BC856
BC857
BC858

T-29-15

SILICON PLANAR EPITAXIAL TRANSISTORS

P-N-P transistors, in a SOT-23 plastic envelope for use in driver and output stages of audio amplifiers in thick and thin-film circuits.

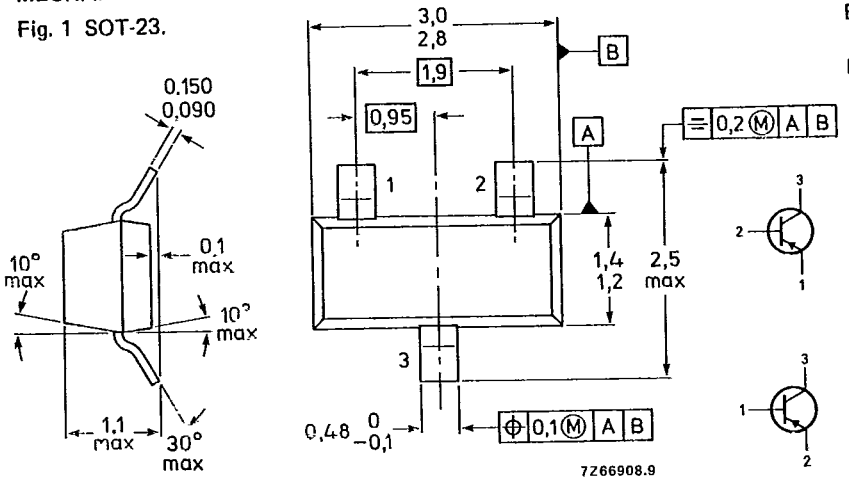
QUICK REFERENCE DATA

			BC856	BC857	BC858	
Collector-emitter voltage (+ V_{BE} = 1 V)	$-V_{CEX}$	max.	80	50	30	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	65	45	30	V
Collector current (peak value)	$-I_{CM}$	max.		200		mA
Total power dissipation up to T_{amb} = 60 °C	P_{tot}	max.		200		mW
Junction temperature	T_j	max.		150		°C
Small-signal current gain $-I_C$ = 2 mA; $-V_{CE}$ = 5 V; f = 1 kHz	h_{fe}			75 to 900		
Transition frequency at f = 35 MHz $-I_C$ = 10 mA; $-V_{CE}$ = 5 V	f_T	typ.		150		MHz
Noise figure at R_S = 2 kΩ $-I_C$ = 200 μA; $-V_{CE}$ = 5 V f = 1 kHz; B = 200 Hz	F	<		10		dB

MECHANICAL DATA

Fig. 1 SOT-23.

Dimensions in mm



TOP VIEW

Marking code

BC856A = 3A
B = 3B
BC857A = 3E
B = 3F
C = 3G
BC858A = 3J
B = 3K
C = 3L

BC856AR = 3AR
BR = 3BR
BC857AR = 3ER
BR = 3FR
CR = 3GR
BC858AR = 3JR
BC = 3KR
CR = 3LR

R-types are available on request

See also *Soldering recommendations.*

RATINGS

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

			BC856	BC857	BC858	
Collector-base voltage (open emitter)	$-V_{CBO}$	max.	80	50	30	V
Collector-emitter voltage ($+V_{BE}$ = 1 V)	$-V_{CEX}$	max.	80	50	30	V
Collector-emitter voltage (open base)	$-V_{CEO}$	max.	65	45	30	V
Emitter-base voltage (open collector)	$-V_{EBO}$	max.	5	5	5	V
Collector current (d.c.)	$-I_C$	max.		100		mA
Collector current (peak value)	$-I_{CM}$	max.		200		mA
Emitter current (peak value)	I_{EM}	max.		200		mA
Base current (peak value)	$-I_{BM}$	max.		200		mA
Total power dissipation ** up to T_{amb} = 60 °C	P_{tot}	max.		200		mW
Storage temperature	T_{stg}			−65 to + 150		°C
Junction temperature	T_j	max.		150		°C

THERMAL CHARACTERISTICS*

$T_j = P \times (R_{th\ j\text{-}t} + R_{th\ t\text{-}s} + R_{th\ s\text{-}a}) + T_{amb}$

