

MICROWAVE NPN POWER TRANSISTOR FOR CLASS C OPERATION
TRANSISTOR NPN HYPERFREQUENCE DE PUISSANCE, CLASSE C

FEATURES

- Gold metallizations
 - Glass passivated structure
 - Hermetical ceramic package
 - Emitter ballast resistors
 - Auto-aligned structure
- } → high reliability
- severe impedance mismatch
- high characteristics reproducibility

APPLICATIONS

Telecommunications up to 2,3 GHz frequency band.

PARTICULARITES

- Métallisations "Or"
 - Structure passivée
 - Boîtier céramique hermétique
 - Résistances ballast d'émetteur
 - Structure auto-alignée
- } → haute fiabilité
- bonne tenue au ROS
- bonne reproductibilité des caractéristiques

APPLICATIONS

Télécommunications dans la bande de fréquences jusqu'à 2,3 GHz

$f = 2,3 \text{ GHz}$

$POUT = 1,75 \text{ W}$

$Gp = 9,5 \text{ dB}$

$\eta_c = 40 \%$

$V_{CC} = 24 \text{ V}$



Case : CB-294 (.2502LFL/FLM)
Boîtier : CB-311 (.2502L/2LM)

ABSOLUTE RATINGS (LIMITING VALUES)
VALEURS LIMITES ABSOLUES D'UTILISATION

	Symbols	Values	Units
Emitter-base (d.c.) voltage <i>Tension continue émetteur-base</i>	VEBO	3	V
Collector-base (d.c.) voltage <i>Tension continue collecteur-base</i>	VCBO	45	V
Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	45	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	IC	0,4	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T _{stg} T _j	— 65 → + 200 — 55 → + 200	°C °C

Thermal resistance (junction-case)
Résistance thermique (jonction-boîtier)

R_{th(j-c)}

30

°C/W

January 1981 - 1/4

STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

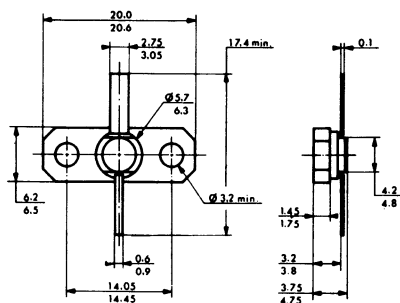
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
V(BR)EBO	3			V	$I_E = 1 \text{ mA}$
V(BR)CBO				V	$I_C = \text{mA}$
V(BR)CES	45			V	$I_C = 5 \text{ mA}$
I _{CBO}			1	mA	$V_{CB} = 24 \text{ V}$
HFE	15		120		$I_C = 100 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C _{22b}			3,5	pF	$V_{CB} = 24 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

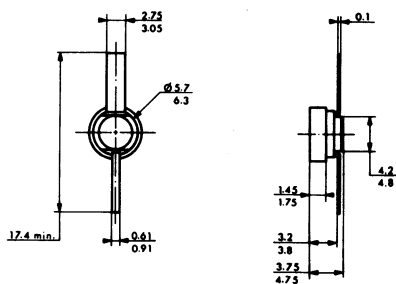
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
POUT	1,6	1,75		W	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,2 \text{ W}$
Gp	9	9,5		dB	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,2 \text{ W}$
η_c	36	40		%	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,2 \text{ W}$

CASE DESCRIPTION
DESCRIPTION DU BOITIER

CB-294 (.2502LFL/FLM)
 (BMH 75 a)



CB-311 (.2502L/2LM)
 (BMH 75 b)



Dimensions in millimeters

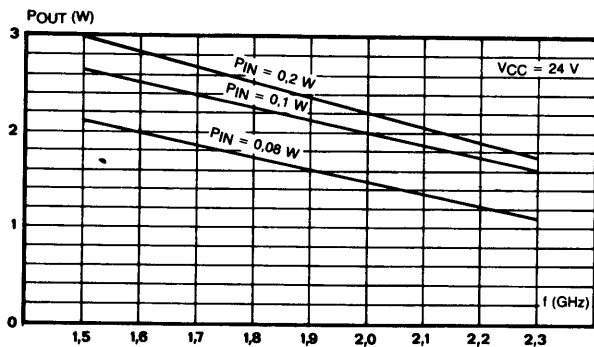


Fig. 1 - Output power versus frequency (typical values).

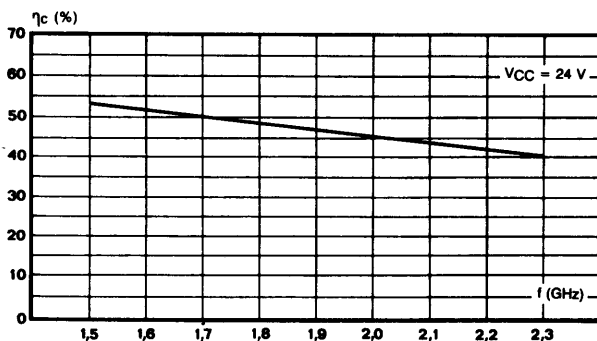


Fig. 2 - Collector efficiency versus frequency (typical values).

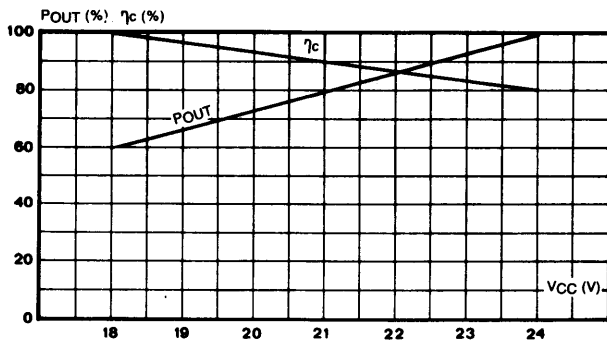


Fig. 3 - Relative output power and relative collector efficiency versus collector voltage.

