alpha pacific

# DEVICE SPECIFICATION

APQ07SN80BH
APQ07SN80BF

**800V/7A N-Channel MOSFET**

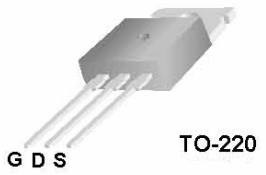
## 1 Description

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

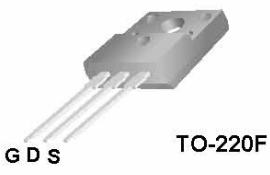
This advanced technology has been especially tailored to minimize on-state resistance, provide superior switching performance, and withstand high energy pulse in the avalanche and commutation mode. These devices are well suited for high efficiency switched mode power supplies, active power factor correction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

## 2 Features

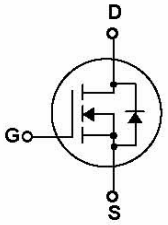
- 800V / 7A
- $R_{DS(on)}$ =1.3Ω(typ)，$V_{GS}$ =10V, $I_D$ =3.5A
- Fast switching
- 100% avalanche tested
- Improved dv/dt capability..




TO-220




TO-220F




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

| Symbol | Parameter | APQ07SN80BH-XXM0 / APQ07SN80BH-XXJ0 / TO-220 | APQ07SN80BF-XXM0 / APQ07SN80BF-XXJ0 / TO-220F | Units |
|---|---|---|---|---|
| $V_{DSS}$ | Drain-Source Voltage | 800 | | V |
| $I_D$ | Drain Current - Continuous ($T_C$= 25°C) | 7 | | A |
| | - Continuous ($T_C$= 100°C) | 4.4 | | |
| $I_{DM}$ | Drain Current – Pulsed ① | 28 | | A |
| $V_{GS}$ | Gate-Source Voltage | ± 30 | | V |
| $E_{AS}$ | Single Pulsed Avalanche Energy ② | 534 | | mJ |
| $I_{AR}$ | Avalanche Current | 7 | | A |
| $P_D$ | Power Dissipation ($T_C$= 25°C) | 154 | 50 | W |
| | - De-rate above 25°C | 1.23 | 0.4 | 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 5 seconds | 300 | | °C |

* note :

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

② $V_{DD}$=135V, starting $T_J$=25℃, L=TBD, $R_G$=20Ω, $I_{AS}$=5.50A

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

## 4 Thermal Characteristics

| Symbol | Parameter | APQ07SN80BH-XXM0<br>APQ07SN80BH-XXJ0<br>TO-220 | APQ07SN80BF-XXM0<br>APQ07SN80BF-XXJ0<br>TO-220F | Units |
|---|---|---|---|---|
| $R_{\theta JC}$ | Thermal Resistance, Junction-to-Case | 0.81 | 2.5 | °C/W |
| $R_{\theta JA}$ | Thermal Resistance, Junction-to-Ambient | 62.5 | 120 | °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 |
| $\Delta BV_{DSS}$ / $\Delta T_J$ | Breakdown Voltage Temperature Coefficient | $I_D$= 250 μA, Referenced to 25°C | -- | 1 | -- | V/°C |
| $I_{DSS}$ | Gate to Source leakage current | $V_{DS}$= 800 V, $V_{GS}$ = 0 V | -- | -- | 1 | 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, $I_D$= 3.5 A ④ | -- | 1.39 | 1.55 | Ω |
| **Dynamic Characteristics** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{DS}$= 25 V, $V_{GS}$= 0 V, f = 1.0 MHz | -- | 1087 | -- | pF |
| $C_{oss}$ | Output Capacitance | | -- | 104 | -- | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | -- | 5.65 | -- | pF |
| **Switching Characteristics** | | | | | | |
| $t_{d(on)}$ | Turn-On Delay Time | $V_{DD}$= 400 V, $I_D$= 7A, $R_G$= 25 Ω ④ | -- | 33.6 | -- | ns |
| $t_r$ | Turn-On Rise Time | | -- | 72 | -- | ns |
| $t_{d(off)}$ | Turn-Off Delay Time | | -- | 63.3 | -- | ns |
| $t_f$ | Turn-Off Fall Time | | -- | 35.3 | -- | ns |
| $Q_g$ | Total Gate Charge | $V_{DS}$= 640 V, $I_D$= 7A, $V_{GS}$= 10 V ④ | -- | 23.2 | -- | nC |
| $Q_{gs}$ | Gate-Source Charge | | -- | 6.98 | -- | nC |
| $Q_{gd}$ | Gate-Drain Charge | | -- | 8.97 | -- | nC |
| **Drain-Source Diode Characteristics and Maximum Ratings** | | | | | | |
| $I_S$ | Maximum Continuous Drain-Source Diode Forward Current | | -- | -- | 7 | A |
| $I_{SM}$ | Maximum Pulsed Drain-Source Diode Forward Current | | -- | -- | 28 | A |
| $V_{SD}$ | Drain-Source Diode Forward Voltage | $V_{GS}$= 0 V, $I_S$= 7 A | -- | -- | 1.4 | V |