Thermal resistance				
From junction to tab	$R_{th\ j\text{-}t}$	=	60	K/W
From tab to soldering points	$R_{th\ t\text{-}s}$	=	280	K/W
From soldering points to ambient**	$R_{th\ s\text{-}a}$	=	90	K/W

CHARACTERISTICS

T_j = 25 °C unless otherwise specified

Collector cut-off current				
$I_E = 0$; $-V_{CB}$ = 30 V; T_j 25 °C	$-I_{CBO}$	typ.	1	nA
		<	15	nA
T_j = 150 °C	$-I_{CBO}$	<	4	μA
Base-emitter voltage▲				
$-I_C$ = 2 mA; $-V_{CE}$ = 5 V	$-V_{BE}$	typ.	650	mV
			600 to 750	mV
$-I_C$ = 10 mA; $-V_{CE}$ = 5 V	$-V_{BE}$	<	820	mV

▲ $-V_{BE}$ decreases by about 2 mV/K with increasing temperature.

* See *Thermal characteristics.*

** Mounted on a ceramic substrate of 8 mm x 10 mm x 0,7 mm.

Saturation voltages *

$-I_C$ = 10 mA; $-I_B$ = 0,5 mA	$-V_{CEsat}$	typ.	75	mV
		<	300	mV
	$-V_{BEsat}$	typ.	700	mV
$-I_C$ = 100 mA; $-I_B$ = 5 mA	$-V_{CEsat}$	typ.	250	mV
		<	650	mV
	$-V_{BEsat}$	typ.	850	mV

Knee voltage

$-I_C$ = 10 mA; $-I_B$ = value for which $-I_C$ = 11 mA at $-V_{CE}$ = 1 V	$-V_{CEK}$	typ.	250	mV
		<	600	mV

Collector capacitance at f = 1 MHz $I_E = I_e$ = 0; $-V_{CB}$ = 10 V	C_c	typ.	4,5	pF
Transition frequency at f = 35 MHz $-I_C$ = 10 mA; $-V_{CE}$ = 5 V	f_T	typ.	150	MHz
Small-signal current gain at f = 1 kHz $-I_C$ = 2 mA; $-V_{CE}$ = 5 V	h_{fe}		75 to 900	
Noise figure at R_S = 2 kΩ $-I_C$ = 200 μA; $-V_{CE}$ = 5 V f = 1 kHz; B = 200 Hz	F	typ.	2	dB
		<	10	dB

D.C. current gain
$-I_C$ = 2 mA; $-V_{CE}$ = 5 V

BC856/857	h_{FE}	75 to 475
BC858	h_{FE}	75 to 800
BC856A/857A/858A	h_{FE}	125 to 250
BC856B/857B/858B	h_{FE}	220 to 475
BC857C/858C	h_{FE}	420 to 800

* $-V_{BEsat}$ decreases by about 1,7 mV/K with increasing temperature.

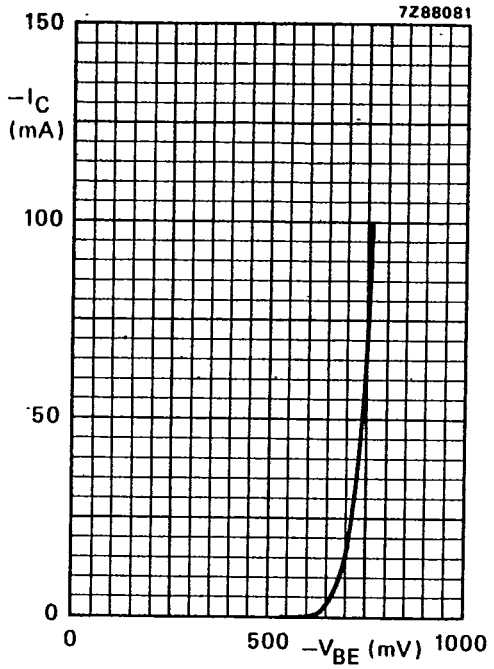


Fig. 3 Typical values. $-V_{CE} = 5$ V; $T_j = 25$ °C.

