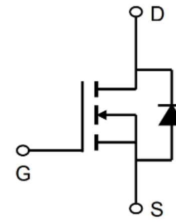
AP18N50F/P

500V N-Channel Enhancement Mode MOSFET

Description

The AP18N50F/P is silicon N-channel Enhanced VDMOSFETs, is obtained by the self-aligned planar Technology which reduce the conduction loss, improve switching performance and enhance the avalanche energy. The transistor can be used in various power switching circuit for system miniaturization and higher efficiency.



General Features

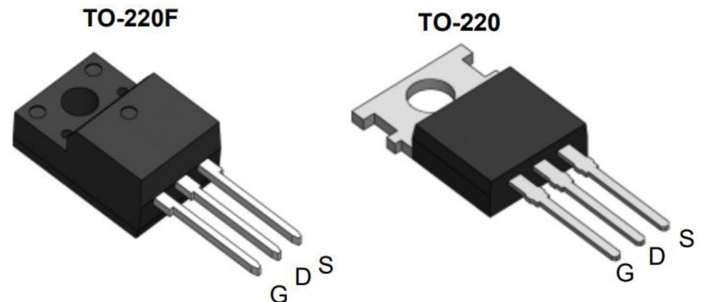
V_{DS} = 500V I_D =18A

$R_{DS(ON)}$ < 350mΩ @ V_{GS}=10V （**Type：280mΩ**）

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP18N50F	TO-220F-3L	AP18N50F XXX YYYY	1000
AP18N50P	TO-220-3L	AP18N50P XXX YYYY	1000

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

Symbol	Parameter	Value TO-220F TO-220	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	500	V
ID	Continuous Drain Current	18	A
IDM	Pulsed Drain Current (note1)	65	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	405	mJ
IAR	Avalanche Current (note1)	16	A
E_{AR}	Repetitive Avalanche Energy note1)	5	mJ
P_D	Power Dissipation (T_C = 25ºC)	29.8	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	3.92	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	62.5	ºC/W

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

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS} = 0 V, I_D = 250 μA	500			V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D=250μA, Referenc ed to 25°C		0.51		V/°C
IDSS	Zero Gate Voltage Drain Current	V_{DS} = 500 V, V_{GS} = 0 V			1	μA
		V_{DS} = 400 V, TC = 125°C			10	μA
IGSSF	Gate-Body Leakage Current, Forward	V_{GS} = 30 V, V_{DS} = 0 V			100	nA
IGSSR	Gate-Body Leakage Current, Reverse	V_{GS} = -30 V, V_{DS} = 0 V			-100	nA
VGS(TH)	Gate Threshold Voltage	V_{DS}=V_{GS}, I_D =250 uA	3.0		5.0	V
RDS(On)	Drain-Source On-state Resistance	V_{GS}=10 V, I_D =8 A, T_J = 25°C		280	350	mΩ
gFS	Forward Transconductance	V_{DS} = 40 V, I_D = 8 A (Note 4)		16		S
C_{iss}	Input Capacitance	V_{DS} = 25V, V_{GS} = 0V, f = 1.0 MHz		1670		pF
C_{oss}	Output Capacitance			247		pF
C_{rss}	Reverse Transfer Capacitance			6.8		pF
td(on)	Turn On Delay Time	V_{DD}=250V, ID=16A, R_G = 25 Ω (Note 4, 5)		27		ns
t_r	Rising Time			45		ns
td(off)	Turn Off Delay Time			61		ns
t_f	Fall Time			38		ns
Q_g	Total Gate Charge	V_{DS} = 250 V, ID = 16A, V_{GS} = 10 V (Note 4, 5)		31		nC
Q_{gs}	Gate-Source Charge			13		nC
Q_{gd}	Gate-Drain Charge			9		nC
ISM	Maximum Pulsed Drain-Source Diode Forward Current				64	A
V_{SD}	Diode Forward Voltage	V_{GS}= 0 V, I_S = 16 A			1.4	V
trr	Reverse Recovery Time	V_{GS} = 0 V, I_S = 16 A, dI_F / dt = 100 A/μs Note 4)		342		ns
Q_{rr}	Reverse Recovery Charge			4.0		μC

Note :

1、The data tested by surface mounted on a 1 inch2 FR-4 board with 2OZ copper.

