

V.H.F. POWER TRANSISTOR

N-P-N epitaxial planar transistor intended for use in class-A, B and C operated mobile, industrial and military transmitters with a supply voltage of 28 V. The transistor is resistance stabilized. Every transistor is tested under severe load mismatch conditions.

It has a TO-39 metal envelope with the collector connected to the case.

QUICK REFERENCE DATA

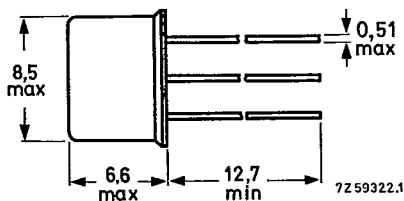
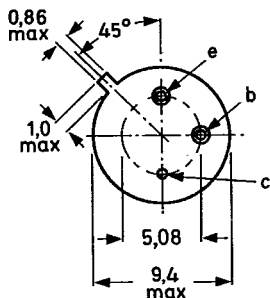
R.F. performance up to $T_{mb} = 25\text{ }^{\circ}\text{C}$ in an unneutralized common-emitter class-B circuit

mode of operation	V_{CE} V	f MHz	P_L W	G_p dB	η %	\bar{z}_i Ω	\bar{Y}_L mS
c.w.	28	175	4	> 10	> 65	$2,3 + j1,6$	$8,9 - j18,1$

MECHANICAL DATA

Dimensions in mm

Fig.1 TO-39/1; collector connected to case.



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

Accessories: 56245 (distance disc).

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

Collector-base voltage (open emitter)
peak value

V_{CBOM} max. 65 V

Collector-emitter voltage (open base)

V_{CEO} max. 36 V

Emitter-base voltage (open collector)

V_{EBO} max. 4 V

Collector current (average)

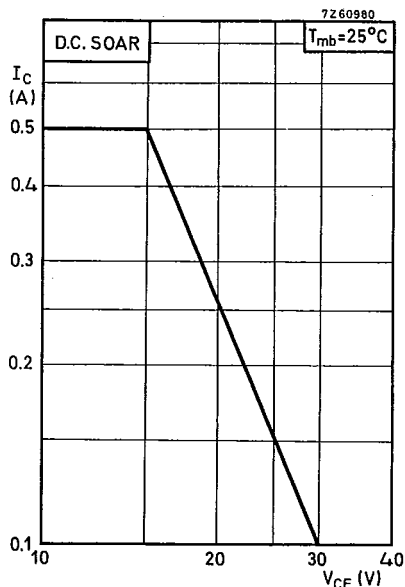
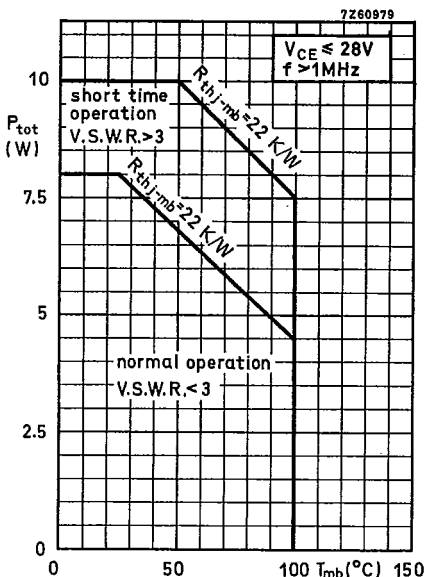
$I_{C(AV)}$ max. 0.5 A

Collector current (peak value) $f > 1$ MHz

I_{CM} max. 1.5 A

Total power dissipation up to $T_{mb} = 25$ °C
 $f > 1$ MHz

P_{tot} max. 8 W



Storage temperature

T_{stg} -65 to +200 °C

Operating junction temperature

T_j max. 200 °C

THERMAL RESISTANCE

From junction to mounting base

$R_{th j-mb} = 22 K/W$

From mounting base to heatsink
with a boron nitride washer
for electrical insulation

