BFW92A

CASE 317A-01, STYLE 2

HIGH FREQUENCY TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Collector-Emitter Voltage	V_{CEO}	15	Vdc
Collector-Base Voltage	V_{CBO}	25	Vdc
Emitter-Base Voltage	V_{EBO}	2.5	Vdc
Collector Current — Continuous	I_C	35	mAdc
Total Device Dissipation @ T_C = 105°C Derate above 105°C	P_D	180 4.0	mW mW/°C
Storage Temperature	T_{stg}	−65 to 150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case(1)	$R_{\theta JC}$	250	°C/W

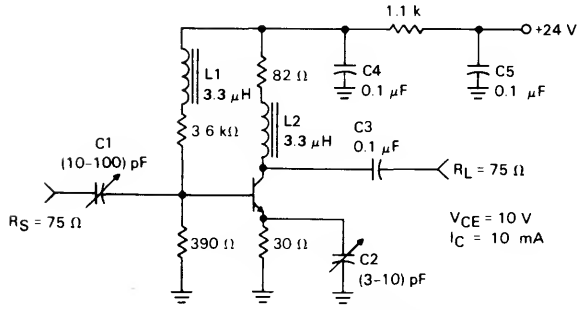
(1) Case temperature measured on collector lead immediately adjacent to body of package.

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 1.0 mAdc, I_B = 0)	$V_{(BR)CEO}$	15	—	—	Vdc
Collector-Base Breakdown Voltage (I_C = 0.1 mAdc, I_E = 0)	$V_{(BR)CBO}$	25	—	—	Vdc
Emitter-Base Breakdown Voltage (I_E = 0.1 mAdc, I_C = 0)	$V_{(BR)EBO}$	2.5	—	—	Vdc
Collector Cutoff Current (V_{CB} = 10 Vdc, I_E = 0)	I_{CBO}	—	—	50	nAdc
ON CHARACTERISTICS					
DC Current Gain (I_C = 2.0 mAdc, V_{CE} = 1.0 Vdc)	h_{FE}	20	50	150	—
SMALL SIGNAL CHARACTERISTICS					
Current-Gain — Bandwidth Product (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	f_T	—	4.5	—	GHz
Collector-Base Capacitance (V_{CB} = 10 Vdc, f = 1.0 MHz, Emitter Guarded)	C_{cb}	—	0.5	1.0	pF
FUNCTIONAL PERFORMANCE					
Optimum Noise Figure (Tuned) (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	NF_{opt}	—	2.7	—	dB
Noise Figure (Untuned, R_S = R_L = 50 Ω) (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	NF	—	3.0	—	dB
Maximum Available Gain(2) (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	MAG	—	16	—	dB
Insertion Gain (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 0.5 GHz)	$\|S_{21}\|^2$	—	14	—	dB

(2) $G_{max} = \frac{|S_{21}|^2}{(1-|S_{11}|^2)(1-|S_{22}|^2)}$

FIGURE 1 — 30-900 MHz BROADBAND AMPLIFIER



C3, C4, C5 — 0.1 μF Chip Capacitor
L1, L2 — 3.3 μH Molded Inductor

All Resistors 1/4 W, 20%

FIGURE 2 — BROADBAND GAIN (Circuit Figure 1)

