alpha pacific

DEVICE SPECIFICATION

APQ03SN80CH
APQ03SN80CF

800V/3A N-Channel MOSFET

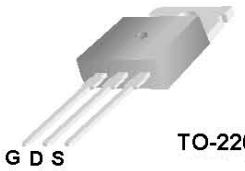
1 Description

These N-Channel enhancement mode power field effect transistors are produced using planar stripe, DMOS technology.

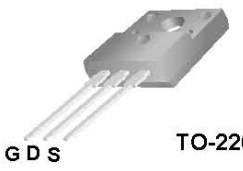
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction based on half bridge topology.

2 Features

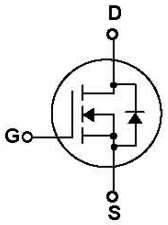
- 800V / 3A
- $R_{DS(on)}$ =4.0Ω(typ)，V_{GS} =10V, I_D =1.5A
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability..



TO-220



TO-220F



3 Absolute Maximum Ratings T_C = 25°C unless otherwise noted

Symbol	Parameter	APQ03SN80CH-XXM0 APQ03SN80CH-XXJ0 TO-220	APQ03SN80CF-XXM0 APQ03SN80CF-XXJ0 TO-220F	Units
V_{DSS}	Drain-Source Voltage	800		V
I_D	Drain Current - Continuous (T_C= 25°C)	3		A
	- Continuous (T_C= 100°C)	1.9		A
I_{DM}	Drain Current – Pulsed ①	12		A
V_{GS}	Gate-Source Voltage	± 30		V
E_{AS}	Single Pulsed Avalanche Energy ②	320		mJ
I_{AR}	Avalanche Current	3		A
dv/dt	Peak Diode Recovery dv/dt ③	5		V/ns
P_D	Power Dissipation (T_C= 25°C)	85	40	W
	- De-rate above 25°C	0.68	0.32	W/°C
T_J, T_{STG}	Operating and Storage Temperature Range	-55 to +150		°C
T_L	Maximum lead temperature for soldering purposes, 1/8"from case for 10 seconds	300		°C

*** Note :**

① Repetitive Rating: Pulse width limited by maximum junction temperature.

② V_{DD}=50V, starting T_J=25℃, L=TBD, R_G=25Ω, I_{AS}=3A

③ ISD ≤ 3A, di/dt ≤ 200A/μs, VDD ≤ $V_{(BR)DSS}$, T_J ≤ 150℃.

4 Thermal Characteristics

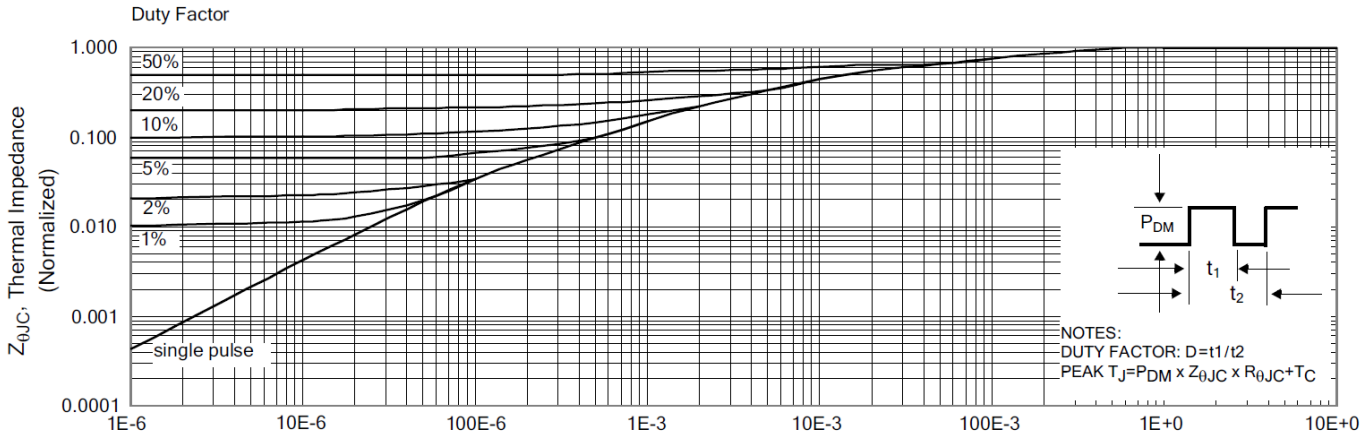
Symbol	Parameter	APQ03SN80CH-XXM0 APQ03SN80CH-XXJ0 TO-220	APQ03SN80CF-XXM0 APQ03SN80CF-XXJ0 TO-220F	Units
$R_{\theta JC}$	Thermal Resistance, Junction-to-Case	1.47	3.12	°C/W
$R_{\theta JA}$	Thermal Resistance, Junction-to-Ambient	62	100	°C/W