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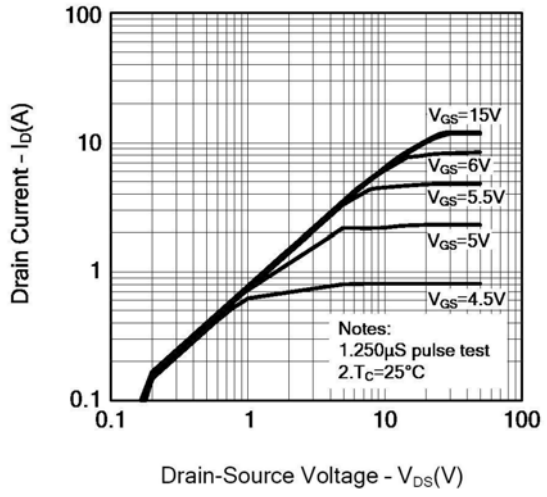
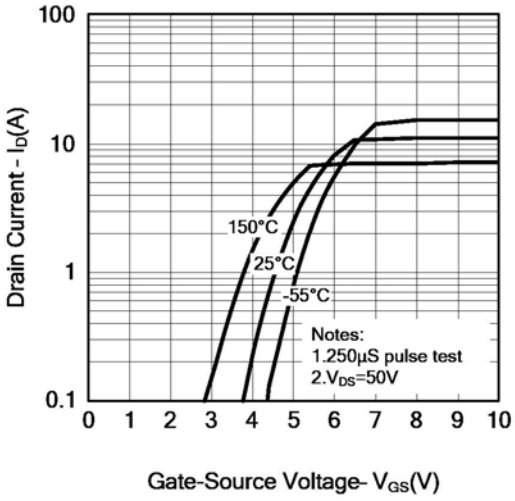
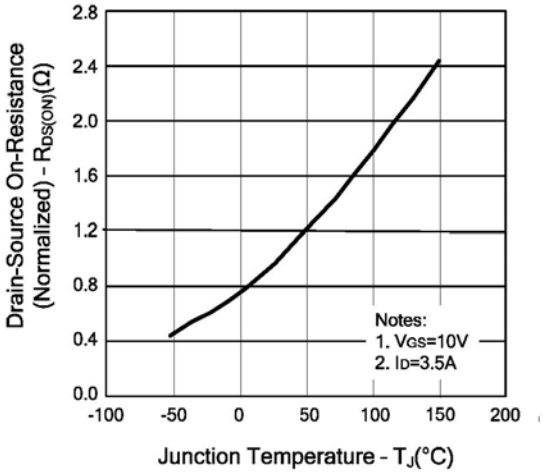
| | | | | | | |
|---|---|---|---|---|---|---|
| $t_{rr}$ | Reverse Recovery Time | $V_{GS}$= 0 V, $I_S$= 7 A, | -- | 190 | -- | ns |
| $Q_{rr}$ | Reverse Recovery Charge | $dI_F/dt$ = 100 A/μs ④ | -- | 0.53 | -- | μC |

