SILICON P-N-P HIGH-VOLTAGE TRANSISTORS

Planar epitaxial transistors in TO-39 metal envelopes, intended as general purpose amplifiers and switching devices in industrial and telephone applications.

QUICK REFERENCE DATA

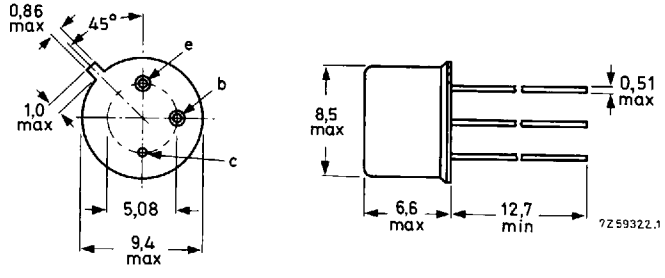
			BFT44	BFT45	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	300	250	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	300	250	V
Collector current (d.c.)	$-I_C$	max.	0,5		A
Total power dissipation up to T_{case} = 50 °C	P_{tot}	max.	5,0		W
Junction temperature	T_j	max.	200		°C
D.C. current gain $-I_C$ = 10 mA; $-V_{CE}$ = 10 V	h_{FE}		50 to 150		
Transition frequency at f = 35 MHz $-I_C$ = 15 mA; $-V_{CE}$ = 10 V	f_T	typ.	70		MHz

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-39.

Collector connected to case.



Maximum lead diameter is guaranteed only for 12,7 mm.

RATINGS

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

			BFT44	BFT45	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	300	250	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	300	250	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	V
Collector current (d.c.)	$-I_C$	max.	0,5		A
Total power dissipation up to T_{case} = 50 °C	P_{tot}	max.	5,0		W

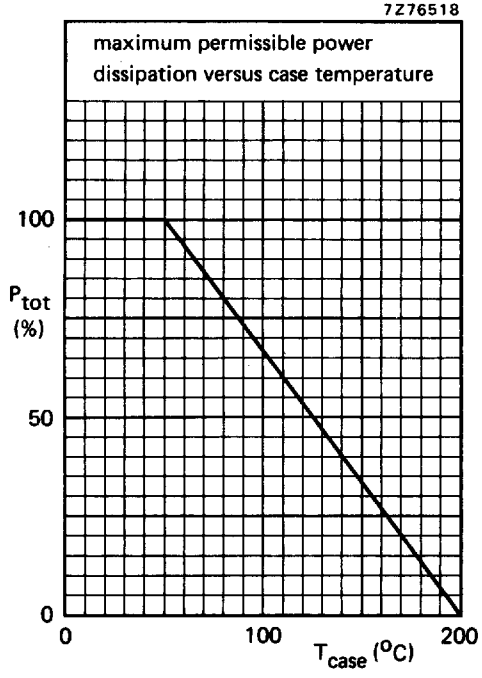


Fig. 2.

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	$R_{th\,j\text{-}a}$	=	200	K/W
From junction to case	$R_{th\,j\text{-}c}$	=	30	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current I_E = 0; $-V_{CB}$ = 200 V		$-I_{CBO}$	<	5	μA
Emitter cut-off current I_C = 0; $-V_{EB}$ = 3 V		$-I_{EBO}$	<	5	μA
Collector-emitter sustaining voltage $-I_C$ = 10 mA; I_B = 0; L = 25 mH		$-V_{CEOsust}$	>	BFT44: 300 / BFT45: 250	V*

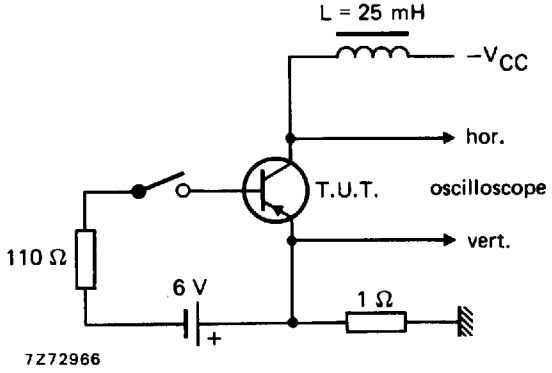


Fig. 3 Test circuit for $V_{CEOsust}$.