5 Electrical Characteristics T_C = 25°C unless otherwise noted

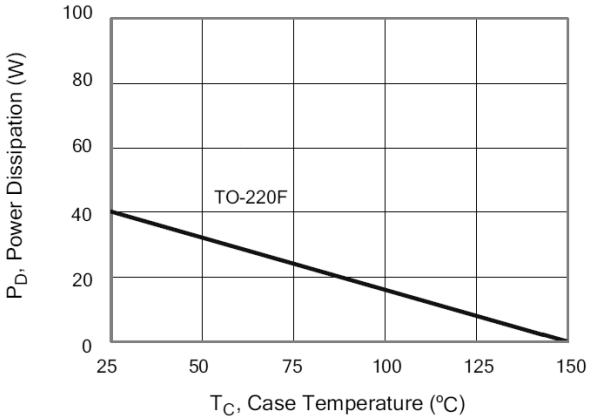
Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
Off Characteristics						
BV_{DSS}	Drain-Source Breakdown Voltage	V_{GS}= 0 V, I_D= 250 μA	800	--	--	V
ΔBV_{DSS} / ΔT_J	Breakdown Voltage Temperature Coefficient	I_D= 250 μA, Referenced to 25°C	--	0.61	--	V/°C
I_{DSS}	Gate to Source leakage current	V_{DS}= 800 V, V_{GS} = 0 V	--	--	1.0	μA
I_{GSSF}	Gate-Body Leakage Current, Forward	V_{GS}= 30 V, V_{DS}= 0 V	--	--	100	nA
I_{GSSR}	Gate-Body Leakage Current, Reverse	V_{GS}= -30 V, V_{DS}= 0 V	--	--	-100	nA
On Characteristics						
$V_{GS(th)}$	Gate Threshold Voltage	V_{DS}= VGS, I_D= 250 μA	2.0	--	4.0	V
$R_{DS(on)}$	Static Drain-Source On-Resistance	V_{GS}= 10 V, I_D= 1.5 A ④	--	4.0	4.8	Ω
Dynamic Characteristics						
C_{iss}	Input Capacitance	V_{DS}= 25 V, V_{GS}= 0 V, f = 1.0 MHz	--	660	--	pF
C_{oss}	Output Capacitance		--	50	--	pF
C_{rss}	Reverse Transfer Capacitance		--	7	--	pF
Switching Characteristics						
$t_{d(on)}$	Turn-On Delay Time	V_{DD}= 400 V, I_D= 3A, R_G= 12 Ω, V_{GS}= 10 V,④	--	16	--	ns
t_r	Turn-On Rise Time		--	15	--	ns
$t_{d(off)}$	Turn-Off Delay Time		--	40	--	ns
t_f	Turn-Off Fall Time		--	20	--	ns
Q_g	Total Gate Charge	V_{DS}= 400 V, I_D= 3A, V_{GS}= 10 V ④	--	18	--	nC
Q_{gs}	Gate-Source Charge		--	5.0	--	nC
Q_{gd}	Gate-Drain Charge		--	8.0	--	nC
Drain-Source Diode Characteristics and Maximum Ratings						
I_S	Maximum Continuous Drain-Source Diode Forward Current		--	--	3	A
I_{SM}	Maximum Pulsed Drain-Source Diode Forward Current		--	--	12	A
V_{SD}	Drain-Source Diode Forward Voltage	V_{GS}= 0 V, I_S= 3 A	--	--	1.5	V
t_{rr}	Reverse Recovery Time	V_{GS}= 0 V, I_S= 3 A, dI_F/ dt = 100 A/μs ④	--	820	--	ns
Q_{rr}	Reverse Recovery Charge		--	6.05	--	μC

