APM
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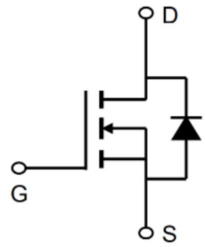
AP3400BI

30V N-Channel Enhancement Mode MOSFET

Description

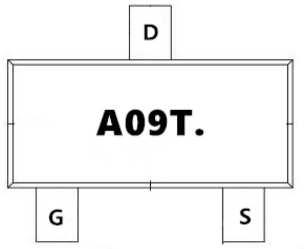
The AP3400BI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

V_{DS} = 30V I_D =5.8A

$R_{DS(ON)}$ < 28mΩ @ V_{GS}=10V （Type：26mΩ）



Application

Battery protection

Load switch

Uninterruptible power supply

Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3400BI	SOT23L	A09T.	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	±12	V
I_D@T_A=25℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	5.8	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 4.5V[1]	3.1	A
I_{DM}	Pulsed Drain Current[2]	16	A
P_D@T_A=25℃	Total Power Dissipation[3]	1	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{θJA}$	Thermal Resistance Junction-ambient [1]	125	℃/W
$R_{θJC}$	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	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=4A		26	28	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=4.5V , I_D=3A	---	29	32	mΩ
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=2.5V , I_D=2A	---	38	47	mΩ
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	0.5	0.95	1.2	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=3A	---	19	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.5	3	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V , V_{GS}=4.5V , I_D=3A	---	8.34	11.7	nC
Qgs	Gate-Source Charge		---	1.26	1.8	
Qgd	Gate-Drain Charge		---	1.88	2.6	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=4.5V , R_G=3.3Ω I_D=3A	---	3.2	6.4	ns
T_r	Rise Time		---	41.8	75	
Td(off)	Turn-Off Delay Time		---	21.2	42	
T_f	Fall Time		---	6.4	12.8	
Ciss	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	662	927	pF
Coss	Output Capacitance		---	51.3	72	
Crss	Reverse Transfer Capacitance		---	43.6	61	
IS	Continuous Source Current[1,4]	V_G=V_D=0V , Force Current	---	---	3.9	A
ISM	Pulsed Source Current[2,4]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	16	A
VSD	Diode Forward Voltage[2]		---	---	1.2	V
trr	Reverse Recovery Time	IF=3A , dI/dt=100A/μs , T_J=25℃	---	6.8	---	nS
Q_{rr}	Reverse Recovery Charge		---	2.3	---	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 I_D and I_{DM} , in real applications , should be limited by total power dissipation.

