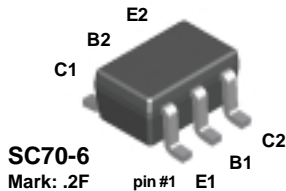


## FFB2907A

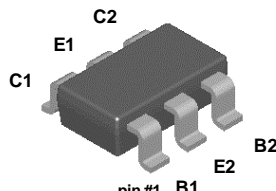


SC70-6

Mark: .2F

NOTE: The pinouts are symmetrical; pin 1 and pin 4 are interchangeable. Units inside the carrier can be of either orientation and will not affect the functionality of the device.

## FMB2907A

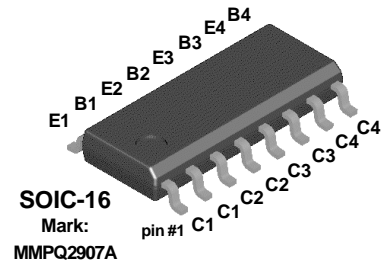


SuperSOT™-6

Mark: .2F

Dot denotes pin #1

## MMPQ2907A



SOIC-16

Mark: MMPQ2907A

## PNP Multi-Chip 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\*

$T_A = 25^\circ\text{C}$  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                   | 600         | mA               |
| $T_J, T_{stg}$ | Operating and Storage Junction Temperature Range | -55 to +150 | $^\circ\text{C}$ |

\*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

$T_A = 25^\circ\text{C}$  unless otherwise noted

| Symbol          | Characteristic                          | Max      |          |           | Units                     |
|-----------------|---|----------|----------|-----------|---------------------------|
|                 |   | FFB2907A | FMB2907A | MMPQ2907A |                           |
| $P_D$           | Total Device Dissipation                | 300      | 700      | 1,000     | mW                        |
|                 | Derate above $25^\circ\text{C}$         | 2.4      | 5.6      | 8.0       | mW/ $^\circ\text{C}$      |
| $R_{\theta JA}$ | Thermal Resistance, Junction to Ambient | 415      | 180      |           | $^\circ\text{C}/\text{W}$ |
|                 | Effective 4 Die                         |          |          | 125       | $^\circ\text{C}/\text{W}$ |
|                 | Each Die                                |          |          | 240       | $^\circ\text{C}/\text{W}$ |

# PNP Multi-Chip General Purpose Amplifier

(continued)

## Electrical Characteristics

$T_A = 25^\circ\text{C}$  unless otherwise noted

| Symbol                     | Parameter                            | Test Conditions   | Min | Typ | Max        | Units                          |
|----------------------------|--------------------------------------|---|-----|-----|------------|--------------------------------|
| <b>OFF CHARACTERISTICS</b> |                                      |   |     |     |            |                                |
| $V_{(BR)CEO}$              | Collector-Emitter Breakdown Voltage* | $I_C = 10\text{ mA}, I_B = 0$   | 60  |     |            | V                              |
| $V_{(BR)CBO}$              | Collector-Base Breakdown Voltage     | $I_C = 10\ \mu\text{A}, I_E = 0$  | 60  |     |            | V                              |
| $V_{(BR)EBO}$              | Emitter-Base Breakdown Voltage       | $I_E = 10\ \mu\text{A}, I_C = 0$  | 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             | $V_{CB} = 50\text{ V}, I_E = 0$<br>$V_{CB} = 50\text{ V}, I_E = 0, T_A = 125^\circ\text{C}$ |     |     | 0.02<br>20 | $\mu\text{A}$<br>$\mu\text{A}$ |

## ON CHARACTERISTICS

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

## SMALL SIGNAL CHARACTERISTICS

|           |                                  |   |  |     |  |     |
|-----------|----------------------------------|---|--|-----|--|-----|
| $f_T$     | Current Gain - Bandwidth Product | $I_C = 50\text{ mA}, V_{CE} = 20\text{ V},$<br>$f = 100\text{ MHz}$ |  | 250 |  | MHz |
| $C_{obo}$ | Output Capacitance               | $V_{CB} = 10\text{ V}, I_E = 0,$<br>$f = 100\text{ kHz}$            |  | 6.0 |  | pF  |
| $C_{ibo}$ | Input Capacitance                | $V_{EB} = 2.0\text{ V}, I_C = 0,$<br>$f = 100\text{ kHz}$           |  | 12  |  | pF  |