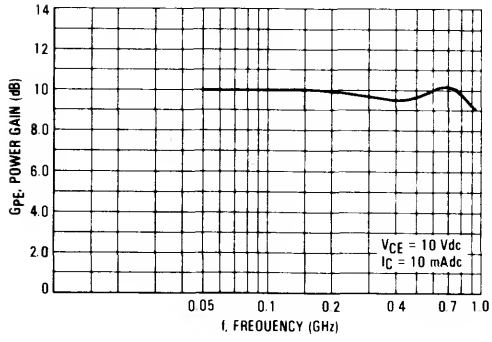


FIGURE 3 — 2nd AND 3rd ORDER INTERCEPT POINTS

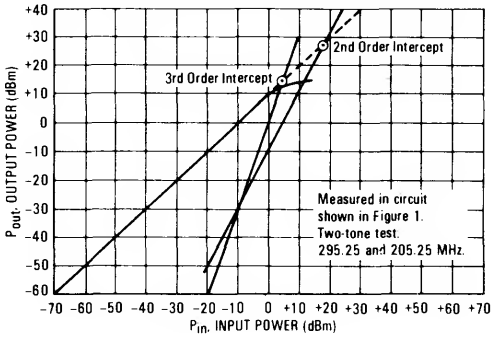


FIGURE 4 — MAXIMUM AVAILABLE GAIN versus FREQUENCY

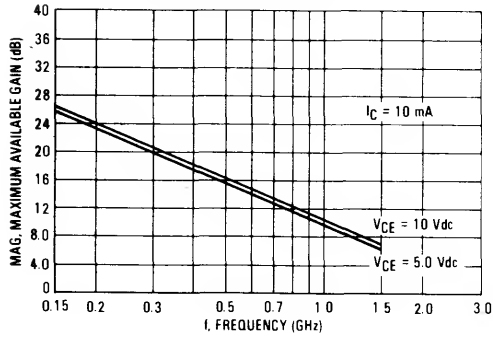
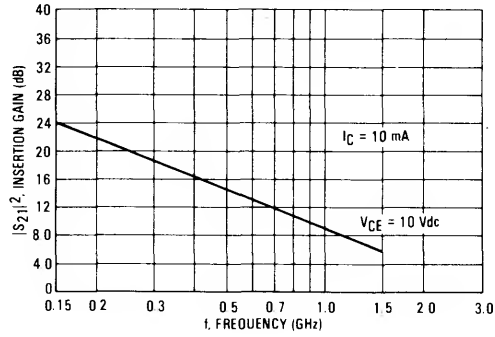


FIGURE 5 — $|S_{21}|^2$ versus FREQUENCY



7

FIGURE 6 — MAXIMUM AVAILABLE GAIN versus COLLECTOR CURRENT

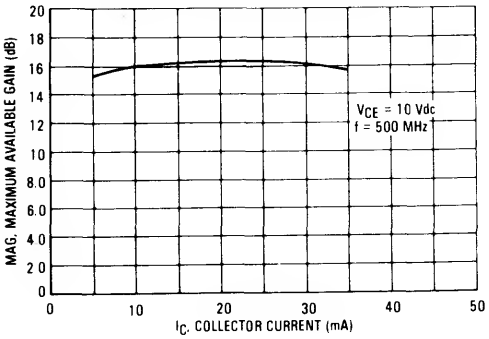


FIGURE 7 — GAIN-BANDWIDTH PRODUCT versus COLLECTOR CURRENT

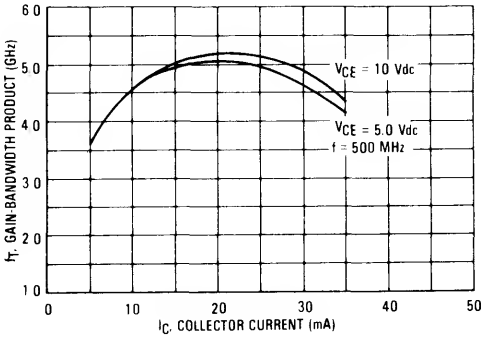


FIGURE 8 — NOISE FIGURE versus COLLECTOR CURRENT

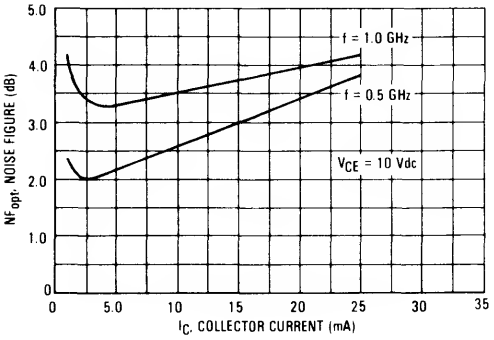


FIGURE 9 — NOISE FIGURE versus COLLECTOR CURRENT Untuned, $R_S = R_L = 50\ \Omega$

