PHILIPS INTERNATIONAL 56E D 7110826 0042258 985 PHIN

T-27-21

SILICON PLANAR EPITAXIAL TRANSISTORS

PNP transistors in TO-39 metal envelopes for general industrial applications.

QUICK REFERENCE DATA

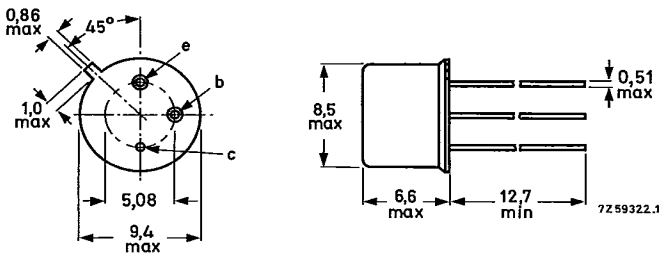
			BFX87	BFX88	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	50	40	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	50	40	V
Collector current (peak value)	$-I_{CM}$	max.	600	600	mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	600	600	mW
DC current gain $-I_C$ = 10 mA; $-V_{CE}$ = 10 V	h_{FE}	min. typ.	40 125	40 125	
Transition frequency at f = 100 MHz $-I_C$ = 50 mA; $-V_{CE}$ = 10 V	f_T	min.	100	100	MHz

MECHANICAL DATA

Dimensions in mm

Fig.1 TO-39.

Collector connected to case



Maximum lead diameter is guaranteed only for 12.7 mm.

Qualification approved to CECC 50 002-71

T-27-21

RATINGS

Limiting values in accordance with the Absolute Maximum System (IEC 134)

			BFX87	BFX88	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	50	40	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	50	40	V
Collector current (DC)	$-I_C$	max.	600		mA
Collector current (peak value)	$-I_{CM}$	max.	600		mA
Emitter current	I_{EM}	max.	600		mA
Total power dissipation up to T_{amb} = 25 °C	P_{tot}	max.	600		mW
Storage temperature range	T_{stg}		−65 to +150		°C
Junction temperature	T_j	max.	+200		°C

THERMAL RESISTANCE

From junction to ambient in free air	$R_{th\ j\text{-}a}$	=	300		K/W

CHARACTERISTICS

			BFX87	BFX88	
Collector cut-off current					
$-V_{CB}$ = 50 V; I_E = 0	$-I_{CBO}$	typ.	1.0	—	nA
		max.	500	—	nA
$-V_{CB}$ = 40 V; I_E = 0	$-I_{CBO}$	typ.	0.5	1.0	nA
		max.	50	500	nA
$-V_{CB}$ = 30 V; I_E = 0	$-I_{CBO}$	typ.	—	0.5	nA
		max.	—	50	nA
$-V_{CB}$ = 40 V; I_E = 0; T_j = 100 °C	$-I_{CBO}$	typ.	0.03	—	μA
		max.	2.0	—	μA
$-V_{CB}$ = 30 V; I_E = 0; T_j = 100 °C	$-I_{CBO}$	typ.	—	0.03	μA
		max.	—	2.0	μA
Emitter cut-off current					
$-V_{EB}$ = 4.0 V; I_C = 0	$-I_{EBO}$	typ.	2.0		nA
		max.	500		nA
$-V_{EB}$ = 3.0 V; I_C = 0	$-I_{EBO}$	typ.	1.0		nA
		max.	100		nA

DC current gain				
$-I_C$ = 1.0 mA; $-V_{CE}$ = 10 V	h_{FE}	min.	40	
		typ.	105	
$-I_C$ = 10 mA; $-V_{CE}$ = 10 V	h_{FE}	min.	40	
		typ.	125	
$-I_C$ = 150 mA; $-V_{CE}$ = 10 V	h_{FE}	min.	40	
		typ.	90	
$-I_C$ = 500 mA; $-V_{CE}$ = 10 V	h_{FE}	min.	25	
		typ.	40	
Collector-emitter saturation voltage				
$-I_C$ = 150 mA; $-I_B$ = 15 mA	$-V_{CE(sat)}$	typ.	0.15	V
		max.	0.40	V
Base-emitter saturation voltage				
$-I_C$ = 30 mA; $-I_B$ = 1.0 mA	$-V_{BE(sat)}$	typ.	0.77	V
		max.	0.90	V
$-I_C$ = 150 mA; $-I_B$ = 15 mA	$-V_{BE(sat)}$	typ.	1.05	V
		max.	1.30	V
Collector capacitance				
$-V_{CB}$ = 10 V; $I_E = I_e$ = 0; f = 1.0 MHz	C_c	typ.	6.0	pF
		max.	12	pF
Emitter capacitance				
$-V_{EB}$ = 2.0 V; $I_C = I_c$ = 0; f = 1.0 MHz	C_e	typ.	18	pF
		max.	30	pF
Transition frequency				
$-I_C$ = 50 mA; $-V_{CE}$ = 10 V; f = 100 MHz; T_{amb} = 25 °C	f_T	min.	100	MHz
		typ.	360	MHz
Saturated switching times				
Turn-on time	t_{on}	typ.	25	ns
		max.	60	ns
Turn-off time	t_{off}	typ.	55	ns
		max.	150	ns
h-parameters				
Measured at $-I_C$ = 10 mA; $-V_{CE}$ = 10 V; f = 1.0 kHz; T_{amb} = 25 °C				
Input impedance	h_{ie}	typ.	600	Ω
Voltage feedback ratio	h_{re}	typ.	1.50×10^{-4}	
Forward current transfer ratio	h_{fe}	typ.	155	
Output admittance	h_{oe}	typ.	104	μmho

