BFY 44
BFY 70

SILIZIUM - NPN - PLANAR - EPITAXIAL - TRANSISTOREN
für Senderstufen mittlerer Leistung

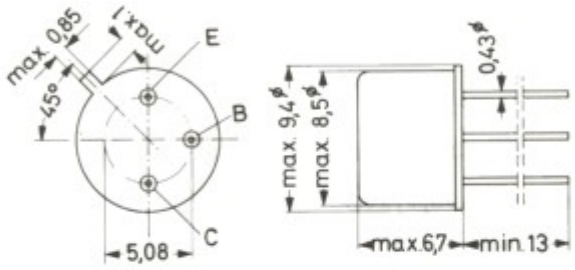
Mechanische Daten:

Gehäuse: Metall, JEDEC TO-39, 5 C 3 nach DIN 41 873

Der Kollektor ist mit dem Metallgehäuse verbunden.

Für isolierten Einbau und zur Erzielung niedriger Wärmewiderstände ist entsprechendes Montagezubehör unter der Typenbezeichnung 56 218 getrennt lieferbar.

Maßangaben in mm.



Kurzdaten:

			BFY 44	BFY 70	
Kollektor-Sperrspannung	$U_{CB\ 0}$	= max.	80	60	V
Kollektor-Emitter-Sperrspannung	$U_{CE\ 0}$	= max.	60	40	V
Kollektorstrom	I_C	= max.	1		A
Gesamtverlustleistung bei ϑ_G = 100 °C	P_{tot}	= max.	2,85		W
Sperrschichttemperatur	ϑ_J	= max.	200		°C
Gleichstromverstärkung bei U_{CB} = 10 V, $-I_E$ = 150 mA	B	=	20		
Transit-Frequenz bei U_{CE} = 10 V, $-I_E$ = 100 mA	f_T	=	210		MHz
Ausgangsleistung } bei f = 180 MHz	P_2	≥	1,7	1,2	W
Leistungsverstärkung } bei f = 180 MHz	V_p	≥	6	6	dB
und	U_{bat}	=	40	28	V

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Absolute Grenzwerte: (gültig bis $\vartheta_{J\ max}$)

			BFY 44	BFY 70	
Kollektor-Sperrspannung bei $I_E = 0$:	$U_{CB\ 0}$	= max.	80	60	V
Kollektor-Emitter-Sperrspannung bei $I_B = 0$:	$U_{CE\ 0}$	= max.	60	40	V
Emitter-Sperrspannung bei $I_C = 0$:	$U_{EB\ 0}$	=	4		V
Kollektorstrom:	I_C	= max.	1,0		A
Basisstrom:	I_B	= max.	0,2		A
Emitterstrom:	$-I_E$	= max.	1,2		A
Gesamtverlustleistung:	P_{tot}	= max.	5		W[1])
Sperrschichttemperatur:	ϑ_J	= max.	200		°C
Lagerungstemperatur:	ϑ_S	= min.	-65		°C
	ϑ_S	= max.	200		°C

Wärmewiderstand:

Wärmewiderstand zwischen Sperrschicht und Gehäuse: $R_{th\ G} \leqq 35$ grd/W

Wärmewiderstand bei Verwendung des Montagezubehörs 56 218 und eines Kühlbleches von 12,5 cm^2 mit einer zentralen Bohrung von 7,8 mm ø ($R_{th\ K} = 35$ grd/W)

bei Montagefolge a
(Oberplatte - Unterplatte - Isolierscheibe - Kühlblech): $R_{th\ U} \leqq 80$ grd/W

bei Montagefolge b
(Oberplatte - Isolierscheibe - Kühlblech): $R_{th\ U} \leqq 100$ grd/W

bei Montagefolge c
(Oberplatte - Kühlblech; nichtisolierte Montage): $R_{th\ U} \leqq 75$ grd/W

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[1]) siehe Grenzkurve $P_{tot\ max} = f(\vartheta_G, \vartheta_U)$

BFY 44
BFY 70

Kennwerte: (bei ϑ_J = 25 °C, sofern nicht anders angegeben)

			BFY 44	BFY 70	
Kollektor-Reststrom					
bei U_{CB} = 28 V, I_E = 0:	$I_{CB\ 0}$	=		3(≦500)	nA +)
bei U_{CB} = 28 V, I_E = 0, ϑ_U=150°C:	$I_{CB\ 0}$	=		1,5(≦ 50)	µA
bei U_{CB} = 40 V, I_E = 0:	$I_{CB\ 0}$	=	3(≦500)		nA +)
bei U_{CB} = 40 V, I_E = 0, ϑ_U=150°C:	$I_{CB\ 0}$	=	1,5(≦ 50)		µA
Emitter-Reststrom					
bei U_{EB} = 1 V, I_C = 0:	$I_{EB\ 0}$	=	1(≦500)	1(≦500)	nA
Kollektor-Emitter-Durchbruchspannung					
bei I_C = 0,5 mA, U_{BE} = 0:	$U_{(BR)\ CE\ S}$	≧	80	60	V +)
bei I_C = 1 mA, R_{BE} = 10 Ω:	$U_{(BR)\ CE\ R}$	≧	80	60	V +)
bei I_C = 10 mA, I_B = 0:	$U_{(BR)\ CE\ 0}$	≧	60	40	V +)
Emitter-Durchbruchspannung					
bei I_E = 0,1 mA, I_C = 0:	$U_{(BR)\ EB\ 0}$	=	6(≧ 4)	6(≧ 4)	V +)
Kollektor-Emitter-Restspannung					
bei I_C = 500 mA, I_B = 100 mA:	$U_{CE\ sat}$	=	0,4(≦0,7)		V +)
Basisspannung					
bei I_C = 500 mA, I_B = 100 mA:	$U_{BE\ sat}$	=	1,0(≦1,5)		V +)
Gleichstromverstärkung					
bei $-I_E$ = 500 mA, U_{CB} = 5 V:	B	=	20(≧ 5)		+)
bei $-I_E$ = 150 mA, U_{CB} = 10 V:	B	=	20		
Transit-Frequenz					
bei U_{CE} = 10 V, $-I_E$ = 100 mA:	f_T	=	210		MHz
Kollektorkapazität					
bei U_{CB} = 28 V, I_E = 0, f=1MHz:	C_{22b}	=		7(≦ 12)	pF
bei U_{CB} = 40 V, I_E = 0, f=1MHz:	C_{22b}	=	7(≦ 12)		pF
Rückwirkungs-Zeitkonstante					
bei U_{CB}=20V, $-I_E$=30mA, f=10,7MHz:	$\left\lvert\frac{h_{12b}}{2\pi f}\right\rvert$	=	18(≦ 35)		ps

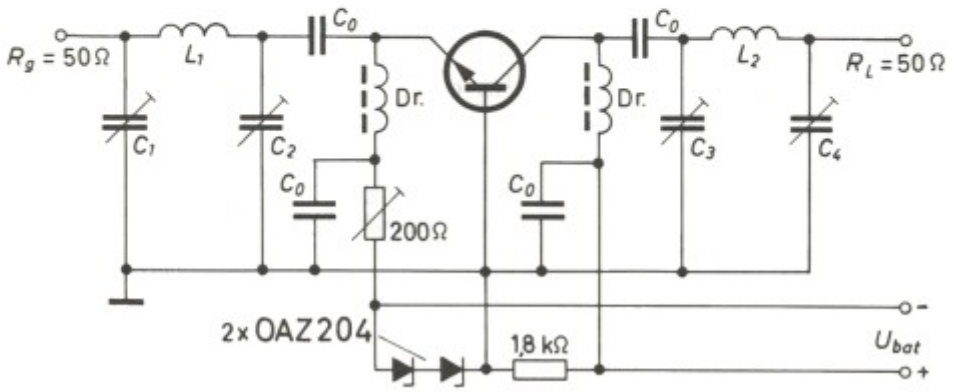
Kleinsignal-Koeffizienten bei U_{CB} = 24 V, $-I_E$ = 150 mA, f = 180 MHz:

g_{11e} = 96 mS	g_{11b} = 48 mS	g_{22b} = 4,3 mS	$\lvert y_{21b}\rvert$ = 98 mS
$-b_{11e}$ = 36 mS	$-b_{11b}$ = 135 mS	b_{22b} = 15 mS	φ_{21b} = 62 °

+) AQL = 0,65 %

BFY 44
BFY 70

HF-Leistungsverstärker, f = 100 bzw. 180 MHz:

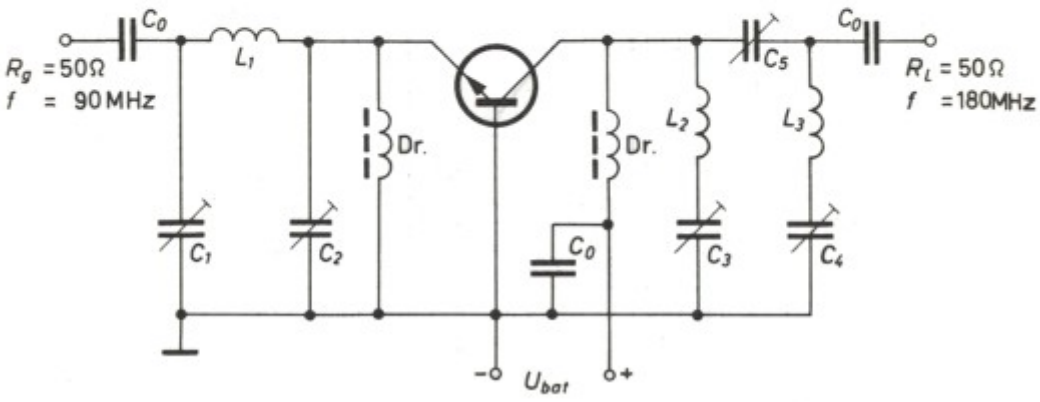


	f = 100 MHz	f = 180 MHz
C_0:	3,3 nF	1 nF
C_1, C_2, C_4:	≦ 25 pF + 22 pF	≦ 25 pF
C_3:	≦ 25 pF	≦ 25 pF
L_1:	2 Wdgn. 1,0 CuL, 12 mm ø	1 Wdg. 1,2 CuL, 12 mm ø
L_2:	3,5 Wdgn. 1,0 CuL, 12 mm ø	2 Wdgn. 1,2 CuL, 12 mm ø

		BFY 44	BFY 70	
f	=	180	180	MHz
U_{bat}	=	40	28	V
I_C	=	107	107	mA
P_1	=	425	300	mW
P_2	=	2,1 (≧1,7)	1,5 (≧1,2)	W
V_p	=	7 (≧ 6)	7 (≧ 6)	dB
η	=	50 (≧ 40)	50 (≧ 40)	%

BFY 44
BFY 70

Frequenzverdoppler von f = 90 MHz auf f = 180 MHz:

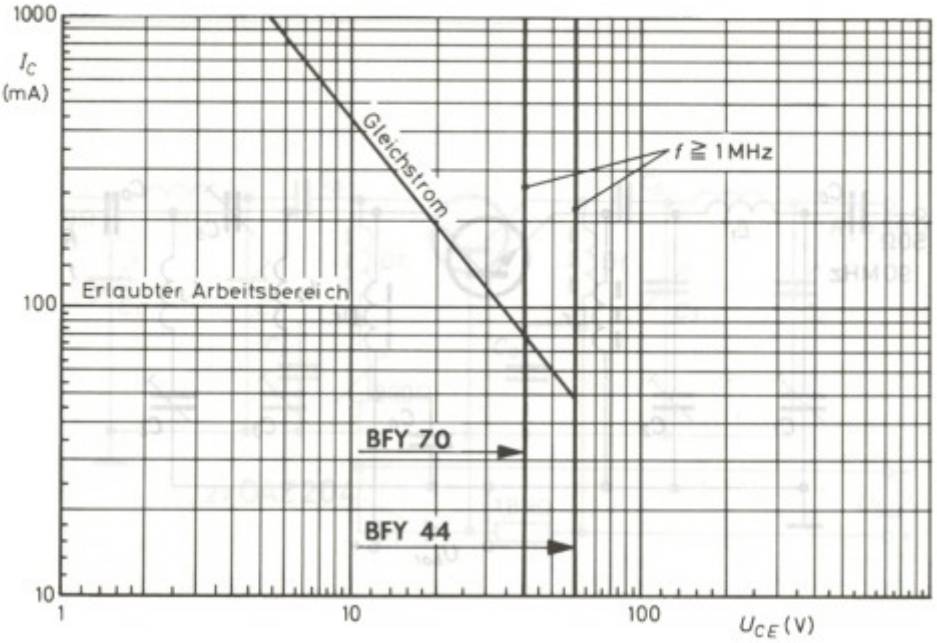


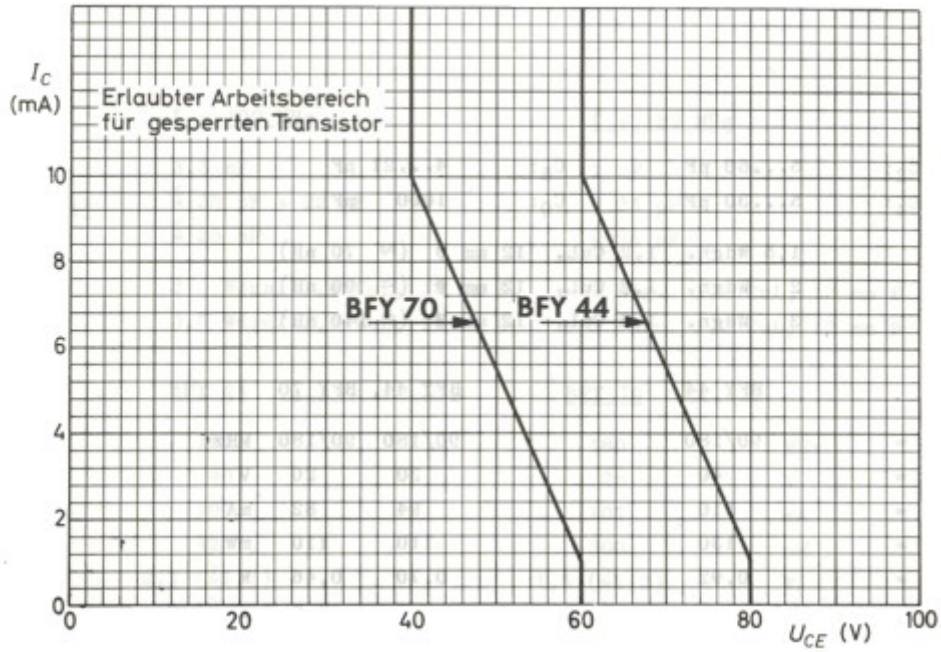
C_1, C_2:	5...60 pF	C_5:	4...21 pF
C_3, C_4:	5...30 pF	C_0:	1000 pF

L_1:	1,5 Wdgn.	1,2 CuL,	12 mm ø	(≈ 70 nH)
L_2:	2 Wdgn.	1,2 CuL,	12 mm ø	(≈ 90 nH)
L_3:	3 Wdgn.	1,2 CuL,	12 mm ø	(≈ 140 nH)

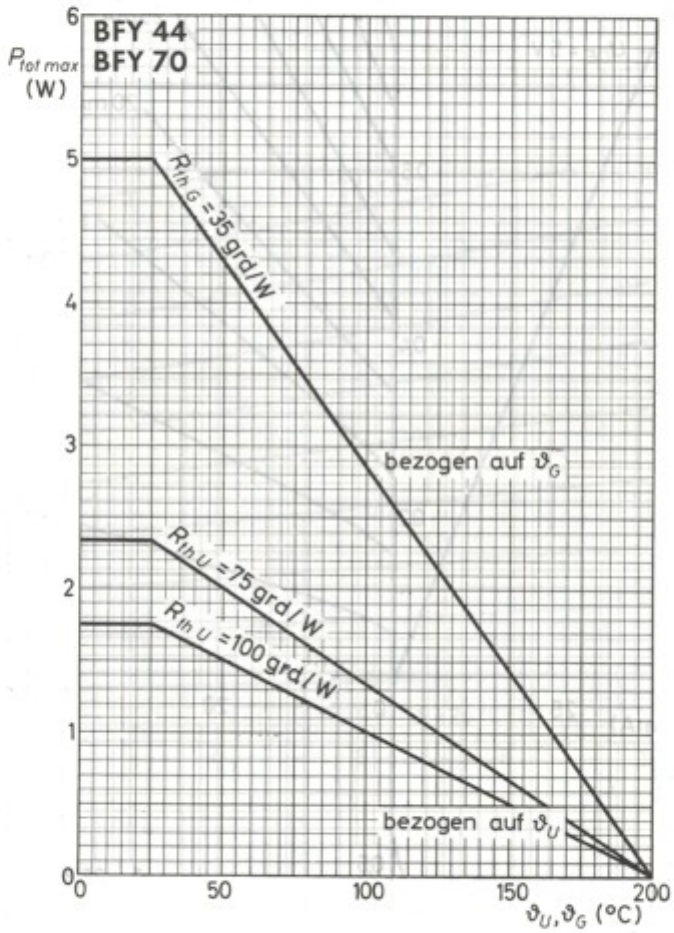
		BFY 44	BFY 44, BFY 70		
f	=	90/180	90/180	90/180	MHz
U_{bat}	=	40	30	20	V
I_C	=	110	94	82	mA
P_1	=	130	110	110	mW
P_2	=	0,92	0,70	0,46	W
V_p	=	8,5	8	6,2	dB
η	=	21	25	28	%