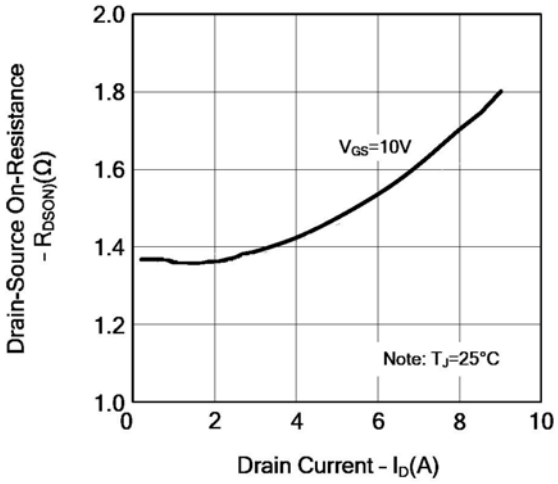
**Notes:**

① Repetitive Rating: Pulse width limited by maximum junction temperature.
② VDD=135V, starting TJ=25℃, L=TBD, RG=20Ω, IAS=5.5A
③ ISD ≤ 3A, di/dt ≤ 200A/μs, VDD ≤ V(BR)DSS, TJ ≤ 150℃
④ Pulse Test: Pulse width ≤300μs, Duty cycle ≤ 2%. Depend on FT Test.
⑤ CP Test



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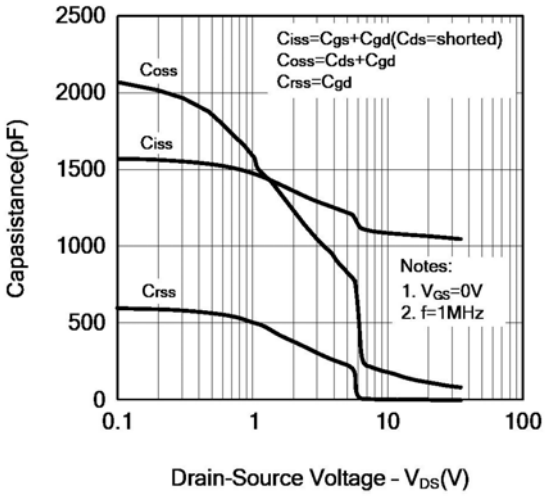