## SWITCHING CHARACTERISTICS

|           |               |  |  |     |  |    |
|-----------|---------------|--|--|-----|--|----|
| $t_{on}$  | Turn-on Time  | $V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$<br>$I_{B1} = 15\text{ mA}$          |  | 30  |  | ns |
| $t_d$     | Delay Time    |  |  | 8.0 |  | ns |
| $t_r$     | Rise Time     |  |  | 20  |  | ns |
| $t_{off}$ | Turn-off Time | $V_{CC} = 6.0\text{ V}, I_C = 150\text{ mA}$<br>$I_{B1} = I_{B2} = 15\text{ mA}$ |  | 80  |  | ns |
| $t_s$     | Storage Time  |  |  | 60  |  | ns |
| $t_f$     | Fall Time     |  |  | 20  |  | ns |

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

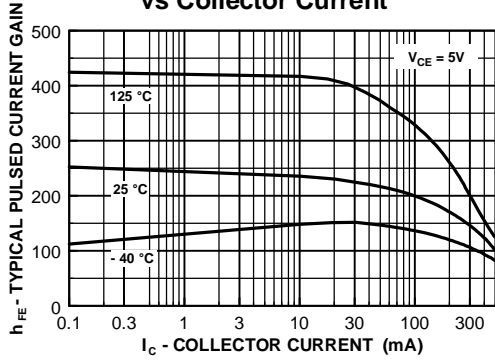
## Spice Model

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)

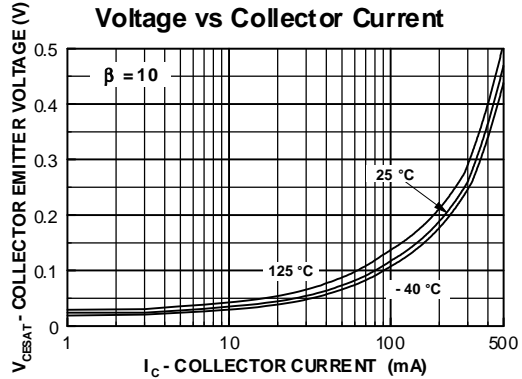
FFB2907A / FMB2907A / MIMPQ2907A

Typical Characteristics

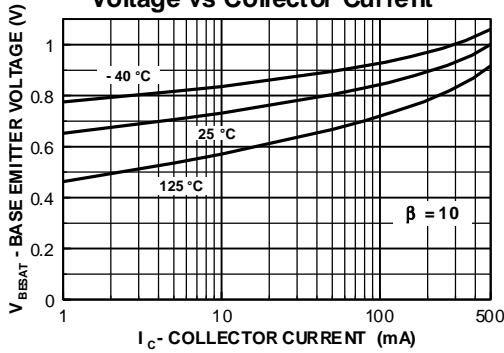
Typical Pulsed Current Gain vs Collector Current



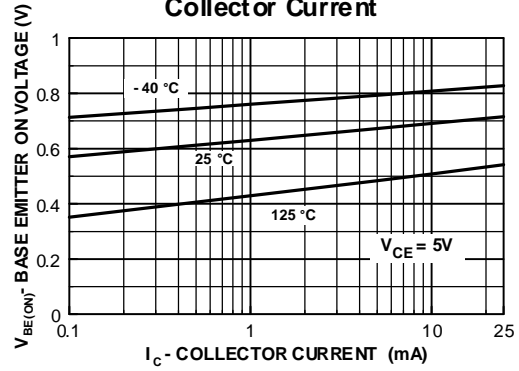
Collector-Emitter Saturation Voltage vs Collector Current



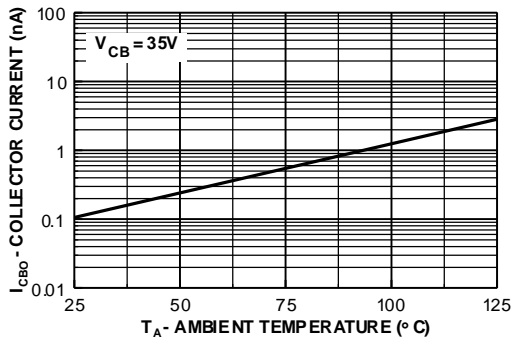
Base-Emitter Saturation Voltage vs Collector Current



