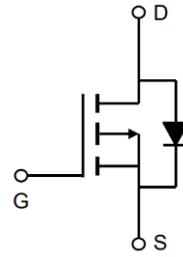


30V P-Channel Enhancement Mode MOSFET

Description

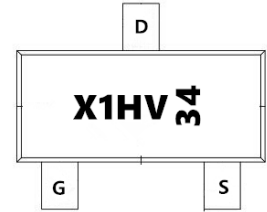
The AP3401MI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 2.5V. This device is suitable for use as a Battery protection or in other Switching application.



General Features

$V_{DS} = -30V$ $I_D = -4.2A$

$R_{DS(ON)} < 55m\Omega @ V_{GS}=10V$



Application

- Battery protection
- Load switch
- Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP3401MI	SOT-23-3L	X1HV-34	3000

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

Symbol	Parameter	Rating	Units
V _{DS}	Drain-Source Voltage	-30	V
V _{GS}	Gate-Source Voltage	±12	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current	-4.3	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current	-3.6	A
IDM	Pulsed Drain Current ²	-20	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation ³	1.4	W
$P_D @ T_A=70^\circ C$	Total Power Dissipation ³	0.9	W
TSTG	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	125	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	85	°C/W



30V P-Channel Enhancement Mode MOSFET

Electrical Characteristics (T_J=25°C, unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =-250uA	-30	-32	---	V
ΔBVDSS/ΔT _J	BV _{DSS} Temperature Coefficient	Reference to 25°C, I _D =-1mA	---	-0.014	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance	V _{GS} =-10V, I _D =-3A	---	48	55	mΩ
		V _{GS} =-4.5V, I _D =-3A	---	57	65	
		V _{GS} =-2.5V, I _D =-2A	---	75	85	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =-250uA	-0.5	-0.9	-1.2	V
ΔVGS(th)	V _{GS(th)} Temperature Coefficient		---	2.6	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =-24V, V _{GS} =0V, T _J =25°C	---	---	-1	uA
		V _{DS} =-24V, V _{GS} =0V, T _J =55°C	---	---	-5	
IGSS	Gate-Source Leakage Current	V _{GS} =±12V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =-5V, I _D =-3A	---	5.6	---	S
Q _g	Total Gate Charge (-4.5V)	V _{DS} =-15V, V _{GS} =-4.5V, I _D =-3A	---	11.9	---	nC
Q _{gs}	Gate-Source Charge		---	1.8	---	
Q _{gd}	Gate-Drain Charge		---	3	---	
Td(on)	Turn-On Delay Time	V _{DD} =-15V, V _{GS} =-4.5V, R _G =3.3Ω, I _D =-3A	---	6.6	---	ns
T _r	Rise Time		---	27.8	---	
Td(off)	Turn-Off Delay Time		---	46.2	---	
T _f	Fall Time		---	20.6	---	
Ciss	Input Capacitance	V _{DS} =-15V, V _{GS} =0V, f=1MHz	---	290	---	pF
Coss	Output Capacitance		---	73	---	
Crss	Reverse Transfer Capacitance		---	71	---	
IS	Continuous Source Current ^{1,4}	V _G =V _D =0V, Force Current	---	---	-4.3	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =-1A, T _J =25°C	---	---	-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°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.

