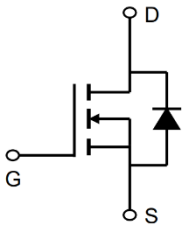
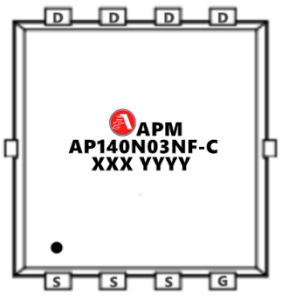
AP140N03NF-C

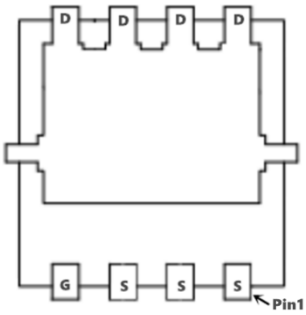
30V N-Channel Enhancement Mode MOSFET

Description

The AP140N03NF-C 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 =140A

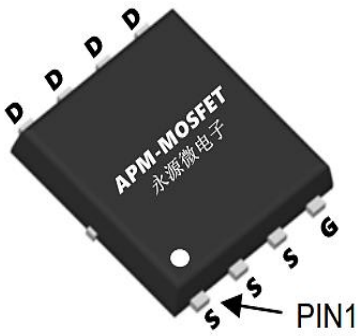
$R_{DS(ON)}$ < 1.5mΩ @ V_{GS}=10V **（Type：1.25mΩ）**

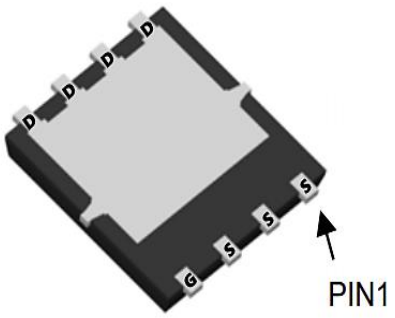
Application

Boost driver

Brushless motor

BLDC





Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP140N03NF-C	PDFN5*6-8L	AP140N03NF-C XXX YYYY	5000

Absolute Maximum Ratings (T_C=25℃unless otherwise noted)

Symbol	Parameter	Rating	Units
VDS	Drain-Source Voltage	30	V
VGS	Gate-Source Voltage	±20	V
ID@TC=25℃	Continuous Drain Current, VGS @ 10V1	140	A
ID@TC=100℃	Continuous Drain Current, VGS @ 10V1	106	A
IDM	Pulsed Drain Current2	672	A
EAS	Single Pulse Avalanche Energy3	180	mJ
IAS	Avalanche Current	54	A
PD@TC=25℃	Total Power Dissipation4	81	W
TSTG	Storage Temperature Range	-55 to 150	℃
TJ	Operating Junction Temperature Range	-55 to 150	℃
RθJA	Thermal Resistance Junction-Ambient 1	25	℃/W
RθJC	Thermal Resistance Junction-Case1	1.7	℃/W

