PULSED MICROWAVE POWER TRANSISTOR

NPN silicon planar epitaxial microwave power transistor, intended for use in a common-base class-C broadband pulse power amplifier with a frequency range of 2.7 to 3.1 GHz.

It is recommended for radar applications.

Features

- Interdigitated structure; giving a high emitter efficiency
- Diffused emitter ballasting resistors; capable of withstanding a high VSWR and providing excellent current sharing
- Gold metallization; ensuring excellent stability of the characteristics and giving a prolonged working life
- Multicell geometry; giving good balance of dissipated power and low thermal resistance
- Input and output matching cells; simplifying circuit design.

The transistor is housed in a metal-ceramic flange envelope (FO-57D).

QUICK REFERENCE DATA

Microwave performance up to T_{mb} = 25 °C in a common-base class-C broadband amplifier

mode of operation	f GHz	V_{CC} V	P_L W	G_p dB	η_C %	$\overline{z}_i$; $\overline{Z}_L$ Ω
class-C t_p = 100 μs δ = 10%	2.7 to 3.1	40	⩾60	⩾6	⩾35	see Fig. 6

MECHANICAL DATA

Dimensions in mm

FO-57D (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.

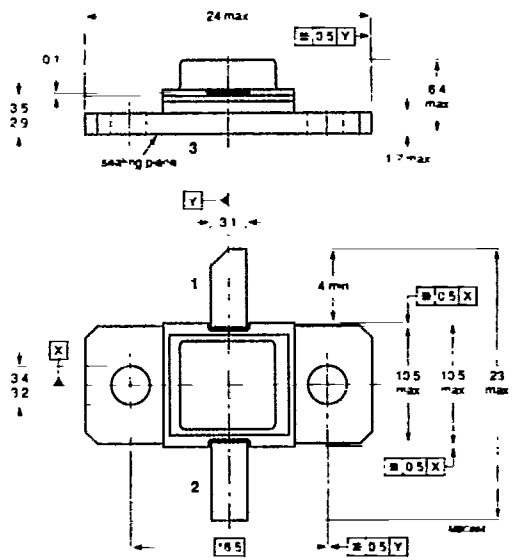
MECHANICAL DATA

Dimensions in mm

Fig. 1 FO-57D.

Base is connected to the seating plane

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.	50 V
Collector-emitter voltage			
$R_{BE} = 0$	V_{CES}	max.	50 V
open base	V_{CEO}	max.	15 V
Emitter-base voltage (open collector)	V_{EBO}	max.	3.5 V
Collector current (peak)*	I_C	max.	5.7 A
Total power dissipation at $T_{mb} \leq 75$ °C*	P_{tot}	max.	125 W
Storage temperature range	T_{stg}		−65 to + 200 °C
Junction temperature	T_j	max.	200 °C
Soldering temperature up to 0.2 mm from the case; $t_{sld} \leq 10$ s	T_{sld}	max.	235 °C

* Maximum value under normal pulsed microwave operating conditions.

THERMAL RESISTANCE (at T_j = 100 °C)

From junction to mounting base (CW)	$R_{th\ j\text{-}mb}$	max.	2.5 K/W
Equivalent thermal impedance under pulsed microwave conditions t_p = 100 μs; δ = 10%	$Z_{th\ j\text{-}mb}$	max.	0.8 K/W
From mounting base to heatsink	$R_{th\ mb\text{-}h}$	max.	0.3 K/W

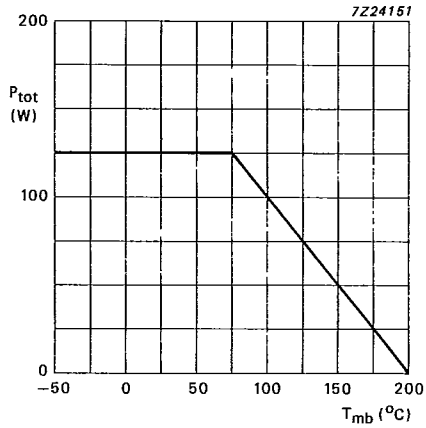


Fig. 2 Power derating curve; t_p = 100 μs; δ = 10%.

CHARACTERISTICS

T_{mb} = 25 °C unless otherwise specified

Collector cut-off current			
V_{CB} = 50 V; I_E = 0	I_{CBO}	max.	24 mA
V_{CB} = 30 V; I_E = 0	I_{CBO}	max.	80 μA
V_{CB} = 50 V; R_{BE} = 0	I_{CES}	max.	24 mA
Emitter cut-off current			
V_{EB} = 1.5 V; I_C = 0	I_{EBO}	max.	150 mA

APPLICATION INFORMATION

Microwave performance up to T_{mb} = 25 °C in a class-C broadband amplifier under pulsed conditions.

mode of operation	f GHz	V_{CC}* V	P_L W	G_p dB	η_C %	z_i; Z_L Ω
class-C t_p = 100 μs δ = 10%	2.7 to 3.1	40	⩾ 60 typ. 65	⩾ 6.0 typ. 6.3	⩾ 35 typ. 40	see Fig. 6

* During pulse.

