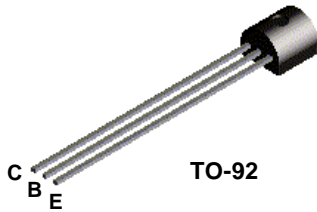


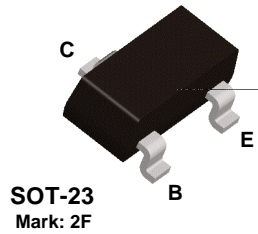
N

Discrete POWER & Signal Technologies

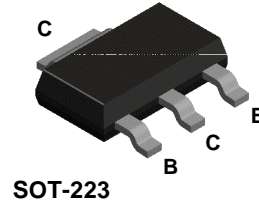
PN2907A



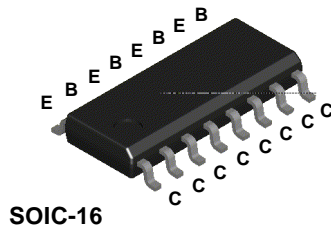
MMBT2907A



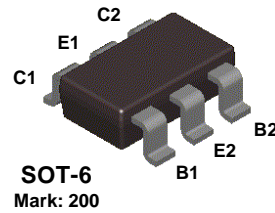
PZT2907A



MMPQ2907



NMT2907



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 | 60 | V |
| V _{CBO} | Collector-Base Voltage | 60 | V |
| V _{EBO} | Emitter-Base Voltage | 5.0 | V |
| I _C | Collector Current - Continuous | 800 | 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.

PN2907A / MMBT2907A / MMPQ2907 / NMT2907 / PZT2907A

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* | $I_C = 10 \text{ mA}, I_B = 0$ | 60 | | V |
| $V_{(BR)CBO}$ | Collector-Base Breakdown Voltage | $I_C = 10 \text{ }\mu\text{A}, I_E = 0$ | 60 | | V |
| $V_{(BR)EBO}$ | Emitter-Base Breakdown Voltage | $I_E = 10 \text{ }\mu\text{A}, I_C = 0$ | 5.0 | | V |
| I_B | Base Cutoff Current | $V_{CB} = 30 \text{ V}, V_{EB} = 0.5 \text{ V}$ | | 50 | nA |
| I_{CEX} | Collector Cutoff Current | $V_{CE} = 30 \text{ V}, V_{BE} = 0.5 \text{ V}$ | | 50 | nA |
| I_{CBO} | Collector Cutoff Current | $V_{CB} = 50 \text{ V}, I_E = 0$ $V_{CB} = 50 \text{ V}, I_E = 0, T_A = 150^\circ\text{C}$ | | 0.02 20 | μA μA |

ON CHARACTERISTICS

| | | | | | |
|---------------|---------------------------------------|--|-------------------------------|------------|--------|
| h_{FE} | DC Current Gain | $I_C = 0.1 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 1.0 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 10 \text{ V}$ $I_C = 150 \text{ mA}, V_{CE} = 10 \text{ V}^*$ $I_C = 500 \text{ mA}, V_{CE} = 10 \text{ V}^*$ | 75 100 100 100 50 | 300 | |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage* | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$ | | 0.4 1.6 | V V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage | $I_C = 150 \text{ mA}, I_B = 15 \text{ mA}^*$ $I_C = 500 \text{ mA}, I_B = 50 \text{ mA}$ | | 1.3 2.6 | V V |

SMALL SIGNAL CHARACTERISTICS (except MMPQ2907 and NMT2222)

| | | | | | |
|-----------|----------------------------------|--|-----|-----|-----|
| f_T | Current Gain - Bandwidth Product | $I_C = 50 \text{ mA}, V_{CE} = 20 \text{ V},$ $f = 100 \text{ MHz}$ | 200 | | MHz |
| C_{obo} | Output Capacitance | $V_{CB} = 10 \text{ V}, I_E = 0,$ $f = 100 \text{ kHz}$ | | 8.0 | pF |
| C_{ibo} | Input Capacitance | $V_{EB} = 2.0 \text{ V}, I_C = 0,$ $f = 100 \text{ kHz}$ | | 30 | pF |

SWITCHING CHARACTERISTICS (except MMPQ2907 and NMT2222)

| | | | | | |
|-----------|---------------|---|--|-----|----|
| t_{on} | Turn-on Time | $V_{CC} = 30 \text{ V}, I_C = 150 \text{ mA},$ $I_{B1} = 15 \text{ mA}$ | | 45 | ns |
| t_d | Delay Time | | | 10 | ns |
| t_r | Rise Time | | | 40 | ns |
| t_{off} | Turn-off Time | $V_{CC} = 6.0 \text{ V}, I_C = 150 \text{ mA}$ $I_{B1} = I_{B2} = 15 \text{ mA}$ | | 100 | ns |
| t_s | Storage Time | | | 80 | ns |
| t_f | Fall Time | | | 30 | ns |

*Pulse Test: Pulse Width $\leq 300 \text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$

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)

