

68V N-Channel Enhancement Mode MOSFET

Description

The AP80N07F/P/T uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with High EAS. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS} = 68V$ $I_D = 80A$

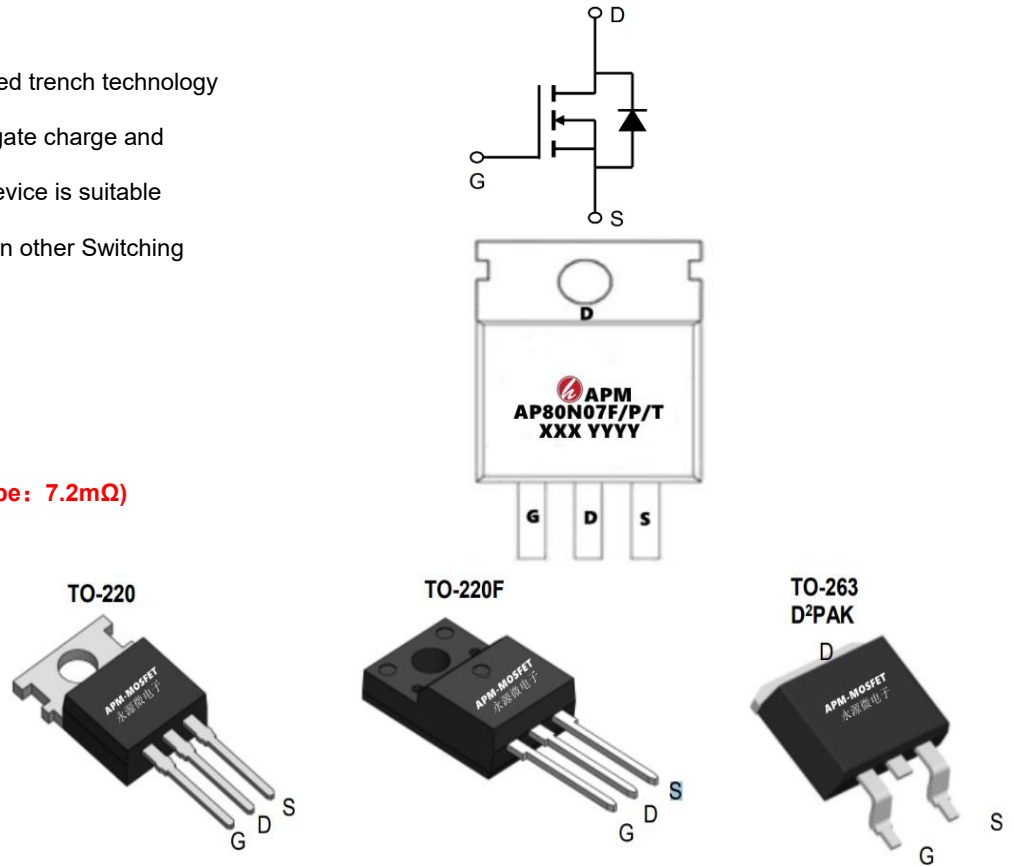
$R_{DS(ON)} < 9.0m\Omega$ @ $V_{GS}=10V$ (Type: 7.2m Ω)

Application

Battery protection

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP80N07F	TO-220F-3L	AP80N07F XXX YYYY	1000
AP80N07P	TO-220-3L	AP80N07P XXX YYYY	1000
AP80N07T	TO-263-3L	AP80N07T XXX YYYY	800

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

Symbol	Parameter	Rating	Units
V_{DS}	Drain-Source Voltage	68	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_c=25^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	80	A
$I_D@T_c=100^{\circ}C$	Continuous Drain Current, $V_{GS} @ 10V^1$	52	A
I_{DM}	Pulsed Drain Current ²	320	A
EAS	Single Pulse Avalanche Energy ³	110	mJ
IAS	Avalanche Current	22	A
$P_D@T_c=25^{\circ}C$	Total Power Dissipation ⁴	103	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	63	$^{\circ}C/W$
$R_{\theta JC}$	Thermal Resistance Junction-Case ¹	1.46	$^{\circ}C/W$

