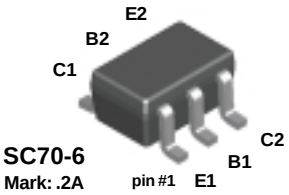
FAIRCHILD
SEMICONDUCTOR TM

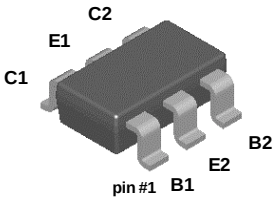
FFB3906



SC70-6
Mark: .2A

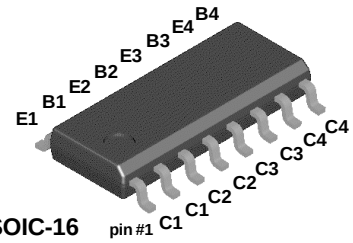
NOTE: The pinouts are symmetrical; pin 1 and pin 4 are interchangeable. Units inside the carrier can be of either orientation and will not affect the functionality of the device.

FMB3906



SuperSOT™-6
Mark: .2A

MMPQ3906



SOIC-16
Mark: MMPQ3906

PNP Multi-Chip General Purpose Amplifier

This device is designed for general purpose amplifier and switching applications at collector currents of 10 µA to 100 mA. Sourced from Process 66.

Absolute Maximum Ratings*

T_A = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	40	V
V_{CBO}	Collector-Base Voltage	40	V
V_{EBO}	Emitter-Base Voltage	5.0	V
I_C	Collector Current - Continuous	200	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

T_A = 25°C unless otherwise noted

Symbol	Characteristic	Max			Units
		FFB3904	FMB3904	MMPQ3904	
P_D	Total Device Dissipation Derate above 25°C	300 2.4	700 5.6	1,000 8.0	mW mW/°C
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient Effective 4 Die Each Die	415	180	 125 240	°C/W °C/W °C/W

PNP Multi-Chip General Purpose Amplifier
(continued)

Electrical Characteristics
T_A = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Typ	Max	Units
OFF CHARACTERISTICS						
$V_{(BR)CEO}$	Collector-Emitter Breakdown Voltage*	I_C = 1.0 mA, I_B = 0	40			V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 10 μA, I_E = 0	40			V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 μA, I_C = 0	5.0			V
I_{BL}	Base Cutoff Current	V_{CE} = 30 V, V_{BE} = 3.0 V			50	nA
I_{CEX}	Collector Cutoff Current	V_{CE} = 30 V, V_{BE} = 3.0 V			50	nA
ON CHARACTERISTICS						
h_{FE}	DC Current Gain *	I_C = 0.1 mA, V_{CE} = 1.0 V I_C = 1.0 mA, V_{CE} = 1.0 V I_C = 10 mA, V_{CE} = 1.0 V I_C = 50 mA, V_{CE} = 1.0 V I_C = 100 mA, V_{CE} = 1.0 V	60 80 100 60 30		 300 	
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA			0.25 0.4	V V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA I_C = 50 mA, I_B = 5.0 mA	0.65		0.85 0.95	V V
SMALL SIGNAL CHARACTERISTICS						
f_T	Current Gain - Bandwidth Product	I_C = 10 mA, V_{CE} = 20 V, f = 100 MHz		450		MHz
C_{obo}	Output Capacitance	V_{CB} = 5.0 V, I_E = 0, f = 100 kHz		3.0		pF
C_{ibo}	Input Capacitance	V_{EB} = 0.5 V, I_C = 0, f = 100 kHz		8.0		pF
NF	Noise Figure (except MMPQ3906)	I_C = 100 μA, V_{CE} = 5.0 V, R_S =1.0kΩ, f=10 Hz to 15.7 kHz		2.5		dB
SWITCHING CHARACTERISTICS						
t_d	Delay Time	V_{CC} = 3.0 V, V_{BE} = 0.5 V, I_C = 10 mA, I_{B1} = 1.0 mA		15		ns
t_r	Rise Time			20		ns
t_s	Storage Time	V_{CC} = 3.0 V, I_C = 10mA I_{B1} = I_{B2} = 1.0 mA		110		ns
t_f	Fall Time			40		ns

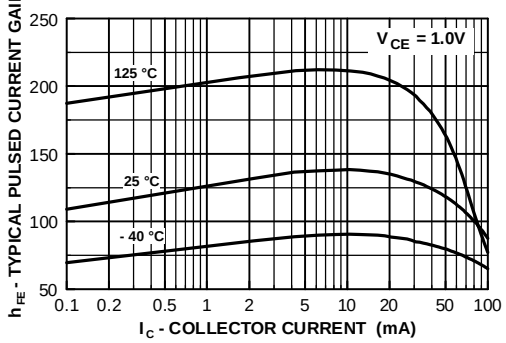
*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Spice Model

