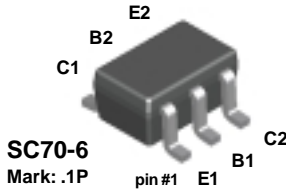
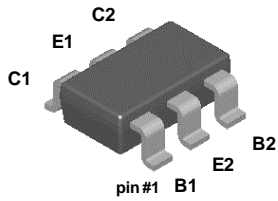


**FFB2222A**



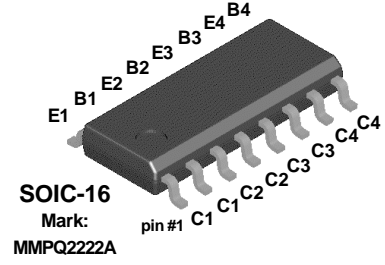
**SC70-6**  
Mark: .1P

**FMB2222A**



**SuperSOT™-6**  
Mark: .1P  
Dot denotes pin #1

**MMPQ2222A**



**SOIC-16**  
Mark: MMPQ2222A

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.

**NPN Multi-Chip General Purpose Amplifier**

This device is for use as a medium power amplifier and switch requiring collector currents up to 500 mA. Sourced from Process 19.

**Absolute Maximum Ratings\***  $T_A = 25^\circ\text{C}$  unless otherwise noted

| Symbol         | Parameter  | Value       | Units            |
|----------------|--|-------------|------------------|
| $V_{CEO}$      | Collector-Emitter Voltage                        | 40          | V                |
| $V_{CBO}$      | Collector-Base Voltage                           | 75          | V                |
| $V_{EBO}$      | Emitter-Base Voltage                             | 5.0         | V                |
| $I_C$          | Collector Current - Continuous                   | 500         | 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  |
|-----------------|---|----------|----------|------------|--|
|                 |   | FFB2222A | FMB2222A | MMPQ2222A  |  |
| $P_D$           | 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 Each Die                |          |          | 125<br>240 | $^\circ\text{C}/\text{W}$<br>$^\circ\text{C}/\text{W}$ |

## NPN 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* | $I_C = 10\text{ mA}, I_B = 0$    | 40  |     |     | V     |
| $V_{(BR)CBO}$              | Collector-Base Breakdown Voltage     | $I_C = 10\ \mu\text{A}, I_E = 0$ | 75  |     |     | V     |
| $V_{(BR)EBO}$              | Emitter-Base Breakdown Voltage       | $I_E = 10\ \mu\text{A}, I_C = 0$ | 5.0 |     |     | V     |
| $I_{CBO}$                  | Collector Cutoff Current             | $V_{CB} = 60\text{ V}, I_E = 0$  |     |     | 10  | nA    |
| $I_{EBO}$                  | Emitter Cutoff Current               | $V_{EB} = 3.0\text{ V}, I_C = 0$ |     |     | 10  | nA    |

### 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>$I_C = 150\text{ mA}, V_{CE} = 1.0\text{ V}^*$<br>$I_C = 500\text{ mA}, V_{CE} = 10\text{ V}^*$ | 35<br>50<br>75<br>100<br>50<br>40 |  | 300        |        |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage* | $I_C = 150\text{ mA}, I_B = 15\text{ mA}$<br>$I_C = 500\text{ mA}, I_B = 50\text{ mA}$   |                                   |  | 0.3<br>1.0 | V<br>V |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage*      | $I_C = 150\text{ mA}, I_B = 15\text{ mA}$<br>$I_C = 500\text{ mA}, I_B = 50\text{ mA}$   |                                   |  | 1.2<br>2.0 | V<br>V |