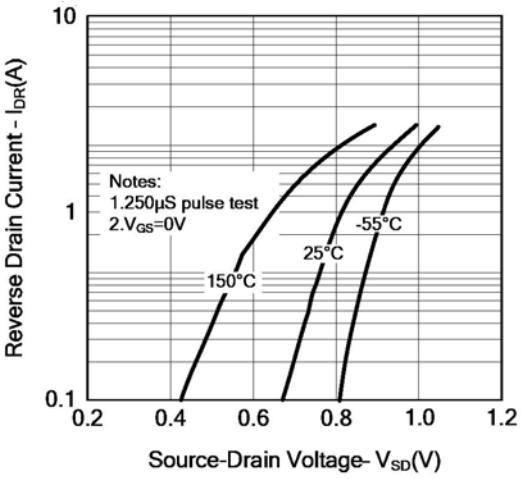


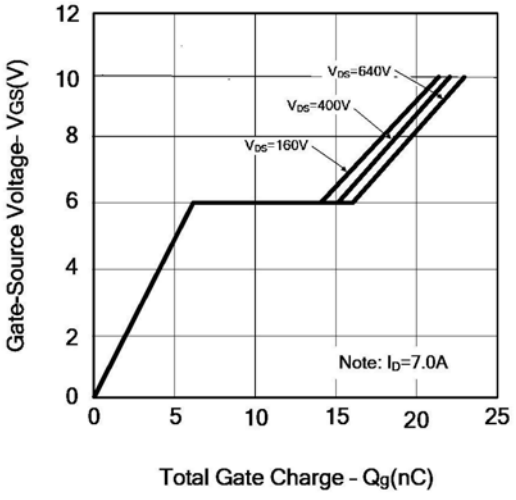


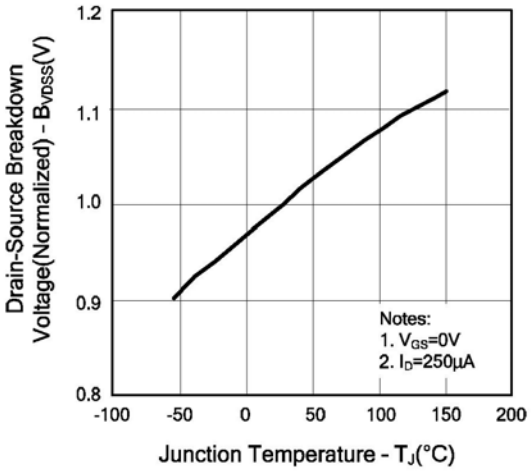

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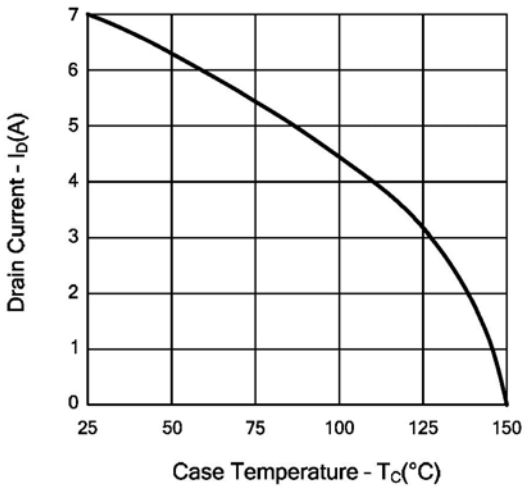
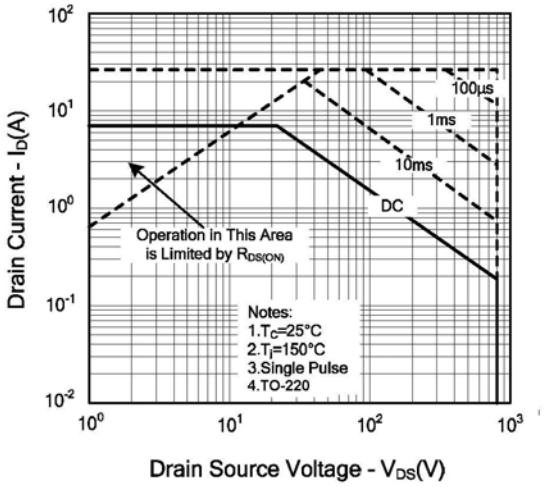
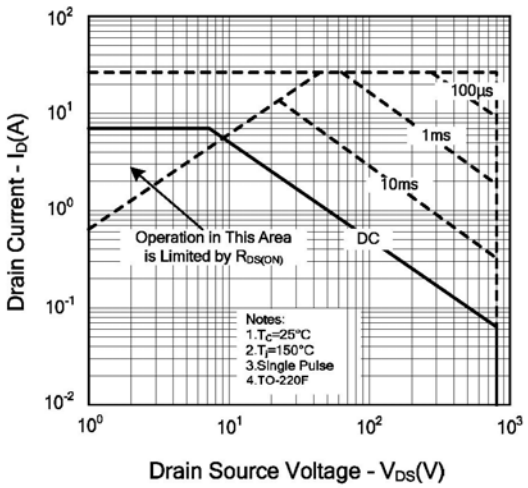


