

65V N-Channel Enhancement Mode MOSFET

Description

The AP65N06NF uses advanced **APM-SGT_{II}** 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

$V_{DS} = 65V$ $I_D = 65A$

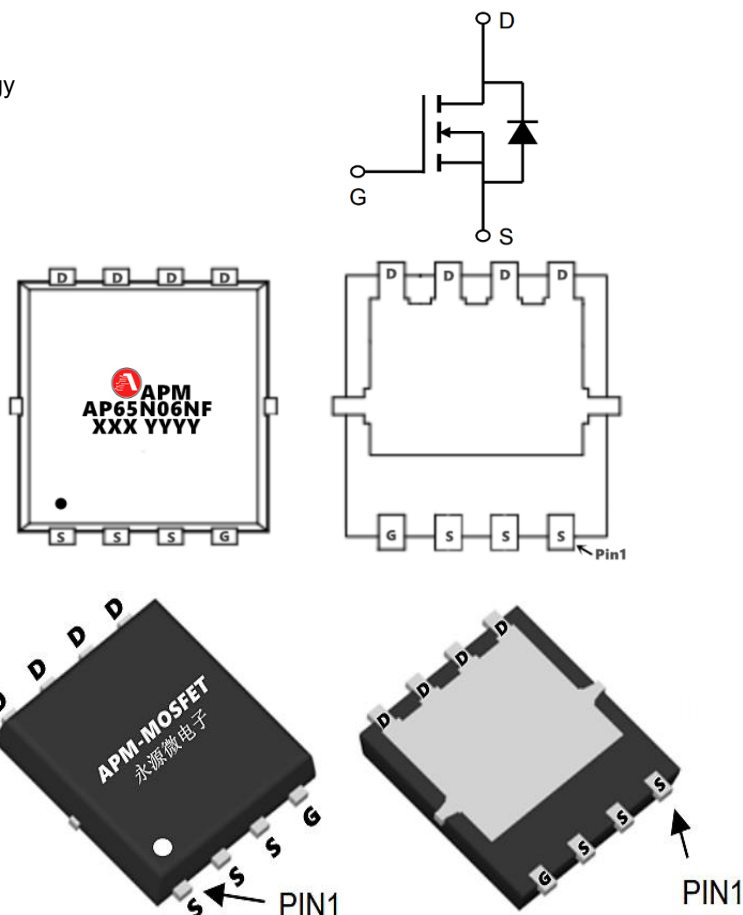
$R_{DS(ON)} < 8.0m\Omega$ @ $V_{GS}=10V$ (Type: **6.5m Ω**)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP65N06NF	PDFN5*6-8L	AP65N06NF XXX YYYY	5000

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

Symbol	Parameter	Value	Unit
V_{DS}	Drain source voltage	60	V
V_{GS}	Gate source voltage	± 20	V
$I_D @ T_A = 25^{\circ}C$	Continuous drain current	65	A
$I_D @ T_A = 70^{\circ}C$	Continuous drain current	31	A
I_{DM}	Pulsed drain current	240	A
$P_D @ T_A = 25^{\circ}C$	Power dissipation	33.1	W
EAS	Single pulsed avalanche energy	130	mJ
TSTG	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operation and storage temperature	-55 to 150	$^{\circ}C$
$R_{\theta JC}$	Thermal resistance, junction-case	2.1	$^{\circ}C/W$
$R_{\theta JA}$	Thermal resistance, junction-ambient5)	25	$^{\circ}C/W$