### SMALL SIGNAL CHARACTERISTICS

|           |                                  |   |  |     |  |     |
|-----------|----------------------------------|---|--|-----|--|-----|
| $f_T$     | Current Gain - Bandwidth Product | $I_C = 20\text{ mA}, V_{CE} = 20\text{ V},$<br>$f = 100\text{ MHz}$                               |  | 300 |  | MHz |
| $C_{obo}$ | Output Capacitance               | $V_{CB} = 10\text{ V}, I_E = 0, f = 100\text{ kHz}$   |  | 4.0 |  | pF  |
| $C_{ibo}$ | Input Capacitance                | $V_{EB} = 0.5\text{ V}, I_C = 0, f = 100\text{ kHz}$  |  | 20  |  | pF  |
| NF        | Noise Figure                     | $I_C = 100\ \mu\text{A}, V_{CE} = 10\text{ V},$<br>$R_S = 1.0\text{ k}\Omega, f = 1.0\text{ kHz}$ |  | 2.0 |  | dB  |

### SWITCHING CHARACTERISTICS

|       |              |   |  |     |  |    |
|-------|--------------|---|--|-----|--|----|
| $t_d$ | Delay Time   | $V_{CC} = 30\text{ V}, V_{BE(OFF)} = 0.5\text{ V},$ |  | 8   |  | ns |
| $t_r$ | Rise Time    | $I_C = 150\text{ mA}, I_{B1} = 15\text{ mA}$        |  | 20  |  | ns |
| $t_s$ | Storage Time | $V_{CC} = 30\text{ V}, I_C = 150\text{ mA},$        |  | 180 |  | ns |
| $t_f$ | Fall Time    | $I_{B1} = I_{B2} = 15\text{ mA}$                    |  | 40  |  | ns |

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

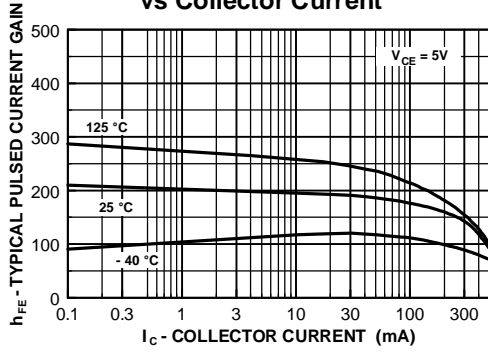
### Spice Model

NPN (Is=14.34f Xti=3 Eg=1.11 Vaf=74.03 Bf=255.9 Ne=1.307 Ise=14.34f Ikf=.2847 Xtb=1.5 Br=6.092 Nc=2 Isc=0 Ikr=0 Rc=1 Cjc=7.306p Mjc=.3416 Vjc=.75 Fc=.5 Cje=22.01p Mje=.377 Vje=.75 Tr=46.91n Tf=411.1p Itf=.6 Vtf=1.7 Xtf=3 Rb=10)

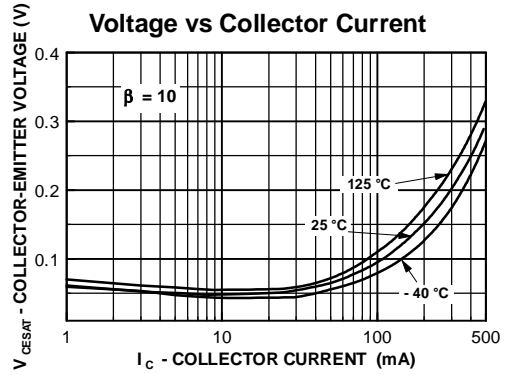
FFB2222A / FMB2222A / MMPQ2222A

Typical Characteristics

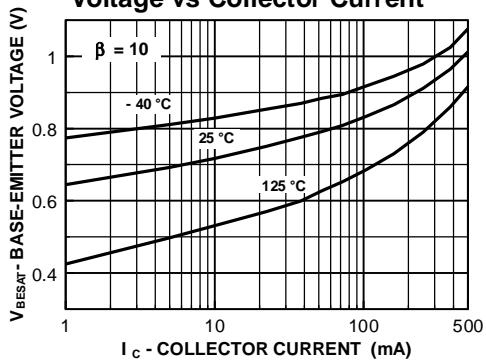
Typical Pulsed Current Gain vs Collector Current