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

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
BVDSS	Drain-Source Breakdown Voltage	V _{GS} =0V, I _D =250uA	68	72	---	V
ΔBVDSS/ΔT _J	BVDSS Temperature Coefficient	Reference to 25°C, I _D =1mA	---	0.023	---	V/°C
RDS(ON)	Static Drain-Source On-Resistance ²	V _{GS} =10V, I _D =10A	---	7.5	9.0	mΩ
VGS(th)	Gate Threshold Voltage	V _{GS} =V _{DS} , I _D =250uA	2.0	3.0	4.0	V
ΔVGS(th)	VGS(th) Temperature Coefficient		---	-4.2	---	mV/°C
IDSS	Drain-Source Leakage Current	V _{DS} =68V, V _{GS} =0V, T _J =25°C	---	---	1	uA
		V _{DS} =68V, V _{GS} =0V, T _J =55°C	---	---	5	
IGSS	Gate-Source Leakage Current	V _{GS} =±20V, V _{DS} =0V	---	---	±100	nA
Q _g	Total Gate Charge (4.5V)	V _{DS} =30V, I _D =30A, V _{GS} =10V	---	35	---	nC
Q _{gs}	Gate-Source Charge		---	11	---	
Q _{gd}	Gate-Drain Charge		---	9	---	
Td(on)	Turn-On Delay Time	V _{DS} =30V, I _D =30A, R _{GEN} =3Ω, V _{GS} =10V	---	15	---	ns
T _r	Rise Time		---	90	---	
Td(off)	Turn-Off Delay Time		---	45	---	
T _f	Fall Time		---	30	---	
Ciss	Input Capacitance	V _{DS} =15V, V _{GS} =0V, f=1MHz	---	4000	---	pF
Coss	Output Capacitance		---	267	---	
Crss	Reverse Transfer Capacitance		---	250	---	
IS	Continuous Source Current ^{1,5}	V _G =V _D =0V, Force Current	---	---	80	A
ISM	Pulsed Source Current ^{2,5}		---	---	320	A
VSD	Diode Forward Voltage ²	V _{GS} =0V, I _S =80A	---	---	1.2	V
trr	Reverse Recovery Time	T _J =25°C I _F =20A, dI/dt=100A/μs	---	78	---	nS
Q _{rr}	Reverse Recovery Charge		---	51	---	nC

Note :

- 1、The data tested by surface mounted on a 1 inch² FR-4 board with 20Z 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 T_J=25°C, V_{DD}=35V, V_G=10V, R_G=25Ω, L=0.5mH, I_{AS}=21A
- 4、The power dissipation is limited by 175°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

