

-30V P-Channel Enhancement Mode MOSFET

Description

The AP40P03DF 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

$V_{DS} = -30V$ $I_D = -40A$

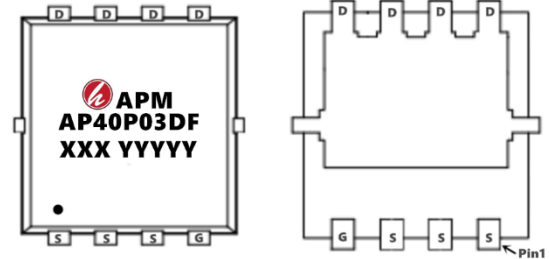
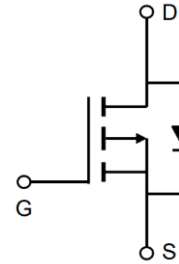
$R_{DS(ON)} < 16m\Omega$ @ $V_{GS} = -10V$

Application

Lithium battery protection

Wireless impact

Mobile phone fast charging



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40P03DF	PDFN3*3-8L	AP40P03DF XXX YYYYY	5000

Absolute Maximum Ratings (TC=25°C 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°C	Continuous Drain Current, V _{GS} @ -10V ¹	-40	A
I _D @T _A =70°C	Continuous Drain Current, V _{GS} @ -10V ¹	-23	A
I _{DM}	Pulsed Drain Current ²	-120	A
E _{AS}	Single Pulse Avalanche Energy ³	68	mJ
I _{AS}	Avalanche Current	-29.4	A
P _D @T _A =25°C	Total Power Dissipation ⁴	3.1	W
P _D @T _A =70°C	Total Power Dissipation ⁴	2	W
T _{STG}	Storage Temperature Range	-55 to 150	°C
T _J	Operating Junction Temperature Range	-55 to 150	°C
R _{θJA}	Thermal Resistance Junction-Ambient ¹	75	°C/W
R _{θJA}	Thermal Resistance Junction-Ambient ¹ (t ≤ 10s)	40	°C/W
R _{θJC}	Thermal Resistance Junction-Case ¹	24	°C/W



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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D = -250μA	-30	-32.5	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} = -30V, V _{GS} =0V,	-	-	-1	μA
IGSS	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±20V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} =V _{GS} , I _D = -250μA	-1.2	-1.5	-2.5	V
RDS(on)	Static Drain-Source on-Resistance note3	V _{GS} = -10V, I _D = -10A	-	11	16	mΩ
		V _{GS} = -4.5V, I _D = -5A	-	16	20	
Rg	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	4.9	7.0	9.1	Ω
Ciss	Input Capacitance	V _{DS} = -24V, V _{GS} =10V, f=1.0MHz	-	2130	-	pF
Coss	Output Capacitance		-	280	-	pF
Crss	Reverse Transfer Capacitance		-	252	-	pF
Qg	Total Gate Charge	V _{DS} = -24V, I _D = -1A, V _{GS} = -10V	-	22	-	nC
Qgs	Gate-Source Charge		-	4	-	nC
Qgd	Gate-Drain("Miller") Charge		-	5.8	-	nC
td(on)	Turn-on Delay Time	V _{DD} = -24V, I _D = -1A, V _{GS} = -10V, R _{GEN} =7.0Ω	-	9	-	ns
t _r	Turn-on Rise Time		-	13	-	ns
td(off)	Turn-off Delay Time		-	48	-	ns
t _r	Turn-off Fall Time		-	20	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	-29.5	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	-44	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _S = -1A	-	-0.74	-1.2	V

Note :

- 1、 Repetitive Rating: Pulse Width Limited by Maximum Junction Temperature
- 2、 E_{AS} condition: T_J=25°C, V_{DD}= -24V, V_G= -10V, R_G=7Ω, L=0.1mH, I_{AS}= -29.5A
- 3、 Pulse Test: Pulse Width≤300μs, Duty Cycle≤2%