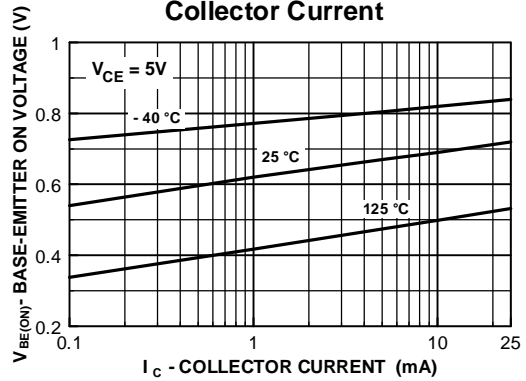
Collector-Emitter Saturation Voltage vs Collector Current



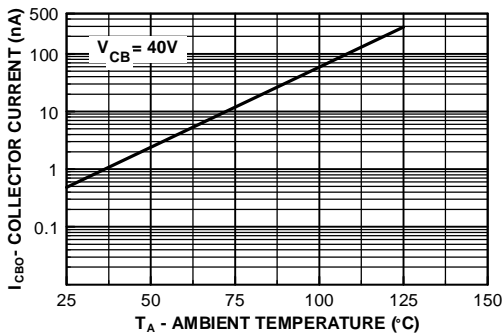
Base-Emitter Saturation Voltage vs Collector Current



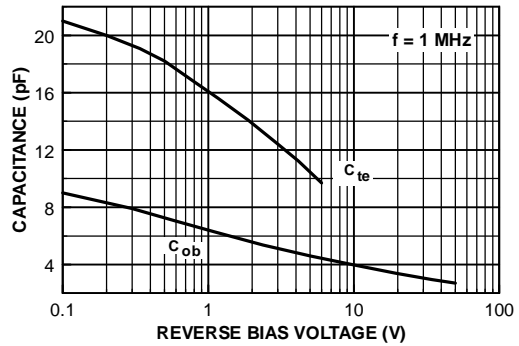
Base-Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs Ambient Temperature



Emitter Transition and Output Capacitance vs Reverse Bias Voltage



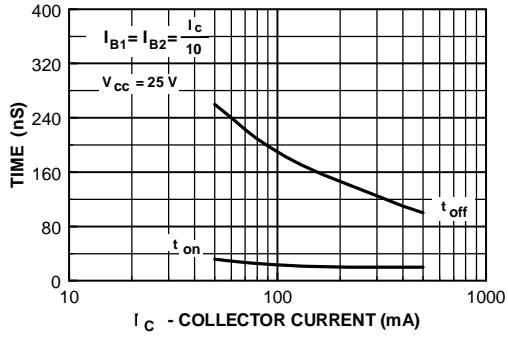
# NPN Multi-Chip General Purpose Amplifier

(continued)

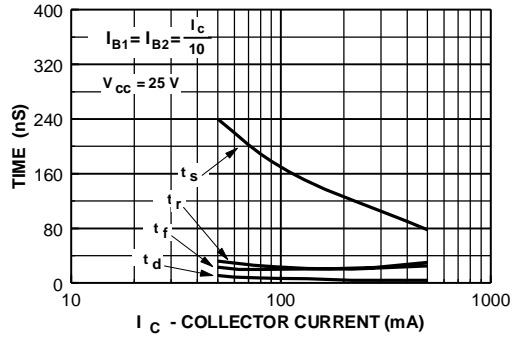
FFB2222A / FMB2222A / MMFQ2222A

## Typical Characteristics (continued)

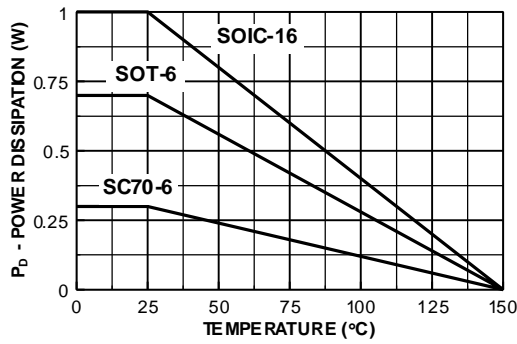
**Turn On and Turn Off Times vs Collector Current**



