# SILICON PLANAR EPITAXIAL TRANSISTORS

N-P-N transistors in plastic TO-92 variant envelopes, primarily intended for use in driver and output stages of audio amplifiers.

The BC337, BC337A, BC338 are complementary to the BC327, BC327A and BC328 respectively.

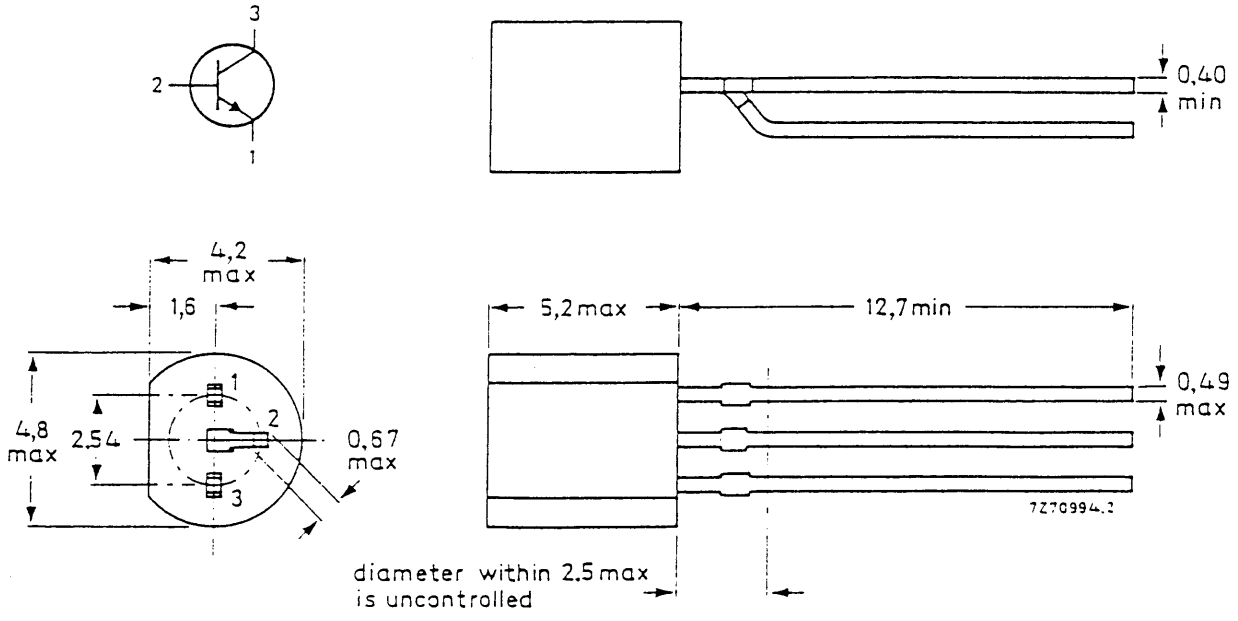
## QUICK REFERENCE DATA

| | | | BC337 | BC337A | BC338 | |
|---|---|---|---|---|---|---|
| Collector-emitter voltage ($V_{BE}$ = 0) | $V_{CES}$ | max. | 50 | 60 | 30 | V |
| Collector-emitter voltage (open base) | $V_{CEO}$ | max. | 45 | 60 | 25 | V |
| Collector current (peak value) | $I_{CM}$ | max. | | 1000 | | mA |
| Total power dissipation up to $T_{amb}$ = 25 °C | $P_{tot}$ | max. | | 800 | | mW |
| Junction temperature | $T_j$ | max. | | 150 | | °C |
| Transition frequency at f = 35 MHz<br>$I_C$ = 10 mA; $V_{CE}$ = 5 V | $f_T$ | typ. | | 100 | | MHz |
| D.C. current gain<br>$I_C$ = 100 mA; $V_{CE}$ = 1 V | $h_{FE}$ | | | 100 to 600 | | |

## MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-92 variant.



## RATINGS

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

| | | | BC337 | BC337A | BC338 | |
|---|---|---|---|---|---|---|
| Collector-emitter voltage ($V_{BE}$ = 0) | $V_{CES}$ | max. | 50 | 60 | 30 | V |
| Collector-emitter voltage (open base) $I_C$ = 10 mA | $V_{CEO}$ | max. | 45 | 60 | 25 | V |
| Emitter-base voltage (open collector) | $V_{EBO}$ | max. | 5 | 5 | 5 | V |
| Collector current (d.c.) | $I_C$ | max. | | 500 | | mA |
| Collector current (peak value) | $I_{CM}$ | max. | | 1000 | | mA |
| Emitter current (peak value) | $-I_{EM}$ | max. | | 1000 | | mA |
| Base current (d.c.) | $I_B$ | max. | | 100 | | mA |
| Base current (peak value) | $I_{BM}$ | max. | | 200 | | mA |
| Total power dissipation at $T_{amb}$ = 25 °C | $P_{tot}$ | max. | | 625 | | mW |
| up to $T_{amb}$ = 25 °C | $P_{tot}$ | max. | | 800 | | mW* |
| Storage temperature | $T_{stg}$ | | | −65 to +150 | | °C |
| Junction temperature | $T_j$ | max. | | 150 | | °C |

## THERMAL RESISTANCE

| | | | | |
|---|---|---|---|---|
| From junction to ambient in free air | $R_{th\ j\text{-}a}$ | = | 0,2 | K/mW |
| From junction to ambient | $R_{th\ j\text{-}a}$ | = | 0,156 | K/mW* |

* Transistor mounted on printed circuit board, max. lead length 4 mm, mounting pad for collector lead min. 10 mm x 10 mm.

## CHARACTERISTICS

$T_j$ = 25 °C unless otherwise specified

| | | | |
|---|---|---|---|
| Collector cut-off current | | | |
| $I_E$ = 0; $V_{CB}$ = 20 V; $T_j$ = 25 °C | $I_{CBO}$ | < | 100 nA |
| $I_E$ = 0; $V_{CB}$ = 20 V; $T_j$ = 150 °C | $I_{CBO}$ | < | 5 μA |
| Emitter cut-off current | | | |
| $I_C$ = 0; $V_{EB}$ = 5 V | $I_{EBO}$ | < | 10 μA |
| Base emitter voltage* | | | |
| $I_C$ = 500 mA; $V_{CE}$ = 1 V | $V_{BE}$ | < | 1,2 V |
| Saturation voltage | | | |
| $I_C$ = 500 mA; $I_B$ = 50 mA | $V_{CEsat}$ | < | 700 mV |
| D.C. current gain | | | |
| $I_C$ = 500 mA; $V_{CE}$ = 1 V | $h_{FE}$ | > | 40 |
| $I_C$ = 100 mA; $V_{CE}$ = 1 V; BC337; BC338 | $h_{FE}$ | | 100 to 600 |
| BC337A | $h_{FE}$ | | 100 to 400 |
| BC337-16 \| BC338-16 | $h_{FE}$ | | 100 to 250 |
| BC337-25 \| BC338-25 | $h_{FE}$ | | 160 to 400 |
| BC337-40 \| BC338-40 | $h_{FE}$ | | 250 to 600 |
| Transition frequency at f = 35 MHz | | | |
| $I_C$ = 10 mA; $V_{CE}$ = 5 V | $f_T$ | typ. | 200 MHz |
| Collector capacitance at f = 1 MHz | | | |
| $I_E = I_e$ = 0; $V_{CB}$ = 10 V | $C_c$ | typ. | 5 pF |

