

BFX68

GENERAL PURPOSE AMPLIFIER

NPN DIFFUSED SILICON PLANAR TRANSISTOR

GENERAL DESCRIPTION - The BFX68 is an NPN silicon PLANAR transistor suitable for use in high performance amplifier, oscillator and switching circuits. It has a current gain range from the microampere region up to 500 mA.

ABSOLUTE MAXIMUM RATINGS (Note 1)

Maximum Temperatures

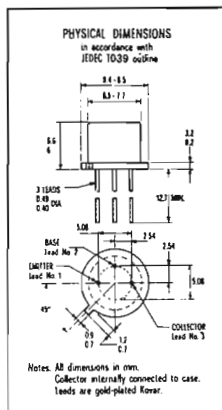
T _{STG}	Storage Temperature	-55°C to +200°C
T _J	Operating Junction Temperature	+200°C
T _L	Lead Temperature (Soldering, 10 sec. time limit)	+260°C

Maximum Power Dissipations (Notes 2 and 3)

P _D	Total Dissipation at 25°C Case Temperature	3 Watts
	at 100°C Case Temperature	1.7 Watt
	at 25°C Ambient Temperature	0.7 Watt

Maximum Voltages (T_A = 25°C unless otherwise noted)

V _{CB0}	Collector to Base Voltage	75 Volts
V _{CER}	Collector to Emitter Voltage (R _{BE} = 10 Ω) (Note 4)	50 Volts
V _{EBO}	Emitter to Base Voltage	7 Volts



ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h _{FE}	DC Current Gain	20	60			I _C = 10 μA V _{CE} = 10 V
h _{FE}	DC Current Gain	35	80			I _C = 0.1 mA V _{CE} = 10 V
h _{FE}	DC Pulse Current Gain (Note 5)	75	130			I _C = 10 mA V _{CE} = 10 V
h _{FE}	DC Pulse Current Gain (Note 5)	100	130	300		I _C = 150 mA V _{CE} = 10 V
h _{FE}	DC Pulse Current Gain (Note 5)	40	75			I _C = 500 mA V _{CE} = 10 V
h _{FE} (-55°C)	DC Pulse Current Gain (Note 5)	35	65			I _C = 10 mA V _{CE} = 10 V
V _{BE} (sat)	Base Saturation Voltage (Note 5)	0.95	1.3		V	I _C = 150 mA I _B = 15 mA
V _{CE} (sat)	Collector Saturation Voltage (Note 5)	0.5	1.5		V	I _C = 150 mA I _B = 15 mA
I _{EBO}	Emitter Cutoff Current	0.05	5		nA	I _C = 0 V _{EB} = 5 V
I _{CBO}	Collector Cutoff Current	0.3	10		nA	I _E = 0 V _{CB} = 60 V
I _{CBO} (125°C)	Collector Cutoff Current	0.4	10		μA	I _E = 0 V _{CB} = 60 V
BV _{CB0}	Collector to Base Breakdown Voltage	75			V	I _E = 0 I _C = 0.1 mA
BV _{EBO}	Emitter to Base Breakdown Voltage	7			V	I _C = 0 I _E = 0.1 mA
LV _{CER}	Collector to Emitter Sustaining Voltage (Notes 4 and 5)	50			V	R _{BE} ≤ 10 Ω I _C = 100 mA (pulsed)

ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

BFX 68

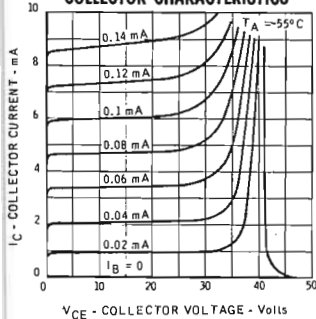
SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
h_{fe}	Small Signal Current Gain ($f=1\text{ KHz}$)	50	115	200		$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$
h_{fe}	Small Signal Current Gain ($f=1\text{ KHz}$)	70	135	300		$I_C = 5\text{ mA}$ $V_{CE} = 10\text{ V}$
h_{ie}	Input Resistance ($f=1\text{ KHz}$)		4.4		Ω	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$
h_{oe}	Output Conductance ($f=1\text{ KHz}$)		23.8		μmho	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$
h_{re}	Voltage Feedback Ratio ($f=1\text{ KHz}$)		7.3		$\times 10^{-4}$	$I_C = 1\text{ mA}$ $V_{CE} = 5\text{ V}$
h_{ib}	Input Resistance ($f=1\text{ KHz}$)	24	27	34	Ω	$I_C = 1\text{ mA}$ $V_{CB} = 5\text{ V}$
h_{ib}	Input Resistance ($f=1\text{ KHz}$)	4	6.3	8	Ω	$I_C = 5\text{ mA}$ $V_{CB} = 10\text{ V}$
h_{ob}	Output Conductance ($f=1\text{ KHz}$)	0.1	0.16	0.5	μmho	$I_C = 1\text{ mA}$ $V_{CB} = 5\text{ V}$
h_{ob}	Output Conductance ($f=1\text{ KHz}$)	0.1	0.19	1	μmho	$I_C = 5\text{ mA}$ $V_{CB} = 10\text{ V}$
h_{rb}	Voltage Feedback Ratio ($f=1\text{ KHz}$)		1.2	5	$\times 10^{-4}$	$I_C = 1\text{ mA}$ $V_{CB} = 5\text{ V}$
h_{rb}	Voltage Feedback Ratio ($f=1\text{ KHz}$)		1.2	5	$\times 10^{-4}$	$I_C = 5\text{ mA}$ $V_{CB} = 10\text{ V}$
h_{fe}	High Frequency Current Gain ($f=20\text{ MHz}$)	3.5	5			$I_C = 50\text{ mA}$ $V_{CE} = 10\text{ V}$
C_{ob}	Output Capacitance		18	25	pF	$I_E = 0$ $V_{CB} = 10\text{ V}$
C_{TE}	Emitter Transition Capacitance		50	80	pF	$I_C = 0$ $V_{EB} = 0.5\text{ V}$
NF	Narrow Band Noise Figure (Note 6)		3.5	8	dB	$I_C = 0.3\text{ mA}$ $V_{CE} = 10\text{ V}$

NOTES :

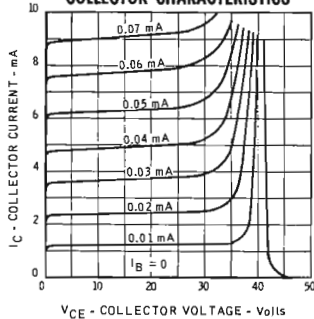
- (1) These ratings are limiting values above which the serviceability of any individual semiconductor device may be impaired.
- (2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.
- (3) These ratings give a maximum junction temperature of 200°C and junction-to-case thermal resistance of 58.3°C/watt (derating factor of 17.2 mW/°C); junction-to-ambient thermal resistance of 250°C/watt (derating factor of 4 mW/°C).
- (4) These ratings refers to a high-current point where collector-to-emitter voltage is lowest. For more information send for SGS-AR 5.
- (5) Pulse Conditions : length = 300 μsec ; duty cycle = 1%.
- (6) $f = 1\text{ KHz}$; $R_S = 510\Omega$; Power Bandwidth of 1 Hz.

TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)

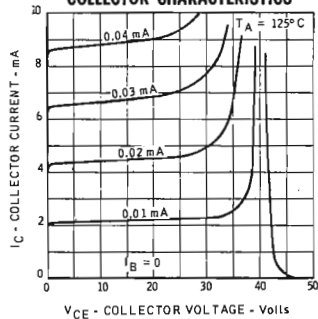
COLLECTOR CHARACTERISTICS*



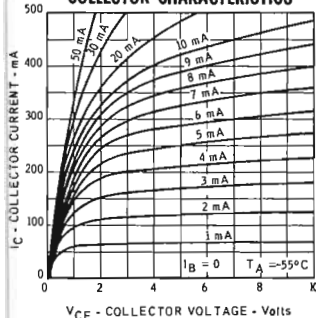
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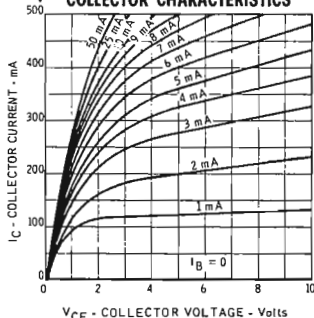
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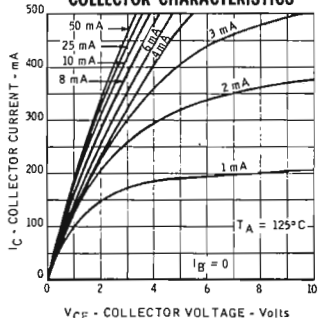
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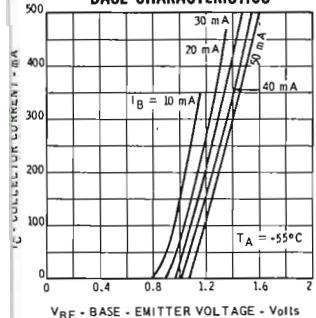
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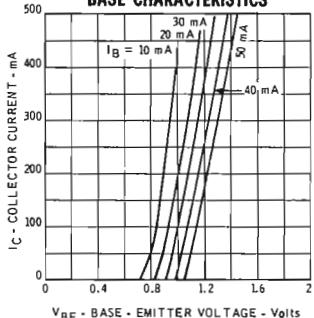
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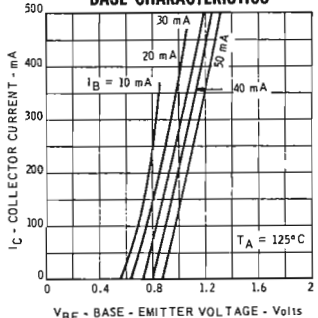
BASE CHARACTERISTICS*



