

85V N-Channel Enhancement Mode MOSFET

Description

The AP120N08P/T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 10V.

This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 85V$ $I_D = 120A$

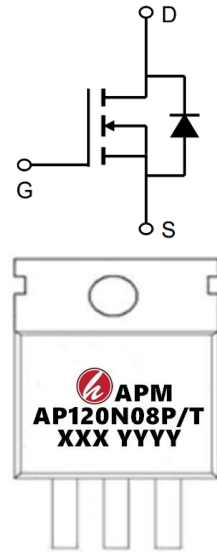
$R_{DS(ON)} < 5.2m\Omega$ $V_{GS}=10V$ (Type: 4.5m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP120N08P	TO-220-3L	AP120N08P XXX YYYY	1000
AP120N08T	TO-263-3L	AP120N08T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	85	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	120	A
$I_D@T_C=100^\circ C$	Continuous Drain Current, $V_{GS} @ 10V$	100	A
IDM	Pulsed Drain Current	480	A
EAS	Single Pulse Avalanche Energy	560	mJ
IAS	Avalanche Current	53.4	A
$P_D@T_C=25^\circ C$	Total Power Dissipation ⁴	220	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	0.70	$^\circ C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case	60	$^\circ C/W$

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

Symbol	Parameter	Conditions	Min	Typ	Max	Unit
V(BR)DSS	Drain-source breakdown voltage	V _{GS} =0V, I _D =250uA	85	92		V
VGS(th)	Gate threshold voltage	V _{DS} =V _{GS} , I _D =250uA T _J =25°C	2.0	3.0	4.0	V
IDSS	Zero gate voltage drain current	V _{DS} =80V, V _{GS} =0V T _J =25°C	-		1	μA
IDSS	Zero gate voltage drain current	V _{DS} =80V, V _{GS} =0V T _J =125°C		- 5		μA
IGSS	Gate-source leakage current	V _{GS} =20V, V _{DS} =0V	-	-	100	nA
RDS(on)	Drain-source on-state resistance	V _{GS} =10V, I _D =50A, T _J =25°C	-	4.5	5.2	mΩ
gfs	Transconductance	V _{DS} =5V, I _D =50A	-	80	-	S
Ciss	Input Capacitance	V _{GS} =0V, V _{DS} =40V, f=1MHz	-	4032	-	pF
Coss	Output Capacitance		-	546	-	pF
Crss	Reverse Transfer Capacitance	V _{GS} =10V, V _{DS} =40V, I _D =25A	-	35	-	pF
Q _G	Gate Total Charge		-	65.7	-	nC
Q _{gs}	Gate-Source charge		-	24.9	-	nC
Q _{gd}	Gate-Drain charge		-	13.9	-	nC
td(on)	Turn-on delay time	T _J =25°C, V _{GS} =10V, V _{DS} =40V, R _L =3Ω	-	20.1	-	ns
t _r	Rise time		-	38	-	ns
td(off)	Turn-off delay time		-	45.1	-	ns
t _f	Fall time		-	21	-	ns
R _G	Gate resistance	V _{GS} =0V, V _{DS} =0V, f=1MHz	-	2	-	Ω
VSD	Body Diode Forward Voltage	V _{GS} =0V, I _{SD} =50A	-	0.9	1.2	V
trr	Body Diode Reverse Recovery Time	I _F =20A, dI/dt=500A/μs	-	61	-	ns
Qrr	Body Diode Reverse Recovery Charge	I _F =20A, dI/dt=500A/μs	-	340	-	nC

Note :

- 1、 The data tested by surface mounted on a 1 inch² FR-4 board with 2OZ copper.
- 2、 The data tested by pulsed , pulse width .The EAS data shows Max. rating .
- 3、 The test cond ≅ 300us duty cycle ≅ 2%, duty cycle ition is V_{DD}=64V_{GS}=10V, L=0.1mH, I_{AS}=53.8A
- 4、 The power dissipation is limited by 175°C 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

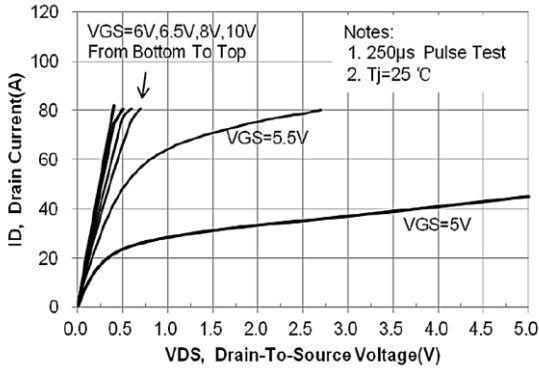


Figure 1. Typ. Output Characteristics (Tj=25 °C)