30V N-Channel Enhancement Mode MOSFET

Typical Characteristics

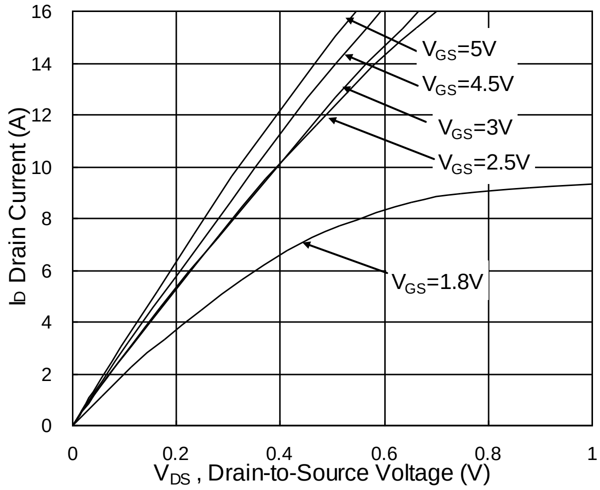


Fig.1 Typical Output Characteristics

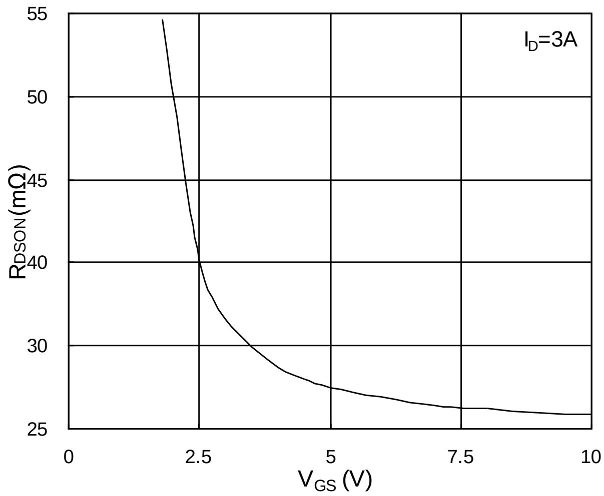


Fig.2 On-Resistance vs G-S Voltage

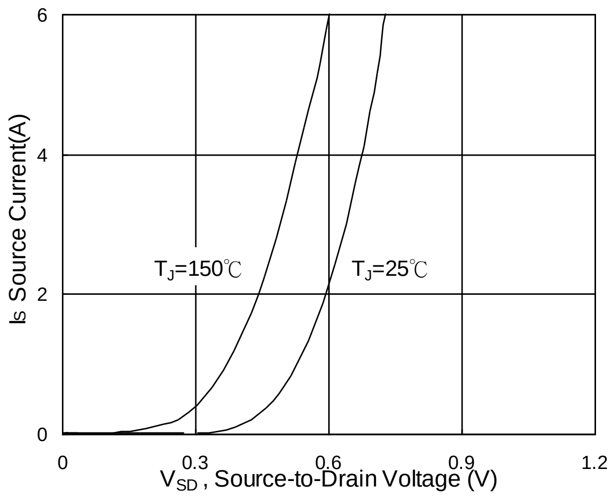


Fig.3 Source Drain Forward Characteristics