$R_{th mb-h} = 2.5 K/W$

CHARACTERISTICS

$T_j = 25^\circ\text{C}$ unless otherwise specified

Collector cut-off current

$$I_B = 0; V_{CE} = 28 \text{ V}$$

$$I_{CEO} < 5 \text{ mA}$$

Breakdown voltages

Collector-base voltage

$$\text{open emitter, } I_C = 1 \text{ mA}$$

$$V_{(BR)CBO} > 65 \text{ V}$$

Collector-emitter voltage

$$\text{open base, } I_C = 10 \text{ mA}$$

$$V_{(BR)CEO} > 36 \text{ V}$$

Emitter-base voltage

$$\text{open collector; } I_E = 1 \text{ mA}$$

$$V_{(BR)EBO} > 4 \text{ V}$$

Transient energy

$$L = 25 \text{ mH; } f = 50 \text{ Hz}$$

open base

$$E > 0.5 \text{ ms}$$

$$-V_{BE} = 1.5 \text{ V; } R_{BE} = 33 \Omega$$

$$E > 0.5 \text{ ms}$$

D. C. current gain

$$I_C = 500 \text{ mA; } V_{CE} = 5 \text{ V}$$

$$h_{FE} > 5$$

Transition frequency

$$I_C = 400 \text{ mA; } V_{CE} = 20 \text{ V}$$

$$f_T \text{ typ. } 500 \text{ MHz}$$

Collector capacitance at $f = 1 \text{ MHz}$

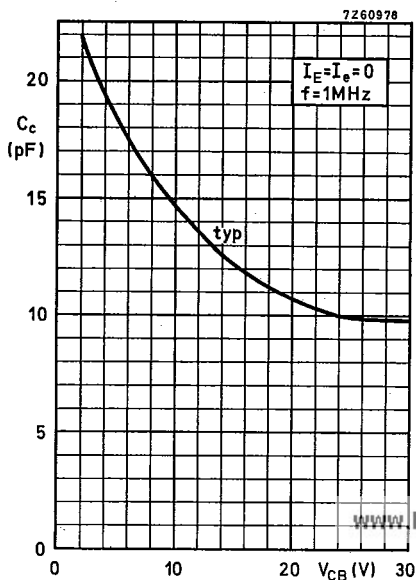
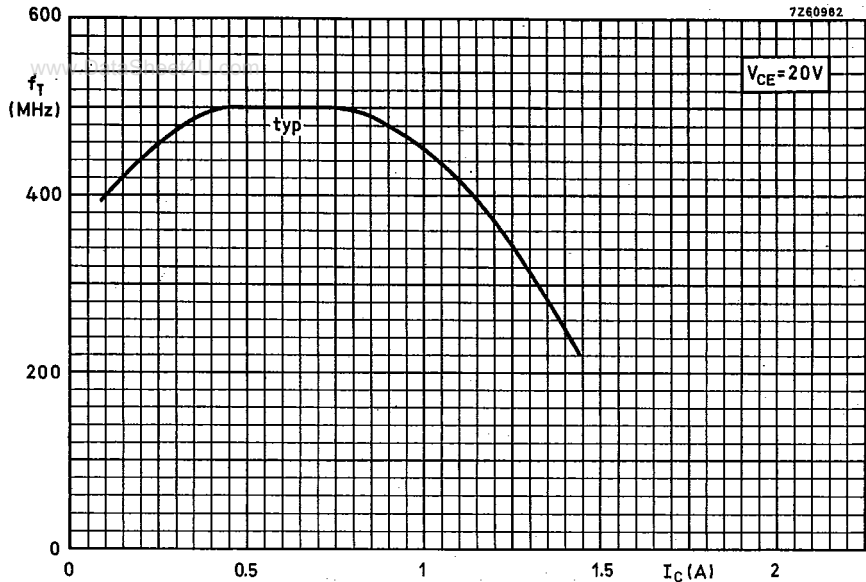
$$I_E = I_e = 0; V_{CB} = 30 \text{ V}$$