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Electrical Characteristics ($T_J=25^{\circ}\text{C}$, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	65	72	-	V
IGSS	Gate-body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 100	nA
IDSS $T_J=25^{\circ}\text{C}$	Zero Gate Voltage Drain Current	$V_{DS}=65V, V_{GS}=0V$			1	μA
IDSS $T_J=100^{\circ}\text{C}$					100	
VGS(th)	Gate-Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1.2	1.7	2.5	V
RDS(on)	Drain-Source On-Resistance ⁴	$V_{GS}=10V, I_D=20A$	-	6.5	8.0	m Ω
RDS(on)	Drain-Source On-Resistance ⁴	$V_{GS}=4.5V, I_D=10A$		8.5	10	m Ω
gfs	Forward Transconductance ⁴	$V_{DS}=10V, I_D=10A$	-	45	-	S
Ciss	Input Capacitance	$V_{DS}=30V, V_{GS}=0V, f=1\text{MHz}$	-	1210	-	pF
Coss	Output Capacitance		-	343	-	
Crss	Reverse Transfer Capacitance		-	17	-	
Rg	Gate Resistance	$f=1\text{MHz}$	-	1.5	-	Ω
Qg	Total Gate Charge	$V_{GS}=10V, V_{DS}=30V, I_D=10A$	-	21.7	-	nC
Qgs	Gate-Source Charge		-	3.9	-	
Qgd	Gate-Drain Charge		-	4.5	-	
td(on)	Turn-On Delay Time	$V_{GS}=10V, V_{DD}=30V, R_G=3\Omega, I_D=10A$	-	7.3	-	ns
tr	Rise Time		-	8.5	-	
td(off)	Turn-Off Delay Time		-	19.6	-	
tf	Fall Time		-	5.6	-	
trr	Body Diode Reverse Recovery Time	$I_F=10A, dI/dt=100A/\mu s$	-	34	-	ns
Qrr	Body Diode Reverse Recovery Charge		-	17	-	nC
VSD	Diode Forward Voltage ⁴	$I_S=10A, V_{GS}=0V$	-	-	1.2	V
IS	Continuous Source Current	$T_A=25^{\circ}\text{C}$	-	-	65	A

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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=38A$
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation

