AP40H03DF2

30V N+N-Channel Enhancement Mode MOSFET

Description

The AP40H03DF2 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

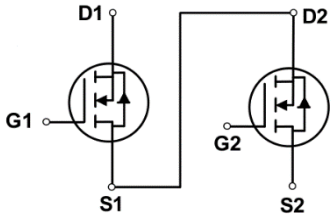
$R_{DS(ON)}$ < 10mΩ @ V_{GS}=10V **(Type：7.8mΩ)**

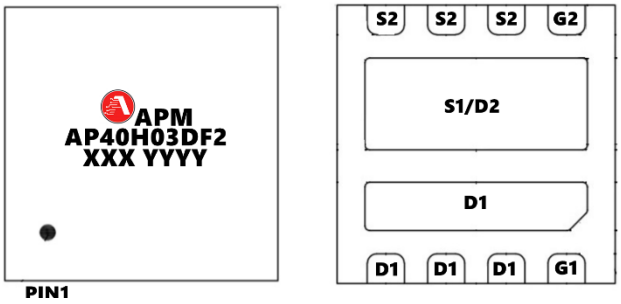
Application

Battery protection

Load switch

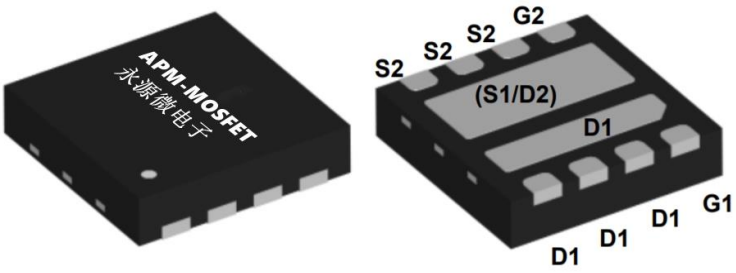
Uninterruptible power supply





DFN3X3B

Top View Bottom View



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40H03DF2	DFN3*3B-8L	AP40N03DF2 XXXX YYYY	5000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	±20	V
I_D@T_C=25℃	Continuous Drain Current, V_{GS} @ 10V[1]	40	A
I_D@T_C=100℃	Continuous Drain Current, V_{GS} @ 10V[1]	23	A
IDM	Pulsed Drain Current[2]	120	A
P_D@T_C=25℃	Total Power Dissipation	137.5	W
TSTG	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta}JA$	Thermal Resistance Junction-Ambient [1]	85	℃/W
$R_{\theta}JC$	Thermal Resistance Junction-Case[1]	4	℃/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	33	---	V
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	7.8	10	mΩ
		V_{GS}=4.5V , I_D=15A	---	11	18	
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}=±20V , V_{DS}=0V	---	---	±100	nA
gfs	Forward Transconductance	V_{DS}=5V , I_D=30A	---	34	---	S
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=15V, V_{GS}=4.5V , I_D=15A	---	9.8	---	nC
Q_{gs}	Gate-Source Charge		---	4.2	---	
Q_{gd}	Gate-Drain Charge		---	3.6	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=15A	---	4	---	ns
T_r	Rise Time		---	8	---	
Td(off)	Turn-Off Delay Time		---	31	---	
T_f	Fall Time		---	4	---	
C_{iss}	Input Capacitance	V_{DS}=15V , V_{GS}=0V , f=1MHz	---	940	---	pF
Coss	Output Capacitance		---	131	---	
Crss	Reverse Transfer Capacitance		---	109	---	
I_S	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	43	A
ISM	Pulsed Source Current[2,5]		---	---	112	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1	V
t_{rr}	Reverse Recovery Time	IF=30A , dI/dt=100A/μs , T_J=25℃	---	8.5	---	nS
Q_{rr}	Reverse Recovery Charge		---	2.2	---	nC

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 ≦ 300us , duty cycle ≦ 2%

3、The EAS data shows Max. rating . The test condition is VDD=25V,VGS=10V,L=0.1Mh,IAS=28A

4、The power dissipation is limited by 175℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