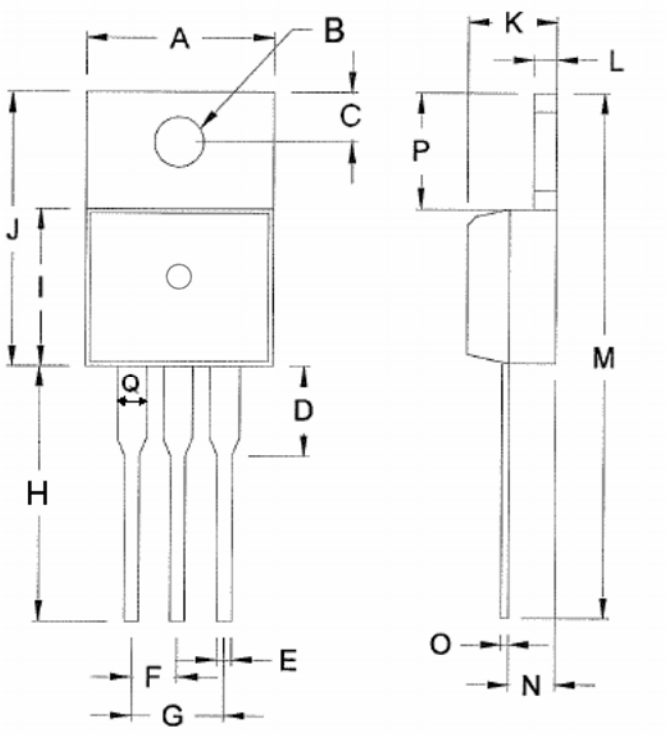



## 6 Package Dimensions

**APQ07SN80BH-XXM0**
**TO-220**

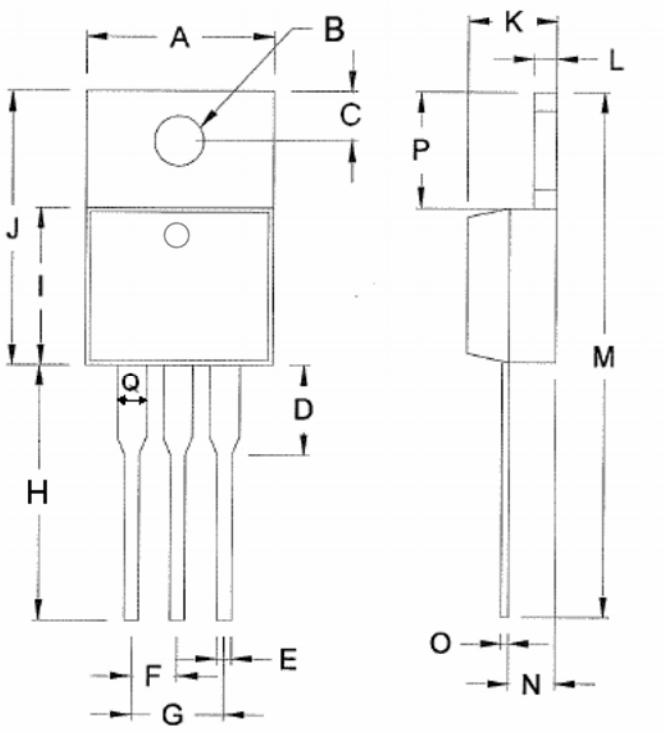
| TO-220 DIMENSION | | | |
|---|---|---|---|
| DIM | MILLIMETERS | | |
| | MIN | MAX | TYP. |
| A | 10.04 | 10.41 | 10.23 |
| B | 3.66 | 3.88 | 3.77 |
| C | 2.50 | 2.84 | 2.67 |
| D | 3.31 | 4.50 | 3.91 |
| E | 0.70 | 0.91 | 0.81 |
| F | 2.54(typ.) | | 2.54 |
| G | 5.08(typ.) | | 5.08 |
| H | 13.47 | 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/7A N-Channel MOSFET**