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Typical Characteristics

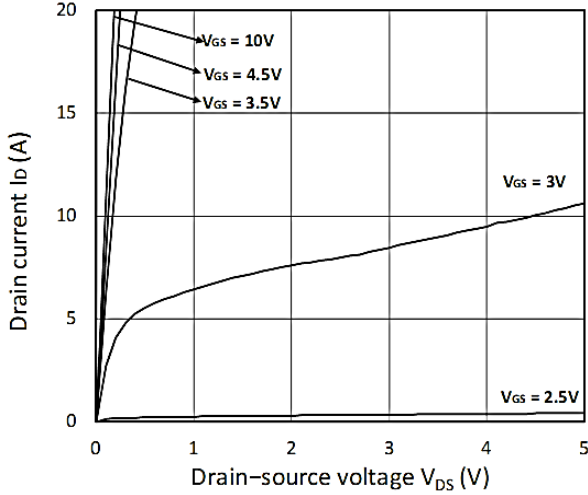


Figure 1. Output Characteristics

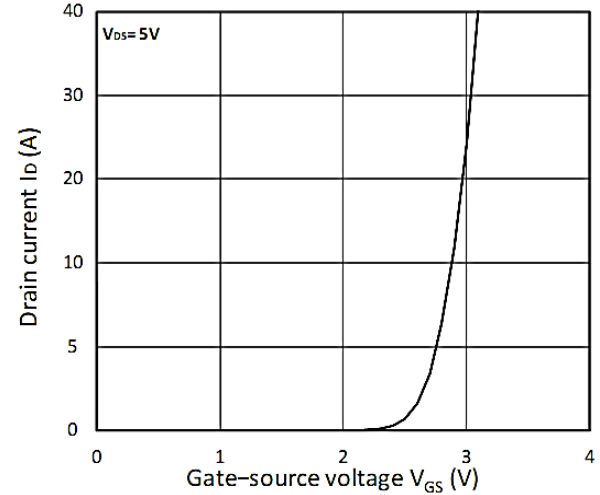


Figure 2. Transfer Characteristics

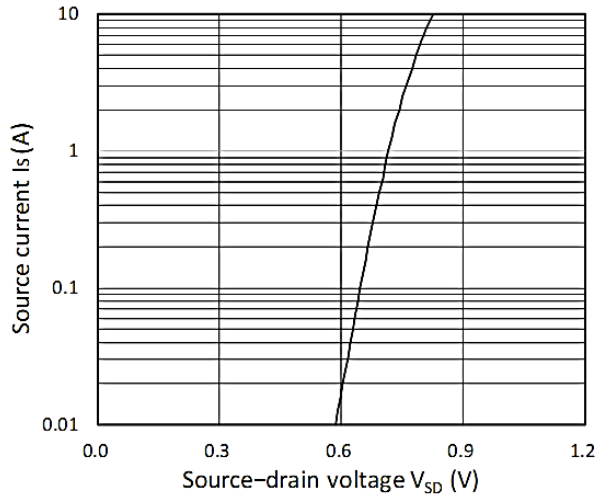


Figure 3. Forward Characteristics of Reverse

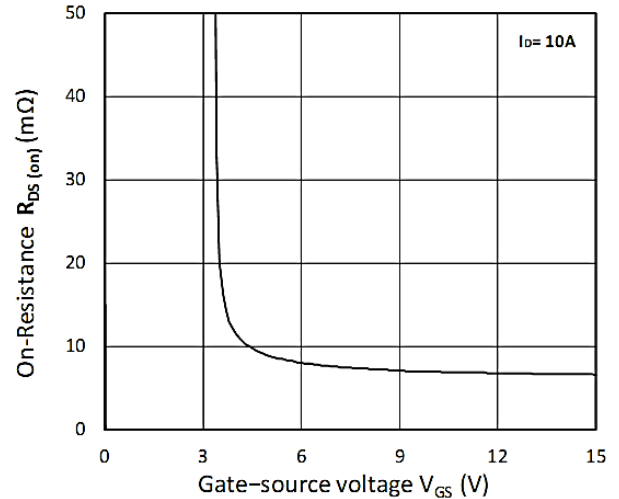


Figure 4. R_DS(ON) vs. V_GS

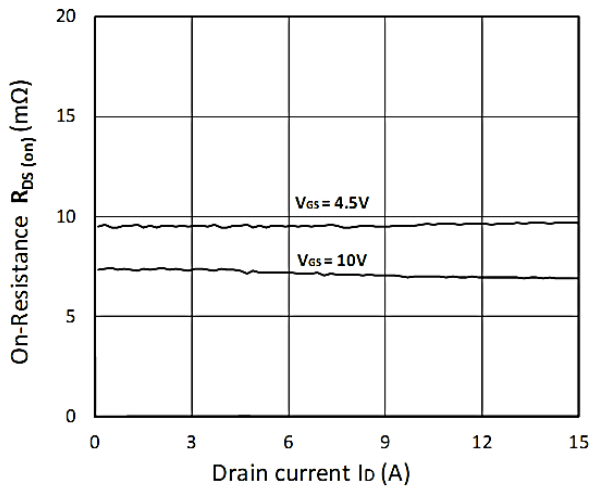


Figure 5. R_DS(ON) vs. I_D

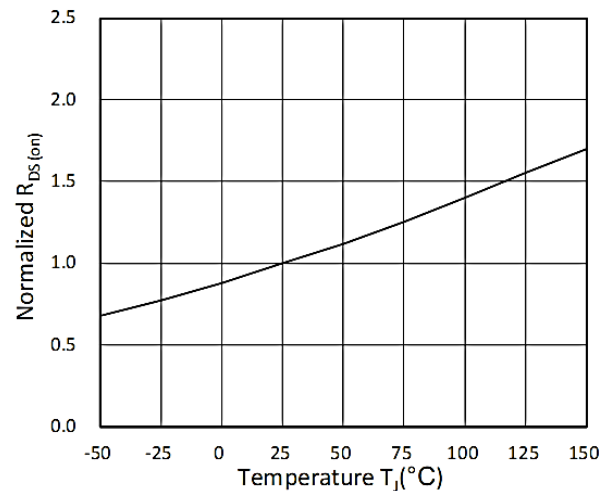


Figure 6. Normalized R_DS(on) vs. Temperature

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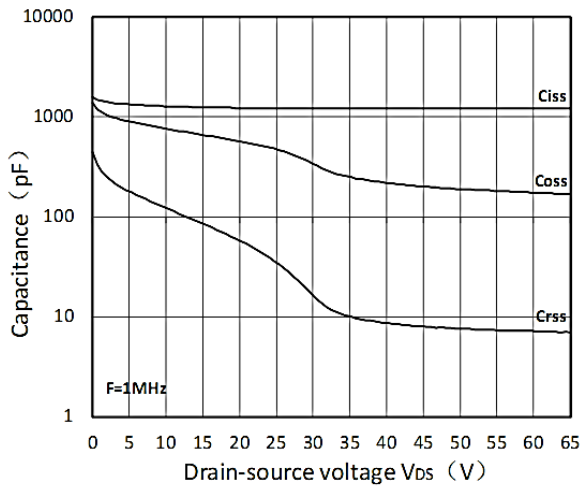