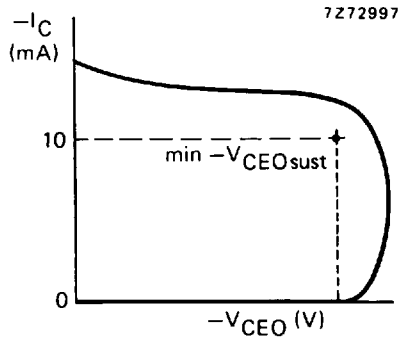


Fig. 4 Oscilloscope display for $V_{CEOsust}$.

Saturation voltages $-I_C$ = 10 mA; $-I_B$ = 1 mA		$-V_{CEsat}$ $-V_{BEsat}$	< <	0,5 0,8	V V
$-I_C$ = 100 mA; $-I_B$ = 10 mA		$-V_{CEsat}$ $-V_{BEsat}$	< <	1,4 0,9	V V
$-I_C$ = 500 mA; $-I_B$ = 100 mA	BFT44 BFT45	$-V_{CEsat}$ $-V_{CEsat}$ $-V_{BEsat}$	< < <	5,0 3,0 1,2	V** V** V**
D.C. current gain $-I_C$ = 1 mA; $-V_{CE}$ = 10 V		h_{FE}	>	30	
$-I_C$ = 10 mA; $-V_{CE}$ = 10 V		h_{FE}		50 to 150	
$-I_C$ = 100 mA; $-V_{CE}$ = 10 V		h_{FE}	>	50	**
Collector capacitance at f = 1 MHz $I_E = I_e$ = 0; $-V_{CB}$ = 20 V		C_c	<	15	pF

* $-V_{CC}$ = 0 to 50 V; f = 400 Hz; δ = 0,5 (see also test circuit).

** Measured under pulse conditions: t_p = 300 μs; δ ≤ 0,02.

CHARACTERISTICS (continued)

T_j = 25 °C

Transition frequency at f = 35 MHz $-I_C$ = 15 mA; $-V_{CE}$ = 10 V	f_T	typ.	70 MHz
Switching times $-I_{Con}$ = 50 mA; $-I_{Bon} = I_{Boff}$ = 5 mA (test circuit 1)	t_{on} t_{off}	typ. typ.	125 ns 850 ns
$-I_{Con}$ = 500 mA; $-I_{Bon} = I_{Boff}$ = 100 mA (test circuit 2)	t_{on} t_{off}	typ. typ.	125 ns 125 ns

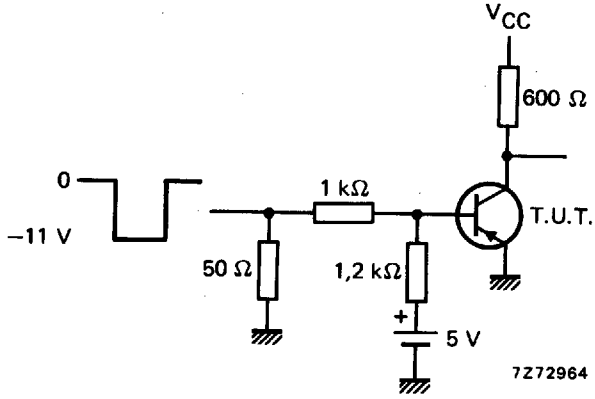


Fig. 5 Test circuit 1.