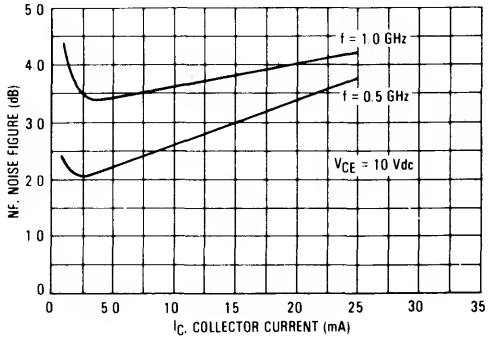


FIGURE 10 — NOISE FIGURE versus FREQUENCY

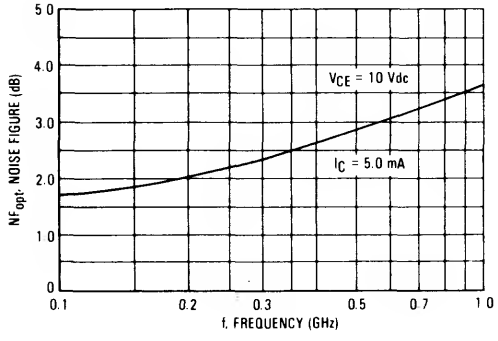


FIGURE 11 — NOISE FIGURE versus FREQUENCY Untuned $R_S = R_L = 50\ \Omega$

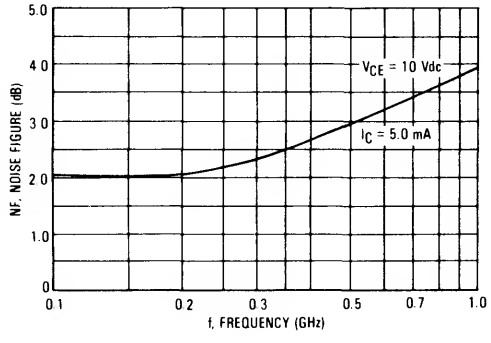


FIGURE 12 — C_{ib} INPUT CAPACITANCE versus EMITTER BASE VOLTAGE

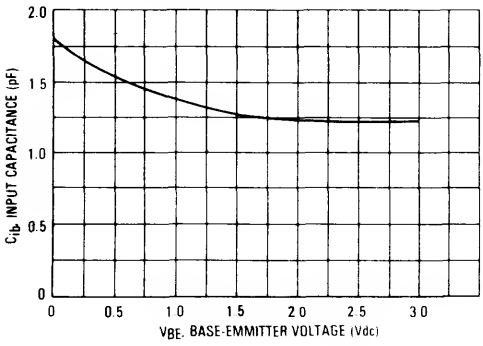
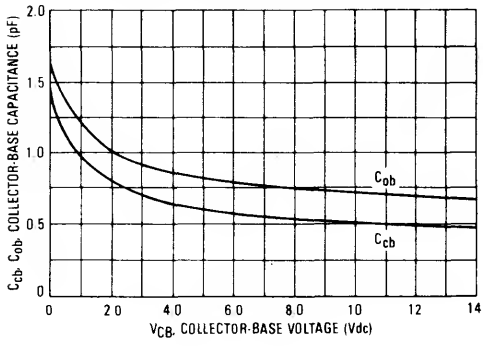
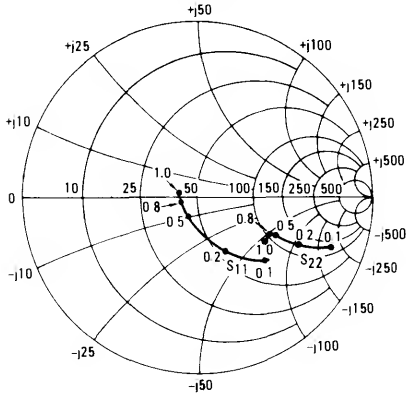


FIGURE 13 — COLLECTOR-BASE CAPACITANCE versus COLLECTOR-BASE VOLTAGE

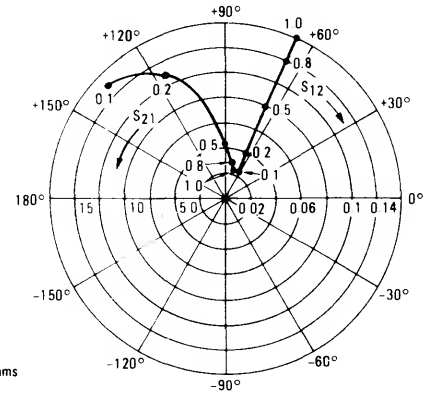


BFW92A COMMON-EMITTER S-PARAMETERS

INPUT/OUTPUT REFLECTION COEFFICIENTS versus FREQUENCY (V_{CE} = 10 V, I_C = 10 mA)