30V P-Channel Enhancement Mode MOSFET

Typical Characteristics

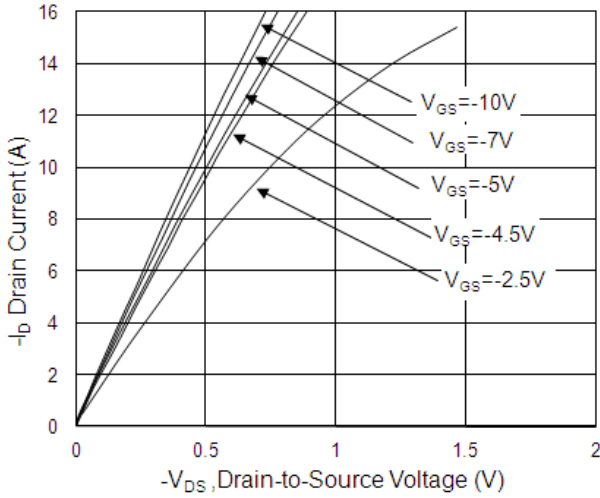


Fig.1 Typical Output Characteristics

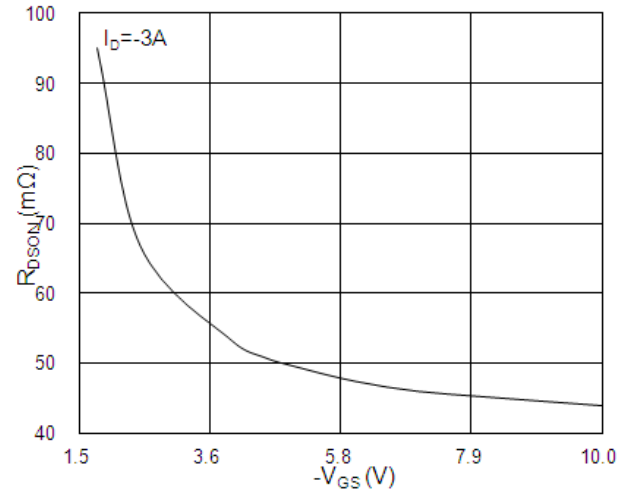


Fig.2 On-Resistance vs. G-S Voltage

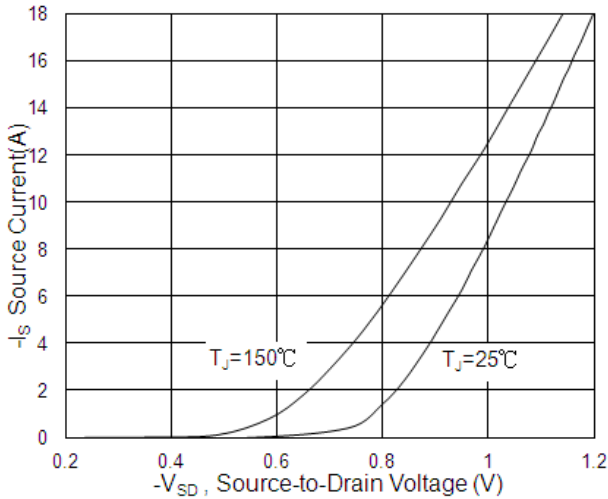