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

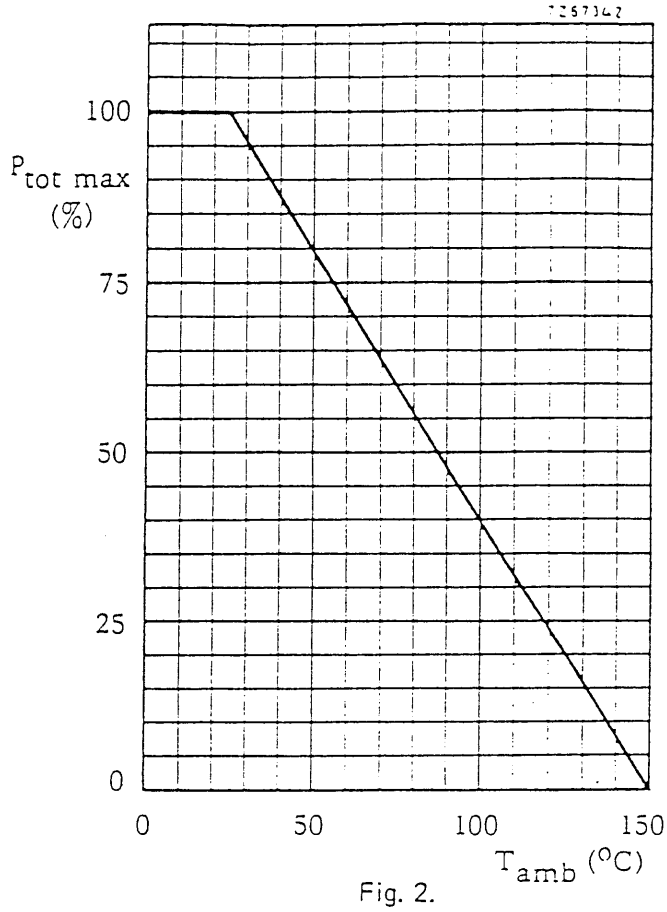

100
$P_{tot\ max}$ (%)
75
50
25
0
0
50
100
150
$T_{amb}$ (°C)

Fig. 2.

