

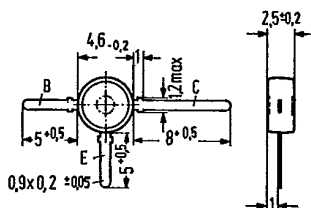
**NPN Silicon Transistor for Low-Noise
RF Broadband Amplifiers**

**BFR 34 A
2 N 6620**

SIEMENS AKTIENGESELLSCHAFT 0 D 7-31-15

BFR 34 A is an epitaxial NPN silicon planar RF transistor in a plastic package similar to TO 119 (50 B 3 DIN 41867) intended for use in RF amplifiers up to the GHz range, e. g. for low-noise input stages, broadband antenna amplifiers and oscillators. BFR 34 A is also available upon request as JEDEC type under the designation 2N6620.

Type	Ordering code
BFR 34 A	Q62702-F346-S1
2N 6620	Q68000-A4668



Approx. weight 0.25 g Dimensions in mm

Maximum ratings

Collector-emitter voltage
Collector-emitter voltage ($R_{BE} \leq 50 \Omega$)
Emitter-base voltage
Collector current
Base current
Junction temperature
Storage temperature range
Total power dissipation ($T_{amb} \leq 50^\circ\text{C}$)

	BFR 34 A 2 N 6620	
V_{CEO}	12	V
V_{CER}	20	V
V_{EBO}	2.5	V
I_C	30	mA
I_B	4	mA
T_j	150	$^\circ\text{C}$
T_{stg}	-55 to +125	$^\circ\text{C}$
P_{tot}	200	mW

Thermal resistance

Junction to ambient air
(mounted on glass fiber epoxy resin PCB
40 mm x 25 mm x 1.5 mm)

R_{thJA}	≤ 500	K/W
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Static characteristics ($T_{amb} = 25^{\circ}\text{C}$)

Collector-emitter breakdown voltage

($I_{CEO} = 500 \mu\text{A}$) $V_{(BR)CEO}$ BFR 34 A
2 N 6620

> 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

DC current gain

($I_C = 5 \text{ to } 25 \text{ mA}$; $V_{CE} = 6 \text{ V}$) h_{FE} ≥ 25

-

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

Small signal current gain

($I_C = 5 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 1 \text{ kHz}$) h_{fe}

70

-

Transition frequency

($I_C = 200 \text{ mA}$; $V_{CE} = 10 \text{ V}$; $f = 200 \text{ MHz}$) f_T

5

GHz

Reverse transfer capacitance

($I_C = 1 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 1 \text{ MHz}$) C_{12e}

0.4

pF

Collector-base capacitance

($V_{CBO} = 10 \text{ V}$, $f = 1 \text{ MHz}$) C_{CBO}

0.75

pF

Noise figure

($I_C = 2 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 10 \text{ MHz}$; $R_g = 75 \Omega$)

NF

1.8

dB

($I_C = 2 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 200 \text{ MHz}$; $R_g = 75 \Omega$)

NF

2

dB

($I_C = 2 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 800 \text{ MHz}$; $R_g = 60 \Omega$)

NF

2

dB

($I_C = 3 \text{ mA}$; $V_{CE} = 10 \text{ V}$; $f = 2 \text{ GHz}$; $Z_g = Z_{g \text{ opt}}$)

NF

4

dB

Power gain

($I_C = 15 \text{ mA}$; $V_{CE} = 6 \text{ V}$; $f = 800 \text{ MHz}$; $R_g = 60 \Omega$) G_{ps}

14

dB

Output voltage

(three tone modulation f approx. 800 MHz)($I_C = 15 \text{ mA}$, $V_{CE} = 6 \text{ V}$; $d_{IM} = 60 \text{ dB}$; $R_g = R_L = 75 \Omega$) V_o