BFY 44
BFY 70

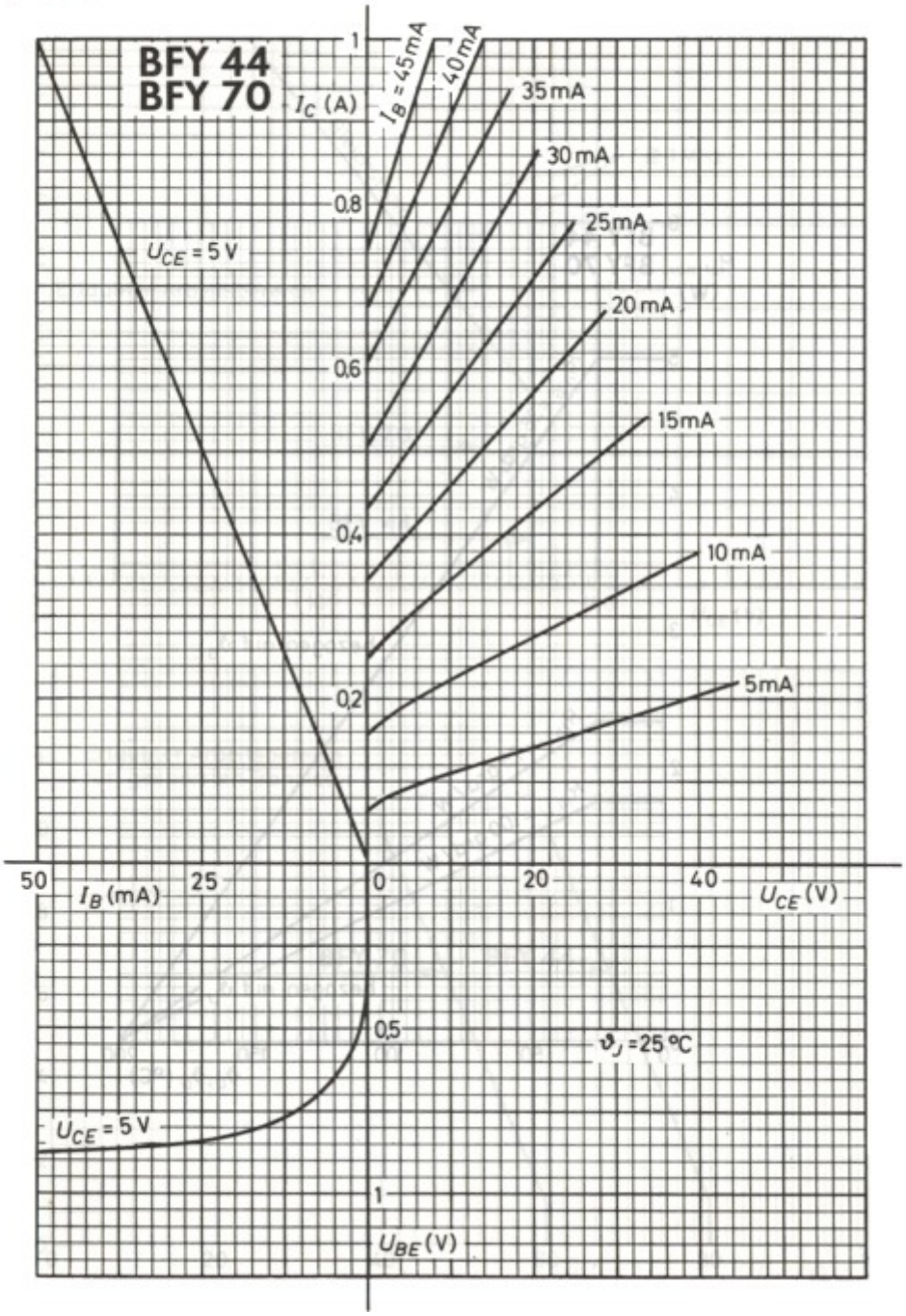

1000
I_C
(mA)
100
10
1
10
100
U_{CE} (V)
Gleichstrom
$f \geqq 1$ MHz
Erlaubter Arbeitsbereich
BFY 70
BFY 44


I_C
(mA)
Erlaubter Arbeitsbereich
für gesperrten Transistor
10
8
6
4
2
0
0
20
40
60
80
100
U_{CE} (V)
BFY 70
BFY 44

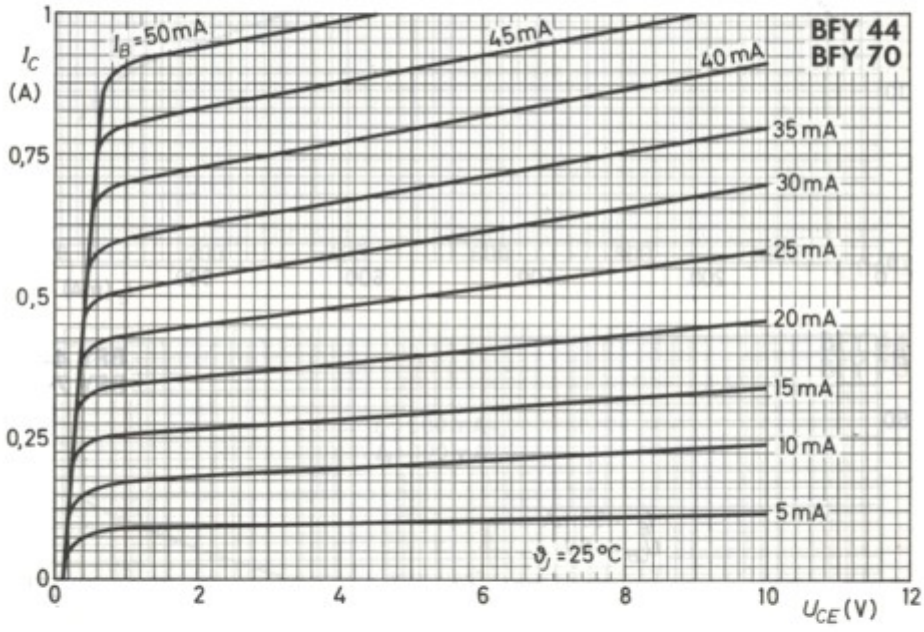
BFY 44
BFY 70


BFY 44
BFY 70
$P_{tot\,max}$ (W)
$R_{th\,G}$ = 35 grd / W
$R_{th\,U}$ = 75 grd / W
$R_{th\,U}$ = 100 grd / W
bezogen auf ϑ_G
bezogen auf ϑ_U
ϑ_U, ϑ_G (°C)
0
1
2
3
4
5
6
0
50
100
150
200