Notes:
① Repetitive Rating: Pulse width limited by maximum junction temperature.
② VDD=50V, starting TJ=25℃, L=TBD, RG=25Ω, IAS=3A
③ ISD ≤ 3A, di/dt ≤ 100A/μs, VDD ≤ V(BR)DSS, TJ ≤ 150℃
④ Pulse Test: Pulse width ≤380μs, Duty cycle ≤ 2%. Depend on FT Test.

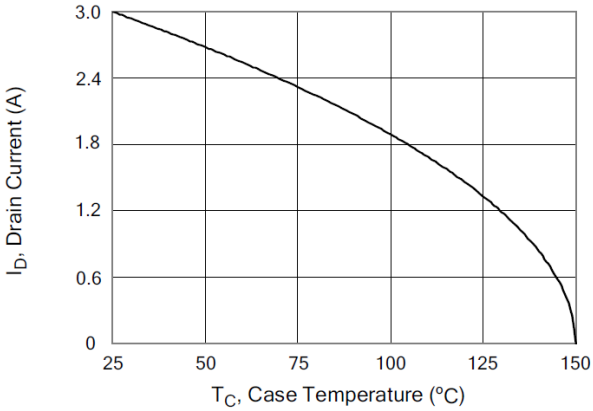
800V/3A N-Channel MOSFET



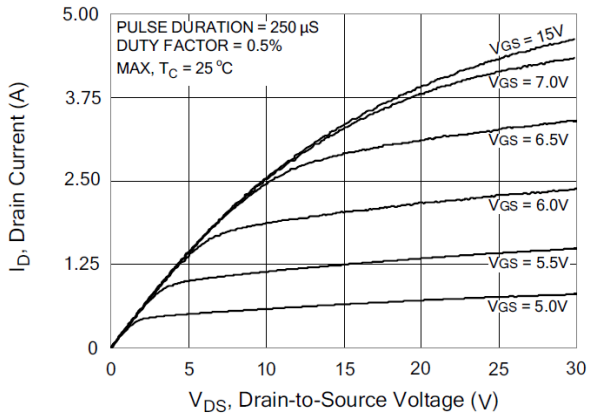
Maximum Effective Thermal Impedance, Junction-to-Case



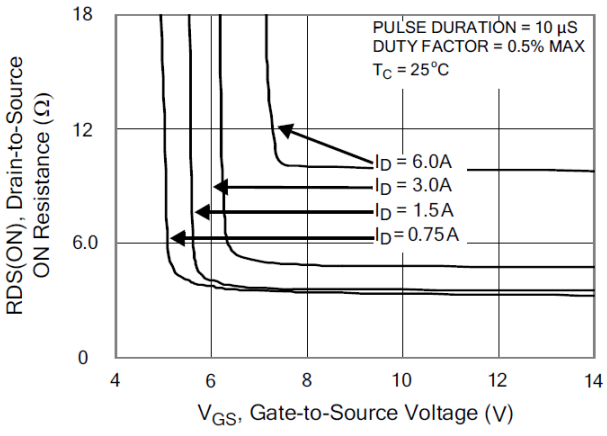
Maximum Power Dissipation vs Case Temp.



Maximum Continuous Drain Current vs Case Temp.

