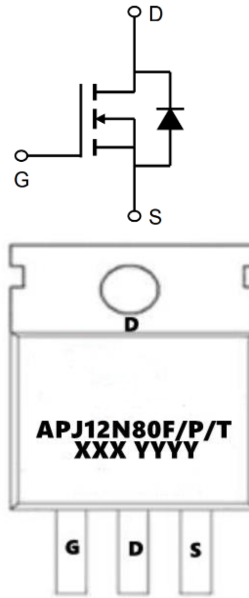
APJ12N80F/P/T (AP65R900)

800V N-Channel Enhancement Mode MOSFET

Description

The APJ12N80F/T/P is CoolFET II MOSFET family that is utilizing charge balance technology for extremely low on-resistance and low gate charge performance.

APJ12N80F/T/P is suitable for applications which require superior power density and outstanding efficiency



General Features

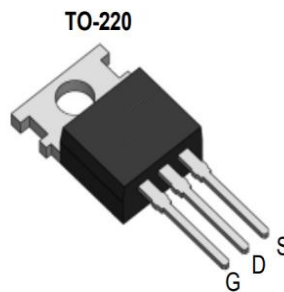
V_{DS} = 800V （Type: 890V） IDM =12A

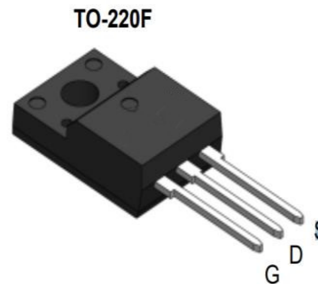
$R_{DS(ON)}$ <900mΩ @ V_{GS}=10V （**Type：800mΩ**）

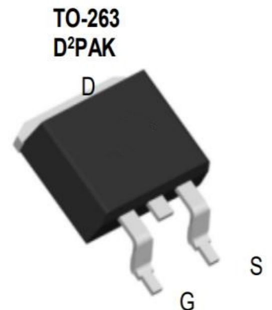
Application

Uninterruptible Power Supply(UPS)

Power Factor Correction (PFC)







Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
APJ12N80F	TO-220F-3L	APJ12N80G XXX YYYY	1000
APJ12N80P	TO-220-3L	APJ12N80P XXX YYYY	1000
APJ12N80T	TO-263-3L	APJ12N80T XXX YYYY	800

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

Symbol	Parameter	Value	Unit
VDSS	Drain-Source Voltage (V_{GS} = 0V)	800	V
ID	Continuous Drain Current	12	A
IDM	Pulsed Drain Current (note1)	12	A
VGS	Gate-Source Voltage	±30	V
E_{AS}	Single Pulse Avalanche Energy (note2)	225	mJ
P_D	Power Dissipation (T_C = 25ºC)	25.5	W
TJ, Tstg	Operating Junction and Storage Temperature Range	-55~+150	ºC
RthJC	Thermal Resistance, Junction-to-Case	2	ºC/W
RthJA	Thermal Resistance, Junction-to-Ambient	62.5	ºC/W