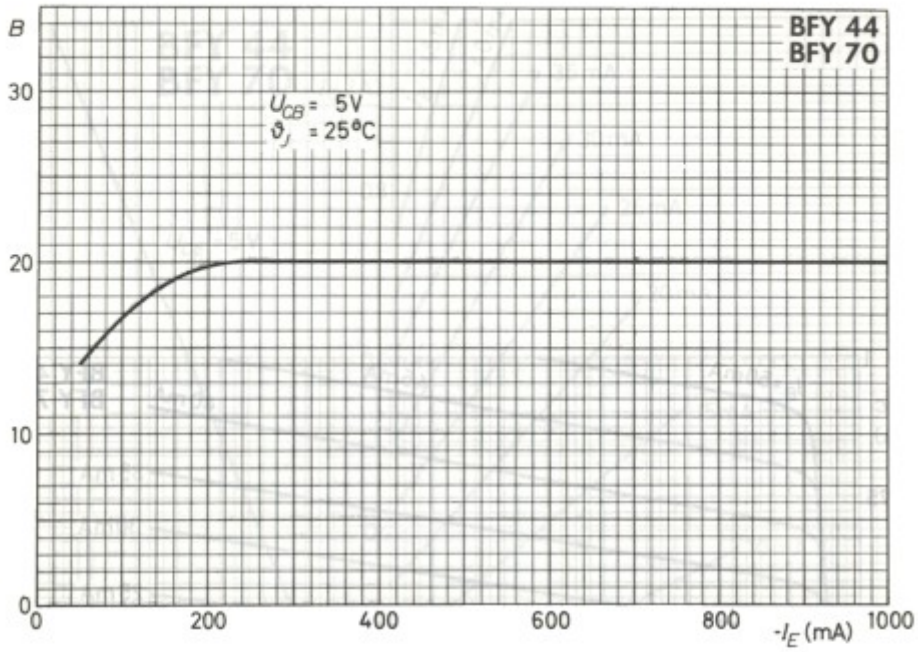
BFY 44
BFY 70

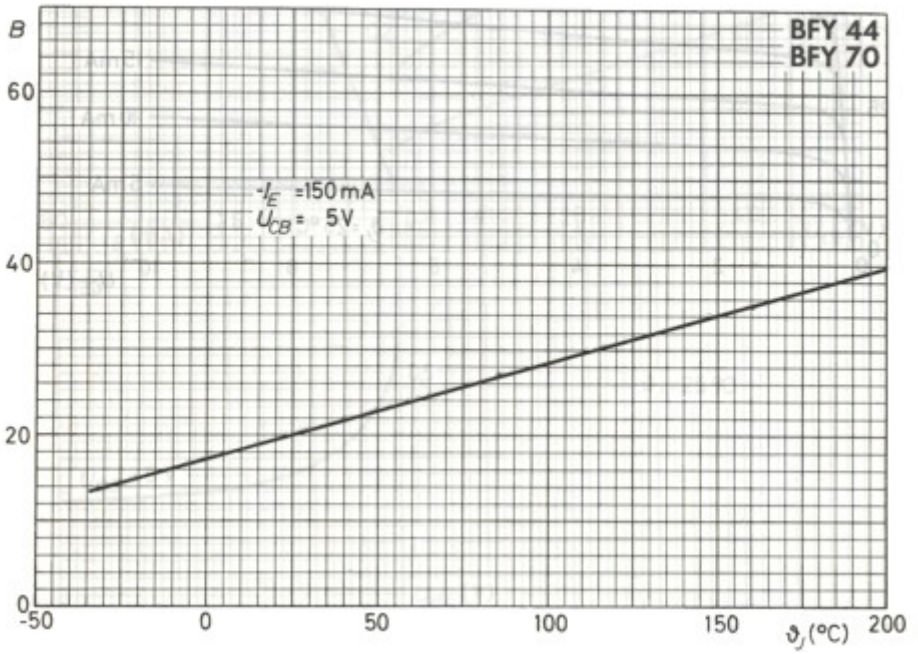

BFY 44
BFY 70
I_C (A)
I_B = 45mA
40mA
35mA
30 mA
25mA
20 mA
15mA
10 mA
5mA
U_{CE} = 5 V
1
0.8
0.6
0.4
0.2
50
I_B (mA)
25
0
20
40
U_{CE} (V)
0.5
ϑ_j = 25 °C
U_{CE} = 5 V
1
U_{BE} (V)

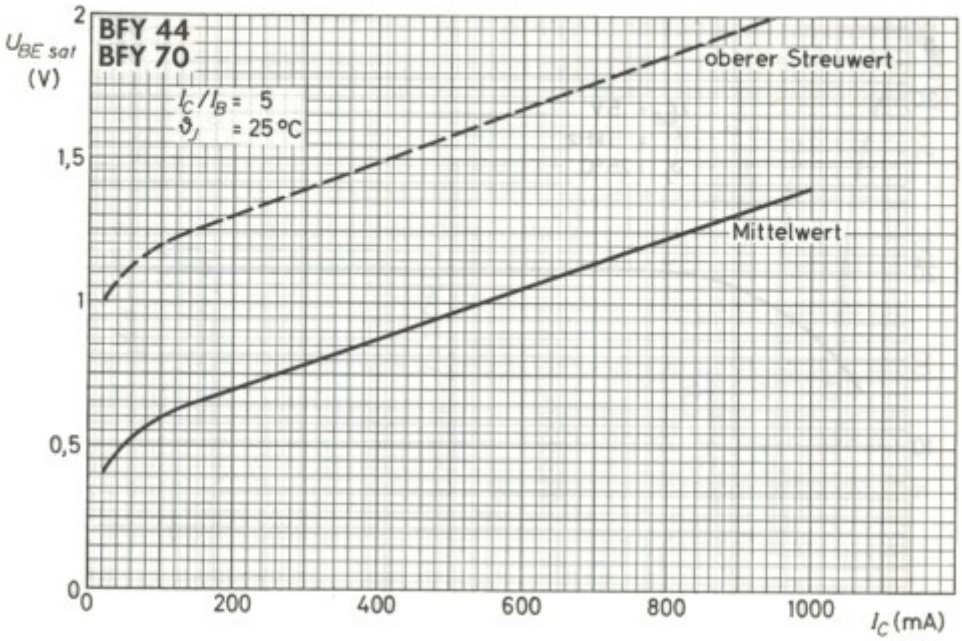
BFY 44
BFY 70

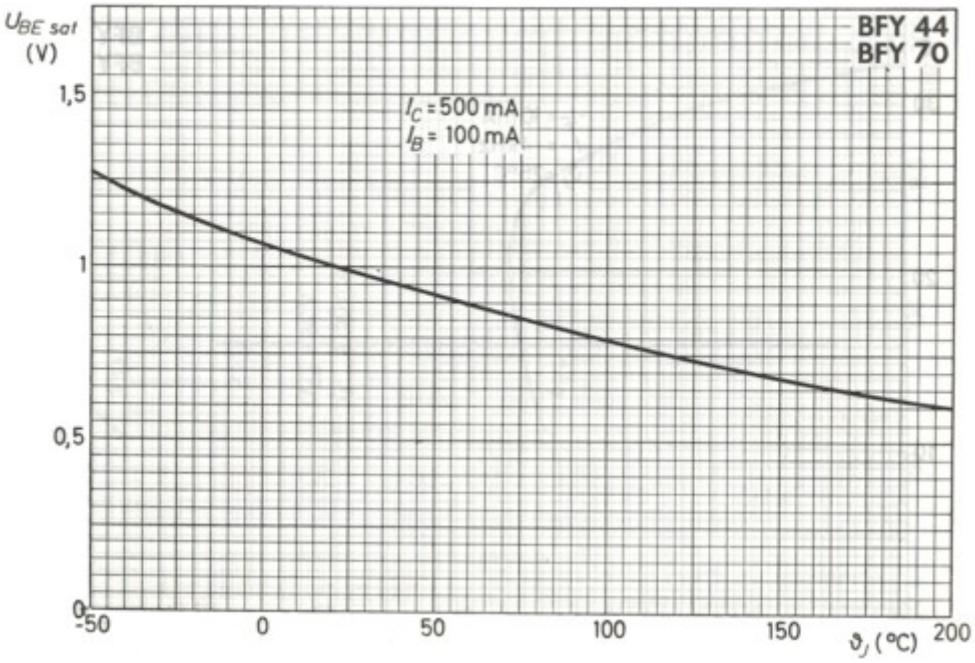

BFY 44
BFY 70
I_C (A)
1
0,75
0,5
0,25
0
I_B=50mA
45mA
40mA
35mA
30mA
25mA
20mA
15mA
10mA
5mA
ϑ_j=25°C
0
2
4
6
8
10
12
U_{CE}(V)

