

30V N-Channel Enhancement Mode MOSFET

Description

The AP135N03NF 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

$V_{DS} = 30V$ $I_D = 135A$

$R_{DS(ON)} < 1.6m\Omega$ @ $V_{GS}=10V$ (**Type: 1.3mΩ**)

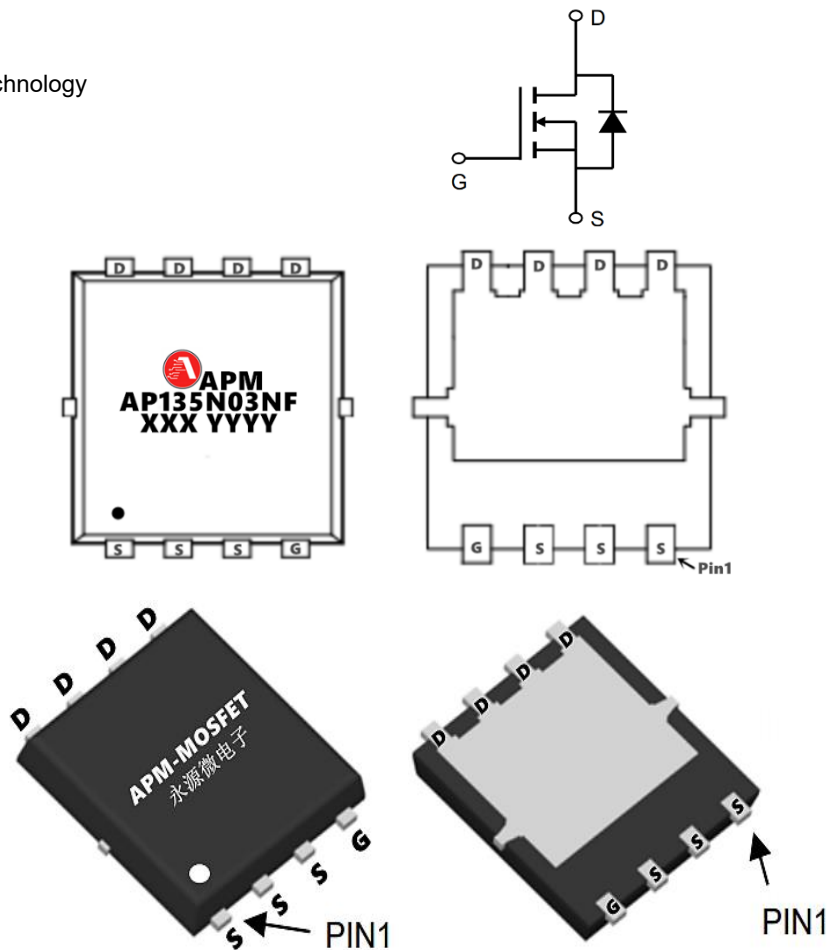
Application

Boost driver

Brushless motor

BLDC

Clip packaging process



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP135N03NF	DFN5*6-8L	AP135N03NF XXX YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	30	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_{D@TC=25^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V$	135	A
$I_{D@TC=100^\circ C}$	Continuous Drain Current, $V_{GS} @ 10V$	110	A
I_{DM}	Pulsed Drain Current ²	485	A
E_{AS}	Single Pulse Avalanche Energy ³	101	mJ
I_{AS}	Avalanche Current	45	A
$P_{D@TC=25^\circ C}$	Total Power Dissipation ⁴	78	W
T_{STG}	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	25	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.2	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	30	36	---	V
RDS(ON)	Static Drain-Source On-Resistance ²	$V_{GS}=10V, I_D=20A$	---	1.3	1.6	m Ω
		$V_{GS}=4.5V, I_D=15A$	---	2.0	3.0	
VGS(th)	Gate Threshold Voltage	$V_{GS}=V_{DS}, I_D=250\mu A$	1.2	1.7	2.5	V
IDSS	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=25^{\circ}\text{C}$	---	---	1	uA
IDSS	Drain-Source Leakage Current	$V_{DS}=30V, V_{GS}=0V, T_J=55^{\circ}\text{C}$	---	---	5	
IGSS	Gate-Source Leakage Current	$V_{GS}=\pm 20V, V_{DS}=0V$	---	---	± 100	nA
gfs	Forward Transconductance	$V_{DS}=5V, I_D=20A$	---	100	---	S
Rg	Gate Resistance	$V_{DS}=0V, V_{GS}=0V, f=1\text{MHz}$	---	1.4	---	Ω
Qg	Total Gate Charge (4.5V)	$V_{DS}=20V, V_{GS}=4.5V, I_D=20A$	---	39	---	nC
Qgs	Gate-Source Charge		---	8.6	---	
Qgd	Gate-Drain Charge		---	5.0	---	
Td(on)	Turn-On Delay Time	$V_{DD}=20V, V_{GS}=10V, R_G=3\Omega, I_D=20A$	---	6.0	---	ns
Tr	Rise Time		---	9.0	---	
Td(off)	Turn-Off Delay Time		---	26	---	
Tf	Fall Time		---	10.0	---	
Ciss	Input Capacitance	$V_{DS}=20V, V_{GS}=0V, f=1\text{MHz}$	---	3050	---	pF
Coss	Output Capacitance		---	2650	---	
Crss	Reverse Transfer Capacitance		---	117	---	
IS	Continuous Source Current ^{1,5}	$V_G=V_D=0V, \text{Force Current}$	---	---	135	A
VSD	Diode Forward Voltage ²	$V_{GS}=0V, I_S=78A, T_J=25^{\circ}\text{C}$	---	---	1.2	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 $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The EAS data shows Max. rating . The test condition is $V_{DD}=32V, V_{GS}=10V, L=0.1mH, I_{AS}=54A$
- 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

