

DEVELOPMENT DATA

This data sheet contains advance information and specifications are subject to change without notice.

RX3034B70W

T-33-15

PULSED MICROWAVE POWER TRANSISTORS

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 3.0 to 3.4 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-125A).

QUICK REFERENCE DATA

Microwave performance up to $T_{mb} = 25^\circ\text{C}$ in an unneutralized common-base class-C broadband amplifier, typical values.

mode of operation	f GHz	V_{CC} V	P_L W	Gp dB	η_C %	$\bar{z}_i; \bar{Z}_L$ Ω
class-C $t_p = 100 \mu\text{s}$; $\delta = 10\%$	3.0 to 3.4	40	80	6	35	see Fig. 5

MECHANICAL DATA

Dimensions in mm

FO-125A (see Fig. 1).

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343

RX3034B70W

T-33-15

MECHANICAL DATA

Fig. 1 FO-125A.

Dimensions in mm

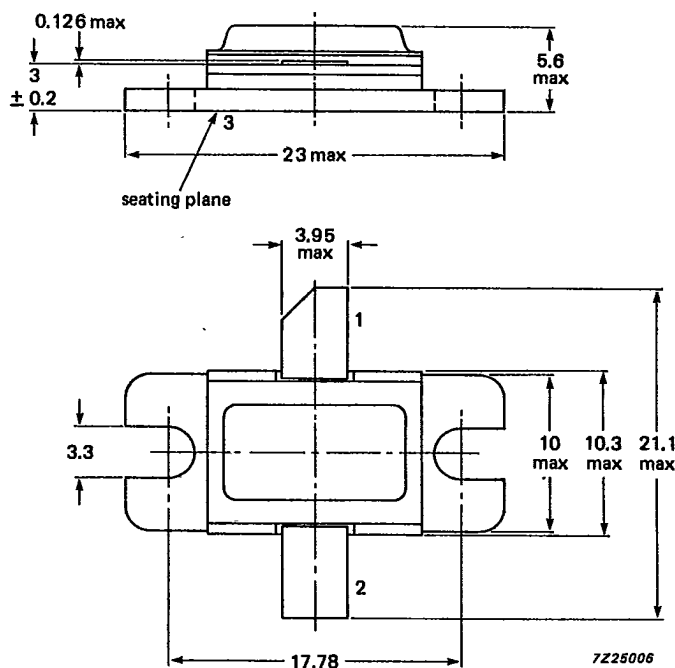
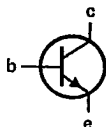
Base is connected
to the seating plane

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
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Collector-emitter voltage,

 $R_{BE} = 10 \Omega$

open base

V_{CER}	max.	50 V
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V_{CEO}	max.	15 V
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Emitter-base voltage (open collector)

V_{EBO}	max.	3.5 V
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Collector current (peak)*

I_C	max.	8.5 A
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Total power dissipation up to $T_{mb} = 75^\circ\text{C}^*$

P_{tot}	max.	185 W
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Storage temperature range

T_{stg}		-65 to $+200^\circ\text{C}$
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Junction temperature

T_j	max.	200°C
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Soldering temperature up to 0.3 mm

from the case; $t_{sld} \leq 10$ s

T_{sld}	max.	235°C
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THERMAL RESISTANCE (at $T_j = 100^\circ\text{C}$)

From junction to mounting base

$R_{th\ j-mb}$	max.	1.7 K/W
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From mounting base to heatsink

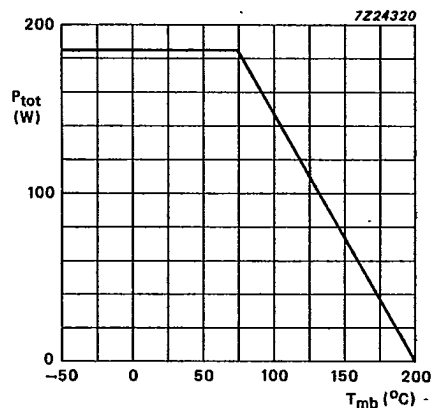
$R_{th\ mb-h}$	typ.	0.3 K/W
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Equivalent thermal impedance under
pulse microwave conditions $t_p = 100 \mu\text{s}$; $\delta = 10\%$

$Z_{th\ j-mb}$	typ.	0.55 K/W
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* Maximum value under normal pulsed microwave operating conditions.

T-33-15

Fig. 2 Power derating curve; $t_p = 100 \mu s$; $\delta = 10\%$.