BFY 44
BFY 70

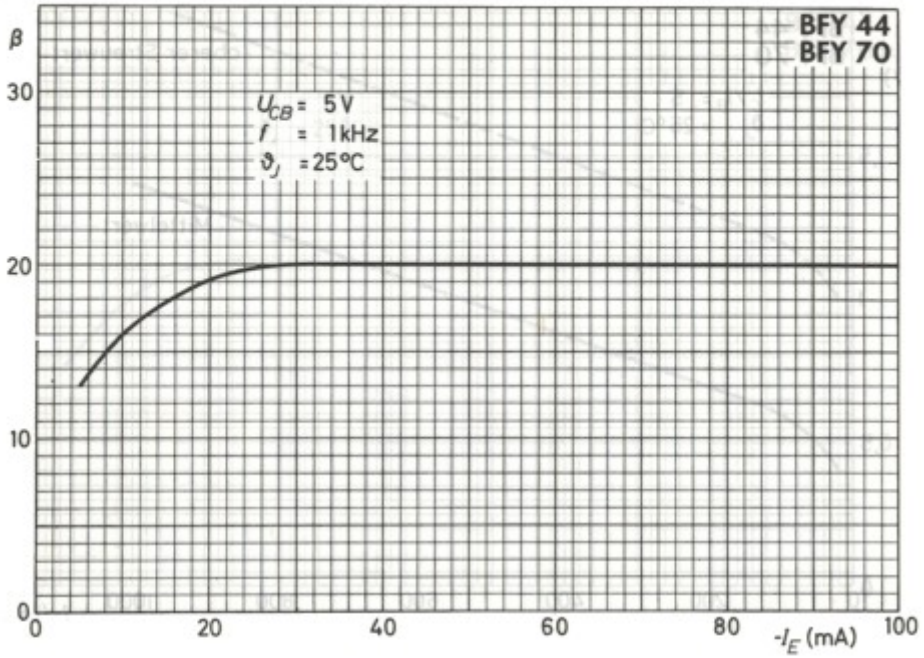

B
30
20
10
0
0
200
400
600
800
1000
$-I_E$ (mA)
BFY 44
BFY 70
U_{CB} = 5V
ϑ_j = 25°C

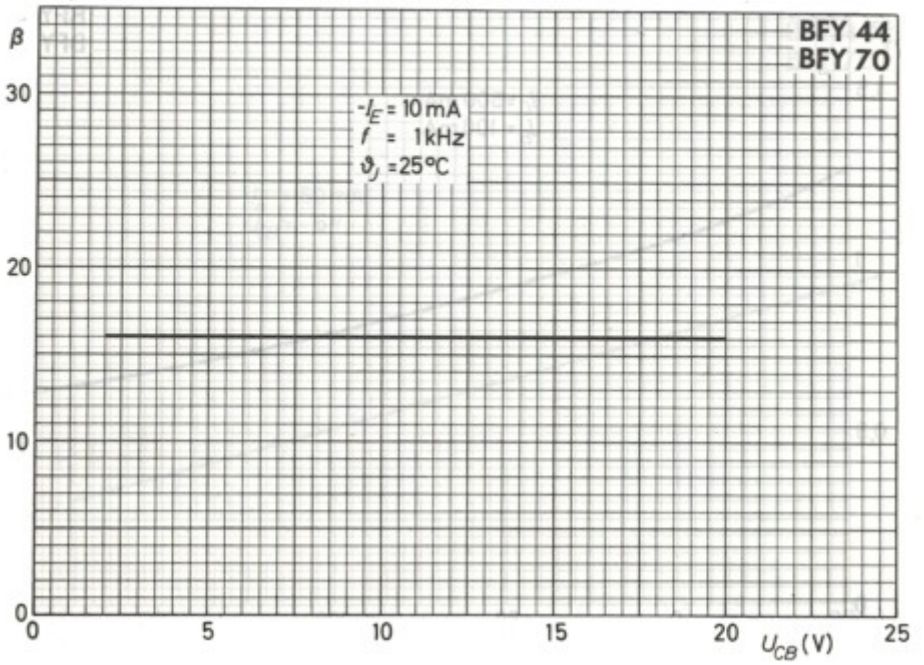

B
60
40
20
0
-50
0
50
100
150
200
ϑ_j (°C)
BFY 44
BFY 70
$-I_E$ = 150 mA
U_{CB} = 5V

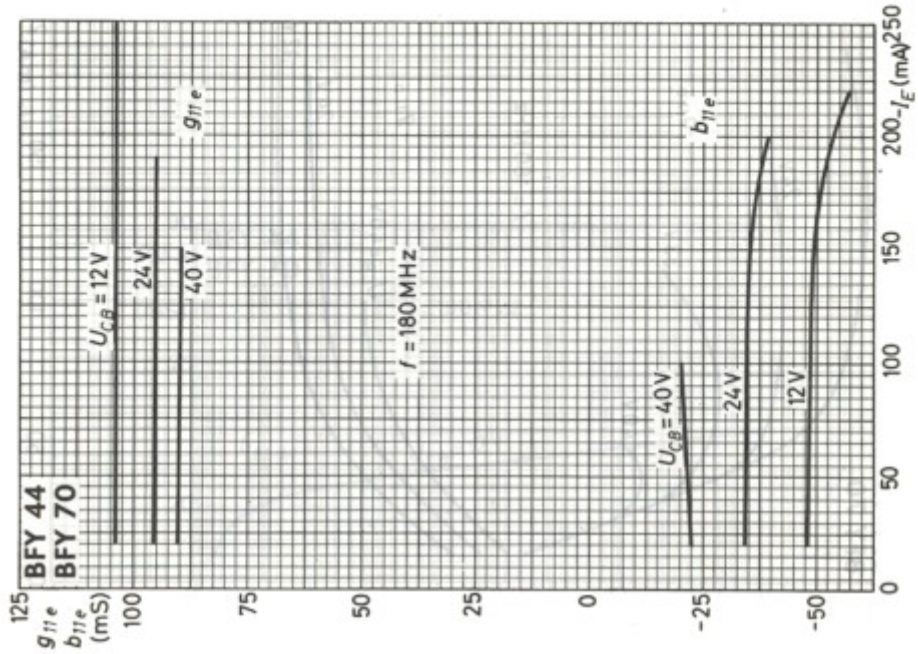

BFY 44
BFY 70
$U_{BE\,sat}$ (V)
I_C/I_B = 5
ϑ_j = 25 °C
oberer Streuwert
Mittelwert
2
1,5
1
0,5
0
0
200
400
600
800
1000
I_C (mA)

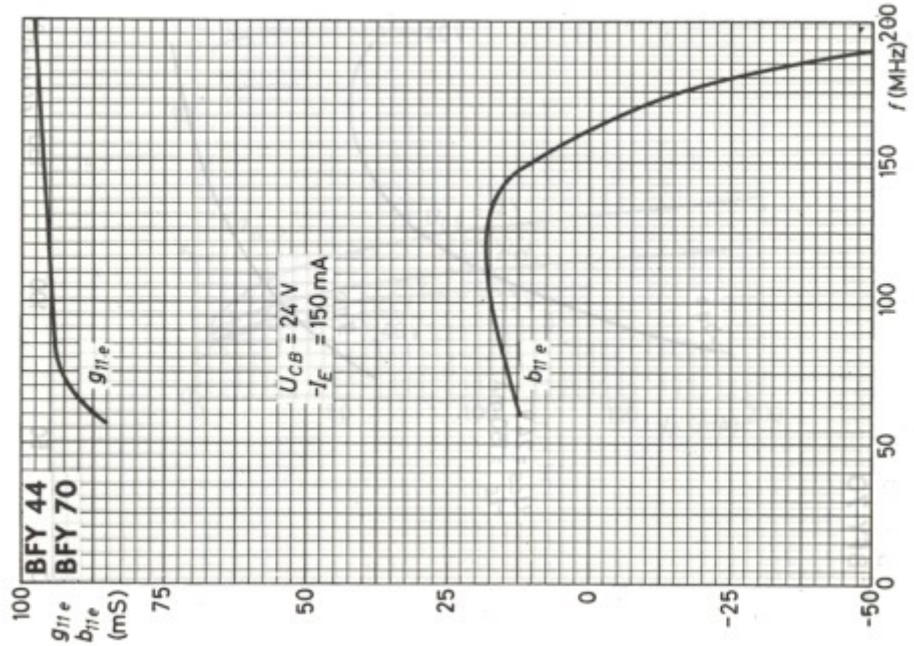

$U_{BE\,sat}$ (V)
BFY 44
BFY 70
I_C = 500 mA
I_B = 100 mA
1,5
1
0,5
0
-50
0
50
100
150
200
ϑ_j (°C)