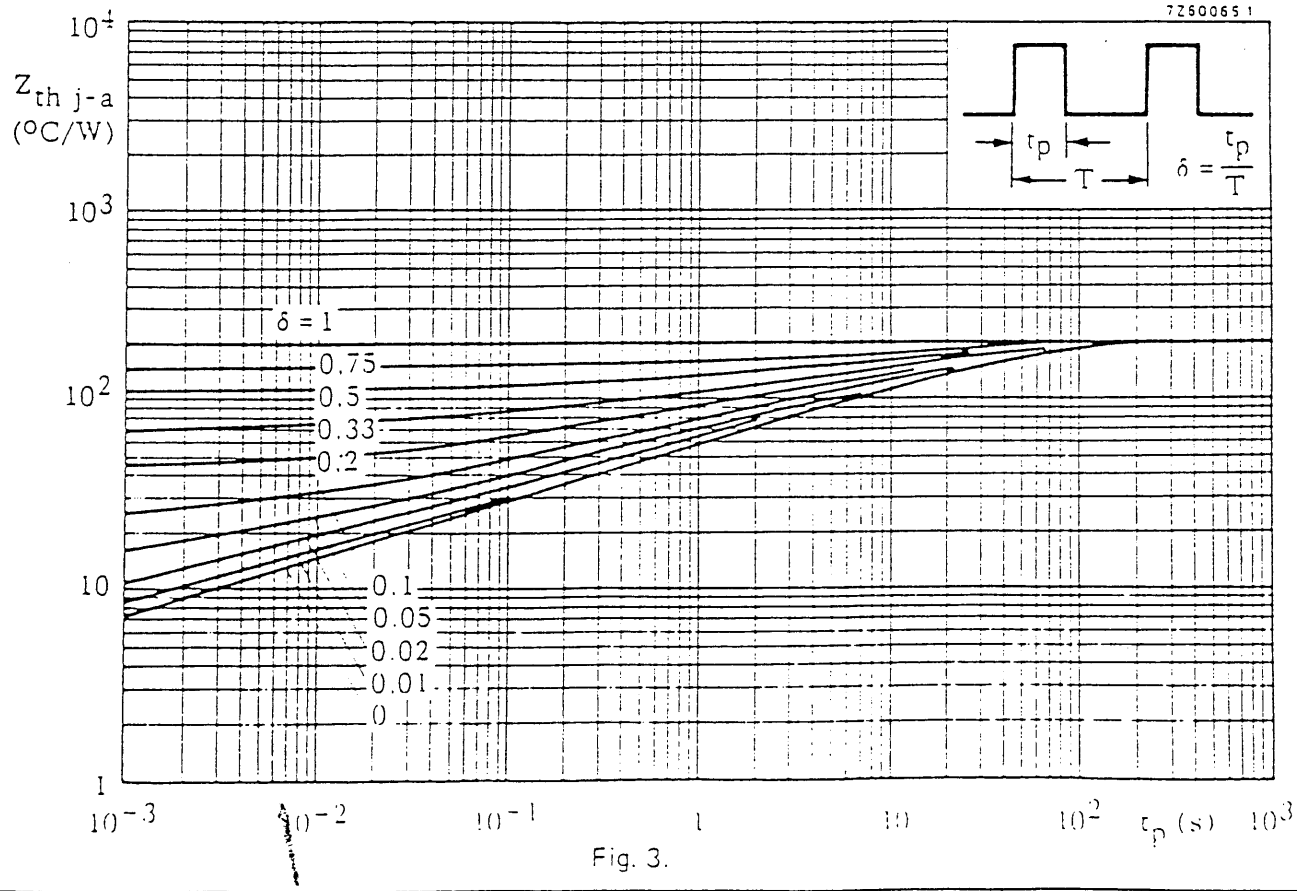

$10^4$
$Z_{th\ j\text{-}a}$ (°C/W)
$10^3$
$10^2$
10
1
δ = 1
0.75
0.5
0.33
0.2
0.1
0.05
0.02
0.01
0
$t_p$
T
$\delta = \frac{t_p}{T}$
$10^{-3}$
$10^{-2}$
$10^{-1}$
1
10
$10^2$
$t_p$ (s)
$10^3$

Fig. 3.

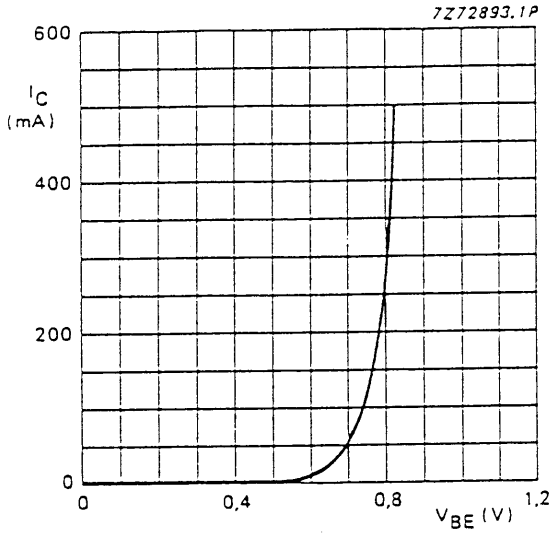



Fig. 4 $V_{CE}$ = 1 V; $T_j$ = 25 °C; typical values.

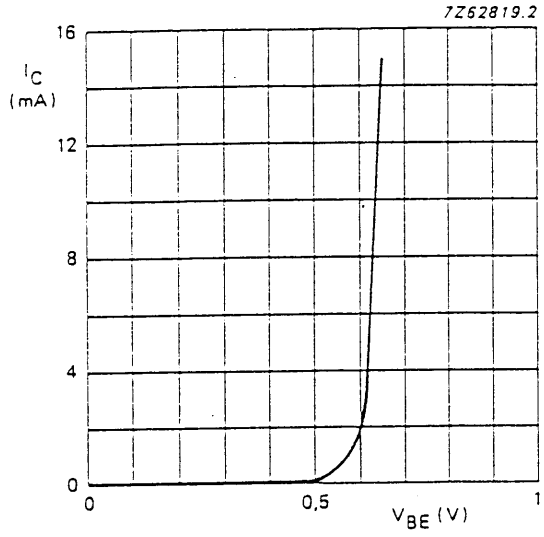



Fig. 5 $V_{CE}$ = 5 V; $T_j$ = 25 °C; typical values.