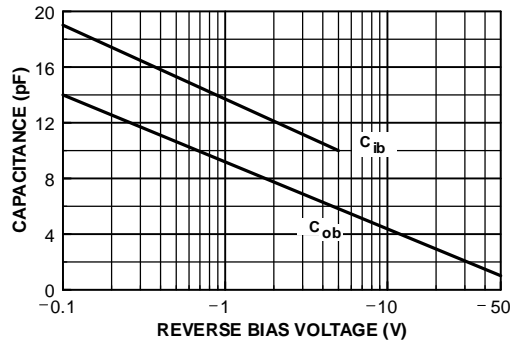
Base Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs Ambient Temperature



Input and Output Capacitance vs Reverse Bias Voltage



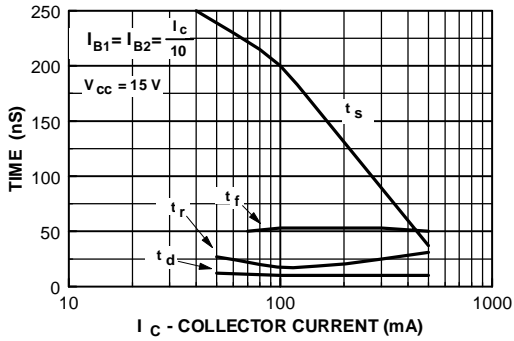
# PNP Multi-Chip General Purpose Amplifier

(continued)

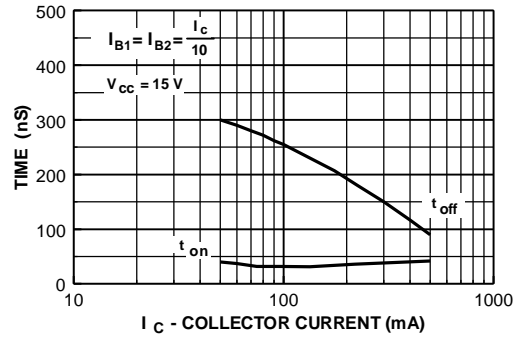
FFB2907A / FMB2907A / MMPQ2907A

## Typical Characteristics (continued)

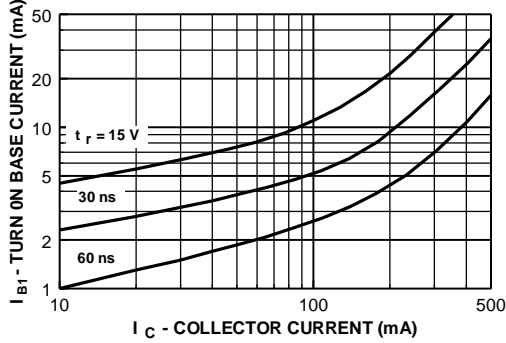
### Switching Times vs Collector Current



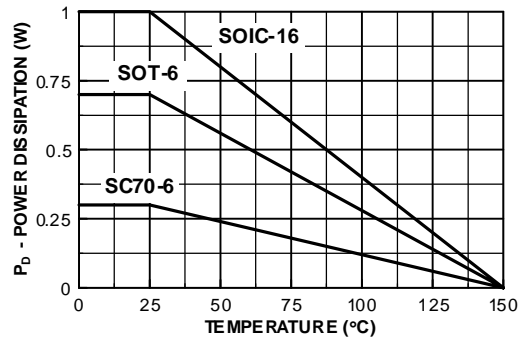
### Turn On and Turn Off Times vs Collector Current