Fig.3 Forward Characteristics Of Reverse

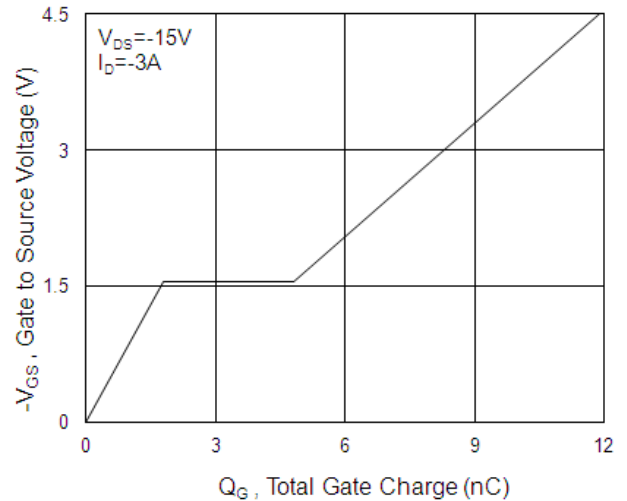


Fig.4 Gate-Charge Characteristics

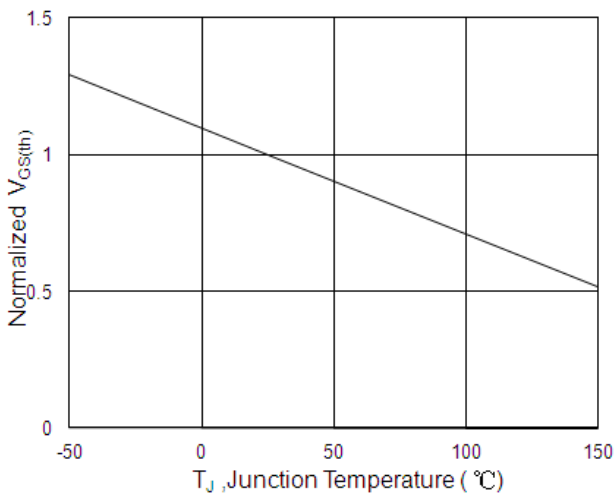


Fig.5 Normalized $V_{GS(th)}$ vs. T_J

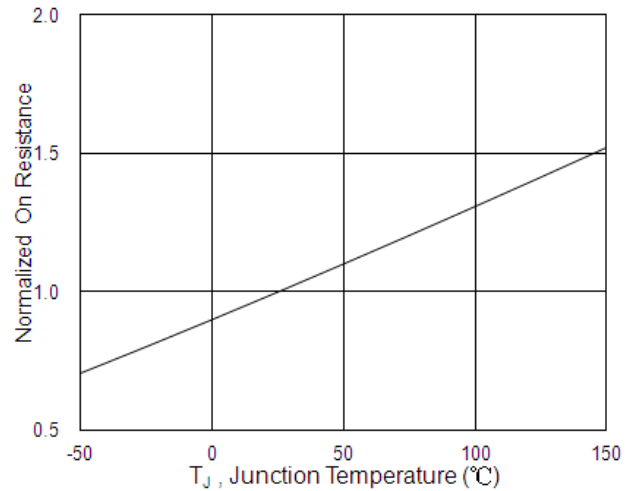


Fig.6 Normalized $R_{DS(on)}$ vs. T_J



