

40V N+N-Channel Enhancement Mode MOSFET

Description

The AP30H04DF 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

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

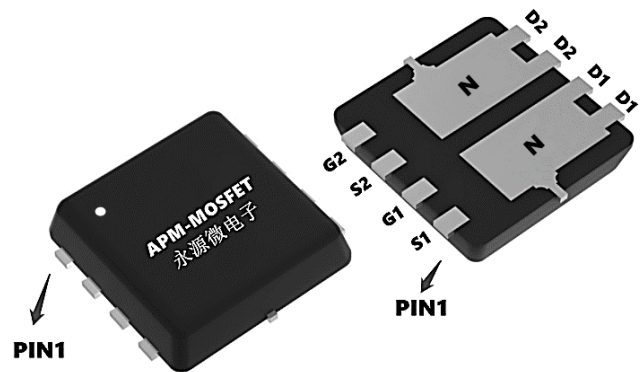
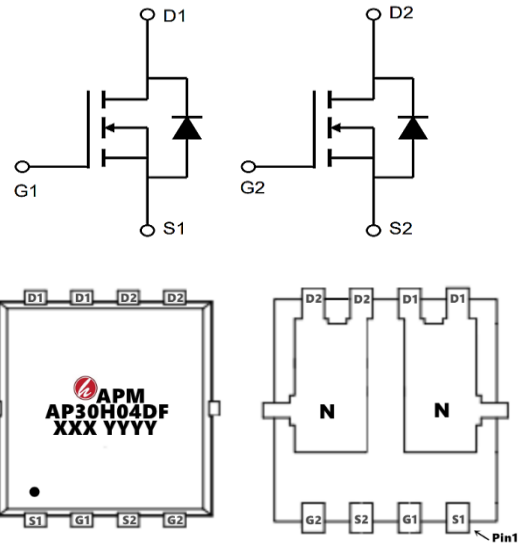
$R_{DS(ON)} < 14m\Omega$ @ $V_{GS}=10V$ (Type: 11m Ω)

Application

Wireless charging

Boost driver

Brushless motor



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP30H04DF	PDFN3*3-8L	AP30H04DF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current ¹	30	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current ¹	21	A
IDM	Pulsed Drain Current ²	36	A
EAS	Single Pulse Avalanche Energy ³	31	mJ
IAS	Avalanche Current	25	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	1.9	W
TSTG	Storage Temperature Range	-55 to 150	$^\circ C$
T_J	Operating Junction Temperature Range	-55 to 150	$^\circ C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹ ($t \leq 10s$)	62.5	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-ambient ¹	8	$^\circ C/W$

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Electrical Characteristics (T_c=25°C unless otherwise noted)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	40	44	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.034	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =8A	---	11	14	mΩ
		V _{GS} =4.5V, I _D =6A	---	13	18	
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	1.0	1.6	2.5	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	-5.64	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =32V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =32V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
gfs	Forward Transconductance	V _{DS} =5V, I _D =8A	---	36	---	S
R _g	Gate Resistance	V _{DS} =0V, V _{GS} =0V, f=1MHz	---	2.1	---	Ω
Q _g	Total Gate Charge (4.5V)	V _{DS} =20V, V _{GS} =4.5V, I _D =8A	---	10.7	---	nC
Q _{gs}	Gate-Source Charge		---	3.3	---	nC
Q _{gd}	Gate-Drain Charge		---	4.2	---	nC
T _{d(on)}	Turn-On Delay Time	V _{DD} =12V V _{GS} =10V R _G =3.3Ω I _D =6A	---	8.6	---	ns
T _r	Rise Time		---	3.4	---	ns
T _{d(off)}	Turn-Off Delay Time		---	24.8	---	ns
T _f	Fall Time		---	2.2	---	ns
C _{iss}	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	1314	---	pF
C _{oss}	Output Capacitance		---	120	---	
C _{rss}	Reverse Transfer Capacitance		---	88	---	
I _S	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	8.5	A
I _{SM}	Pulsed Source Current ^{2,5}		---	---	34	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 inch² FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width ≤ 300us , duty cycle ≤ 2%
- 3、EAS condition: T_J=25°C, V_{DD}=32V, V_{GS}=10V, L=0.1Mh, I_{AS}=22A
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