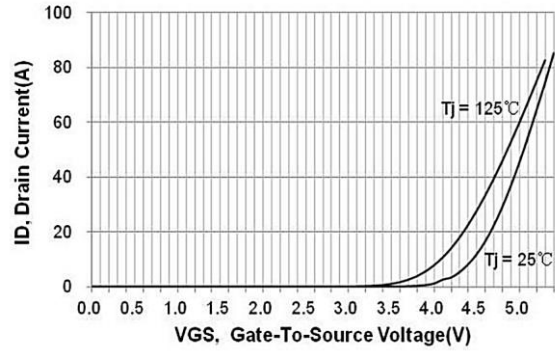


Figure 2. Transfer Characteristics

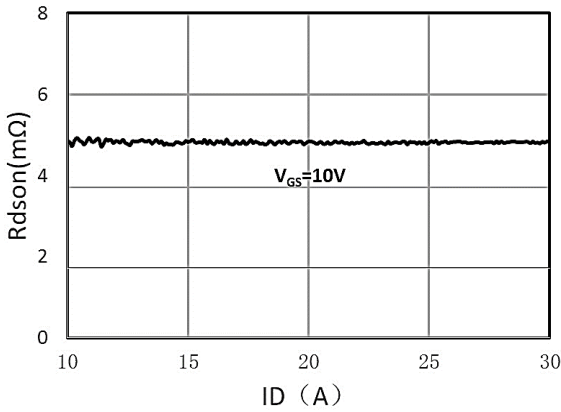


Figure 3. On-Resistance vs. Drain Current and Gate Voltage Figure

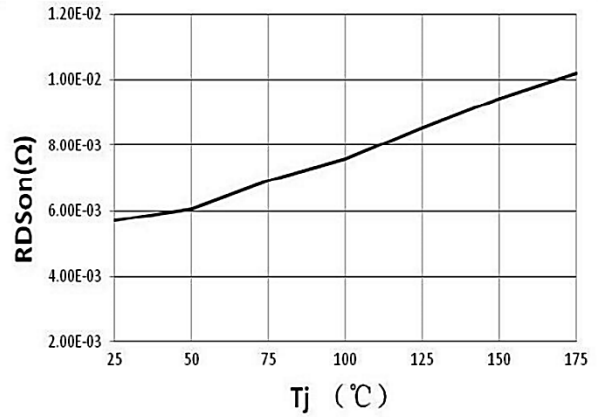


Figure 4. On-Resistance vs. Junction Temperature

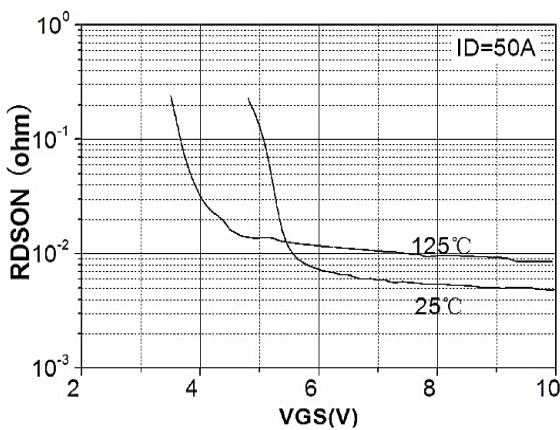


Figure 5. On-Resistance vs. Gate-Source Voltage

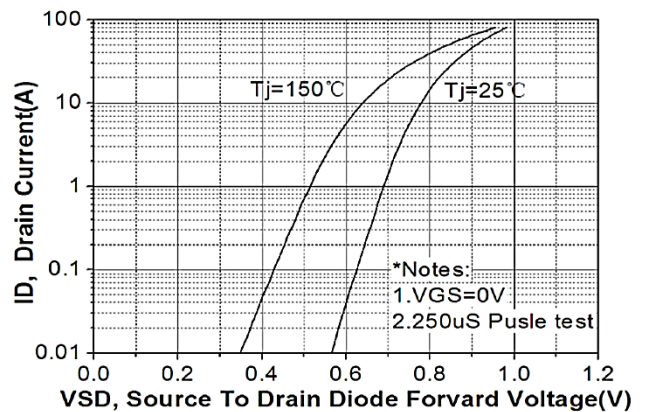


Figure 6 . Body-Diode Characteristics

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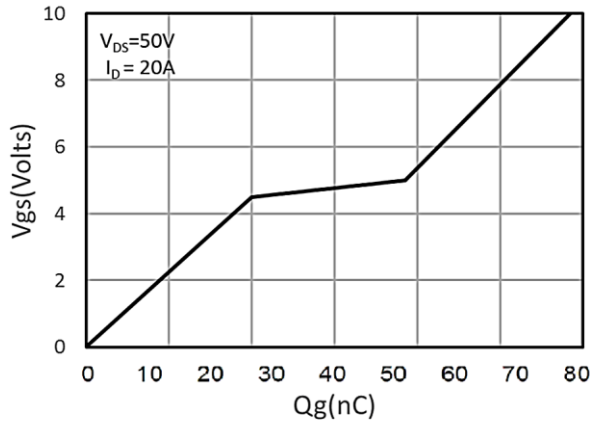