BFY 44
BFY 70

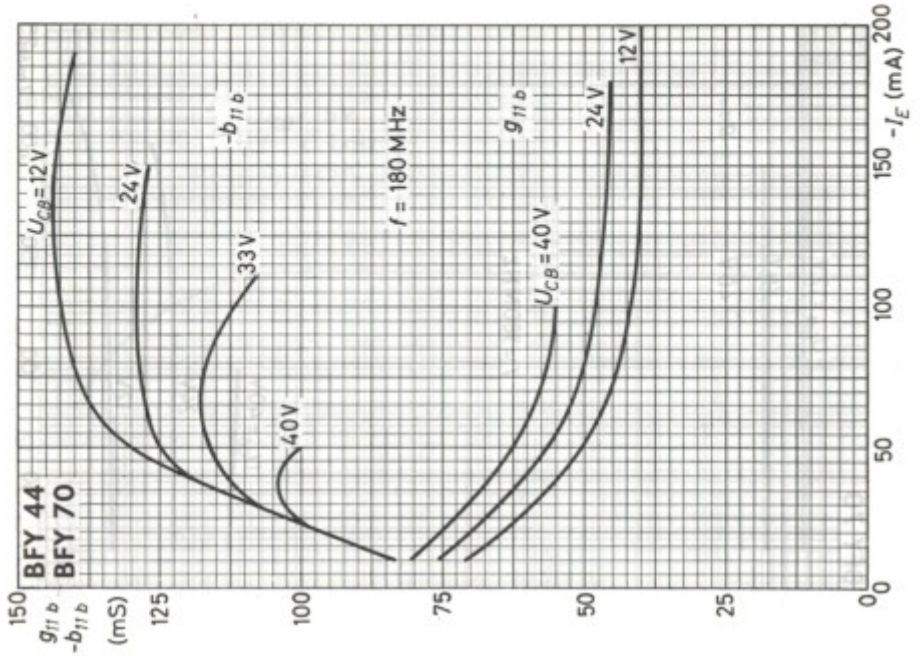

β
30
20
10
0
0
20
40
60
80
100
$-I_E$ (mA)
BFY 44
BFY 70
U_{CB} = 5 V
f = 1 kHz
ϑ_j = 25 °C

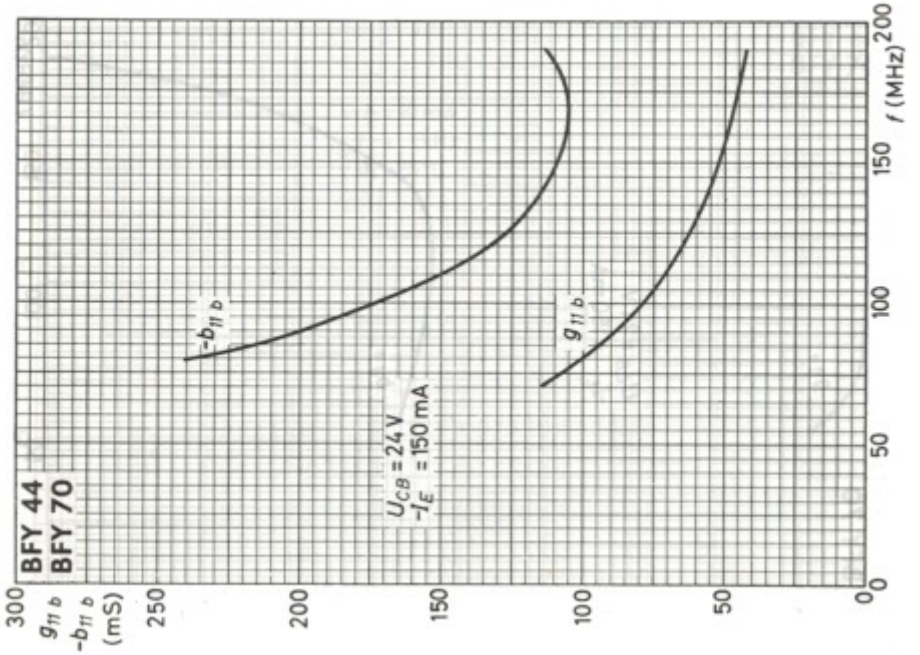

β
30
20
10
0
0
5
10
15
20
25
U_{CB} (V)
BFY 44
BFY 70
$-I_E$ = 10 mA
f = 1 kHz
ϑ_j = 25 °C


BFY 44
BFY 70
g_{11e}
b_{11e} (mS)
125
100
75
50
25
0
-25
-50
U_{CB} = 12 V
24 V
40 V
g_{11e}
f = 180 MHz
U_{CB} = 40 V
24 V
12 V
b_{11e}
0
50
100
150
200
$-I_E$ (mA)250

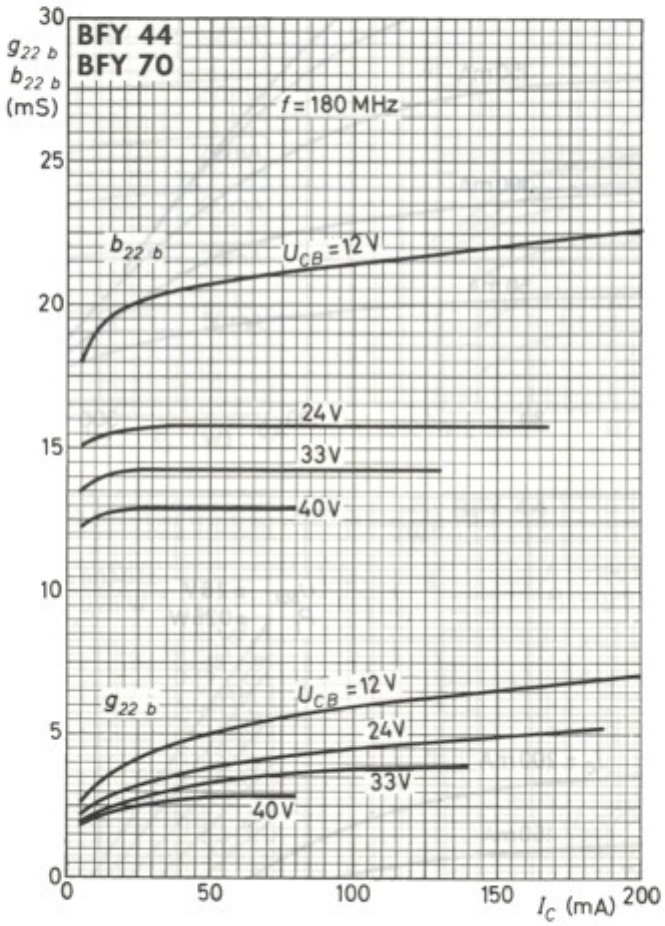

BFY 44
BFY 70
g_{11e}
b_{11e} (mS)
100
75
50
25
0
-25
-50
g_{11e}
U_{CB} = 24 V
$-I_E$ = 150 mA
b_{11e}
0
50
100
150
f (MHz)200

BFY 44
BFY 70

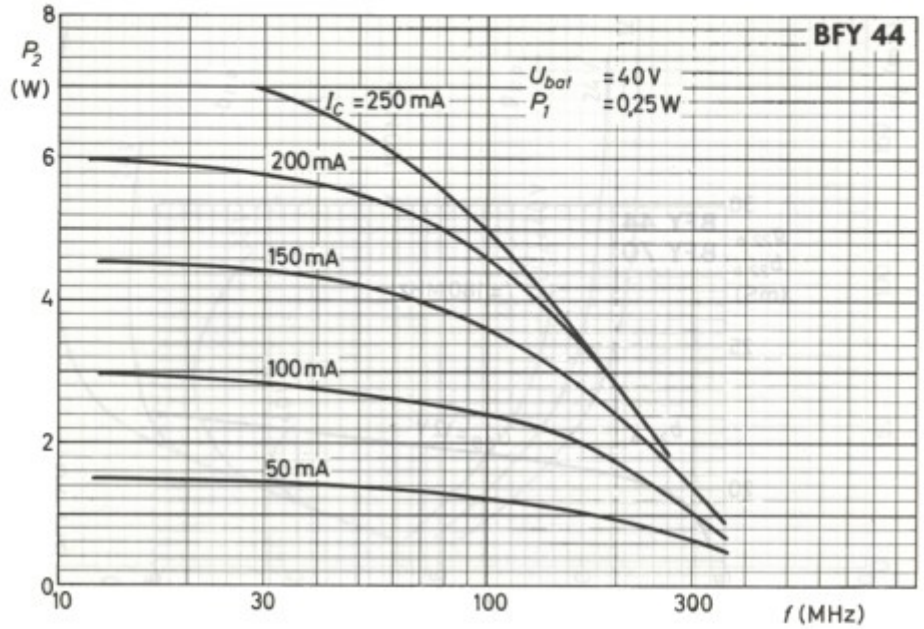

BFY 44
BFY 70
U_{CB}=12 V
24 V
33 V
40 V
$-b_{11\,b}$
$g_{11\,b}$
f = 180 MHz
U_{CB}=40 V
24 V
12 V
$-I_E$ (mA)
$g_{11\,b}$
$-b_{11\,b}$ (mS)