**Switching Times vs Collector Current**



**Power Dissipation vs Ambient Temperature**

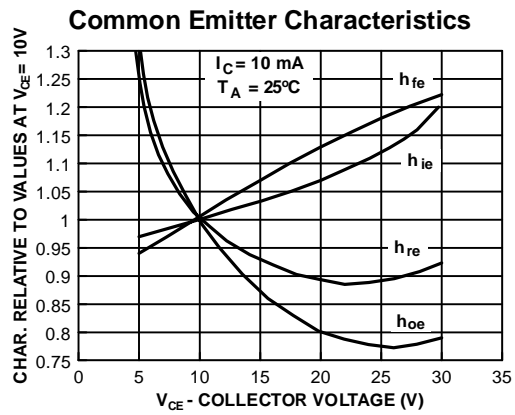
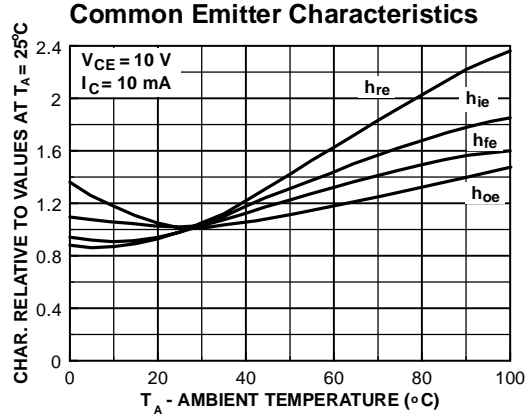
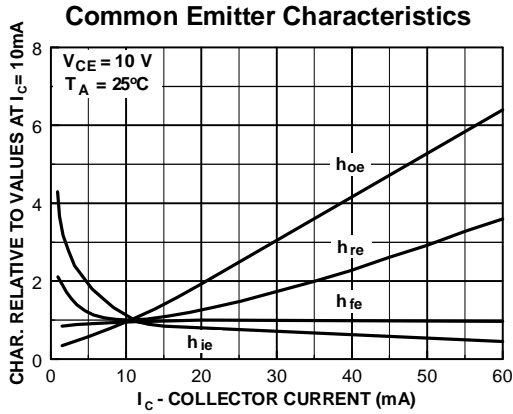


# NPN Multi-Chip General Purpose Amplifier

(continued)