30V P-Channel Enhancement Mode MOSFET

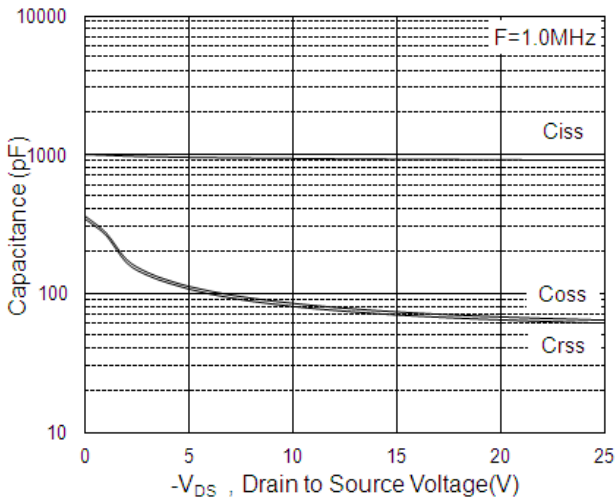


Fig.7 Capacitance

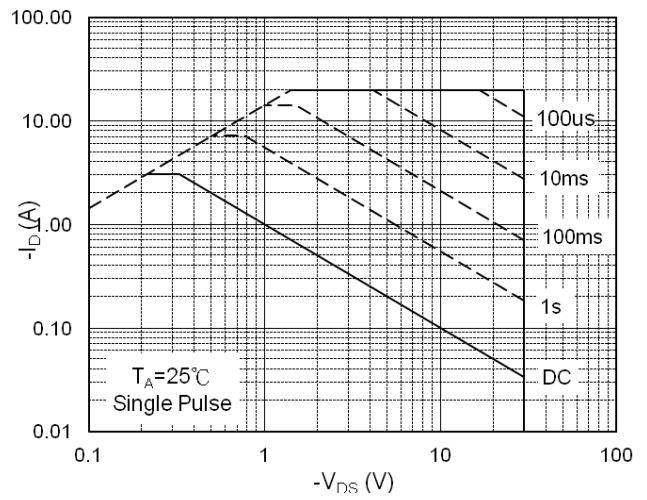


Fig.8 Safe Operating Area

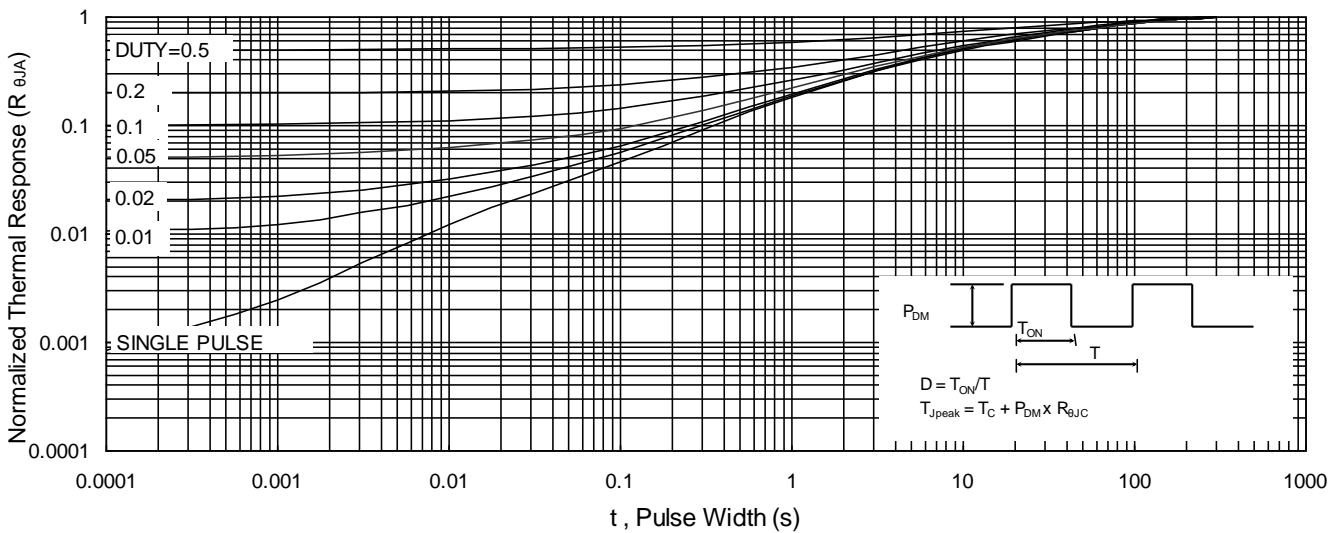


Fig.9 Normalized Maximum Transient Thermal Impedance

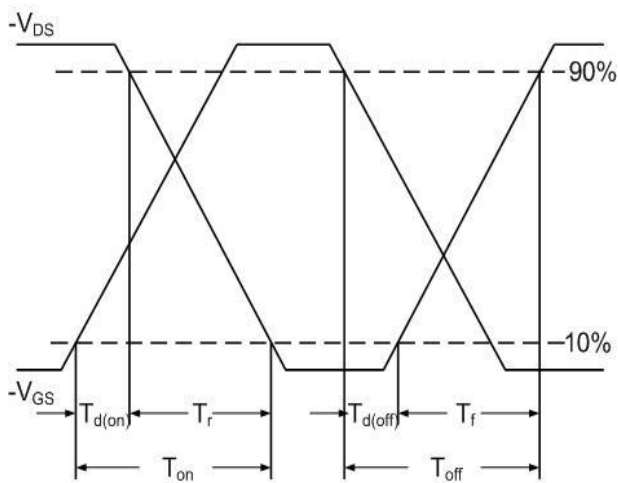


