

500V N-Channel Enhancement Mode MOSFET

Description

The AP10N50F/P/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

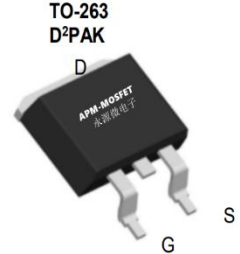
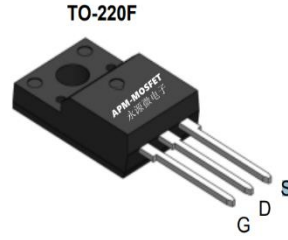
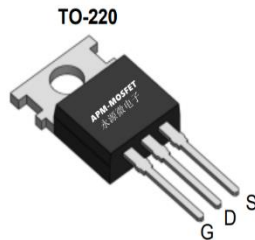
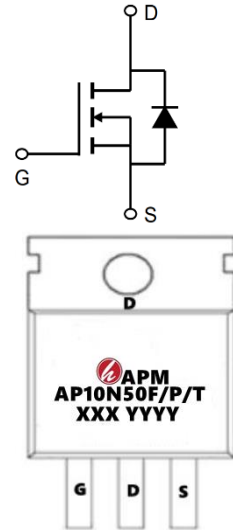
$V_{DS} = 500V$ $I_D = 10A$

$R_{DS(ON)} < 680m\Omega$ @ $V_{GS}=10V$ (Type: 600m Ω)

Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP10N50F	TO-220F-3L	AP10N50F XXXX YYYY	1000
AP10N50P	TO-220-3L	AP10N50P XXXX YYYY	1000
AP10N50T	TO-263-3L	AP10N50T XXXX YYYY	800

Absolute Maximum Ratings ($T_c=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DSS}	Drain-Source Voltage ($V_{GS} = 0V$)	500	V
I_D	Continuous Drain Current	10	A
I_{DM}	Pulsed Drain Current (note1)	36	A
V_{GS}	Gate-Source Voltage	± 30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	347	mJ
I_{AR}	Avalanche Current (note1)	9	A
E_{AR}	Repetitive Avalanche Energy note1)	22	mJ
P_D	Power Dissipation ($T_c = 25^{\circ}C$)	178	W
T_J, T_{stg}	Operating Junction and Storage Temperature Range	$-55 \sim +150$	$^{\circ}C$
R_{thJC}	Thermal Resistance, Junction-to-Case	0.7	$^{\circ}C/W$
R_{thJA}	Thermal Resistance, Junction-to-Ambient	62.5	$^{\circ}C/W$

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Units
V(BR)DSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250μA	500	535	-	V
IDSS	Zero Gate Voltage Drain Current	V _{DS} =500V, V _{GS} =0V, T _J =25°C	-	-	1	μA
IGSS	Gate to Body Leakage Current	V _{DS} =0V, V _{GS} = ±30V	-	-	±100	nA
VGS(th)	Gate Threshold Voltage	V _{DS} = V _{GS} , I _D =250μA	2	3	4	V
RDS(on)	Static Drain-Source on-Resistance	V _{GS} =10V, I _D =3A	-	600	695	mΩ
Ciss	Input Capacitance	V _{DS} =25V, V _{GS} =0V, f=1.0MHz	-	1100	-	pF
Coss	Output Capacitance		-	106	-	pF
Crss	Reverse Transfer Capacitance		-	32	-	pF
Q _g	Total Gate Charge	V _{DD} =400V, I _D =9A, V _{GS} =10V	-	19.5	-	nC
Q _{gs}	Gate-Source Charge		-	4.6	-	nC
Q _{gd}	Gate-Drain(“Miller”) Charge		-	7.1	-	nC
td(on)	Turn-on Delay Time	V _{DD} =250V, I _D =9A, R _G =25Ω	-	24	-	ns
tr	Turn-on Rise Time		-	44	-	ns
td(off)	Turn-off Delay Time		-	55	-	ns
t _f	Turn-off Fall Time		-	35	-	ns
IS	Maximum Continuous Drain to Source Diode Forward Current		-	-	9	A
ISM	Maximum Pulsed Drain to Source Diode Forward Current		-	-	36	A
VSD	Drain to Source Diode Forward Voltage	V _{GS} =0V, I _{SD} =9A	-	-	1.4	V
trr	Reverse Recovery Time	V _{GS} =0V, I _S =9A, di/dt=100A/μs	-	332	-	ns
Q _{rr}	Reverse Recovery Charge		-	3.5	-	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 . IAS=6A, VDD = 50V, RG = 25 Ω, Starting T_J = 25 °C
- 3、The test condition is Pulse Test: Pulse width ≤ 300μs, Duty Cycle ≤ 1%
- 4、The power dissipation is limited by 150°C junction temperature
- 5、The data is theoretically the same as ID and IDM , in real applications , should be limited by total power dissipation.