Electrical Characteristics (T_J=25℃, unless otherwise noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	I_D = 1mA, V_{GS} = 0V	30	36		V
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 30V, V_{GS} = 0V			1.0	μA
IDSS T_J = 55°C					5.0	
IGSS	Gate-Body Leakage Current	V_{DS} = 0V, V_{GS} = ±20V			±100	nA
VGS(th)	Gate Threshold Voltage	V_{DS} = V_{GS}, I_D = 250mA	1.2	1.7	2.5	V
RDS(ON)	Static Drain-Source ON-Resistance	V_{GS} = 10V, I_D = 20A		1.25	1.5	mΩ
		V_{GS} = 4.5V, I_D = 15A		1.85	2.3	mΩ
gFS	Forward Transconductance	V_{DS} = 5V, I_D = 20A		85		S
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 15V, f = 1MHz		3100		pF
C_{oss}	Output Capacitance			1800		pF
C_{rss}	Reverse Transfer Capacitance			73		pF
R_g	Gate Resistance	V_{GS} = 0V, V_{DS}= 0V, f = 1MHz		1.4		Ω
Q_g	Total Gate Charge	V_{GS} = 0 to 10V V_{DS} = 15V, I_D = 20A		49		nC
Q_{gs}	Gate Source Charge			11		nC
Q_{gd}	Gate Drain Charge			9		nC
tD(on)	Turn-On DelayTime	V_{GS} = 10V, V_{DS} = 15V R_L = 0.75Ω, R_{GEN} = 3Ω		13		ns
t_r	Turn-On Rise Time			24		ns
tD(off)	Turn-Off DelayTime			35		ns
t_f	Turn-Off Fall Time			8.3		ns
trr	Body Diode Reverse Recovery Time	I_F = 20A, dI_F/dt = 100A/us		53		ns
Q_{rr}	Body Diode Reverse Recovery Charge			71		nC
IS	Diode Continuous Current	T_C = 25°C			90	A
V_{SD}	Diode Forward Voltage	I_S = 1A, V_{GS} = 0V		0.68	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 ≦ 300us , duty cycle ≦ 2%

3、The EAS data shows Max. rating . The test condition is VDD =32V,VGS =10V,L=0.1mH,IAS =54A