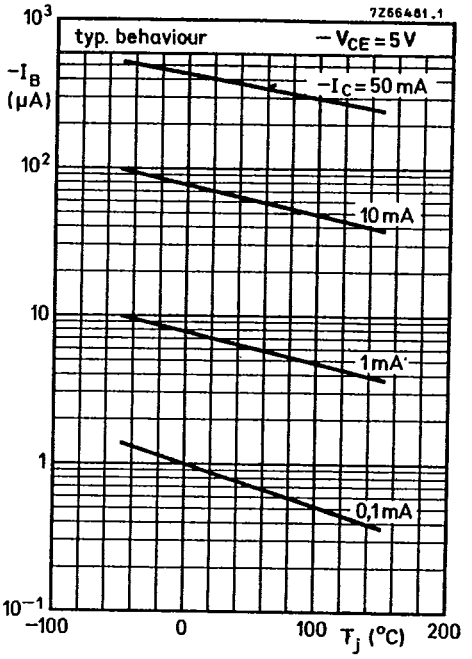


Fig. 4 Typical values.

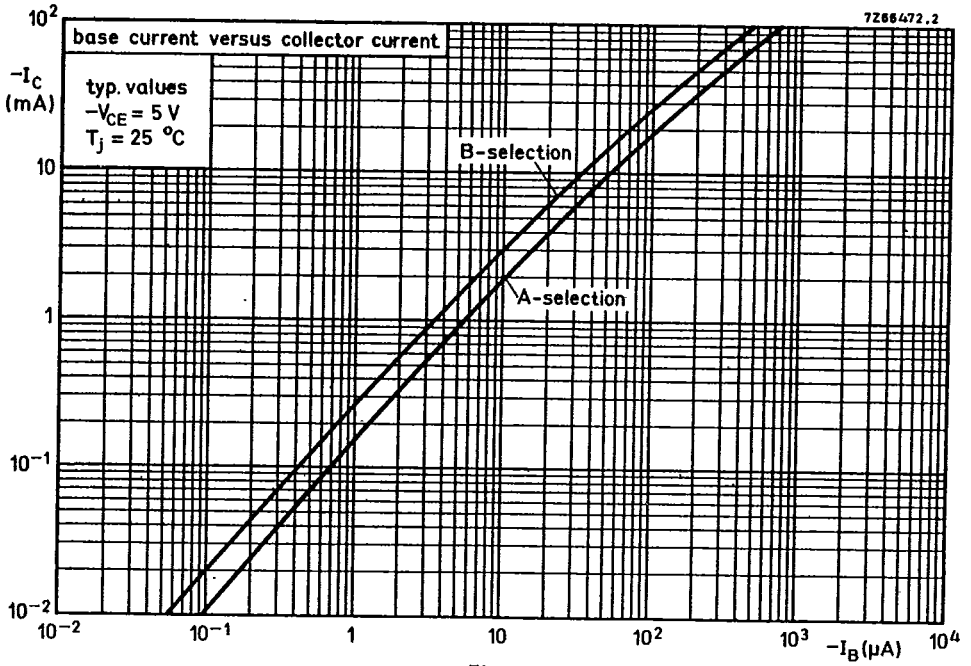


Fig. 5.