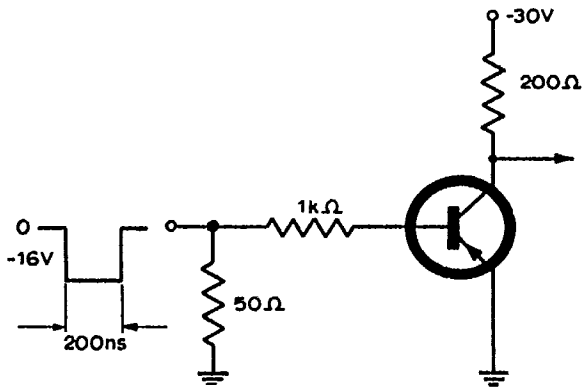


Fig.2 Saturated turn-on switching time.

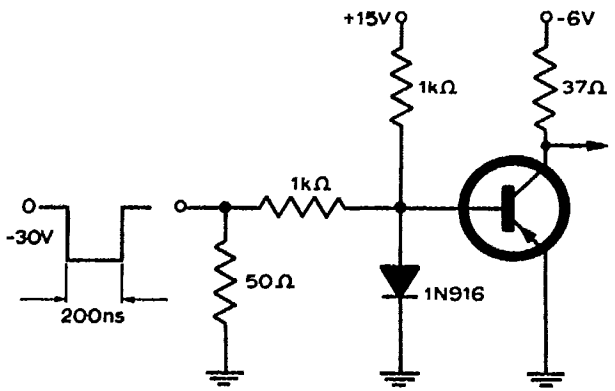


Fig.3 Saturated turn-off switching time.

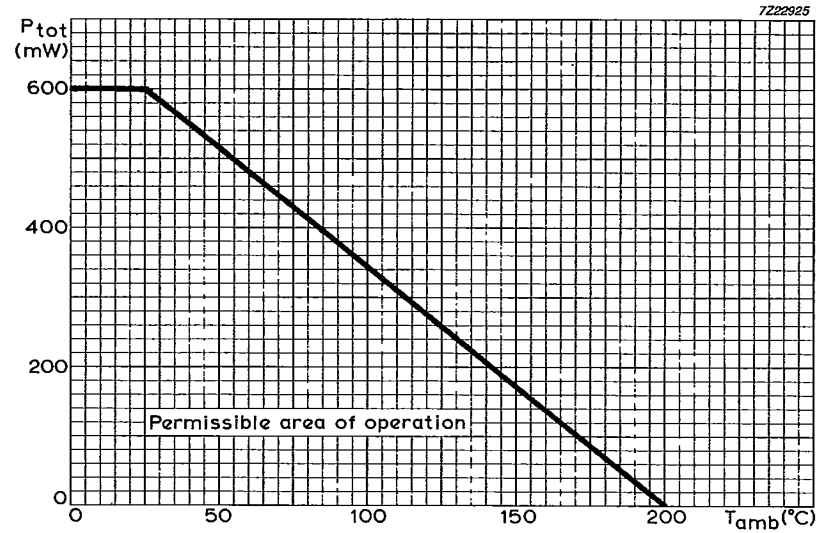


Fig.4 Maximum total dissipation plotted against ambient temperature.

