

30V N-Channel Enhancement Mode MOSFET

Description

The AP300N03NF 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

$V_{DS} = 30V$ $I_D = 300A$

$R_{DS(ON)} < 0.7m\Omega$ @ $V_{GS}=10V$ (Type: **0.5mΩ**)

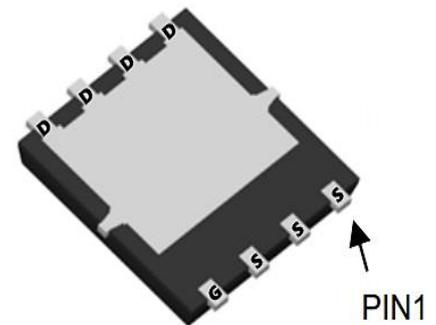
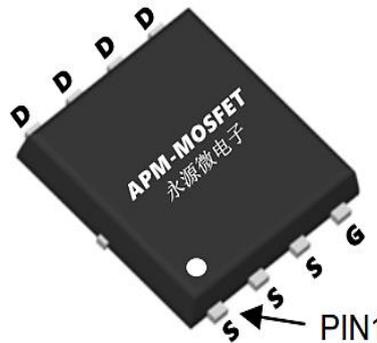
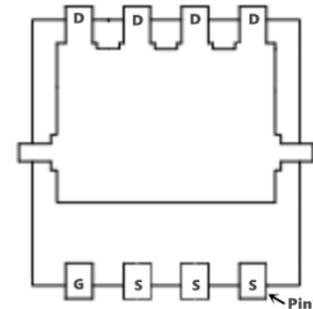
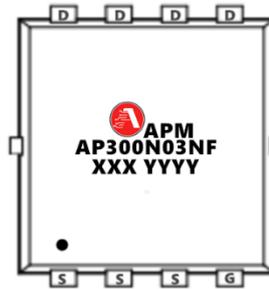
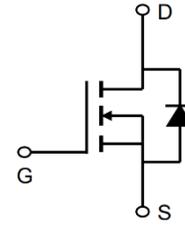
Application

Boost driver

Brushless motor

BLDC

Clip packaging process



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP300N03NF	PDFN5*6-8L	AP300N03NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	± 20	V
ID@TC=25°C	Continuous Drain Current, VGS @ 10V1	300	A
ID@TC=100°C	Continuous Drain Current, VGS @ 10V1	227	A
IDM	Pulsed Drain Current ²	1500	A
EAS	Single Pulse Avalanche Energy ³	1231	mJ
IAS	Avalanche Current	73	A
PD@TC=25°C	Total Power Dissipation ⁴	156	W
TSTG	Storage Temperature Range	-55 to 150	°C
TJ	Operating Junction Temperature Range	-55 to 150	°C
RθJA	Thermal Resistance Junction-Ambient 1	41	°C/W
RθJC	Thermal Resistance Junction-Case ¹	0.72	°C/W

