

25C D ■ 8235605 0004657 T ■ SIEG

T-31-17

NPN Silicon Microwave Transistor up to 2 GHz

BFR 14 B

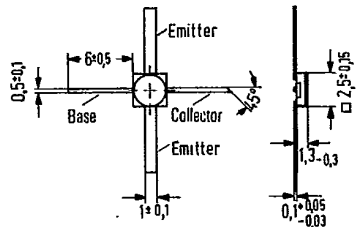
SIEMENS AKTIENGESELLSCHAFT

D

BFR 14 B is an epitaxial NPN silicon planar microwave transistor in hermetically sealed metal ceramic 100 mil package similar to TO 120. Because of its low noise figure, high gain, and low distortion, the transistor is particularly intended for use in low-noise input stages, broadband, IF, and radar amplifiers up to 4 GHz, as well as for oscillator circuits of low performance up to 6 GHz.

The ceramic package is especially suitable for thin and thick film circuits and permits Space applications. The emitter terminal is connected to the package. The transistor is marked on its package with the short designation "14 B".

Type	Mark	Ordering code
BFR 14 B	14 B	Q62702-F494



Approx. weight 0.05 g Dimensions in mm

Maximum ratings

Collector-emitter voltage	V_{CEO}	12	V
Collector-base voltage	V_{CBO}	20	V
Collector-emitter voltage ($R_{BE} \leq 50 \Omega$)	V_{CER}	20	V
Emitter-base voltage	V_{EBO}	2.5	V
Collector current	I_C	30	mA
Base current	I_B	4	mA
Junction temperature	T_j	200	°C
Storage temperature range	T_{stg}	-65 to +175	°C
Total power dissipation ($T_{amb} \leq 137^\circ\text{C}$)	P_{tot}	250	mW

Thermal resistance

Junction to ambient air when mounted on Al_2O_3 ceramics 16x25x0.6 mm or glass-fiber reinforced Teflon 40x25x1.5 mm	R_{thJA}	≤ 250	K/W
---	------------	------------	-----

— SIEMENS AKTIENGESELLSCHAFT

Static characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Collector-emitter breakdown voltage ($I_{CEO} = 500 \mu\text{A}$)	$V_{(BR)CEO}$	≥ 12	V
Collector-emitter breakdown voltage ($I_{CER} = 10 \text{ mA}; R_{BE} = 50 \Omega$)	$V_{(BR)CER}$	≥ 20	V
Emitter-base breakdown voltage ($I_{EBO} = 100 \mu\text{A}$)	$V_{(BR)EBO}$	≥ 2.5	V
Collector cutoff current ($V_{CBO} = 10 \text{ V}$)	I_{CBO}	< 50	nA
($V_{CBO} = 10 \text{ V}; T_{amb} = 150^{\circ}\text{C}$)	I_{CBO}	< 50	μA
Collector cutoff current ($V_{CB} = 20 \text{ V}; V_{BE} = 0$)	I_{CES}	< 100	μA
DC current gain ($I_C = 5 \text{ mA}; V_{CE} = 6 \text{ V}$)	h_{FE}	> 30	—

Dynamic characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Small signal current gain ($I_C = 20 \text{ mA}; V_{CE} = 6 \text{ V}; f = 1 \text{ kHz}$)	h_{fe}	75 (≥ 35)	—
($I_C = 20 \text{ mA}; V_{CE} = 6 \text{ V}; f = 1 \text{ kHz}$)	h_{fe}	75 (≥ 35)	—
Transition frequency ($I_C = 20 \text{ mA}; V_{CE} = 6 \text{ V}; f = 200 \text{ MHz}$)	f_T	6	GHz
Reverse transfer capacitance ($I_C = 1 \text{ mA}; V_{CE} = 6 \text{ V}; f = 1 \text{ MHz}$)	C_{12e}	0.45 (≤ 0.65)	pF
Noise figure ($I_C = 2 \text{ mA}; V_{CE} = 10 \text{ V};$ $f = 200 \text{ MHz}; R_g = 100 \Omega$)	NF	1.5 (≤ 2)	dB
($I_C = 3 \text{ mA}; V_{CE} = 10 \text{ V};$ $f = 2 \text{ GHz}; Z_g = Z_{g \text{ opt}}$)	NF	3.2 (≤ 4)	dB
Power gain ($I_C = 15 \text{ mA}; V_{CE} = 10 \text{ V};$ $f = 2 \text{ GHz}$)	$G_{pe \text{ opt}}$	12.5 (≥ 11)	dB

