

MICROWAVE POWER TRANSISTORS FOR BROADBAND AMPLIFIERS

NPN transistors for use in common-base, class B, wideband amplifiers under CW conditions in military and professional applications and intended to drive PZ1418B30U/PZ1721B25U/PZ2024B20U family.

Features

- Interdigitated structure giving a high emitter efficiency
- Diffused emitter ballasting resistors providing excellent current sharing and withstanding a high VSWR
- Gold metallization realizing a very good stability of the characteristics and an excellent life-time
- Multicell geometry giving good balance of dissipated power and low thermal resistance
- 5 GHz technology

The transistors are housed in a ceramic flange envelope (FO-57C).

Internal input and output prematching ensures good stability and easy broadband use.

QUICK REFERENCE DATA

Microwave performance up to $T_{mb} = 25\text{ }^{\circ}\text{C}$ in a common-base class-B wideband amplifier

type number	f GHz	V _{CC} V	P ₁ W	G _p dB	η_C %	z _i Ω	Z _L Ω
PZ1418B15U	1.4 to 1.8	28	≥ 1.5	≥ 7	≥ 38	see Fig. 6	see Fig. 7
PZ1721B12U	1.7 to 2.1	28	≥ 1.7	≥ 6.8	≥ 35	see Fig. 11	see Fig. 12
PZ2024B10U	2.0 to 2.4	28	≥ 9	≥ 5.6	≥ 30	see Fig. 16	see Fig. 17

MECHANICAL DATA

Dimensions in mm

FO-57C (see Fig. 1)

WARNING

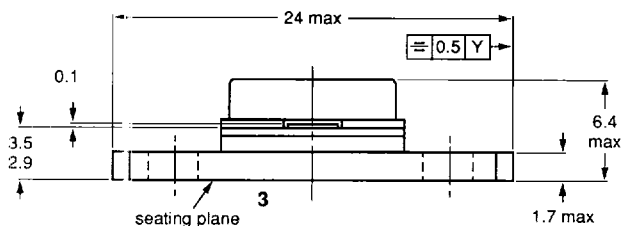
Product and environmental safety – toxic materials

This product contains beryllium oxide. The product is entirely safe provided that the BeO slab is not damaged. All persons who handle, use or dispose of this product should be aware of its nature and of the necessary safety precautions.

After use, dispose of as chemical or special waste according to the regulations applying at the location of the user. It must never be thrown out with general industrial or domestic waste.

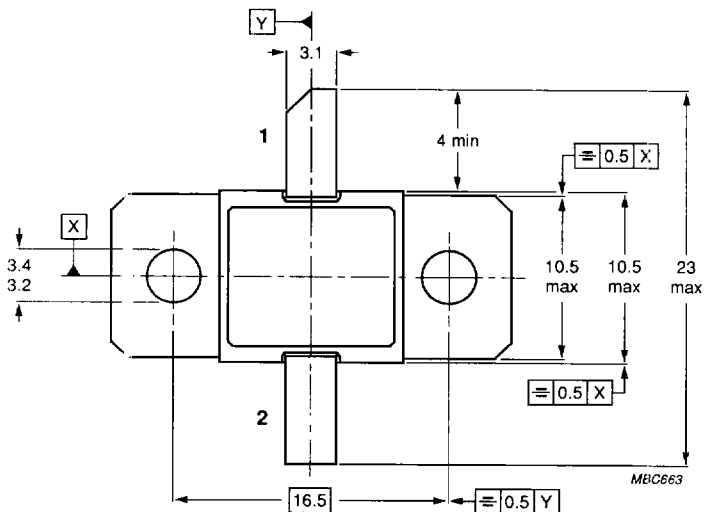
Fig. 1 FO-57C.

