BCY 58 · BCY 59

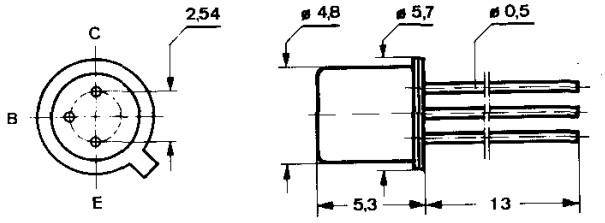
Silizium-NPN-Epitaxial-Planar-Transistoren
Silicon NPN Epitaxial Planar Transistors

Anwendungen: Allgemein und NF-Verstärker
Applications: *General and AF amplifiers*

Besondere Merkmale:
- Verlustleistung 1 W
- In Gruppen sortiert
- Komplementär zu BCY 78, BCY 79

Features:
- *Power dissipation 1 W*
- *In groups selected*
- *Complementary to BCY 78, BCY 79*

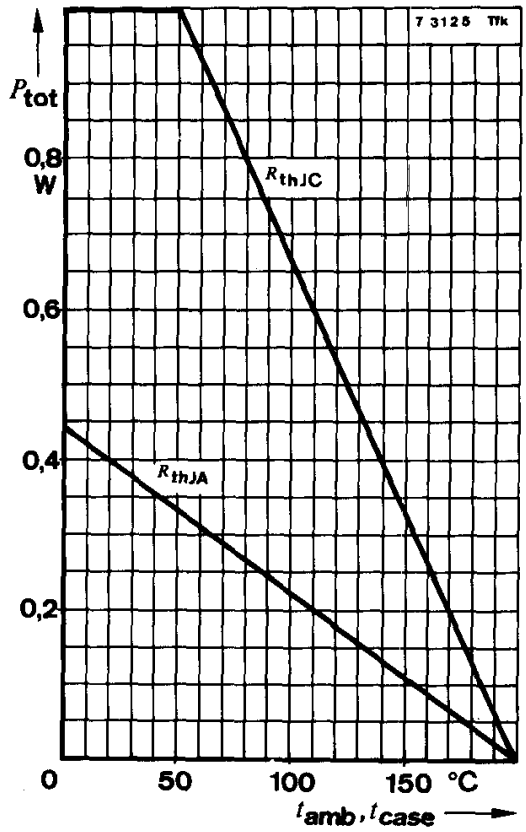
Abmessungen in mm
Dimensions in mm



Kollektor mit Gehäuse verbunden
Collector connected with case

Normgehäuse
Case
18 A 3 DIN 41876
JEDEC TO 18
Gewicht · *Weight*
max. 0,5 g

Absolute Grenzdaten ***Absolute maximum ratings***		**BCY 58**	**BCY 59**	
Kollektor-Basis-Sperrspannung *Collector-base voltage*	U_{CBO}	32	45	V
Kollektor-Emitter-Sperrspannung *Collector-emitter voltage*	U_{CEO}	32	45	V
Emitter-Basis-Sperrspannung *Emitter-base voltage*	U_{EBO}	7		V
Kollektorstrom *Collector current*	I_C	200		mA
Basisstrom *Base current*	I_B	50		mA
Gesamtverlustleistung *Total power dissipation* $t_{case} \leq 45\,°C$	P_{tot}	1		W
Sperrschichttemperatur *Junction temperature*	t_j	200		°C
Lagerungstemperaturbereich *Storage temperature range*	t_{stg}	−65 ... +200		°C



Wärmewiderstände ***Thermal resistances***		**Min.**	**Typ.**	**Max.**	
Sperrschicht-Umgebung *Junction ambient*	R_{thJA}			450	°C/W
Sperrschicht-Gehäuse *Junction case*	R_{thJC}			150	°C/W

Statische Kenngrößen
DC characteristics

t_{amb} = 25 °C, falls nicht anders angegeben
unless otherwise specified

Kollektorreststrom *Collector cut-off current*					
U_{CE} = 32 V	**BCY 58**	I_{CES} *)		10	nA
U_{CE} = 32 V, t_{amb} = 150 °C	**BCY 58**	I_{CES} **)		10	µA
U_{CE} = 45 V	**BCY 59**	I_{CES} *)		10	nA
U_{CE} = 45 V, t_{amb} = 150 °C	**BCY 59**	I_{CES} **)		10	µA
U_{CE} = 32 V, U_{BE} = 0,2 V, t_{amb} = 100 °C	**BCY 58**	I_{CEV} **)		20	µA
U_{CE} = 45 V, U_{BE} = 0,2 V, t_{amb} = 100 °C	**BCY 59**	I_{CEV} **)		20	µA