SIEMENS AKTIENGESELLSCHAFT

S parameter

Operating point: $V_{CE} = 10\text{ V}$, $I_C = 3\text{ mA}$, $Z_o = 50\ \Omega$

f (GHz)	S ₁₁	φ	S ₂₁	φ	S ₁₂	φ	S ₂₂	φ	G _{max} (dB)
0,1	0,859	- 18	6,96	164	0,018	76	1,018	- 7	-
0,2	0,855	- 34	6,90	153	0,032	66	0,946	-14	32,2
0,3	0,796	- 49	6,53	141	0,045	57	0,879	-21	27,1
0,4	0,767	- 65	6,17	131	0,054	51	0,806	-28	24,2
0,5	0,726	- 77	5,68	124	0,061	45	0,800	-31	22,8
0,6	0,700	- 92	5,36	116	0,067	40	0,721	-33	20,7
0,7	0,650	-104	5,00	108	0,071	35	0,721	-37	19,5
0,8	0,644	-116	4,66	101	0,074	31	0,677	-36	18,4
0,9	0,602	-128	4,42	94	0,076	28	0,602	-42	16,8
1,0	0,610	-136	4,11	88	0,078	26	0,653	-44	16,7
1,1	0,568	-147	3,89	83	0,080	24	0,586	-42	15,3
1,2	0,610	-153	3,61	78	0,080	23	0,566	-50	14,9
1,3	0,553	-160	3,37	74	0,081	21	0,563	-49	13,8
1,4	0,605	-167	3,16	70	0,082	19	0,558	-53	13,6
1,5	0,552	-170	2,94	65	0,081	19	0,542	-49	12,5
1,6	0,569	-176	2,83	62	0,081	19	0,537	-56	12,2
1,7	0,542	179	2,63	58	0,082	19	0,543	-54	11,4
1,8	0,568	172	2,51	54	0,082	19	0,534	-59	11,2
1,9	0,565	168	2,42	51	0,084	18	0,530	-57	10,8
2,0	0,562	163	2,33	47	0,085	19	0,512	-64	10,3

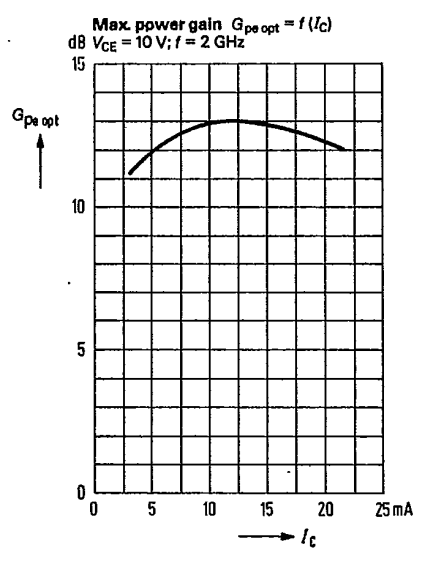
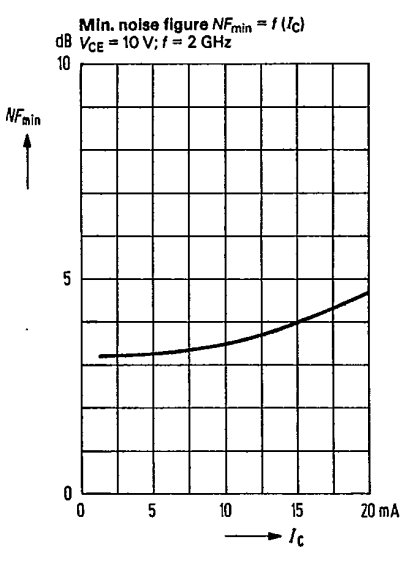
Operating point: $V_{CE} = 10\text{ V}$, $I_C = 10\text{ mA}$, $Z_o = 50\ \Omega$

0,1	0,647	- 35	18,73	155	0,014	69	0,959	-14	38,7
0,2	0,604	- 69	17,15	137	0,023	55	0,800	-25	31,1
0,3	0,551	- 97	14,60	122	0,029	49	0,680	-31	27,6
0,4	0,535	-116	12,38	111	0,033	45	0,589	-37	25,2
0,5	0,509	-132	10,52	104	0,036	44	0,578	-37	23,5
0,6	0,512	-143	9,06	97	0,039	44	0,509	-37	21,8
0,7	0,492	-154	7,98	90	0,042	43	0,512	-39	20,6
0,8	0,497	-162	7,11	85	0,044	43	0,473	-35	19,4
0,9	0,492	-172	6,36	80	0,047	43	0,414	-41	18,1
1,0	0,509	-175	5,82	76	0,050	43	0,478	-43	17,7
1,1	0,493	175	5,34	72	0,053	43	0,422	-38	16,6
1,2	0,527	174	4,91	68	0,056	43	0,410	-48	16,0
1,3	0,489	167	4,50	65	0,058	43	0,412	-46	15,1
1,4	0,546	165	4,17	62	0,061	42	0,414	-51	14,8
1,5	0,494	161	3,88	58	0,063	43	0,405	-46	13,8
1,6	0,517	158	3,69	56	0,066	43	0,399	-54	13,4
1,7	0,494	154	3,46	53	0,070	45	0,413	-50	12,8
1,8	0,531	150	3,26	49	0,073	44	0,401	-56	12,5
1,9	0,523	148	3,14	46	0,076	43	0,404	-53	12,1
2,0	0,525	144	3,00	44	0,080	43	0,388	-61	11,6