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Typical Characteristics

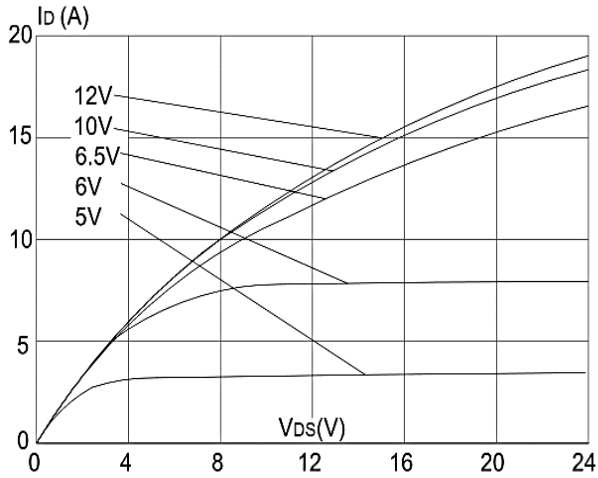


Figure1: Output Characteristics

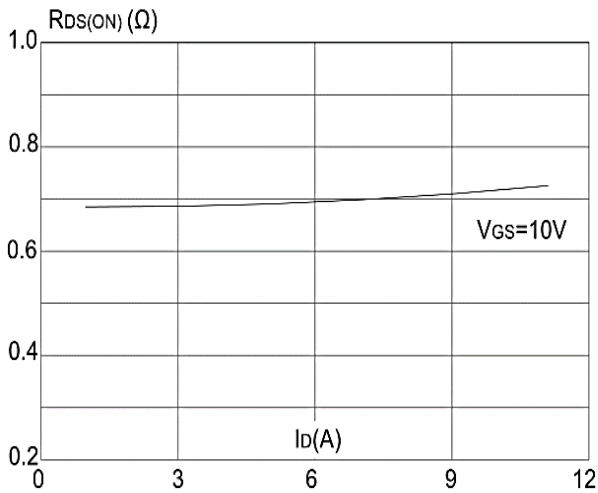


Figure 3: On-resistance vs. Drain Current

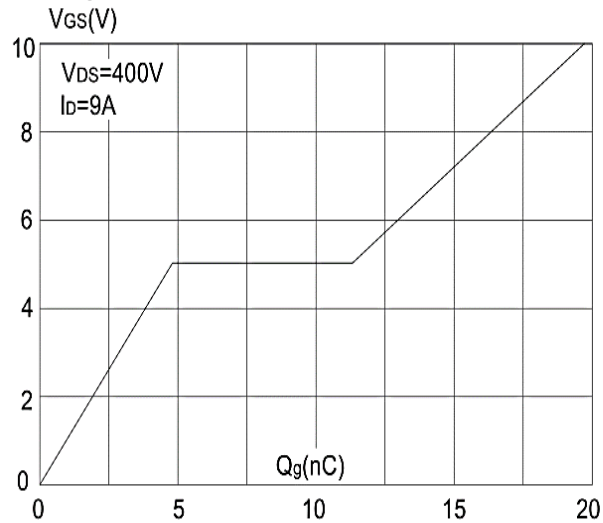


Figure 5: Gate Charge Characteristics