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Typical Characteristics

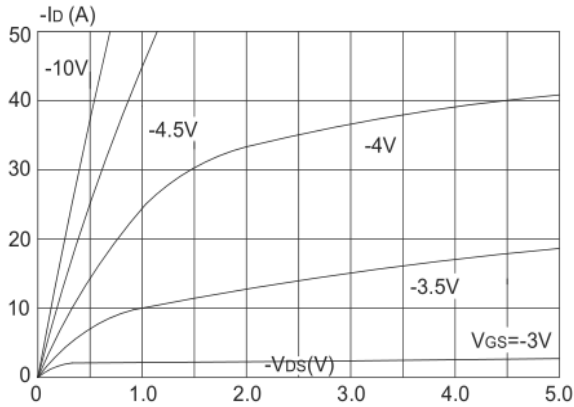


Figure1: Output Characteristics

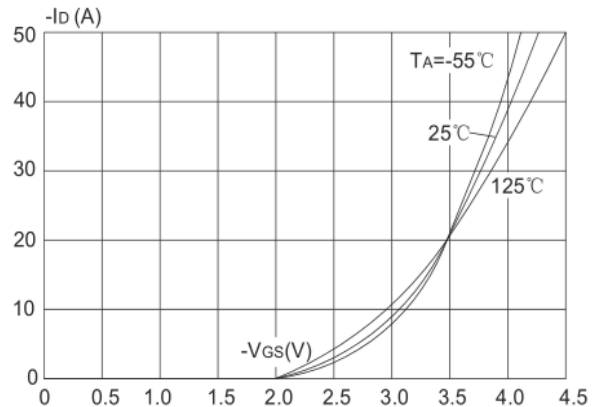


Figure2: Typical Transfer Characteristics

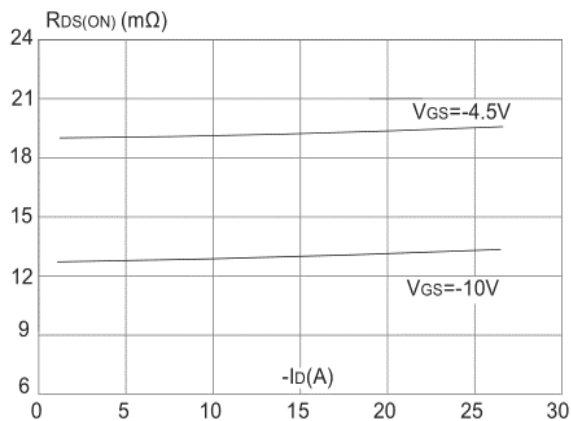


Figure 3: On-resistance vs. Drain Current

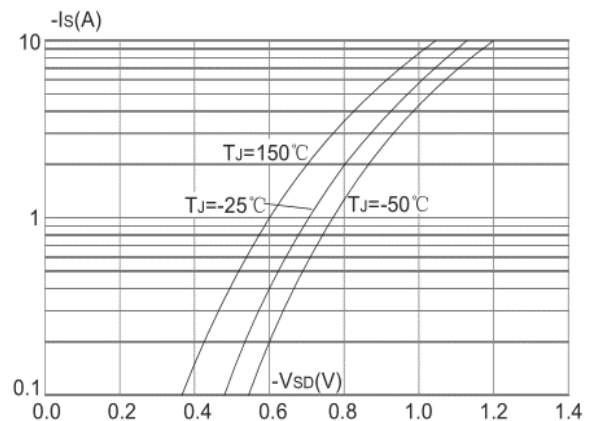


Figure 4: Body Diode Characteristics

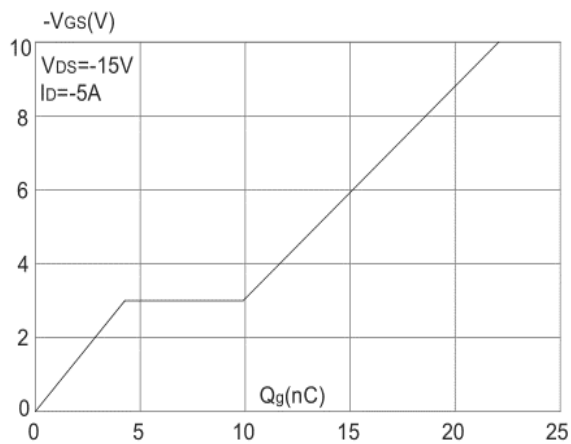


Figure 5: Gate Charge Characteristics

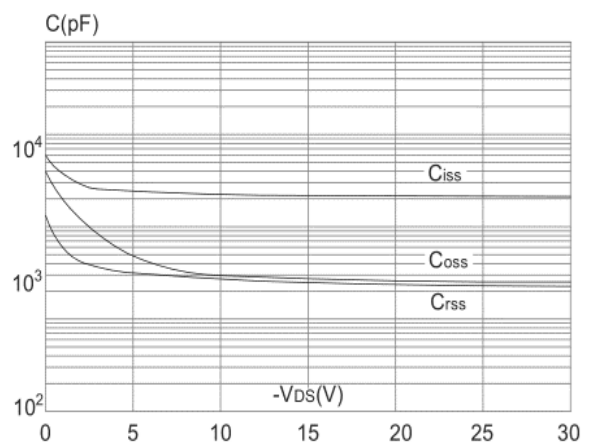


Figure 6: Capacitance Characteristics

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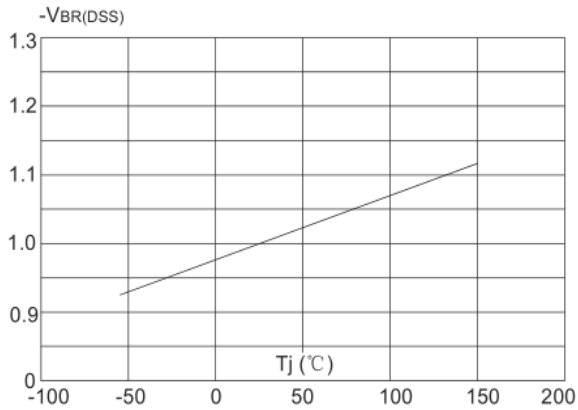