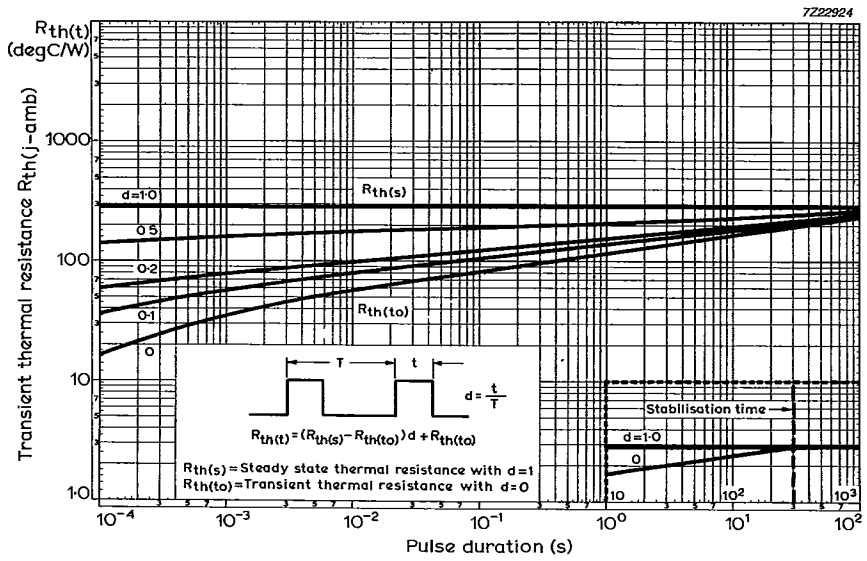


Fig.5 Transient thermal resistance for various duty factors plotted against pulse duration.

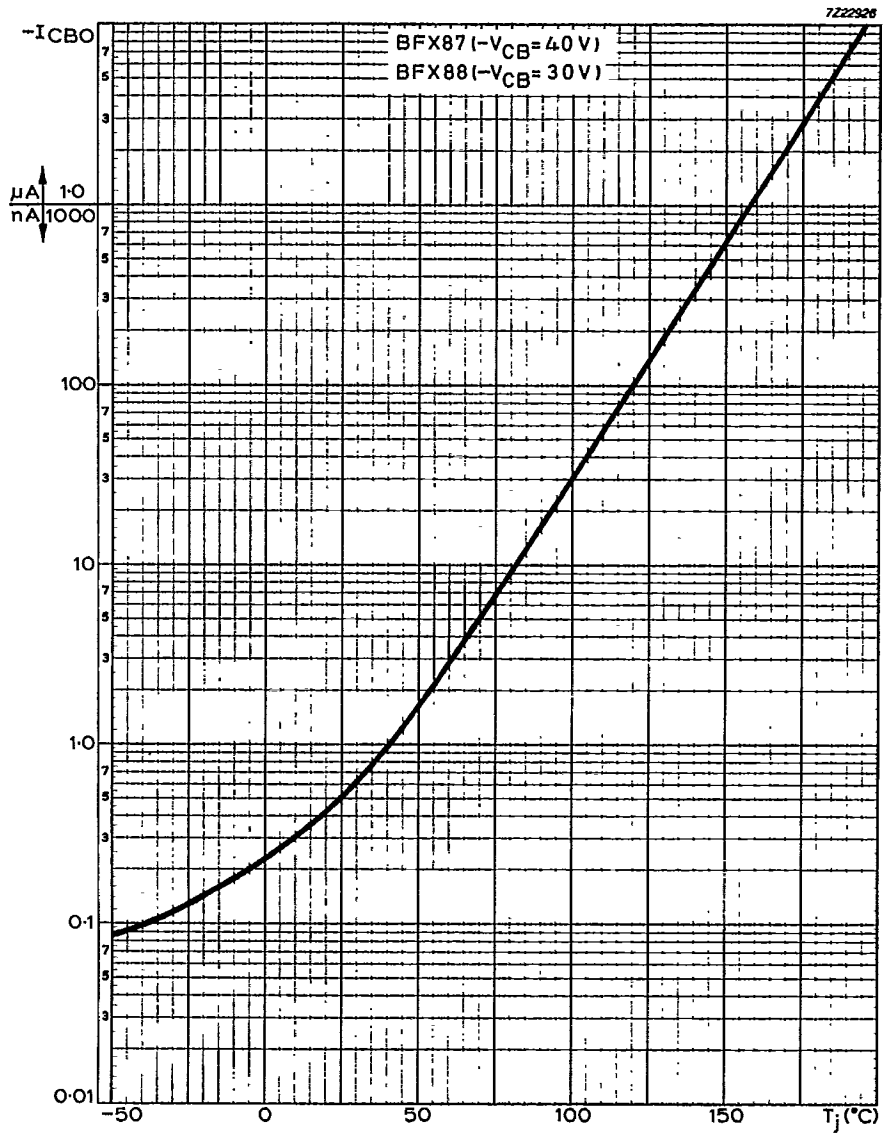


Fig.6 Typical variation of collector cut-off current with junction temperature.