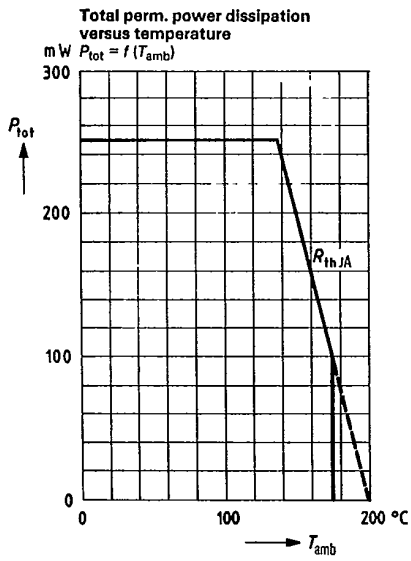
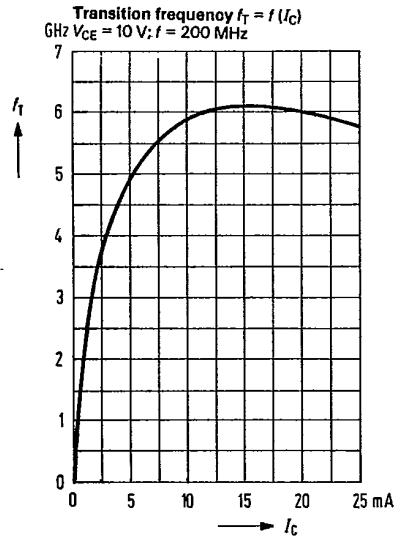
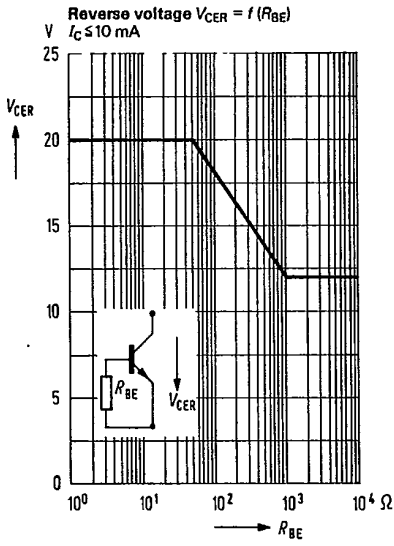
SIEMENS AKTIENGESELLSCHAFT

S parameter
 Operating point: $V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$, $Z_o = 50\ \Omega$

f (GHz)	S_{11}	φ	S_{21}	φ	S_{12}	φ	S_{22}	φ	G_{\max} (dB)
0,1	0,478	- 62	27,67	146	0,011	65	0,897	-18	37,0
0,2	0,491	-108	21,99	123	0,018	53	0,699	-26	31,0
0,3	0,492	-133	16,91	110	0,021	51	0,585	-29	27,6
0,4	0,495	-148	13,37	101	0,024	50	0,514	-33	25,1
0,5	0,495	-160	10,97	95	0,027	51	0,521	-31	23,4
0,6	0,508	-166	9,20	90	0,030	52	0,470	-31	21,7
0,7	0,498	-174	8,01	84	0,033	53	0,485	-33	20,5
0,8	0,503	-179	7,08	79	0,036	54	0,462	-28	19,3
0,9	0,510	172	6,30	75	0,039	53	0,405	-35	18,1
1,0	0,520	171	5,74	71	0,043	54	0,472	-37	17,6
1,1	0,514	163	5,26	68	0,047	54	0,427	-32	16,6
1,2	0,542	163	4,83	65	0,050	53	0,410	-42	16,0
1,3	0,512	156	4,41	61	0,053	54	0,419	-40	15,1
1,4	0,565	157	4,07	58	0,055	54	0,422	-46	14,7
1,5	0,515	152	3,80	55	0,058	53	0,421	-41	13,8
1,6	0,536	150	3,60	52	0,063	54	0,411	-49	13,4
1,7	0,515	146	3,38	49	0,066	54	0,430	-46	12,8
1,8	0,552	143	3,20	46	0,071	52	0,418	-52	12,5
1,9	0,545	141	3,06	43	0,074	52	0,422	-49	12,1
2,0	0,548	138	2,93	41	0,078	52	0,404	-57	11,7



SIEMENS AKTIENGESELLSCHAFT





LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

LittleDiode.com

Looking forward to providing you with the best possible service.