Fig.10 Switching Time Waveform

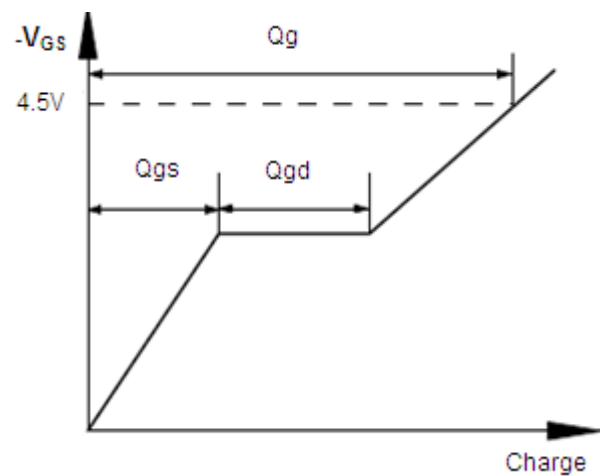
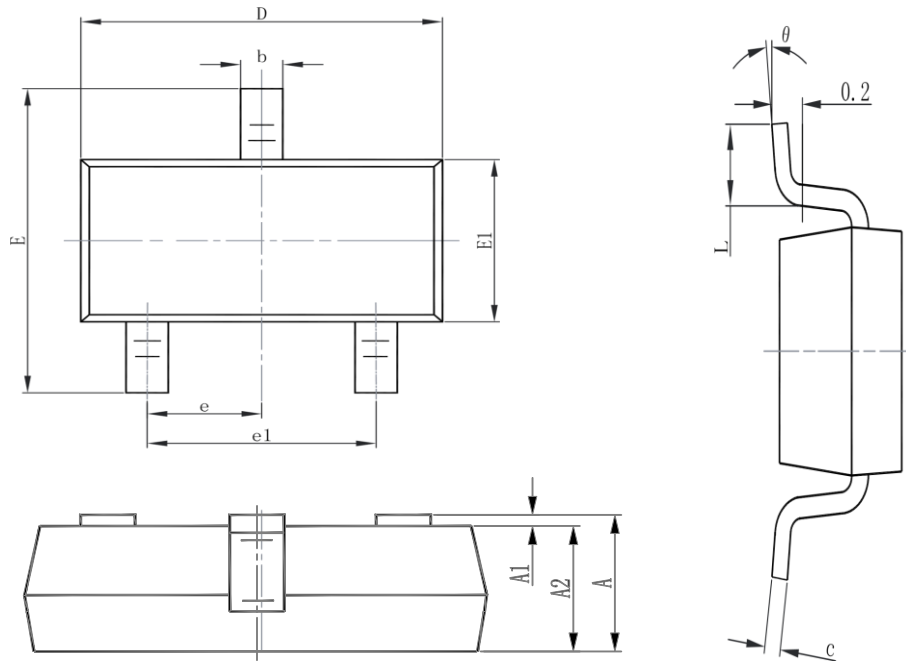


Fig.11 Gate Charge Waveform

Package Mechanical Data-SOT23-3



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 P-Channel Enhancement Mode MOSFET**Attention**