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	$I_D=250\text{mA}$, $V_{GS}=0\text{V}$	30	-	-	V
IDSS	Zero Gate Voltage Drain Current	$V_{DS}=24\text{V}$, $V_{GS}=0\text{V}$	-	-	1.0	mA
IGSS	Gate-Body Leakage Current	$V_{DS}=0\text{V}$, $V_{GS}=\pm 20\text{V}$	-	-	± 100	nA
VGS(th)	Gate Threshold Voltage	$V_{DS}=V_{GS}$, $I_D=250\text{mA}$	1.2	1.6	2.2	V
RDS(ON)	Static Drain-Source ON-Resistance ⁽⁴⁾	$V_{GS}=10\text{V}$, $I_D=20\text{A}$	-	0.5	0.7	m Ω
		$V_{GS}=4.5\text{V}$, $I_D=15\text{A}$	-	1.0	1.4	m Ω
R _g	Gate Resistance	f = 1MHz	-	2.2	-	Ω
C _{iss}	Input Capacitance	$V_{GS}=0\text{V}$, $V_{DS}=15\text{V}$, f=1MHz	-	14008	16064	pF
C _{oss}	Output Capacitance		-	9600	12056	pF
C _{rss}	Reverse Transfer Capacitance		-	280	380	pF
Q _g	Total Gate Charge	$V_{GS}=0$ to 10V $V_{DS}=15\text{V}$, $I_D=20\text{A}$	-	153	210	nC
Q _{gs}	Gate Source Charge		-	33	50	nC
Q _{gd}	Gate Drain("Miller") Charge		-	20	33	nC
td(on)	Turn-On DelayTime	$V_{GS}=10\text{V}$, $V_{DD}=15\text{V}$ $I_D=20\text{A}$, $R_{GEN}=3\text{W}$	-	18	-	ns
t _r	Turn-On Rise Time		-	36	-	ns
td(off)	Turn-Off DelayTime		-	116	-	ns
t _f	Turn-Off Fall Time		-	59	-	ns
IS	Maximum Continuous Body Diode Forward Current		-	-	358	A
ISM	Maximum Pulsed Body Diode Forward Current		-	-	1434	A
VSD	Body Diode Forward Voltage	$V_{GS}=0\text{V}$, $I_S=20\text{A}$	-		1.2	V
trr	Body Diode Reverse Recovery Time	$I_F=20\text{A}$, $di/dt=100\text{A/us}$	84	118	160	ns
Qrr	Body Diode Reverse Recovery Charge		-	232	-	nC

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 $\leq 300\mu\text{s}$, duty cycle $\leq 2\%$
- 3、 The EAS data shows Max. rating . The test condition is $V_{DD}=40\text{V}$, $V_{GS}=10\text{V}$, $L=0.5\text{mH}$, $I_{AS}=70\text{A}$
- 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