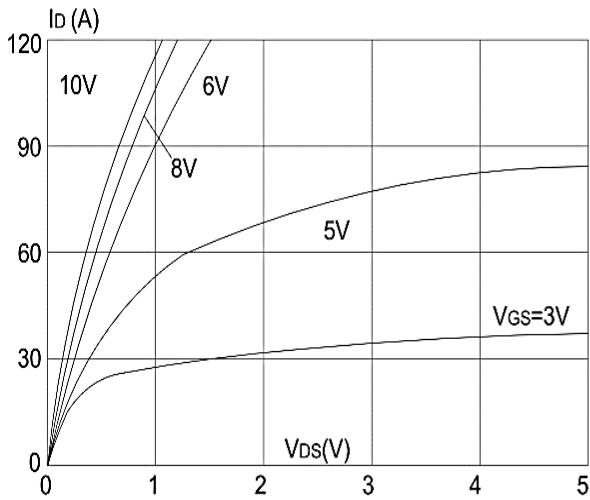


Figure1: Output Characteristics

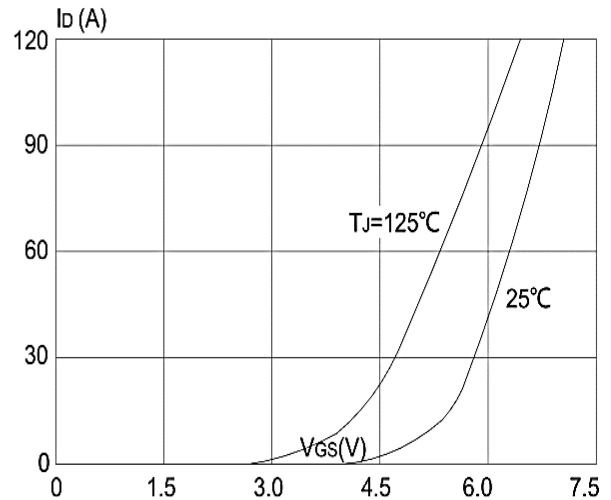


Figure 2: Typical Transfer Characteristics

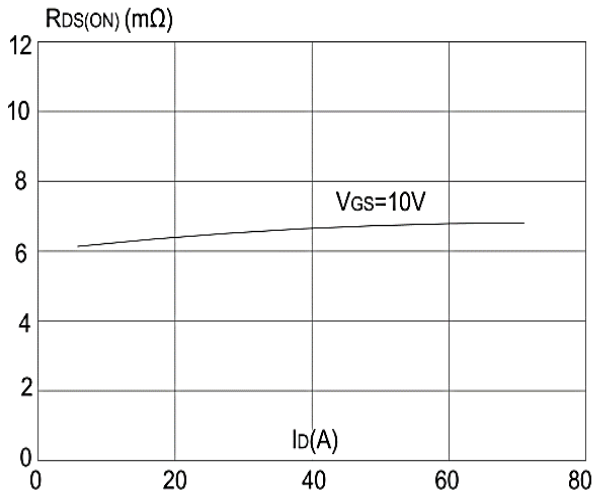


Figure 3: On-resistance vs. Drain Current

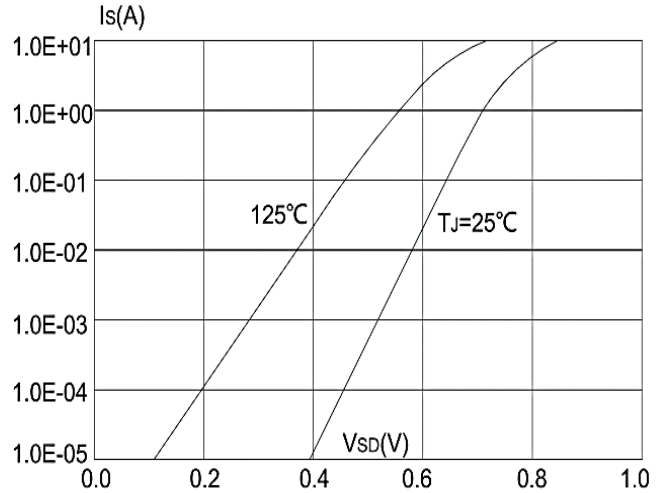


