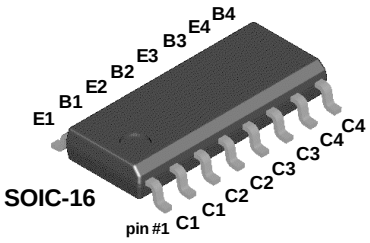
FAIRCHILD
SEMICONDUCTOR TM

# MMPQ2907




## PNP General Purpose Amplifier

This device is designed for use as a general purpose amplifier and switch requiring collector currents to 500 mA. Sourced from Process 63.

### Absolute Maximum Ratings* TA = 25°C unless otherwise noted

| Symbol | Parameter | Value | Units |
|---|---|---|---|
| $V_{CEO}$ | Collector-Emitter Voltage | 40 | V |
| $V_{CBO}$ | Collector-Base Voltage | 60 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 5.0 | V |
| $I_C$ | Collector Current - Continuous | 600 | mA |
| $T_J$, $T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | °C |

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

**NOTES**:
**1)** These ratings are based on a maximum junction temperature of 150 degrees C.
**2)** These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

### Thermal Characteristics TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | Units |
|---|---|---|---|
| | | MMPQ2907 | |
| $P_D$ | Total Device Dissipation<br>Derate above 25°C | 1,000<br>8.0 | mW<br>mW/°C |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient<br>Effective 4 Die<br>Each Die | <br>125<br>240 | °C/W<br>°C/W<br>°C/W |

*Device mounted on FR-4 PCB 36 mm X 18 mm X 1.5 mm; mounting pad for the collector lead min. 6 $cm^2$.

**Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

## PNP General Purpose Amplifier
(continued)

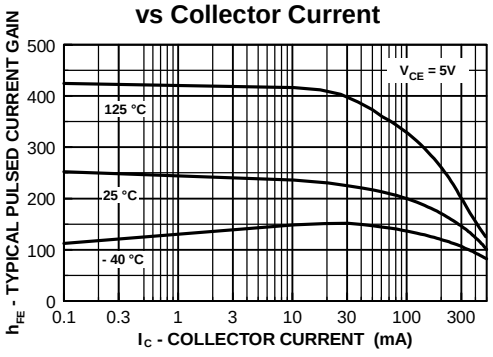
## Electrical Characteristics
TA = 25°C unless otherwise noted

| Symbol | Parameter | Test Conditions | Min | Max | Units |
|---|---|---|---|---|---|
| **OFF CHARACTERISTICS** | | | | | |
| $V_{(BR)CEO}$ | Collector-Emitter Breakdown Voltage* | $I_C$ = 10 mA, $I_B$ = 0 | 40 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C$ = 10 µA, $I_E$ = 0 | 60 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E$ = 10 µA, $I_C$ = 0 | 5.0 | | V |
| $I_{EBO}$ | Emitter Cutoff Current | $V_{EB}$ = 30 V | | 50 | nA |
| $I_{CBO}$ | Collector Cutoff Current | $V_{CB}$ = 30 V | | 50 | nA |
| **ON CHARACTERISTICS** | | | | | |
| $h_{FE}$ | DC Current Gain | $I_C$ = 10 mA, $V_{CE}$ = 10 V<br>$I_C$ = 150 mA, $V_{CE}$ = 10 V*<br>$I_C$ = 300 mA, $V_{CE}$ = 10 V<br>$I_C$ = 500 mA, $V_{CE}$ = 10 V* | 75<br>100<br>30<br>50 | 300 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage* | $I_C$ = 150 mA, $I_B$ = 15 mA<br>$I_C$ = 300 mA, $I_B$ = 30 mA | | 0.4<br>1.6 | V<br>V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C$ = 150 mA, $I_B$ = 15 mA*<br>$I_C$ = 300 mA, $I_B$ = 30 mA | | 1.3<br>2.6 | V<br>V |