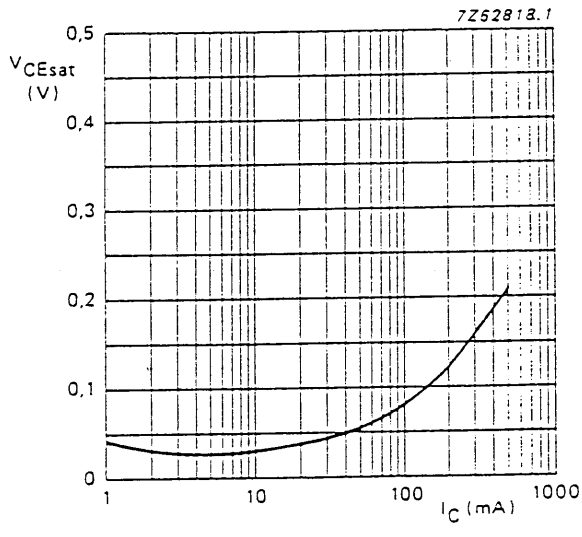



Fig. 6 $I_C/I_B$ = 10; $T_j$ = 25 °C; typical values.

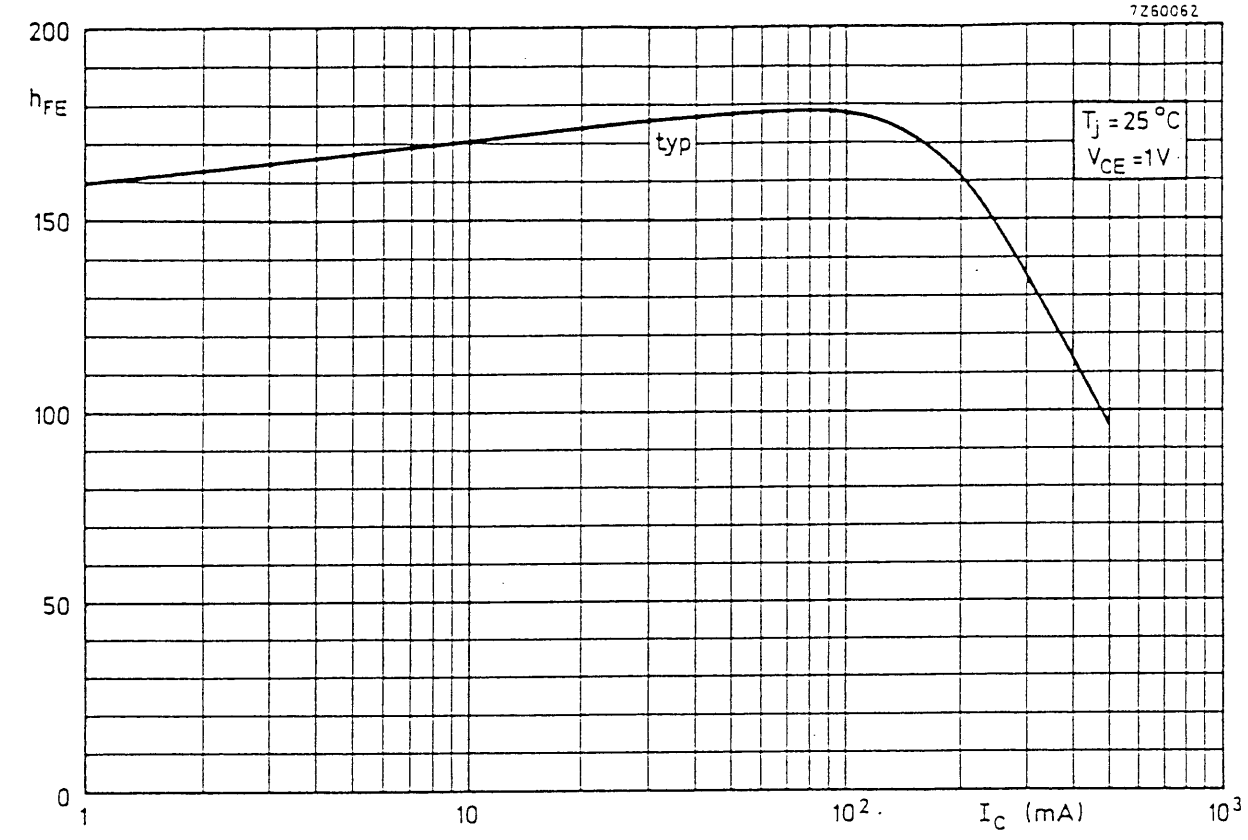



Fig. 7.