**APQ07SN80BH-XXJ0**
**TO-220**

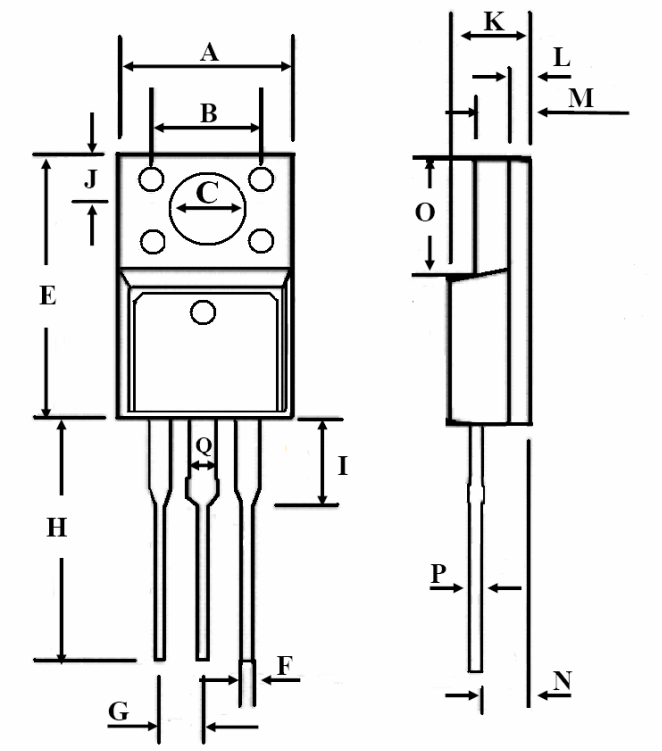
| TO-220 DIMENSION | | | |
|---|---|---|---|
| DIM | MILLIMETERS | | |
| | MIN | MAX | TYP. |
| A | 10.01 | 10.31 | 10.16 |
| B | 3.66 | 3.94 | 3.80 |
| C | 2.59 | 2.89 | 2.74 |
| D | 3.5 | 3.96 | 3.73 |
| E | 0.70 | 0.90 | 0.80 |
| F | 2.54 TYP. | | |
| G | 4.98 | 5.18 | 5.08 |
| H | 13.4 | 13.8 | 13.6 |
| 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/7A N-Channel MOSFET**

**APQ07SN80BF—XXM0**
**TO-220F**

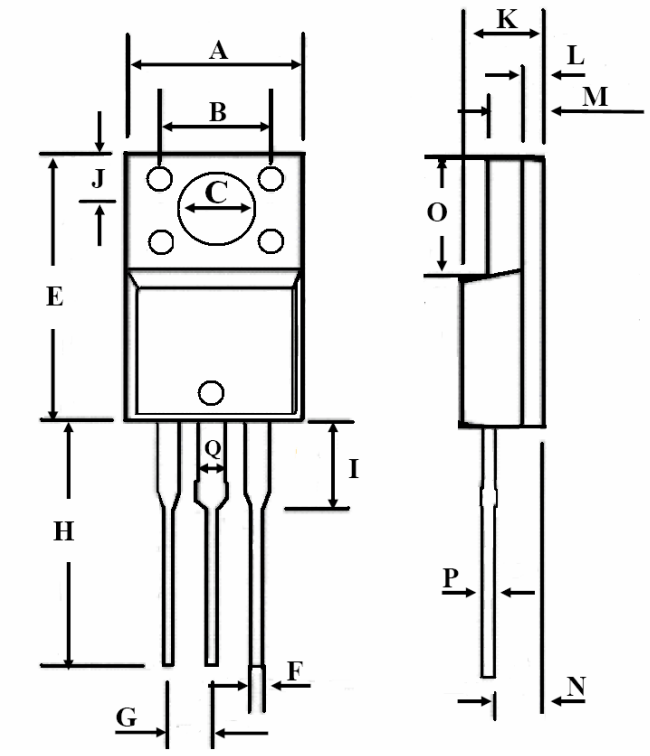
| TO-220F DIMENSION | | | |
|---|---|---|---|
| DIM | MILLIMETERS | | |
| | MIN | MAX | TYP. |
| A | 9.96 | 10.36 | 10.16 |
| B | 6.50 TYP. | | 6.50 |
| C | 3.00 | 3.20 | 3.10 |
| E | 15.10 | 16.07 | 15.59 |
| F | 0.55 | 1.39 | 0.97 |
| G | 2.54 TYP. | | |
| H | 12.37 | 13.5 | 12.94 |
| I | 2.23 | 3.90 | 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/7A N-Channel MOSFET**

**APQ07SN80BF-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/7A N-Channel MOSFET**

**Note**

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