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

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
V(BR)DSS	Drain-source breakdown voltage	VGS=0V, ID=250μA	800	-	-	V
V(GS)th	Gate threshold voltage	VDS=VGS, ID=250μA	2.5	3.5	4.5	V
IDSS	Zero gate voltage drain current	VDS=800V, VGS=0V, Tj=25°C	-	-	1	μA
IDSS	Zero gate voltage drain current	VDS=800V, VGS=0V, Tj=150°C			10	μA
IGSS	Gate-source leakage current	VGS=±30V, VDS=0V	-	-	±100	nA
RDS(on)	Drain-source on-state resistance	VGS=10V, ID=2.5A, Tj=25°C	-	800	900	mΩ
RDS(on)	Drain-source on-state resistance	VGS=10V, ID=2.5A, Tj=150°C		2000	5000	mΩ
Ciss	Input capacitance	VGS=0V, VDS=50V, f=1MHz	-	541	-	pF
Coss	Output capacitance		-	31.6	-	pF
Crss	Reverse transfer capacitance		-	1.33	-	pF
td(on)	Turn-on delay time	VDD=400V, VGS=13V, ID=2.2A,	-	17.6	-	ns
tr	Rise time		-	22.4	-	ns
td(off)	Turn-off delay time		-	64.2	-	ns
tf	Fall time		-	28.2	-	ns
Qgs	Gate to source charge	VDD=400V, ID=4A, VGS=0 to 10V	-	2.7	-	nC
Qgd	Gate to drain charge		-	4.97	-	nC
Qg	Gate charge total		-	10.7	-	nC
Vplateau	Gate plateau voltage		-	5.42	-	V
VSD	Diode forward voltage	VGS=0V, IF=5A, Tf=25°C	-	0.86	-	V
trr	Reverse recovery time	VR=400V, IF=1.1A, diF/dt=100A/μs	-	181	-	ns
Qrr	Reverse recovery charge		-	0.74	-	μC
Irrm	Peak reverse recovery current		-	8.68	-	A

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=0.5mH, IAS =5.0A, VDD =50V, RG=25Ω
3、The test condition is Pulse Test: ISD ≤ ID, di/dt = 100A/us, VDD≤ BVDSS, Starting at TJ =25℃
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

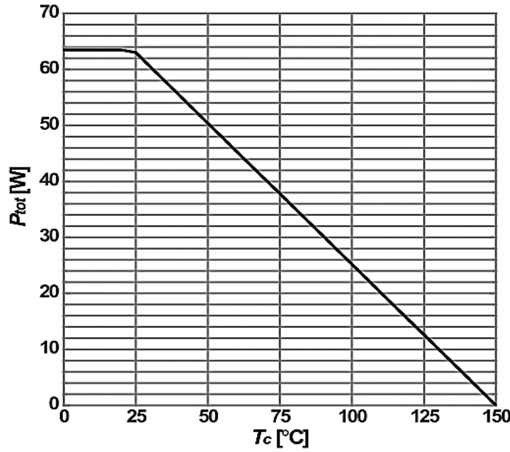


Figure1: Power dissipation (Non FullPAK)

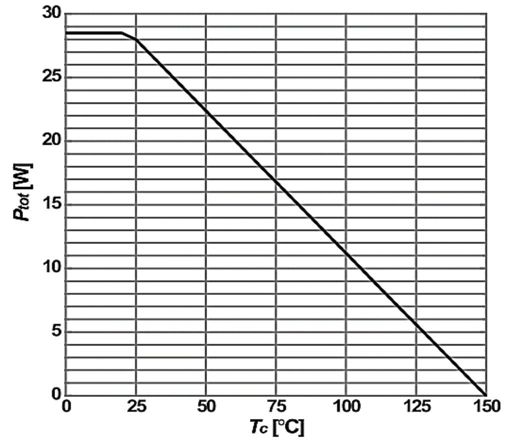


Figure2: Power dissipation (FullPAK)