*) AQL = 0,65% **) AQL = 2,5%

			Min.	Typ.	Max.	
Emitterreststrom *Emitter cut-off current* U_{EB} = 5 V		I_{EBO}			10	nA
Kollektor-Emitter-Durchbruchspannung *Collector-emitter breakdown voltage* I_C = 2 mA	**BCY 58**	$U_{(BR)CEO}$ *)	32			V
	BCY 59	$U_{(BR)CEO}$ *)	45			V
Emitter-Basis-Durchbruchspannung *Emitter-base breakdown voltage* I_E = 1 µA		$U_{(BR)EBO}$ *) [1])	7			V
Kollektor-Sättigungsspannung *Collector saturation voltage* I_C = 10 mA, I_B = 0,25 mA		U_{CEsat} *)		100	350	mV
I_C = 100 mA, I_B = 2,5 mA		U_{CEsat} [1])		700		mV
Basis-Sättigungsspannung *Base saturation voltage* I_C = 10 mA, I_B = 0,25 mA		U_{BEsat} *)	0,6	0,7	0,85	V
I_C = 100 mA, I_B = 2,5 mA		U_{BEsat} [1])	0,75	0,9	1,2	V
Basis-Emitter-Spannung *Base-emitter voltage* U_{CE} = 5 V, I_C = 10 µA		U_{BE}		500		mV
U_{CE} = 5 V, I_C = 2 mA		U_{BE}	550	600	700	mV
U_{CE} = 1 V, I_C = 10 mA		U_{BE}		700		mV
U_{CE} = 1 V, I_C = 100 mA		U_{BE} [1])		750		mV
Kollektor-Basis-Gleichstromverhältnis *DC forward current transfer ratio* U_{CE} = 5 V, I_C = 10 µA	**Gruppe / *Group* VII**	h_{FE}		78		
	Gruppe / *Group* VIII	h_{FE}	20	145		
	Gruppe / *Group* IX	h_{FE}	40	220		
	Gruppe / *Group* X	h_{FE}	100	300		
U_{CE} = 5 V, I_C = 2 mA	**Gruppe / *Group* VII**	h_{FE} *)	120	170	220	
	Gruppe / *Group* VIII	h_{FE} *)	180	250	310	
	Gruppe / *Group* IX	h_{FE} *)	250	350	460	
	Gruppe / *Group* X	h_{FE} *)	380	500	630	
U_{CE} = 1 V, I_C = 10 mA	**Gruppe / *Group* VII**	h_{FE}	80	190		
	Gruppe / *Group* VIII	h_{FE}	120	260	400	
	Gruppe / *Group* IX	h_{FE}	160	380	630	
	Gruppe / *Group* X	h_{FE}	240	550	1000	
U_{CE} = 1 V, I_C = 100 mA	**Gruppe / *Group* VII**	h_{FE} [1])	40			
	Gruppe / *Group* VIII	h_{FE} [1])	45			
	Gruppe / *Group* IX	h_{FE} [1])	60			
	Gruppe / *Group* X	h_{FE} [1])	60			

*) AQL = 0,65%

[1]) $\frac{t_p}{T}$ = 0,01, t_p = 0,3 ms

Dynamische Kenngrößen ***AC characteristics***		**Min.**	**Typ.**	**Max.**	
t_{amb} = 25 °C					
Transitfrequenz *Gain bandwidth product* U_{CE} = 5 V, I_C = 10 mA, f = 100 MHz	f_T	125	250		MHz
Kollektor-Basis-Kapazität *Collector-base capacitance* U_{CB} = 10 V, f = 1 MHz	C_{CBO}		3,5	6	pF
Emitter-Basis-Kapazität *Emitter-base capacitance* U_{EB} = 0,5 V, f = 1 MHz	C_{EBO}		8	15	pF
Rauschmaß *Noise figure* U_{CE} = 5 V, I_C = 200 µA, R_G = 2 kΩ, f = 1 kHz, Δf = 200 Hz	F		2	6	dB

