

40V N-Channel Enhancement Mode MOSFET

Description

The AP75N04DF-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.

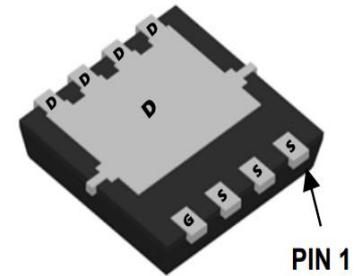
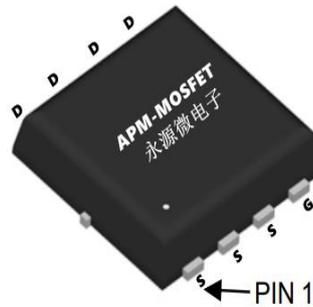
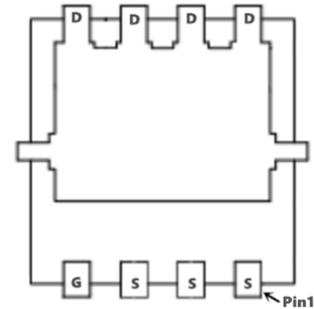
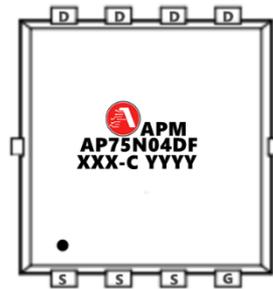
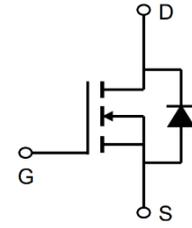
General Features

$V_{DS} = 40V$ $I_D = 75A$

$R_{DS(ON)} < 5.5m\Omega @ V_{GS}=10V$ (Type: 4.3m Ω)

Application

- Wireless charging
- Boost driver
- Brushless motor



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP75N04DF-C	PDFN3*3-8L	AP75N04DF XXX-C YYYY	5000

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	40	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D @ T_A=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	75	A
$I_D @ T_A=70^\circ C$	Continuous Drain Current, $V_{GS} @ 10V^1$	44	A
IDM	Pulsed Drain Current ²	280	A
EAS	Single Pulse Avalanche Energy ³	73	mJ
IAS	Avalanche Current	27	A
$P_D @ T_A=25^\circ C$	Total Power Dissipation ⁴	43	W
TSTG	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	3.0	$^\circ C/W$



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Electrical Characteristics (T_J=25 °C, unless otherwise noted)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} = 0V, I _D = 250μA	40	-	-	V
IGSS	Gate-body Leakage Current	V _{DS} = 0V, V _{GS} = ±20V	-	-	±100	nA
IDSS T _J =25°C	Zero Gate Voltage Drain Current	V _{DS} = 40V, V _{GS} = 0V	-	-	1	μA
IDSS T _J =100°C			-	-	100	
VGS(th)	Gate-Threshold Voltage	V _{DS} = V _{GS} , I _D = 250μA	1.2	1.5	2.5	V
RDS(on)	Drain-Source On-Resistance ⁴	V _{GS} = 10V, I _D = 20A	-	4.3	5.5	mΩ
		V _{GS} = 4.5V, I _D = 10A	-	5.5	7.0	
gfs	Forward Transconductance ⁴	V _{DS} = 5V, I _D = 20A	-	78	-	S
Ciss	Input Capacitance	V _{DS} = 20V, V _{GS} = 0V, f = 1MHz	-	1100	-	pF
Coss	Output Capacitance		-	260	-	
Crss	Reverse Transfer Capacitance		-	12	-	
R _g	Gate Resistance	f = 1MHz	-	1.1	-	Ω
Q _g	Total Gate Charge	V _{GS} = 10V, V _{DS} = 20V, I _D = 20A	-	18	-	nC
Q _{gs}	Gate-Source Charge		-	3.4	-	
Q _{gd}	Gate-Drain Charge		-	2.7	-	
td(on)	Turn-On Delay Time	V _{GS} = 10V, V _{DD} = 20V, R _G = 3Ω, I _D = 20A	-	7.7	-	ns
t _r	Rise Time		-	1.6	-	
td(off)	Turn-Off Delay Time		-	17.2	-	
t _f	Fall Time		-	3.1	-	
trr	Body Diode Reverse Recovery Time	I _F = 20A, di/dt = 100A/μs	-	25	-	ns
Q _{rr}	Body Diode Reverse Recovery Charge		-	6	-	nC
VSD	Diode Forward Voltage ⁴	I _S = 20A, V _{GS} = 0V	-	-	1.2	V
IS	Continuous Source Current	T _C = 25°C	-	-	75	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 ≅ 300us , duty cycle ≅ 2%
- 3、 The EAS data shows Max. rating . The test condition is VDD = 32V, VGS = 10V, L = 0.1mH, IAS = 27A
- 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