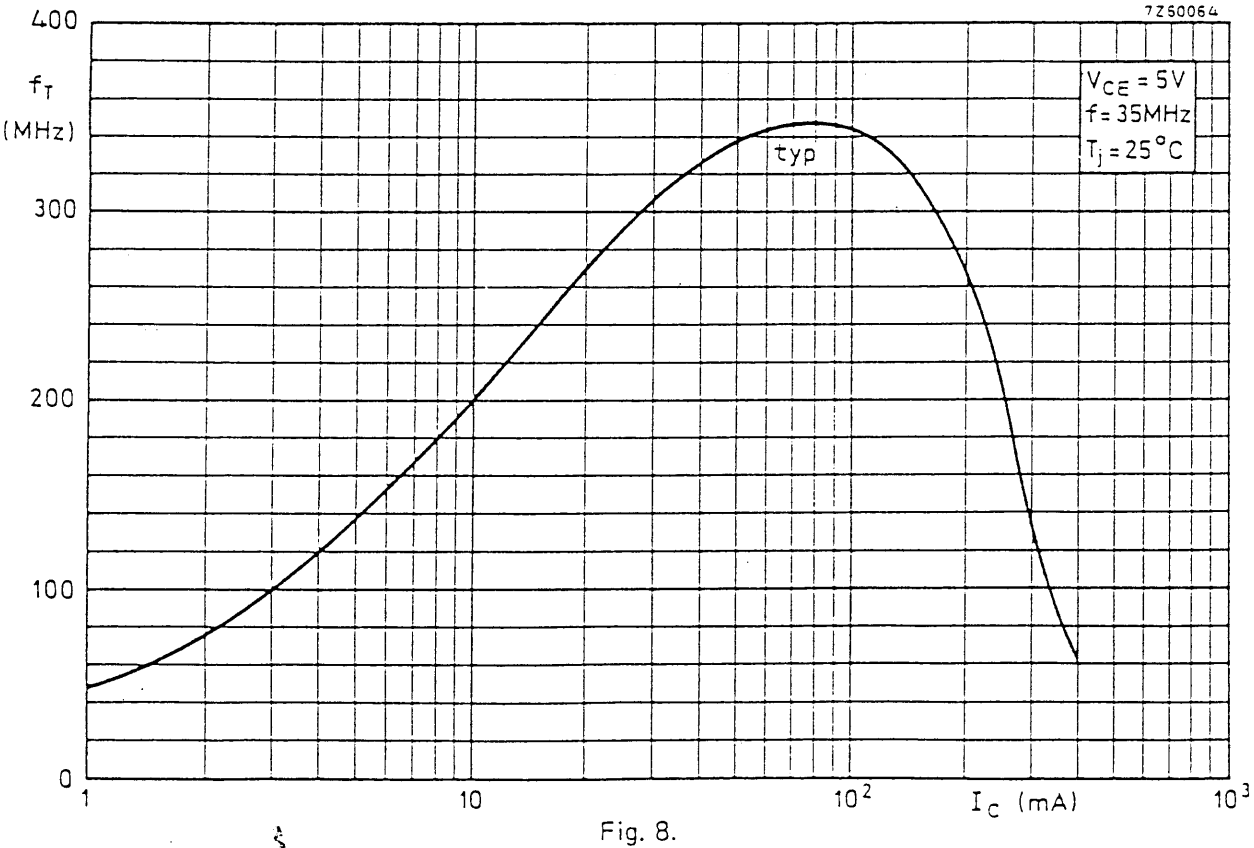



Fig. 8.

APPLICATION INFORMATION, see BC327; BC328.