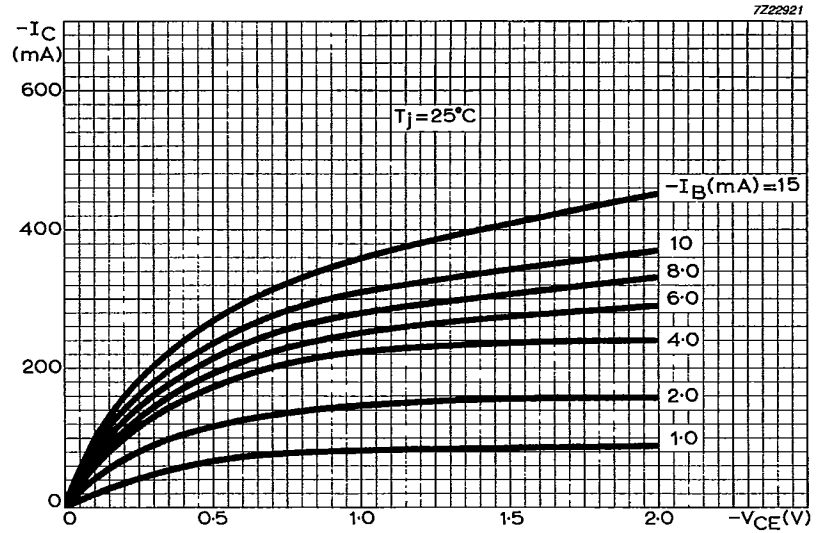


Fig.7 Typical output characteristics at low collector-emitter voltages.

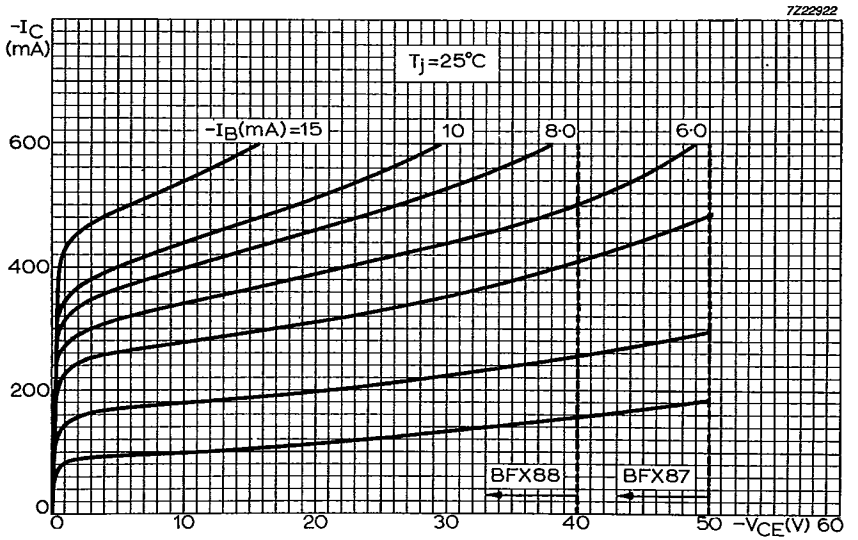


Fig.8 Typical output characteristics at high collector-emitter voltages.

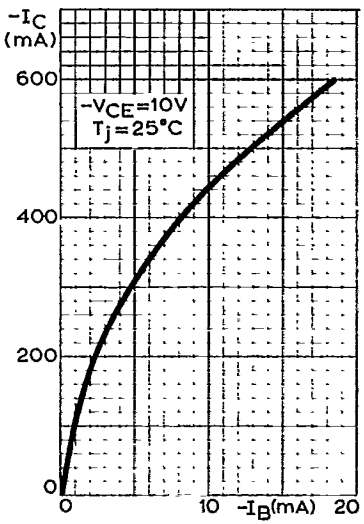


Fig.9 Typical transfer characteristic.