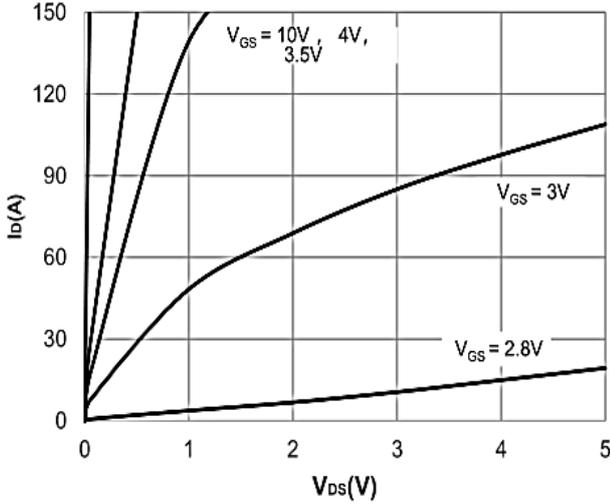


Figure 1. Output Characteristics

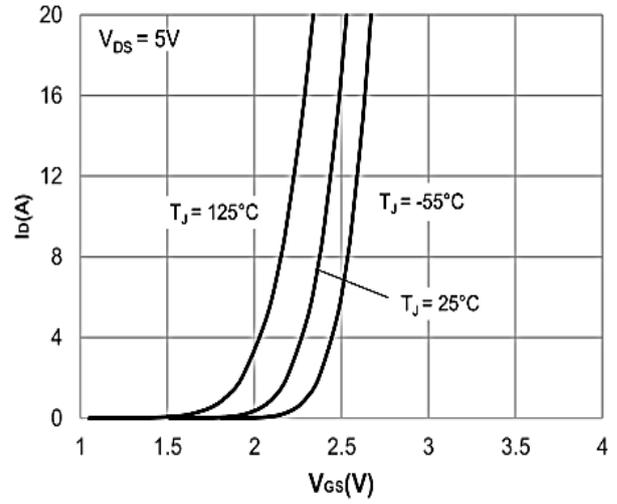


Figure 2. Typical Transfer Characteristics

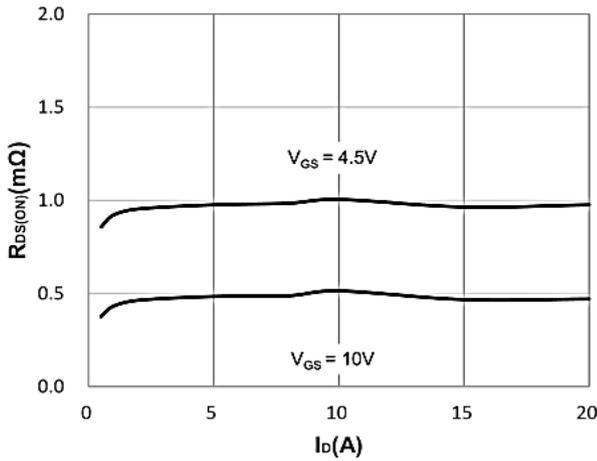


Figure 3. On-resistance vs. Drain Current

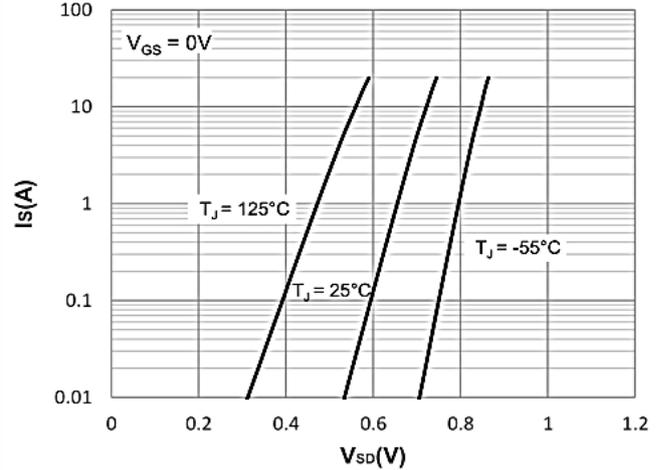


Figure 4. Body Diode Characteristics

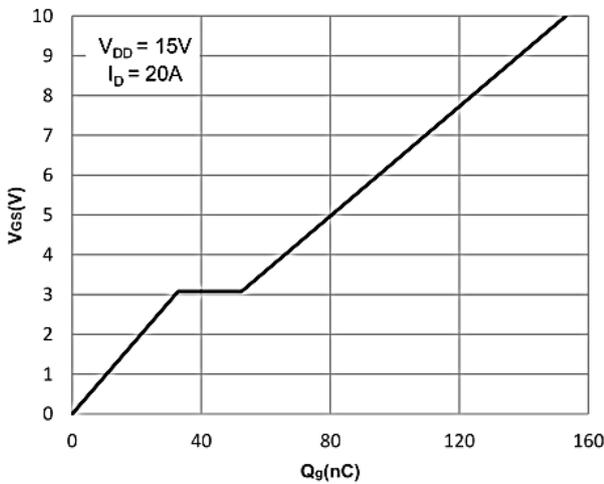


Figure 5. Gate Charge Characteristics

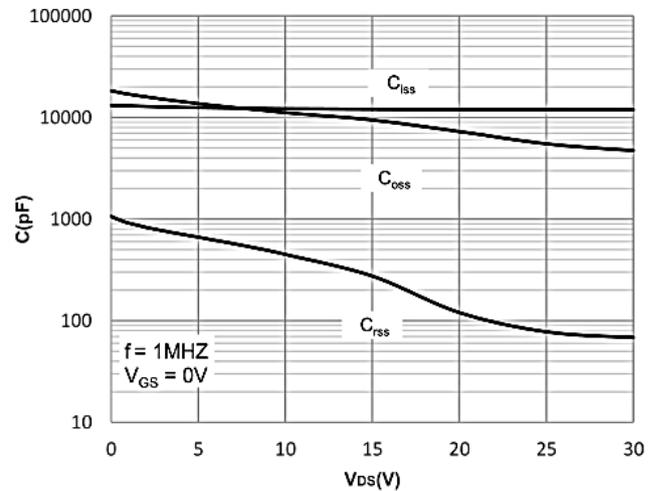


Figure 6. Capacitance Characteristics

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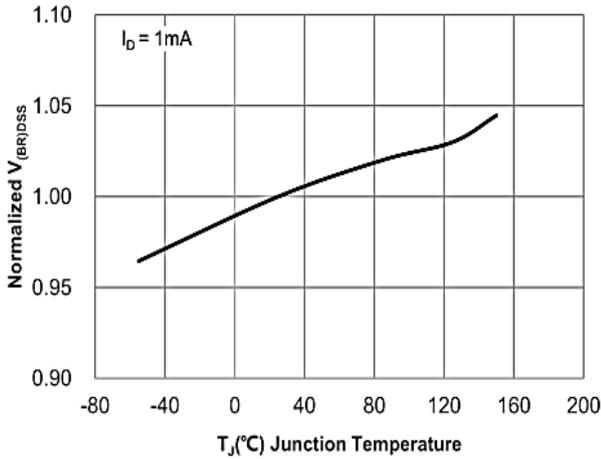