FORWARD/REVERSE TRANSMISSION COEFFICIENTS versus FREQUENCY (V_{CE} = 10 V, I_C = 10 mA)



Coordinates in Ohms

7

BFW92A COMMON-EMITTER S-PARAMETERS

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\lvert S_{11}\rvert$	$\angle\phi$	$\lvert S_{21}\rvert$	$\angle\phi$	$\lvert S_{12}\rvert$	$\angle\phi$	$\lvert S_{22}\rvert$	$\angle\phi$
5 0	5 0	100	0 71	-33	11 2	145	0 031	69	0 87	-18
		200	0 49	-60	8 6	122	0 052	62	0 70	-26
		500	0 21	-119	4 5	92	0 094	61	0 48	-30
		800	0 17	-161	3 0	78	0 137	60	0 44	-36
		1000	0 16	176	2 5	71	0 164	60	0.44	-40
	10	100	0 52	-46	16 6	135	0.027	67	0 78	-23
		200	0 31	-75	11 2	113	0 044	65	0.58	-29
		500	0 14	-150	5 2	88	0 089	67	0 40	-29
		800	0 15	173	3 3	76	0 135	65	0 37	-34
		1000	0 16	154	2 8	70	0 164	64	0 37	-38
	15	100	0 40	-55	19 7	129	0 025	69	0.72	-26
		200	0 22	-88	12 1	109	0 041	68	0 52	-29
		500	0 14	-170	5 4	86	0 087	70	0 36	-27
		800	0 16	161	3 5	76	0 134	68	0 34	-33
		1000	0 17	145	2 9	69	0 164	66	0.35	-37
	20	100	0 33	-62	21 1	125	0 023	69	0 68	-27
		200	0 18	-99	12 5	106	0 039	69	0 49	-28
		500	0 14	178	5 5	85	0 086	72	0 35	-26
		800	0 17	155	3 5	75	0 133	69	0 33	-32
		1000	0 18	142	2 9	69	0 164	67	0 34	-37
	25	100	0 27	-69	21 9	122	0 022	70	0 65	-27
		200	0.15	-111	12 7	104	0 038	71	0 47	-27
		500	0 16	172	5 5	85	0 085	73	0 35	-25
		800	0 19	153	3 5	75	0 132	70	0 33	-31
		1000	0 20	140	2 9	69	0 163	68	0 33	-36
10	5 0	100	0 73	-30	11 1	146	0 026	71	0 90	-14
		200	0 53	-52	8 8	124	0 044	63	0 75	-21
		500	0 21	-98	4 7	94	0 082	62	0 57	-25
		800	0 14	-136	3 1	80	0 120	62	0 53	-30
		1000	0 11	-161	2 6	73	0 143	62	0 53	-34
	10	100	0 57	-39	16 7	137	0 023	70	0 82	-18
		200	0 35	-62	11 5	115	0 038	66	0 65	-23
		500	0 12	-117	5 4	89	0 078	69	0 50	-23
		800	0 09	-163	3 5	78	0 118	67	0 47	-28
		1000	0 09	168	2 9	71	0 144	66	0 48	-32
	15	100	0.46	-46	19 9	130	0 021	70	0 77	-20
		200	0 26	-68	12 6	110	0 035	68	0 60	-22
		500	0 09	-137	5 6	87	0 076	71	0 47	-21
		800	0 09	177	3 7	77	0 117	69	0 45	-27
		1000	0 10	153	3 0	71	0 143	68	0 46	-31
	20	100	0 39	-50	21 5	126	0 020	70	0 74	-21
		200	0 21	-73	13 0	107	0 034	71	0 58	-21
		500	0 08	-154	5 7	86	0 075	72	0 46	-20
		800	0 10	168	3 7	76	0 117	70	0 45	-27
		1000	0 11	148	3 0	71	0 142	69	0 45	-31
	25	100	0 34	-54	22 3	123	0 019	70	0 71	-20
		200	0 17	-79	13 0	105	0 033	71	0 57	-20
		500	0 08	-166	5 7	86	0 075	73	0 47	-19
		800	0 11	162	3 7	76	0 116	70	0 45	-26
		1000	0 13	144	3 0	70	0 141	69	0 46	-30