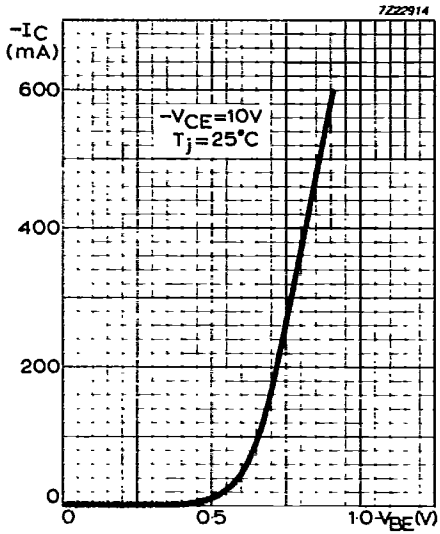


Fig.10 Typical mutual characteristic.

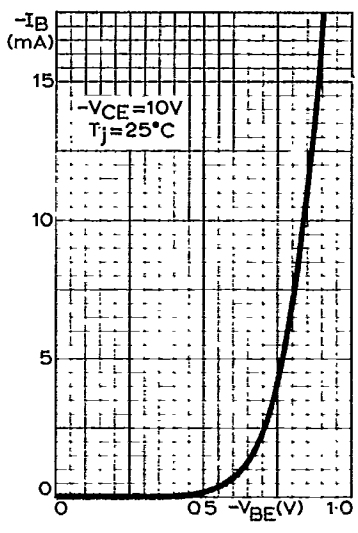


Fig.11 Typical input characteristic.

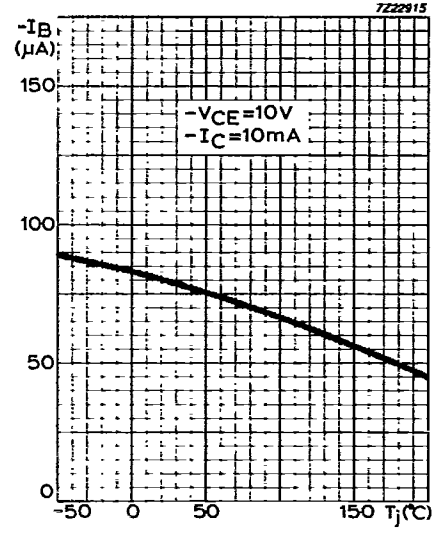


Fig.12 Typical base current as a function of junction temperature.

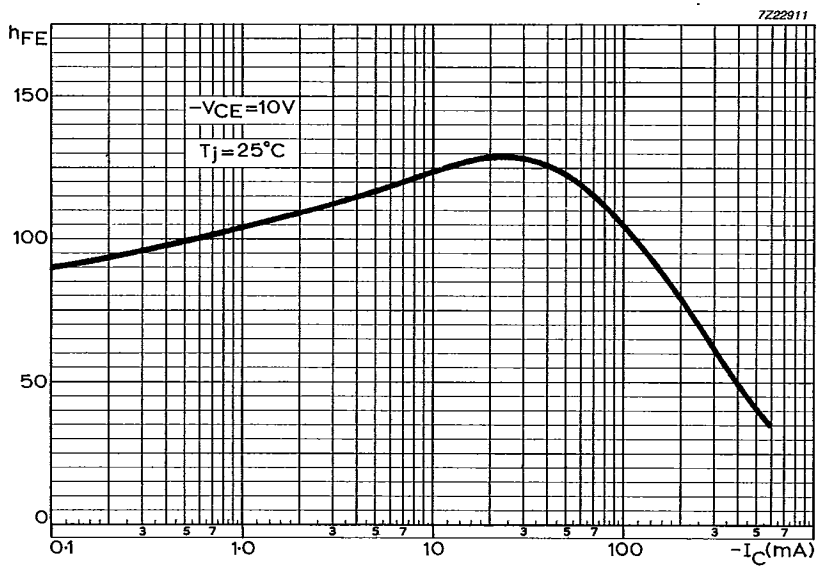


Fig.13 Typical variation of DC current gain with collector current.

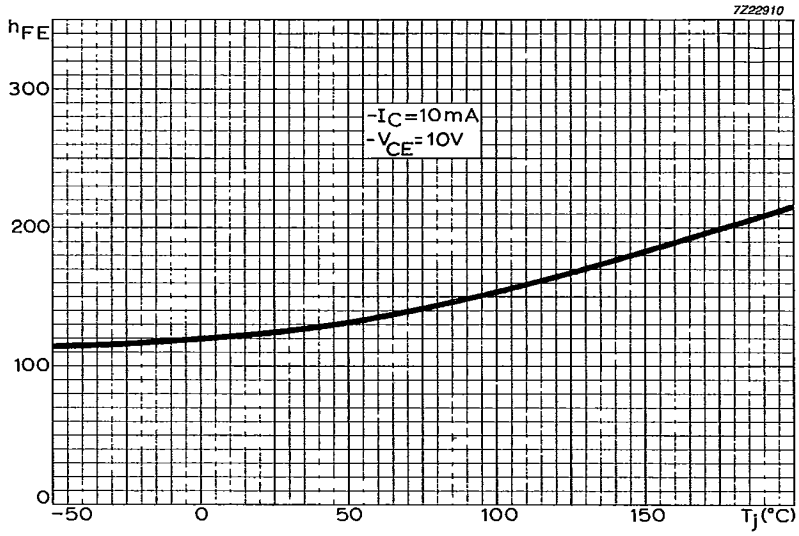


Fig.14 Typical variation of DC current gain with junction temperature.