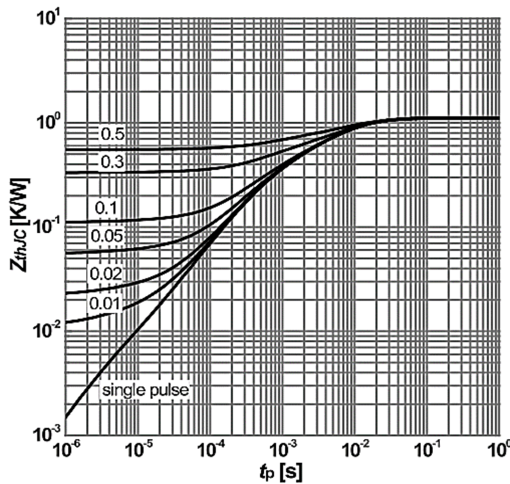


Figure3:Max. transient thermal impedance

$Z_{thJC}=f(t_p)$; parameter: $D= t_p/T$

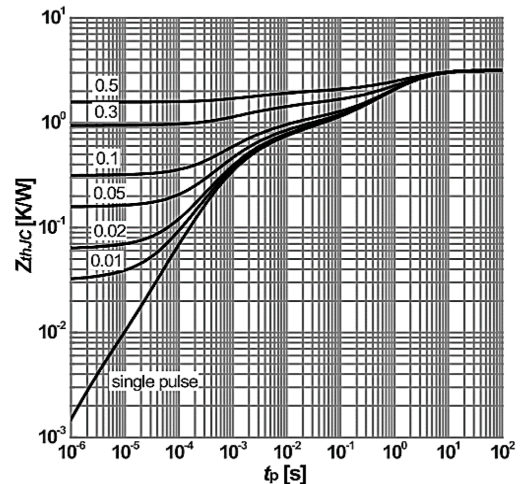


Figure4:Max. transient thermal impedance

$Z_{thJC}=f(t_p)$; parameter: $D= t_p/T$

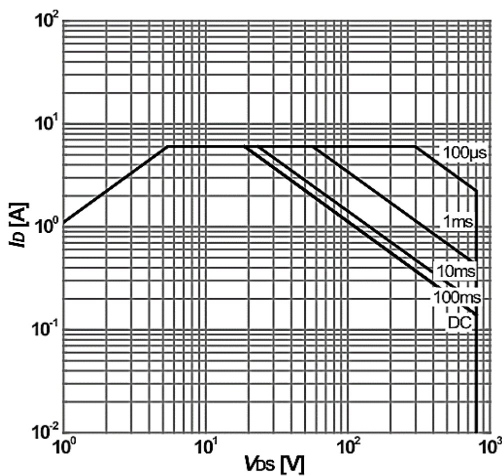


Figure5: Safe operating area (Non FullPAK)

$I_D=f(V_{DS})$; T_j=25°C; D=0; parameter: t_p

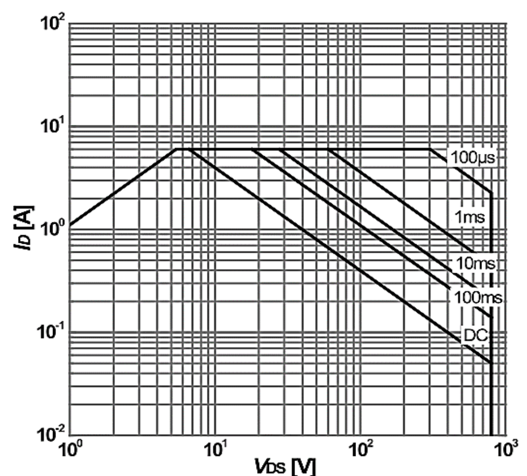


Figure6: Safe operating area (FullPAK)