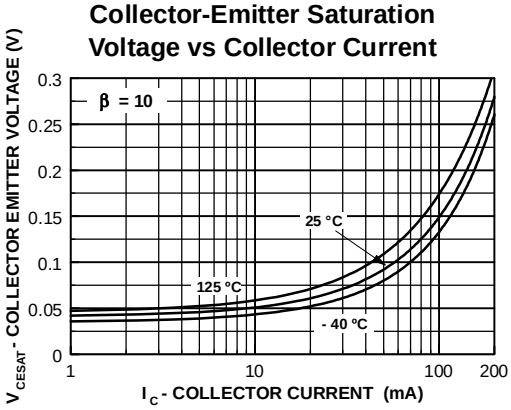
PNP (Is=1.41f Xti=3 Eg=1.11 Vaf=18.7 Bf=180.7 Ne=1.5 Ise=0 Ikf=80m Xtb=1.5 Br=4.977 Nc=2 Isc=0 Ikr=0 Rc=2.5 Cjc=9.728p Mjc=.5776 Vjc=.75 Fc=.5 Cje=8.063p Mje=.3677 Vje=.75 Tr=33.42n Tf=179.3p Itf=.4 Vtf=4 Xtf=6 Rb=10)

Typical Characteristics

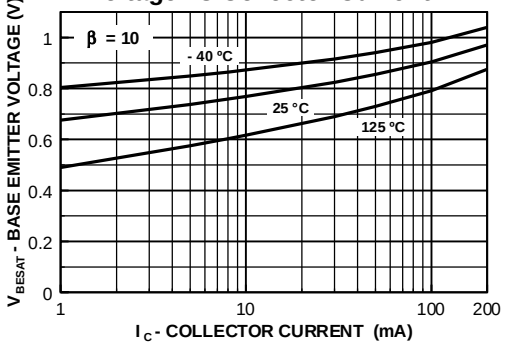
Typical Pulsed Current Gain vs Collector Current



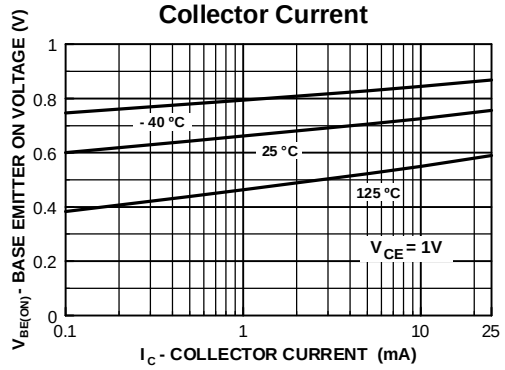
Collector-Emitter Saturation Voltage vs Collector Current



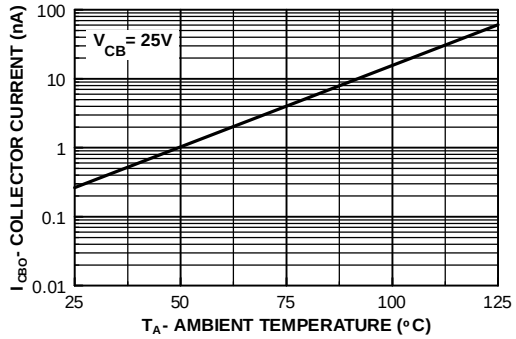
Base-Emitter Saturation Voltage vs Collector Current



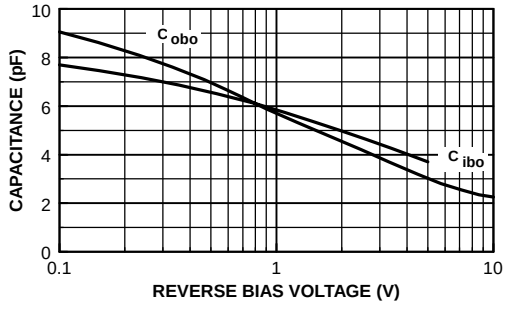
Base Emitter ON Voltage vs Collector Current



Collector-Cutoff Current vs Ambient Temperature

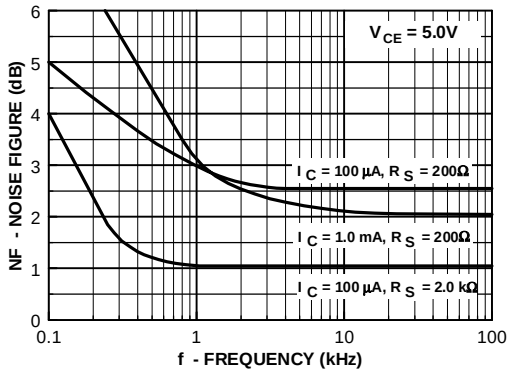


Common-Base Open Circuit Input and Output Capacitance vs Reverse Bias Voltage

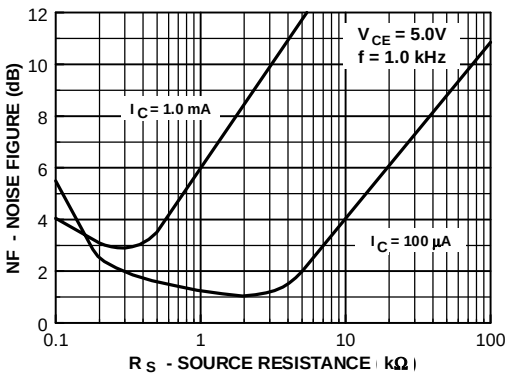


Typical Characteristics (continued)