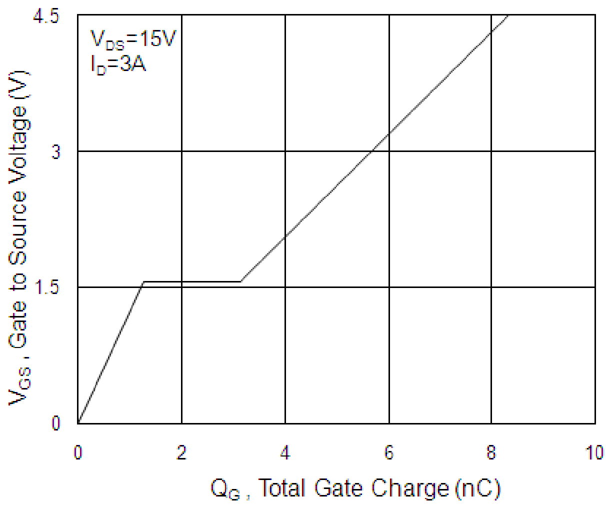


Fig.4 Gate-Charge Characteristics

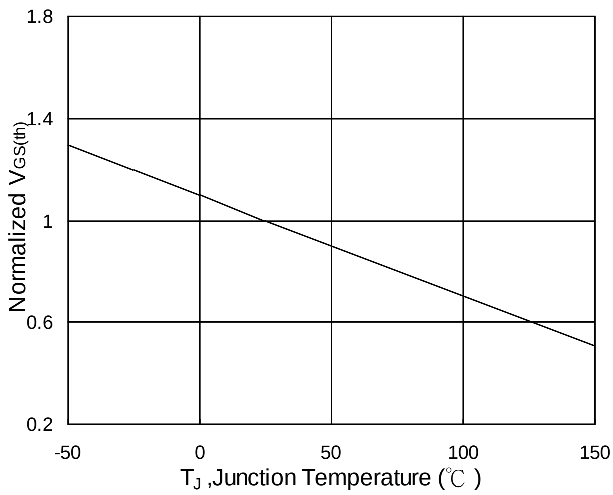


Fig.5 Normalized $V_{GS(th)}$ vs T_J

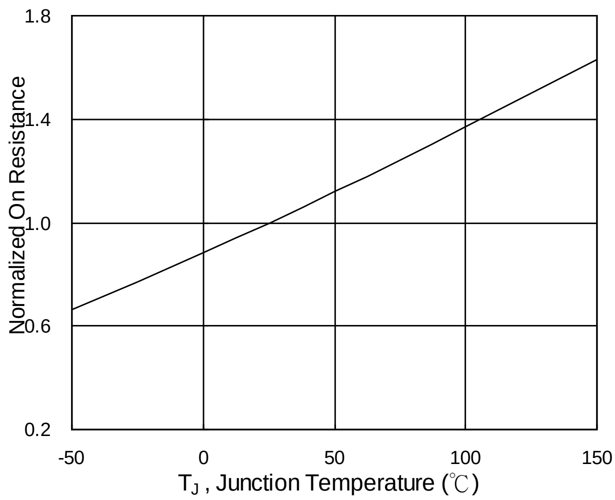


Fig.6 Normalized R_{DSON} vs T_J

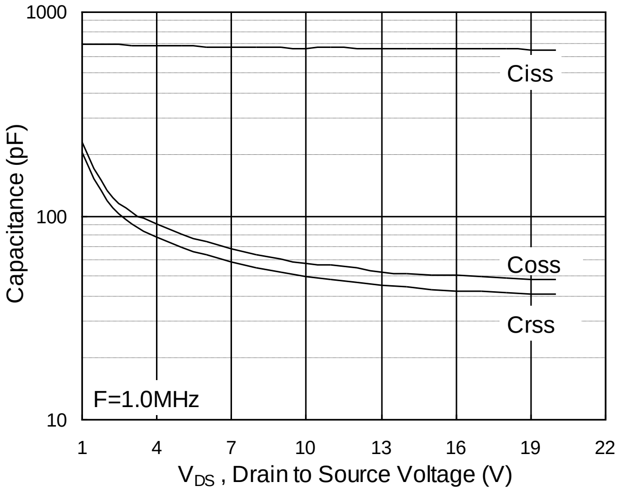


Fig.7 Capacitance