$$C_c \text{ typ. } 10 \text{ pF}$$
$$< 15 \text{ pF}$$

Feedback capacitance at $f = 1 \text{ MHz}$

$$I_C = 25 \text{ mA; } V_{CE} = 30 \text{ V}$$

$$-C_{re} \text{ typ. } 7.5 \text{ pF}$$



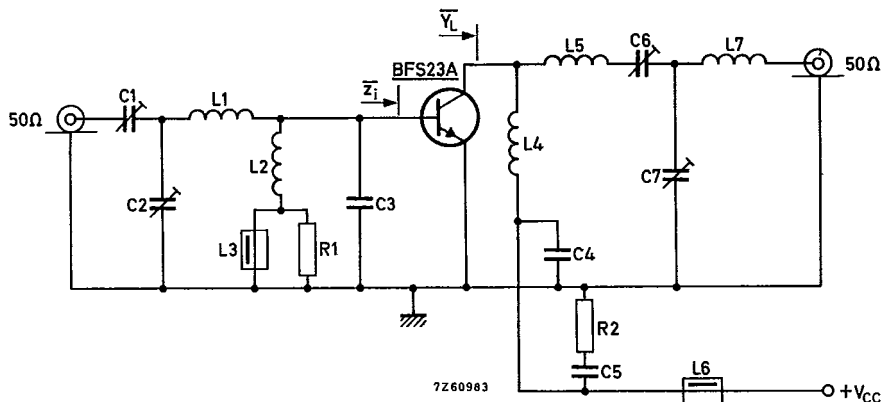
APPLICATION INFORMATION

R. F. performance in c. w. operation (unneutralised common-emitter class B circuit)

$V_{CC} = 28 \text{ V}$; T_{mb} up to $25 \text{ }^\circ\text{C}$

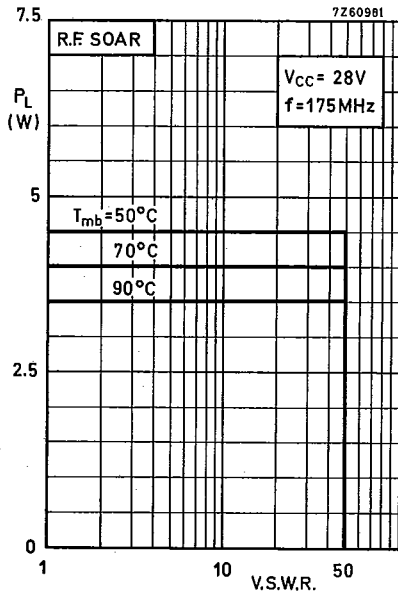
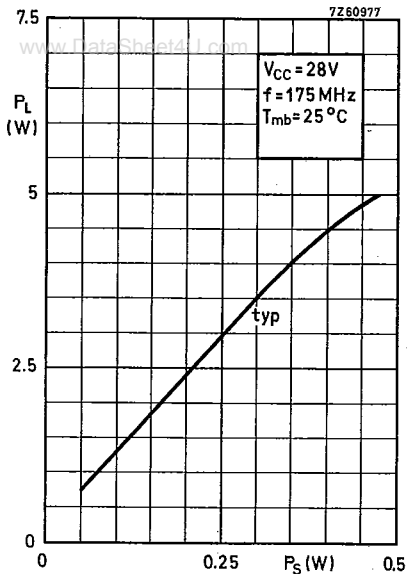
f(MHz)	P_S (W)	P_L (W)	I_C (A)	G_p (dB)	η (%)	\bar{z}_i (Ω)	\bar{Y}_L (mS)
175	< 0.40	4	< 0.22	> 10	> 65	$2.3 + j1.6$	$8.9 - j18.1$

Test circuit



- C1 = C6 = 4 to 29 pF air trimmer with insulated rotor
- C2 = C7 = 4 to 29 pF air trimmer with non-insulated rotor
- C3 = 39 pF ceramic
- C4 = 100 pF ceramic
- C5 = 15 nF polyester