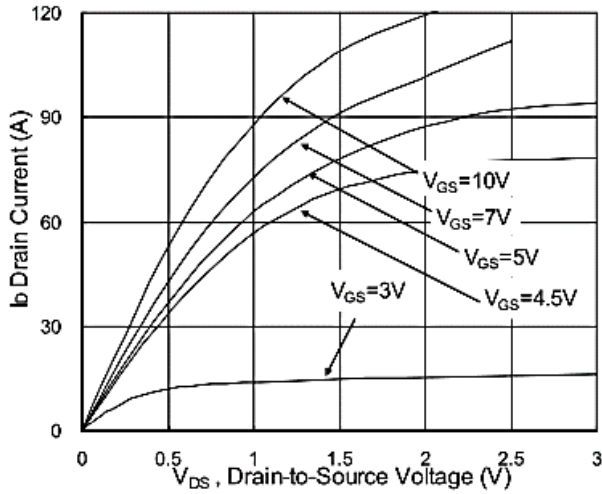


Fig.1 Typical Output Characteristics

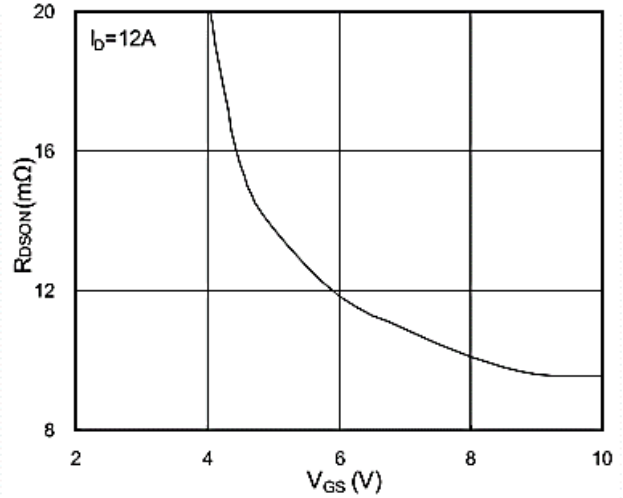


Fig.2 On-Resistance vs. G-S Voltage

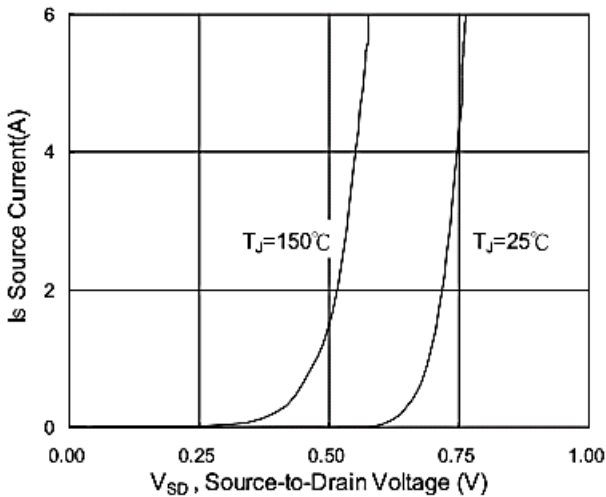


Fig.3 Forward Characteristics of Reverse

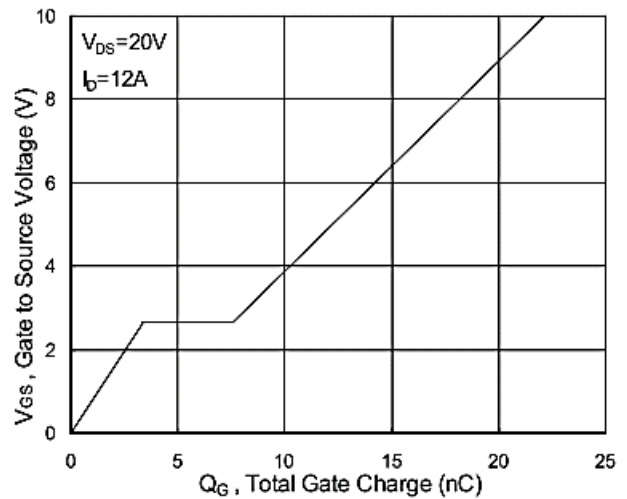


Fig.4 Gate-Charge Characteristics

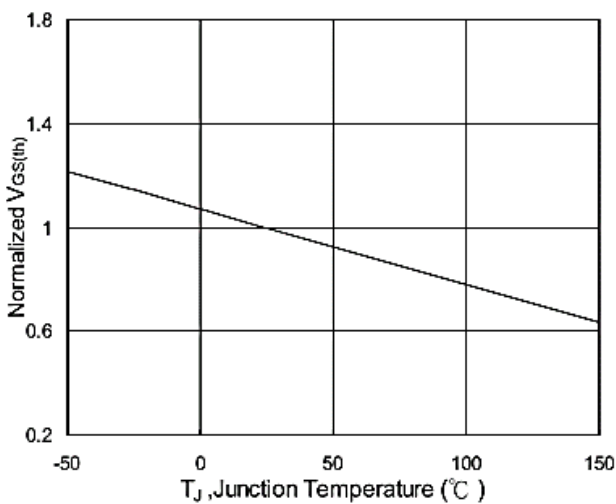


Fig.5 V_{GS(th)} vs. T_J