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

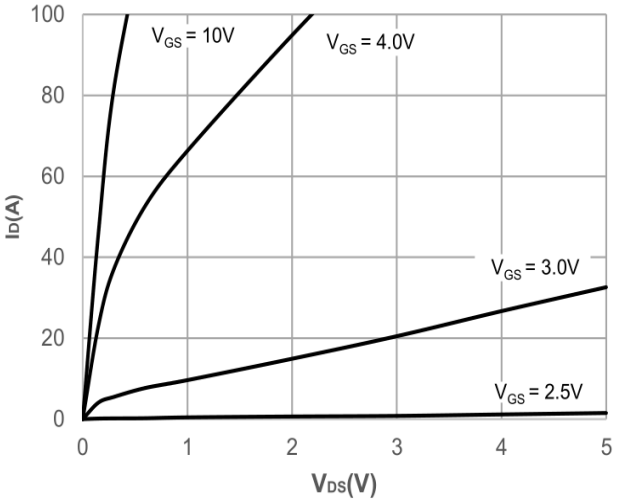


Figure 1: Output Characteristics

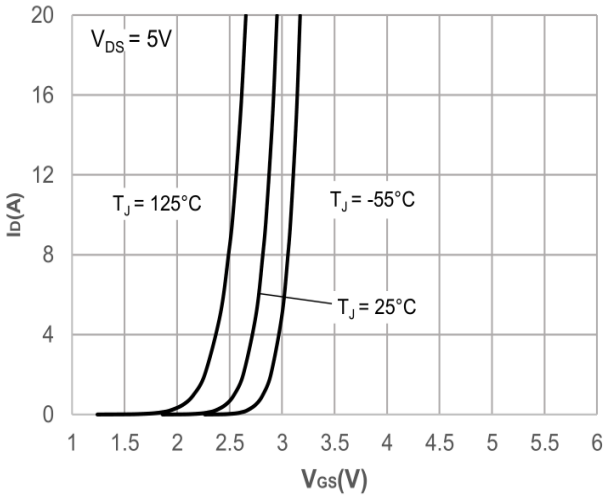


Figure 2: Typical Transfer Characteristics

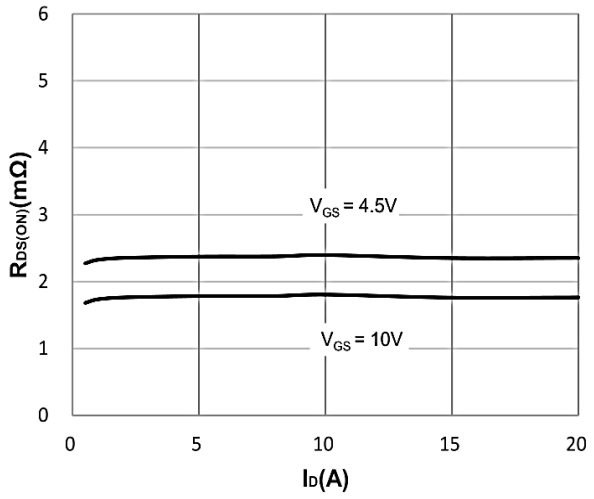


Figure 3: On-resistance vs. Drain Current

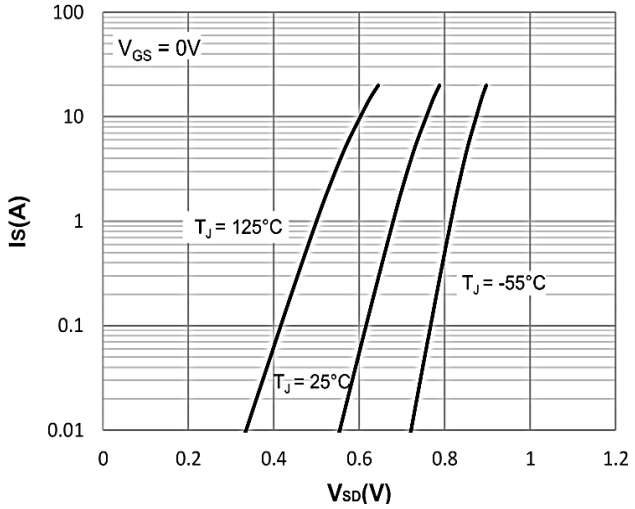


Figure 4: Body Diode Characteristics