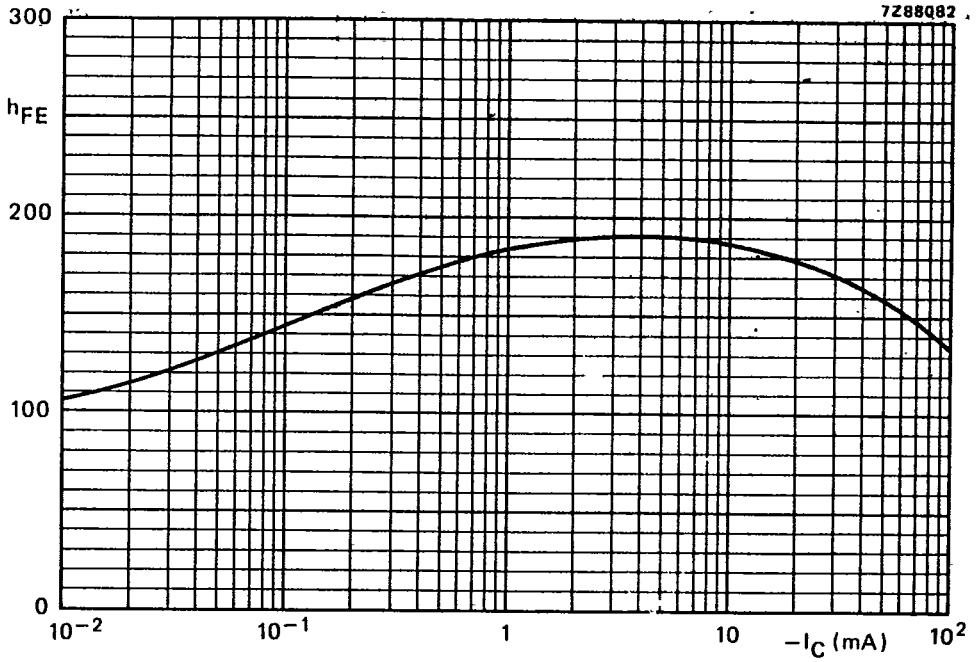


Fig. 6 Typical values D.C. current gain A-selections. $-V_{CE}$ = 5 V; T_j = 25 °C.

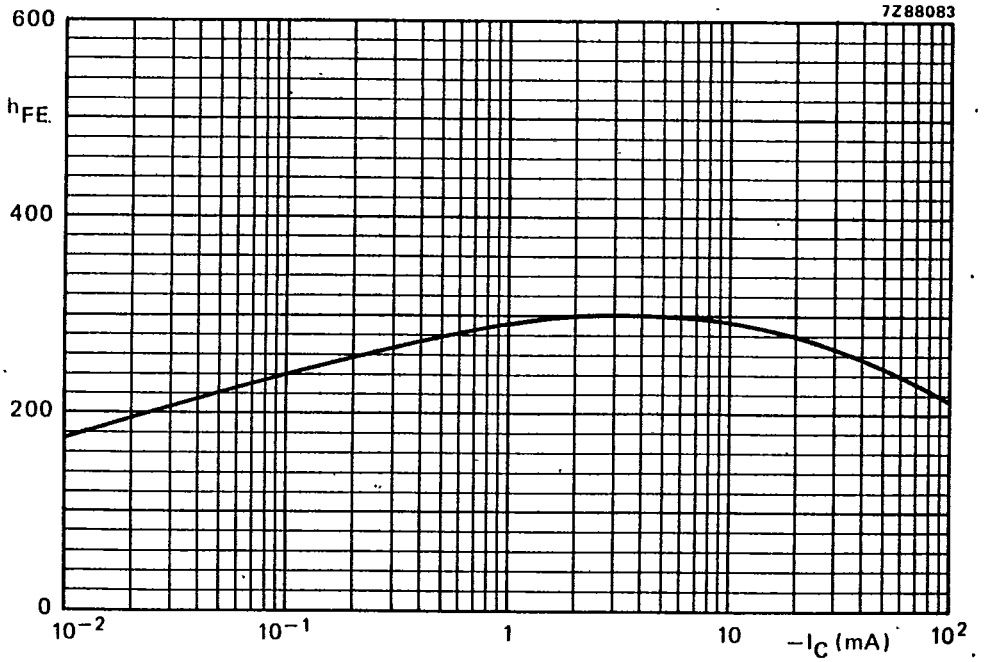


Fig. 7 Typical values D.C. current gain B-selections. $-V_{CE}$ = 5 V; T_j = 25 °C.