Vierpol Kenngrößen
Two port characteristics

t_{amb} = 25 °C

Emitterschaltung
Common emitter configuration

U_{CE} = 5 V, I_C = 2 mA, f = **1 kHz**

Kurzschluß-Eingangswiderstand *Short circuit input resistance*				
	Gruppe VII ***Group***	h_{ie}	2,7	kΩ
	Gruppe VIII ***Group***	h_{ie}	3,6	kΩ
	Gruppe IX ***Group***	h_{ie}	4,5	kΩ
	Gruppe X ***Group***	h_{ie}	7,5	kΩ
Leerlauf-Spannungsrückwirkung *Open circuit reverse voltage transfer ratio*				
	Gruppe VII ***Group***	h_{re}	$1{,}5 \cdot 10^{-4}$	
	Gruppe VIII ***Group***	h_{re}	$2 \cdot 10^{-4}$	
	Gruppe IX ***Group***	h_{re}	$2 \cdot 10^{-4}$	
	Gruppe X ***Group***	h_{re}	$3 \cdot 10^{-4}$	

			Min.	Typ.	Max.	
Kurzschluß-Stromverstärkung *Short circuit forward current transfer ratio*						
	Gruppe VII ***Group***	h_{fe}	125	200	250	
	Gruppe VIII ***Group***	h_{fe}	175	260	350	
	Gruppe IX ***Group***	h_{fe}	250	330	500	
	Gruppe X ***Group***	h_{fe}	350	520	700	
Leerlauf-Ausgangsleitwert *Open circuit output conductance*						
	Gruppe VII ***Group***	h_{oe}		18	30	µS
	Gruppe VIII ***Group***	h_{oe}		24	50	µS
	Gruppe IX ***Group***	h_{oe}		30	60	µS
	Gruppe X ***Group***	h_{oe}		50	100	µS

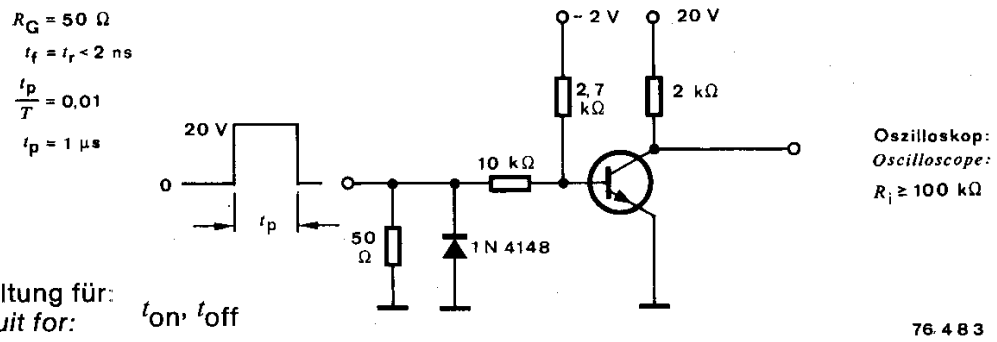
Schaltzeiten
Switching characteristics

t_{amb} = 25 °C
I_C = 10 mA, $I_{B1} = -I_{B2}$ = 1 mA

Einschaltzeit *Turn-on time*	t_{on}	150	ns
Ausschaltzeit *Turn-off time*	t_{off}	800	ns

