AP60H04NF

40V N+N-Channel Enhancement Mode MOSFET

Description

The AP60H04NF uses advanced **APM-SGT V** 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 =60A

$R_{DS(ON)}$ < 5.8mΩ @ V_{GS}=10V **（Type：4.8mΩ）**

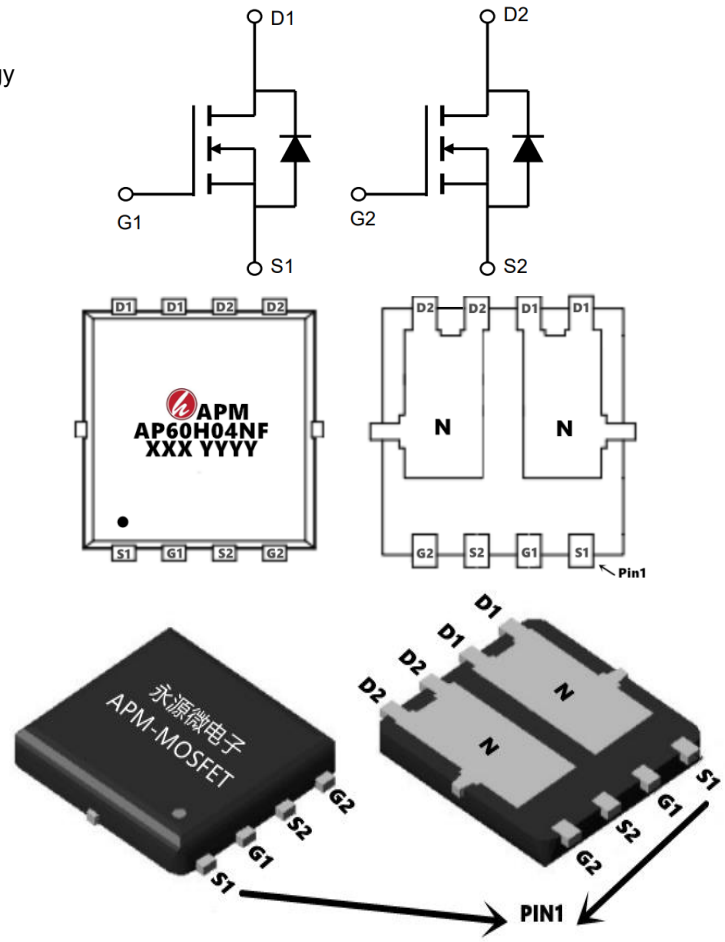
Ciss≈1204 PF

Application

Wireless charging

Boost driver

Brushless motor



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP60H04NF	PDFN5*6-8L	AP60H04NF XXX YYYY	5000

Absolute Maximum Ratings (T_C=25℃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℃	Continuous Drain Current, V_{GS} @ 10V[1]	60	A
I_D@T_A=70℃	Continuous Drain Current, V_{GS} @ 10V[1]	40	A
I_{DM}	Pulsed Drain Current[2]	250	A
EAS	Single Pulse Avalanche Energy[3]	36	mJ
I_{AS}	Avalanche Current	27	A
P_D@T_A=25℃	Total Power Dissipation[4]	42	W
T_{STG}	Storage Temperature Range	-55 to 150	℃
T_J	Operating Junction Temperature Range	-55 to 150	℃
$R_{\theta JA}$	Thermal Resistance Junction-Ambient [1]	25	℃/W
$R_{\theta JC}$	Thermal Resistance Junction-Case[1]	3.0	℃/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	40	47	---	V
RDS(ON)	Static Drain-Source On-Resistance[2]	V_{GS}=10V , I_D=30A	---	4.8	5.8	mΩ
		V_{GS}=4.5V , I_D=20A	---	6.4	8.0	
VGS(th)	Gate Threshold Voltage	V_{GS}=V_{DS} , I_D =250uA	1.2	1.6	2.5	V
IDSS	Drain-Source Leakage Current	V_{DS}=32V , V_{GS}=0V , T_J=25℃	---	---	1	uA
		V_{DS}=32V , V_{GS}=0V , T_J=55℃	---	---	5	
IGSS	Gate-Source Leakage Current	V_{GS}=±20V , V_{DS}=0V	---	---	±100	nA
R_g	Gate Resistance	V_{DS}=0V , V_{GS}=0V , f=1MHz	---	1.8	---	Ω
Q_g	Total Gate Charge (4.5V)	V_{DS}=20V , V_{GS}=4.5V , I_D=12A	---	9.7	---	nC
Qgs	Gate-Source Charge		---	3.2	---	
Qgd	Gate-Drain Charge		---	4.0	---	
Td(on)	Turn-On Delay Time	V_{DD}=15V , V_{GS}=10V , R_G=3.3Ω I_D=1A	---	4.8	---	ns
T_r	Rise Time		---	8.6	---	
Td(off)	Turn-Off Delay Time		---	23	---	
T_f	Fall Time		---	15.2	---	
Ciss	Input Capacitance	V_{DS}=20V , V_{GS}=0V , f=1MHz	---	1204	---	pF
Coss	Output Capacitance		---	536	---	
Crss	Reverse Transfer Capacitance		---	51	---	
IS	Continuous Source Current[1,5]	V_G=V_D=0V , Force Current	---	---	42	A
VSD	Diode Forward Voltage[2]	V_{GS}=0V , I_S=1A , T_J=25℃	---	---	1.0	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 EAS data shows Max. rating . The test condition is VDD =32V,VGS =10V,L=0.1mH,IAS =27A
4、The power dissipation is limited by 150℃ 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