140

mV

25C D 8235605 0004672 6 SIEG

25C 04672 D T-31-15

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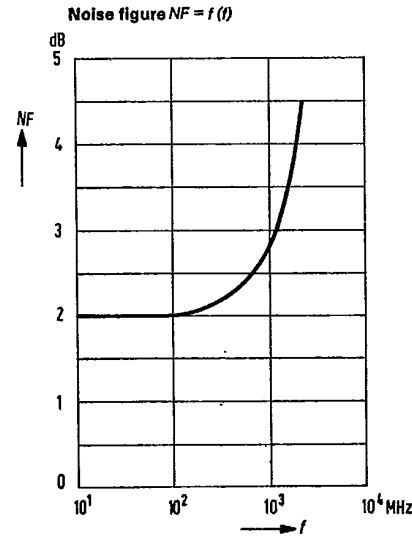
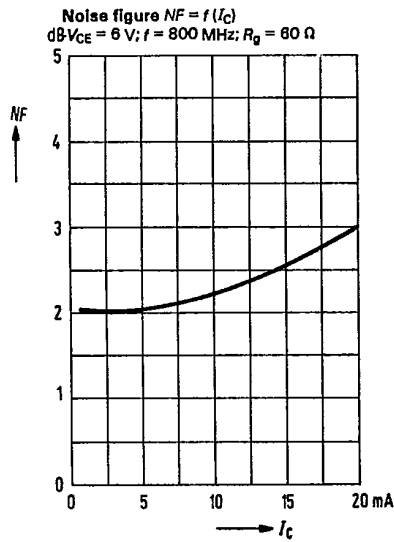
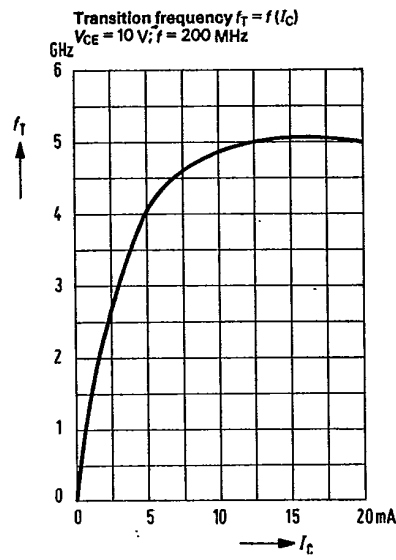
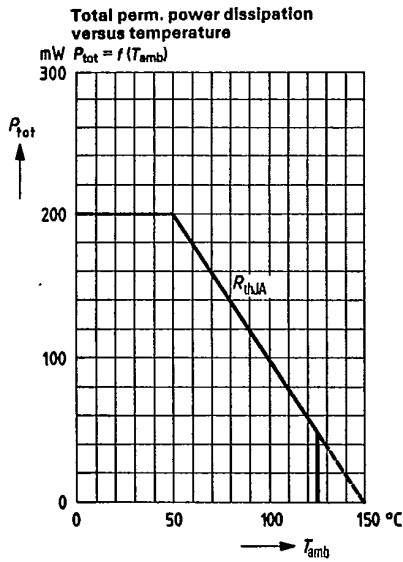
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S parameter

Operating point: $V_{CE} = 6 \text{ V}$, $I_C = 5 \text{ mA}$, $Z_o = 50 \Omega$

f (GHz)	S_{11}	φ	S_{21}	φ	S_{12}	φ	S_{22}	φ
0,1	0,794	- 27	13,08	153	0,021	75	0,930	-13
0,2	0,663	- 52	11,38	136	0,037	62	0,843	-20
0,3	0,535	- 71	9,11	121	0,047	58	0,697	-27
0,4	0,420	- 89	7,70	110	0,054	57	0,691	-27
0,5	0,385	-103	6,50	103	0,062	58	0,595	-26
0,6	0,306	-113	5,57	97	0,068	58	0,577	-30
0,7	0,287	-131	4,95	91	0,076	58	0,546	-31
0,8	0,272	-138	4,35	86	0,084	58	0,539	-33
0,9	0,254	-153	3,96	83	0,089	60	0,543	-34
1,0	0,264	-158	3,51	79	0,095	60	0,520	-33
1,1	0,256	-169	3,29	75	0,104	60	0,502	-37
1,2	0,268	-175	3,03	72	0,111	61	0,504	-38
1,3	0,271	177	2,82	69	0,120	61	0,488	-42
1,4	0,280	171	2,60	66	0,125	60	0,508	-42
1,5	0,236	158	2,30	62	0,121	53	0,439	-46
1,6	0,314	165	2,36	60	0,139	62	0,467	-46
1,7	0,328	161	2,21	59	0,148	64	0,469	-46
1,8	0,345	157	2,07	54	0,154	61	0,439	-50
1,9	0,354	156	1,99	52	0,162	62	0,452	-53
2,0	0,374	153	1,90	49	0,169	60	0,435	-55

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