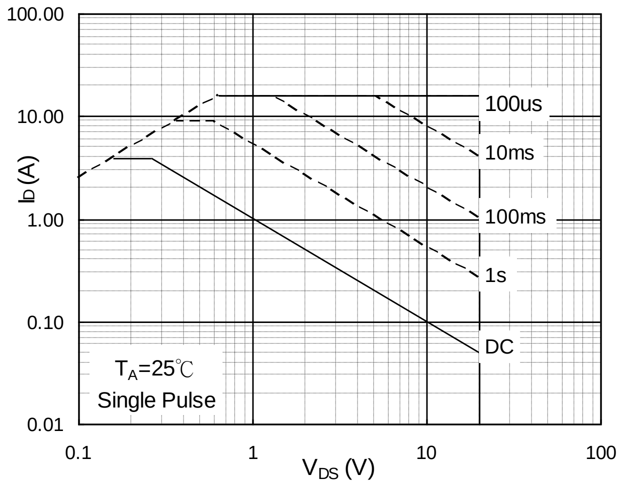


Fig.8 Safe Operating Area

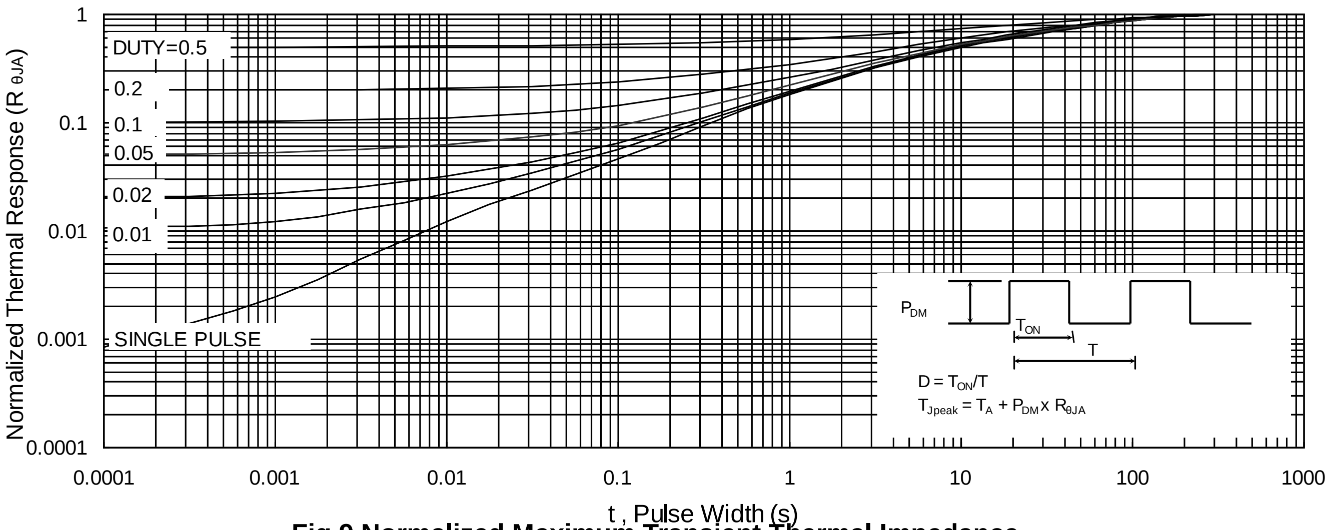


Fig.9 Normalized Maximum Transient Thermal Impedance

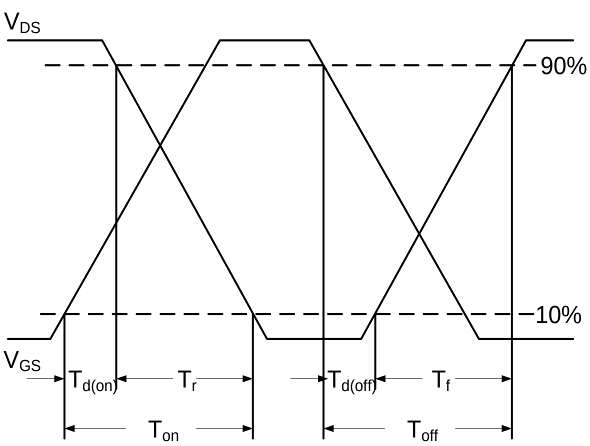


Fig.10 Switching Time Waveform

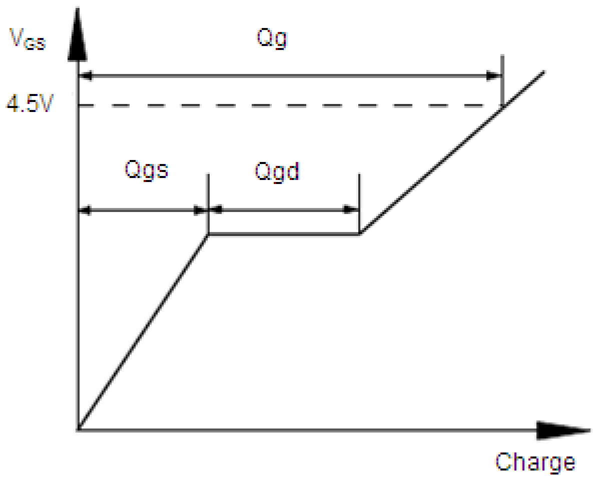
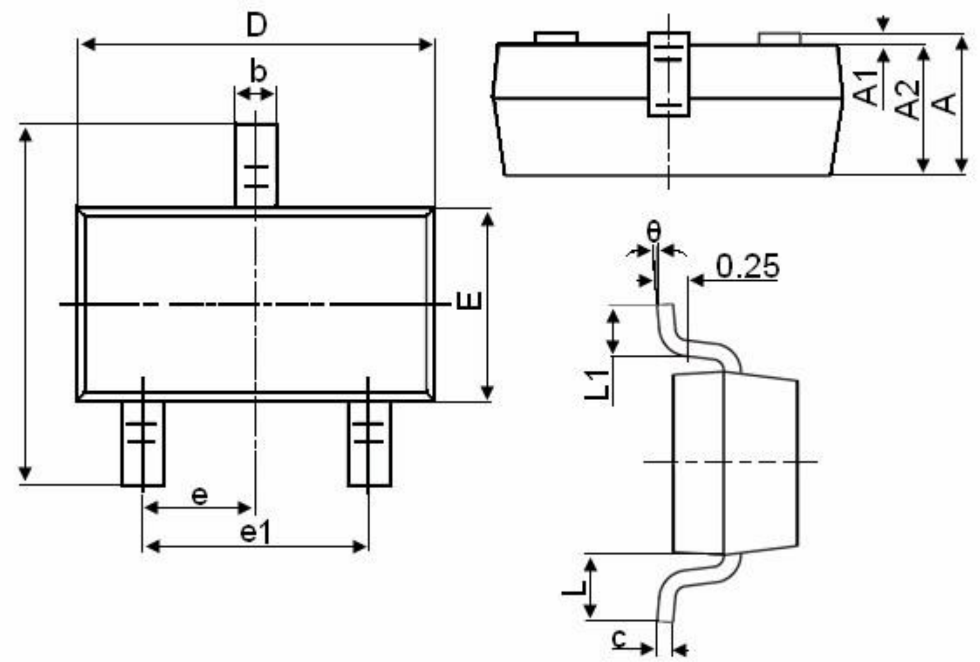