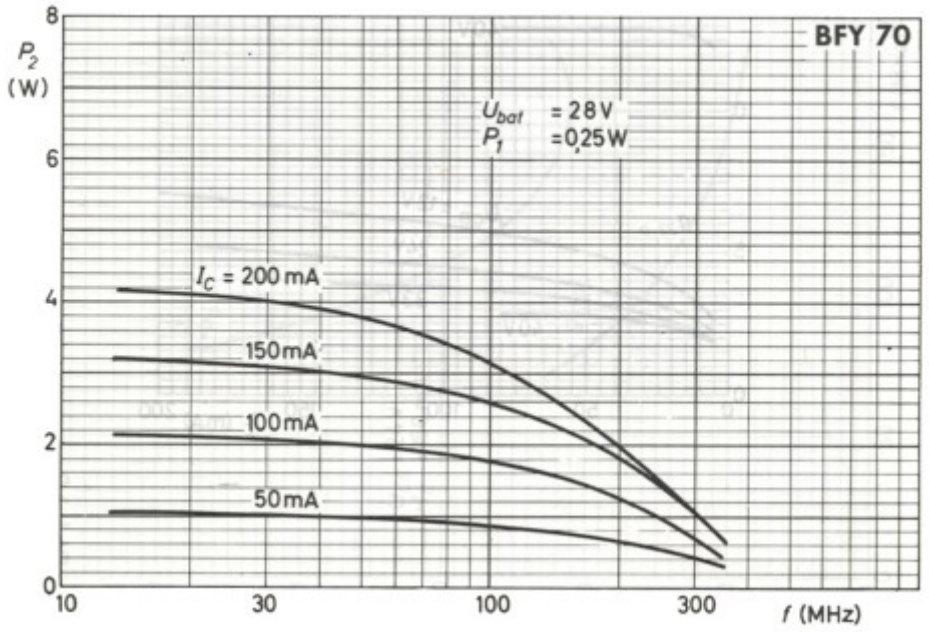

BFY 44
BFY 70
$-b_{11\,b}$
$g_{11\,b}$
U_{CB} = 24 V
$-I_E$ = 150 mA
f (MHz)
$g_{11\,b}$
$-b_{11\,b}$ (mS)

BFY 44
BFY 70

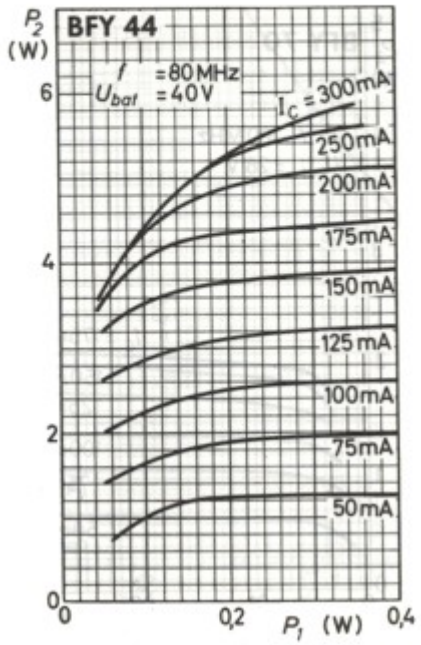

BFY 44
BFY 70
$g_{22\,b}$
$b_{22\,b}$
(mS)
f = 180 MHz
$b_{22\,b}$
U_{CB} = 12 V
24 V
33 V
40 V
$g_{22\,b}$
U_{CB} = 12 V
24 V
33 V
40 V
30
25
20
15
10
5
0
0
50
100
150
200
I_C (mA)

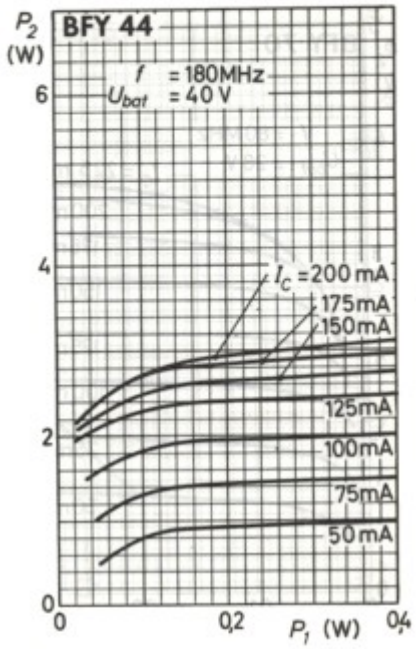
BFY 44
BFY 70

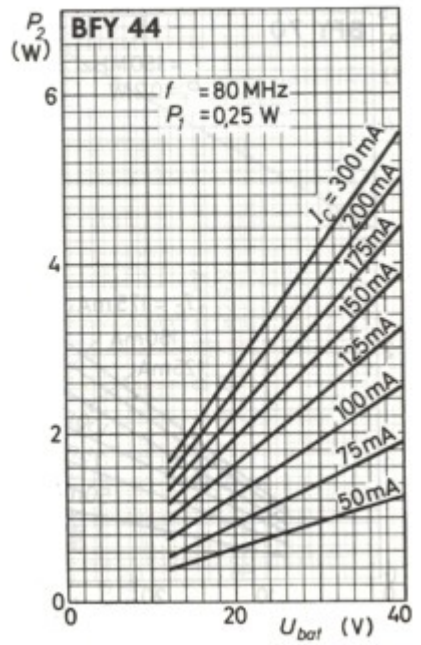

BFY 44
P_2 (W)
U_{bat} = 40 V
P_1 = 0,25 W
I_C = 250 mA
200 mA
150 mA
100 mA
50 mA
0
2
4
6
8
10
30
100
300
f (MHz)

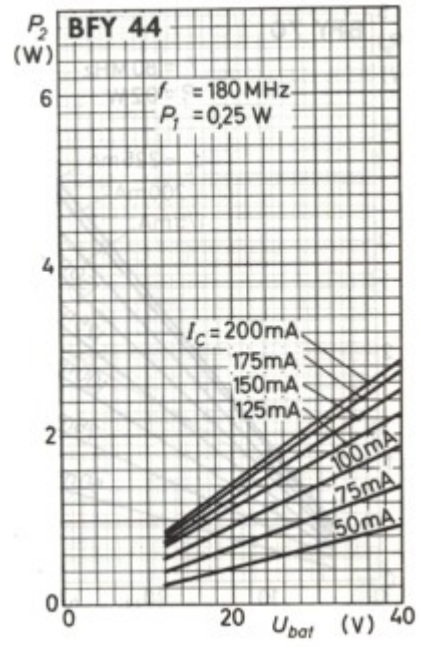

BFY 70
P_2 (W)
U_{bat} = 28 V
P_1 = 0,25 W
I_C = 200 mA
150 mA
100 mA
50 mA
0
2
4
6
8
10
30
100
300
f (MHz)

BFY 44
BFY 70

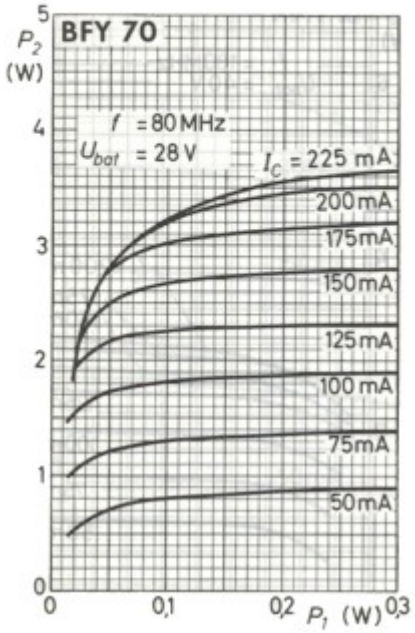

BFY 44
P_2 (W)
f = 80 MHz
U_{bat} = 40 V
I_C = 300 mA
250 mA
200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
0
2
4
6
0,2
0,4
P_1 (W)