Figure 7. Normalized Breakdown voltage vs. Junction Temperature

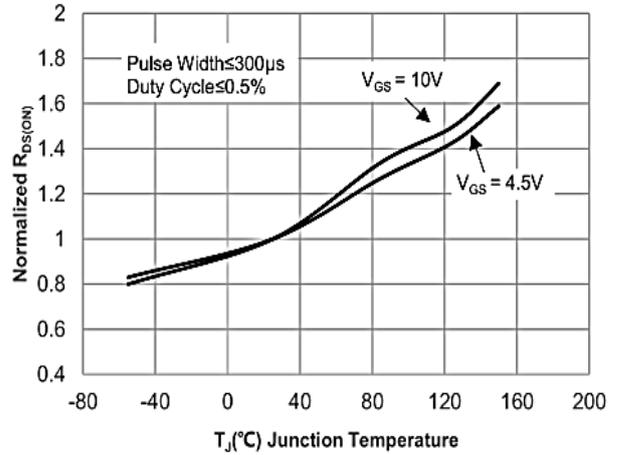


Figure 8. Normalized on Resistance vs. Junction Temperature

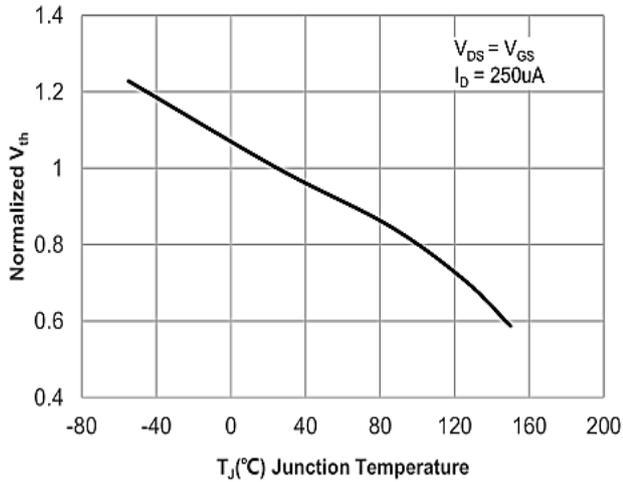


Figure 9. Normalized Threshold Voltage vs. Junction Temperature

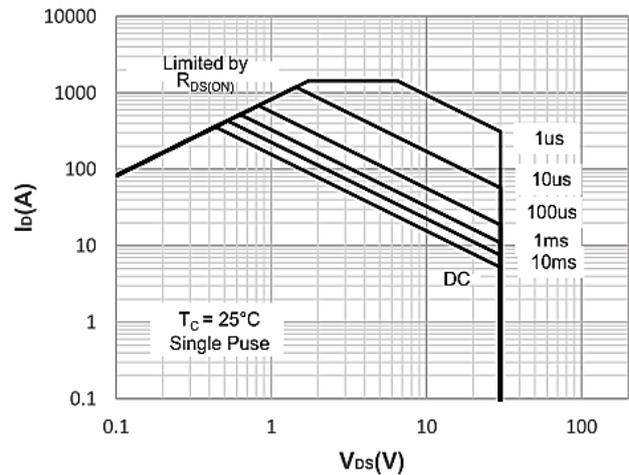


Figure 10. Safe Operating Area

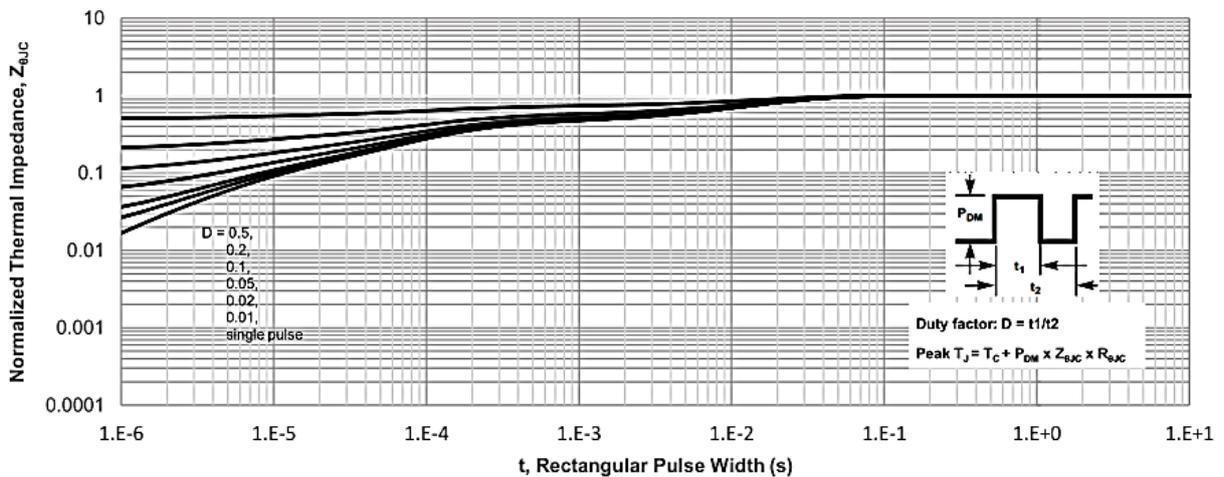