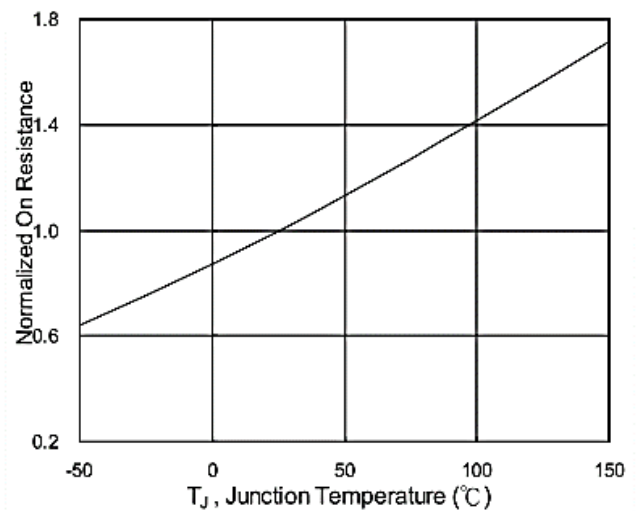


Fig.6 Normalized R_{DS(on)} vs. T_J



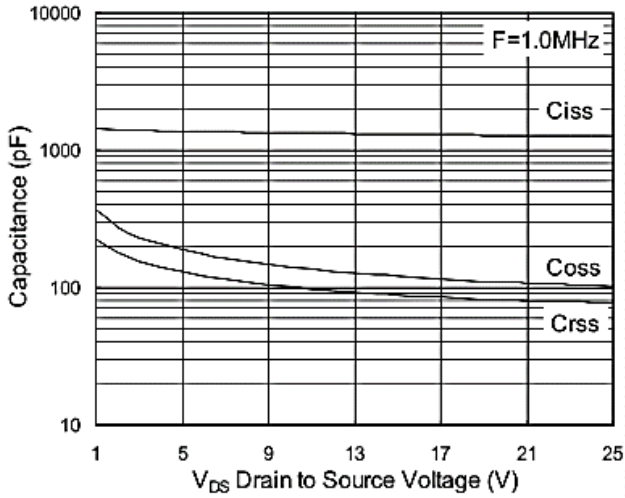


Fig.7 Capacitance

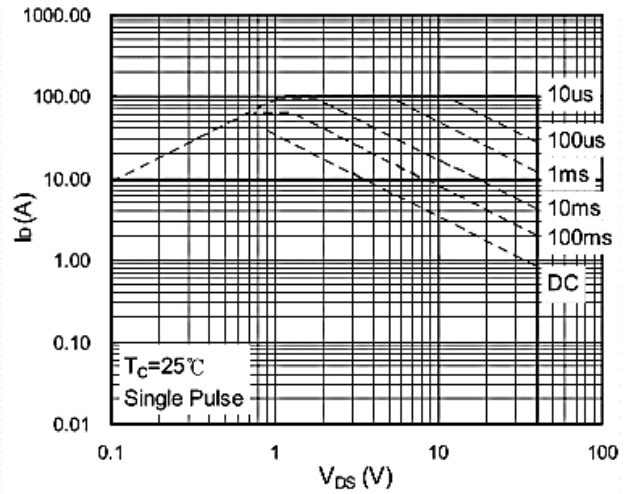


Fig.8 Safe Operating Area

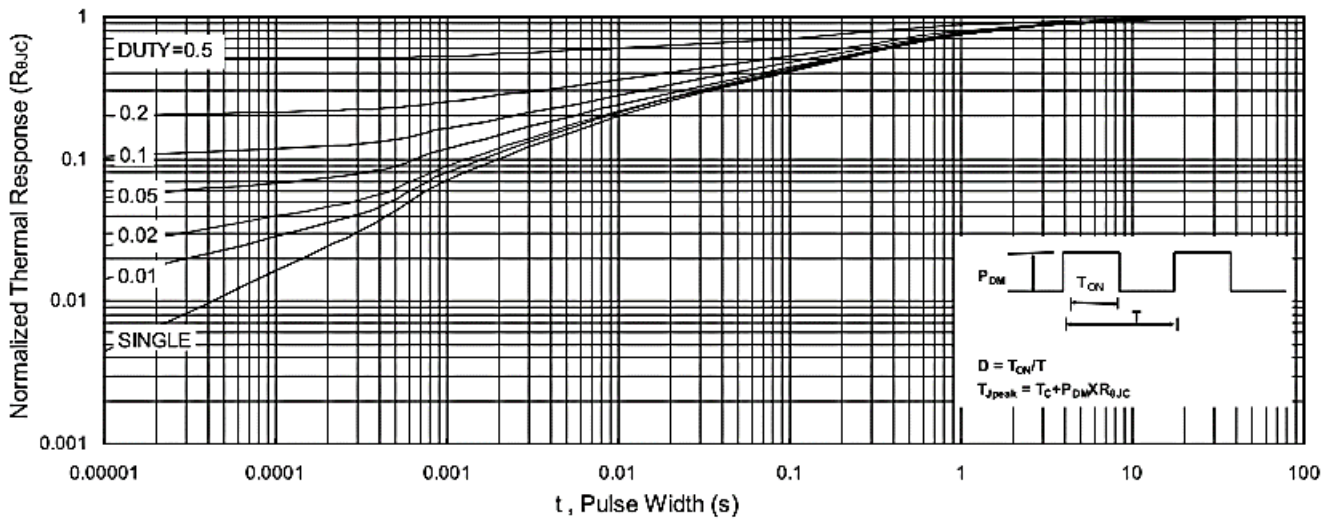


Fig.9 Normalized Maximum Transient Thermal Impedance

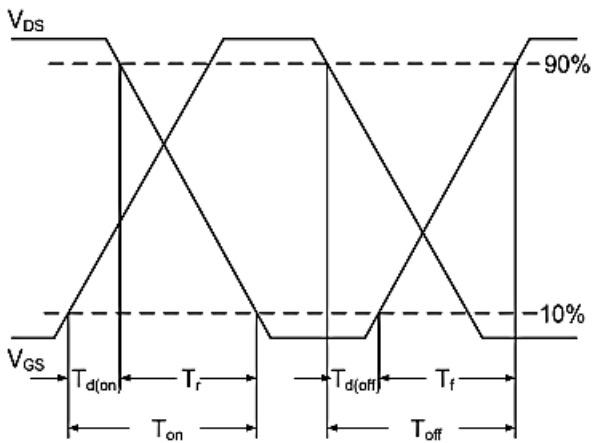


Fig.10 Switching Time Waveform