V_{CC} = −31 V
t_p = 10 μs

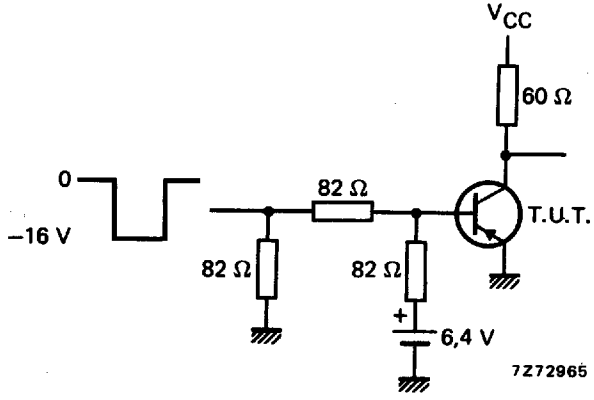


Fig. 6 Test circuit 2.

V_{CC} = −31 V
t_p = 10 μs

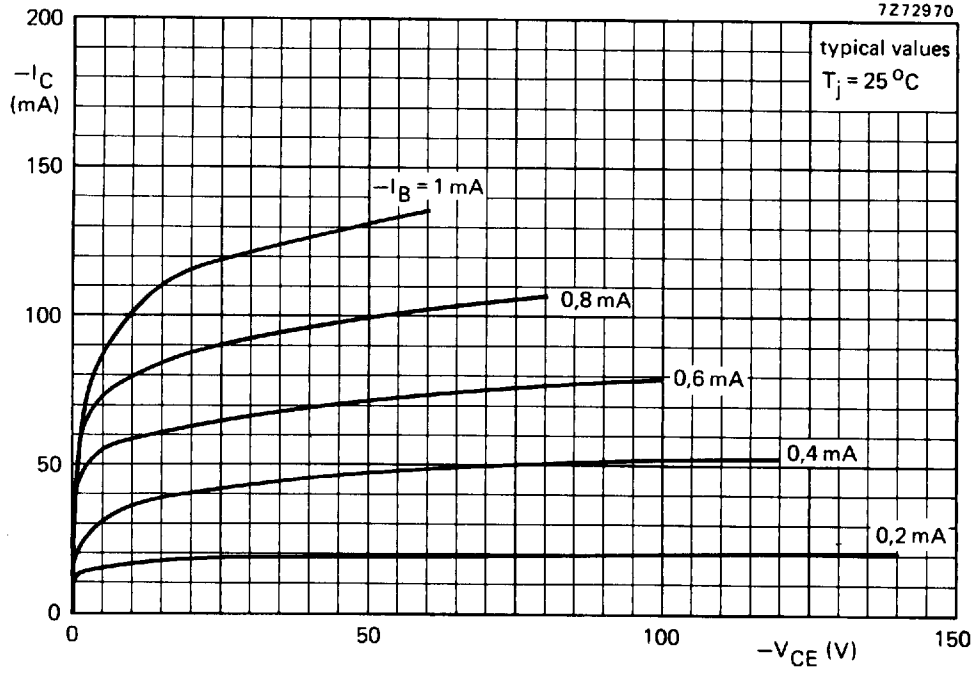

7Z72970
typical values
T_j = 25 °C
$-I_C$ (mA)
$-I_B$ = 1 mA
0,8 mA
0,6 mA
0,4 mA
0,2 mA
200
150
100
50
0
0
50
100
150
$-V_{CE}$ (V)

Fig. 7.