Z_{IN} : Input impedance
 Z_{CL} : Collector load impedance

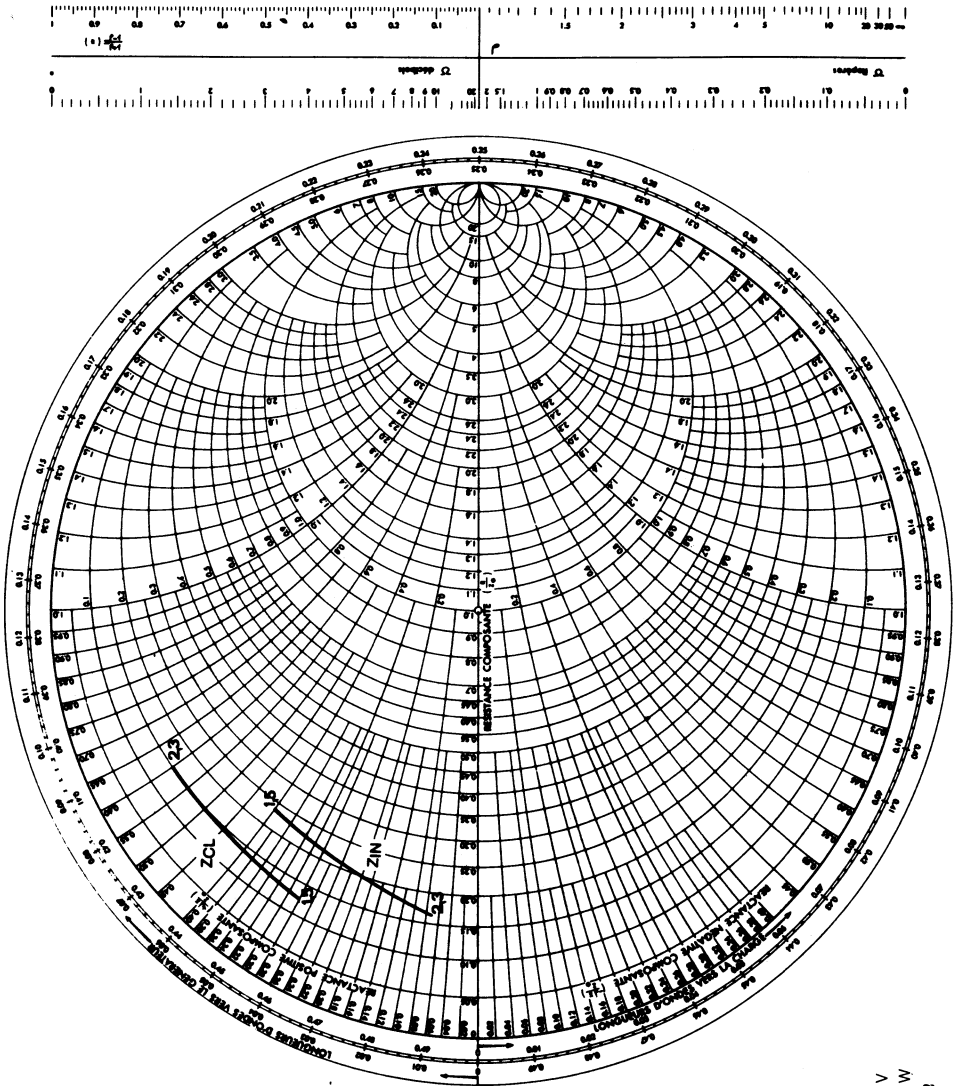


Fig. 4 - Smith chart

$V_{CC} = 24 \text{ V}$
 $P_{IN} = 0.2 \text{ W}$
 $Z_0 = 50 \Omega$

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APPLICATIONS

Télécommunications dans la bande de fréquences jusqu'à 2,3 GHz

$f = 2,3 \text{ GHz}$

$P_{OUT} = 3,5 \text{ W}$

$G_p = 8,5 \text{ dB}$

$\eta_c = 40 \%$

$V_{CC} = 24 \text{ V}$


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Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	45	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	IC	0,8	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T _{stg} T _j	— 65 → + 200 — 55 → + 200	°C °C

 Thermal resistance (junction-case)
Résistance thermique (jonction-boîtier)

 R_{th(j-c)}

17

°C/W

January 1981 - 1/4

STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

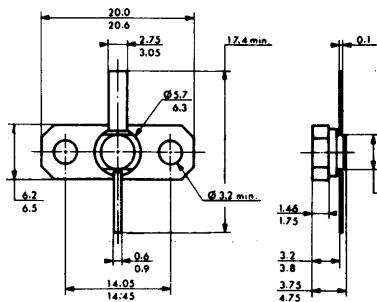
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
$V_{(BR)EBO}$	3			V	$I_E = 2,5 \text{ mA}$
$V_{(BR)CBO}$				V	$I_C = \text{ mA}$
$V_{(BR)CES}$	45			V	$I_C = 10 \text{ mA}$
I_{CBO}			2,5	mA	$V_{CB} = 24 \text{ V}$
HFE	15		120		$I_C = 250 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			5,5	pF	$V_{CB} = 24 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

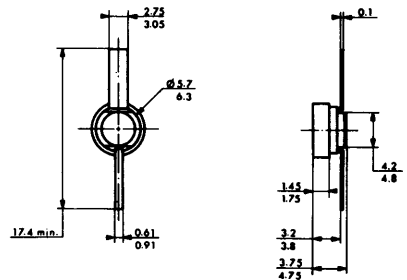
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
P_{OUT}	3,2	3,5		W	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,5 \text{ W}$
Gp	8	8,5		dB	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,5 \text{ W}$
η_c	36	40		%	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 0,5 \text{ W}$

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DESCRIPTION DU BOITIER

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 (BMH 75 b)



Dimensions in millimeters

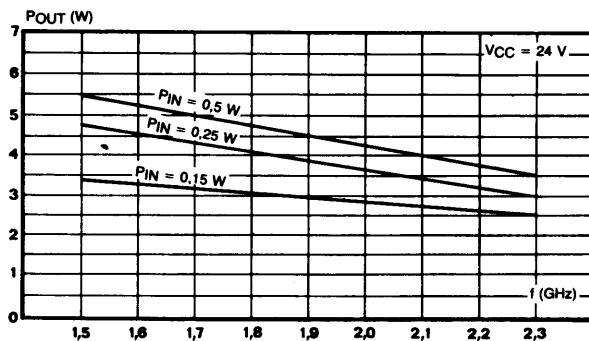


Fig. 1 - Output power versus frequency (typical values).

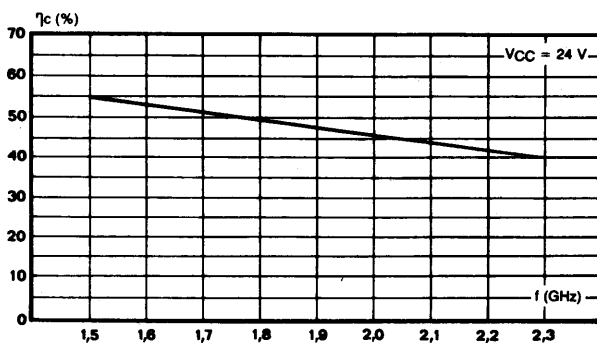


Fig. 2 - Collector efficiency versus frequency (typical values).

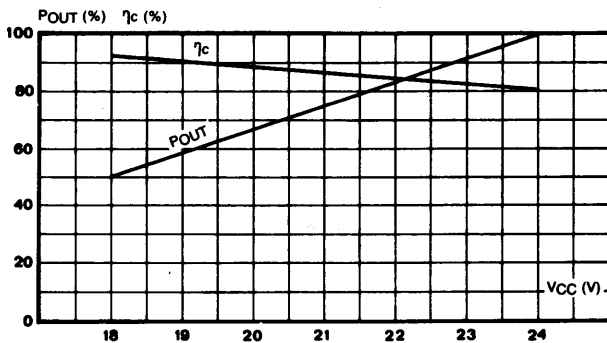


Fig. 3 - Relative output power and relative collector efficiency versus collector voltage.