FFB2222A / FMB2222A / MMPQ2222A

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



Test Circuits

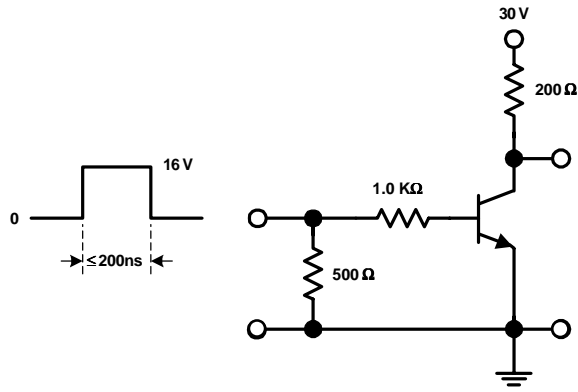


FIGURE 1: Saturated Turn-On Switching Time

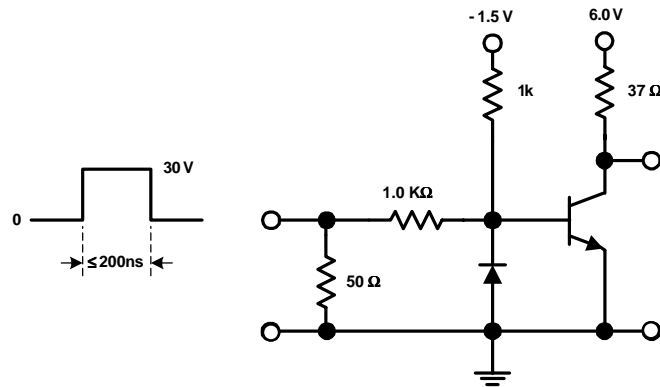


FIGURE 2: Saturated Turn-Off Switching Time

## TRADEMARKS

The following are registered and unregistered trademarks Fairchild Semiconductor owns or is authorized to use and is not intended to be an exhaustive list of all such trademarks.

|                      |                     |                     |            |
|----------------------|---------------------|---------------------|------------|
| ACEx™                | FASTr™              | PowerTrench®        | SyncFET™   |
| Bottomless™          | GlobalOptoisolator™ | QFET™               | TinyLogic™ |
| CoolFET™             | GTO™                | QS™                 | UHC™       |
| CROSSVOLT™           | HiSeC™              | QT Optoelectronics™ | VCX™       |
| DOME™                | ISOPLANAR™          | Quiet Series™       |            |
| E <sup>2</sup> CMOS™ | MICROWIRE™          | SILENT SWITCHER®    |            |
| EnSigna™             | OPTOLOGIC™          | SMART START™        |            |
| FACT™                | OPTOPLANAR™         | SuperSOT™-3         |            |
| FACT Quiet Series™   | PACMAN™             | SuperSOT™-6         |            |
| FAST®                | POP™                | SuperSOT™-8         |            |

## DISCLAIMER

FAIRCHILD SEMICONDUCTOR RESERVES THE RIGHT TO MAKE CHANGES WITHOUT FURTHER NOTICE TO ANY PRODUCTS HEREIN TO IMPROVE RELIABILITY, FUNCTION OR DESIGN. FAIRCHILD DOES NOT ASSUME ANY LIABILITY ARISING OUT OF THE APPLICATION OR USE OF ANY PRODUCT OR CIRCUIT DESCRIBED HEREIN; NEITHER DOES IT CONVEY ANY LICENSE UNDER ITS PATENT RIGHTS, NOR THE RIGHTS OF OTHERS.

## LIFE SUPPORT POLICY

FAIRCHILD'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF FAIRCHILD SEMICONDUCTOR CORPORATION. As used herein:

1. Life support devices or systems are devices or systems which, (a) are intended for surgical implant into the body, or (b) support or sustain life, or (c) whose failure to perform when properly used in accordance with instructions for use provided in the labeling, can be reasonably expected to result in significant injury to the user.
2. A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

## PRODUCT STATUS DEFINITIONS

### Definition of Terms

| Datasheet Identification | Product Status         | Definition  |
|--------------------------|------------------------|---|
| Advance Information      | Formative or In Design | This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.  |
| Preliminary              | First Production       | This datasheet contains preliminary data, and supplementary data will be published at a later date. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design. |
| No Identification Needed | Full Production        | This datasheet contains final specifications. Fairchild Semiconductor reserves the right to make changes at any time without notice in order to improve design.   |
| Obsolete                 | Not In Production      | This datasheet contains specifications on a product that has been discontinued by Fairchild semiconductor. The datasheet is printed for reference information only.   |



## Стандарт Электрон Связь

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

### Наши контакты:

**Телефон:** +7 812 627 14 35

**Электронная почта:** [sales@st-electron.ru](mailto:sales@st-electron.ru)

**Адрес:** 198099, Санкт-Петербург,  
Промышленная ул, дом № 19, литера Н,  
помещение 100-Н Офис 331