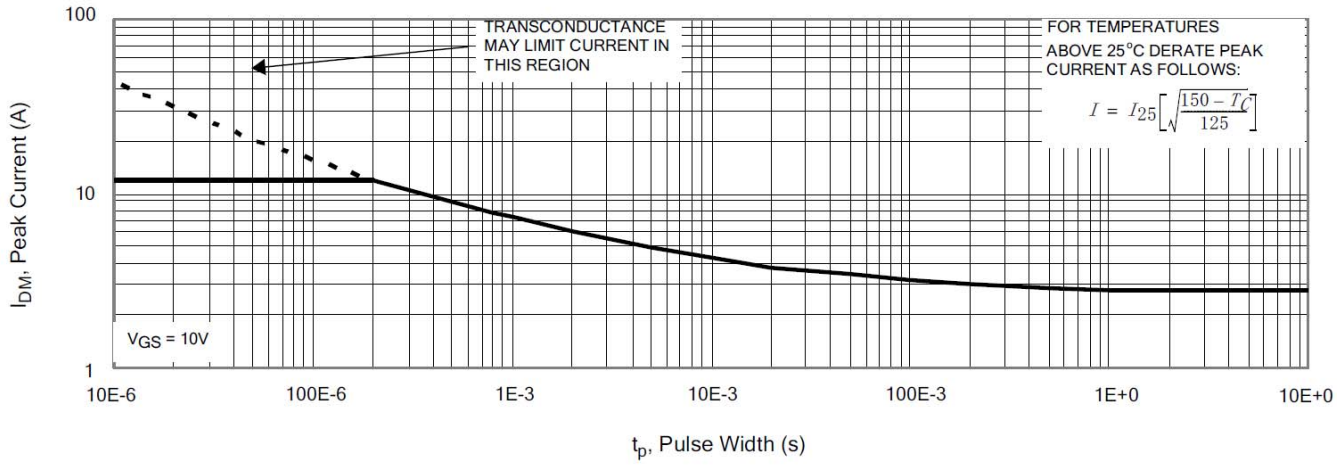


Typical Output Characteristics

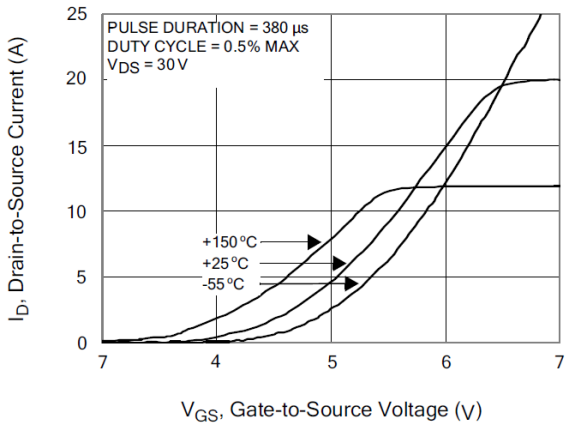


Typical Drain-to-Source ON Resistance vs Gate Voltage and Drain Current

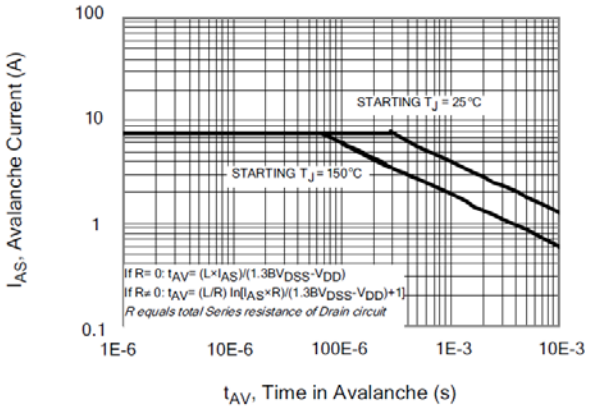
800V/3A N-Channel MOSFET



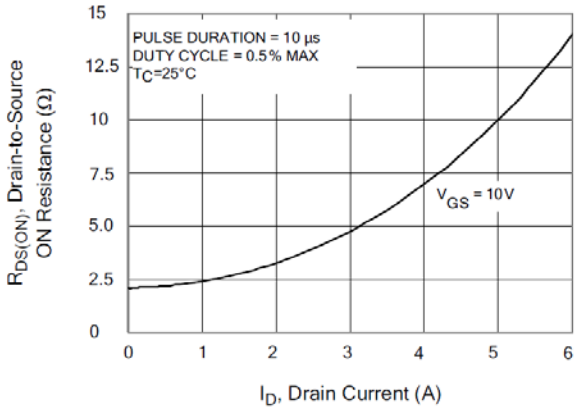
Maximum Peak Current Capability



