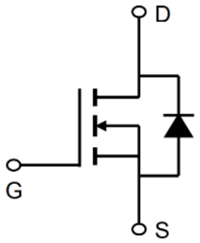
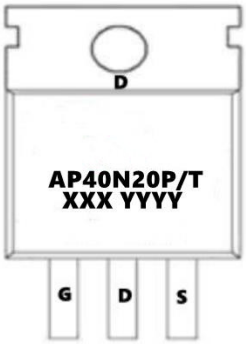
AP40N20P/T

200V N-Channel Enhancement Mode MOSFET



Description

The AP40N20P/T 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} = 200V I_D =40A

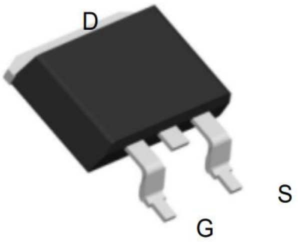
$R_{DS(ON)}$ < 65mΩ @ V_{GS}=10V **（Type：50mΩ）**

Application

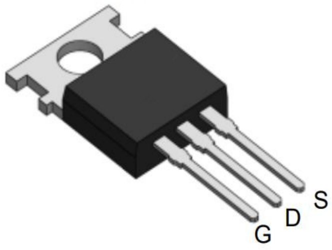
Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)

TO-263
D²PAK



TO-220



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP40N20T	TO-263-3L	AP40N20T XXX YYYY	800
AP40N20P	TO-220-3L	AP40N20P XXX YYYY	1000

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

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage	200	V
ID	Drain Current -continuous	40	A
IDM	Drain Current -pulse	112	A
VGSS	Gate-Source Voltage	±30	V
EAS	Single Pulsed Avalanche Energy	588	mJ
IAR	Avalanche Current	28	A
EAR	Repetitive Avalanche Current	15.8	mJ
dv/dt	Peak Diode Recovery dv/dt	5.5	V/ns
PD TC=25℃	Power Dissipation	158	W
TJ，TSTG	Operating and Storage Temperature Range	-55～+150	℃
TL	Maximum Lead Temperature for Soldering Purposes	300	℃
Rth(j-c)	Thermal Resistance, Junction to Case	0.79	℃/W
Rth(j-A)	Thermal Resistance, Junction to Ambient	62.5	℃/W

200V N-Channel Enhancement Mode MOSFET

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

Symbol	Parameter	Tests conditions	Min	Typ	Max	Units
BV_{DSS}	Drain-Source Voltage	I_D=250μA, V_{GS}=0V	200	-	-	V
IDSS	Zero Gate Voltage Drain Current	V_{DS}=200V, V_{GS}=0V,T_C=25℃	-	-	1	μA
IGSSF	Gate-body leakage current, forward	V_{DS}=0V, V_{GS} =30V	-	-	100	nA
IGSSR	Gate-body leakage current, reverse	V_{DS}=0V, V_{GS} =-30V	-	-	-100	nA
VGS(th)	Gate Threshold Voltage	V_{DS} = V_{GS} , I_D=250μA	2.0	3.0	4.0	V
RDS(ON)	Static Drain-Source On-Resistance	V_{GS} =10V , I_D=14.0A	-	50	65	mΩ
g_{fs}	Forward Transconductance	V_{DS} = 40V , I_D=14.0A	-	24	-	S
C_{iss}	Input capacitance	V_{DS}=25V, V_{GS} =0V, f=1.0MHz	-	2879	3742	pF
C_{oss}	Output capacitance		-	362	470	pF
C_{rss}	Reverse transfer capacitance		-	81	105	pF
t_d(on)	Turn-On delay time	V_{DD}=100V,I_D=28A,R_G=25Ω V_{GS} =10V （note 4，5）	-	28	69	ns
t_r	Turn-On rise time		-	251	494	ns
t_d(off)	Turn-Off delay time		-	309	617	ns
t_f	Turn-Off Fall time		-	220	412	ns
Q_g	Total Gate Charge	V_{DS} =160V , I_D=28A V_{GS} =10V	-	103	136	nC
Q_{gs}	Gate-Source charge		-	16	-	nC
Q_{gd}	Gate-Drain charge		-	53	-	nC
IS	Continuous Body Diode Current	T_C = 25 ºC	-	-	28	A
ISM	Pulsed Diode Forward Current		-	-	112	A
VSD	Body Diode Voltage	V_{GS}=0V, I_S=28A	-		1.4	V
trr	Reverse recovery time	V_{GS}=0V, I_S=28A dI_F/dt=100A/μs		218		ns
Q_{rr}	Reverse recovery charge			1.91		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=1.5mH, I_{AS}=28A, V_{DD}=50V, R_G=25 Ω,Starting T_J=25℃

