

30V N-Channel Enhancement Mode MOSFET

Description

The AP180N03NF 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

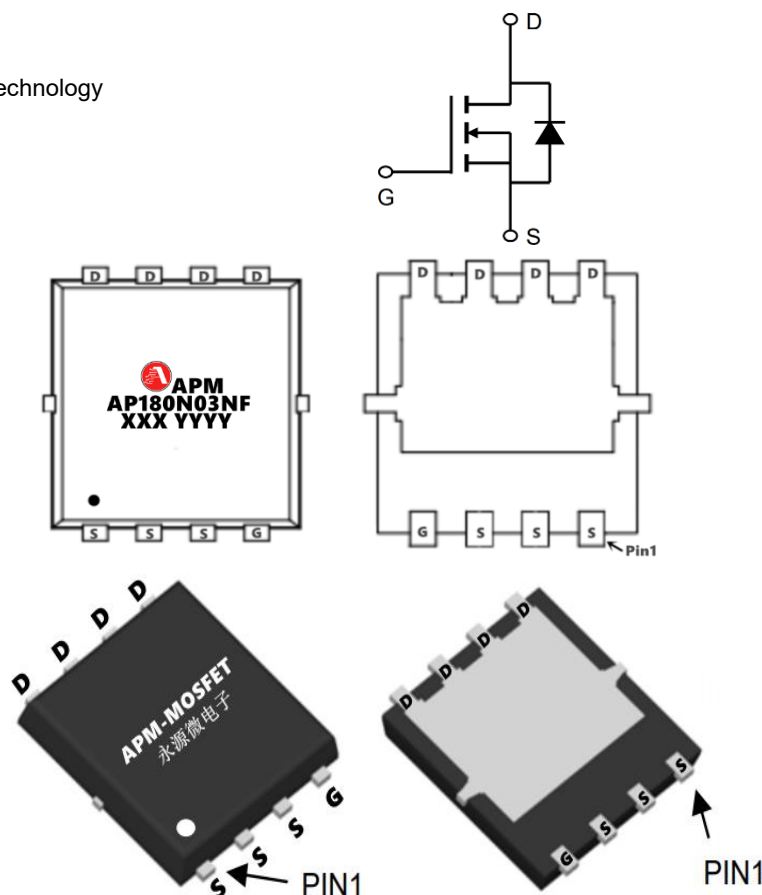
$V_{DS} = 30V$ $I_D = 180A$

$R_{DS(ON)} < 1.2m\Omega$ @ $V_{GS}=10V$ (Type: **0.95mΩ**)

Application

Buck

Boost



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP180N03NF	PDFN5*6-8L	AP180N03NF XXX YYYY	5000

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

Symbol	Parameter	Max.	Units
V_{DSS}	Drain-Source Voltage	30	V
V_{GSS}	Gate-Source Voltage	± 20	V
$I_{D@TC=25^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	180	A
$I_{D@TC=100^{\circ}C}$	Continuous Drain Current, $V_{GS} @ 10V$	154	A
I_{DM}	Pulsed Drain Current	972	A
E_{AS}	Single Pulsed Avalanche Energy	260	mJ
I_{AS}	Avalanche Current	36	A
$P_{D@TC=25^{\circ}C}$	Power Dissipation	113	W
T_J TSTG	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-Ambient ¹	25	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance, Junction to Case	1.1	$^{\circ}C/W$