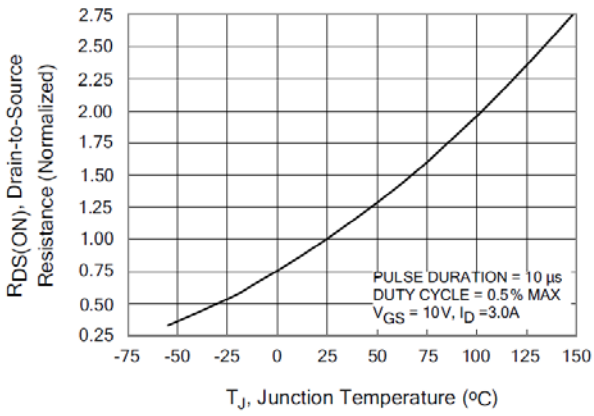
Typical Transfer Characteristics



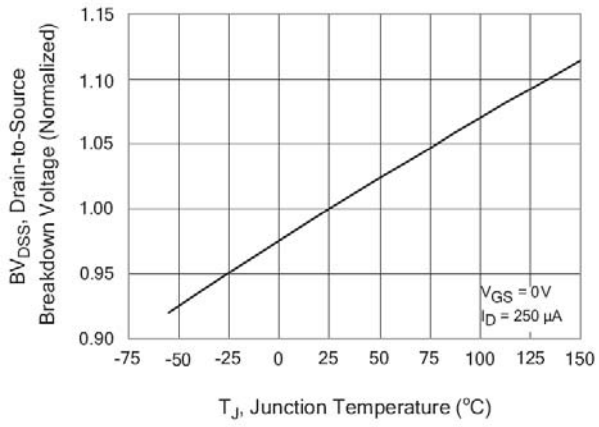
Unclamped Inductive Switching Capability



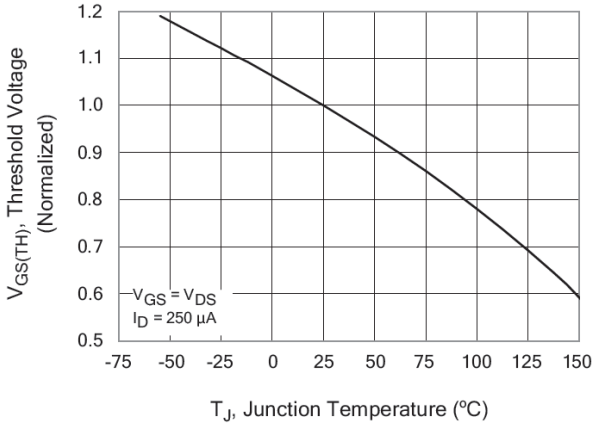
Typical Drain-to-Source ON Resistance vs Drain Current



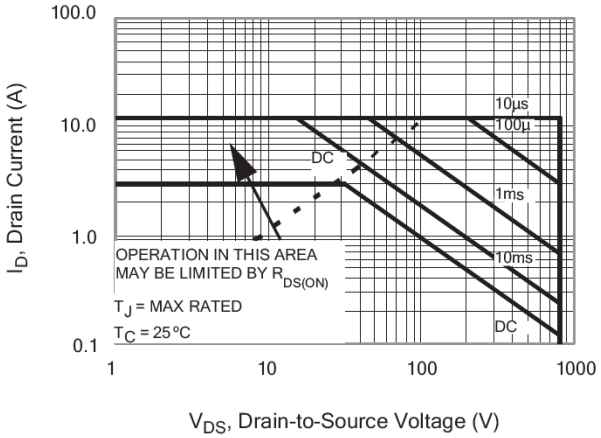
Typical Drain-to-Source ON Resistance vs Junction Temp.



