BFW92A

The RF Line

NPN SILICON HIGH FREQUENCY TRANSISTOR

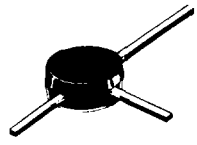
. . . designed primarily for use in MATV/CATV amplifiers and other broadband linear applications demanding high power gain with low noise over a wide current range.

- High Power Gain —
  MAG = 16 dB (Typ) @ f = 0.5 GHz
- Low Noise Figure —
  NF = 2.7 dB (Typ) @ f = 0.5 GHz
- Ion-Implanted Arsenic Emitters
- Gold Top Metal
- Silicon Nitride Passivation
- Industry Standard Plastic Macro-T Package
- Compatible with Other BFW92 Types

f_T 4.5 GHz @ 10 mA

HIGH FREQUENCY TRANSISTOR

NPN SILICON



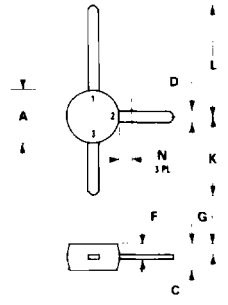
MAXIMUM RATINGS

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 Range	T_{stg}	65 to 150	°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance Junction to Case (2)	$R_{\theta JC}$	250	°C/W

Note Case temperature measured on collector lead immediately adjacent to body of package



STYLE 2
PIN 1 COLLECTOR
2 EMITTER
3 BASE

NOTE
DIMENSION D NOT APPLICABLE IN ZONE N

DIM	MILLIMETERS MIN	MILLIMETERS MAX	INCHES MIN	INCHES MAX
A	4.44	5.21	0.175	0.205
C	1.90	2.54	0.075	0.100
D	0.84	0.99	0.033	0.039
F	0.20	0.30	0.008	0.012
G	0.76	1.14	0.030	0.045
K	7.24	8.13	0.285	0.320
L	10.54	11.43	0.415	0.450
N	—	1.65	—	0.065

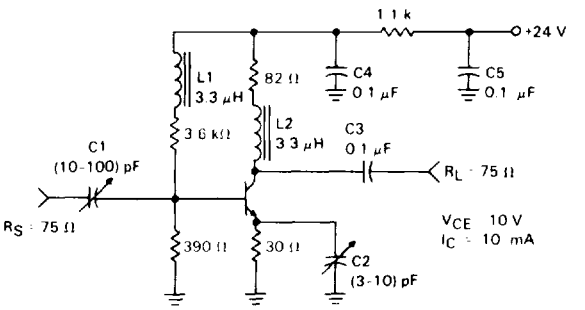
CASE 317A-01

ELECTRICAL CHARACTERISTICS (T_C = 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	—
DYNAMIC 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 (1) (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

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

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)