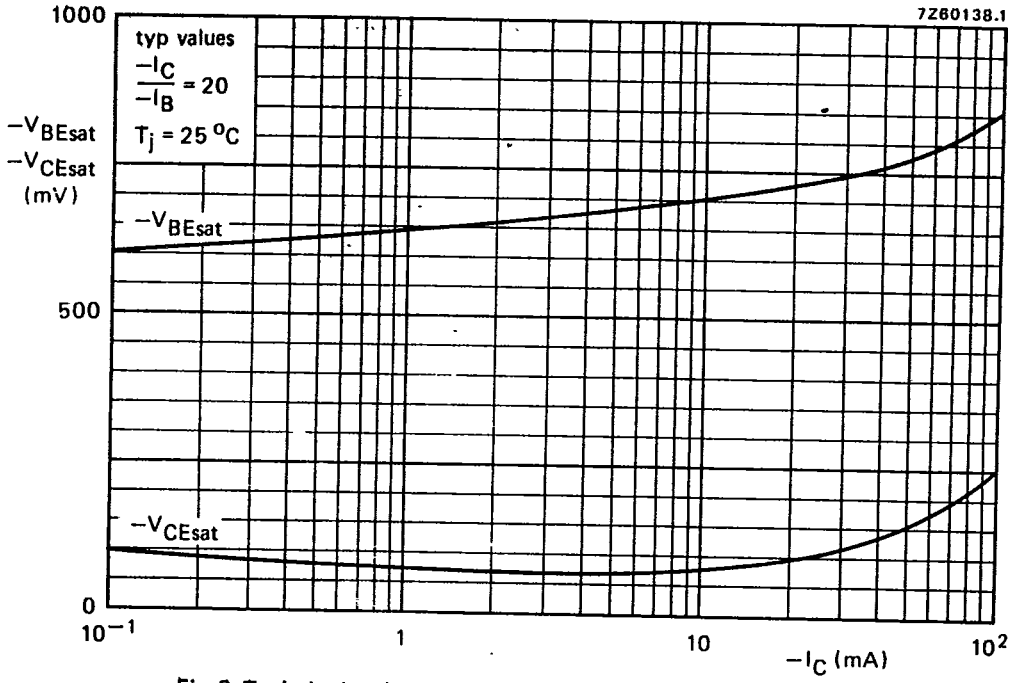


Fig. 8 Typical values base-emitter and collector-emitter saturation voltage.

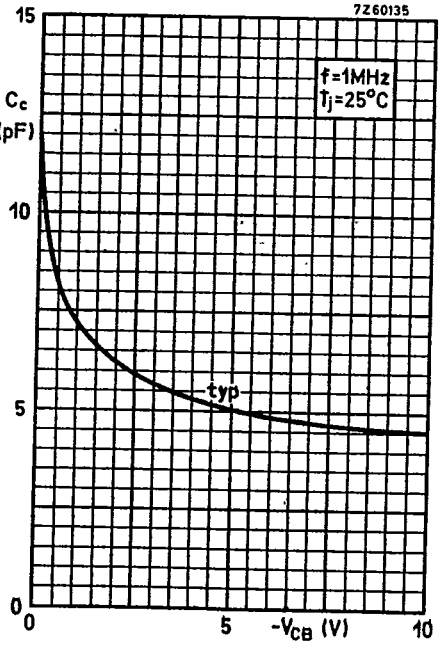


Fig. 9 Typical values.

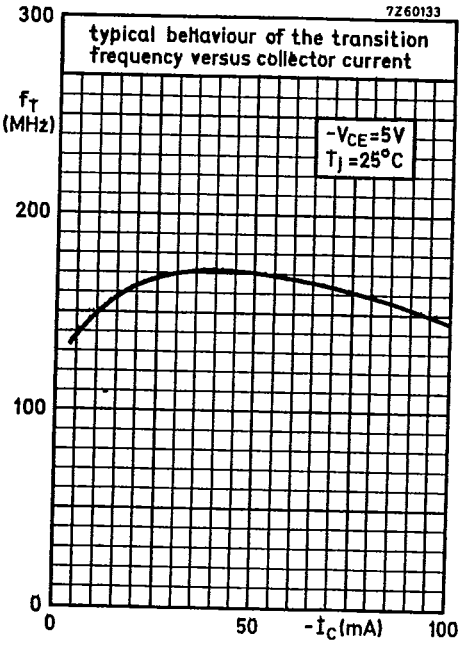


Fig. 10 Typical values. f = 35 MHz.