PN2907A / MMBT2907A / MMPQ2907 / NMT2907 / PZT2907A

PNP General Purpose Amplifier

(continued)

Thermal Characteristics

TA = 25°C unless otherwise noted

| Symbol | Characteristic | Max | | Units |
|------------------|---|---------|-----------|-------|
| | | PN2907A | *PZT2907A | |
| P _D | Total Device Dissipation Derate above 25°C | 625 | 1,000 | mW |
| | | 5.0 | 8.0 | mW/°C |
| R _{θJC} | Thermal Resistance, Junction to Case | 83.3 | | °C/W |
| R _{θJA} | Thermal Resistance, Junction to Ambient | 200 | 125 | °C/W |

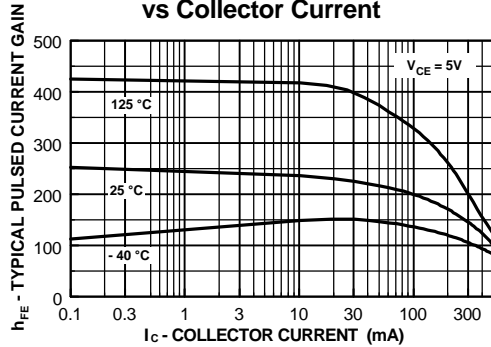
| Symbol | Characteristic | Max | | Units |
|------------------|--|-------------|----------|-------|
| | | **MMBT2907A | MMPQ2907 | |
| P _D | Total Device Dissipation Derate above 25°C | 350 | 1,000 | mW |
| | | 2.8 | 8.0 | mW/°C |
| R _{θJA} | Thermal Resistance, Junction to Ambient Effective 4 Die Each Die | 357 | | °C/W |
| | | | 125 | °C/W |
| | | | 240 | °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 μ m

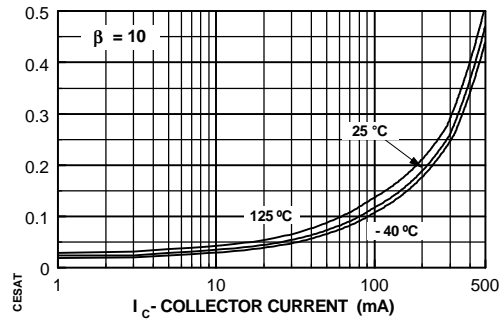
** Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

Typical Characteristics

Typical Pulsed Current Gain vs Collector Current



Collector-Emitter Saturation Voltage vs Collector Current



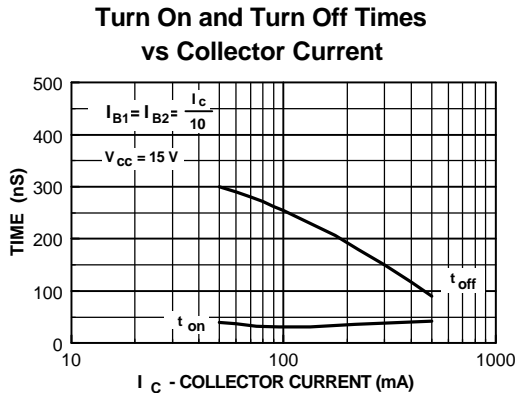
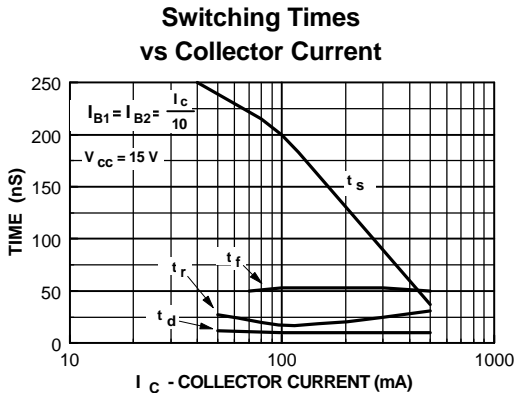
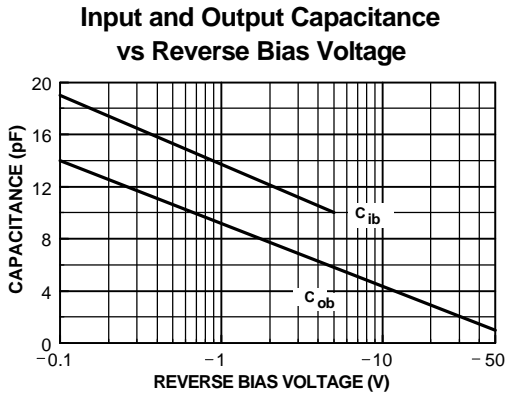
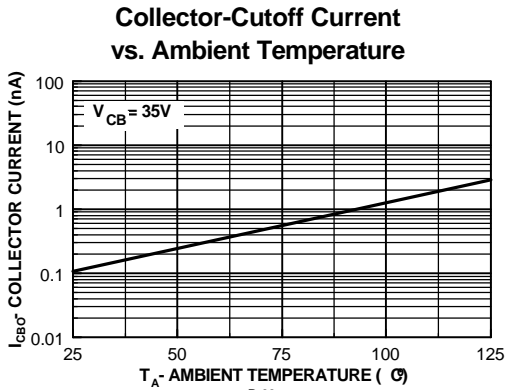
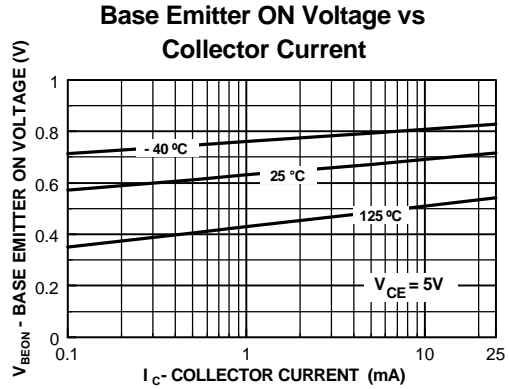
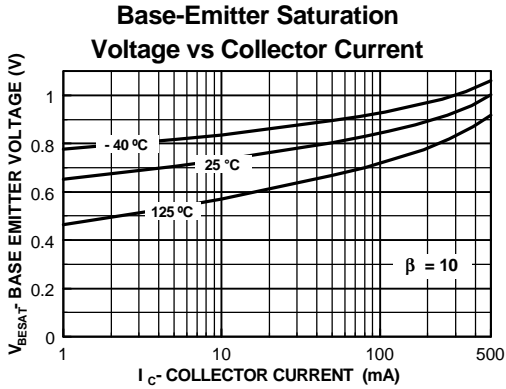
PN2907A / MMBT2907A / MMPQ2907 / NMT2907 / PZT2907A