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.

Electrical Characteristics

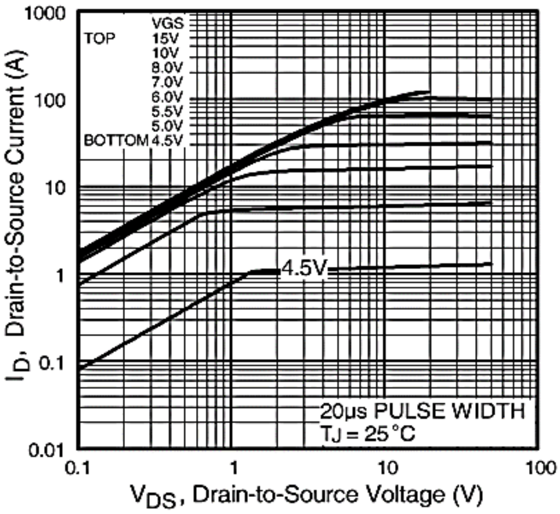


Fig 1. Typical Output Characteristics

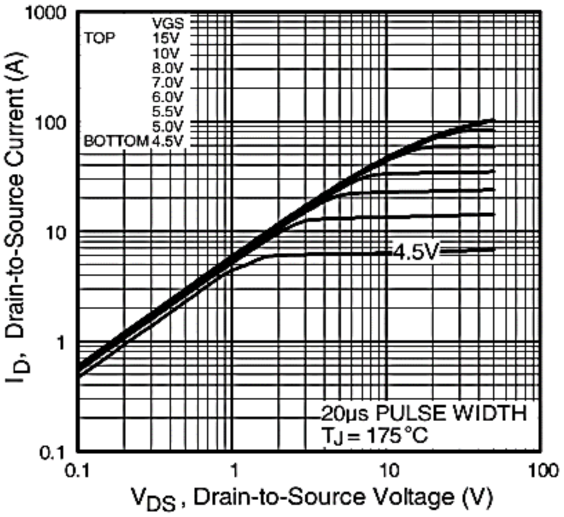


Fig 2. Typical Output Characteristics

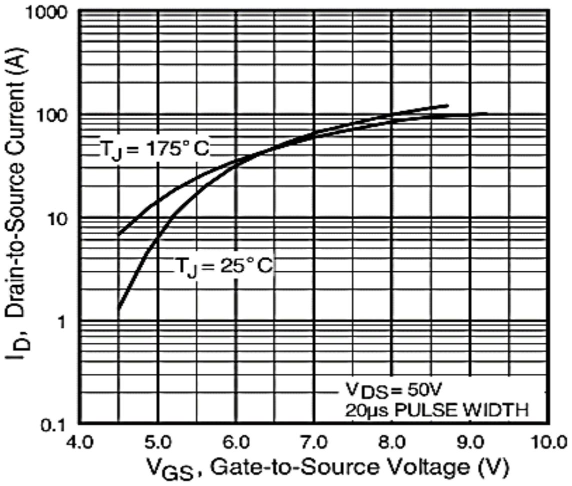


Fig 3. Typical Transfer Characteristics

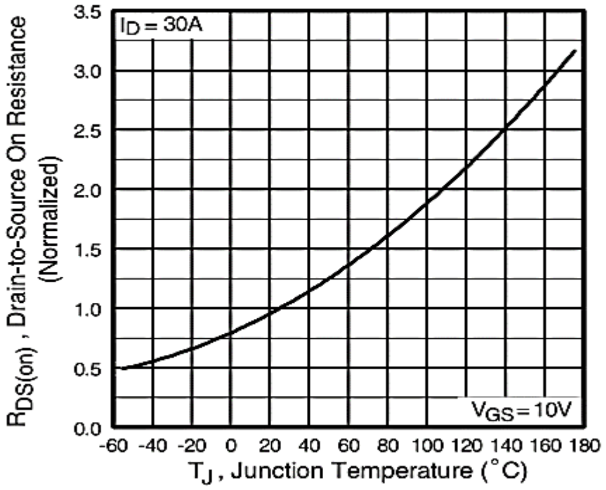