$I_D=f(V_{DS})$; T_j=25°C; D=0; parameter: t_p

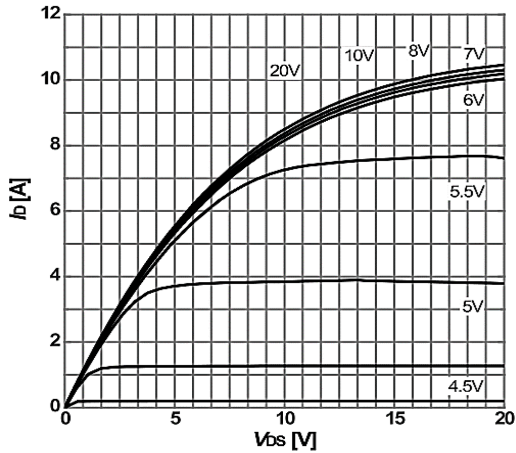


Figure 7: Typ. outp ut characteristics

$I_D=f(V_{DS})$; $T_j=25°C$; parameter: V_{GS}

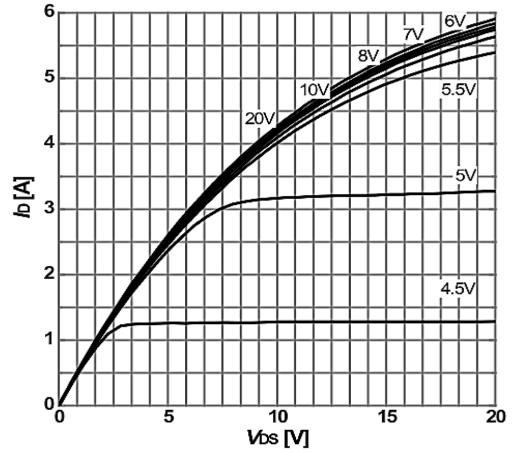


Figure8 : Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=125°C$; parameter: V_{GS}