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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	$V_{GS}=0V, I_D=250\mu A$	30	-	-	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	$V_{DS}=30V, V_{GS}=0V$	-	-	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	$V_{GS}=10V, I_D=20A$	-	0.95	1.2	m Ω
		$V_{GS}=4.5V, I_D=10A$	-	1.35	1.7	
gfs	Forward Transconductance ⁴	$V_{DS}=10V, I_D=20A$	-	126	-	S
Ciss	Input Capacitance	$V_{DS}=15V, V_{GS}=0V, f=1\text{MHz}$	-	3370	-	pF
Coss	Output Capacitance		-	1340	-	
Crss	Reverse Transfer Capacitance		-	135	-	
R _G	Gate Resistance	$f=1\text{MHz}$	-	1	-	Ω
Q _g	Total Gate Charge	$V_{GS}=10V, V_{DS}=15V, I_D=20A$	-	53	-	nC
Q _{gs}	Gate-Source Charge		-	7.8	-	
Q _{gd}	Gate-Drain Charge		-	8.8	-	
td(on)	Turn-on Delay Time	$V_{GS}=10V, V_{DD}=15V, R_G=3\Omega, I_D=20A$	-	10	-	ns
t _r	Rise Time		-	6.5	-	
td(off)	Turn-off Delay Time		-	36.5	-	
t _f	Fall Time		-	11.3	-	
trr	Body Diode Reverse Recovery Time	$I_F=20A, di/dt=100A/\mu s$	-	58	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	29	-	nC
VSD	Diode Forward Voltage ⁴	$I_S=20A, V_{GS}=0V$	-	-	1.2	V
IS	Continuous Source Current	$T_C=25^{\circ}\text{C}$			180	A

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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=25V, V_{GS}=10V, L=0.1mH, I_{AS}=36A$
- 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