CHARACTERISTICS

 $T_{mb} = 25^\circ C$ unless otherwise specified

Collector cut-off current

 $V_{CB} = 50 V$; $I_E = 0$ $V_{CB} = 30 V$; $I_E = 0$ $V_{CB} = 50 V$; $R_{BE} = 10 \Omega$ I_{CBO} max. 30 mA I_{CBO} max. 150 μA I_{CER} max. 150 mA

Emitter cut-off current

 $V_{EB} = 1.5 V$; $I_C = 0$ $V_{EB} = 3.5 V$; $I_C = 0$ I_{EBO} max. 150 μA I_{EBO} max. 7 mA

APPLICATION INFORMATION

Microwave performance up to $T_{mb} = 25^\circ C$ 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 %	$\bar{z}_i, \bar{Z}_L$ Ω
class-C $t_p = 100 \mu s$; $\delta = 10\%$	3.0 to 3.4	40	≥ 70	≥ 5.4	≥ 30	see Fig. 5

* During pulse.

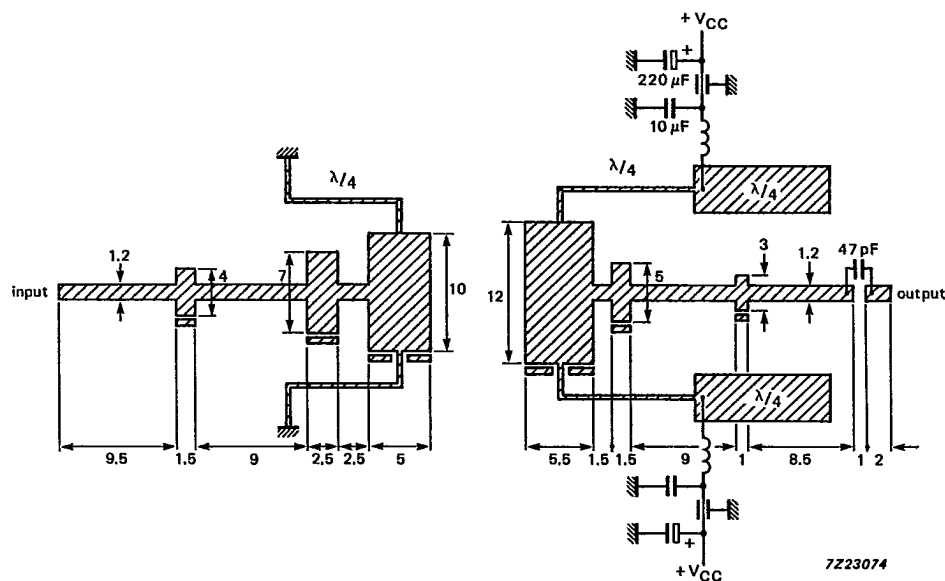


Fig. 3 Broadband test circuit for 3.0 to 3.4 GHz. (dimensions in mm).
PTFE fibreglass printed circuit board; $\epsilon_r = 2.55$; thickness 0.4 mm.

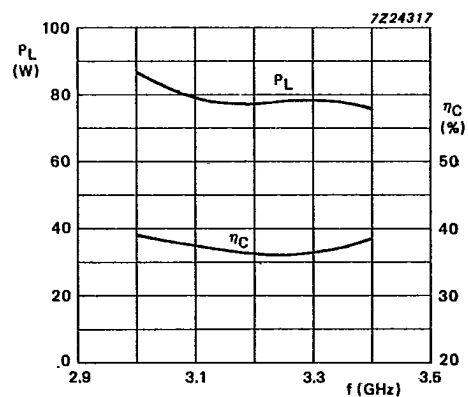


Fig. 4 Load power and collector efficiency as a function of frequency*;
 $V_{CC} = 40 \text{ V}$, $t_p = 100 \mu\text{s}$; $\delta = 10\%$; typical values.

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

Pulsed microwave power transistor

RX3034B70W

T-33-15

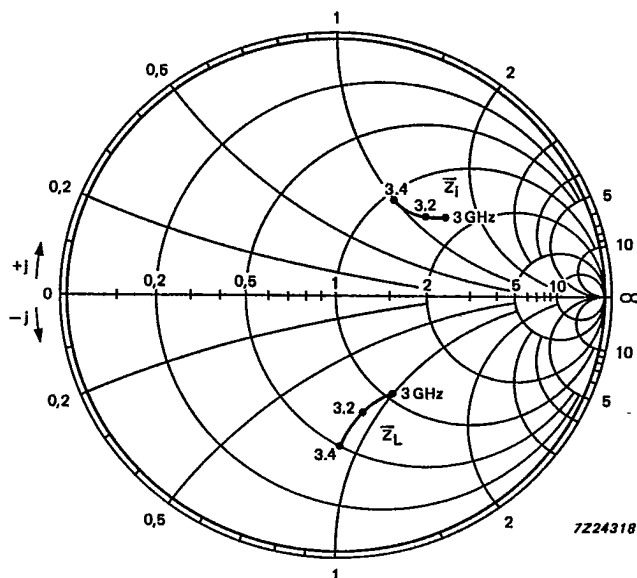


Fig. 5 Input and optimum load impedance as a function of frequency;
 $Z_0 = 5 \Omega$; $V_{CC} = 40 \text{ V}$; typical values.

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