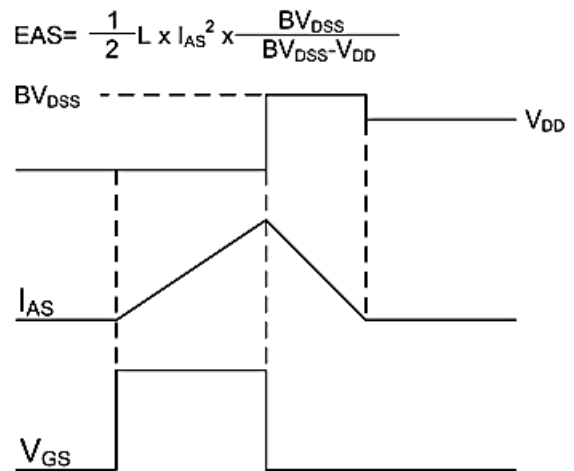
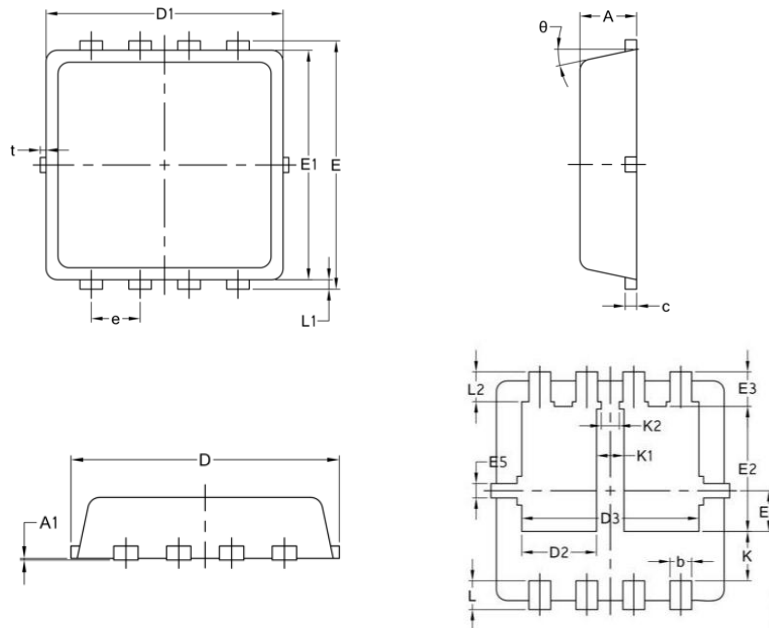


Fig.11 Unclamped Inductive Switching Waveform

Package Mechanical Data-PDFN3*3-8L Double



Symbol	Common		
	Mm		
	Min	Nom	Max
A	0.70	0.75	0.85
A1	/	/	0.05
b	0.25	0.30	0.39
c	0.14	0.152	0.20
D	3.20	3.30	3.45
D1	3.05	3.15	3.25
D2	0.84	1.04	1.24
D3	2.30	2.45	2.60
E	3.20	3.30	3.40
E1	2.95	3.05	3.15
E2	1.60	1.74	1.90
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	0.50	0.69	0.80
K1	0.30	0.38	0.53
K2	0.15	0.25	0.35
L	0.30	0.40	0.50
L1	0.06	0.125	0.20
L2	0.27	0.42	0.57
t	0	0.075	0.13
Φ	10°	12°	14°

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Edition	Date	Change
Rve1.0	2021/7/23	Initial release

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