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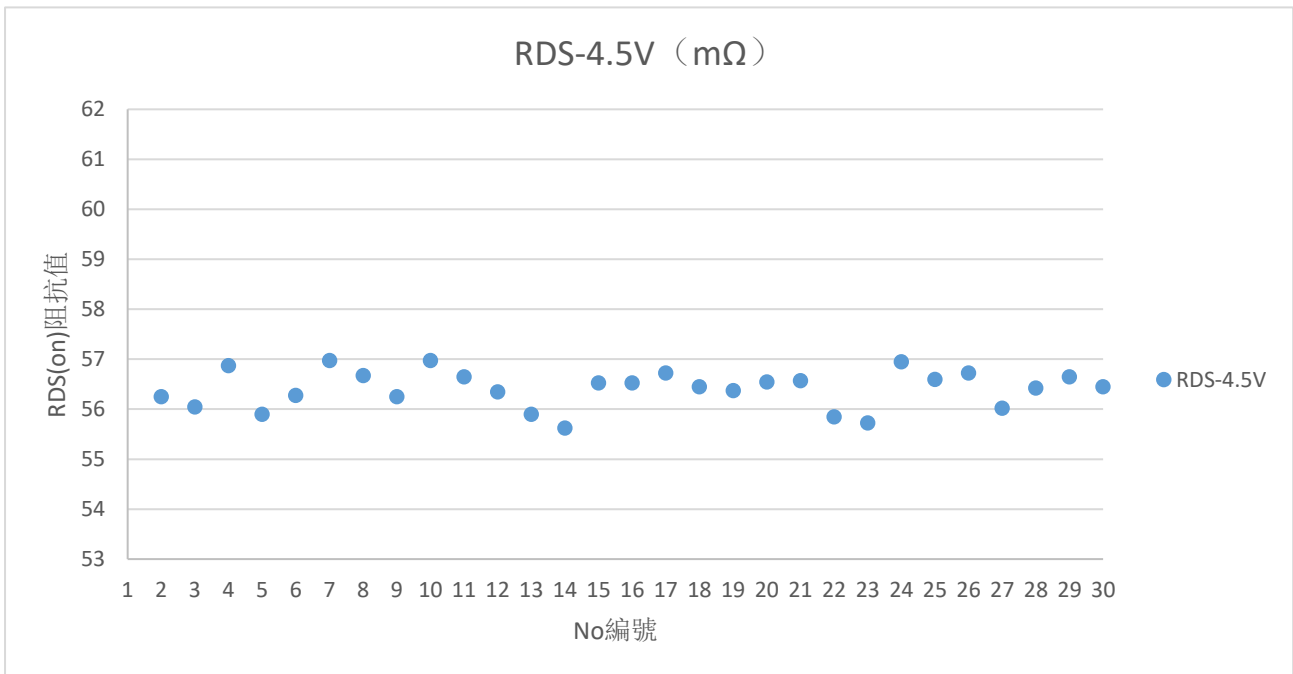
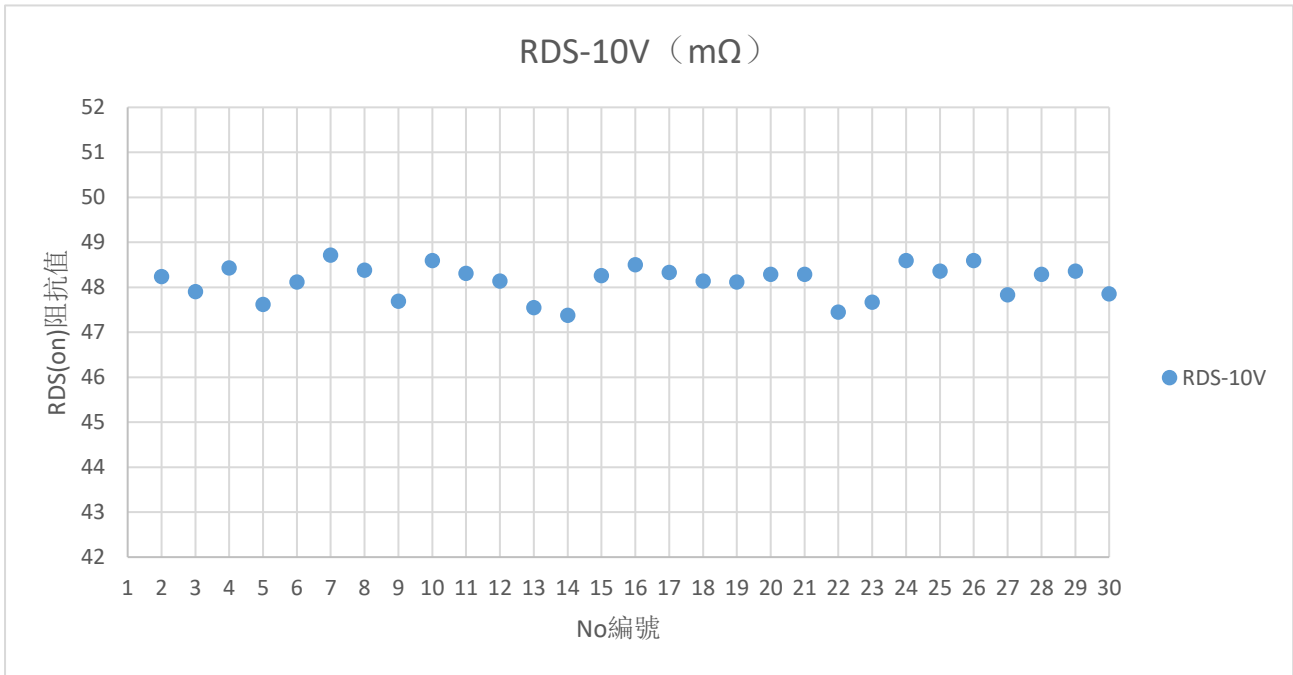
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Edition	Date	Change
Rve3.8	2018/1/31	Initial release
Rve3.9	2019/12/01	Reduce RDS(on)