Z_{IN} : Input impedance
 Z_{CL} : Collector load impedance

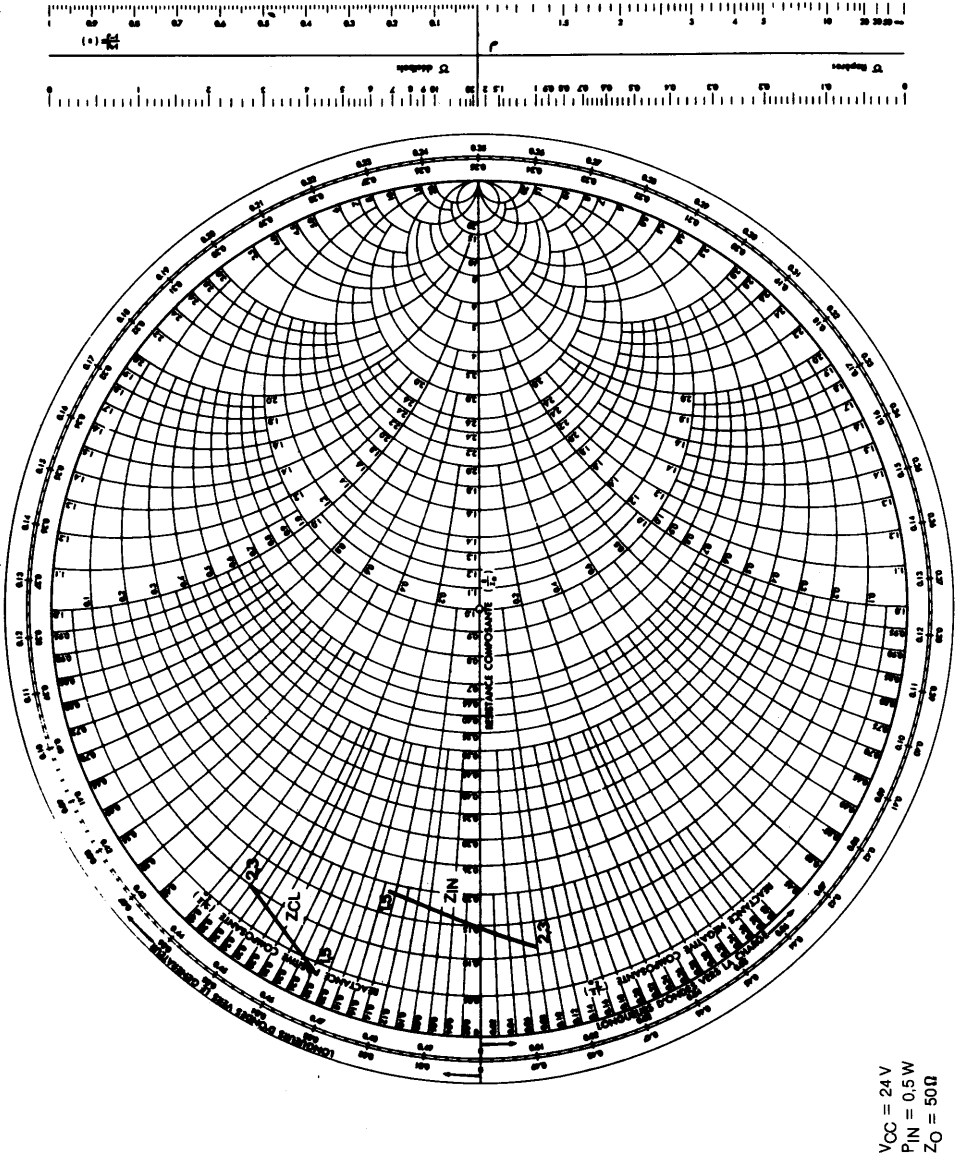


Fig. 4. Smith chart

$V_{CC} = 24\text{ V}$
 $P_{IN} = 0.5\text{ W}$
 $Z_0 = 50\Omega$

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Télécommunications dans la bande de fréquences jusqu'à 2,3 GHz

$$f = 2,3 \text{ GHz}$$

$$POUT = 7 \text{ W}$$

$$GP = 8,5 \text{ dB}$$

$$\eta_c = 40 \%$$

$$V_{CC} = 24 \text{ V}$$



Case : CB-294 (.2502LFL/FLM)
Boîtier : CB-311 (.2502L/2LM)

ABSOLUTE RATINGS (LIMITING VALUES) VALEURS LIMITES ABSOLUES D'UTILISATION

	Symbols	Values	Units
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Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	45	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	I _C	1,5	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T _{stg} T _j	— 65 → + 200 — 55 → + 200	°C °C

Thermal resistance (junction-case) *Résistance thermique (jonction-boîtier)*

R_{th(j-c)} = 8,5 °C/W

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STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

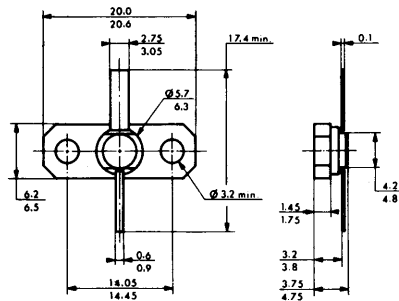
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
V(BR)EBO	3			V	$I_E = 5 \text{ mA}$
V(BR)CBO				V	$I_C = \text{ mA}$
V(BR)CES	45			V	$I_C = 25 \text{ mA}$
ICBO			5	mA	$V_{CB} = 24 \text{ V}$
HFE	15		120		$I_C = 500 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			8	pF	$V_{CB} = 24 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

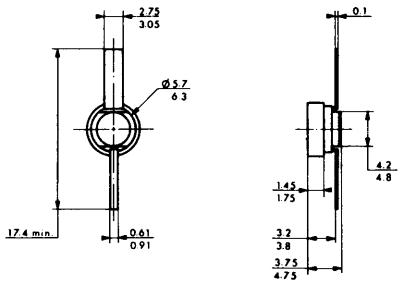
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
POUT	6,3	7		W	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 1 \text{ W}$
GP	8	8,5		dB	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 1 \text{ W}$
η_c	36	40		%	$f = 2,3 \text{ GHz}$ $V_{CC} = 24 \text{ V}$ $P_{IN} = 1 \text{ W}$

CASE DESCRIPTION
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CB-311 (2502L/2LM)
 (BMH 75 b)



Dimensions in millimeters

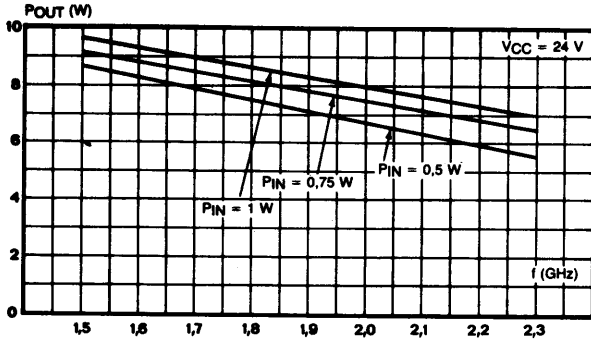


Fig. 1 - Output power versus frequency (typical values).

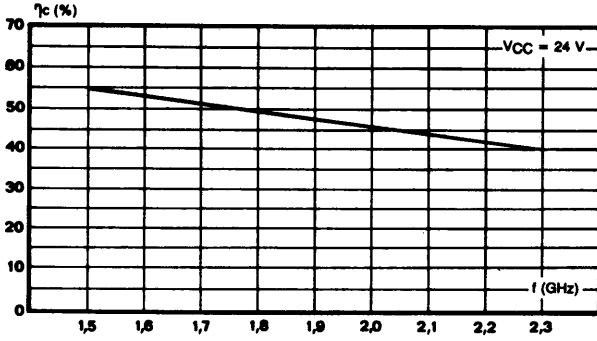


Fig. 2 - Collector efficiency versus frequency (typical values).

