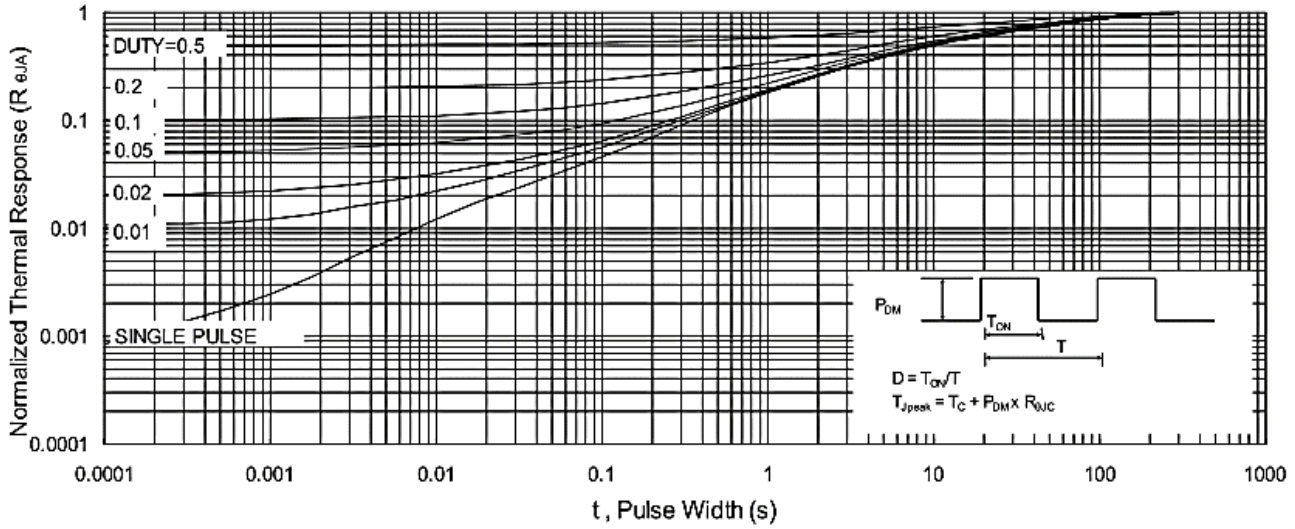


Fig.9 Normalized Maximum Transient Thermal Impedance

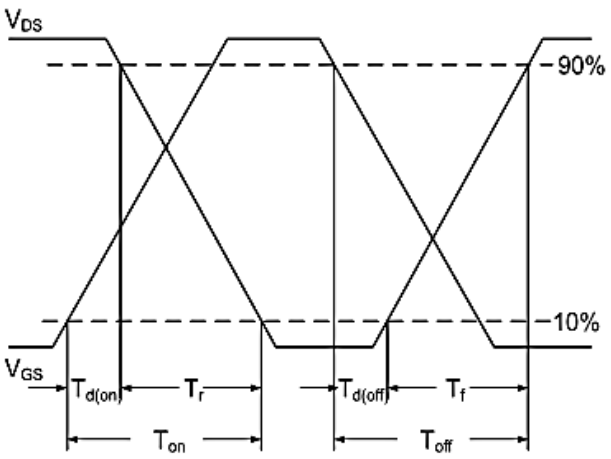


Fig.10 Switching Time Waveform

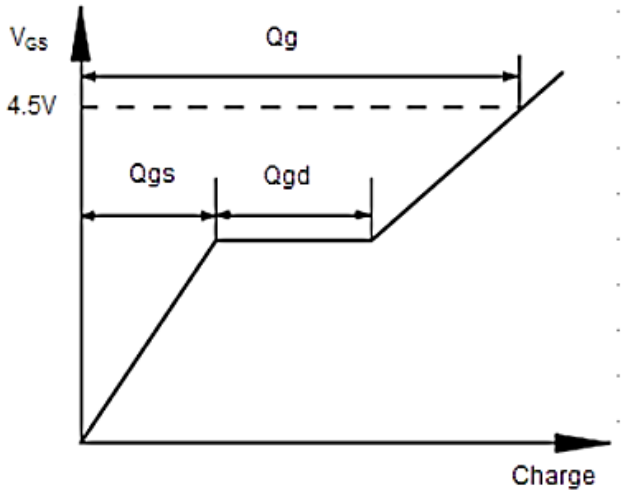
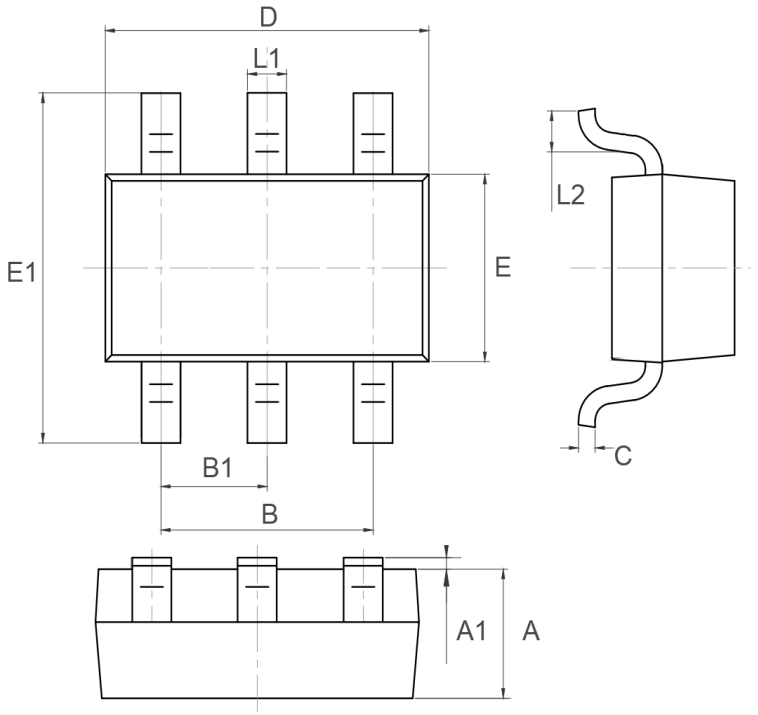


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-6L



Symbol	Dimensions In Millimeters		
	min.	typ.	max.
A	1.00	1.10	1.20
A1	0.00	0.05	0.10
B	1.80	1.90	2.00
B1	0.95TYP		
C	0.10	0.15	0.20
D	2.82	2.92	3.02
E	1.50	1.60	1.70
E1	2.65	2.80	2.95
L1	0.30	0.40	0.50
L2	0.30	0.45	0.60

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Edition	Date	Change
Rve1.0	2022/2/12	Initial release
Rve1.1	2026/6/6	Update LOGO And Corrected Manual POD

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