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



### Power Dissipation vs Ambient Temperature

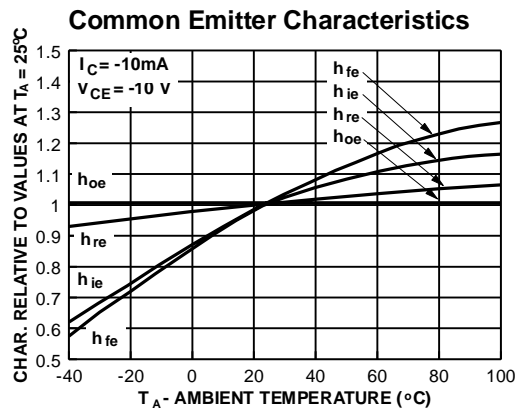
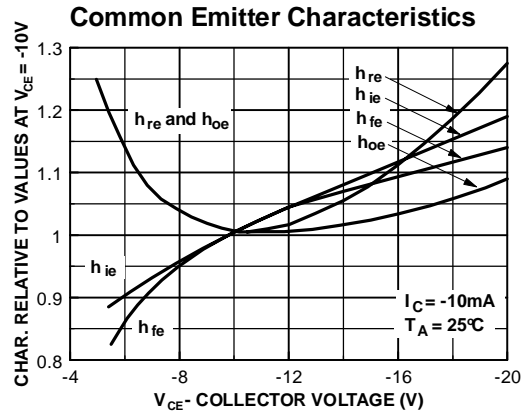
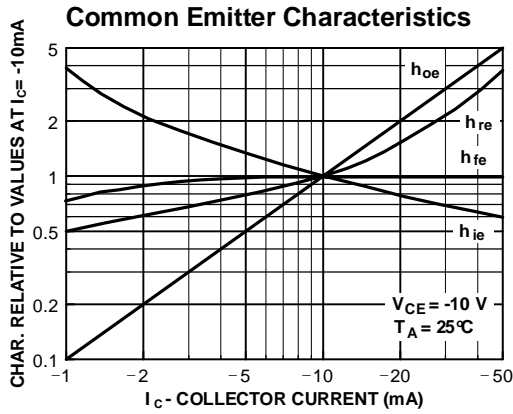


# PNP Multi-Chip General Purpose Amplifier

(continued)

FFB2907A / FMB2907A / MMPQ2907A

## Typical Common Emitter Characteristics (f = 1.0kHz)



Test Circuits

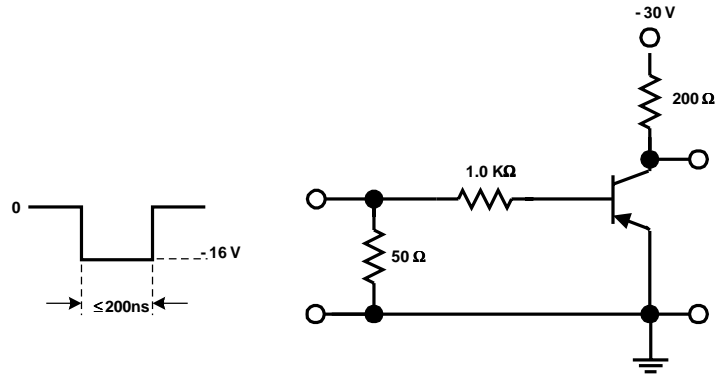


FIGURE 1: Saturated Turn-On Switching Time Test Circuit

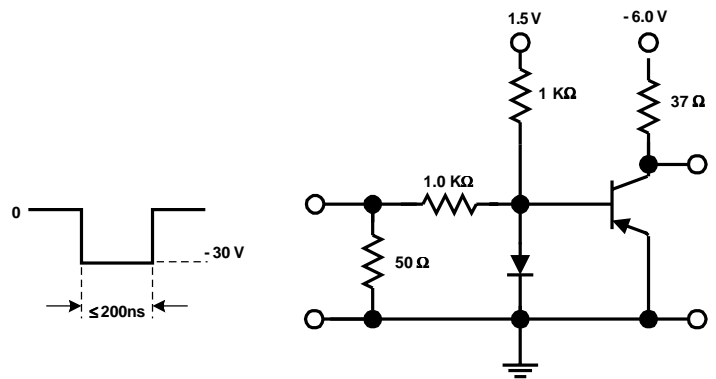


FIGURE 2: Saturated Turn-Off Switching Time Test Circuit

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| CROSSVOLT™           | HiSeC™              | QT Optoelectronics™ | VCX™       |
| DOME™                | ISOPLANAR™          | Quiet Series™       |            |
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| EnSigna™             | OPTOLOGIC™          | SMART START™        |            |
| FACT™                | OPTOPLANAR™         | SuperSOT™-3         |            |
| FACT Quiet Series™   | PACMAN™             | SuperSOT™-6         |            |
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