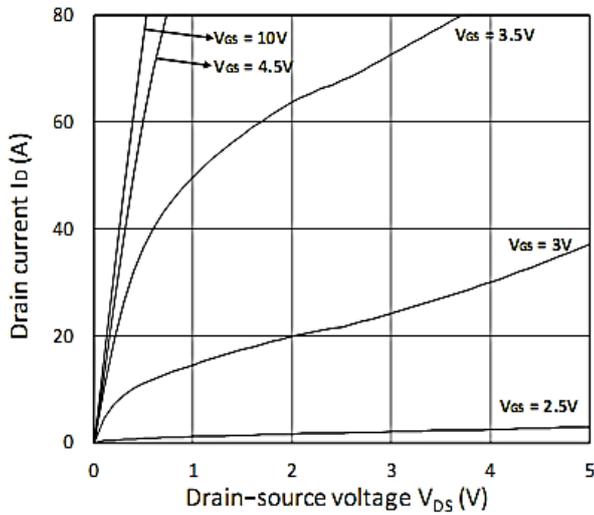


Figure 1. Output Characteristics

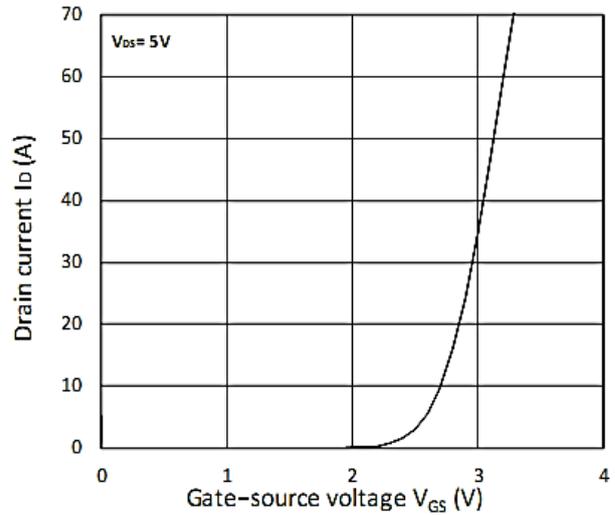


Figure 2. Transfer Characteristics

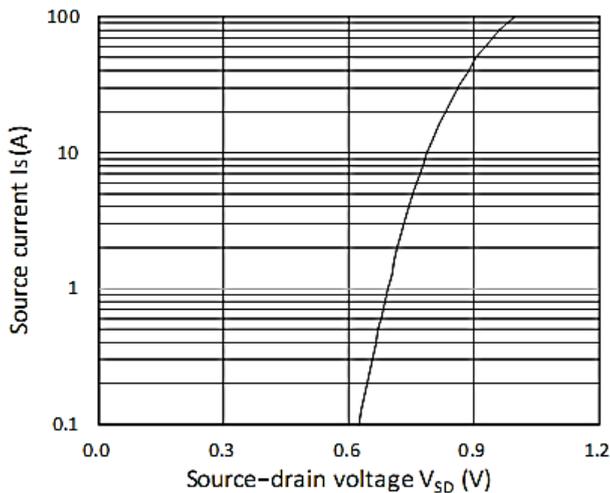


Figure 3. Forward Characteristics of Reverse

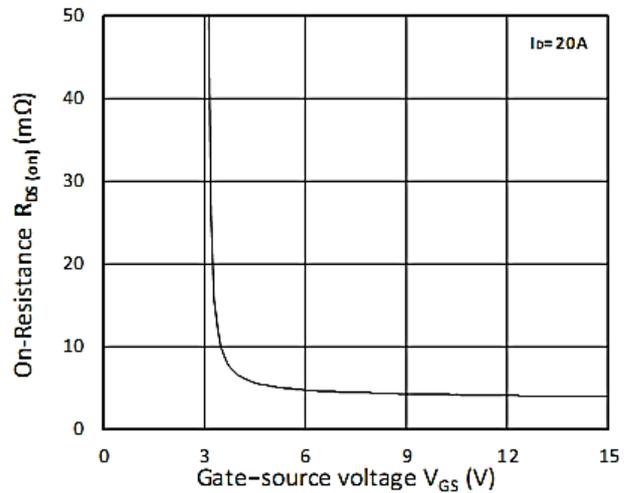