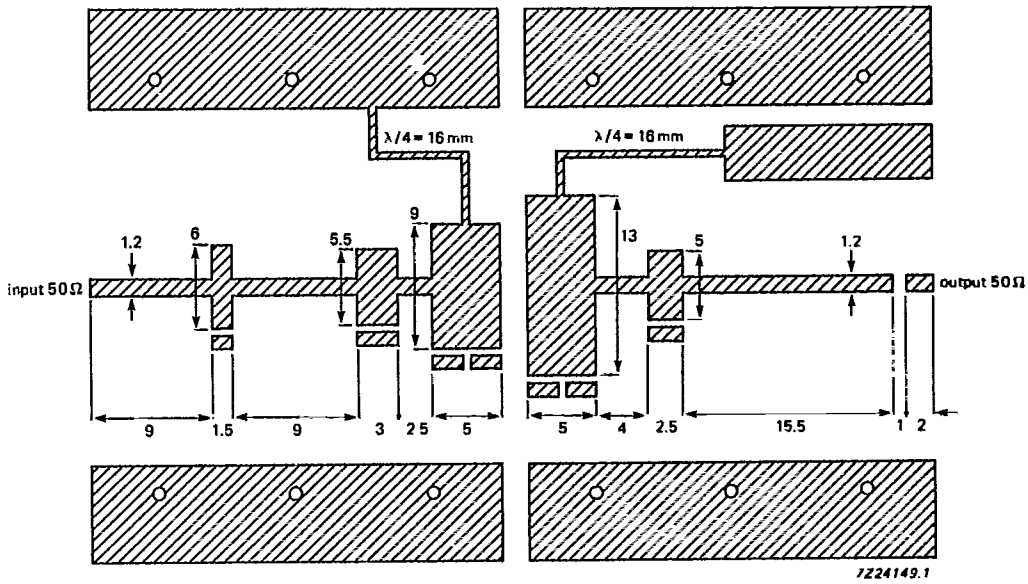


Fig. 3 Broadband test circuit for 2.7 to 3.1 GHz. (dimensions in mm).
PTFE fibreglass printed circuit board, thickness 0.4 mm; $\epsilon_r = 2.54$.

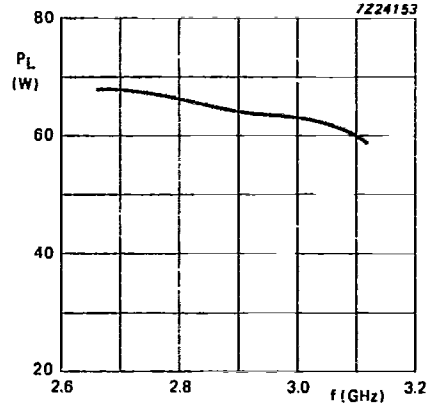


Fig. 4 Load power as a function of frequency*; V_{CC} = 40 V;
P_{in} = 15 W; t_p = 100 μs; δ = 10%; typical values.

* In a broadband test circuit as shown in Fig. 3.

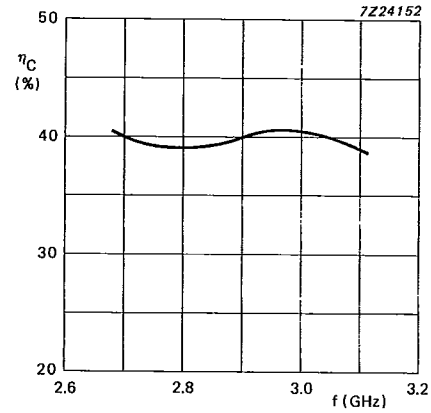


Fig. 5 Collector efficiency as a function of frequency*; V_{CC} = 40 V; P_{in} = 15 W; t_p = 100 μs; δ = 10%; typical values.

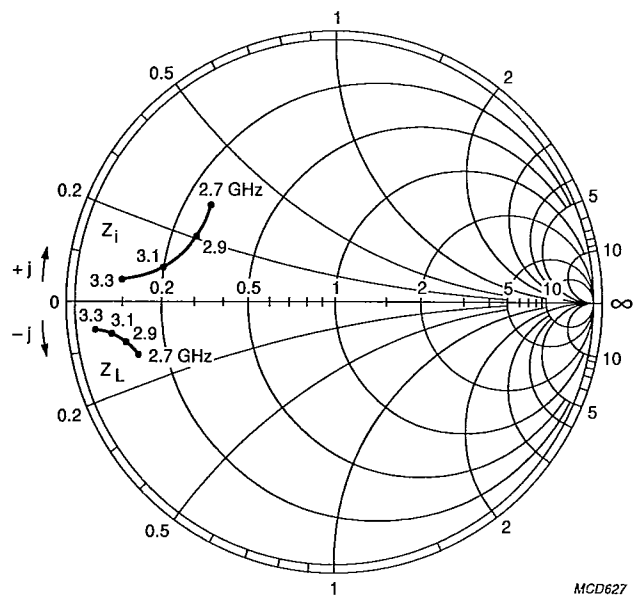


Fig. 6 Input and optimum load impedance as a function of frequency; Z_O = 50 Ω; V_{CC} = 40 V; typical values.

* In a broadband test circuit as shown in Fig. 3.