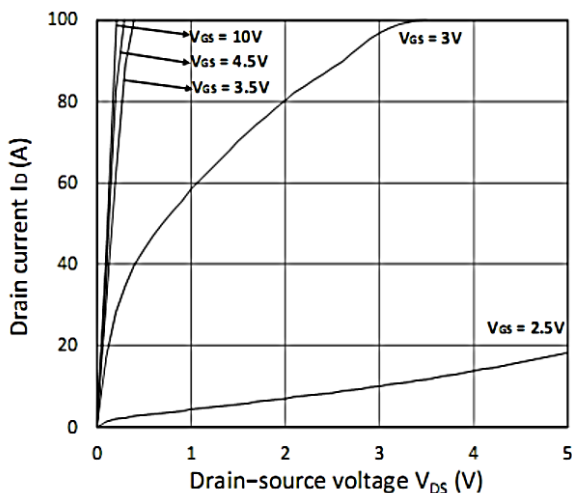


Figure 1. Output Characteristics

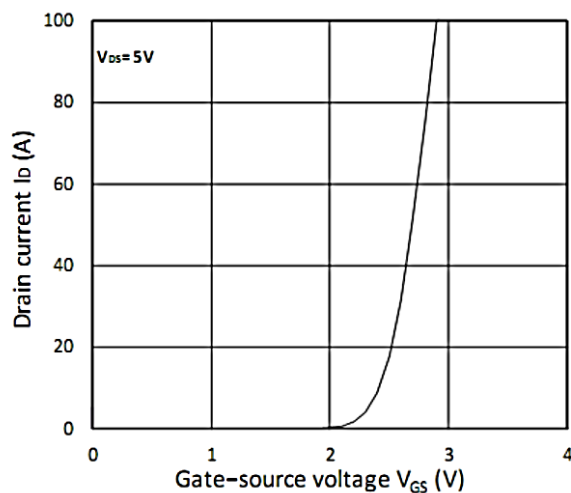


Figure 2. Transfer Characteristics

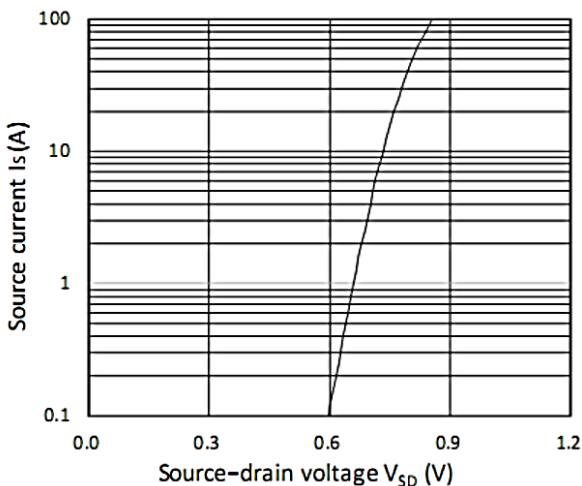


Figure 3. Forward Characteristics of Reverse

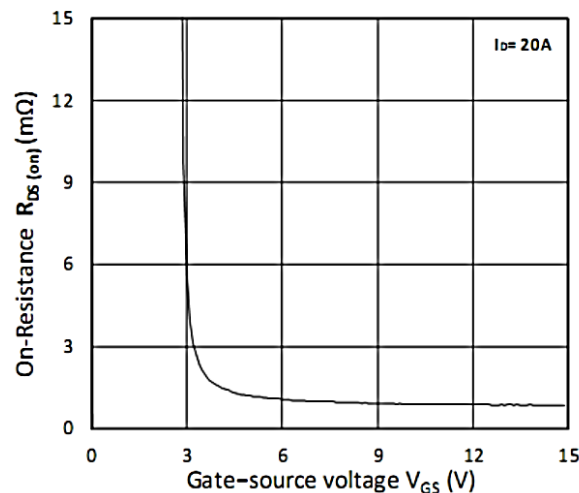


Figure 4. R_DS(ON) vs. V_GS

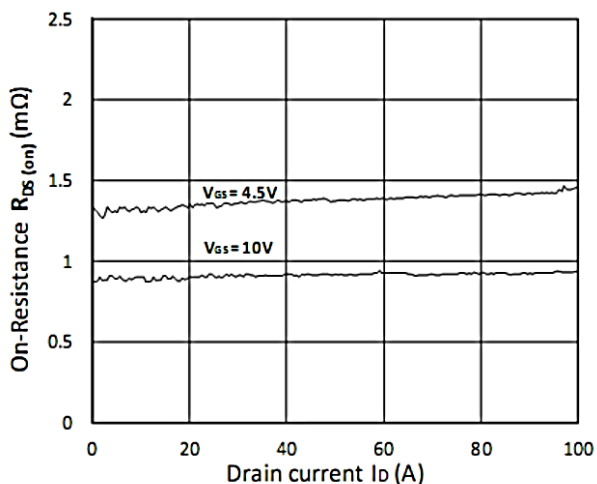


Figure 5. R_DS(ON) vs. I_D

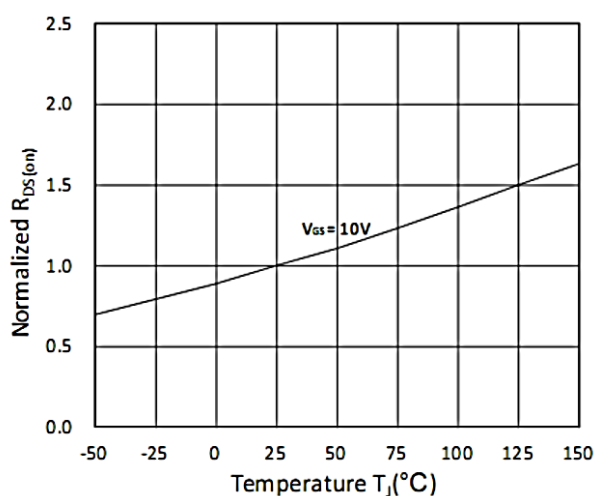


Figure 6. Normalized R_DS(on) vs. Temperature

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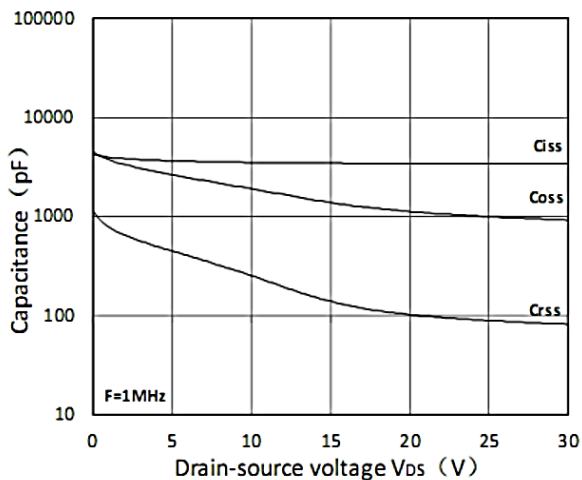