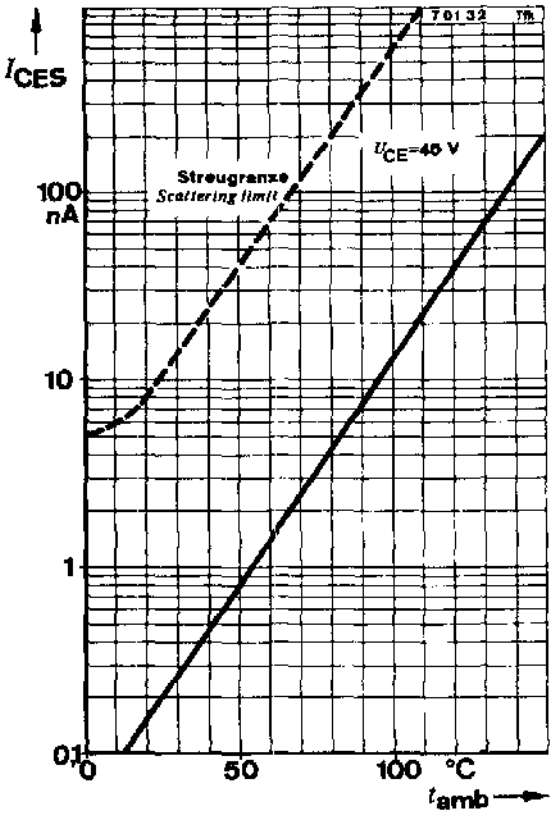
I_C = 100 mA, $I_{B1} = -I_{B2}$ = 10 mA

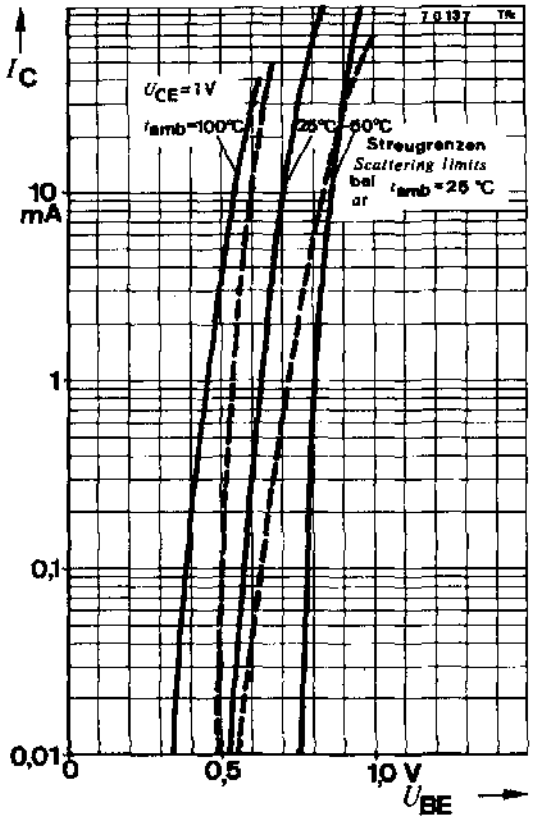
Einschaltzeit *Turn-on time*	t_{on} [1])	150	ns
Ausschaltzeit *Turn-off time*	t_{off} [1])	800	ns