Fig 4. Normalized On-Resistance Vs. Temperature

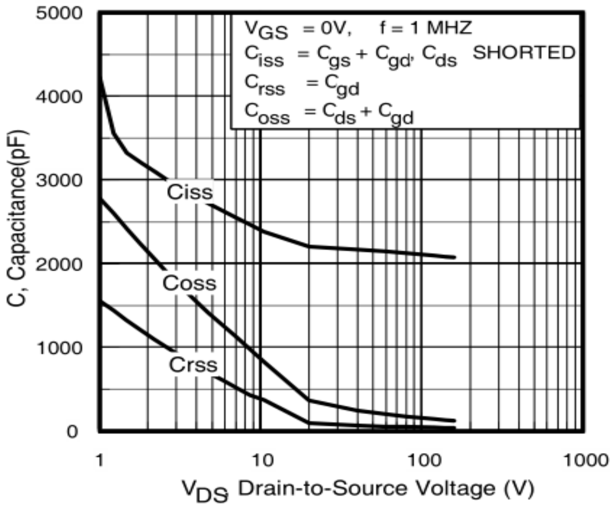


Fig 5. Typical Capacitance Vs. Drain-to-Source Voltage

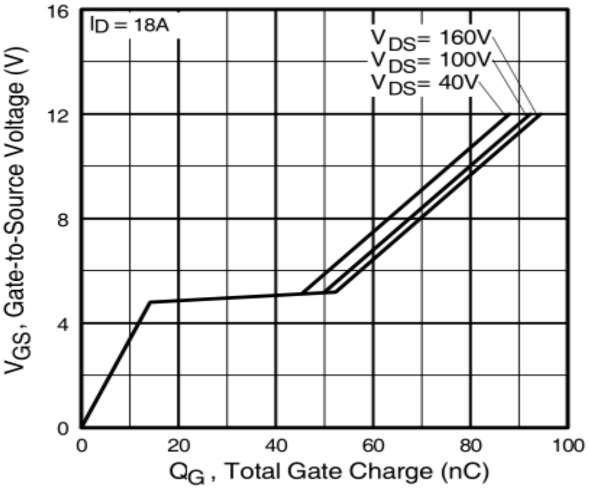


Fig 6. Typical Gate Charge Vs. Gate-to-Source Voltage

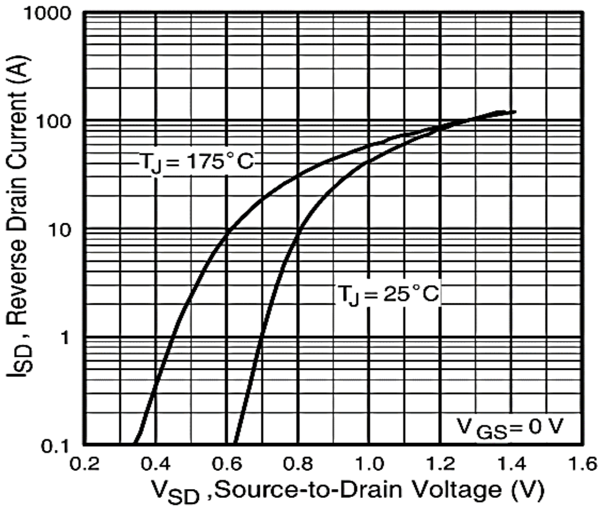


Fig 7. Typical Source-Drain Diode Forward Voltage