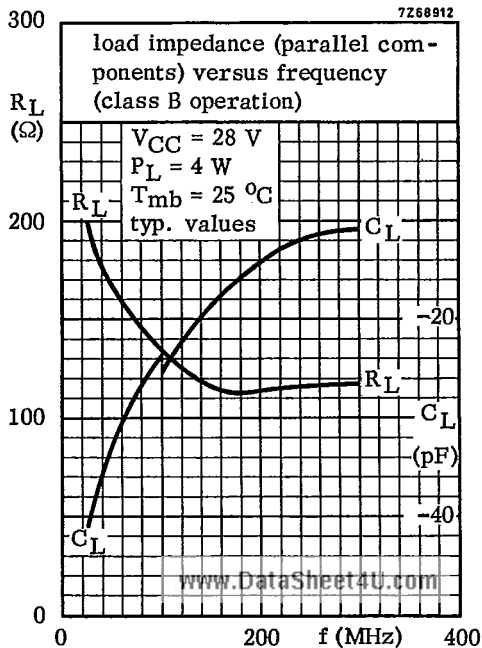
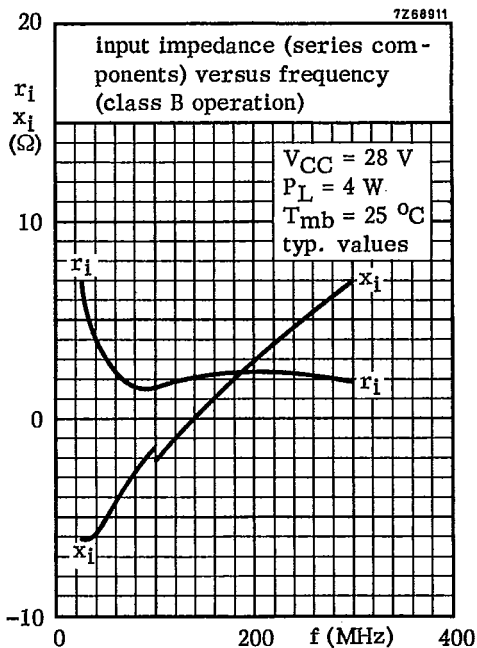
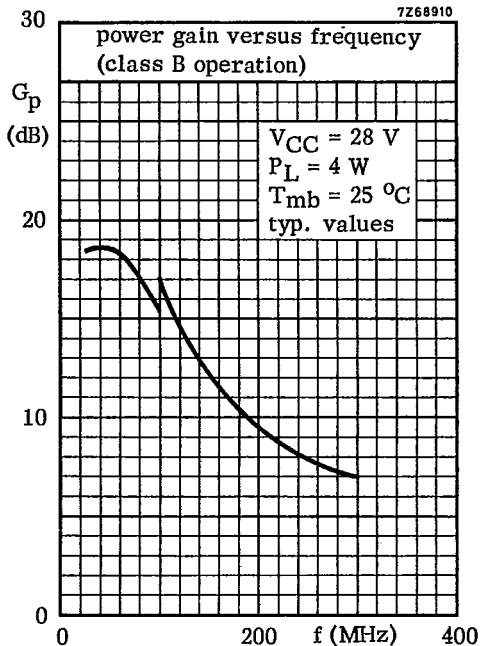
- L1 = 1 turn enamelled Cu wire (1.0 mm); int. diam. 10 mm; leads 2 x 10 mm
- L2 = 6 turns enamelled Cu wire (0.7 mm); int. diam. 4 mm; leads 2 x 10 mm
- L3 = L6 = ferroxcube choke (code number 4312 020 36640)
- L4 = 8 turns enamelled Cu wire (0.7 mm); int. diam. 4 mm; leads 2 x 10 mm
- L5 = 5 turns enamelled Cu wire (1.0 mm); winding pitch 1.0 mm; int. diam. 8 mm; leads 2 x 10 mm
- L7 = 4 turns enamelled Cu wire (1.0 mm); winding pitch 1.0 mm; int. diam. 6 mm; leads 2 x 5 mm
- R1 = R2 = 10 Ω carbon



For high voltage operation, a stabilized power supply is generally used. The graph shows the allowable output power under nominal conditions as a function of the V.S.W.R., with heat-sink temperature as parameter.

OPERATING NOTE Below 100 MHz a base-emitter resistor of $10\ \Omega$ is recommended to avoid oscillation. This resistor must be effective for both d.c. and r.f.

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