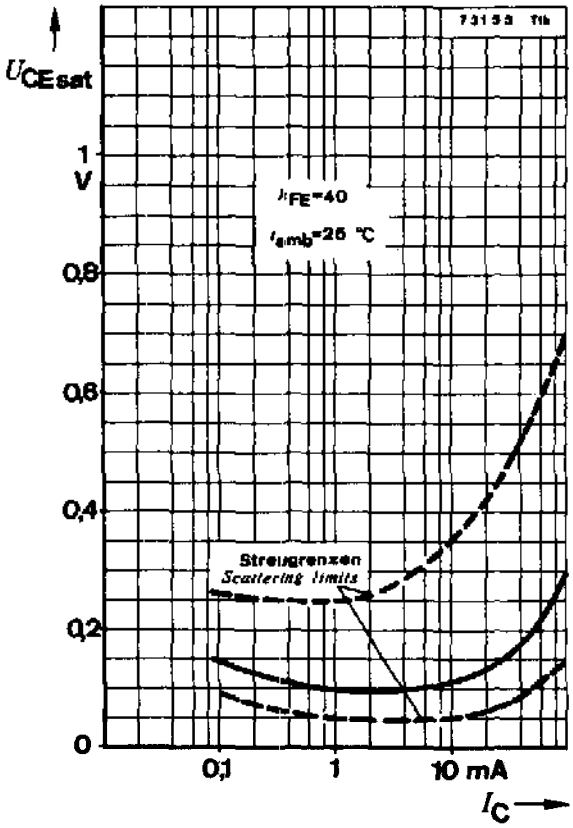


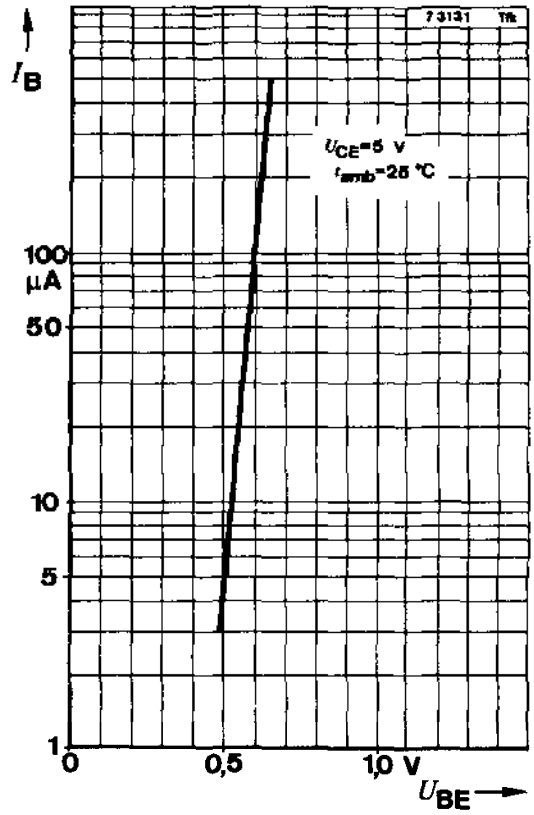
Meßschaltung für:
Test circuit for: t_{on}, t_{off}

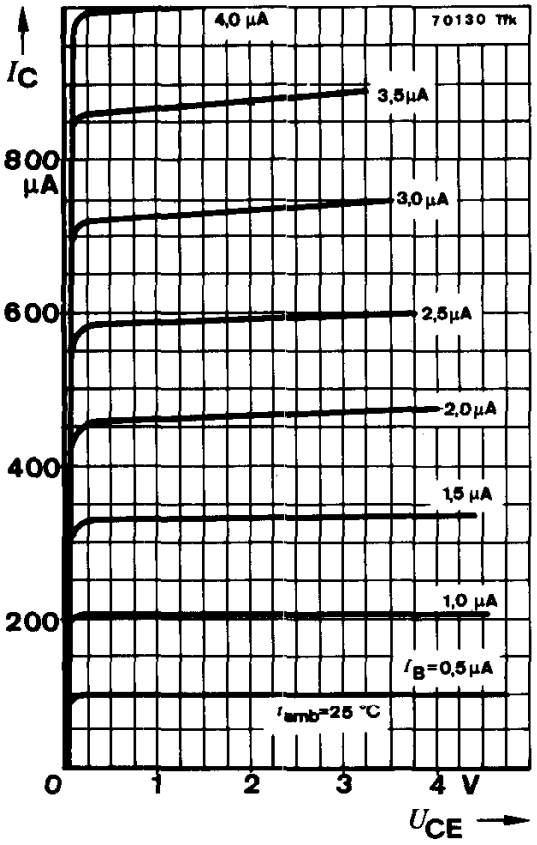
[1]) siehe Meßschaltung
see test circuit

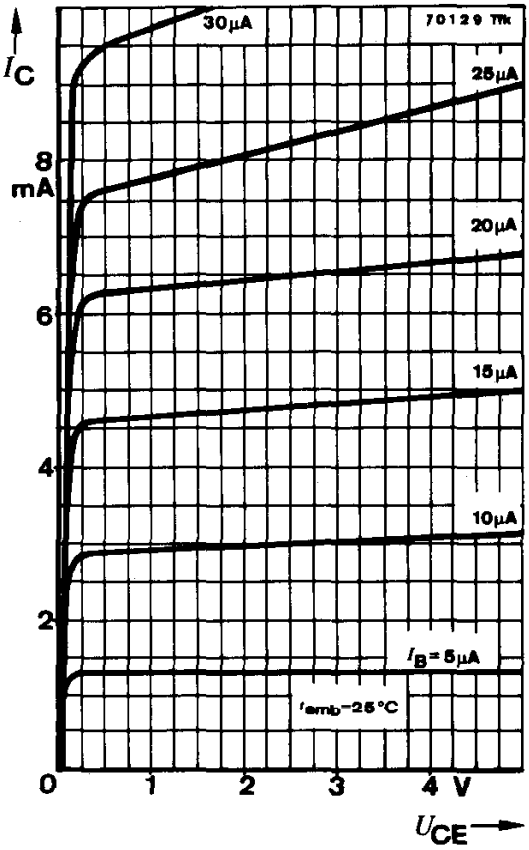

7 01 32 Tfk
I_{CES}
100 nA
10
1
0,1
0
50
100 °C
t_{amb}
Streugrenze
Scattering limit
U_{CE}=45 V