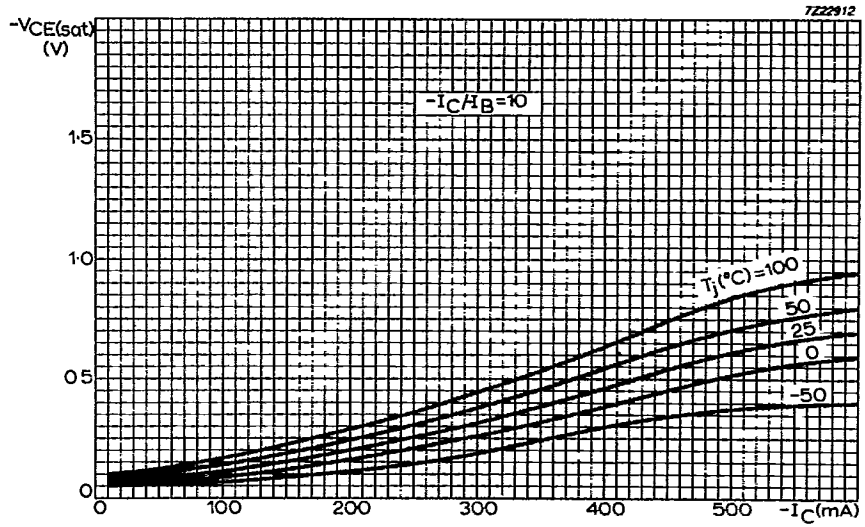


Fig.15 Typical variation of collector-emitter saturation voltage with collector current.

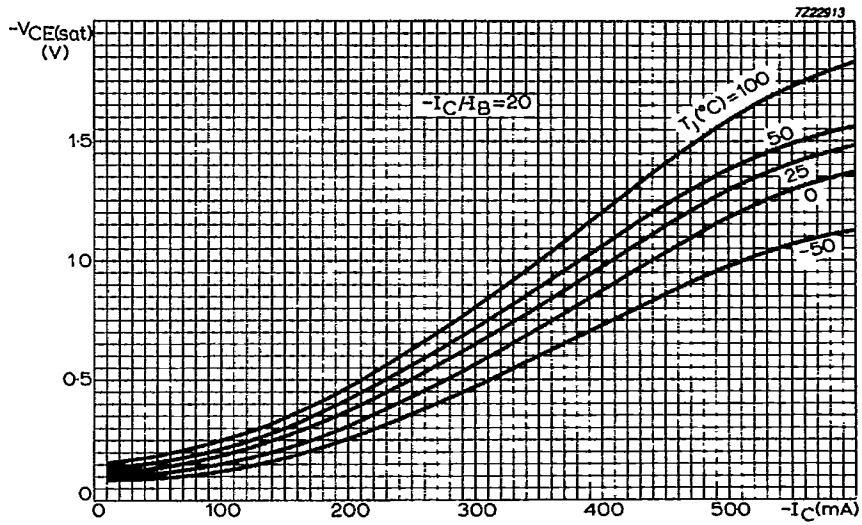


Fig.16 Typical variation of collector-emitter saturation voltage with collector current.