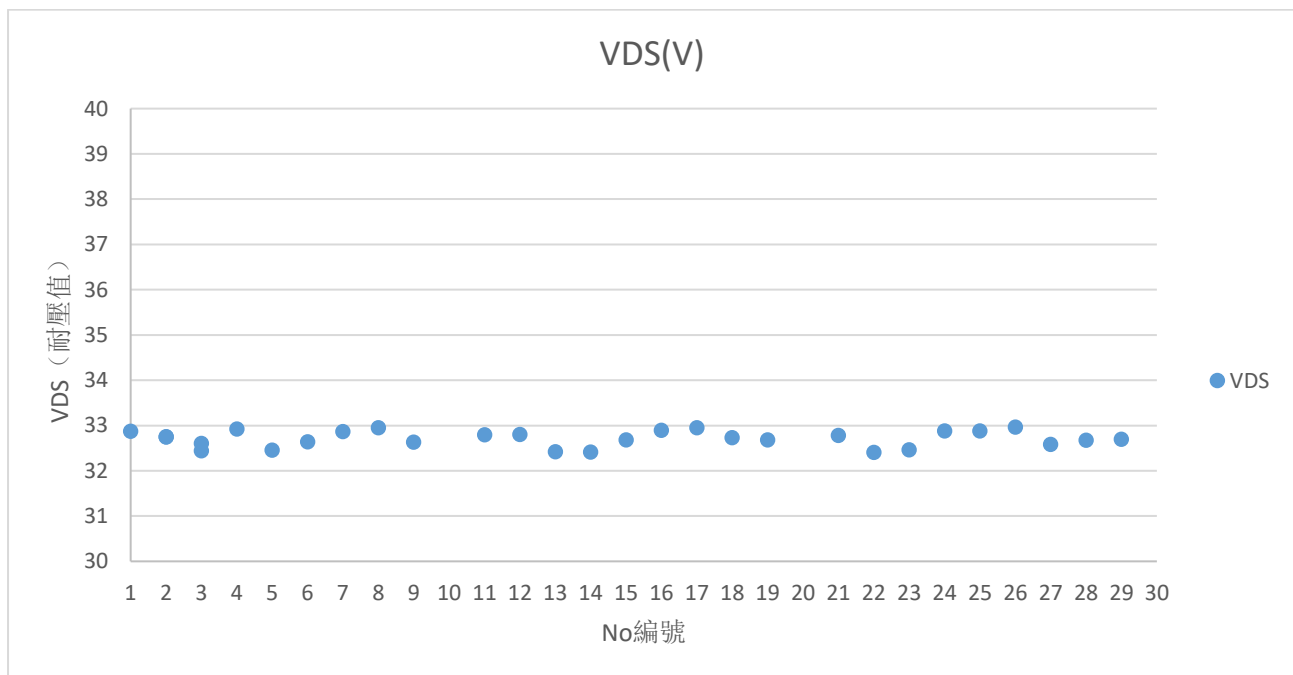
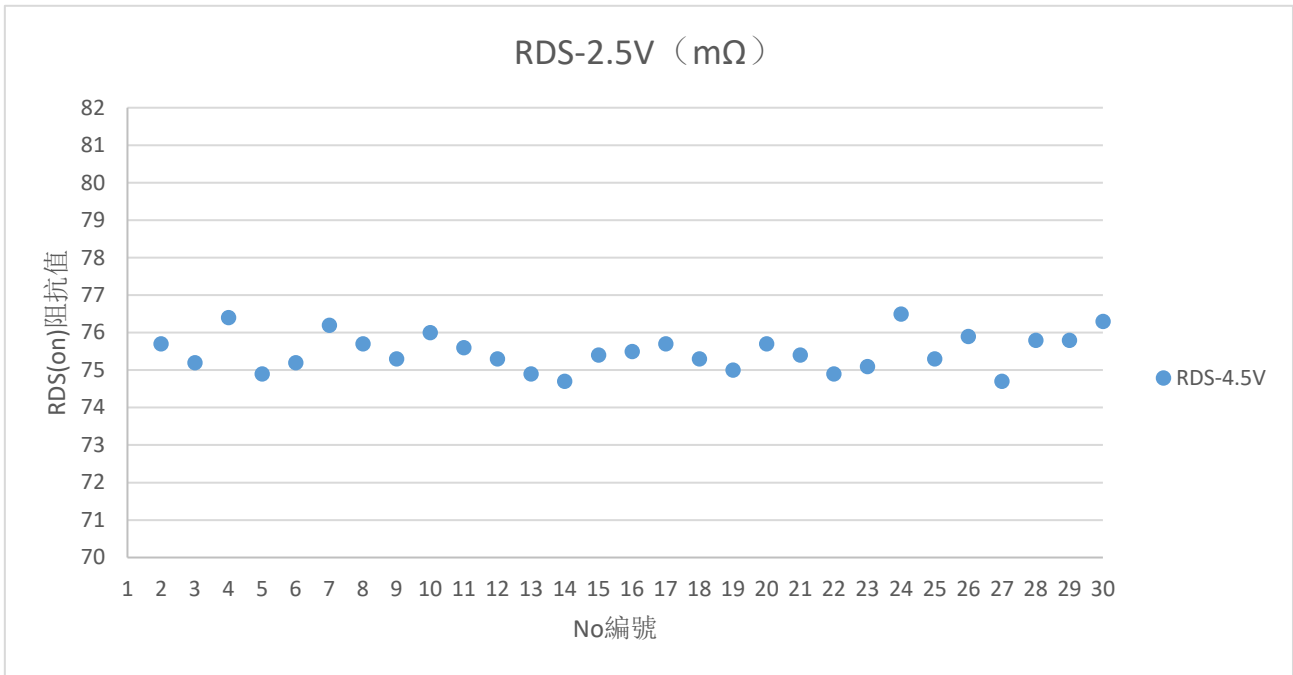
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Test Report For 30PCS (30pcs 典型測試報告)