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

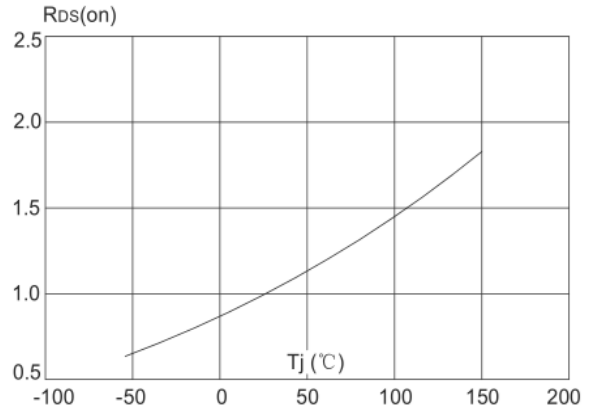


Figure 8: Normalized on Resistance vs. Junction Temperature

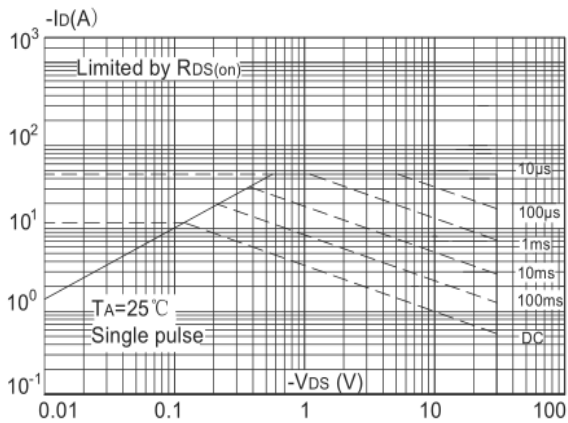


Figure 9: Maximum Safe Operating Area

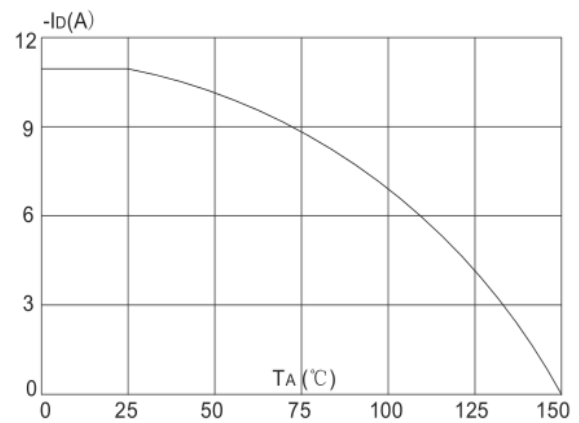


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

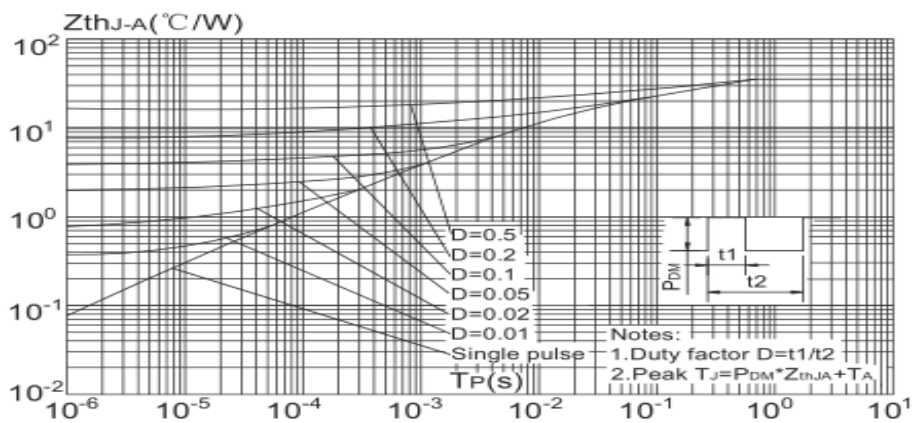
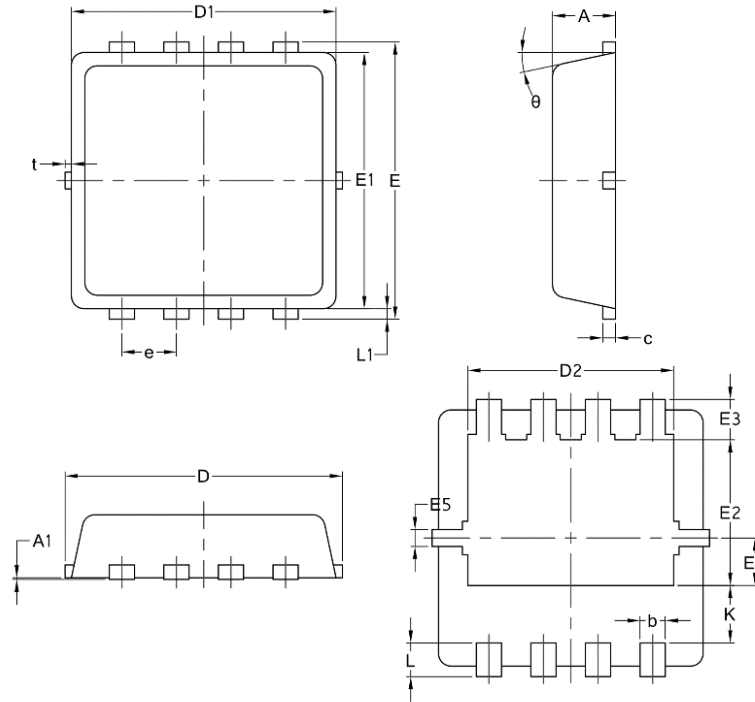


Figure 11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambient

Package Mechanical Data-DFN3*3-8L-JQ Single



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.20	0.30	0.40
c	0.10	0.152	0.25
D	3.15	3.30	3.45
D1	3.00	3.15	3.25
D2	2.29	2.45	2.65
E	3.15	3.30	3.45
E1	2.90	3.05	3.20
E2	1.54	1.74	1.94
E3	0.28	0.48	0.65
E4	0.37	0.57	0.77
E5	0.10	0.20	0.30
e	0.60	0.65	0.70
K	0.59	0.69	0.89
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
t	0	0.075	0.13
Φ	10	12	14