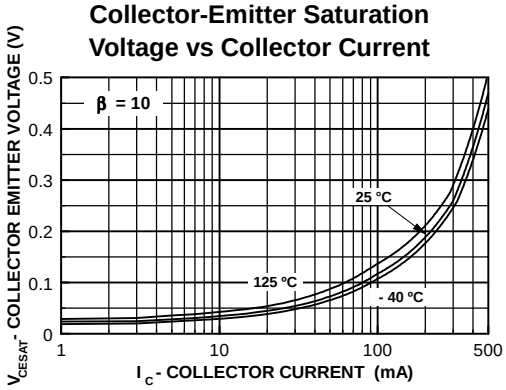
*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%

## Typical Characteristics

**Typical Pulsed Current Gain vs Collector Current**




**Collector-Emitter Saturation Voltage vs Collector Current**

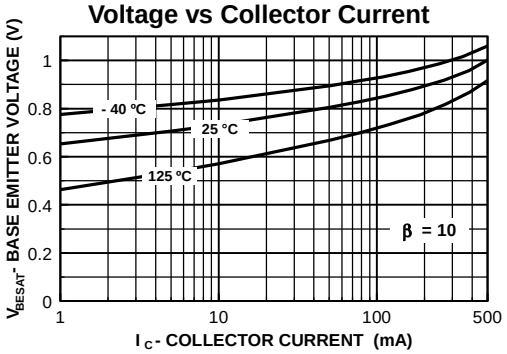



## Spice Model

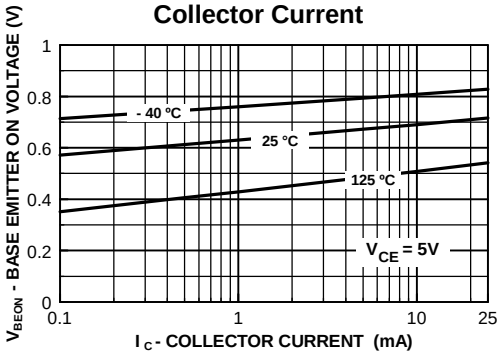
PNP (Is=650.6E-18 Xti=3 Eg=1.11 Vaf=115.7 Bf=231.7 Ne=1.829 Ise=54.81f Ikf=1.079 Xtb=1.5 Br=3.563 Nc=2 Isc=0 Ikr=0 Rc=.715 Cjc=14.76p Mjc=.5383 Vjc=.75 Fc=.5 Cje=19.82p Mje=.3357 Vje=.75 Tr=111.3n Tf=603.7p Itf=.65 Vtf=5 Xtf=1.7 Rb=10)

## Typical Characteristics (continued)

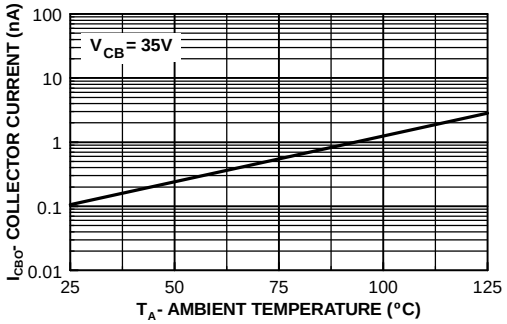
### Base-Emitter Saturation Voltage vs Collector Current