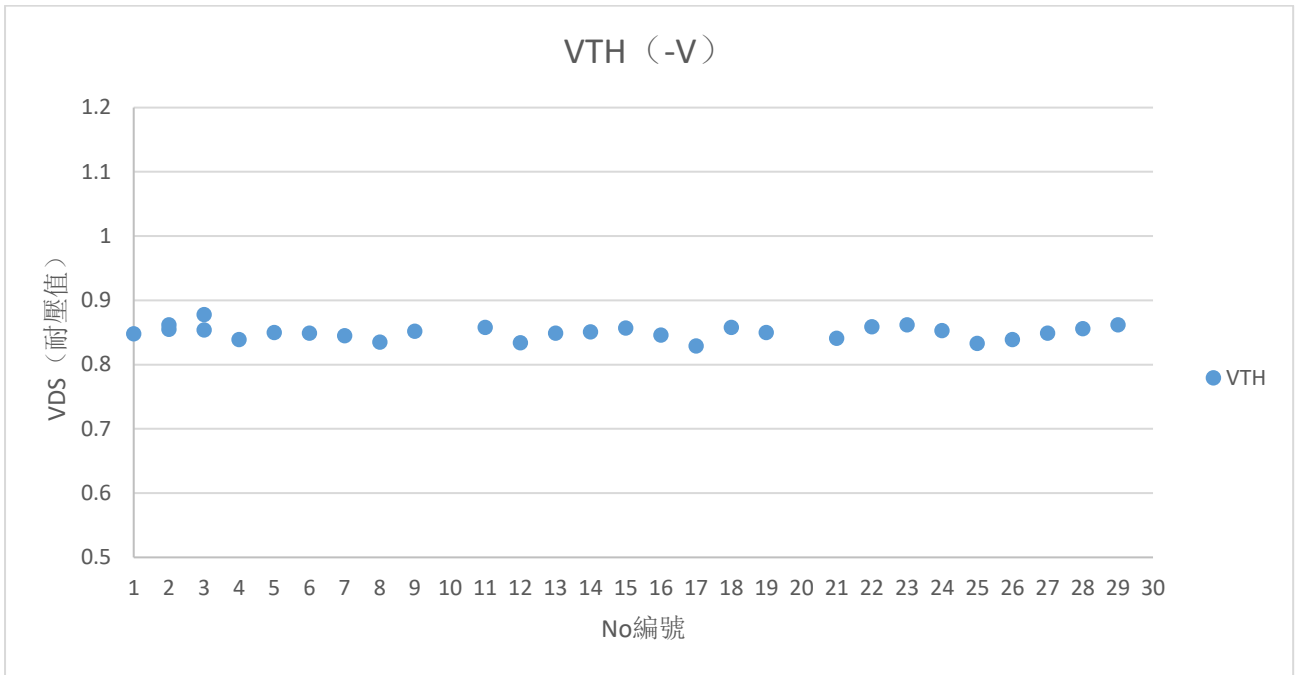


30V P-Channel Enhancement Mode MOSFET





30V P-Channel Enhancement Mode MOSFET



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