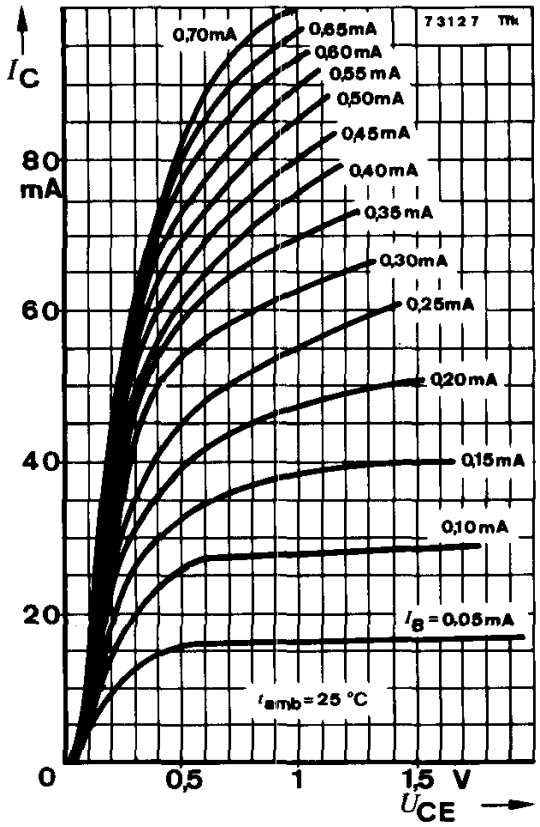

7 0 137 Tfk
I_C
10 mA
1
0,1
0,01
0
0,5
1,0 V
U_{BE}
U_{CE}=1 V
t_{amb}=100°C
25°C
50°C
Streugrenzen
Scattering limits
bei
at
t_{amb}=25 °C

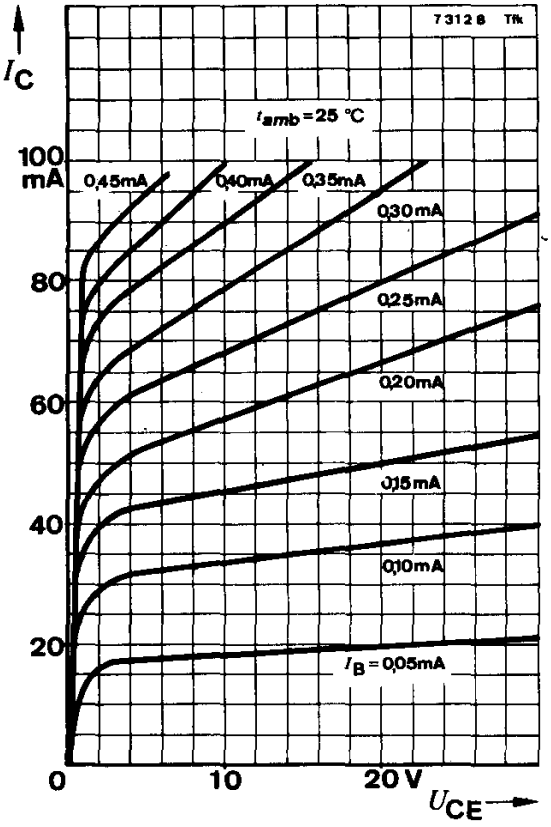

7 3 1 5 3 Tfk
U_{CEsat}
1 V
0,8
0,6
0,4
0,2
0
0,1
1
10 mA
I_C
h_{FE}=40
t_{amb}=25 °C
Streugrenzen
Scattering limits