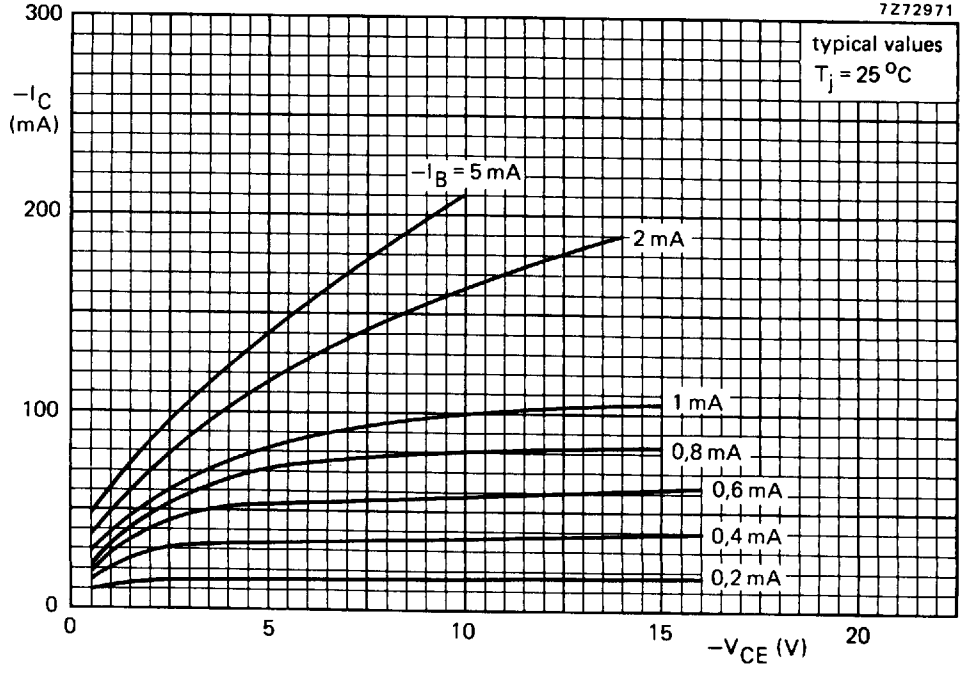

7Z72971
typical values
T_j = 25 °C
$-I_C$ (mA)
$-I_B$ = 5 mA
2 mA
1 mA
0,8 mA
0,6 mA
0,4 mA
0,2 mA
300
200
100
0
0
5
10
15
20
$-V_{CE}$ (V)

Fig. 8.

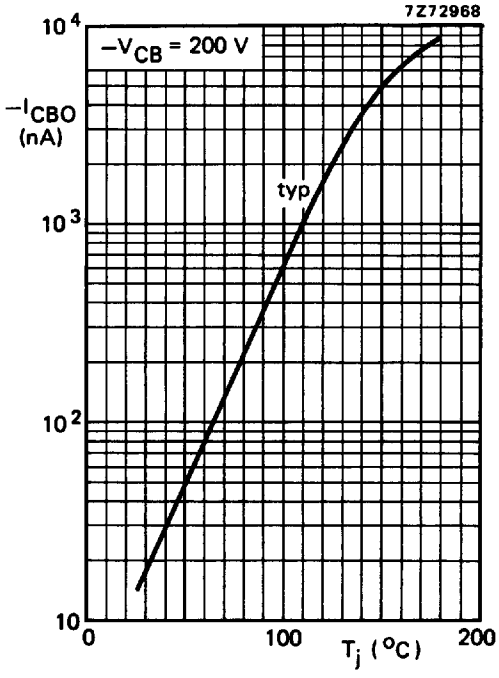


Fig. 9.

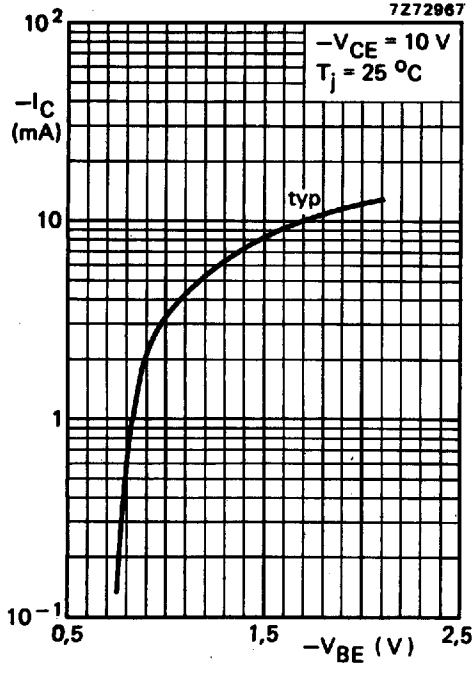


Fig. 10.

