

BFY 33, BFY 34 (2N 1613); BFY 46 (2N 1711)

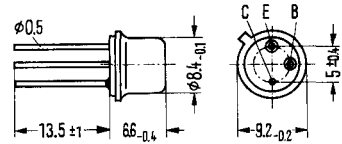
NPN-Transistors for universal RF application

Not for new development

BFY 33, BFY 34 and BFY 46 are double-diffused planar NPN silicon RF-transistors in a case 5 C 3 DIN 41873 (TO-39). The collector is electrically connected to the case. The transistors are for universal application.

BFY 34 corresponds to type 2 N 1613;
BFY 46 corresponds to type 2 N 1711.

Type	Order number
BFY 33	Q 60206-Y 33
BFY 34	Q 60206-Y 34
BFY 46	Q 60206-Y 46



Weight approx. 1.5 g Dimensions in mm

Maximum ratings		BFY 33	BFY 34	BFY 46	
Collector-emitter voltage ($I_{CEO} = 30 \text{ mA}$)	V_{CEO}	24	30	30	V
Collector-emitter voltage ($R_{BE} < 10 \Omega$)	V_{CER}	30	50	50	V
Collector-base voltage	V_{CBO}	50	75	75	V
Emitter-base voltage	V_{EBO}	7	7	7	V
Collector current	I_C	500	500	500	mA
Junction temperature	T_j	200	200	200	°C
Storage temperature	T_s	-65 to +200	-65 to +200	-65 to +200	°C
Total power dissipation ($T_{case} \leq 45 \text{ °C}$)	P_{tot}	2.6	2.6	2.6	W
Thermal resistance					
Junction to ambient air	R_{thJamb}	≤ 220	≤ 220	≤ 220	K/W
Junction to case	$R_{thJcase}$	≤ 60	≤ 60	≤ 60	K/W

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Static characteristics ($T_{amb} = 25\text{ °C}$) **BFY 33**

At a collector voltage of $V_{CE} = 10\text{ V}$ and the collector currents stated below, the following data apply:

I_C mA	I_B mA	h_{FE} I_C/I_B	$V_{BEsat}^{3)}$ V	$V_{CEsat}^{3)}$ V
10 ¹⁾	<0.29	>35*	—	—
150 ¹⁾	<3.75	>40*	—	—
150	15	10	0.95 (<1.3)	0.6 (<1.5)*
500 ¹⁾	<25	>20*	—	—

Collector-base cutoff current ($V_{CBO} = 40\text{ V}$)	I_{CBO}	0.8 (<20)*	nA
Collector-emitter breakdown voltage ($I_{CER} = 100\text{ mA}$; $R_{BE} \leq 10\ \Omega$)	$V_{(BR)CER}$	>30	V
Collector-base breakdown voltage ($I_{CBO} = 100\ \mu\text{A}$)	$V_{(BR)CBO}$	>50	V
Emitter-base breakdown voltage ($I_{EBO} = 100\ \mu\text{A}$)	$V_{(BR)EBO}$	>7*	V

Static characteristics ($T_{amb} = 25\text{ °C}$) **BFY 34**

For a collector voltage $V_{CE} = 10\text{ V}$ and the listed collector currents I_C :

I_C mA	I_B mA	h_{FE} I_C/I_B	$V_{BEsat}^{3)}$ V	$V_{CEsat}^{3)}$ V
0.01	$<0.656 \cdot 10^{-3}$	35	—	—
0.1	$2 (<5) \cdot 10^{-3}$	50 (>20)	—	—
10 ¹⁾	$0.29 (<0.5)^2)$	35 (>20)	—	—
10 ¹⁾	0.125 (<0.29)	80 (>35)	—	—
150 ¹⁾	1.25 to 3.75	40 to 120*	—	—
150	15	10	0.95 (<1.3)	0.6 (<1.5)*
500 ¹⁾	9.1 (<25)	55 (>20)*	—	—

	T_{amb}	150	25	°C
Collector-base cutoff current ($V_{CBO} = 60\text{ V}$)	I_{CBO}	—	0.3 (<10)*	nA
Collector-base cutoff current ($V_{CBO} = 60\text{ V}$)	I_{CBO}	-0.4 (<10)	—	μA
Emitter-base cutoff current ($V_{EBO} = 5\text{ V}$)	I_{EBO}	—	0.05 (<10)*	nA

¹⁾ Measured with impulses: impulse length 200 μs ; duty cycle <0.01

²⁾ For $T_{amb} = -55\text{ °C}$

³⁾ The transistor has been overdriven to such an extent that the DC current gain has fallen to a value $h_{FE} = 10$

* AQL=0.65%

BFY 34, BFY 46

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Static characteristics ($T_{amb} = 25\text{ °C}$) **BFY 34**

Collector-emitter breakdown voltage ($I_{CEO} = 30\text{ mA}$)	$V_{(BR)CEO}$	> 30	V
Collector-emitter breakdown voltage ($I_{CER} = 100\text{ mA}$; $R_{BE} \leq 10\ \Omega$)	$V_{(BR)CER}$	> 50	V
Collector-base breakdown voltage ($I_{CBO} = 100\ \mu\text{A}$)	$V_{(BR)CBO}$	> 75	V
Emitter-base breakdown voltage ($I_{EBO} = 100\ \mu\text{A}$)	$V_{(BR)EBO}$	> 7	V