2、The EAS data shows Max. rating . L=4.1Mh IAS=16A, VDD=50V, RG=25Ω, Starting TJ = 25 ºC

3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%

4、The power dissipation is limited by 150℃ junction temperature

5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

Typical Characteristics

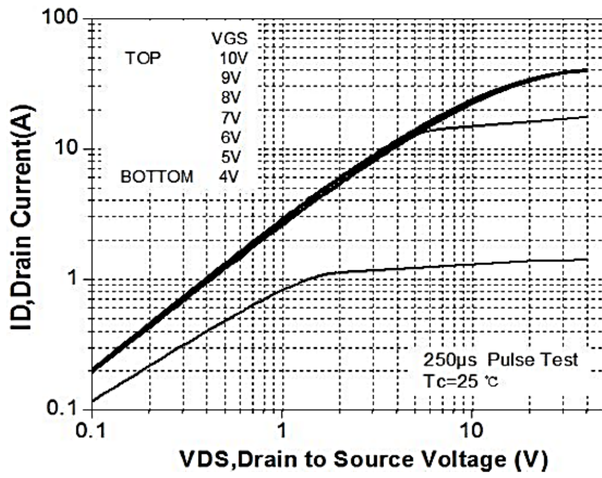


Figure 1. On-Region Characteristics

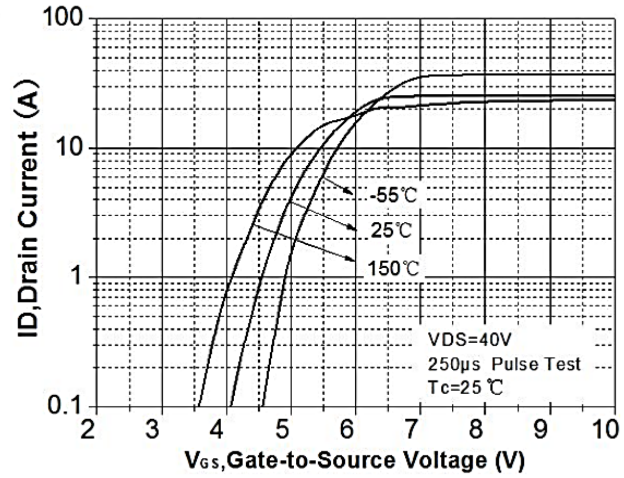


Figure 2. Transfer Characteristics

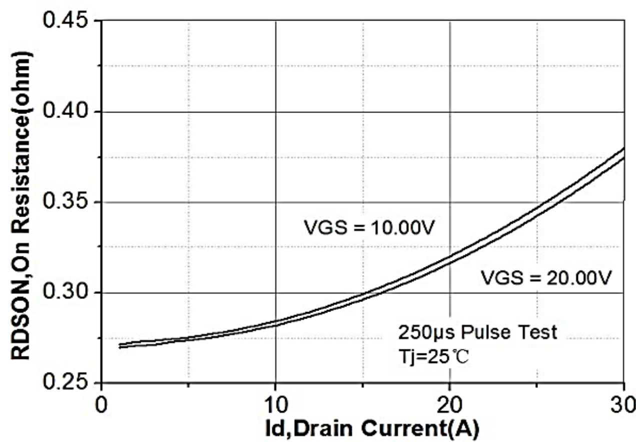


Figure 3. On-Resistance Variation vs Drain Current and Gate Voltage

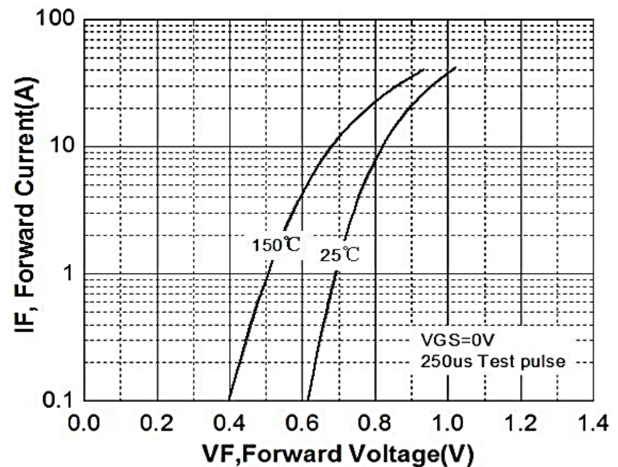


Figure 4. Body Diode Forward Voltage Variation with Source Current and Temperature