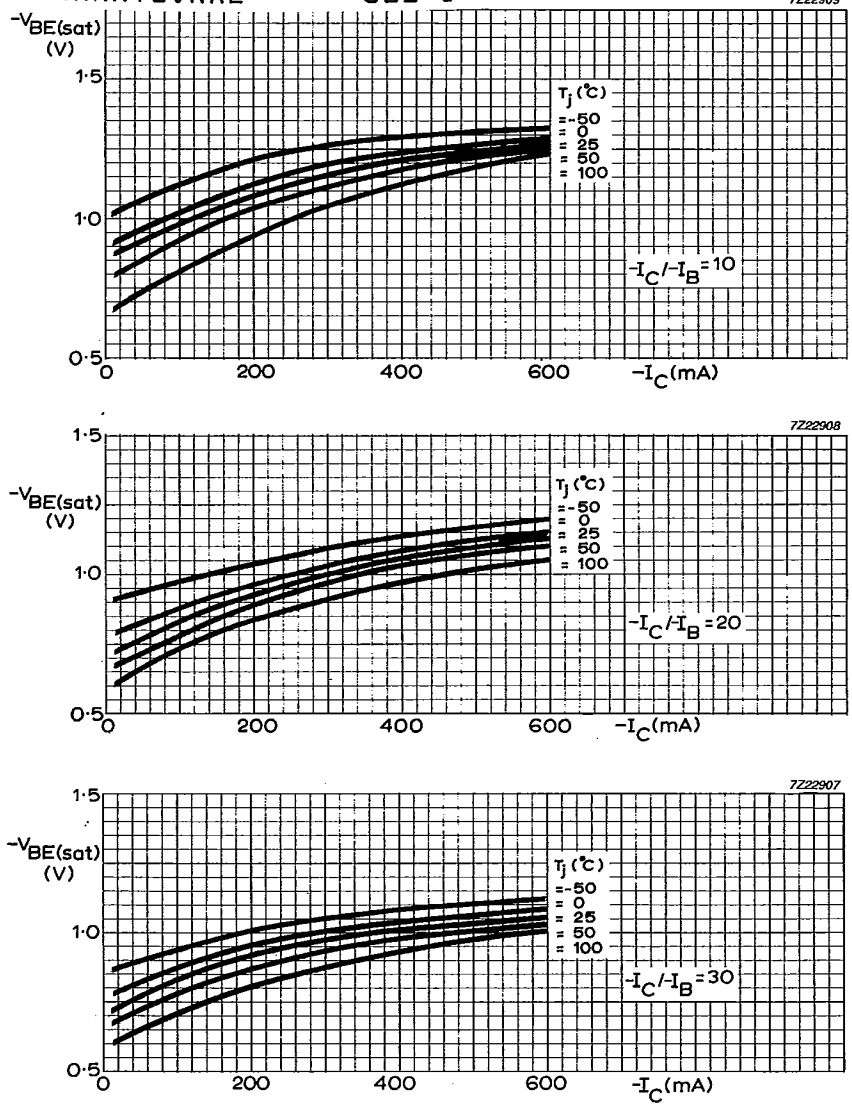


Fig.17 Typical variation of base-emitter saturation voltage with collector current.

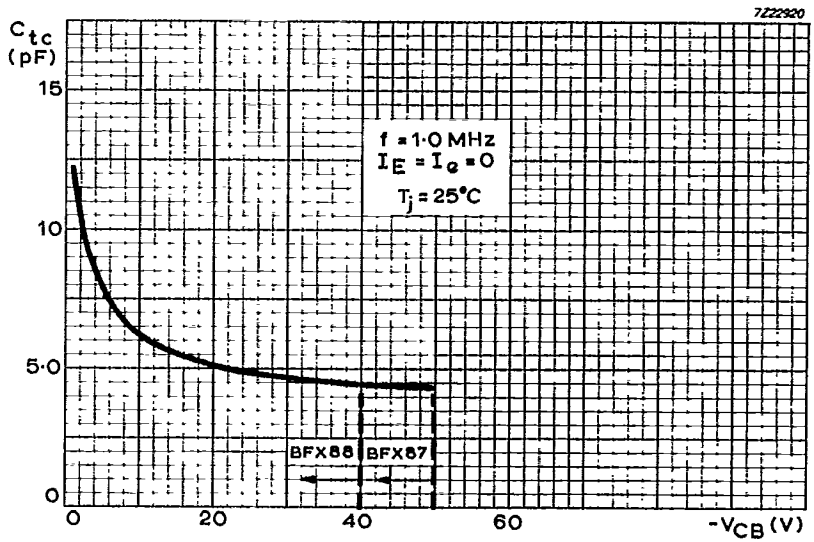


Fig.18 Typical variation of collector capacitance with collector-base voltage.