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-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	2020/5/1	Initial release

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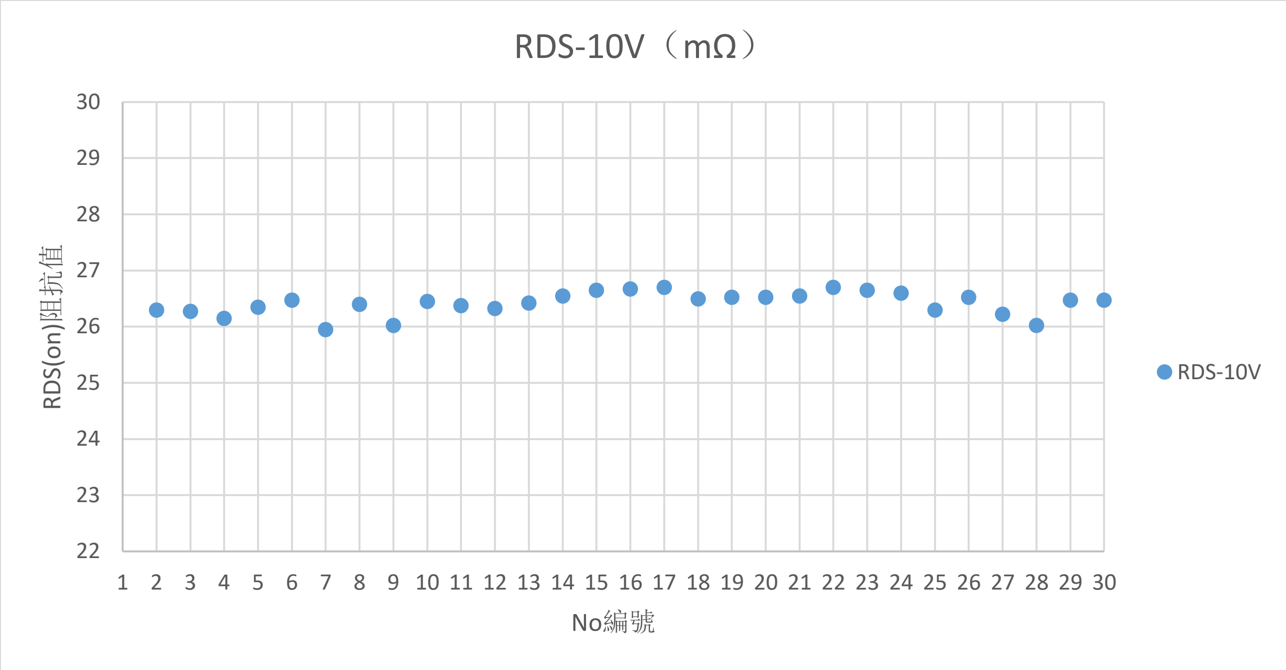