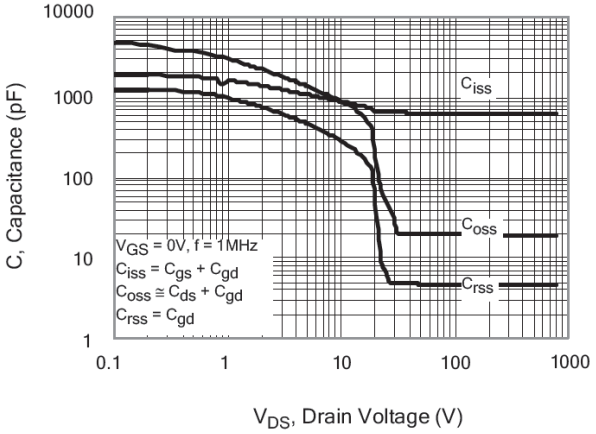
Typical Breakdown Voltage vs Junction Temp.



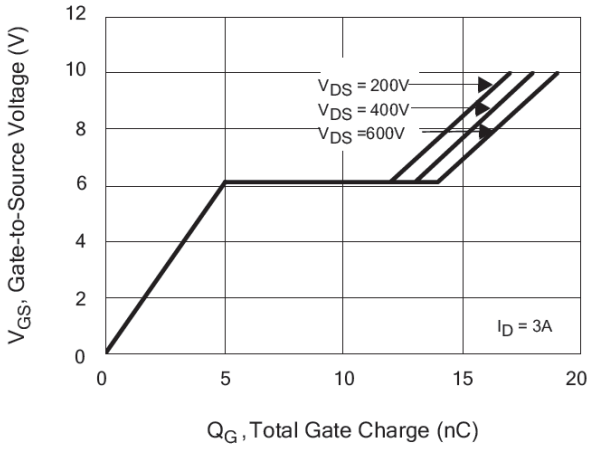
Typical Threshold Voltage vs Junction Temp.



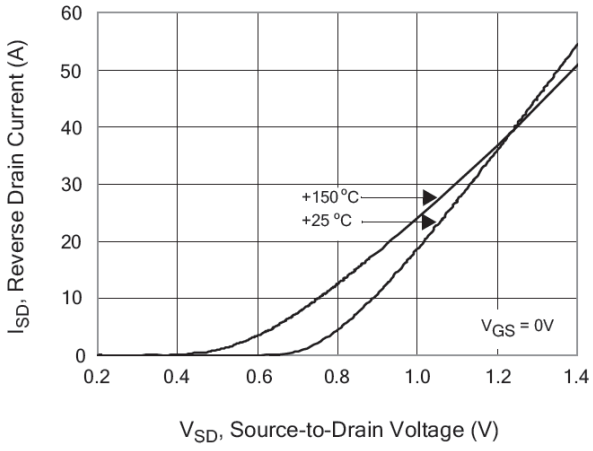
Maximum Forward Bias Safe Operating Area