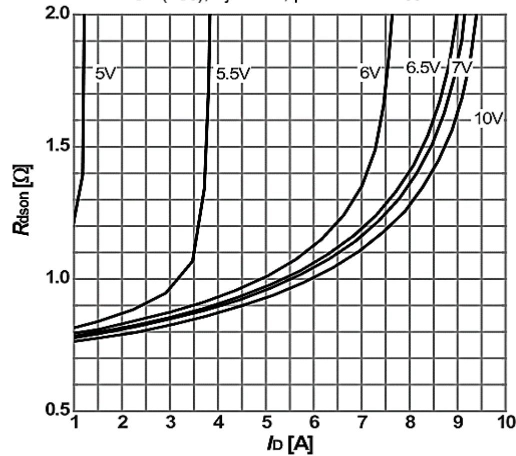


Figure9 : Typ. drain-source on-state resistance

$R_{DS}(on)=f(I_D)$; $T_j=25°C$; parameter: V_{GS}

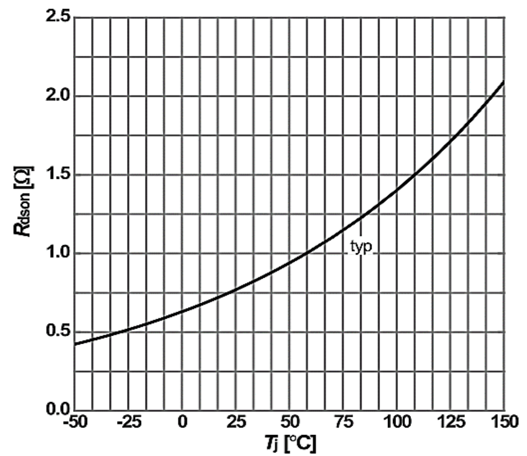


Figure 10: drain -source on-state resistance

$R_{DS}(on)=f(T_j)$; $I_D=3.2A$; $V_{GS}=10V$

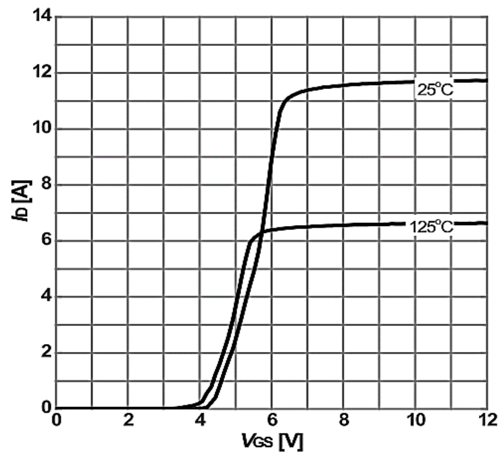


Figure 11: Type. transfer characteristics

$I_D=f(V_{GS})$; $V_{DS}=20V$; parameter: T_j

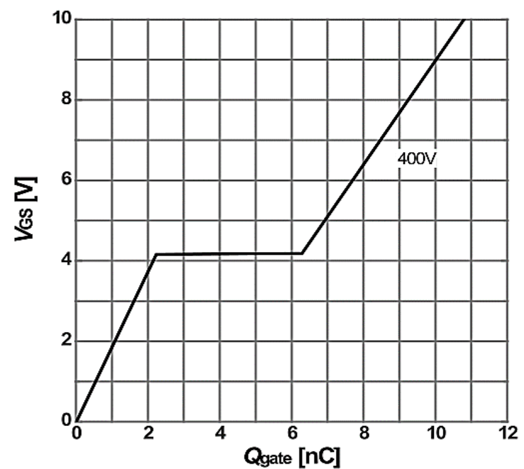
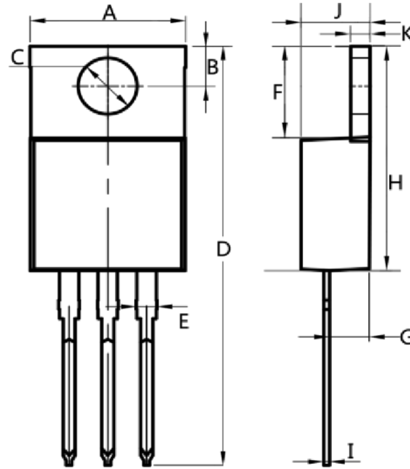


Figure 12: Type. gate charge

$V_{GS}=f(Q_{gate})$; $I_D=3.2A$ pulsed; $V_{DS}=480V$

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		

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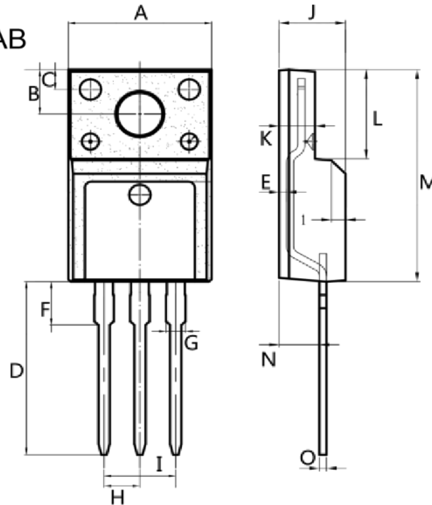

Dim.	Min.	Max.
A	9.9	10.3
B	2.9	3.5
C	1.15	1.45
D	12.75	13.25
E	0.55	0.75
F	3.1	3.5
G	1.25	1.45
H	Typ 2.54	
I	Typ 5.08	
J	4.55	4.75
K	2.4	2. 7
L	6.35	6.75
M	15.0	16.0
N	2.75	3.15
O	0.45	0.60
All Dimensions in millimeter		

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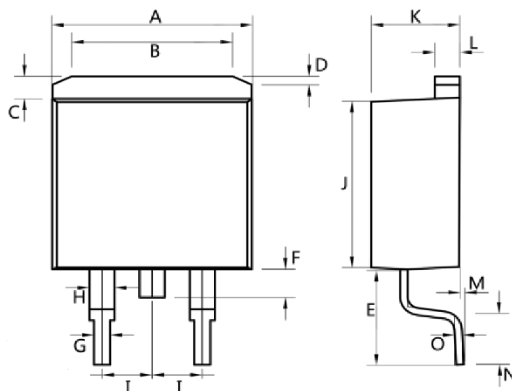

Dim.	Min.	Max.
A	10.0	10. 5
B	7.25	7.75
C	1.3	1.5
D	0.55	0.75
E	5.0	6.0
F	1.4	1.6
G	0.75	0.95
H	1.15	1.35
I	Typ 2.54	
J	8.4	8.6
K	4.4	4.6
L	1.25	1.45
M	0.02	0.1
N	2.4	2.8
O	0.35	0.45
All Dimensions in millimeter		