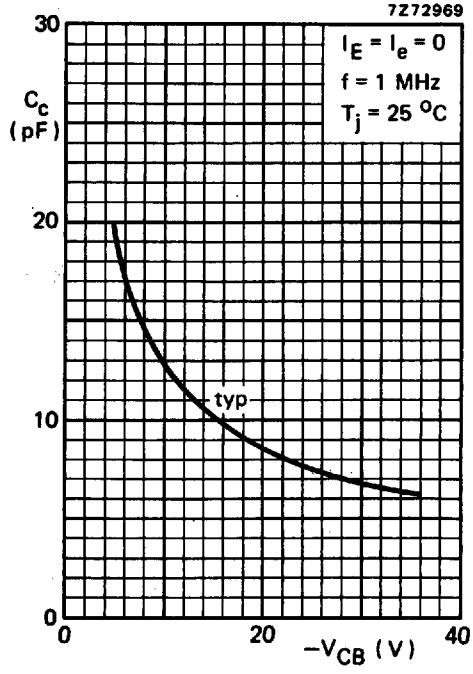


Fig. 11.

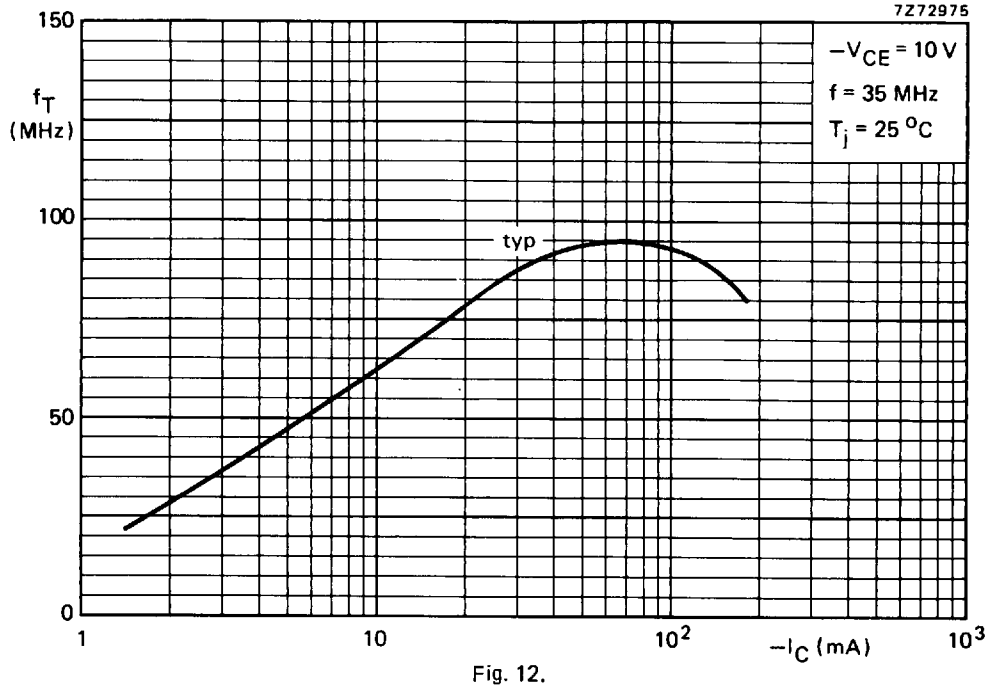

7Z72975
150
f_T (MHz)
100
50
0
$-V_{CE}$ = 10 V
f = 35 MHz
T_j = 25 °C
typ
1
10
10^2
$-I_C$ (mA)
10^3

Fig. 12.