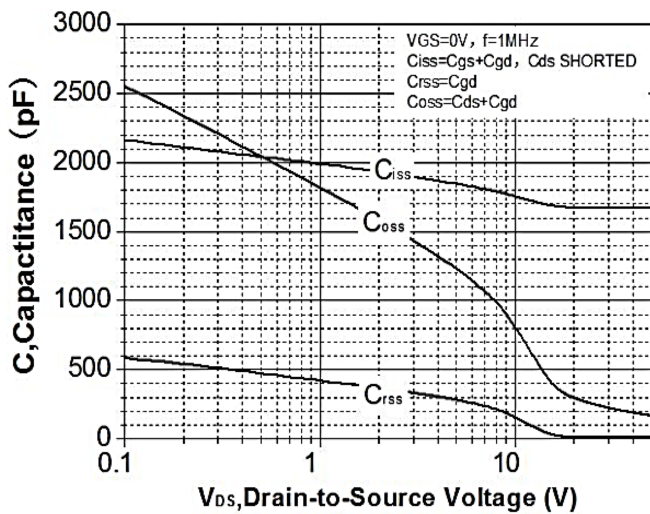


Figure 5. Capacitance Characteristics

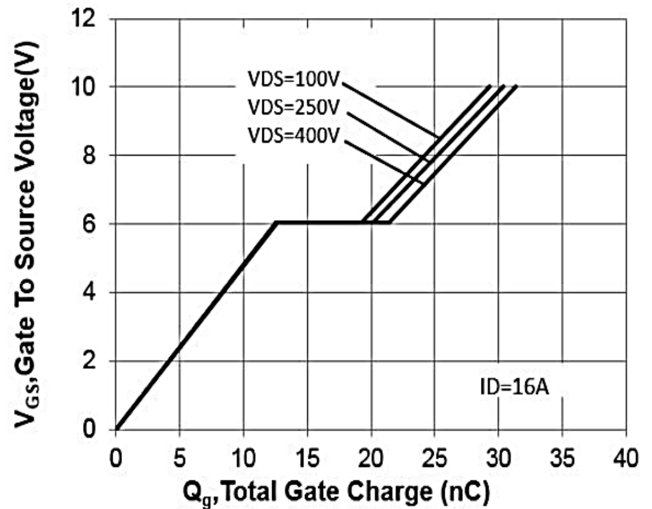


Figure 6. Gate Charge Characteristics

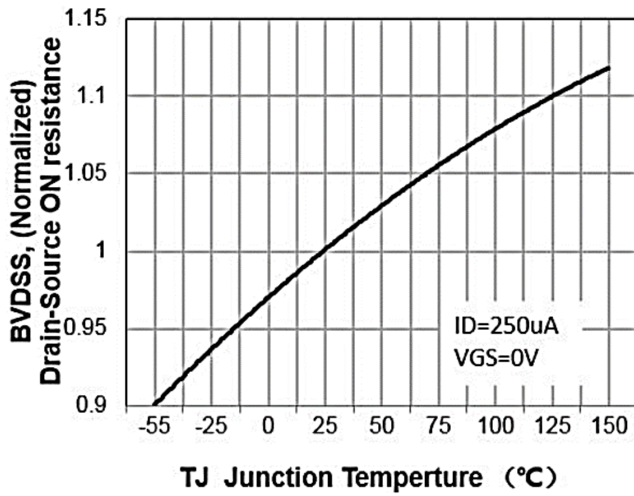


Figure 7. Breakdown Voltage Variation vs Temperature

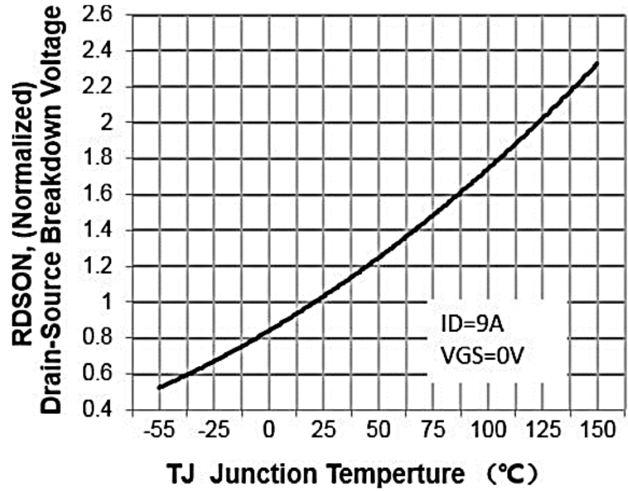


Figure 8. On-Resistance Variation vs Temperature

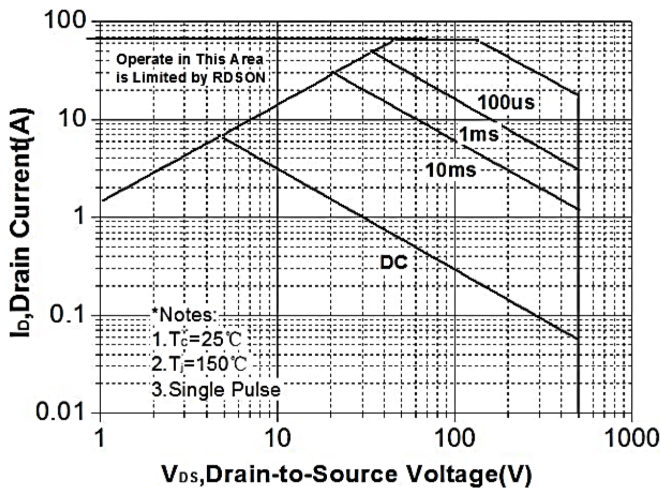


Figure 9. Maximum Safe Operating Area

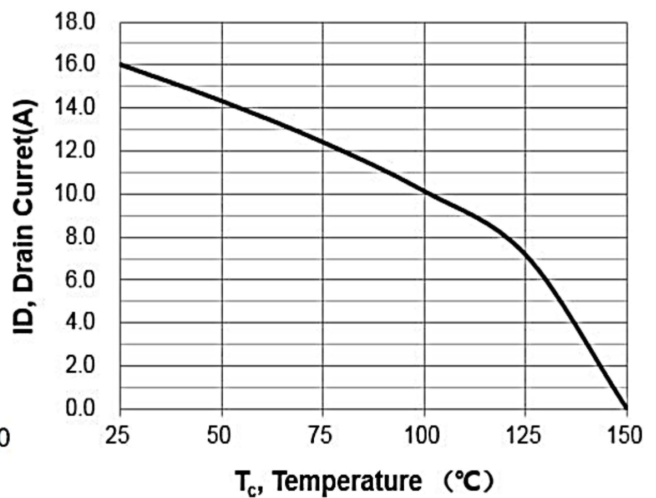


Figure 10. Maximum Drain Current vs Case Temperature

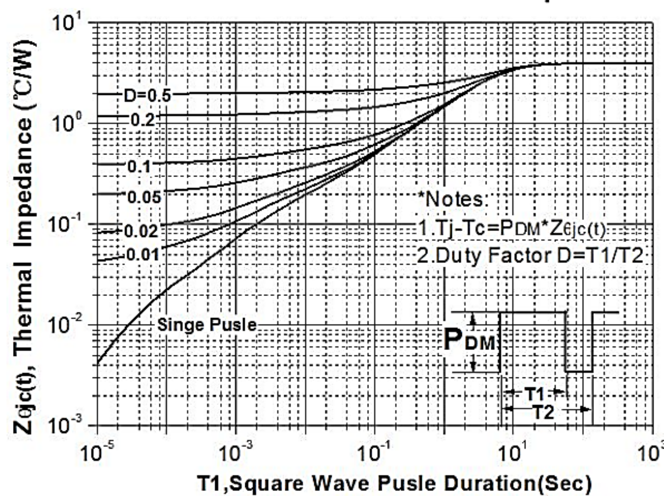


Figure 11. Transient Thermal Response Curve