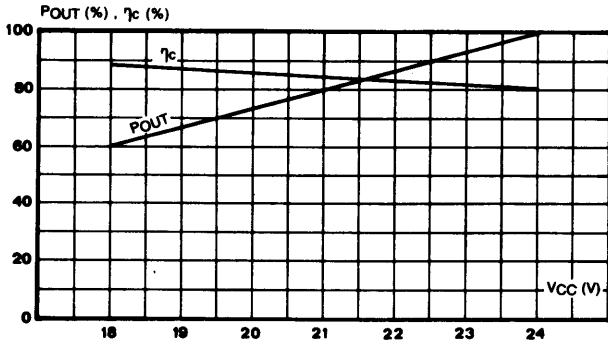
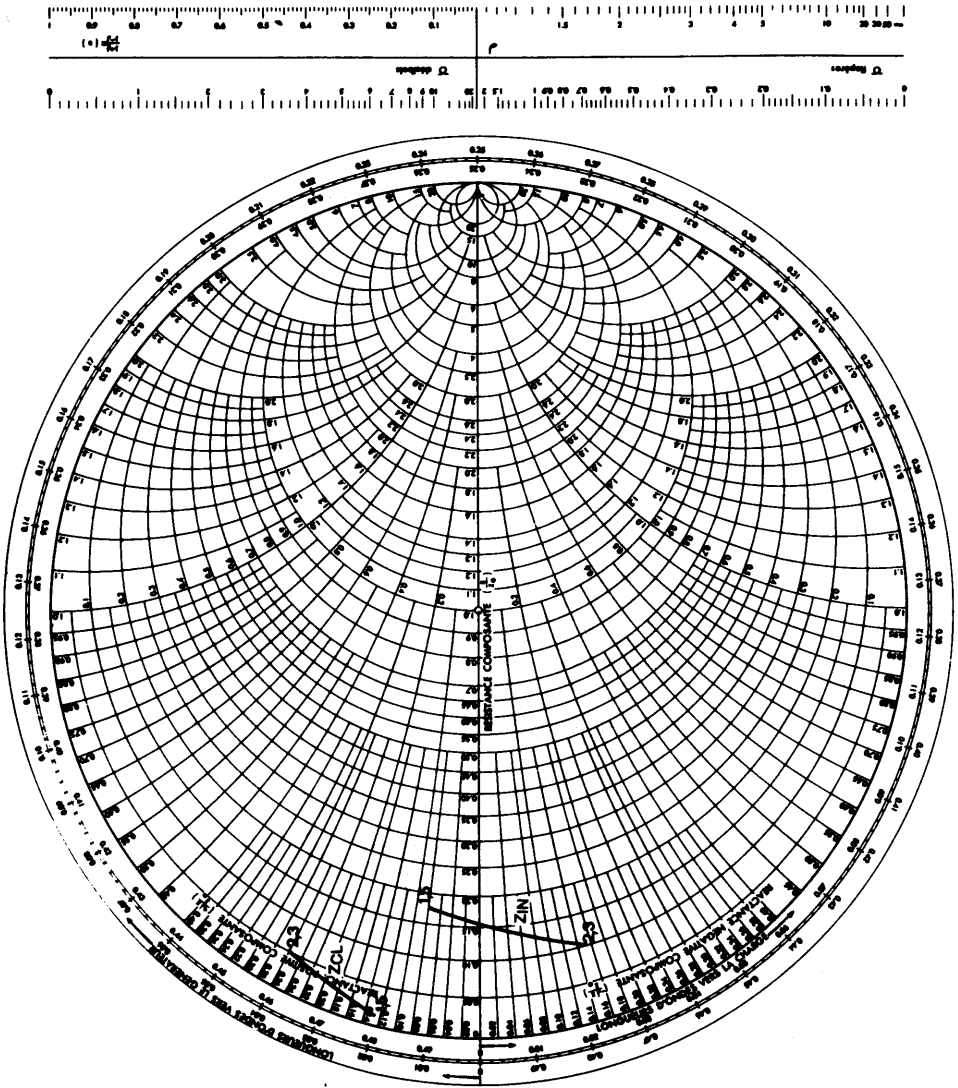


Fig. 3 - Relative output power and relative collector efficiency versus collector voltage.

Z_{IN} : Input impedance
 Z_{CL} : Collector load impedance



$V_{CC} = 24 \text{ V}$
 $P_{IN} = 1 \text{ W}$
 $Z_0 = 50 \Omega$

Fig. 4 - Smith chart

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APPLICATIONS

Télécommunications dans la bande de fréquences jusqu'à 3 GHz

$$f = 3 \text{ GHz}$$

$$POUT = 0,55 \text{ W}$$

$$G_P = 7,4 \text{ dB}$$

$$\eta_c = 25 \%$$

$$V_{CC} = 28 \text{ V}$$



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ABSOLUTE RATINGS (LIMITING VALUES) VALEURS LIMITES ABSOLUES D'UTILISATION	Symbols	Values	Units
Emitter-base (d.c.) voltage <i>Tension continue émetteur-base</i>	VEBO	3	V
Collector-base (d.c.) voltage <i>Tension continue collecteur-base</i>	VCBO	50	V
Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	50	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	I _C	0,15	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T _{stg} T _j	— 65 → + 200 — 55 → + 200	°C °C

Thermal resistance (junction-case) <i>Résistance thermique (jonction-boîtier)</i>	R _{th(j-c)}	45	°C/W
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STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
$V_{(BR)EBO}$	3			V	$I_E = 0,5 \text{ mA}$
$V_{(BR)CBO}$				V	$I_C = \text{ mA}$
$V_{(BR)CES}$	50			V	$I_C = 5 \text{ mA}$
I_{CBO}			0,5	mA	$V_{CB} = 28 \text{ V}$
HFE	15		120		$I_C = 50 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			2,5	pF	$V_{CB} = 28 \text{ V}$ $f = 1 \text{ MHz}$

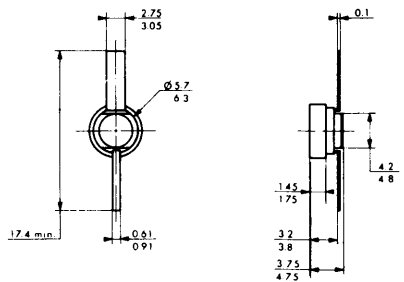
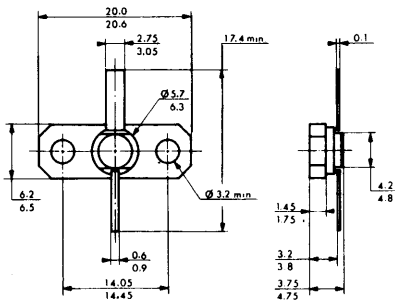
DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
POUT	0,5	0,55		W	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,1 \text{ W}$
GP	7	7,4		dB	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,1 \text{ W}$
η_c	22,5	25		%	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,1 \text{ W}$

CASE DESCRIPTION
DESCRIPTION DU BOITIER

CB-294 (.2502LFL/FLM)
 BMH 75 a

CB-311 (.2502L/LM)
 BMH 75 b



Dimensions in millimeters

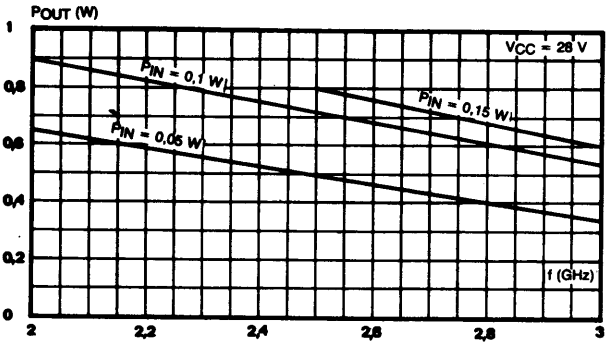


Fig. 1 - Output power versus frequency (typical values).