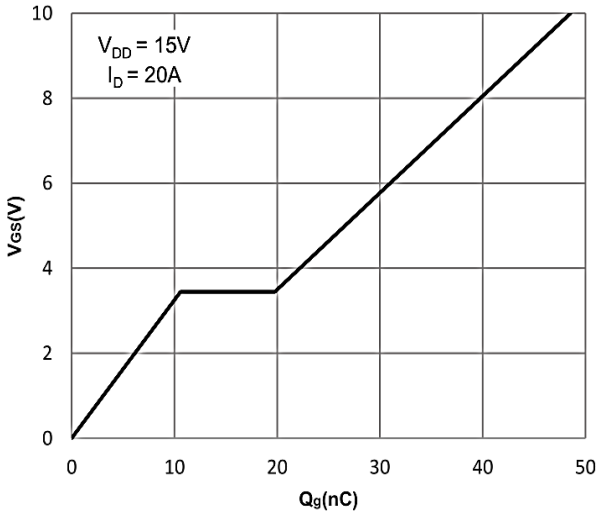


Figure 5: Gate Charge Characteristics

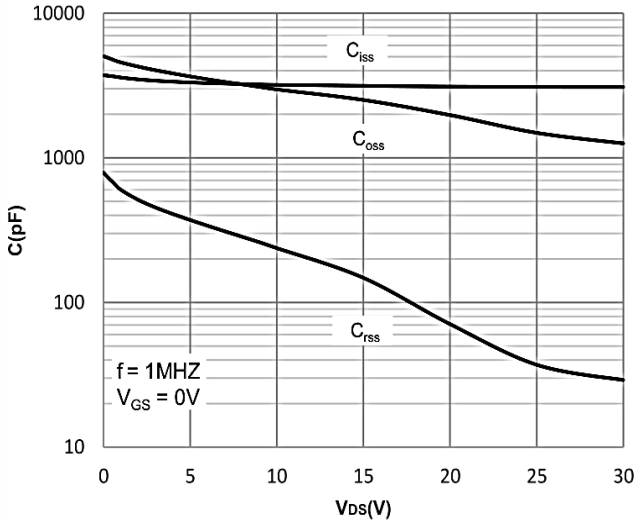


Figure 6: Capacitance Characteristics

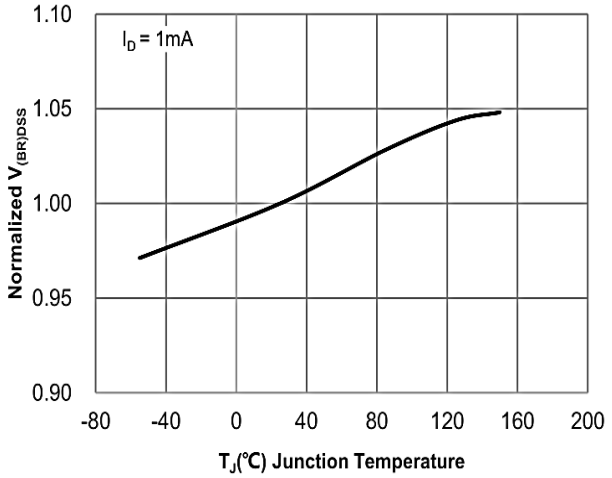


Figure 7: Normalized Breakdown voltage vs. Junction Temperature

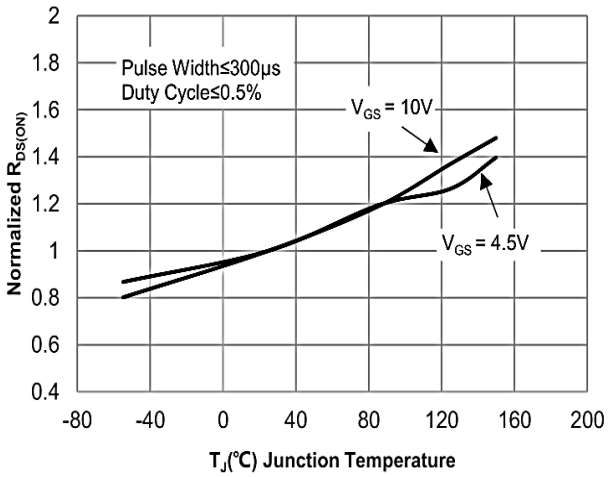


Figure 8: Normalized on Resistance vs. Junction Temperature