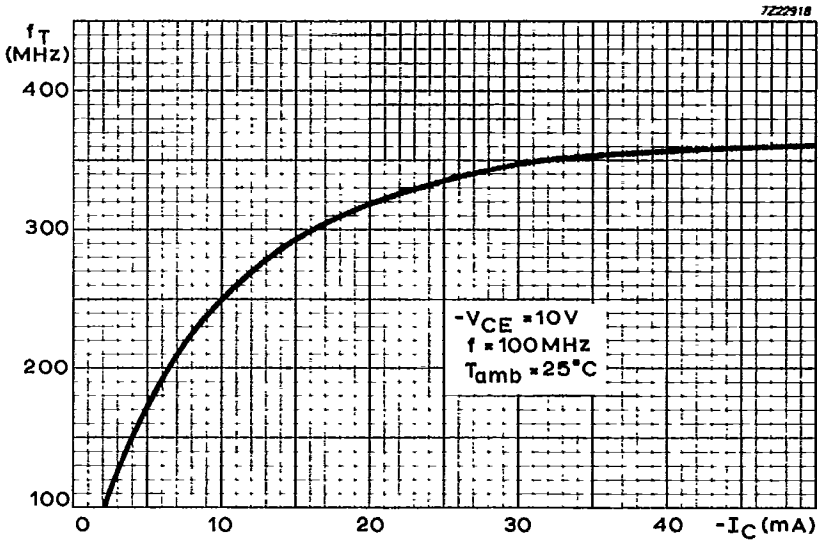


Fig.19 Typical variation of transition frequency with collector current.

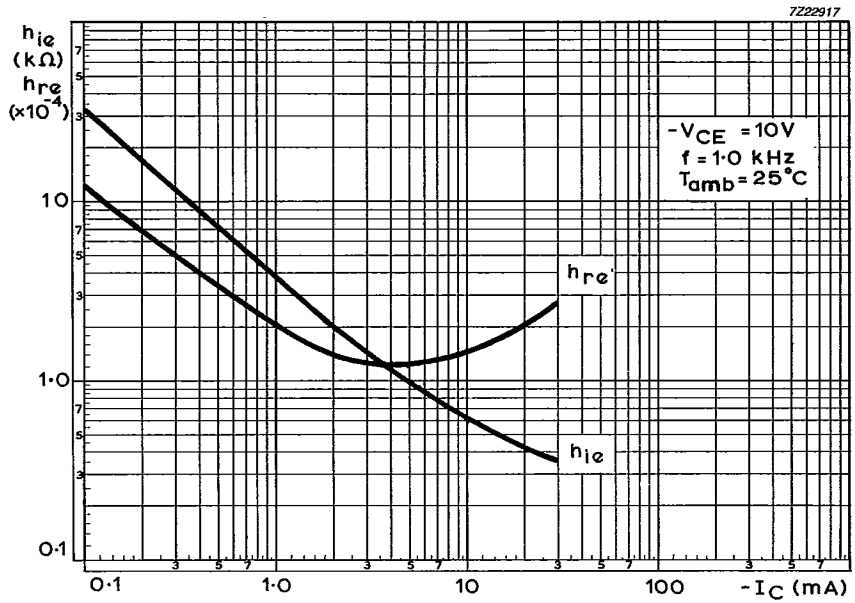


Fig.20 Typical input impedance and typical voltage feedback ratio plotted against collector current.

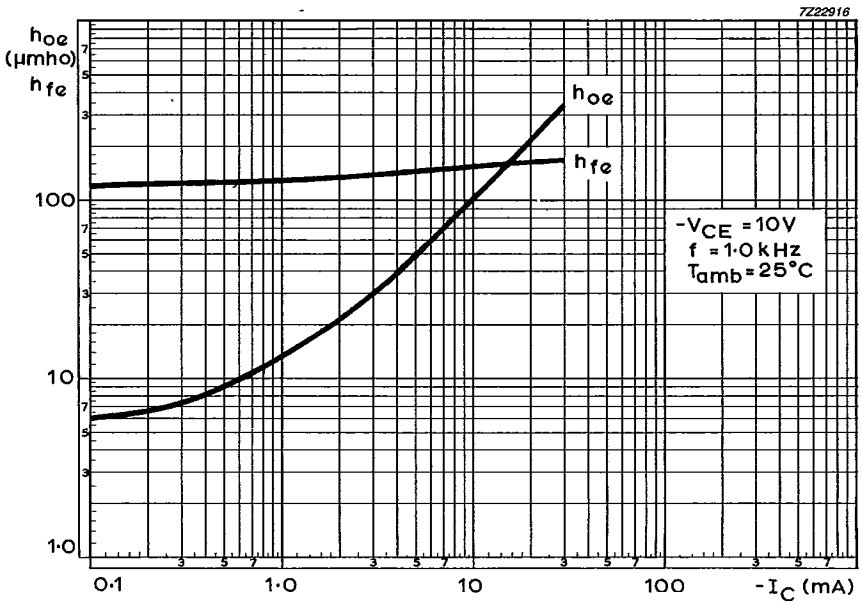


Fig.21 Typical forward current transfer ratio and typical output admittance plotted against collector current.