Typical Capacitance vs Drain-to-Source Voltage



Typical Gate Charge vs Gate-to-Source Voltage

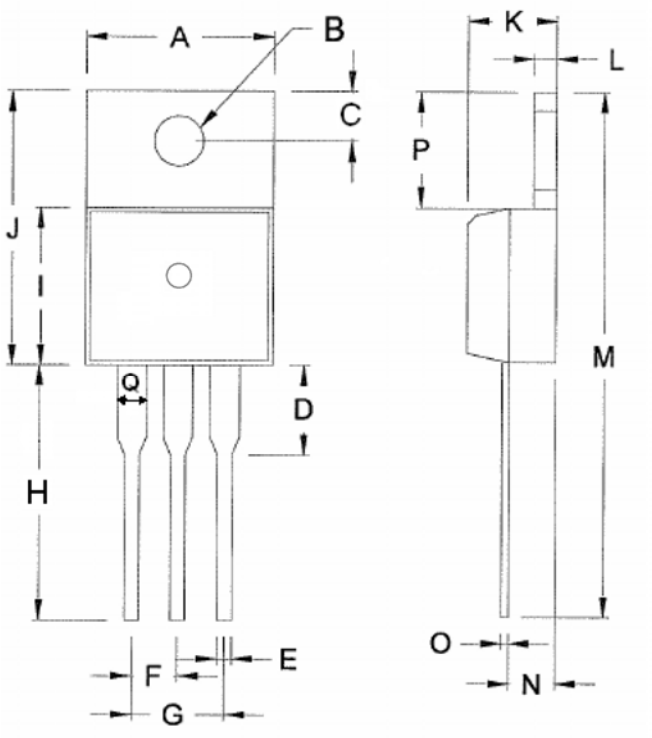


Typical Body Diode Transfer Characteristics

6 Package Dimensions

APQ03SN80CH-XXM0
TO-220

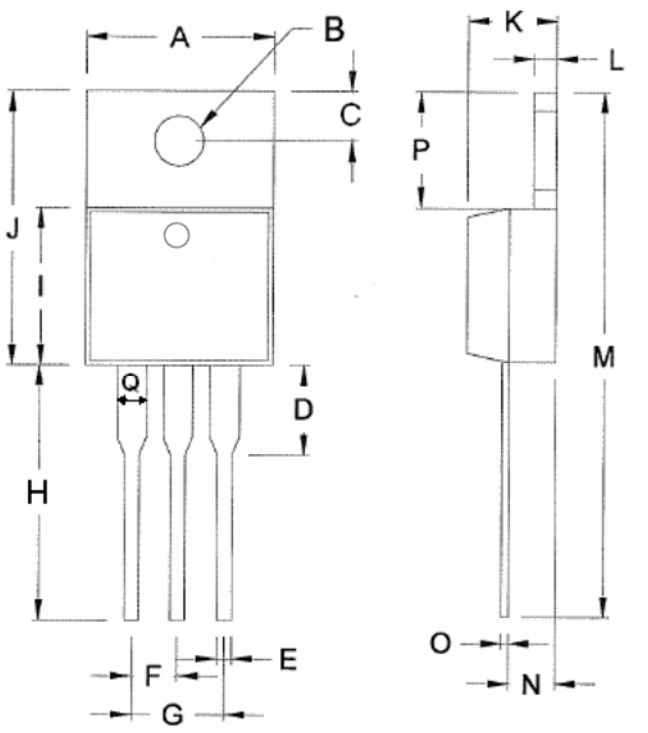
TO-220 DIMENSION			
DIM	MILLIMETERS		
	MIN	MAX	TYP.
A	10.04	10.41	10.23
B	3.66	3.88	3.77
C	2.50	2.84	2.67
D	3.31	4.50	3.91
E	0.70	0.91	0.81
F	2.54(typ.)		2.54
G	5.08(typ.)		5.08
H	13.47	14.20	13.84
I	8.50	9.00	8.80
J	14.80	15.49	15.15
K	4.32	4.57	4.45
L	1.22	1.42	1.30
M	28.27	29.69	28.98
N	2.40	2.90	2.65
O	0.36	0.53	0.45
P	5.97	6.47	6.22
Q	1.15	1.45	1.30



800V/3A N-Channel MOSFET

APQ03SN80CH-XXJ0
TO-220

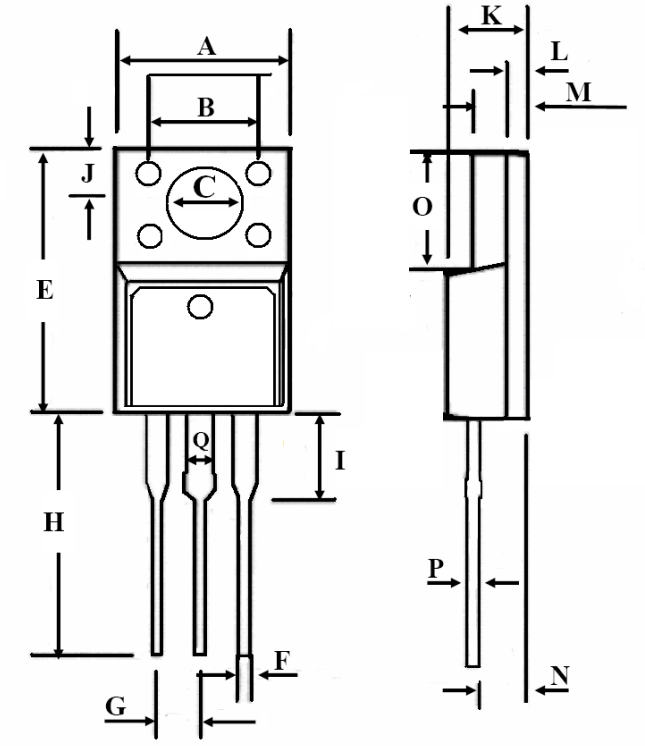
TO-220 DIMENSION			
DIM	MILLIMETERS		
	MIN	MAX	TYP.
A	10.01	10.31	10.16
B	3.66	3.94	3.80
C	2.59	2.89	2.74
D	3.5	3.96	3.73
E	0.70	0.90	0.80
F	2.54 TYP.		
G	4.98	5.18	5.08
H	13.4	13.8	13.6
I	8.5	8.9	8.70
J	14.65	15.35	15.05
K	4.47	4.67	4.57
L	1.22	1.42	1.32
M	28.05	29.15	28.60
N	2.52	2.82	2.67
O	0.31	0.53	0.42
P	6.10	6.50	6.30
Q	1.17	1.37	1.27