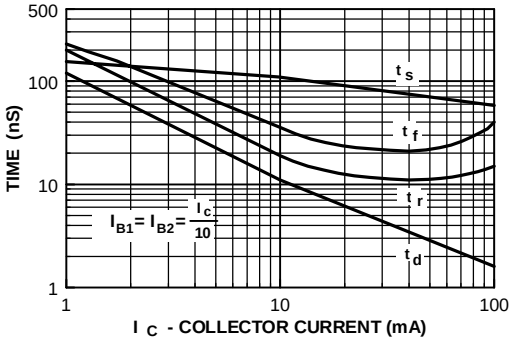
Noise Figure vs Frequency



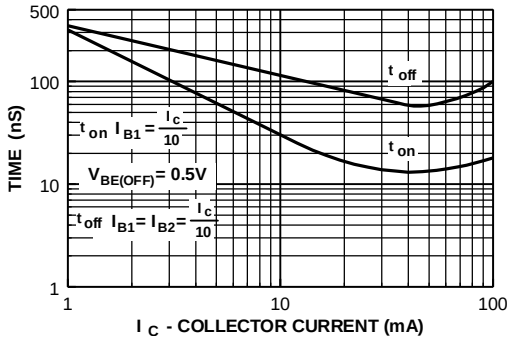
Noise Figure vs Source Resistance



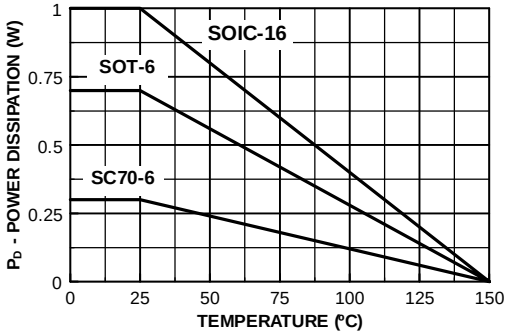
Switching Times vs Collector Current



Turn On and Turn Off Times vs Collector Current

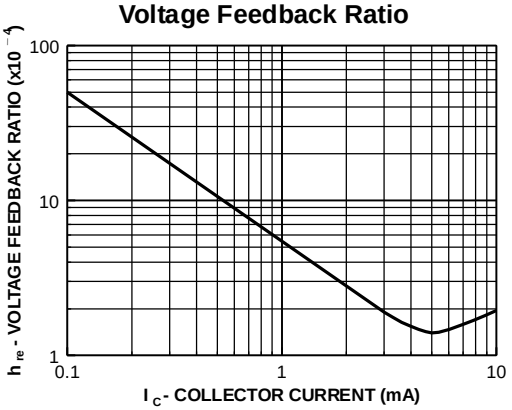


Power Dissipation vs Ambient Temperature

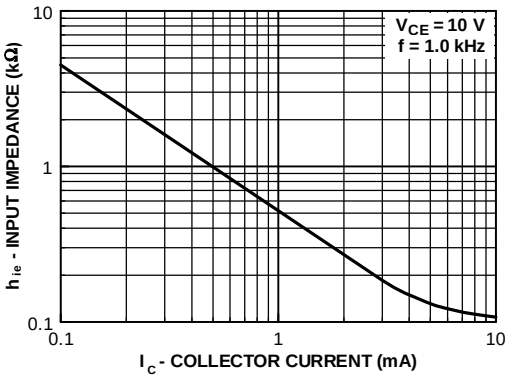


Typical Characteristics (continued)

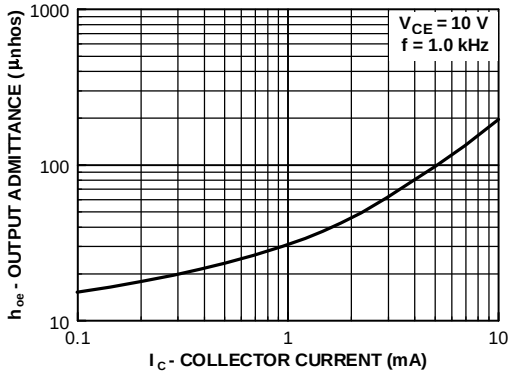
Voltage Feedback Ratio



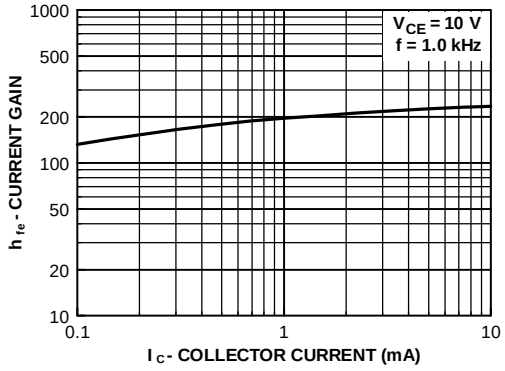
Input Impedance



Output Admittance



Current Gain



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