Figure 4: Body Diode Characteristics

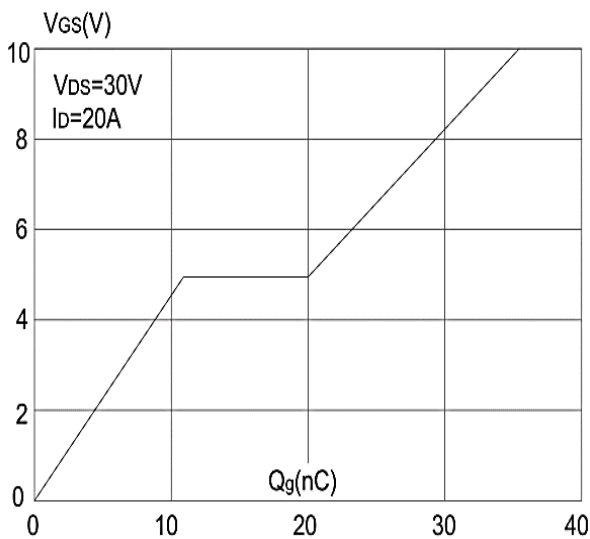


Figure 5: Gate Charge Characteristics

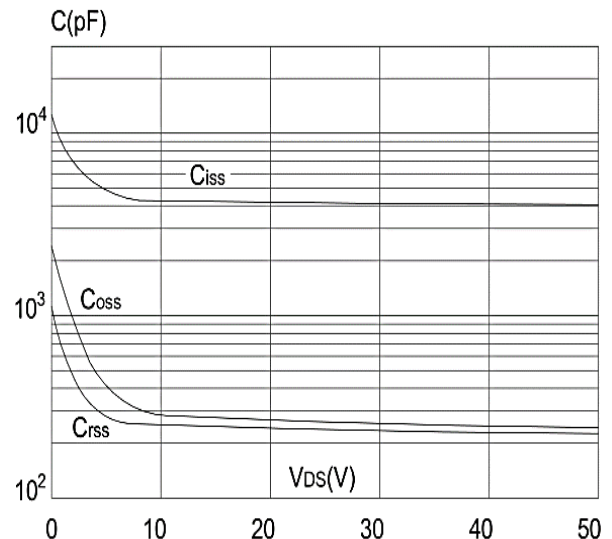


Figure 6: Capacitance Characteristics

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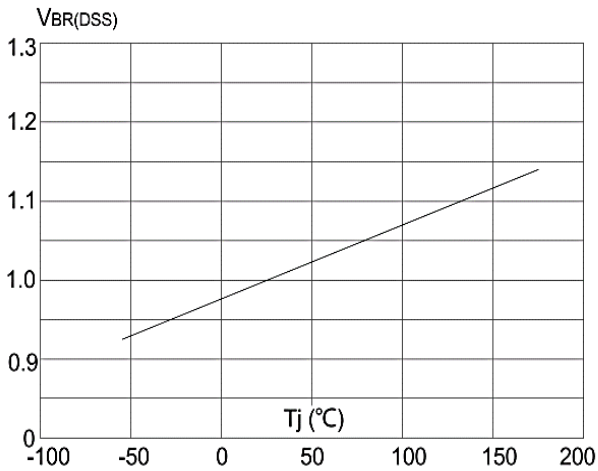