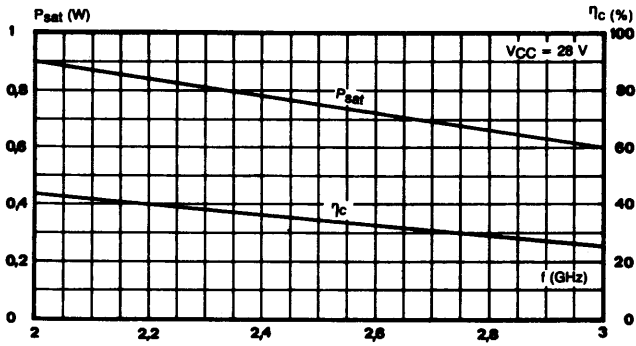


Fig. 2 - Collector efficiency and saturation power versus frequency (typical values).

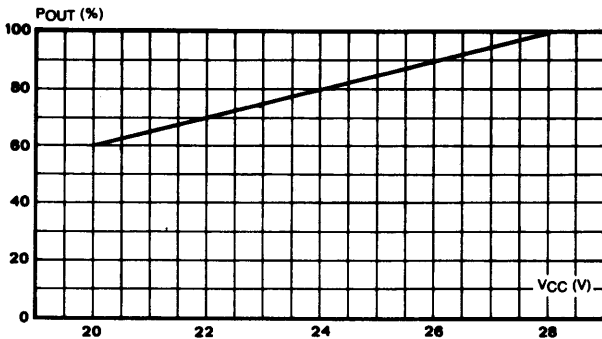
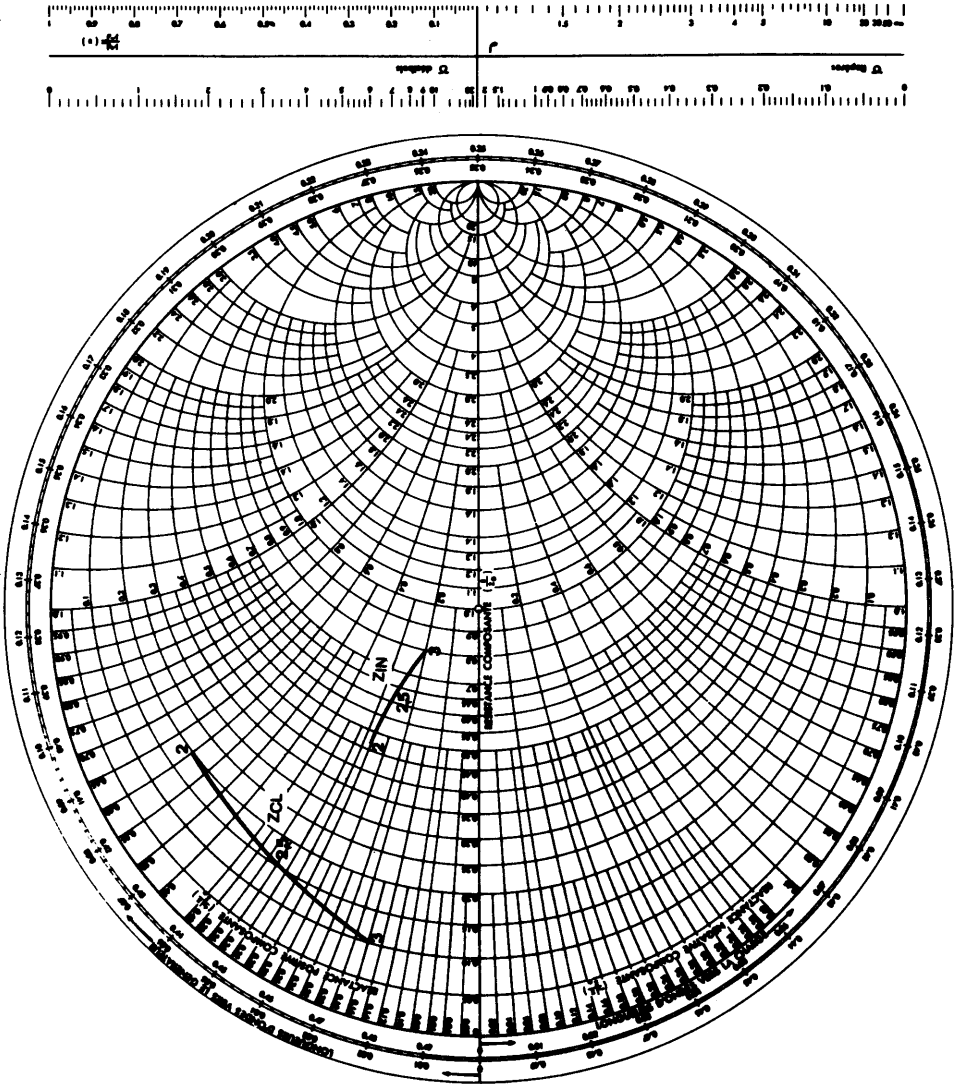


Fig. 3 - Relative output power versus collector voltage.

Z_{IN} : Input impedance
 Z_{CL} : Collector load impedance



$V_{CC} = 28V$
 $P_{IN} = 0.1W$
 $Z_0 = 50\Omega$

Fig. 4 - Smith chart

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Télécommunications dans la bande de fréquences jusqu'à 3 GHz

$$f = 3 \text{ GHz}$$

$$P_{OUT} = 1 \text{ W}$$

$$G_P = 7 \text{ dB}$$

$$\eta_c = 30 \%$$

$$V_{CC} = 28 \text{ V}$$



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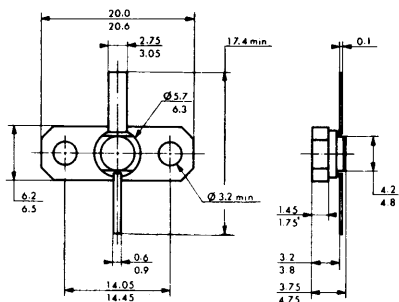
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I_{CBO}			1	mA	$V_{CB} = 28 \text{ V}$
HFE	15		120		$I_C = 100 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			3	pF	$V_{CB} = 28 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

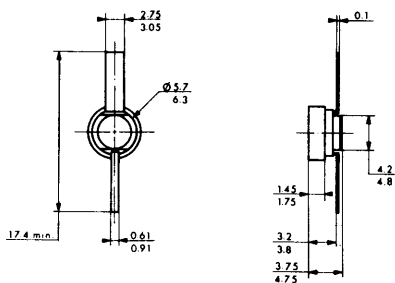
Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
P_{OUT}	0,9	1		W	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,2 \text{ W}$
GP	6,5	7		dB	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,2 \text{ W}$
η_c	27	30		%	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,2 \text{ W}$