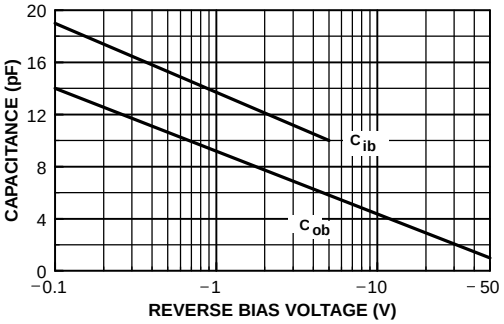

### Base Emitter ON Voltage vs Collector Current



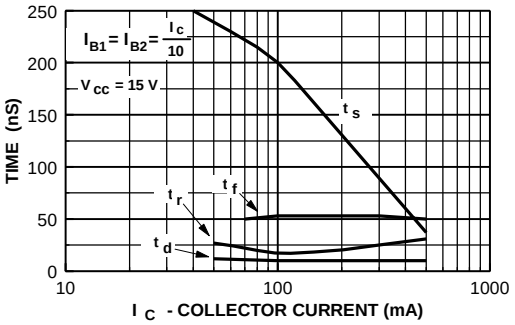

### Collector-Cutoff Current vs. Ambient Temperature



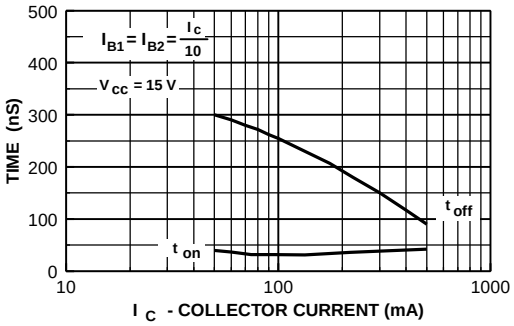

### Input and Output Capacitance vs Reverse Bias Voltage




### Switching Times vs Collector Current

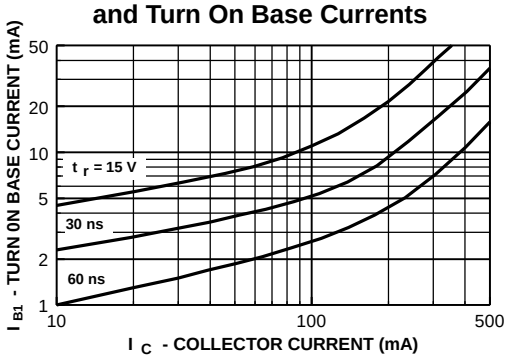



### Turn On and Turn Off Times vs Collector Current

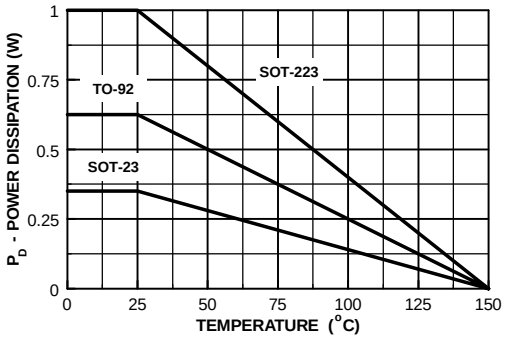


## Typical Characteristics (continued)

**Rise Time vs Collector and Turn On Base Currents**




**Power Dissipation vs Ambient Temperature**




## Test Circuits

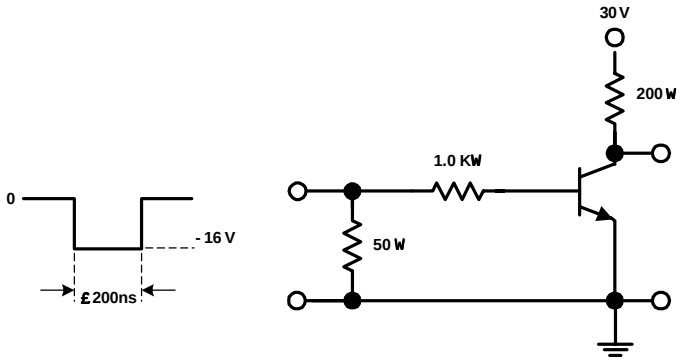



**FIGURE 1: Saturated Turn-On Switching Time Test Circuit**

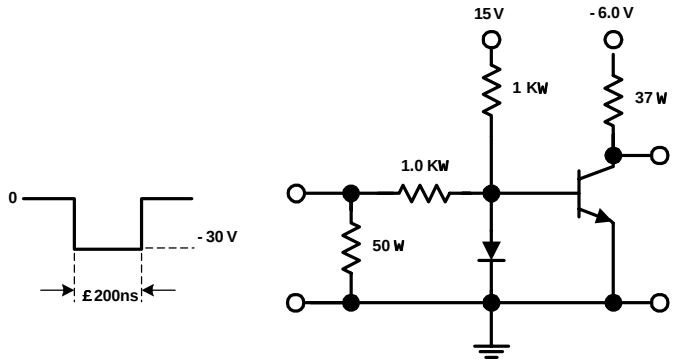



**FIGURE 2: Saturated Turn-Off Switching Time Test Circuit**

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Rev. H1