Static characteristics ($T_{amb} = 25\text{ °C}$) **BFY 46**

For a collector voltage of $V_{CE} = 10\text{ V}$ and the listed collector currents I_C :

I_C mA	I_B mA	h_{FE} I_C/I_B	V_{BEsat}^3 V	V_{CESat}^3 V
0.01	$0.167 (<0.5) \cdot 10^{-3}$	60 (>20)	—	—
0.1	$1.25 (<2.9) \cdot 10^{-3}$	80 (>35)	—	—
10 ¹⁾	$0.154 (<2.9)^2$	65 (>35)	—	—
10 ¹⁾	0.077 (<0.134)	130 (>75)	—	—
150 ¹⁾	0.5 to 1.5	100 to 300*	—	—
150	15	10	0.95 (<1.3)	0.5 (<1.5)*
500 ¹⁾	6.67 (<12.5)	75 (>40)*	—	—

	T_{amb}	150	25	°C
Collector-base cutoff current ($V_{CBO} = 60\text{ V}$)	I_{CBO}	—	0.3 (<10)*	nA
Collector-base cutoff current ($V_{CBO} = 60\text{ V}$)	I_{CBO}	0.4 (<10)	—	μA
Emitter-base cutoff current ($V_{EBO} = 5\text{ V}$)	I_{EBO}	—	0.05 (<5)*	nA

Collector-emitter breakdown voltage ($I_{CEO} = 30\text{ mA}$)	$V_{(BR)CEO}$	> 30	V
($I_{CER} = 100\text{ mA}$ [Impulse]; $R_{BE} \leq 10\ \Omega$)	$V_{(BR)CER}$	> 50	V
Collector-base breakdown voltage ($I_{CBO} = 100\ \mu\text{A}$)	$V_{(BR)CBO}$	> 75	V
Emitter-base breakdown voltage ($I_{EBO} = 100\ \mu\text{A}$)	$V_{(BR)EBO}$	> 7	V

¹⁾ Measured with impulses: impulse length 200 μs ; duty cycle < 0.01

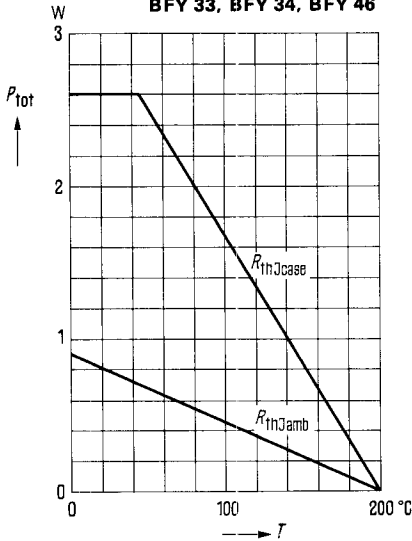
²⁾ For $T_{amb} = -55\text{ °C}$

³⁾ The transistor has been overdriven to such an extent that the DC current gain has fallen to a value $h_{FE} = 10$

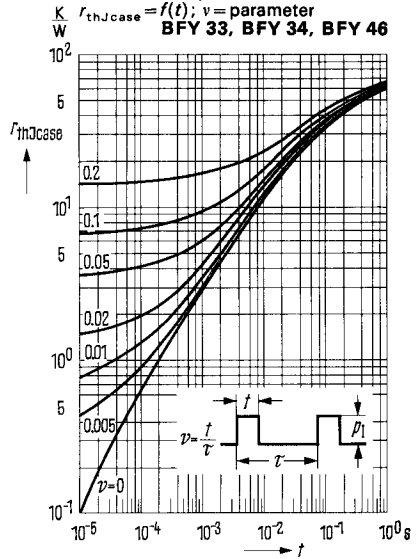
* AQL = 0.65%

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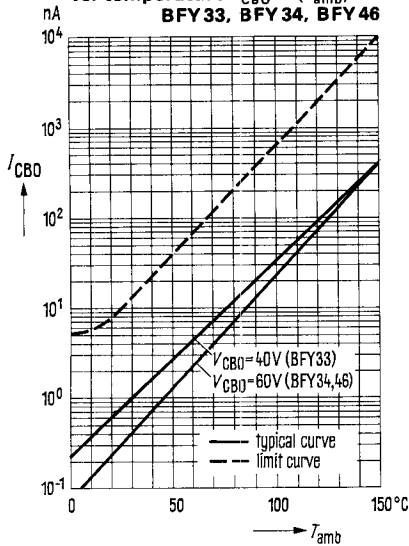
Total power dissipation
 $P_{tot} = f(T); R_{th} = \text{parameter}$
BFY 33, BFY 34, BFY 46



Permissible pulse load
 $r_{thJcase} = f(t); v = \text{parameter}$
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Collector-base cutoff current vs. temperature
 $I_{CBO} = f(T_{amb})$
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Current-gain bandwidth product
 $f_T = f(I_C)$
 $V_{CE} = \text{parameter}$
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