CASE DESCRIPTION
DESCRIPTION DU BOITIER

CB-294 (.2502LFL/FLM)
 (BMH 75 a)



CB-311 (.2502L/2LM)
 (BMH 75 b)



Dimensions in millimeters

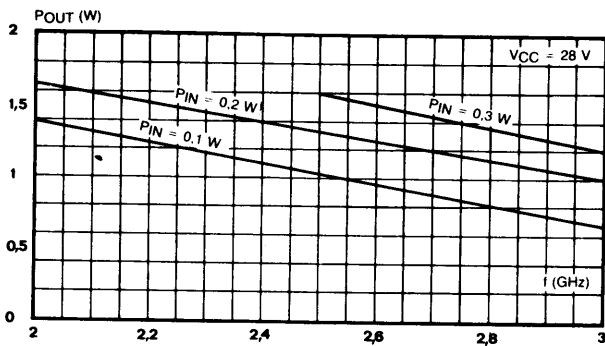


Fig. 1 - Output power versus frequency (typical values).

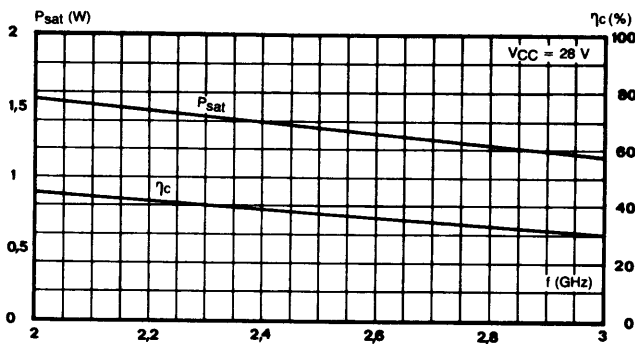


Fig. 2 - Collector efficiency and saturation power versus frequency (typical values).

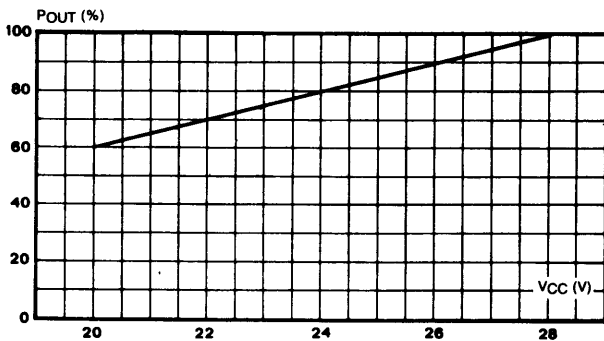
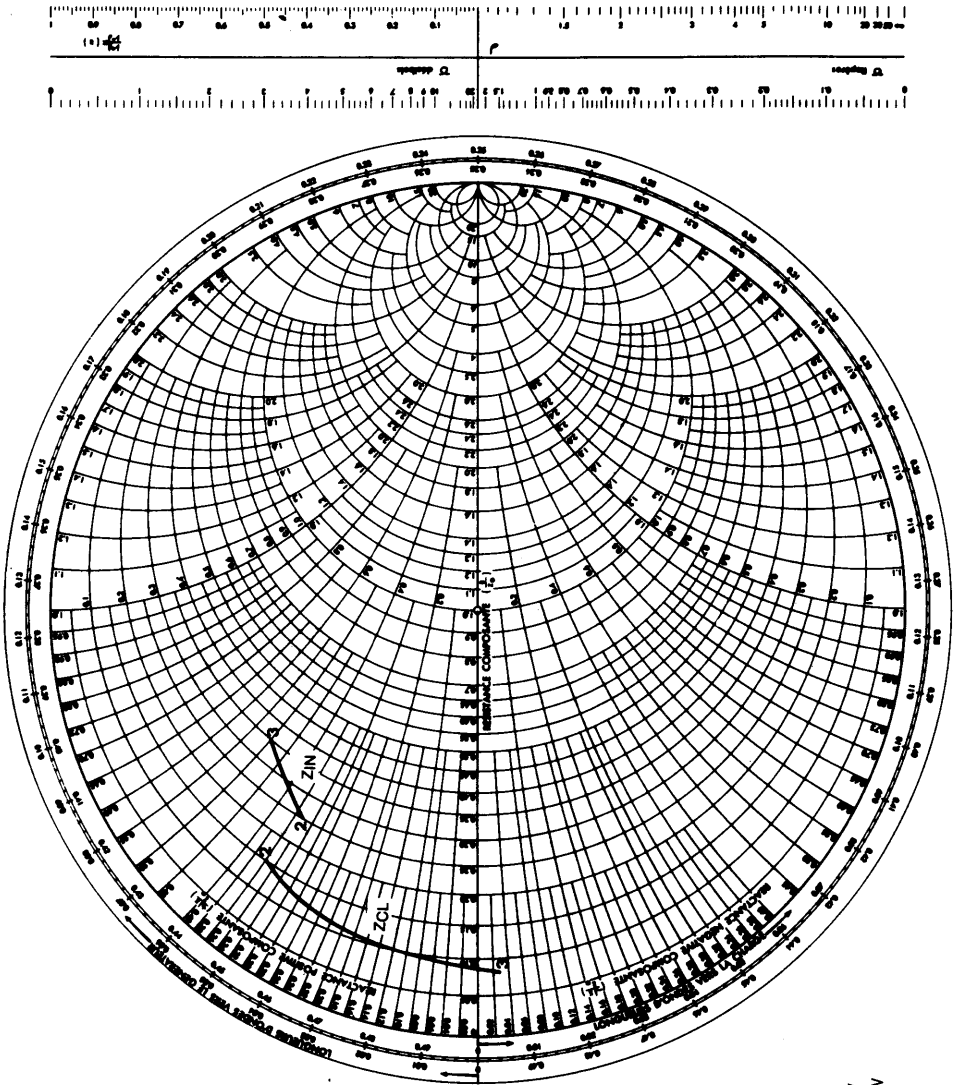


Fig. 3 - Relative output power versus collector voltage.

Z_{IN} : Input impedance
Z_{CL} : Collector load impedance



V_{CC} = 28 V
P_{IN} = 0.2 W
Z_O = 50 Ω

Fig. 4 - Smith chart

MICROWAVE NPN POWER TRANSISTOR FOR CLASS C OPERATION
TRANSISTOR NPN HYPERFREQUENCE DE PUISSANCE, CLASSE C

FEATURES

- Gold metallizations
 - Glass passivated structure
 - Hermetical ceramic package
 - Emitter ballast resistors
 - Auto-aligned structure
- } → high reliability
- severe impedance mismatch
- high characteristics reproducibility

APPLICATIONS

Telecommunications up to 3 GHz frequency band.