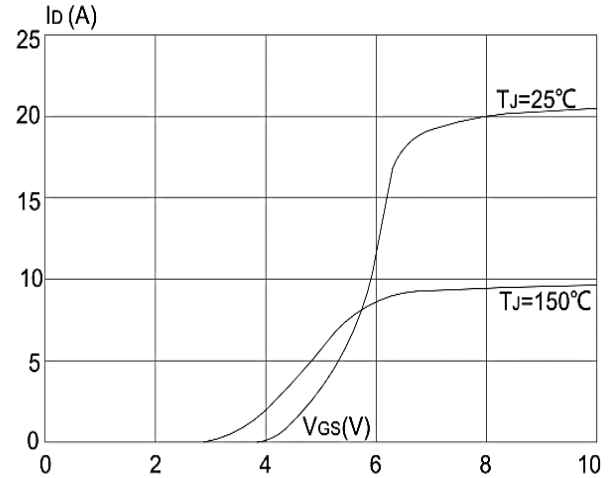


Figure 2: Typical Transfer Characteristics

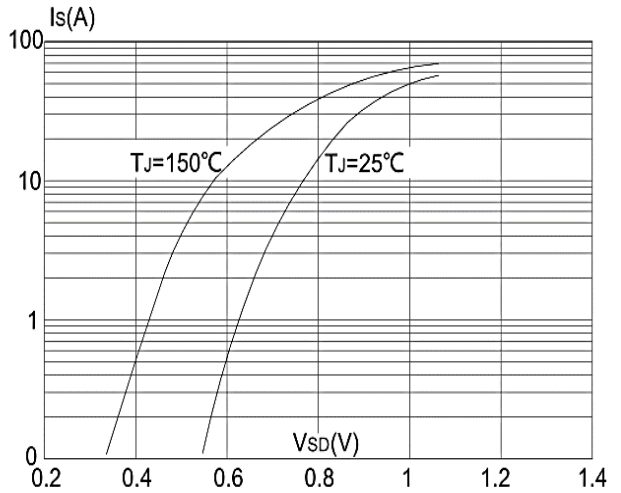


Figure 4: Body Diode Characteristics

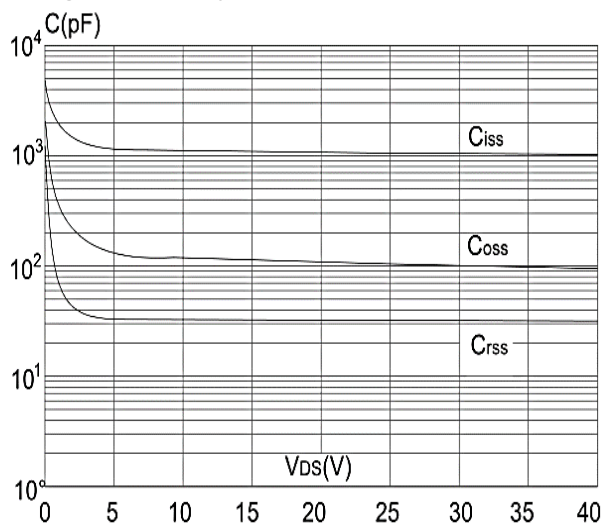


Figure 6: Capacitance Characteristics

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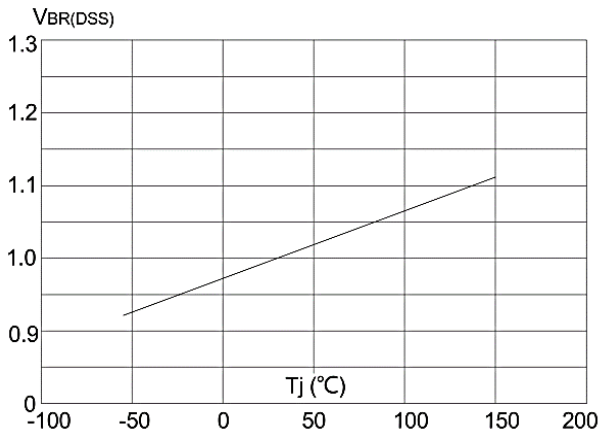