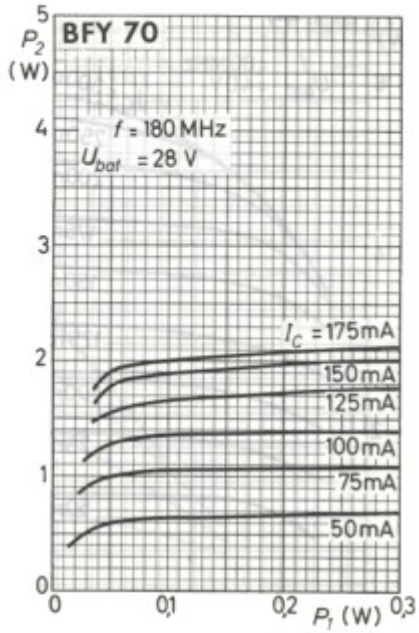

BFY 44
P_2 (W)
f = 180 MHz
U_{bat} = 40 V
I_C = 200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
0
2
4
6
0,2
0,4
P_1 (W)

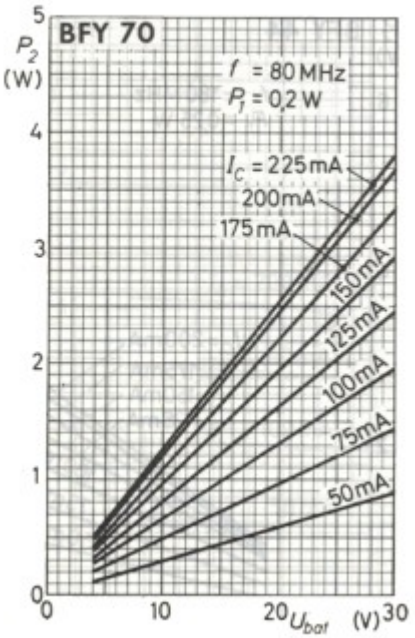

BFY 44
P_2 (W)
f = 80 MHz
P_1 = 0,25 W
I_C = 300 mA
200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
0
2
4
6
20
40
U_{bat} (V)

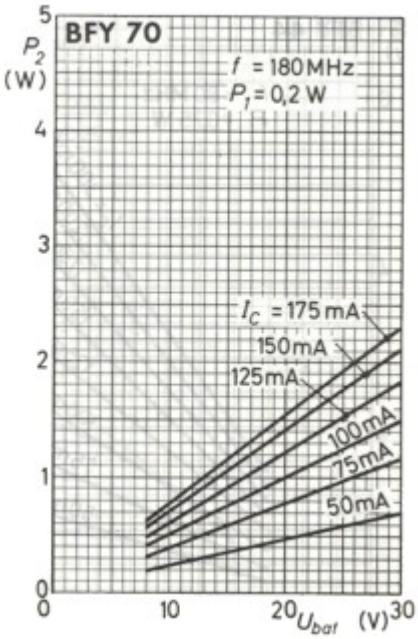

BFY 44
P_2 (W)
f = 180 MHz
P_1 = 0,25 W
I_C = 200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
0
2
4
6
20
40
U_{bat} (V)

BFY 44
BFY 70

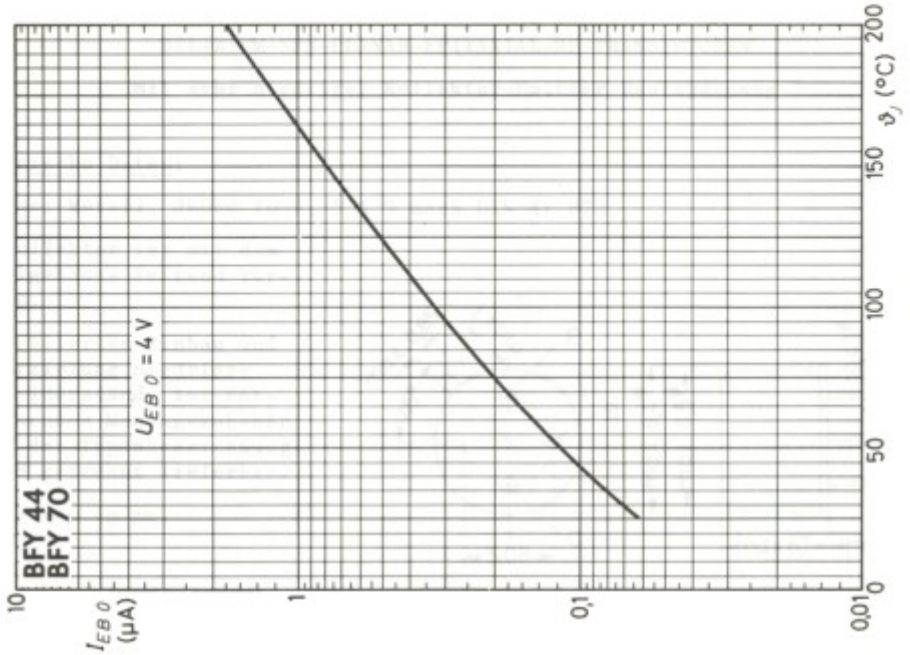

BFY 70
P_2 (W)
f = 80 MHz
U_{bat} = 28 V
I_C = 225 mA
200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
P_1 (W)

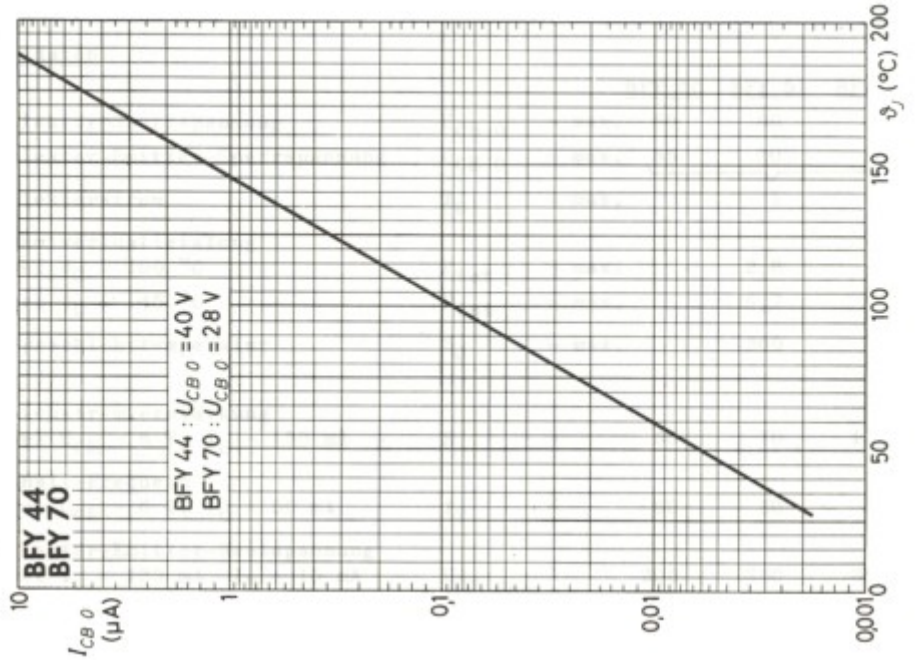

BFY 70
P_2 (W)
f = 180 MHz
U_{bat} = 28 V
I_C = 175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
P_1 (W)


BFY 70
P_2 (W)
f = 80 MHz
P_1 = 0,2 W
I_C = 225 mA
200 mA
175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
U_{bat} (V)


BFY 70
P_2 (W)
f = 180 MHz
P_1 = 0,2 W
I_C = 175 mA
150 mA
125 mA
100 mA
75 mA
50 mA
U_{bat} (V)

BFY 44
BFY 70


BFY 44
BFY 70
$U_{EB\,0}$ = 4 V
$I_{EB\,0}$ (µA)
10
1
0,1
0,01
0
50
100
150
200
ϑ_j (°C)


BFY 44
BFY 70
BFY 44 : $U_{CB\,0}$ = 40 V
BFY 70 : $U_{CB\,0}$ = 28 V
$I_{CB\,0}$ (µA)
10
1
0,1
0,01
0,001
0
50
100
150
200
ϑ_j (°C)