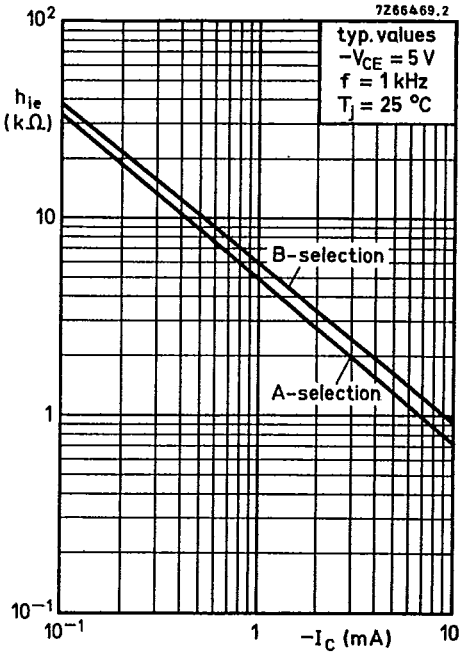


Fig. 11.

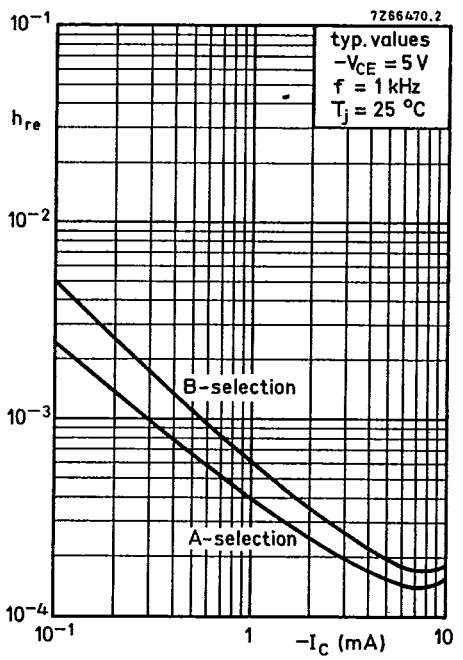


Fig. 12.

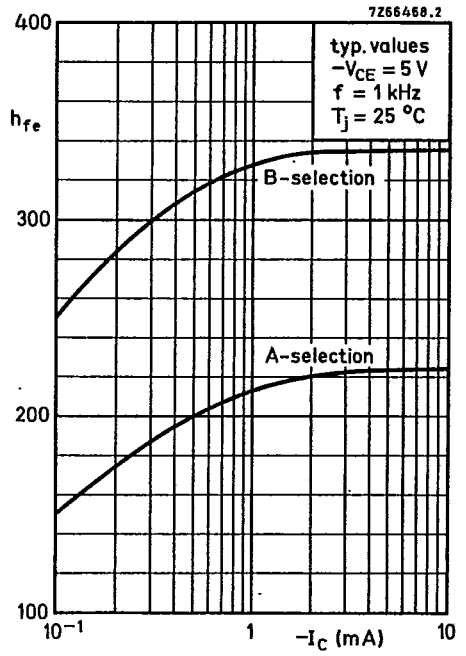


Fig. 13.

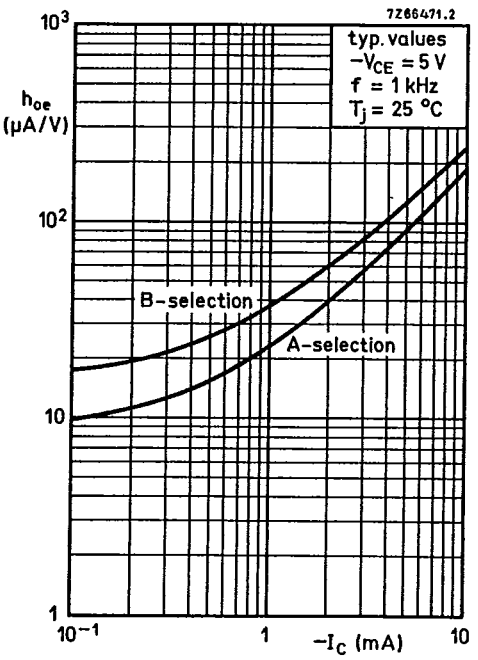


Fig. 14.