PNP General Purpose Amplifier

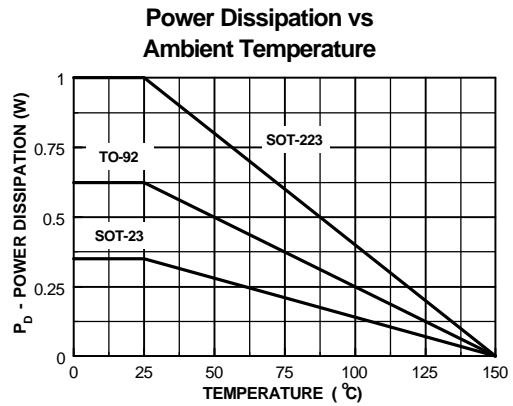
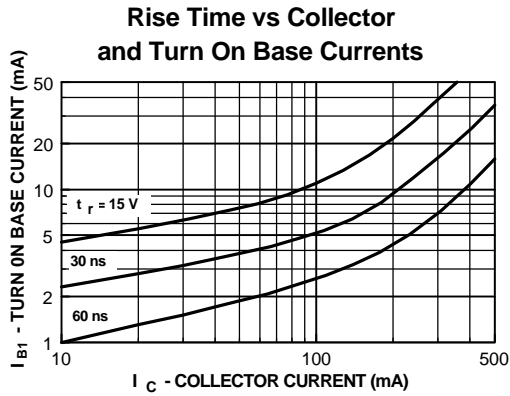
(continued)

PN2907A / MMBT2907A / MMPQ2907 / NMT2907 / PZT2907A

Typical Characteristics (continued)



Typical Characteristics (continued)



Test Circuits

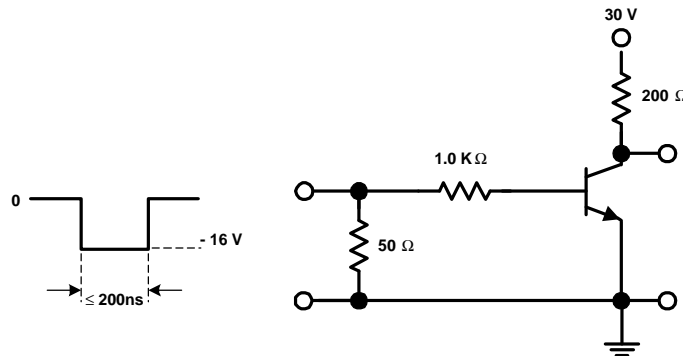


FIGURE 1: Saturated Turn-On Switching Time Test Circuit

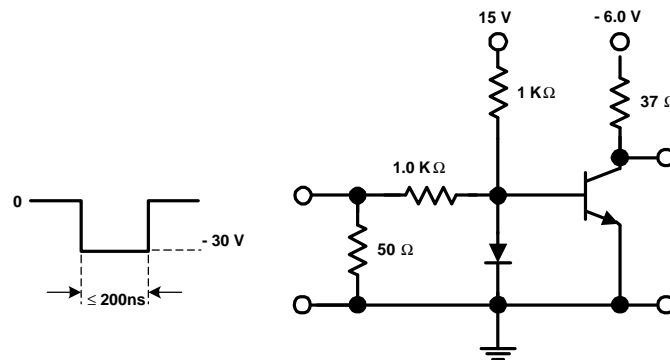


FIGURE 2: Saturated Turn-Off Switching Time Test Circuit