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

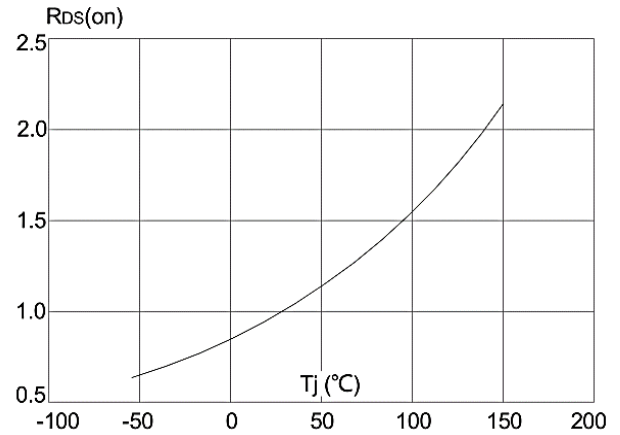


Figure 8: Normalized on Resistance vs. Junction Temperature

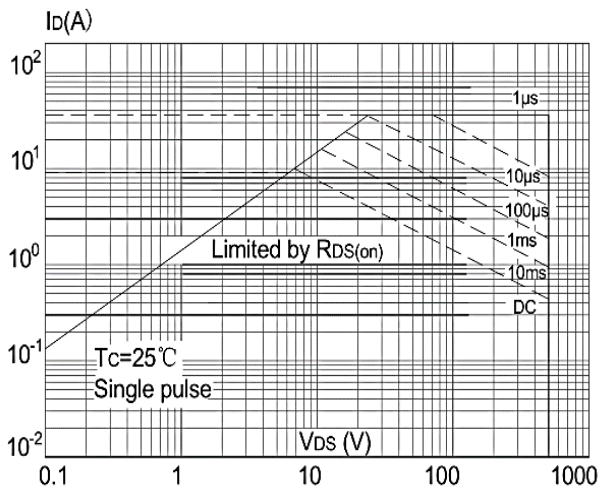


Figure 9: Maximum Safe Operating Area vs. Case Temperature

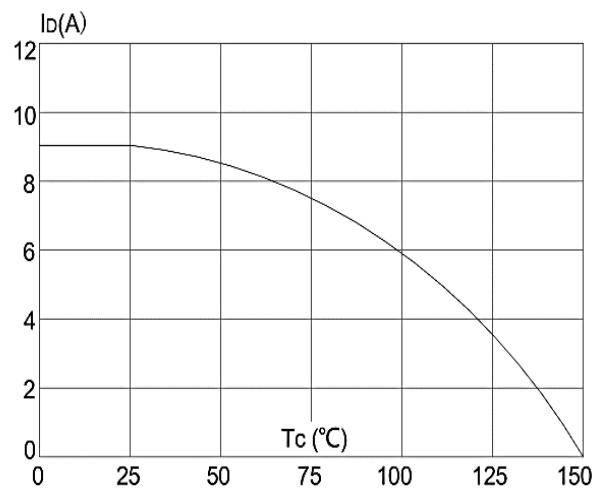


Figure 10: Maximum Continuous Drain Current

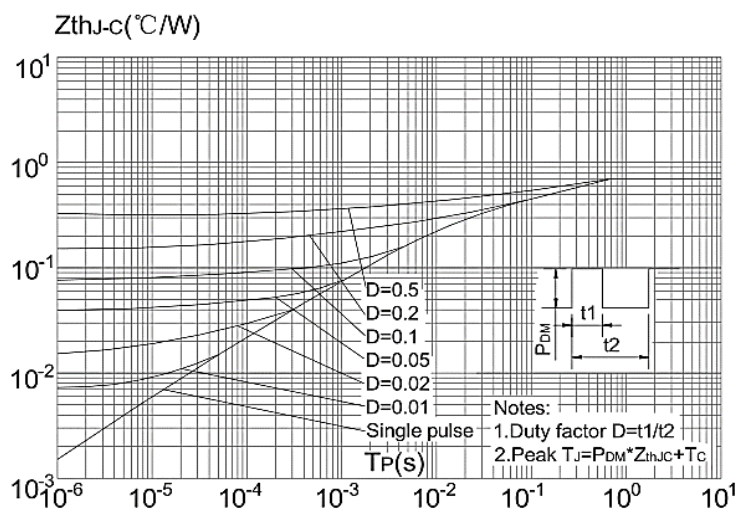
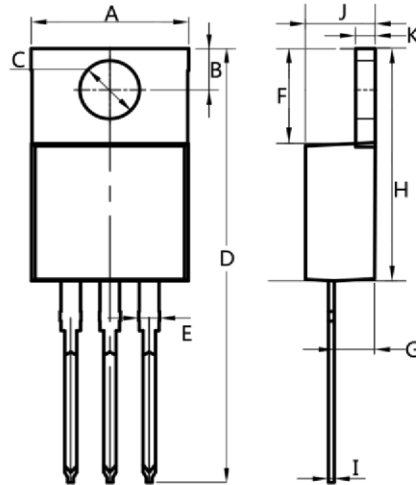


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

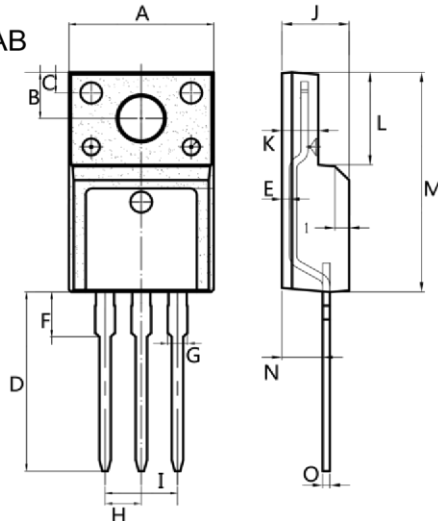
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TO-220AB



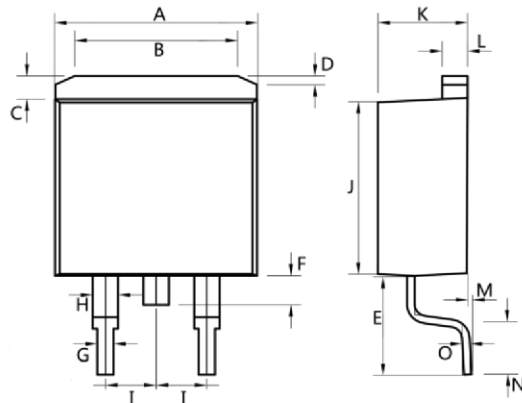
Dim.	Min.	Max.
A	10.0	10.4
B	2.5	3.0
C	3.5	4.0
D	28.0	30.0
E	1.1	1.5
F	6.2	6.6
G	2.9	3.3
H	15.0	16.0
I	0.35	0.45
J	4.3	4.7
K	1.2	1.4
All Dimensions in millimeter		

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		

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AP10N50F/P/T

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Edition	Date	Change
Rve1.0	2022/10/31	Initial release

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