Figure 4. $R_{DS(ON)}$ vs. V_{GS}

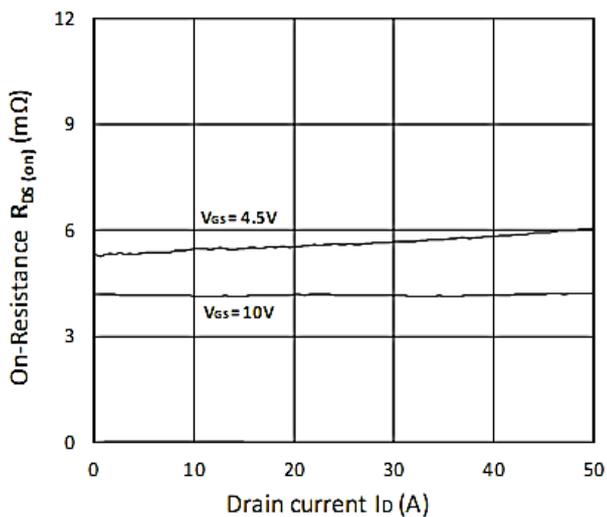


Figure 5. $R_{DS(ON)}$ vs. I_D

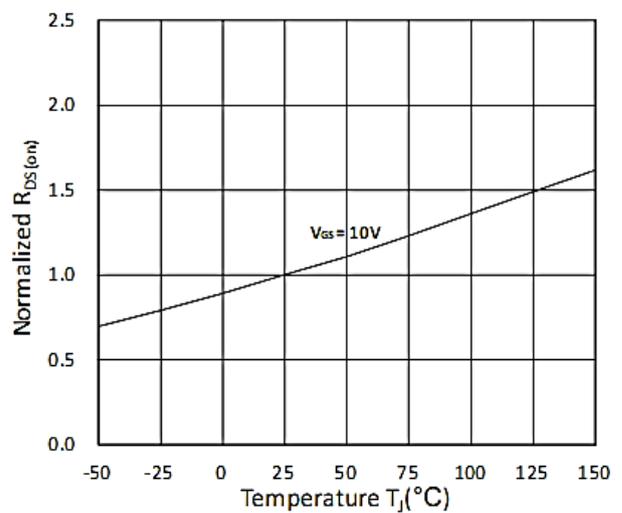


Figure 6. Normalized $R_{DS(on)}$ vs. Temperature



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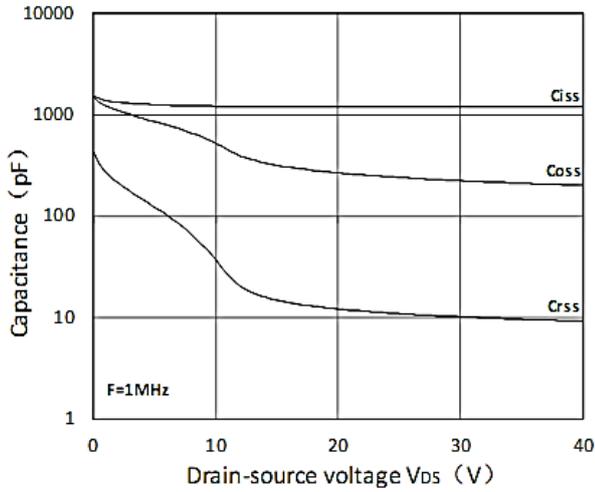