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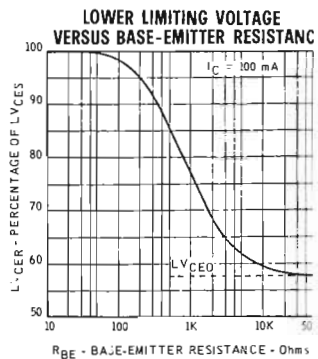
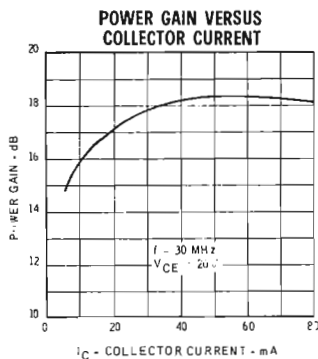
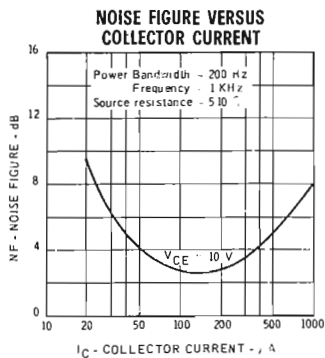
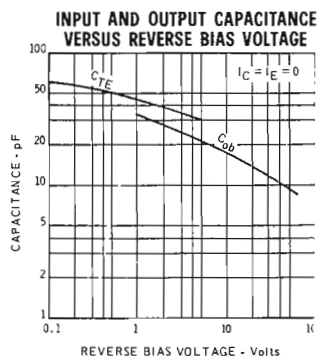
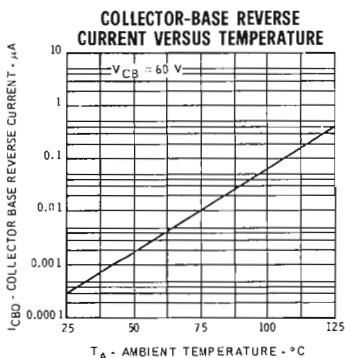
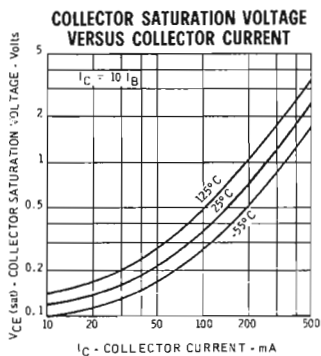
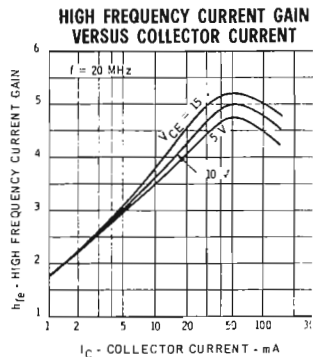
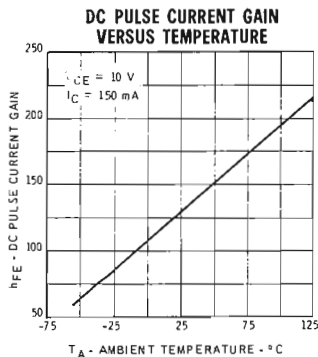
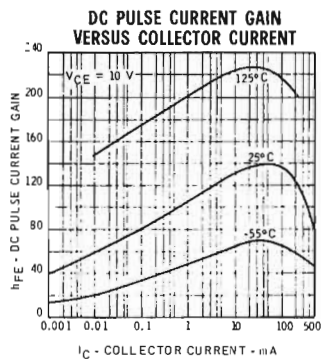


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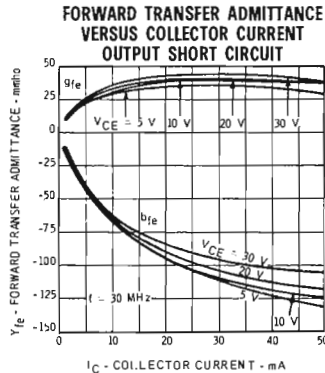
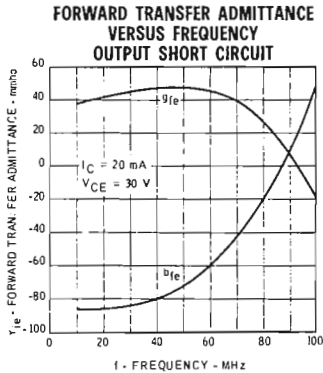
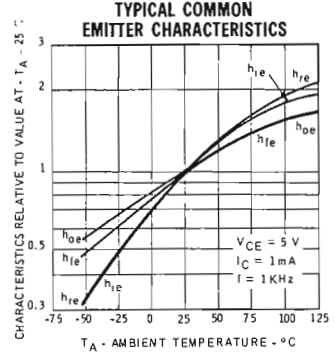
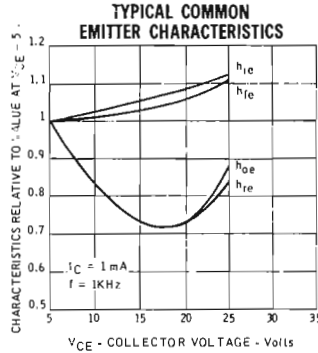
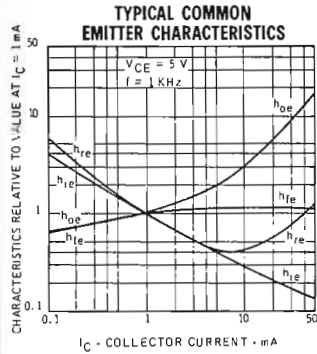
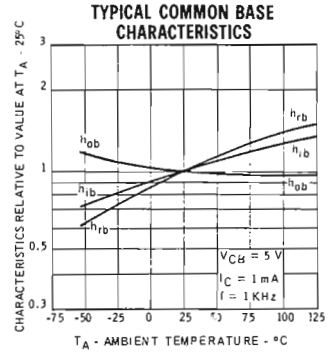
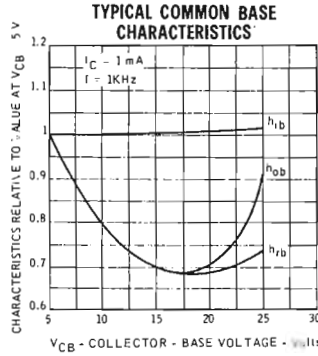
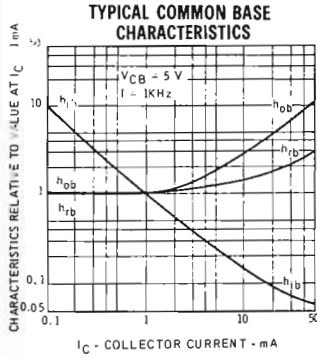