Figure 7. Capacitance Characteristics

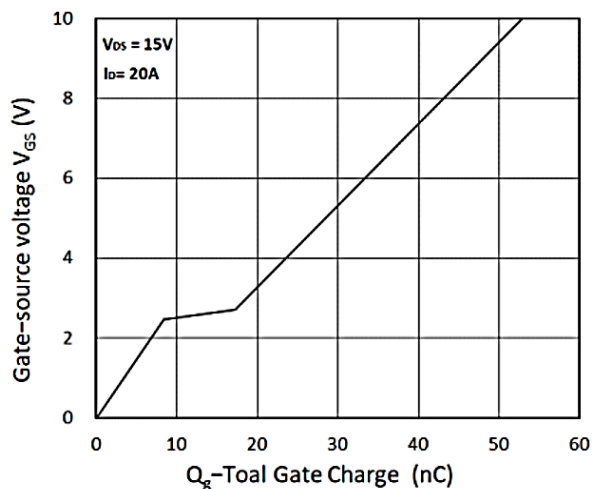


Figure 8. Gate Charge Characteristics

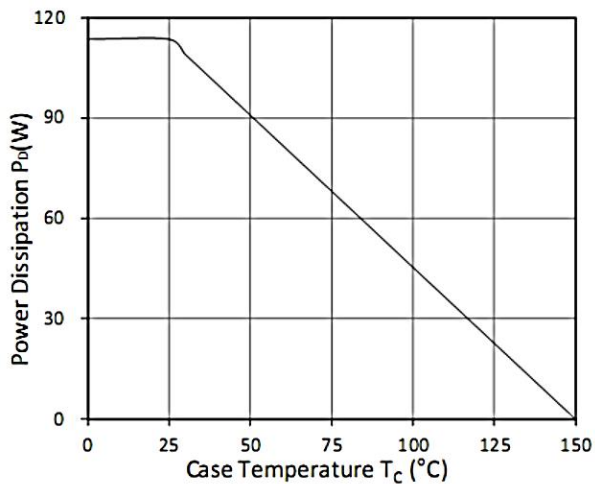


Figure 9. Power Dissipation

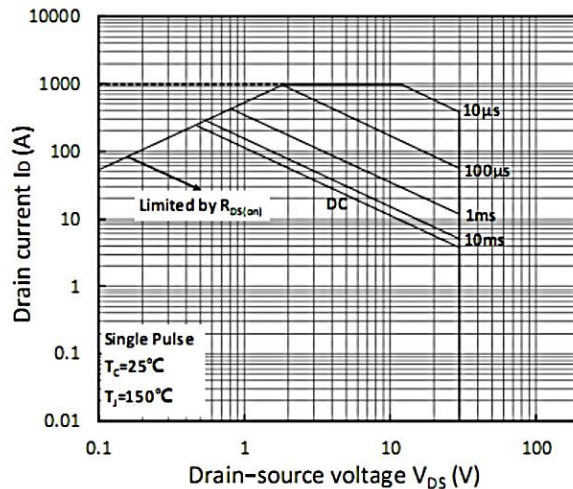


Figure 10. Safe Operating Area