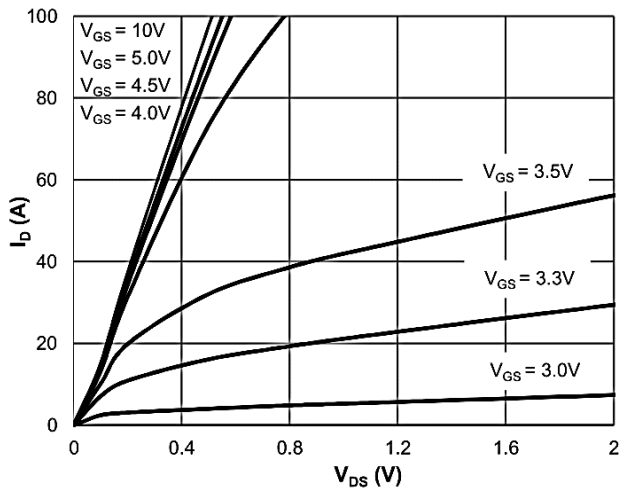


Figure 1: Saturation Characteristics

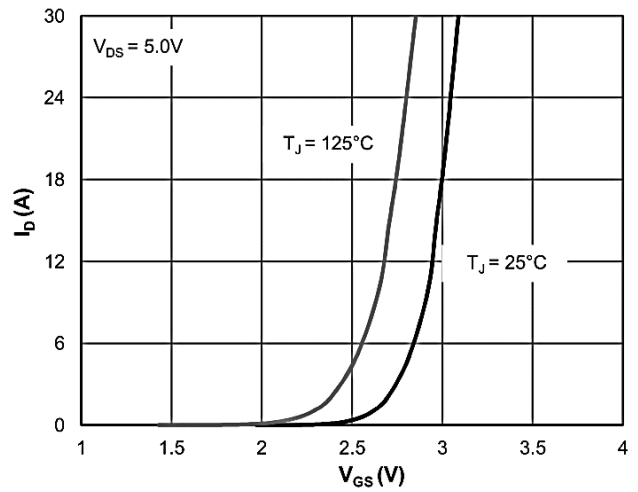


Figure 2: Transfer Characteristics

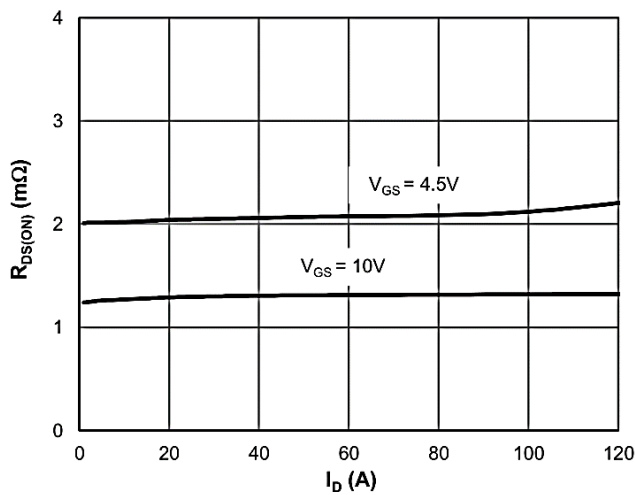


Figure 3: $R_{DS(ON)}$ vs. Drain Current

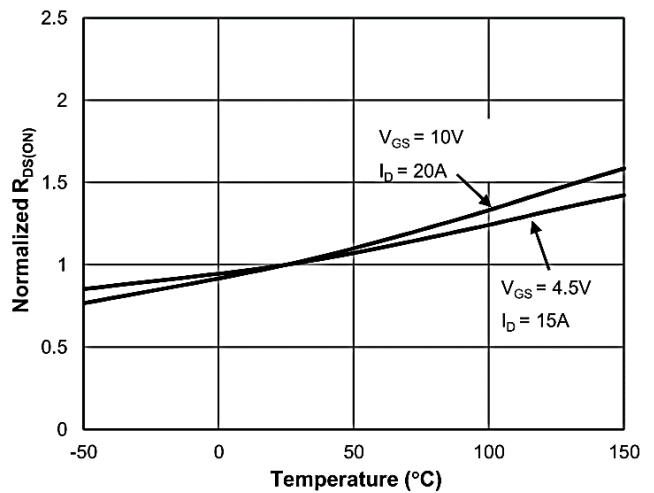


Figure 4: $R_{DS(ON)}$ vs. Junction Temperature

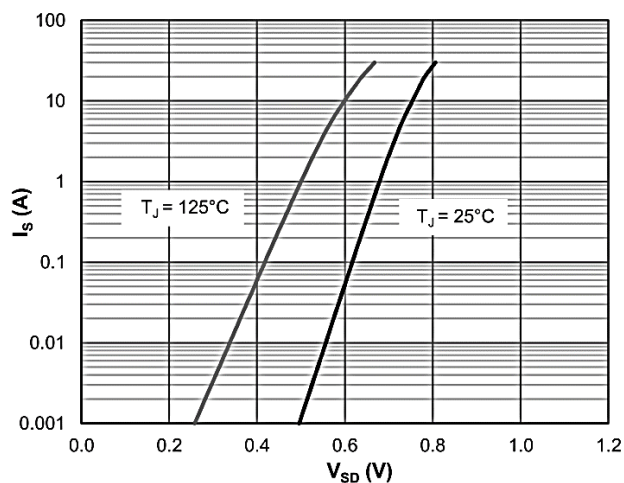