Figure 7. Capacitance Characteristics

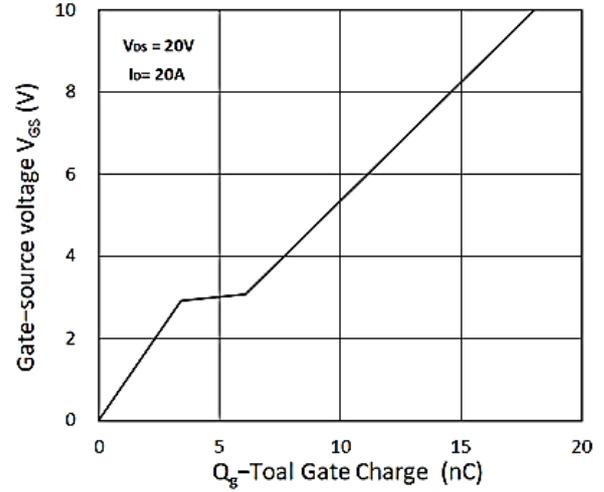


Figure 8. Gate Charge Characteristics

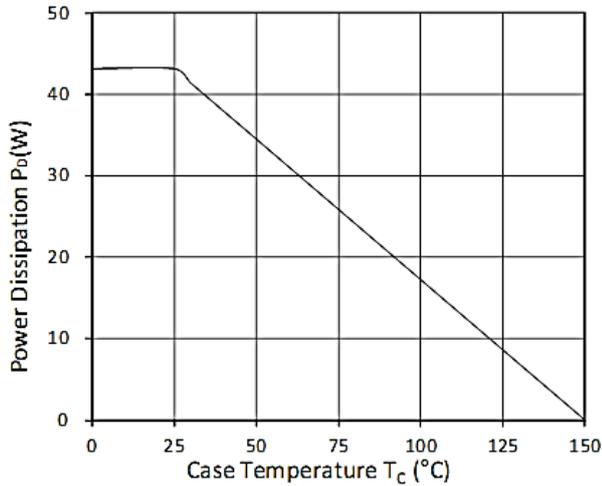


Figure 9. Power Dissipation

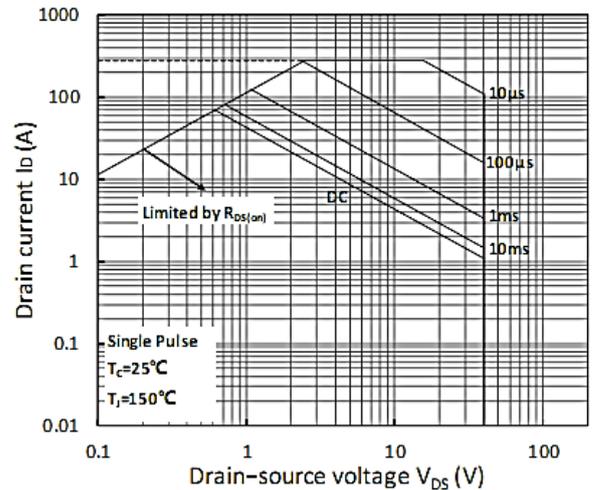


Figure 10. Safe Operating Area

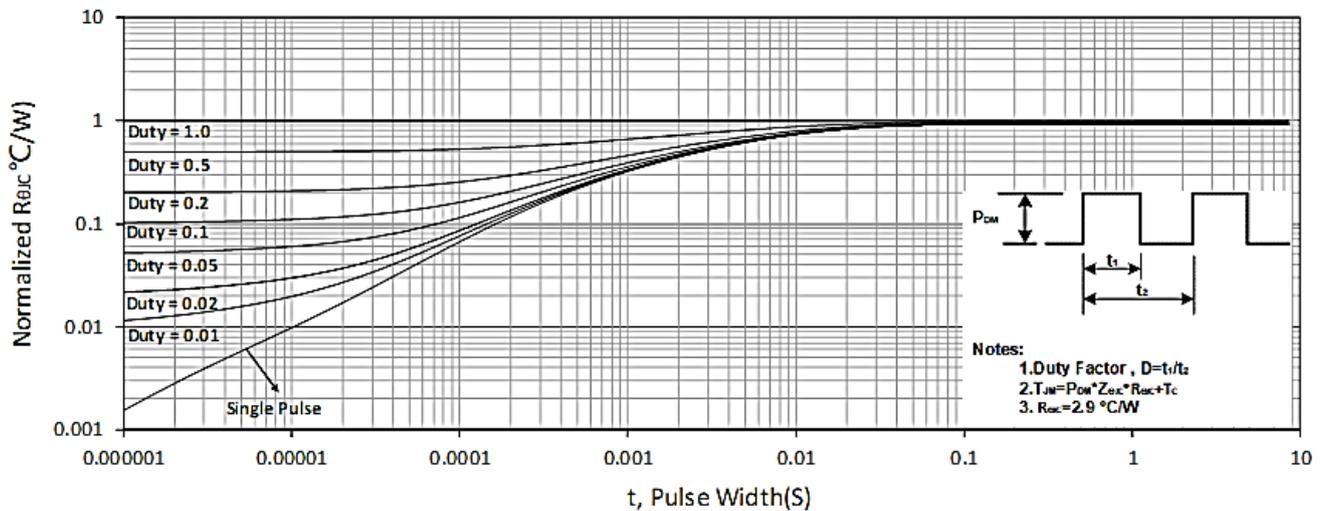
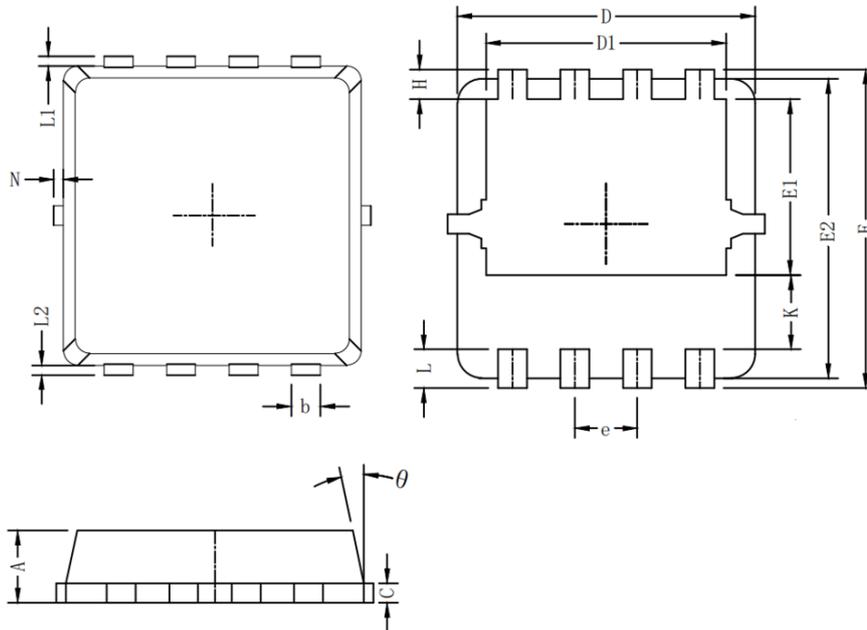


Figure 9 Normalized Maximum Transient Thermal Impedance

Package Mechanical Data-PDFN3*3-8L



Symbol	Dim in mm		
	Min	Typ	Max
A	0.6	0.75	0.9
b	0.2	0.3	0.4
C	0.15	0.2	0.25
D	3	3.1	3.2
D1	2.3	2.45	2.6
E	3.15	3.3	3.45
E1	1.43	1.73	1.93
E2	2.9	3.05	3.2
e	0.65BSC		
H	0.2	0.35	0.5
K	0.57	0.77	0.87
L	0.3	0.4	0.5
L1/L2	0.1REF		
θ	8°	10°	13°
N	0		0.15

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Edition	Date	Change
REV1.0	2024/4/11	Initial release

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