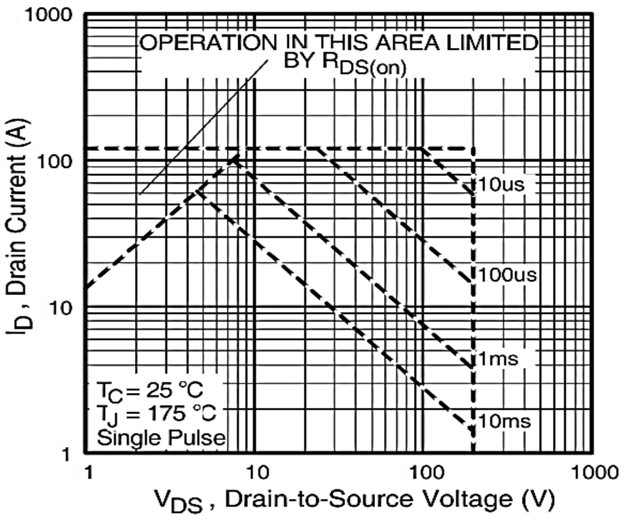


Fig 8. Maximum Safe Operating Area

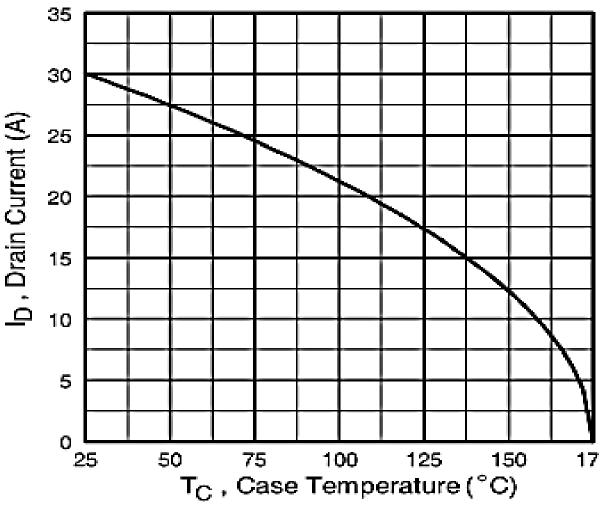


Fig 9. Maximum Drain Current Vs. Case Temperature

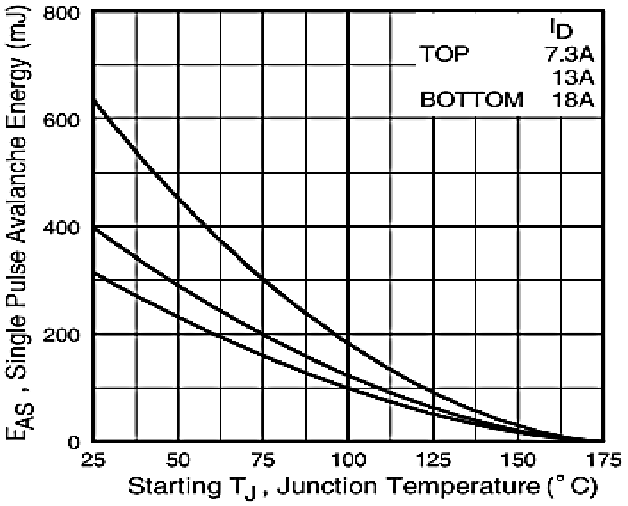


Fig 12c. Maximum Avalanche Energy Vs. Drain Current

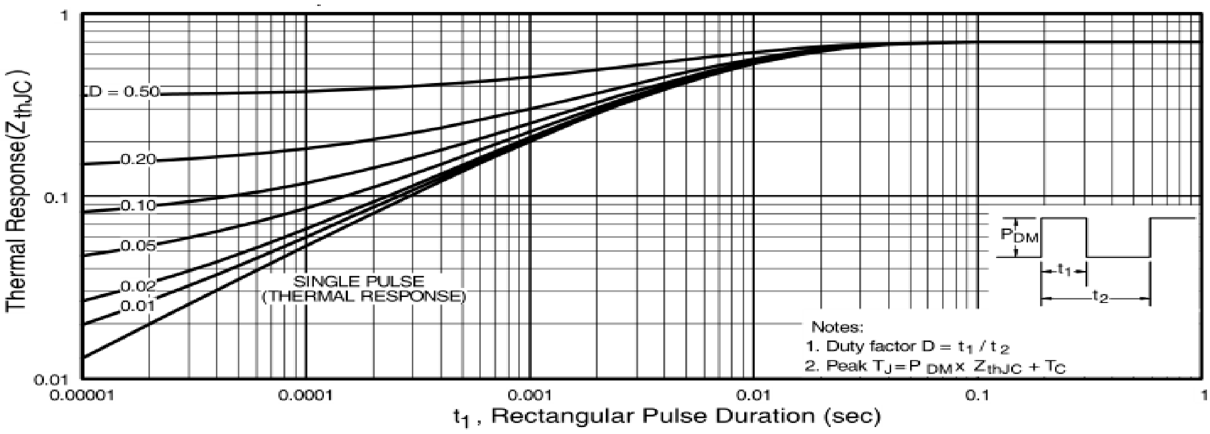
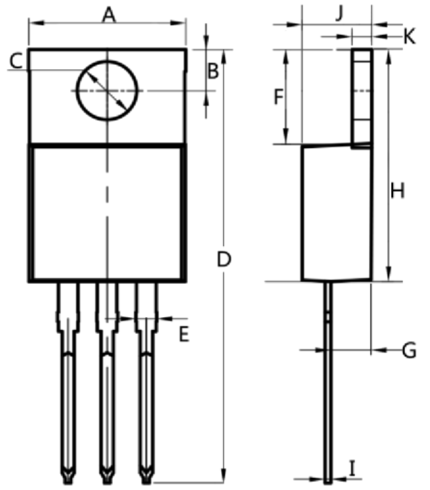