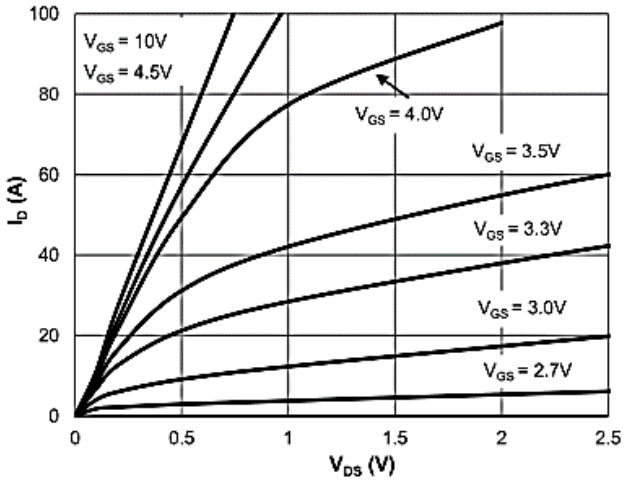


Figure 1: Saturation Characteristics

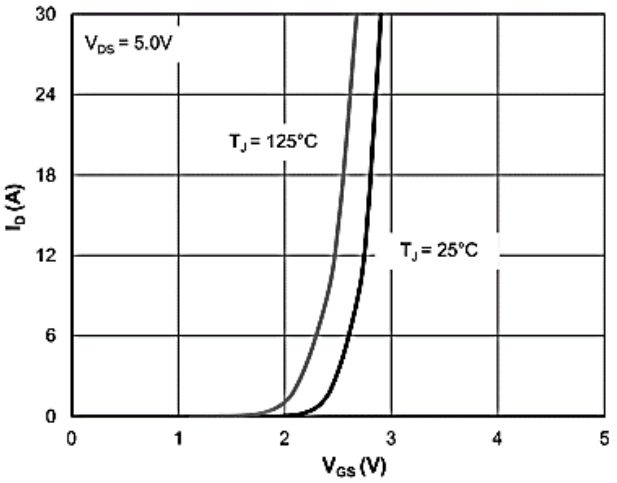


Figure 2: Transfer Characteristics

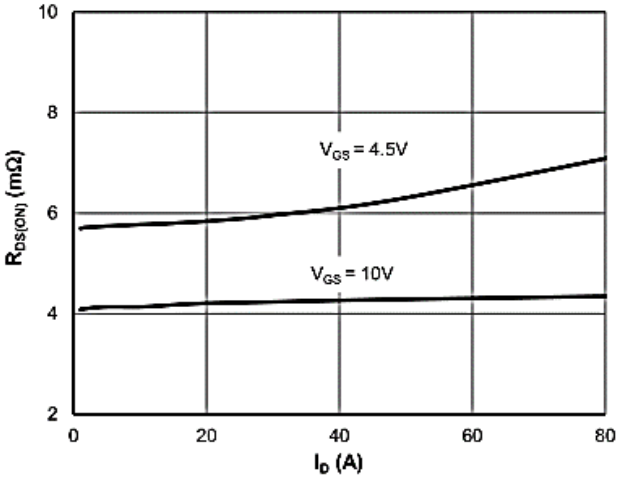


Figure 3: $R_{DS(ON)}$ vs. Drain Current

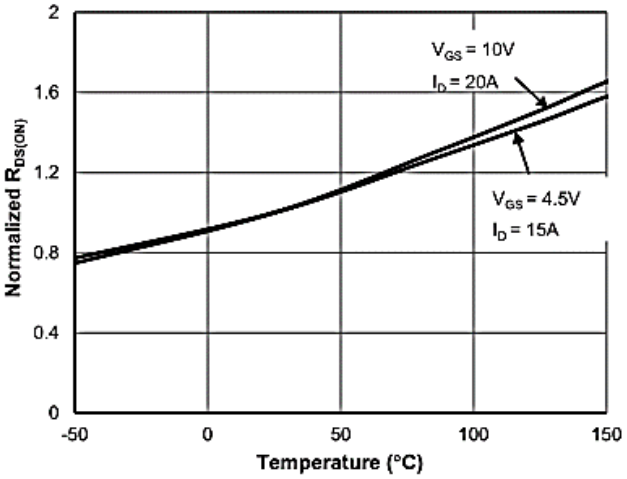


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