Figure 5: Body-Diode Characteristics

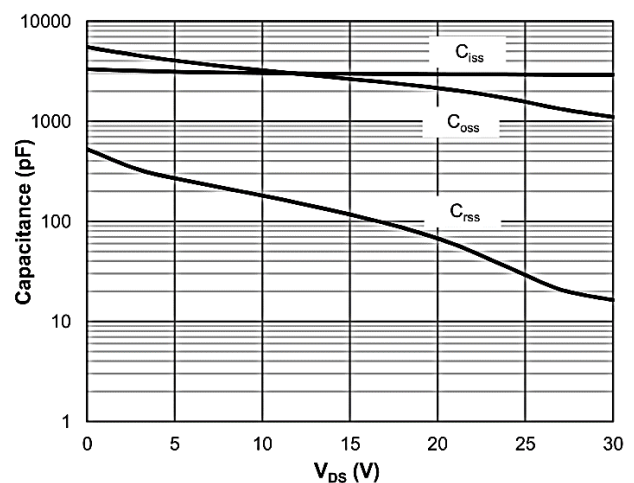


Figure 6: Capacitance Characteristics

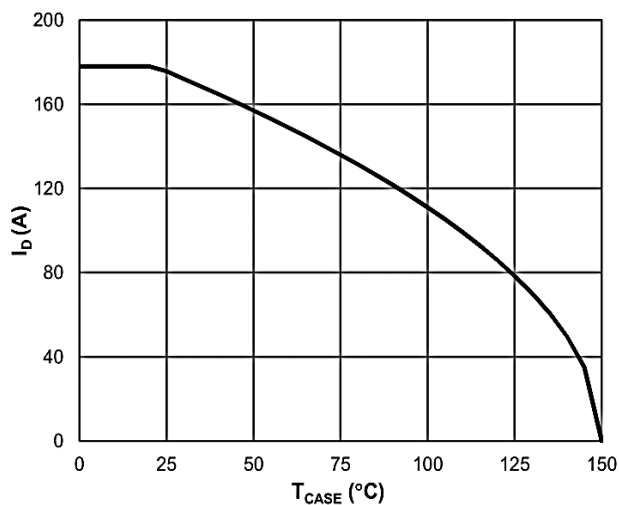


Figure 7: Current De-rating

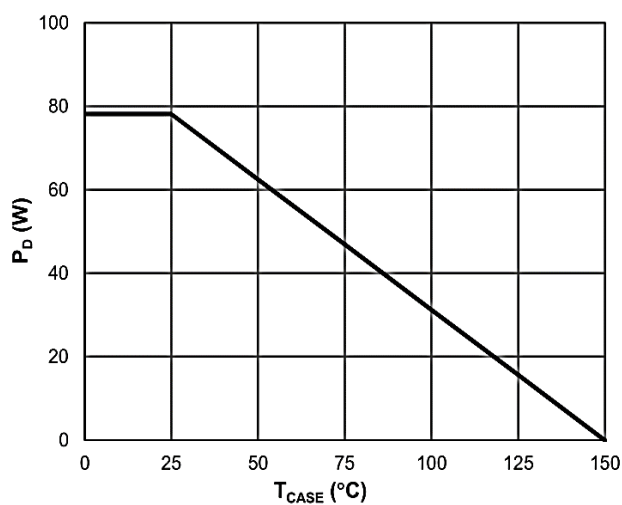


Figure 8: Power De-rating

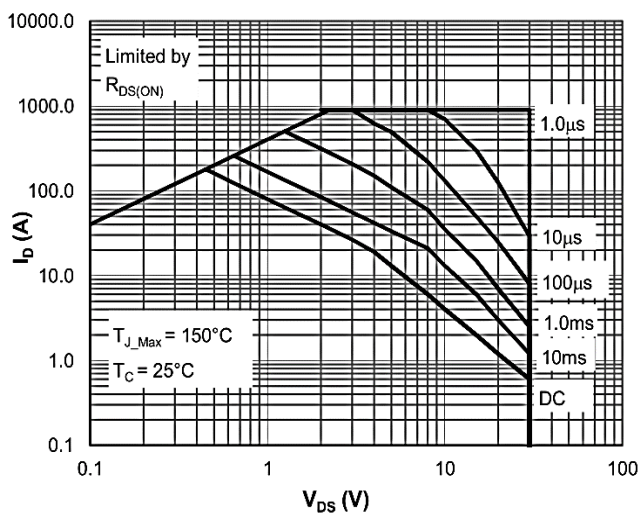


Figure 9: Maximum Safe Operating Area

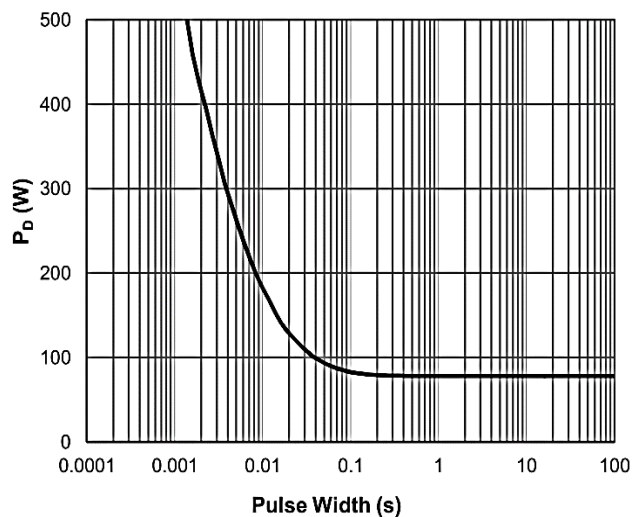