PARTICULARITES

- Métallisations "Or"
 - Structure passivée
 - Boîtier céramique hermétique
 - Résistances ballast d'émetteur
 - Structure auto-alignée
- } → haute fiabilité
- bonne tenue au ROS
- bonne reproductibilité des caractéristiques

APPLICATIONS

Télécommunications dans la bande de fréquences jusqu'à 3 GHz

$f = 3 \text{ GHz}$

$POUT = 3 \text{ W}$

$GP = 6 \text{ dB}$

$\eta_c = 30 \%$

$V_{CC} = 28 \text{ V}$



Case : { CB-294 (.2502LFL/FLM)
 Boîtier : { CB-311 (.2502L/2LM)

ABSOLUTE RATINGS (LIMITING VALUES) VALEURS LIMITES ABSOLUES D'UTILISATION	Symbols	Values	Units
Emitter-base (d.c.) voltage <i>Tension continue émetteur-base</i>	VEBO	3	V
Collector-base (d.c.) voltage <i>Tension continue collecteur-base</i>	VCBO	50	V
Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	50	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	I_{C0}	0,8	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T_{stg}	— 65 → + 200	°C
	T_j	— 55 → + 200	°C

Thermal resistance (junction-case) <i>Résistance thermique (jonction-boîtier)</i>	$R_{th(j-c)}$	17	°C/W
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STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

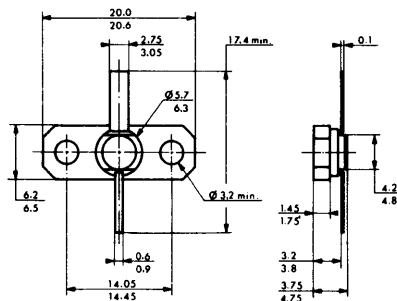
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
V(BR)EBO	3			V	$I_E = 2,5 \text{ mA}$
V(BR)CBO				V	$I_C = \text{ mA}$
V(BR)CES	50			V	$I_C = 25 \text{ mA}$
ICBO			2,5	mA	$V_{CB} = 28 \text{ V}$
HFE	15		120		$I_C = 250 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			5	pF	$V_{CB} = 28 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

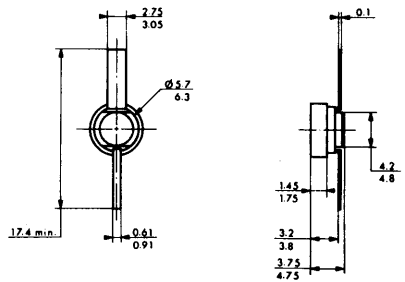
Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
P _{OUT}	2,5	3		W	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,75 \text{ W}$
GP	5	6		dB	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,75 \text{ W}$
η_c	27	30		%	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 0,75 \text{ W}$

CASE DESCRIPTION
DESCRIPTION DU BOITIER

CB-294 (.2502LFL/FLM)
 BMH 75 a



CB-311 (.2502L/2LM)
 BMH 75 b



Dimensions in millimeters

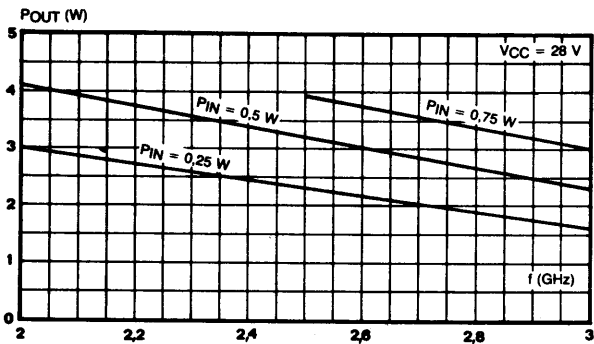


Fig. 1 - Output power versus frequency (typical values).

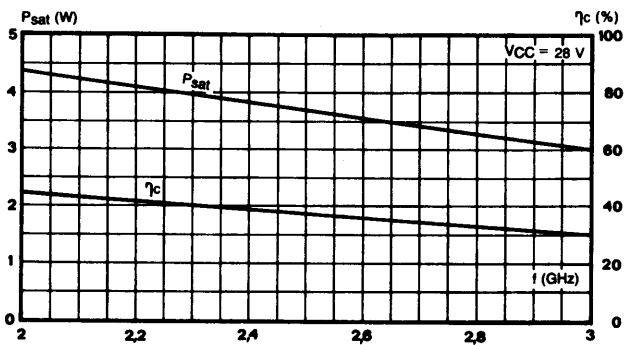


Fig. 2 - Collector efficiency and saturation power versus frequency (typical values).

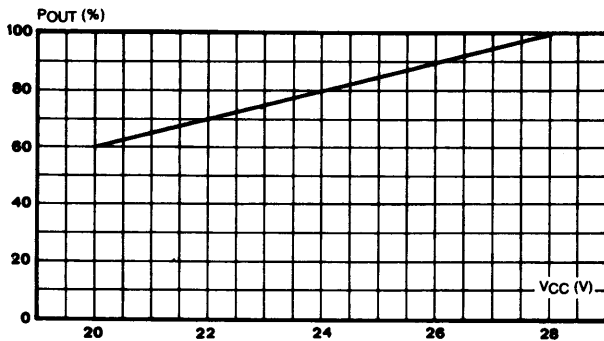
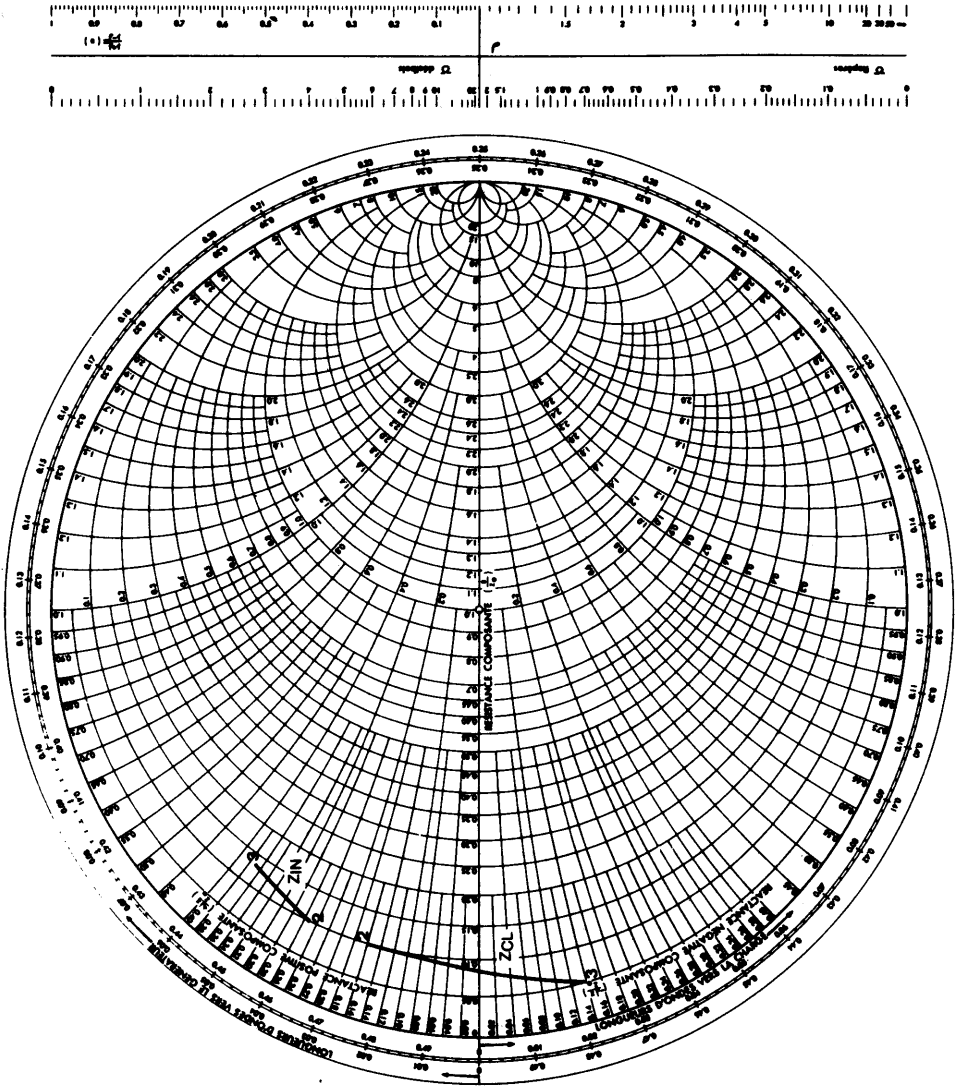