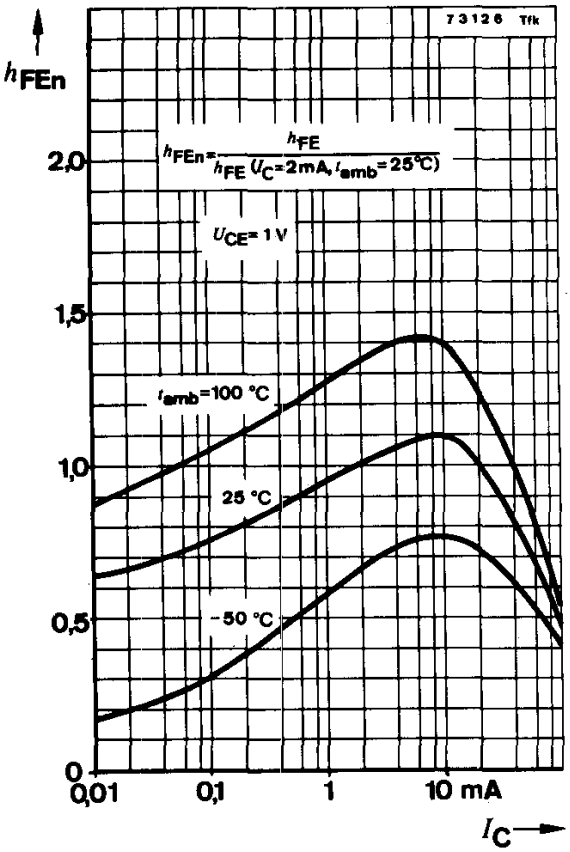

7 3 1 3 1 Tfk
I_B
100 µA
50
10
5
1
0
0,5
1,0 V
U_{BE}
U_{CE}=5 V
t_{amb}=25 °C

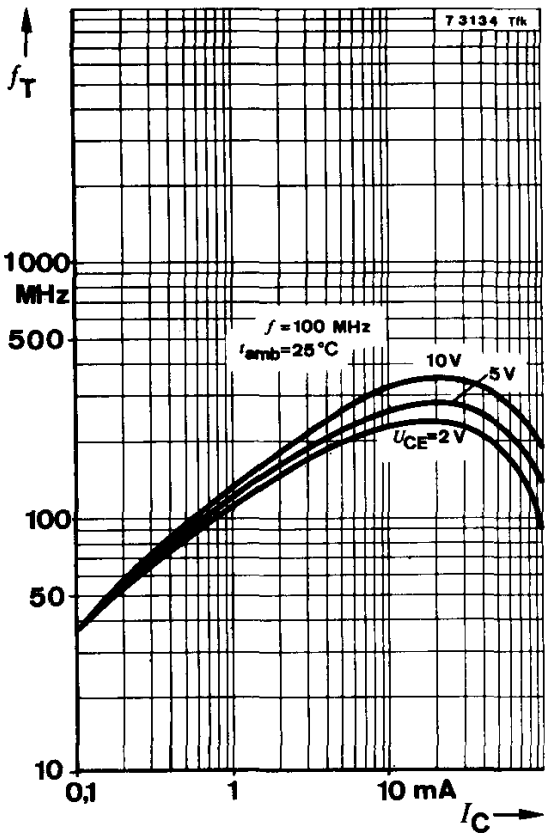

70130 Tfk
I_C
800 µA
600
400
200
0
1
2
3
4 V
U_{CE}
4,0 µA
3,5µA
3,0 µA
2,5µA
2,0µA
1,5 µA
1,0 µA
I_B=0,5µA
t_{amb}=25 °C