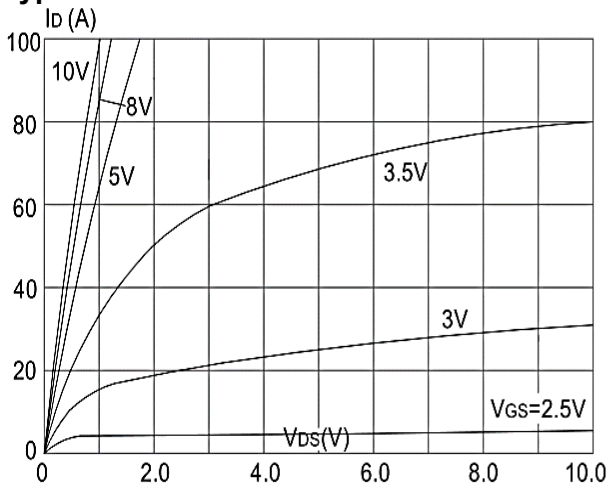


Figure1: Output Characteristics

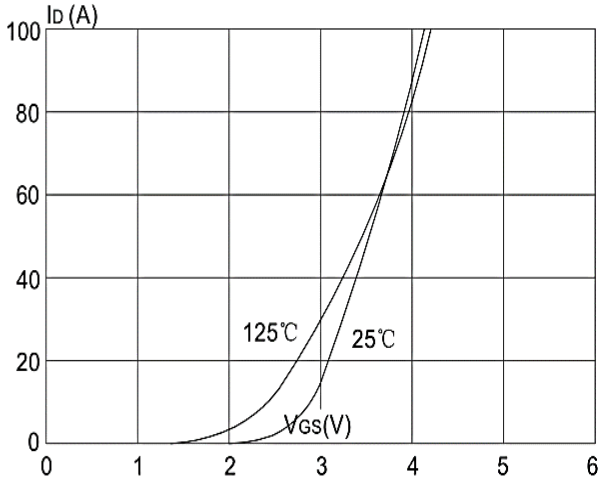


Figure 2: Typical Transfer Characteristics

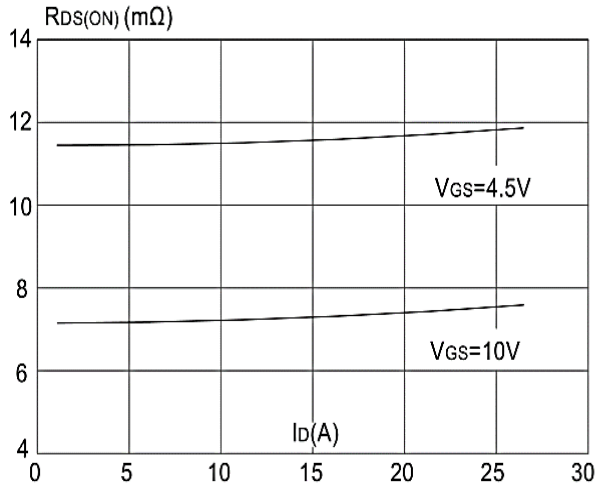


Figure 3:On-resistance vs. Drain Current

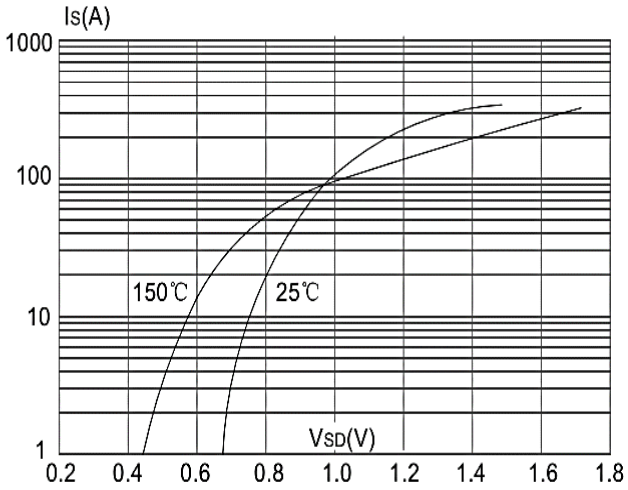


Figure 4: Body Diode Characteristics

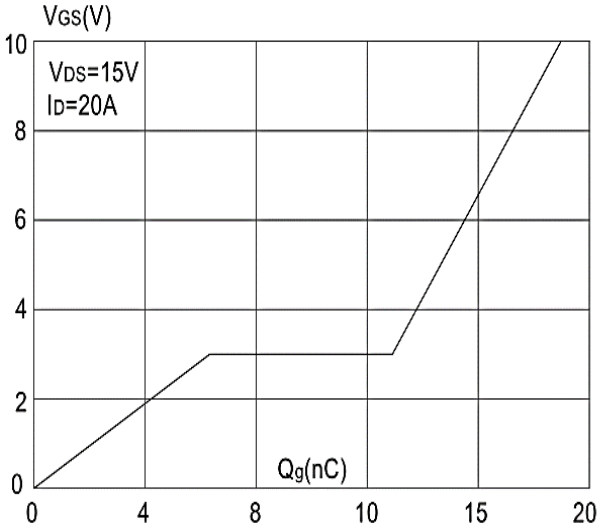


Figure 5: Gate Charge Characteristics

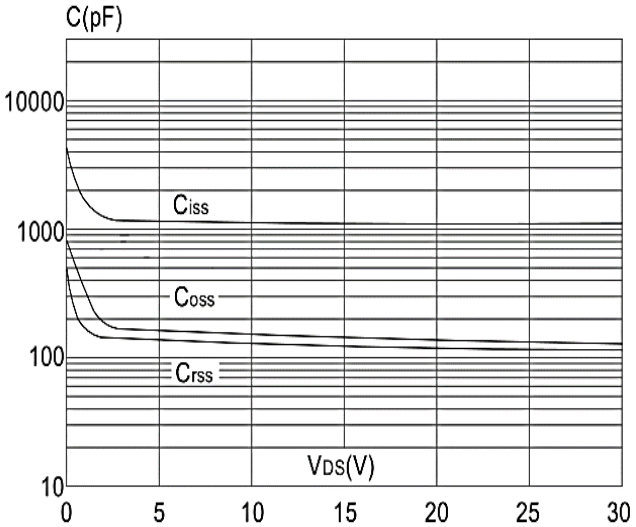


Figure 6: Capacitance Characteristics

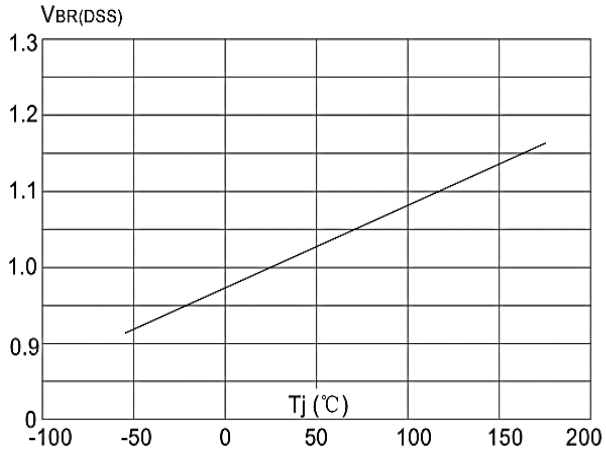