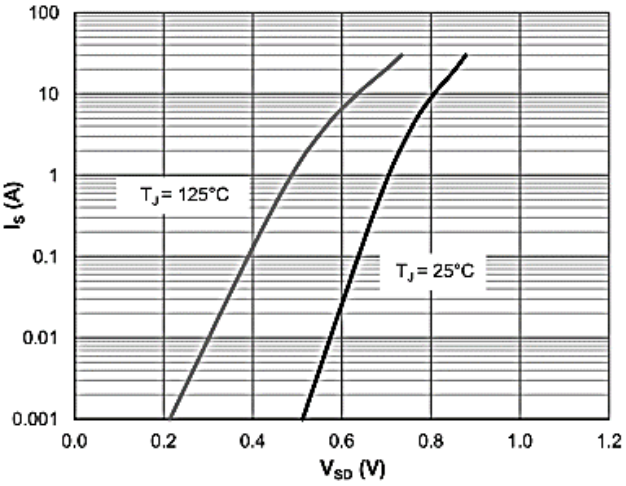


Figure 5: Body-Diode Characteristics

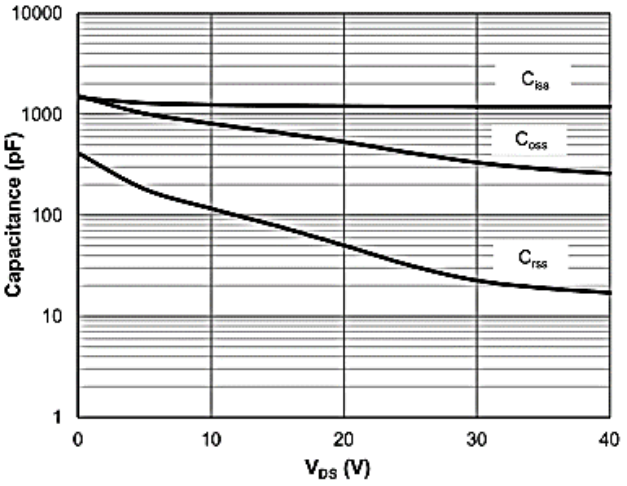


Figure 6: Capacitance Characteristics

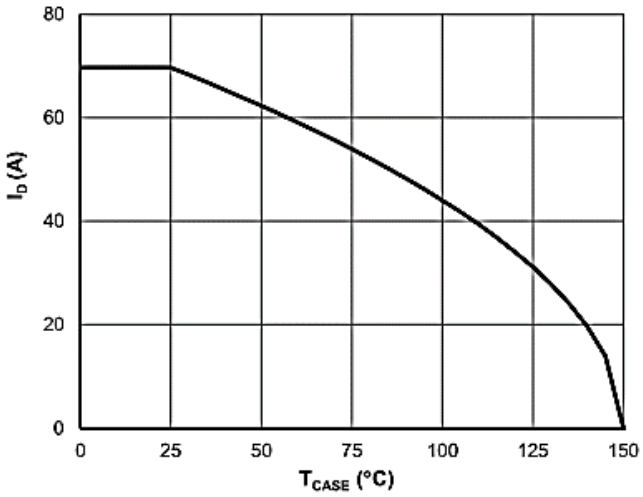


Figure 7: Current De-rating

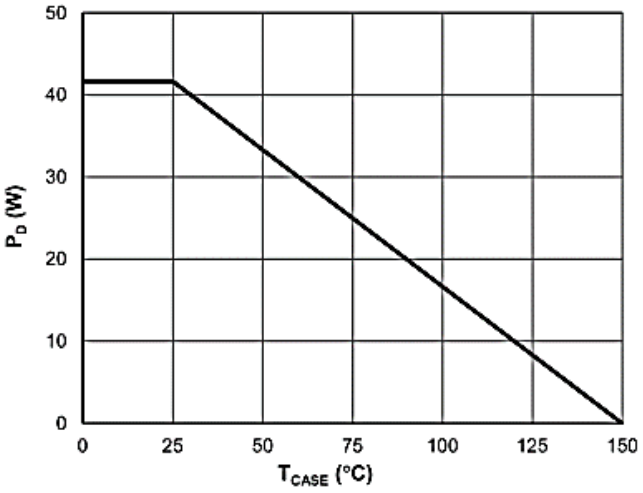


Figure 8: Power De-rating

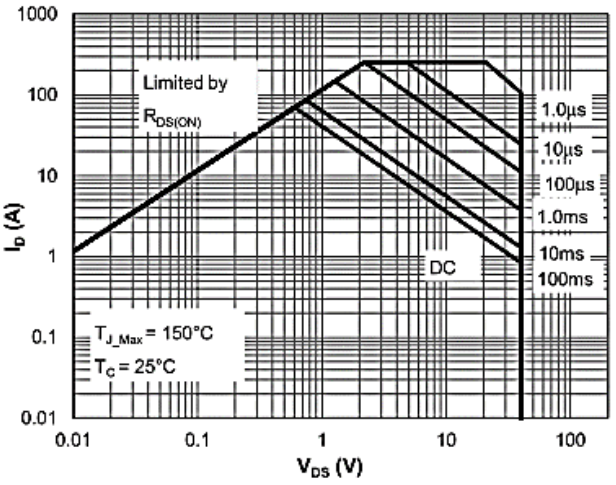