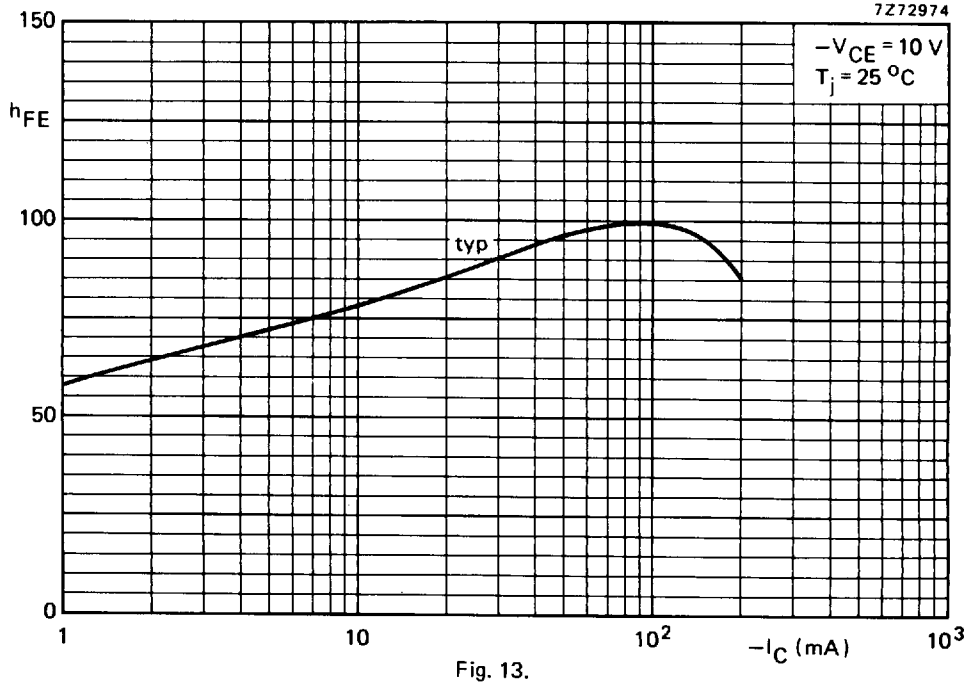

7Z72974
150
h_{FE}
100
50
0
$-V_{CE}$ = 10 V
T_j = 25 °C
typ
1
10
10^2
$-I_C$ (mA)
10^3

Fig. 13.