Figure 7. Gate-Charge Characteristics

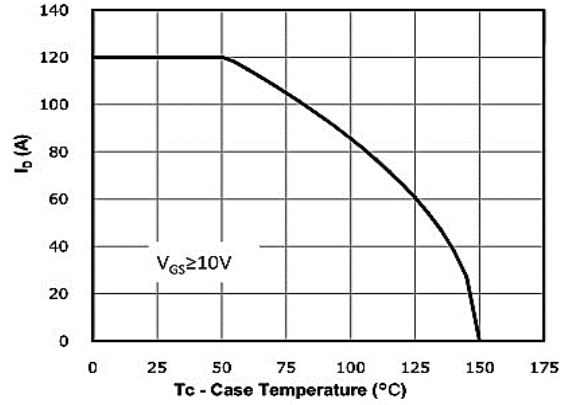


Figure 8. Drain Current Derating

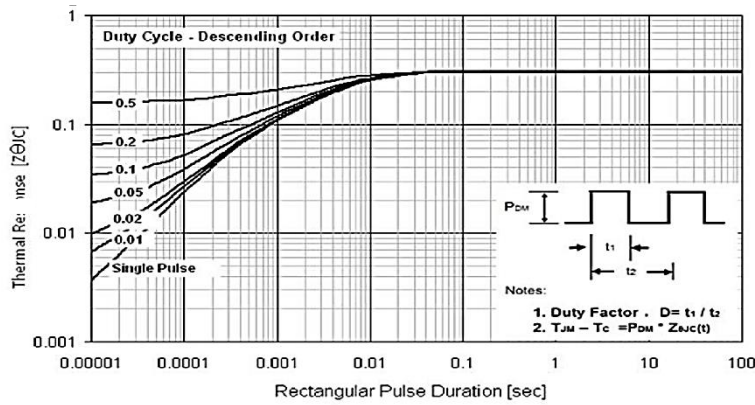


Figure 9: Normalized Maximum Transient Thermal Impedance

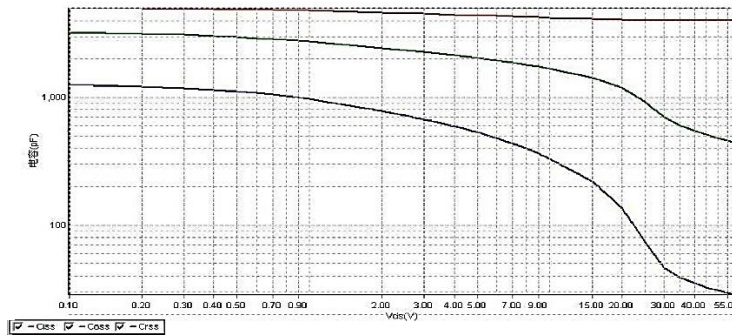
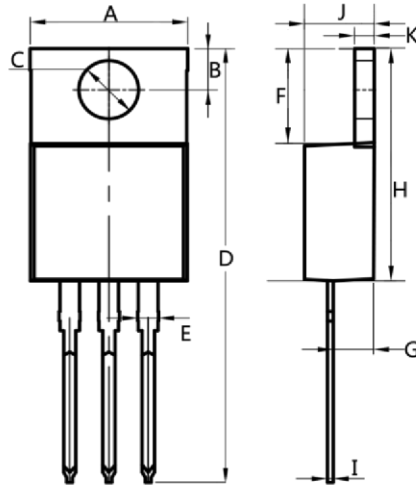


Figure 10. Capacitance Characteristics

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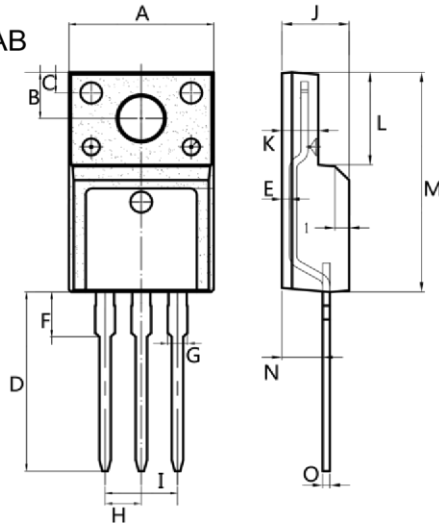
TO-220AB



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

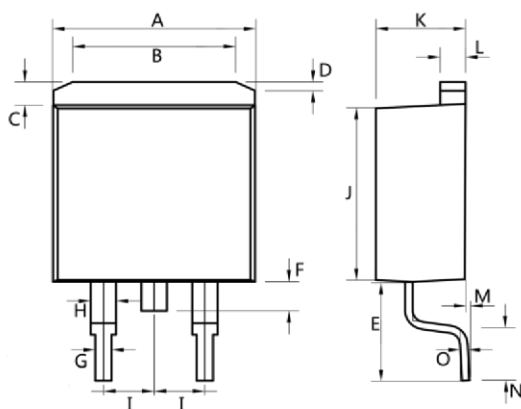
ITO-220AB



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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Edition	Date	Change
Rve1.0	2020/10/31	Initial release
Rve1.1	2021/1/12	Modify BVDSS