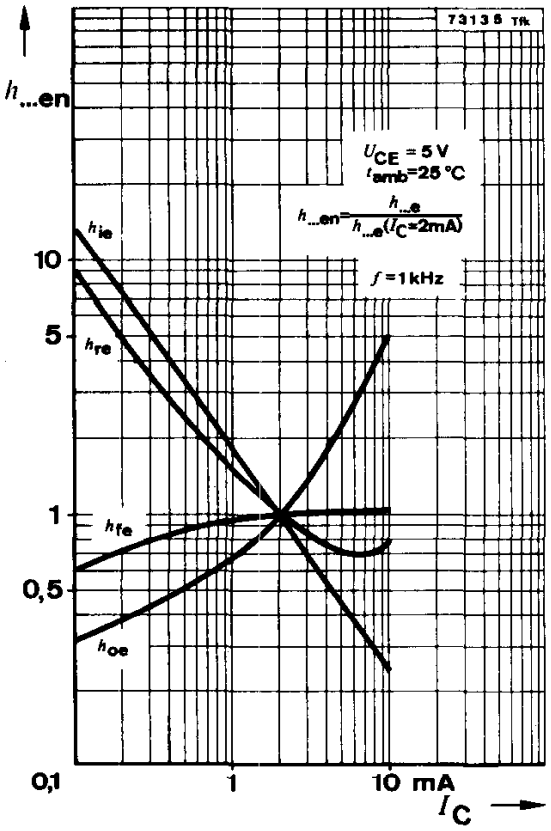

70129 Tfk
I_C
8 mA
6
4
2
0
1
2
3
4 V
U_{CE}
30µA
25µA
20µA
15µA
10µA
I_B=5µA
t_{amb}=25°C

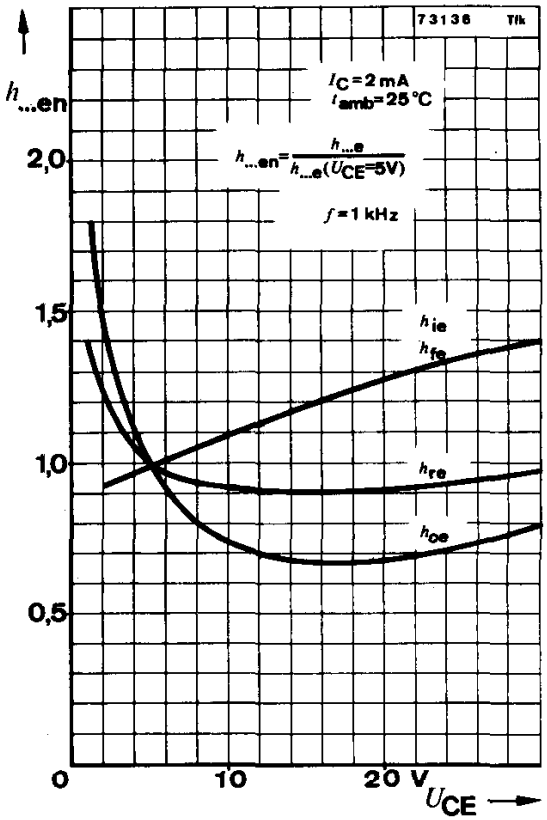

73127 Tfk
I_C
80 mA
60
40
20
0
0,5
1
1,5 V
U_{CE}
0,70mA
0,65mA
0,60mA
0,55 mA
0,50mA
0,45mA
0,40mA
0,35 mA
0,30mA
0,25mA
0,20mA
0,15mA
0,10mA
I_B=0,05mA
t_{amb}=25 °C


73128 Tfk
I_C
100 mA
80
60
40
20
0
10
20 V
U_{CE}
t_{amb}=25 °C
0,45mA
0,40mA
0,35mA
0,30mA
0,25mA
0,20mA
0,15mA
0,10mA
I_B=0,05mA


73126 Tfk
h_{FEn}
$h_{FEn} = \frac{h_{FE}}{h_{FE}(U_C=2mA, t_{amb}=25°C)}$
U_{CE}= 1 V
t_{amb}=100 °C
25 °C
-50 °C
2,0
1,5
1,0
0,5
0
0,01
0,1
1
10 mA
I_C


73134 Tfk
f_T
1000
MHz
500
100
50
10
f = 100 MHz
t_{amb}=25 °C
10V
5V
U_{CE}=2 V
0,1
1
10 mA
I_C


73135 Tfk
$h_{...en}$
U_{CE} = 5 V
t_{amb}=25 °C
$h_{...en} = \frac{h_{...e}}{h_{...e}(I_C=2mA)}$
f = 1 kHz
h_{ie}
h_{re}
h_{fe}
h_{oe}
10
5
1
0,5
0,1
1
10 mA
I_C


73136 Tfk
$h_{...en}$
I_C=2 mA
t_{amb}=25 °C
$h_{...en} = \frac{h_{...e}}{h_{...e}(U_{CE}=5V)}$
f = 1 kHz
h_{ie}
h_{fe}
h_{re}
h_{oe}
2,0
1,5
1,0
0,5
0
10
20 V
U_{CE}