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

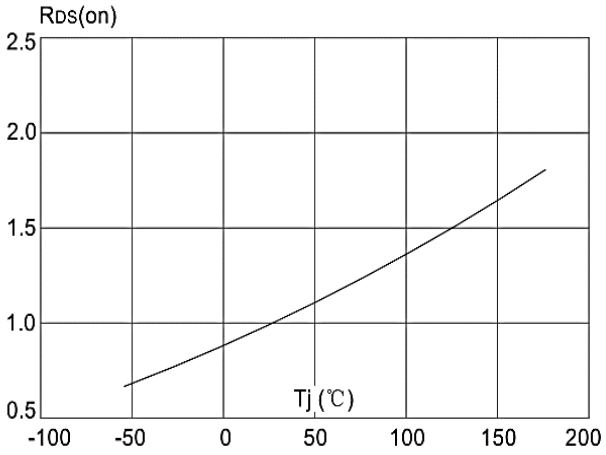


Figure 8: Normalized on Resistance vs. Junction Temperature

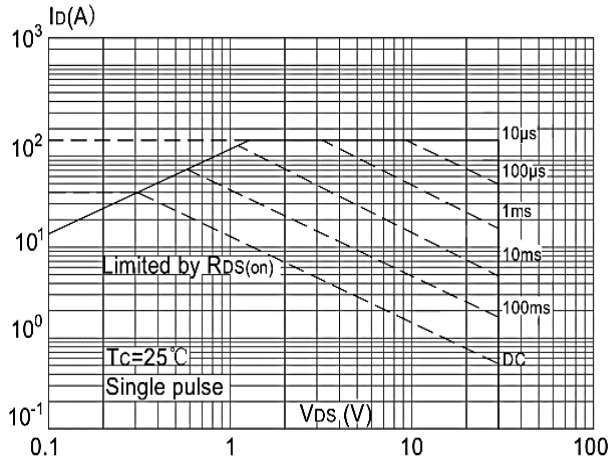


Figure 9: Maximum Safe Operating Area Temperature

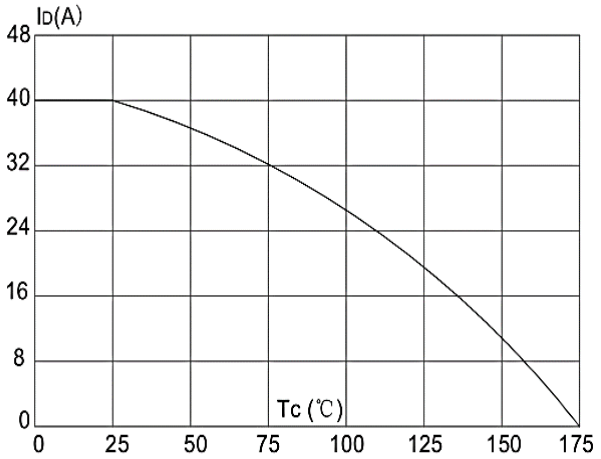


Figure 10: Maximum Continuous Drain Current vs. Ambient

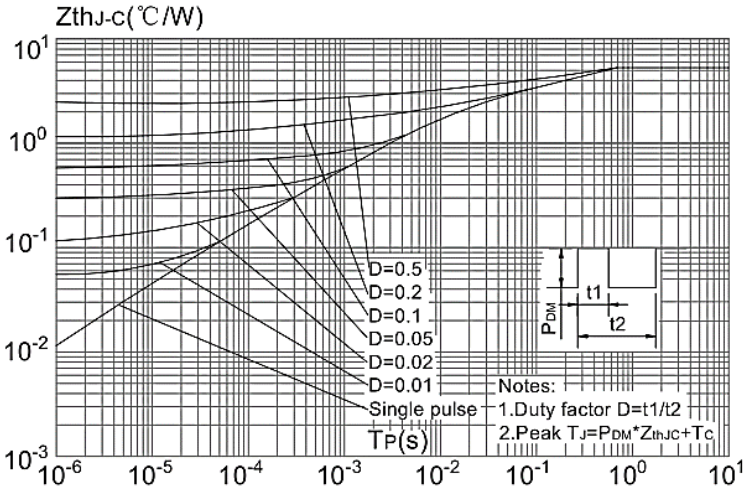
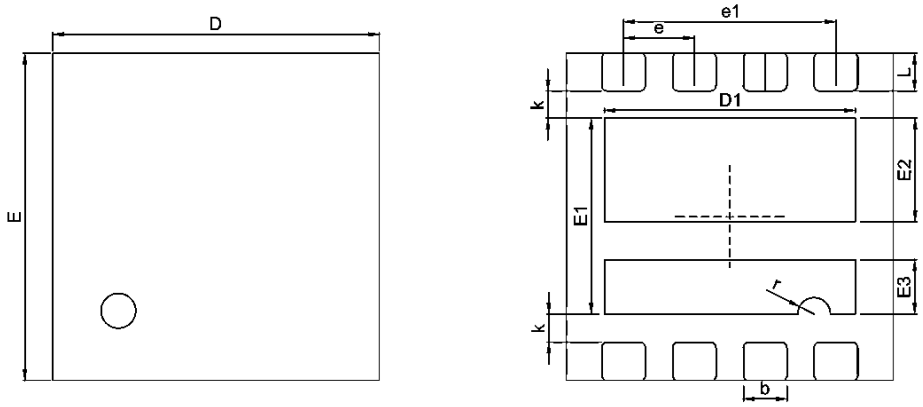


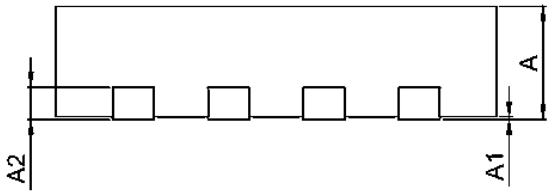
Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

Package Mechanical Data-DFN3*3B-8L Double



TOP VIEW

BOTTOM VIEW



SIDE VIEW

Symbol	Common(mm)		
	Min	Nom	Max
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
b	0.35	0.40	0.40
A2		0.203BSC	
D	2.95	3.00	3.05
E	2.95	3.00	3.05
D1	2.25	2.30	2.35
E2	0.09	0.95	1.00
E3	0.45	0.50	0.55
e		0.65BSC	
e1		1.95 BSC	
K	0.20	0.25	0.30
L	0.30	0.35	0.40
r		0.15REF	

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30V N+N-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2024/1/31	Initial release