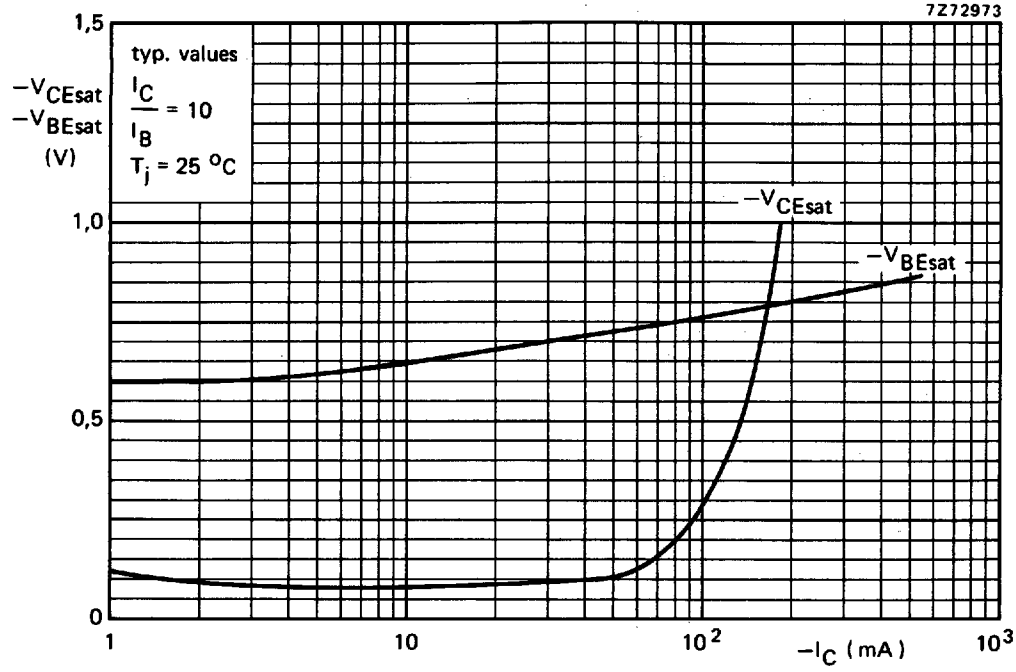

7Z72973
1,5
1,0
0,5
0
typ. values
$\frac{I_C}{I_B} = 10$
$T_j = 25\ ^oC$
$-V_{CEsat}$
$-V_{BEsat}$
(V)
$-V_{CEsat}$
$-V_{BEsat}$
1
10
10^2
10^3
$-I_C$ (mA)

Fig. 14.

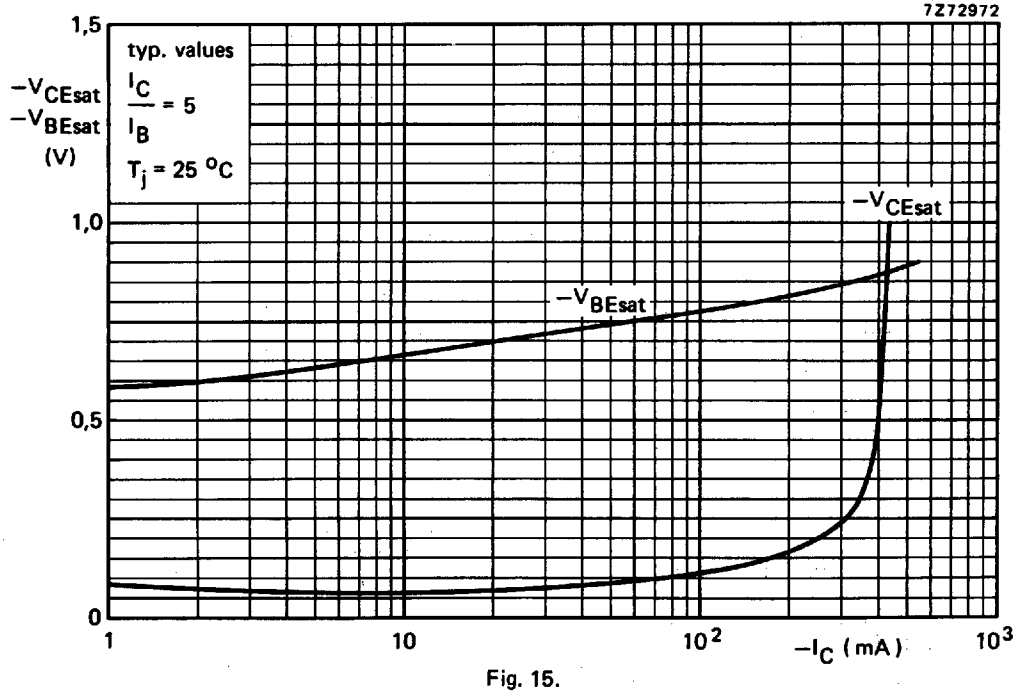

7Z72972
1,5
1,0
0,5
0
typ. values
$\frac{I_C}{I_B} = 5$
$T_j = 25\ ^oC$
$-V_{CEsat}$
$-V_{BEsat}$
(V)
$-V_{CEsat}$
$-V_{BEsat}$
1
10
10^2
10^3
$-I_C$ (mA)

Fig. 15.