Figure 7. Capacitance Characteristics

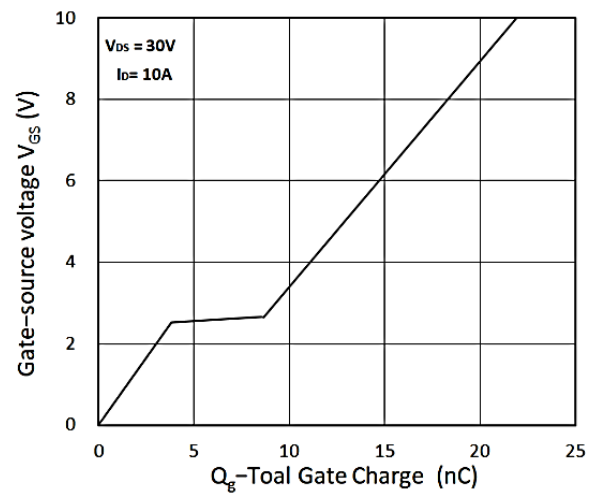


Figure 8. Gate Charge Characteristics

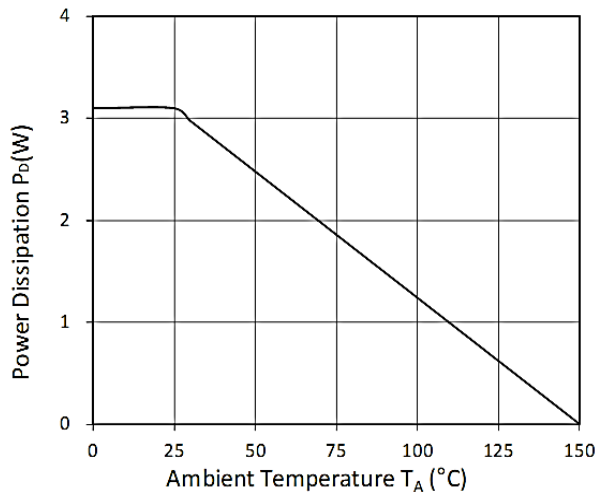


Figure 9. Power Dissipation

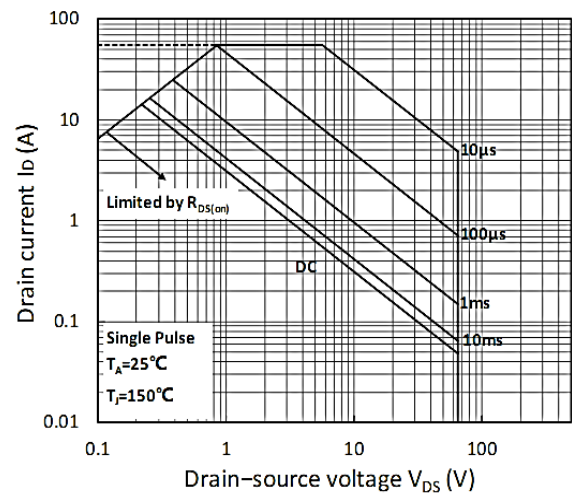


Figure 10. Safe Operating Area

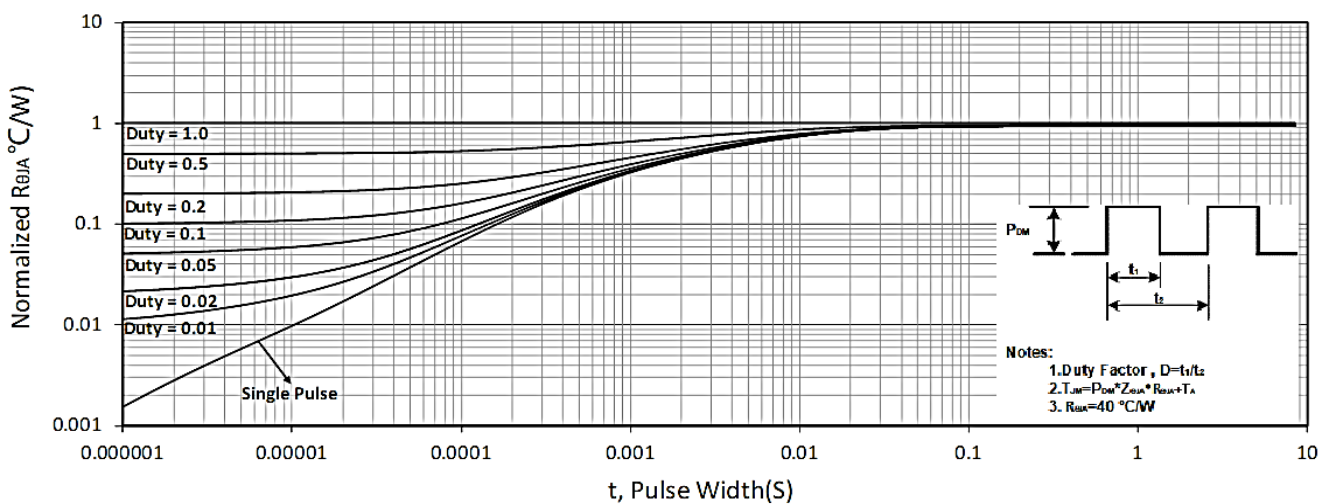
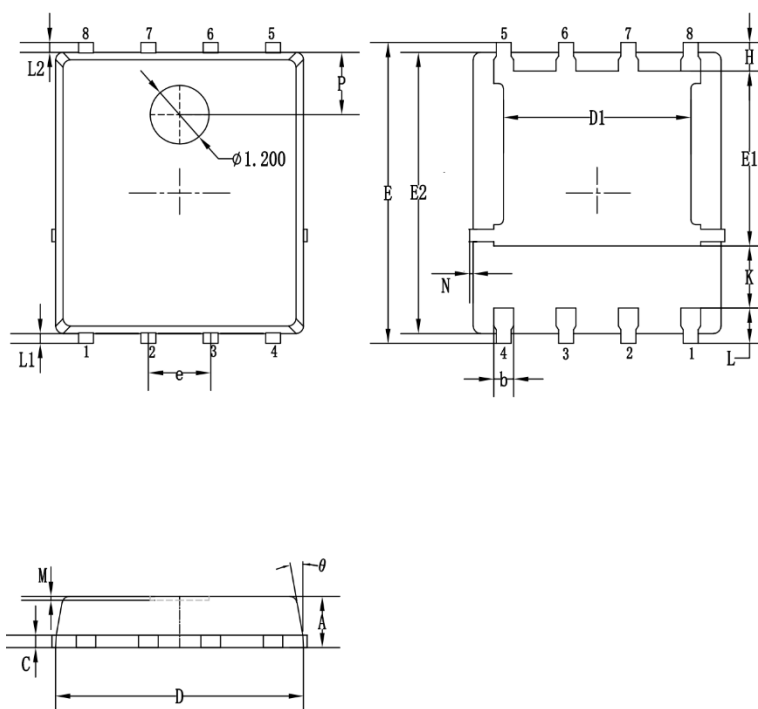


Figure 11. Normalized Maximum Transient Thermal Impedance

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Package Mechanical Data-PDFN5*6-8L Single



Symbol	Dim in mm		
	Min	Typ	Max
A	0.9	1.05	1.2
b	0.3	0.4	0.5
C	0.2	0.25	0.35
D	4.9	5.05	5.2
D1	3.72	3.82	4.12
E	5.9	6.1	6.3
E1	3.3	3.5	3.7
E2	5.6	5.75	5.9
e	1.27BSC		
H	0.48	0.58	0.7
K	1.14	1.27	1.4
L	0.54	0.74	0.84
L1/L2	0.1	0.2	0.3
θ	8°	10°	12°
M	0.08REF		
N	0		0.15
P	1.28REF		

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Edition	Date	Change
REV1.0	2019/8/1	Initial release
REV1.1	2024/4/1	Internal Rds

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