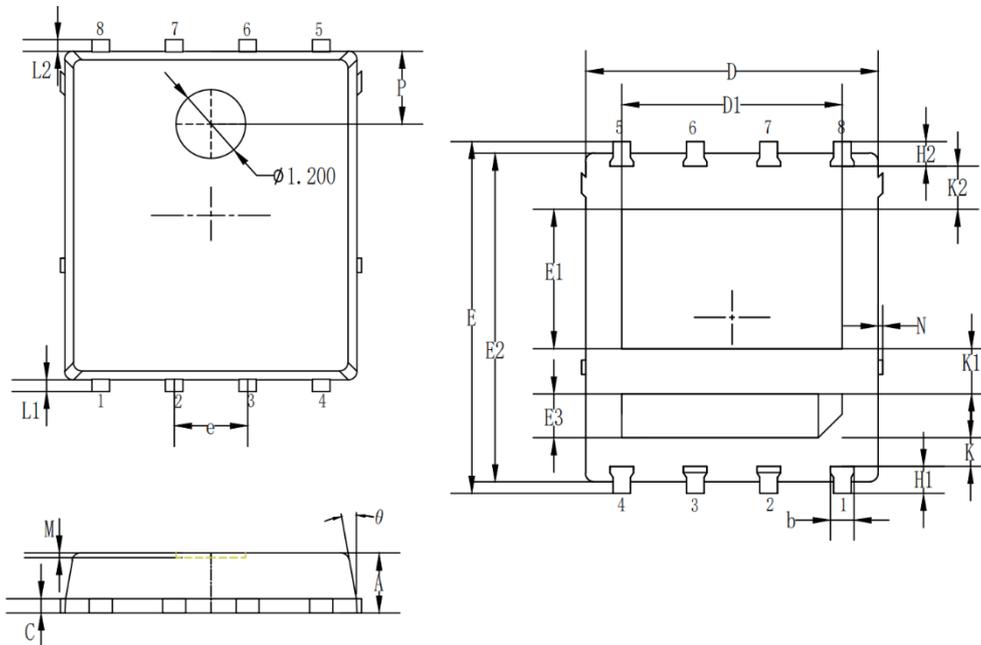


Figure 11. Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-PDFN5*6-8L



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/D2	1.51	1.66	1.81
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		
d	0.5	0.6	0.7

30V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
REV1.0	2024/3/31	Initial release

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