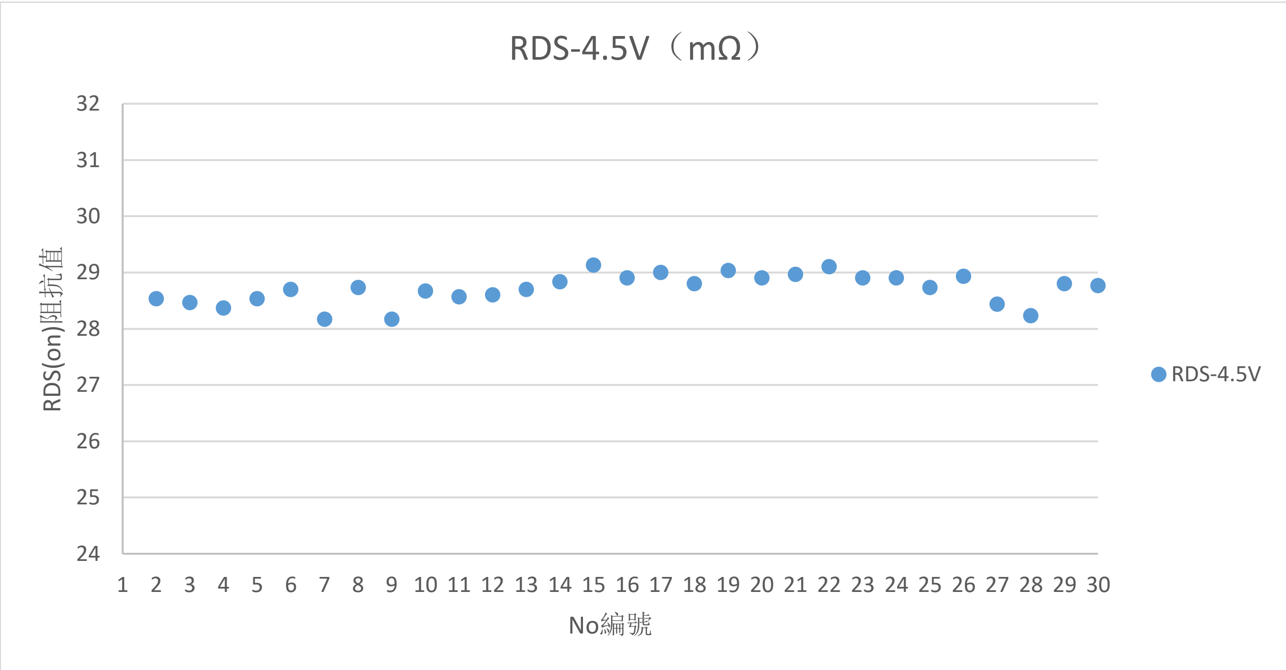
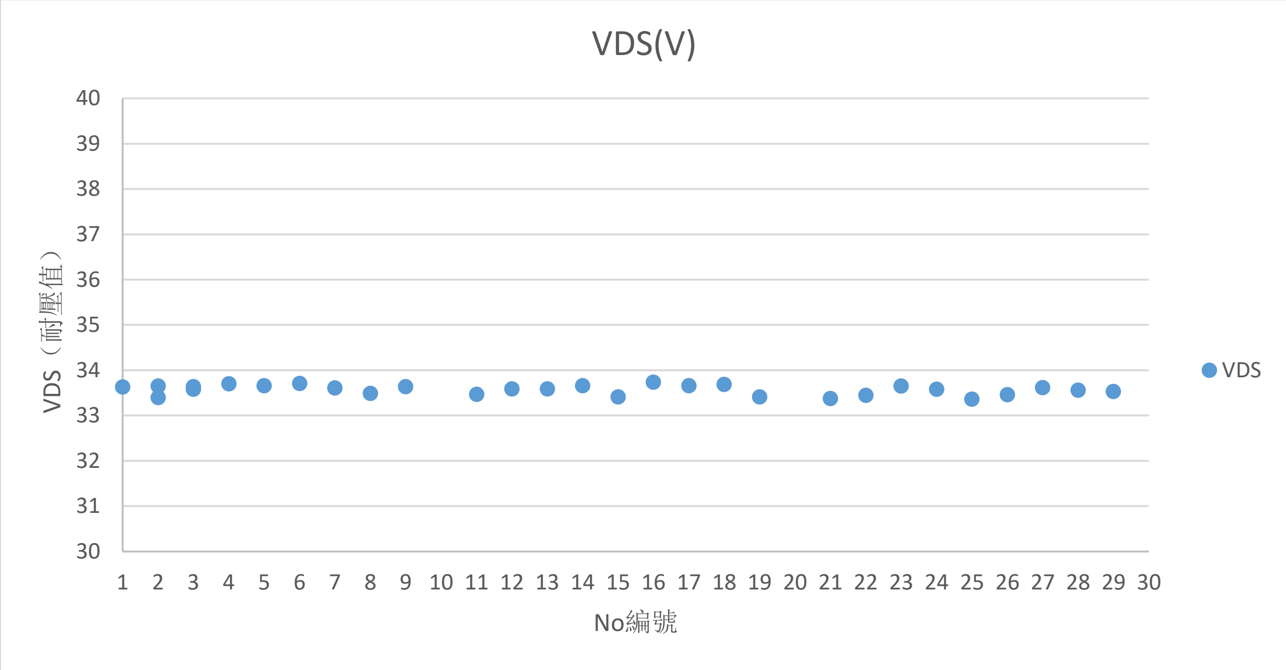
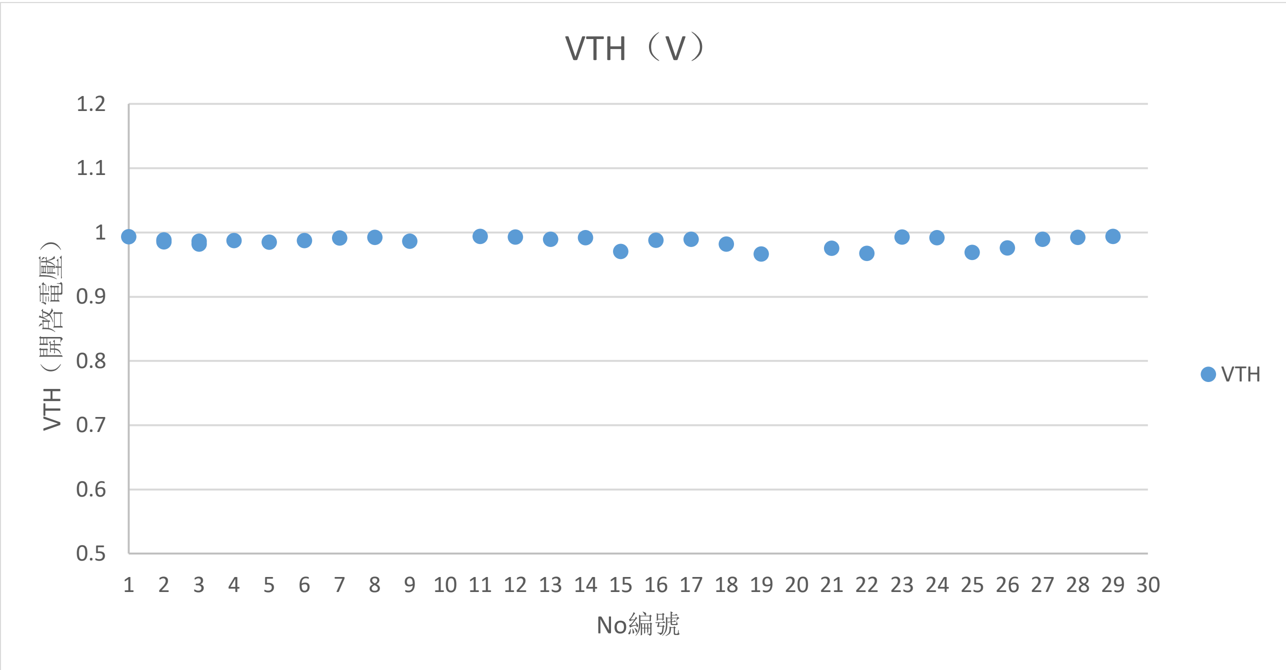
Test Report For 30PCS（30pcs 典型測試報告）






VDS(V)
40
39
38
37
36
35
34
33
32
31
30
VDS（耐壓值）
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
No編號
VDS


VTH（V）
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
VTH（開啓電壓）
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
No編號
VTH

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