Torque on screw: max 0,5 Nm
Recommended screw: M3



Pinning

- 1 = collector
- 2 = emitter
- 3 = base



RATINGS

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

Collector-base voltage open emitter	V_{CBO}	max.	40 V
Collector-emitter voltage $R_{BE} = 0$ open base	V_{CES} V_{CEO}	max. max.	35 V 15 V
Emitter-base voltage open collector	V_{EBO}	max.	3 V
Collector current (DC)	I_C	max.	2 A
Total power dissipation up to $T_{mb} = 75\text{ °C}$	P_{tot}	max.	27 W
Storage temperature	T_{stg}		-65 to +200 °C
Junction temperature	T_j	max.	+200 °C
Lead soldering temperature	T_{sld}	max.	+235 °C

THERMAL RESISTANCE (at $T_j = 75\text{ °C}$)

From junction to mounting base	$R_{th\ j-mb}$	max.	4 K/W
From mounting base to heatsink	$R_{th\ mb-h}$	max.	0.2 K/W

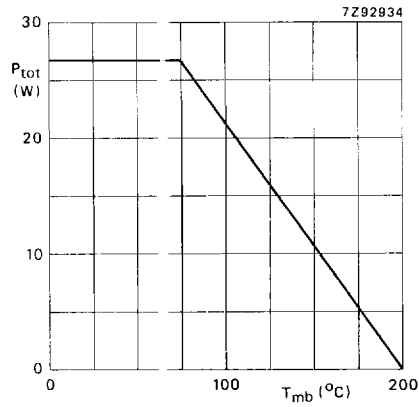


Fig. 2 Power derating curve as a function of mounting base temperature.

CHARACTERISTICS

$T_{mb} = 25\text{ }^{\circ}\text{C}$

Collector cut-off current

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

$I_E = 0; V_{CB} = 40\text{ V}$

$R_{BE} = 0; V_{CE} = 35\text{ V}$

Emitter cut-off current

$I_C = 0; V_{EB} = 1.5\text{ V}$

I_{CBO} max. 2.5 mA

I_{CBO} max. 5 mA

I_{CES} max. 25 mA

I_{EBO} max. 100 μA

APPLICATION INFORMATION (type PZ1413B15U)

Microwave performance up to $T_{mb} = 25\text{ }^{\circ}\text{C}$ in a common-base class-B wideband amplifier

type number	f GHz	V _{CC} V	P _L W	G _p dB	η _C %	z _i Ω	Z _L Ω
PZ1418B15U	1.4 to 1.8	28	≥ 12.5 typ. 15	≥ 7 typ. 7.8	≥ 38 typ. 45	see Fig.6	see Fig.7

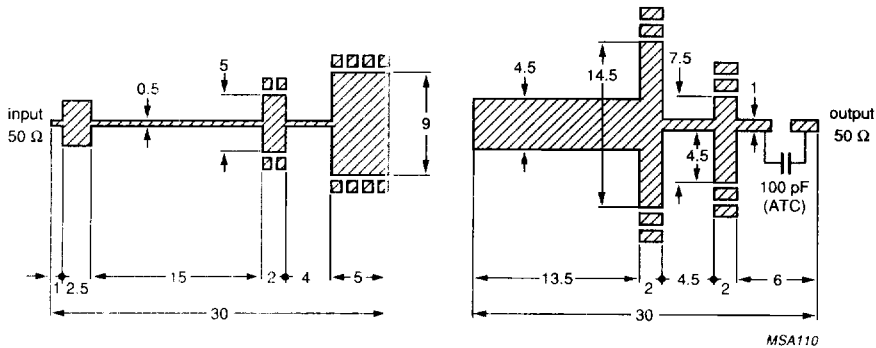


Fig. 3 Wideband test circuit boards for 1.4 to 1.8 GHz (dimensions in mm); Epsilam p.c. board; thickness 0.635 mm; ε_r = 10.

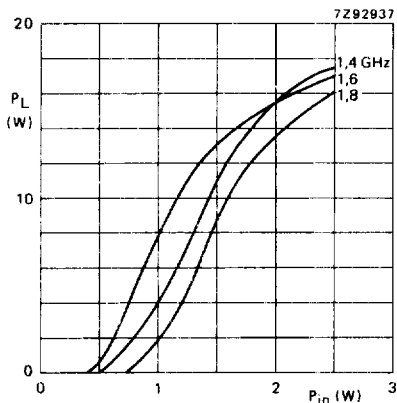


Fig. 4 Load power as a function of input power; typical values.