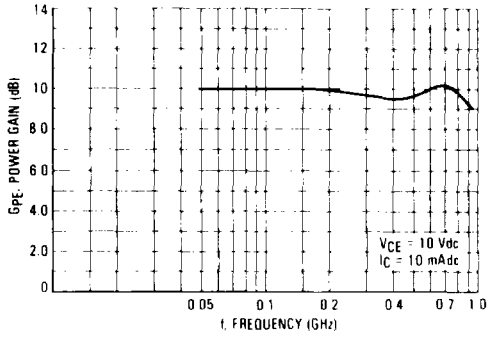


FIGURE 3 — 2nd AND 3rd ORDER INTERCEPT POINTS

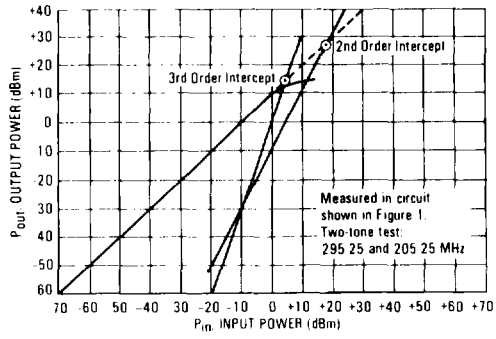


FIGURE 4 — MAXIMUM AVAILABLE GAIN versus FREQUENCY

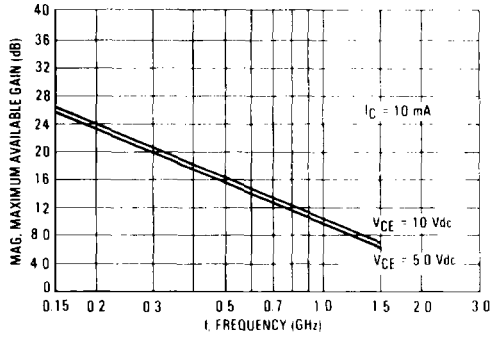


FIGURE 5 — $|S_{21}|^2$ versus FREQUENCY

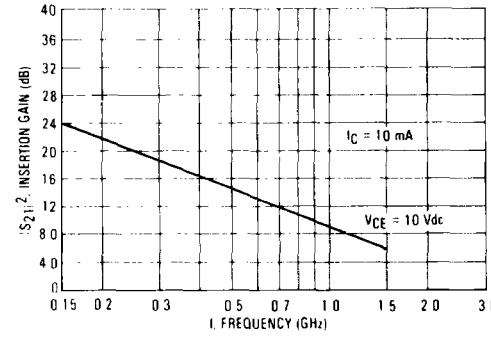


FIGURE 6 — MAXIMUM AVAILABLE GAIN versus COLLECTOR CURRENT

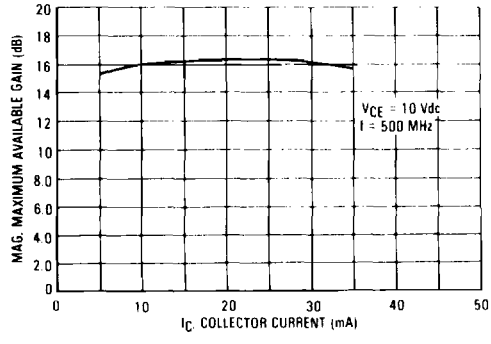
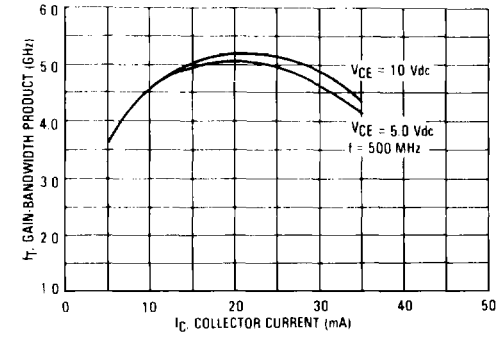