* Single family characteristics on Transistor Curve Tracer.

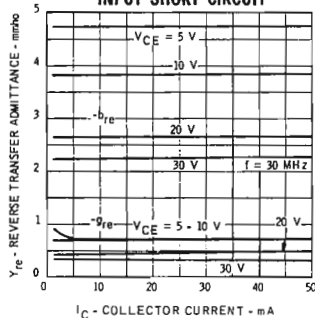
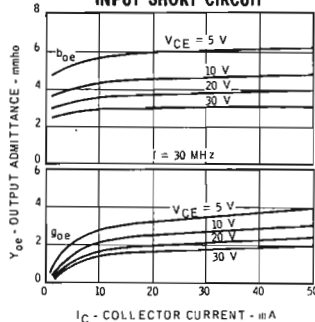
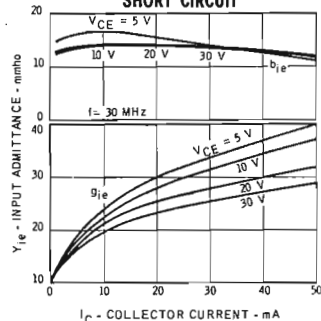
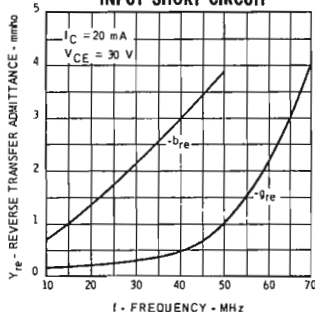
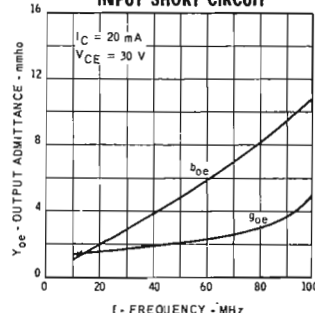
TYPICAL ELECTRICAL CHARACTERISTICS (25°C free air temperature unless otherwise noted)



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REVERSE TRANSFER ADMITTANCE
VERSUS COLLECTOR CURRENT
INPUT SHORT CIRCUITOUTPUT ADMITTANCE VERSUS
COLLECTOR CURRENT
INPUT SHORT CIRCUITINPUT ADMITTANCE VERSUS
COLLECTOR CURRENT OUTPUT
SHORT CIRCUITREVERSE TRANSFER ADMITTANCE
VERSUS FREQUENCY
INPUT SHORT CIRCUITOUTPUT ADMITTANCE VERSUS
FREQUENCY
INPUT SHORT CIRCUITINPUT ADMITTANCE VERSUS
FREQUENCY
OUTPUT SHORT CIRCUIT