Figure 10: Single Pulse Power Rating, Junction-to-Case

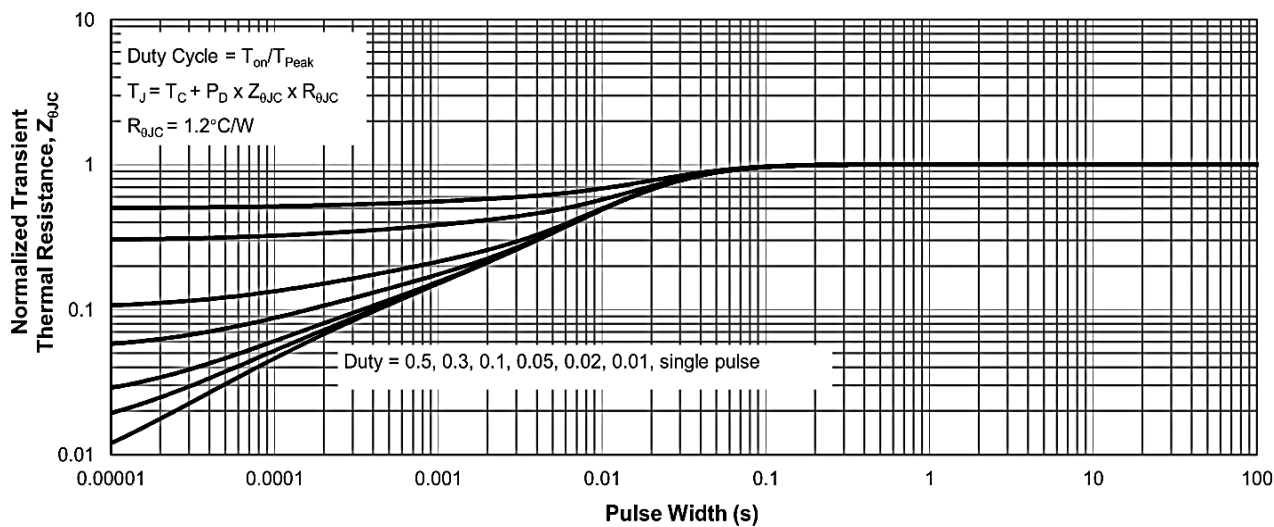
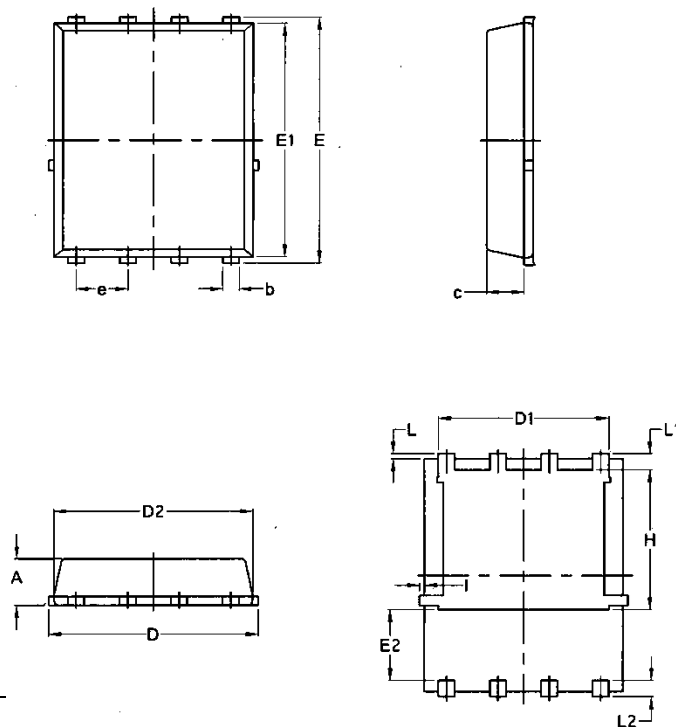


Figure 11: Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-PDFN5*6-8L-JQ Single



Symbol	mm		Inch	
	Mim	Max	Min	Max
A	1.03	1.17	0.0406	0.0461
b	0.34	0.48	0.0134	0.0189
c	0.824	0.0970	0.0324	0.082
D	4.80	5.40	0.1890	0.2126
D1	4.11	4.31	0.1618	0.1697
D2	4.80	5.00	0.1890	0.1969
E	5.95	6.55	0.2343	0.2620
E1	5.65	6.25	0.2224	0.2500
E2	1.60	/	0.0630	/
e	1.27 BSC		0.05 BSC	
L	0.05	0.25	0.0020	0.0098
L1	0.38	0.50	0.0150	0.0197
L2	0.38	0.50	0.0150	0.0197
H	3.30	3.50	0.1299	0.1378
I	/	0.18	/	0.0070

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Edition	Date	Change
RVE1.0	2023/2/27	Initial release

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