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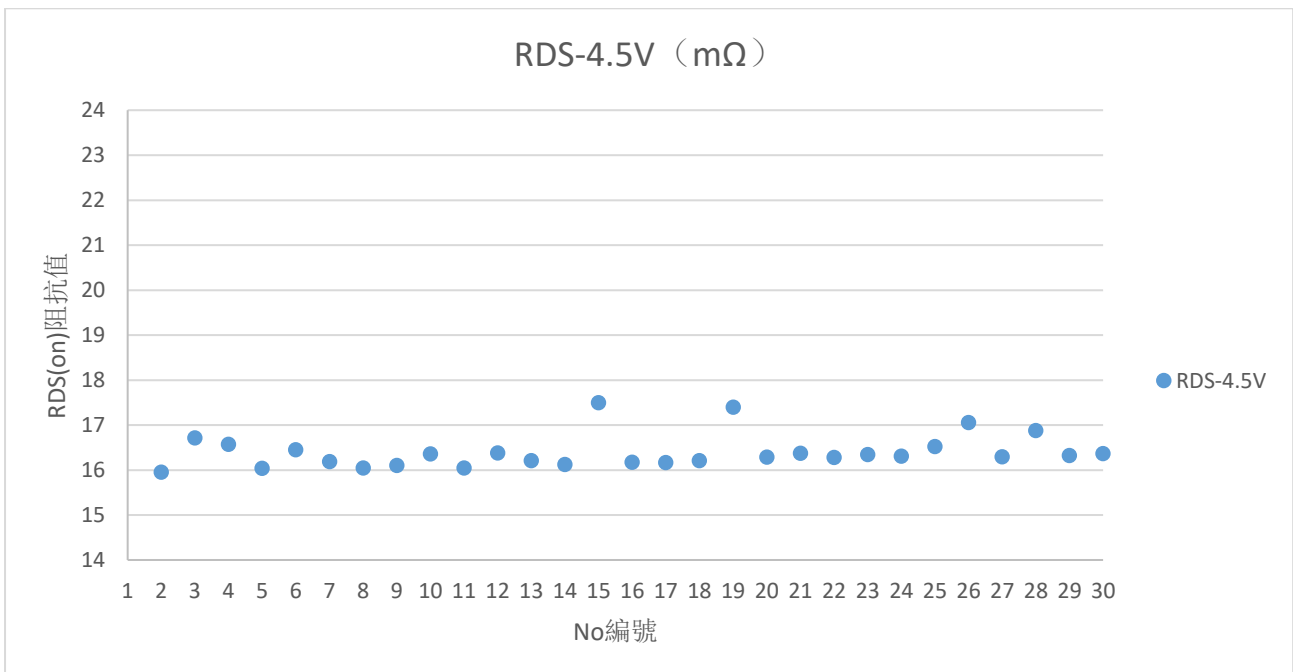
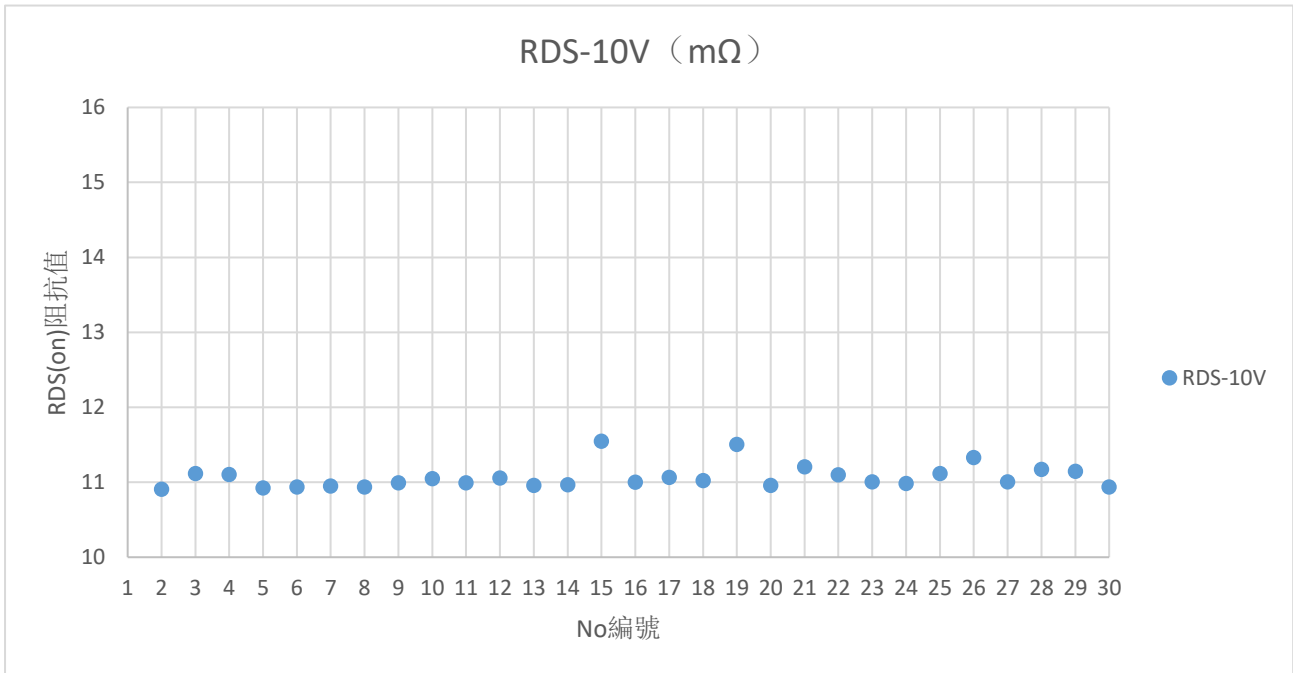
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Edition	Date	Change
Rve1.0	2020/4/10	Initial release

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Test Report For 30PCS (30pcs 典型測試報告)





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