Figure 7: Normalized Breakdown Voltage vs Junction Temperature

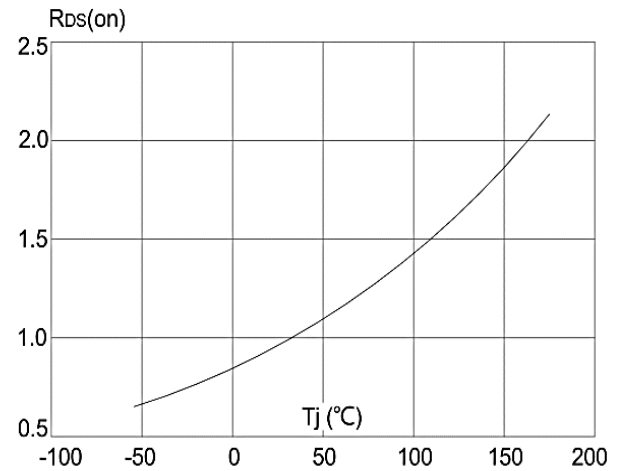


Figure 8: Normalized on Resistance vs. Junction Temperature

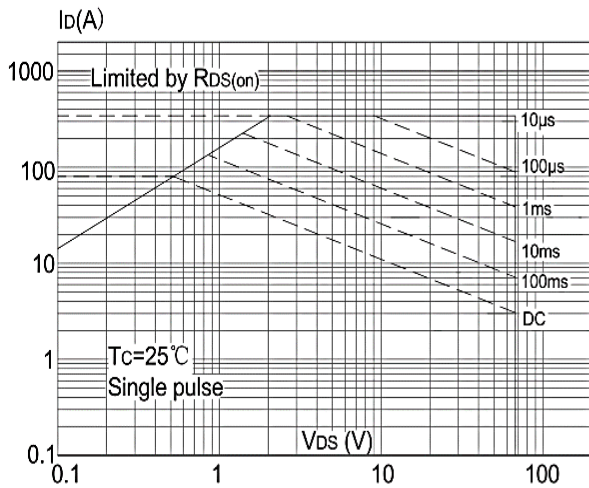


Figure 9: Maximum Safe Operating Area

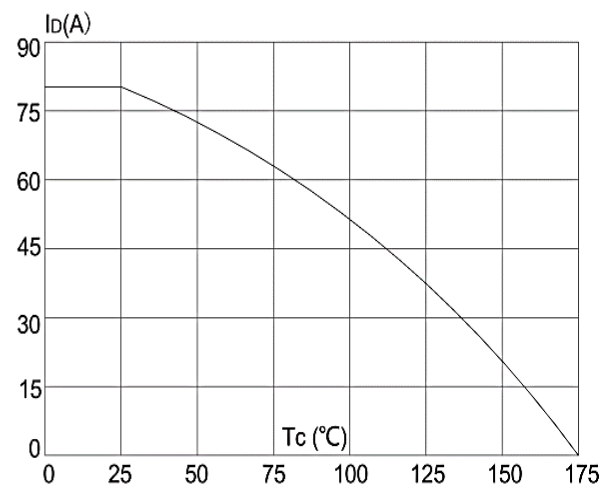


Figure 10: Maximum Continuous Drain Current vs. Ambient Temperature

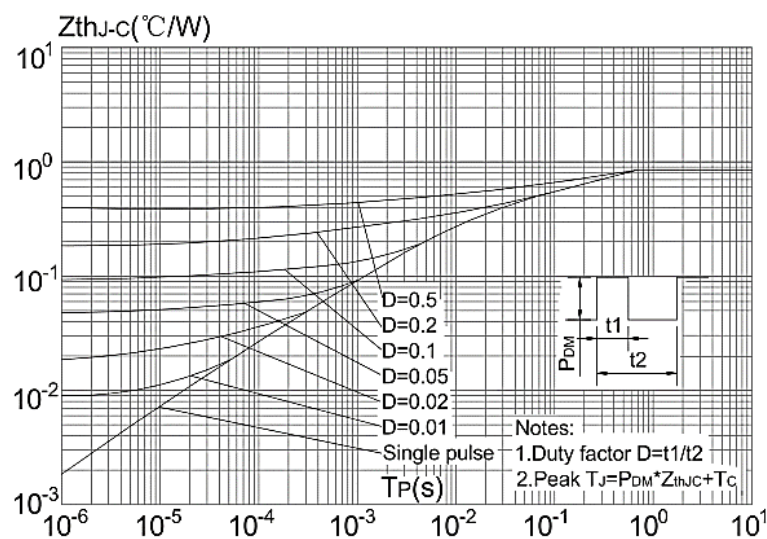
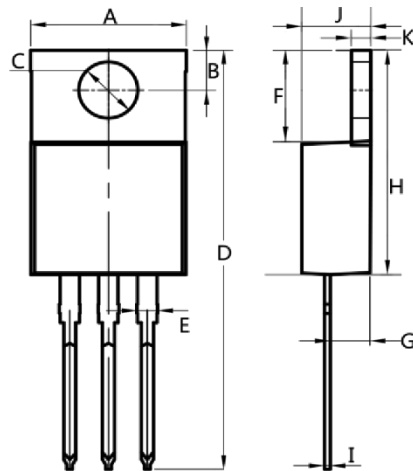


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Ambien

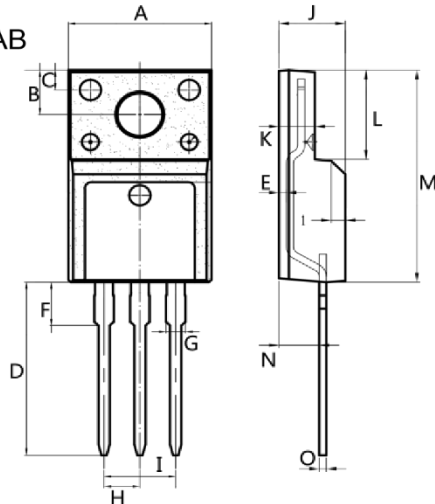
TO-220AB



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

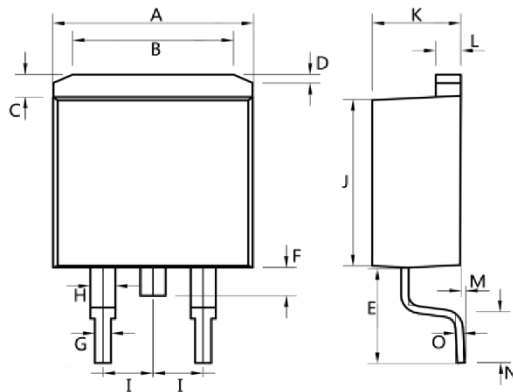
ITO-220AB



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

68V N-Channel Enhancement Mode MOSFET**Attention**

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Edition	Date	Change
REV1.0	2018/12/21	Initial release
REV1.1	2023/4/23	Change layout

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