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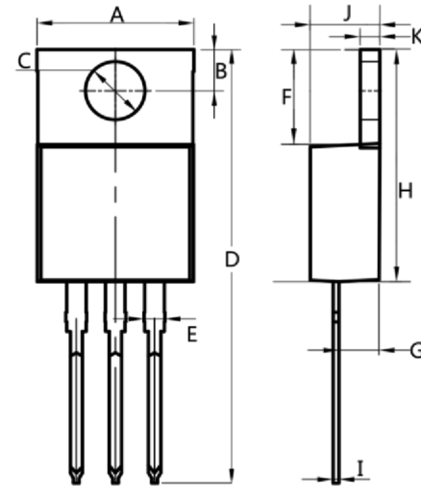

Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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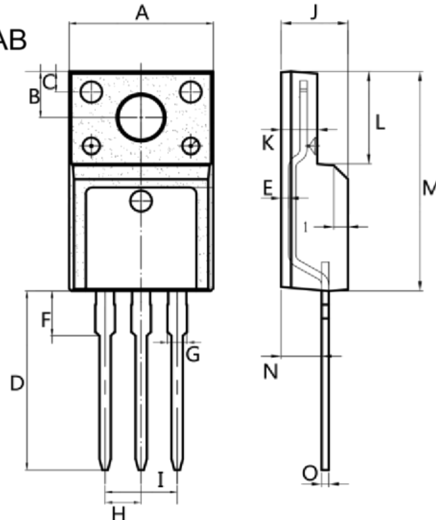

Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2. 7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
All Dimensions in millimeter		

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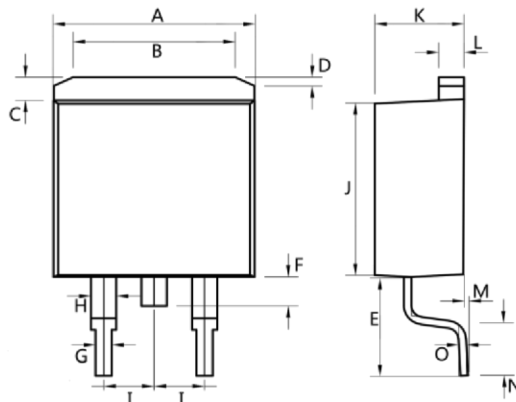

Dim.	Min.	Max.
A	10.0	10. 5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45
All Dimensions in millimeter		