Figure 9: Maximum Safe Operating Area

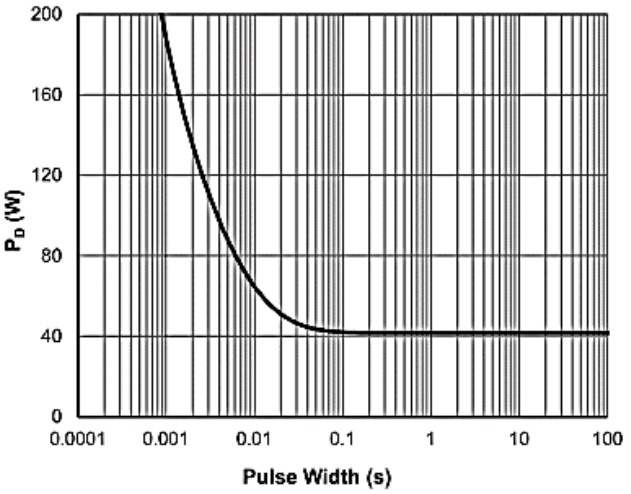


Figure 10: Single Pulse Power Rating, Junction-to-Case

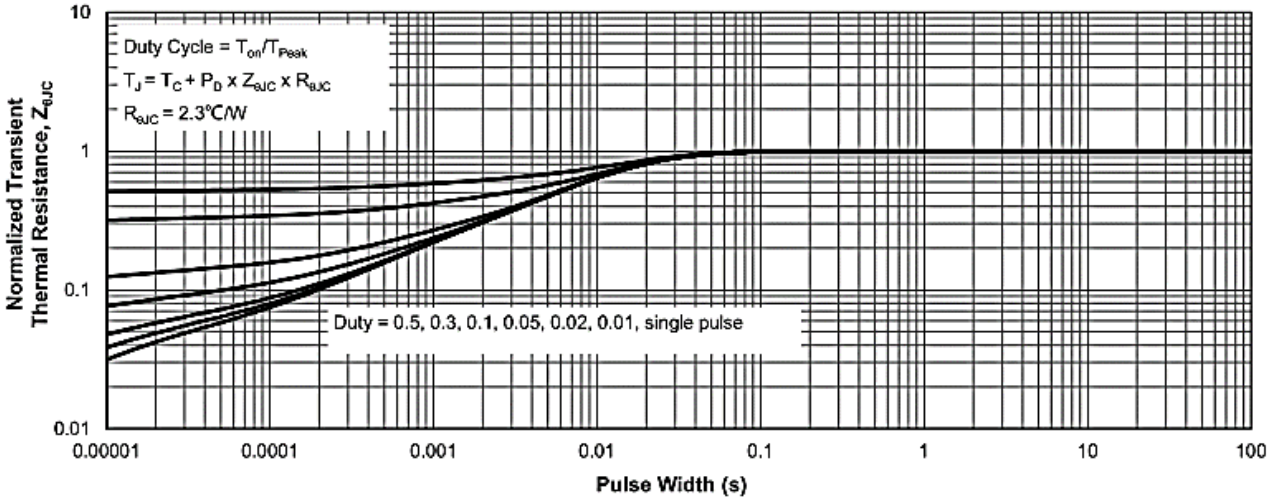
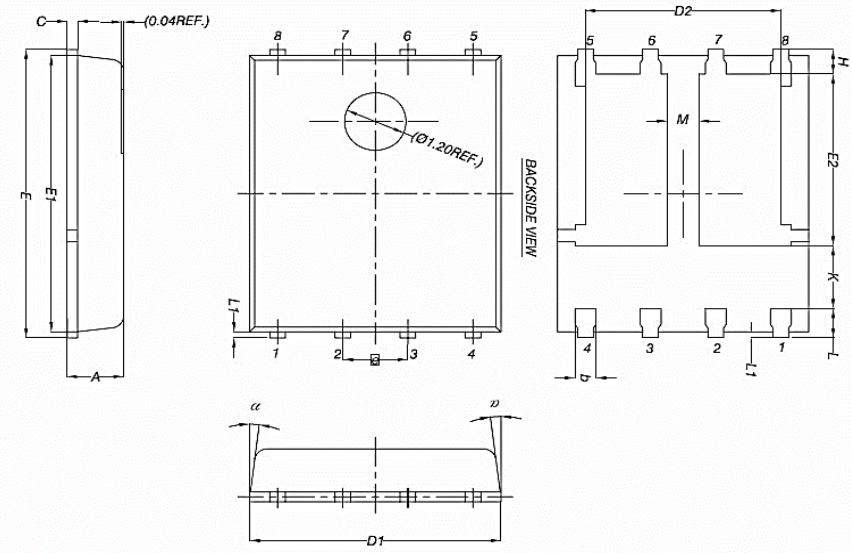


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-DFN5*6-8L-JQ Double



Symbol	Common		
	mm		
	Mim	Nom	Max
A	0.90	1.00	1.10
b	0.33	0.41	0.51
C	0.20	0.25	0.30
D1	4.80	4.90	5.00
D2	3.61	3.81	3.96
E	5.90	6.00	6.10
E1	5.70	3.30	3.45
E2	3.38	3.05	3.20
e	1.27BSC		
H	0.41	0.51	0.61
K	1.10	--	--
L	0.51	0.61	0.71
L1	0.06	0.13	0.20
M	0.50	--	--
a	0°	--	12°

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40V N+N-Channel Enhancement Mode MOSFET

Edition	Date	Change
REV1.0	2023/4/11	Initial release