FIGURE 7 — GAIN-BANDWIDTH PRODUCT versus COLLECTOR CURRENT



2

FIGURE 8 — NOISE FIGURE versus COLLECTOR CURRENT

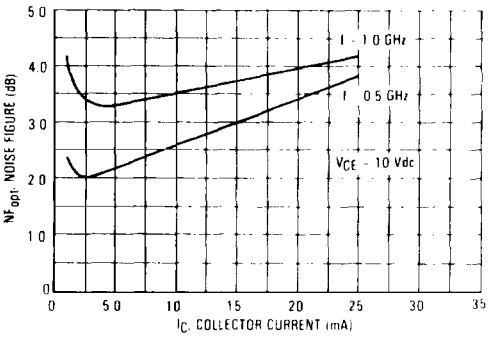


FIGURE 9 — NOISE FIGURE versus COLLECTOR CURRENT
Untuned, R_S = R_L = 50 Ω

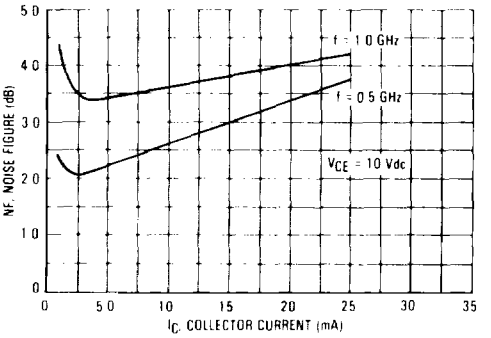


FIGURE 10 NOISE FIGURE versus FREQUENCY

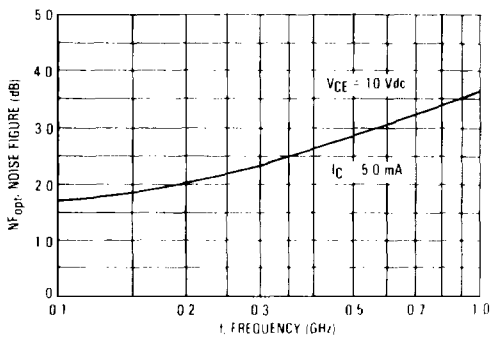


FIGURE 11 — NOISE FIGURE versus FREQUENCY
Untuned R_S = R_L = 50 Ω

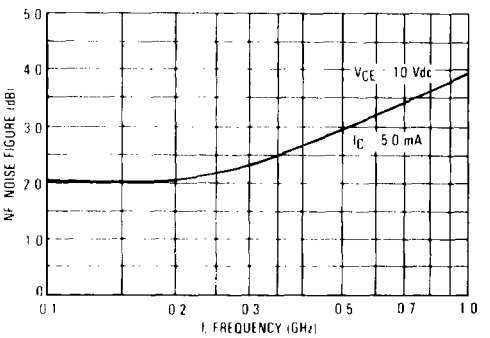


FIGURE 12 C_{ib} INPUT CAPACITANCE versus EMITTER BASE VOLTAGE

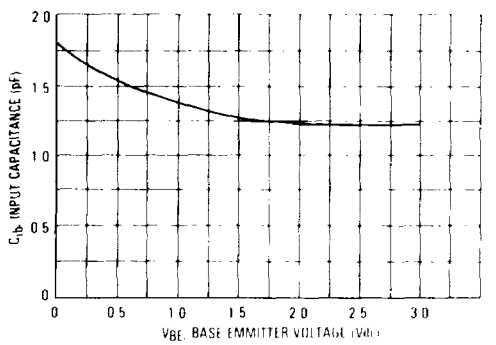
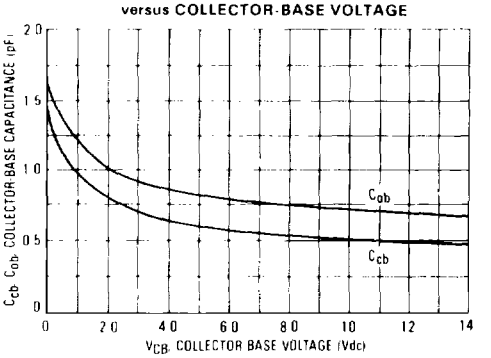
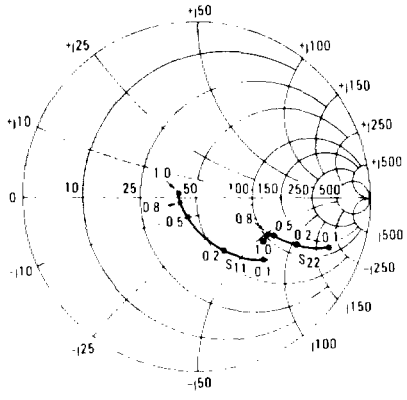


FIGURE 13 — COLLECTOR-BASE CAPACITANCE versus COLLECTOR-BASE VOLTAGE

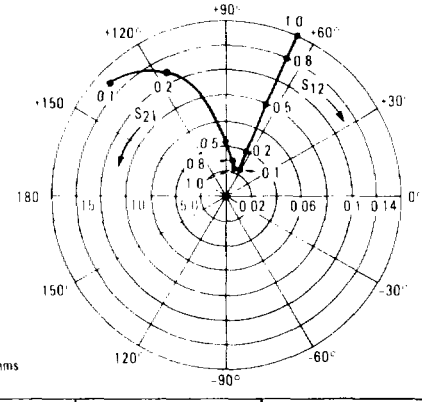


BFW92A COMMON-EMITTER S-PARAMETERS

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

V_{CE} (Volts)	I_C (mA)	f (MHz)	S_{11}		S_{21}		S_{12}		S_{22}	
			$\lvert S_{11}\rvert$	∠φ	$\lvert S_{21}\rvert$	∠φ	$\lvert S_{12}\rvert$	∠φ	$\lvert S_{22}\rvert$	∠φ
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