800V/3A N-Channel MOSFET

APQ03SN80CF-XXM0
TO-220F

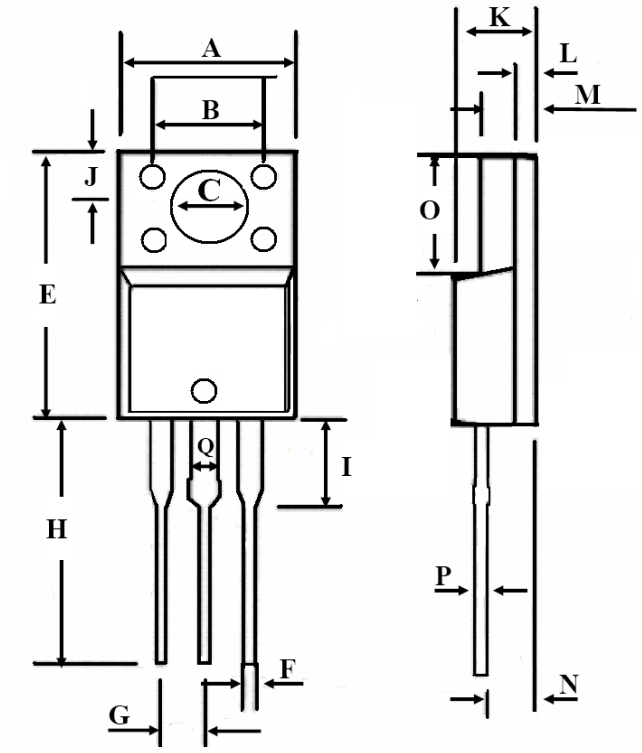
TO-220F DIMENSION			
DIM	MILLIMETERS		
	MIN	MAX	TYP.
A	9.96	10.36	10.16
B	6.50 TYP.		6.50
C	3.00	3.20	3.10
E	15.10	16.07	15.59
F	0.55	1.39	0.97
G	2.54 TYP.		
H	12.37	13.5	12.94
I	2.23	3.90	3.07
J	2.90	3.50	3.2
K	4.45	4.93	4.69
L	1.15 TYP.		
M	2.34	2.74	2.54
N	2.56	2.96	2.76
O	6.50	7.10	6.8
P	0.36	0.68	0.52
Q	1.15	1.66	1.41



800V/3A N-Channel MOSFET

APQ03SN80CF-XXJ0
TO-220F

TO-220F DIMENSION			
DIM	MILLIMETERS		
	MIN	MAX	TYP.
A	9.96	10.36	10.16
B	6.50TYP.		
C	3.5 REF.		
E	14.8	15.2	15.0
F	0.45	0.75	0.55
G	2.54 TYP.		
H	13.23	14.33	13.78
I	3.60	4.00	3.80
J	2.70 TYP.		2.70
K	4.30	4.70	4.50
L	1.30 TYP.		
M	2.80	3.20	3.00
N	2.50	2.90	2.70
O	6.50	7.10	6.8
P	0.45	0.75	0.55
Q	1.05	1.75	1.40



800V/3A N-Channel MOSFET

Note

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