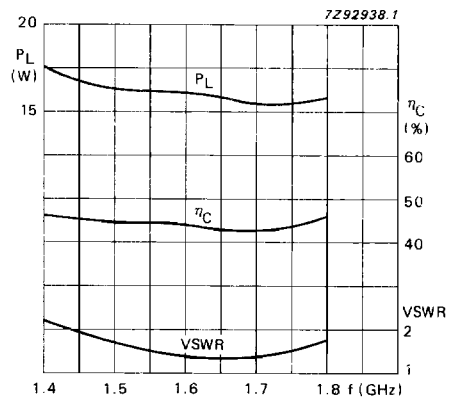


Fig. 5 Load power, efficiency and VSWR as a function of frequency; typical values; P_{in} = 2.5 W.

Conditions for Figs 4 and 5:

V_{CC} = 28 V; class-B operation; T_{mb} = 25 °C.

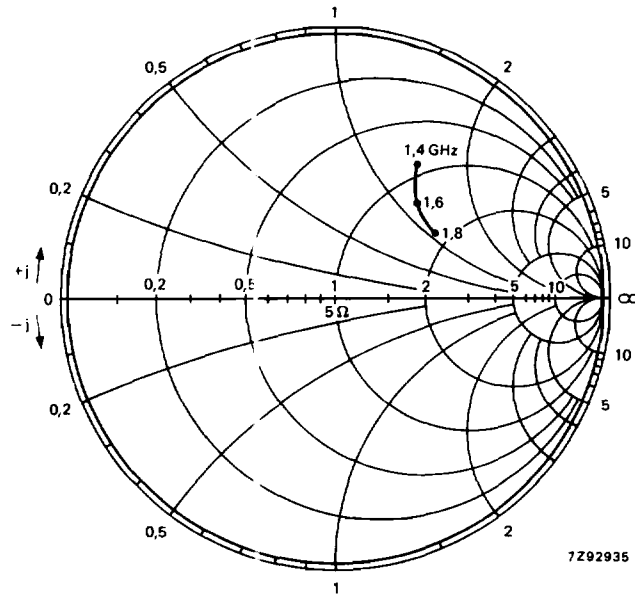


Fig. 6 Input impedance as a function of frequency; typical values; $Z_0 = 5 \Omega$.

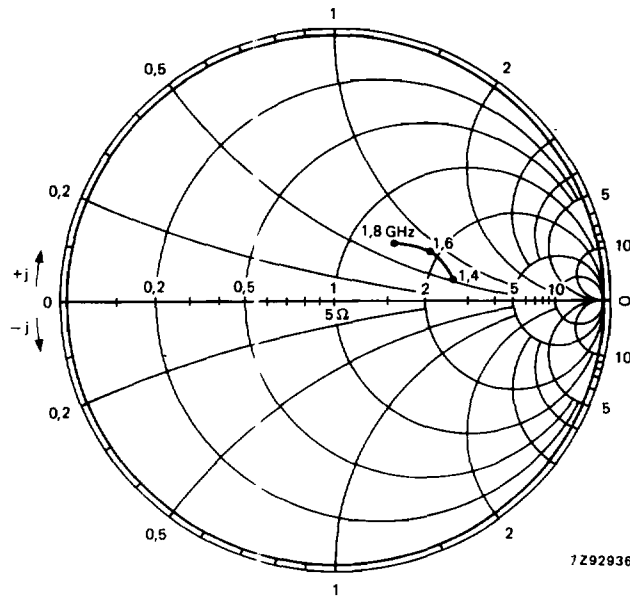


Fig. 7 Optimum load impedance as a function of frequency; typical values; $Z_0 = 5 \Omega$.