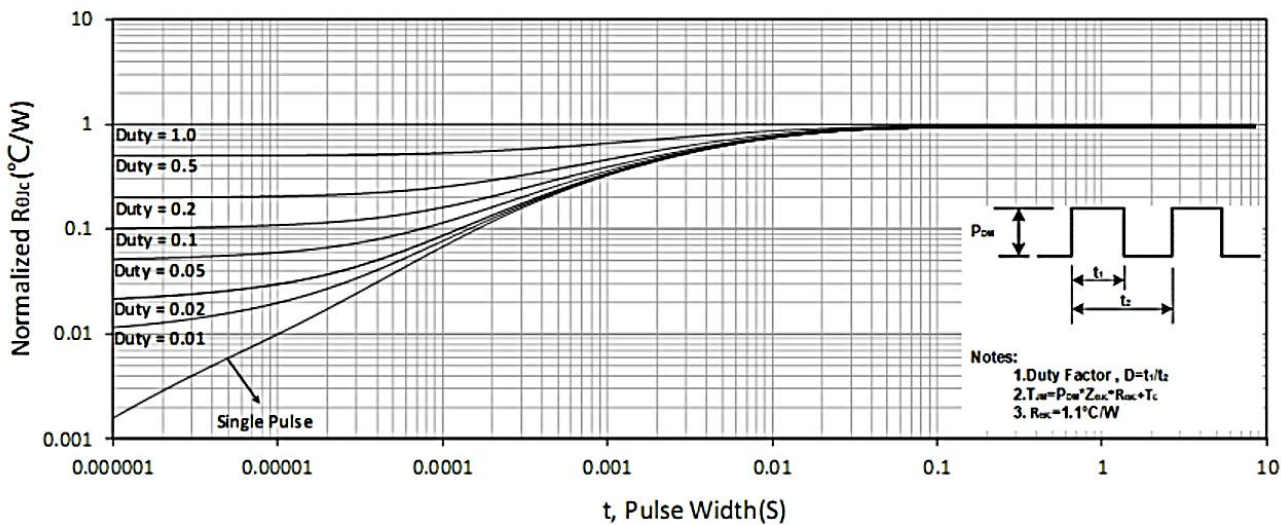
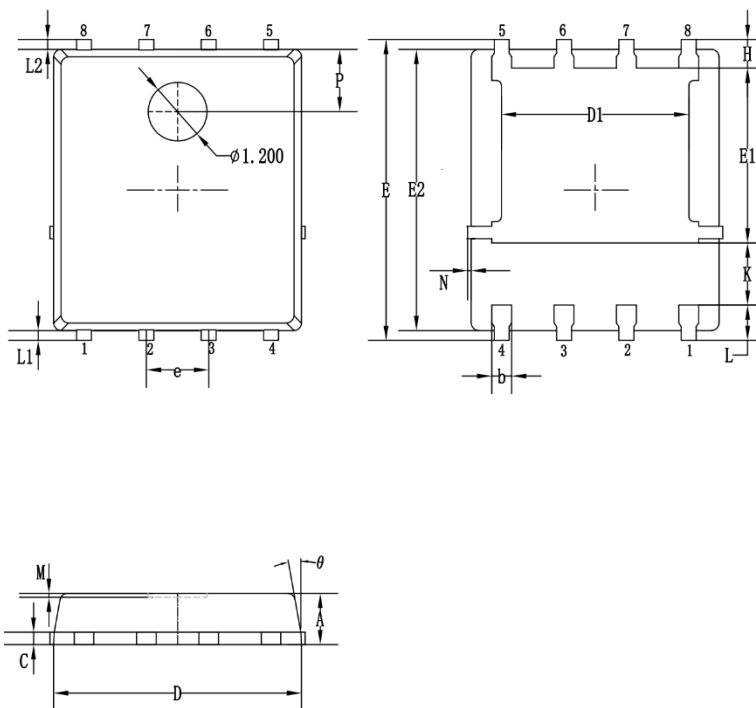


Figure 9 Normalized Maximum Transient Thermal Impedance

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	2024/7/31	Initial release

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