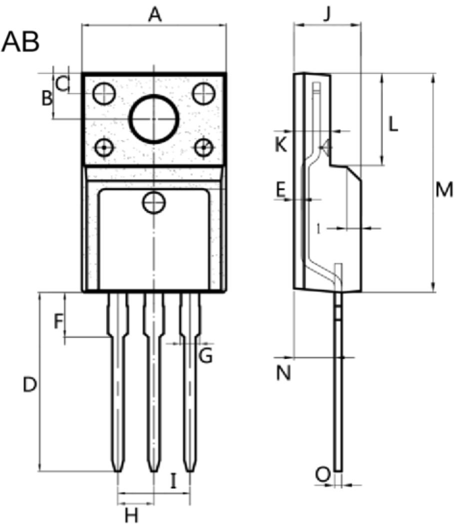
Fig 11. Maximum Effective Transient Thermal Impedance, Junction-to-Case

TO-220AB



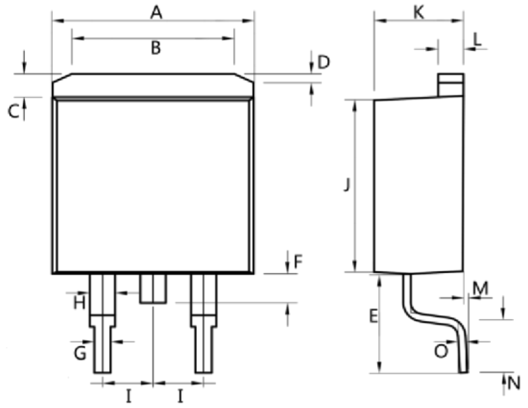
Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

ITO-220AB



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		

TO-263



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		