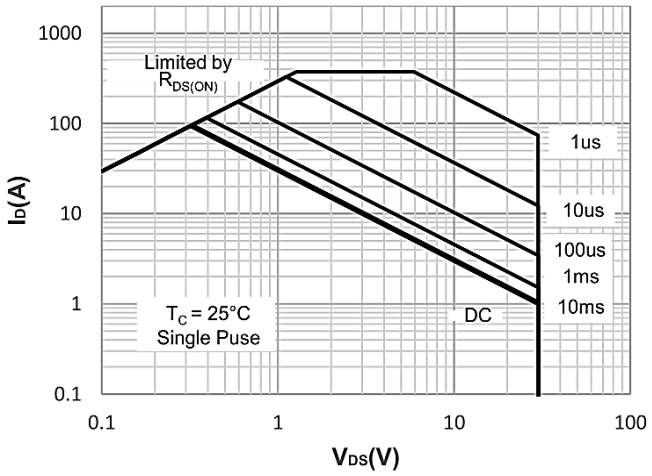


Figure 9: Maximum Safe Operating Area

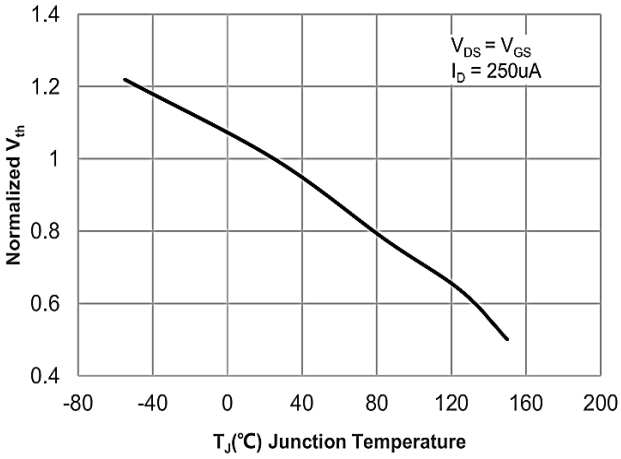


Figure 10: Normalized Threshold Voltage vs. Junction Temperature

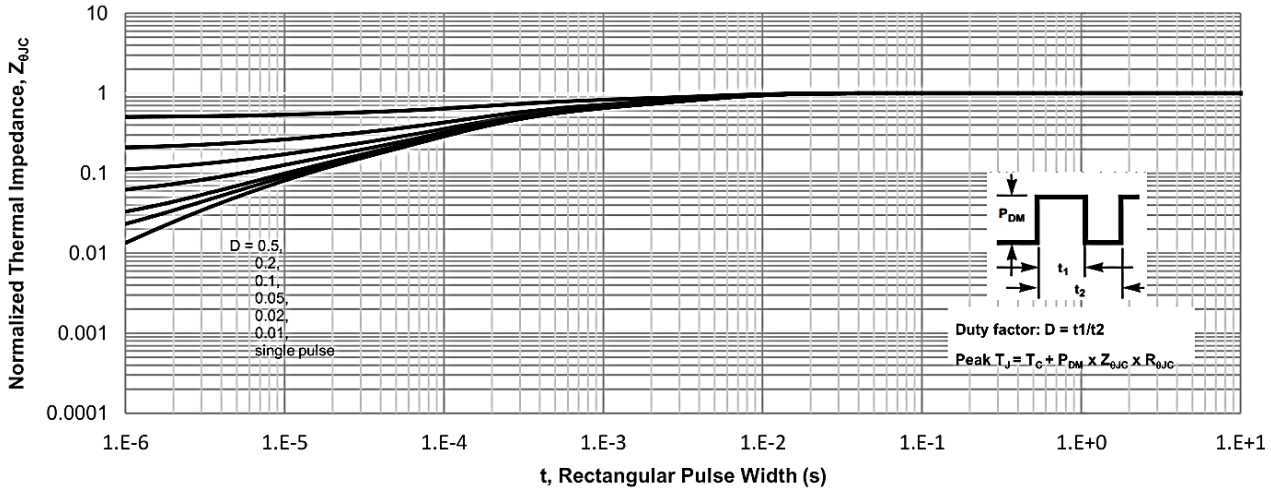
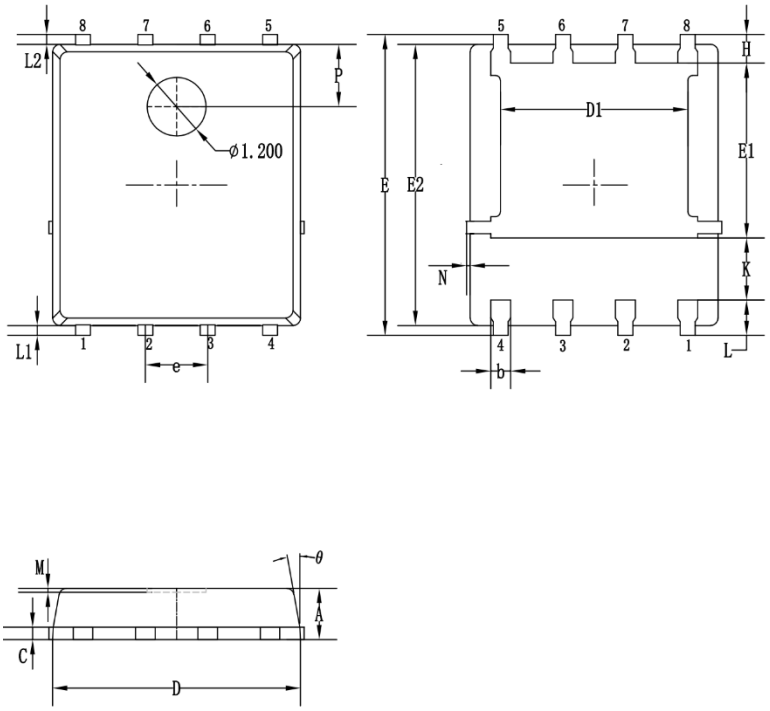


Figure 11: Normalized Maximum Transient Thermal Impedance

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	2023/9/31	Initial release