Fig. 3 - Relative output power versus collector voltage.

Z_{IN} : input impedance
 Z_{CL} : Collector load impedance



$V_{CC} = 28\text{ V}$
 $P_{IN} = 0.5\text{ W}$
 $Z_0 = 50\ \Omega$

Fig. 4 - Smith chart

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APPLICATIONS

Télécommunications dans la bande de fréquences jusqu'à 3 GHz

f = 3 GHz

POUT = 5 W

GP = 5 dB

η_c = 30 %

VCC = 28 V



Case : CB-294 (.2502LFL/FLM)
 Boîtier : CB-311 (.2502L/2LM)

ABSOLUTE RATINGS (LIMITING VALUES)
VALEURS LIMITES ABSOLUES D'UTILISATION

	Symbols	Values	Units
Emitter-base (d.c.) voltage <i>Tension continue émetteur-base</i>	VEBO	3	V
Collector-base (d.c.) voltage <i>Tension continue collecteur-base</i>	VCBO	50	V
Collector-emitter (d.c.) voltage <i>Tension continue collecteur-émetteur</i>	VCES	50	V
Collector (d.c.) current <i>Courant continu de collecteur</i>	IC	1,5	A
Storage and junction temperature range <i>Températures extrêmes de stockage et de jonction</i>	T _{stg}	— 65 → + 200	°C
	T _j	— 55 → + 200	°C

Thermal resistance (junction-case)
Résistance thermique (jonction-boîtier)

R_{th(j-c)}

8,5

°C/W

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STATIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES STATIQUES à $t_{amb} = 25^{\circ}\text{C}$

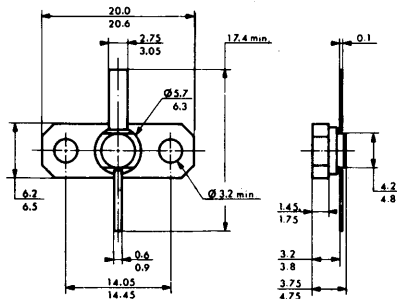
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
V(BR)EBO	3			V	$I_E = 5 \text{ mA}$
V(BR)CBO				V	$I_C = \text{ mA}$
V(BR)CES	50			V	$I_C = 50 \text{ mA}$
ICBO			5	mA	$V_{CB} = 28 \text{ V}$
HFE	15		120		$I_C = 500 \text{ mA}$ $V_{CE} = 5 \text{ V}$
C22b			8	pF	$V_{CB} = 28 \text{ V}$ $f = 1 \text{ MHz}$

DYNAMIC CHARACTERISTICS at $t_{amb} = 25^{\circ}\text{C}$
CARACTERISTIQUES DYNAMIQUES à $t_{amb} = 25^{\circ}\text{C}$

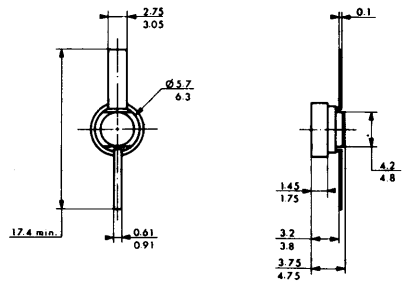
Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
POUT	4,5	5		W	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 1,6 \text{ W}$
Gp	4,5	5		dB	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 1,6 \text{ W}$
η_c	27	30		%	$f = 3 \text{ GHz}$	$V_{CC} = 28 \text{ V}$	$P_{IN} = 1,6 \text{ W}$

CASE DESCRIPTION
DESCRIPTION DU BOITIER

CB-294 (2502LFL/FLM)
 BMH 75 a



CB-311 (2502L/2LM)
 BMH 75 b



Dimensions in millimeters

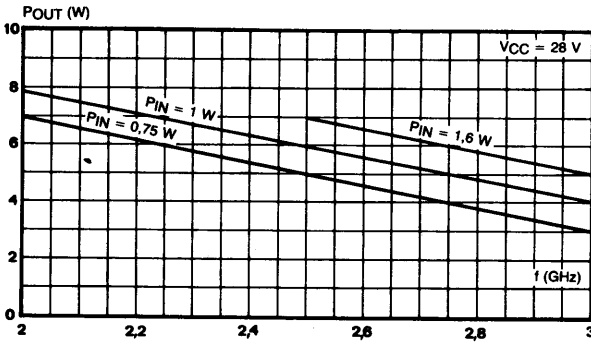


Fig. 1 - Output power versus frequency (typical values).

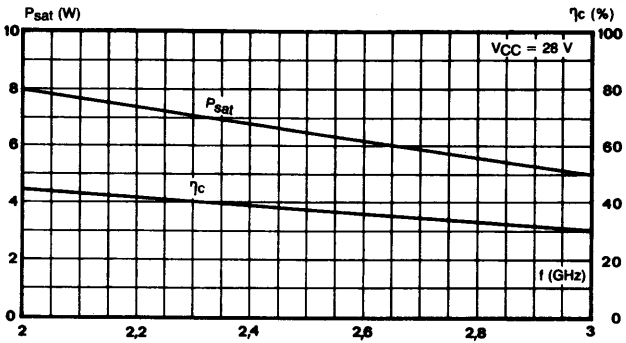


Fig. 2 - Collector efficiency and saturation power versus frequency (typical values).

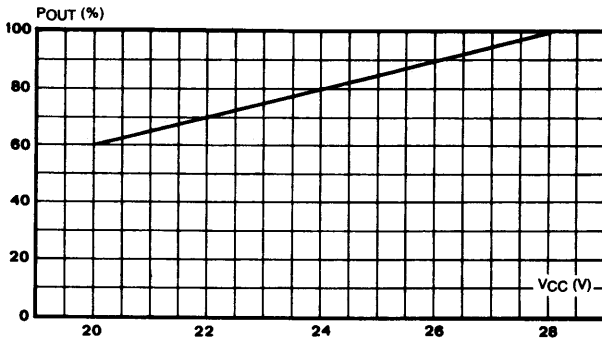


Fig. 3 - Relative output power versus collector voltage.

Z_{IN} : input impedance
 Z_{CL} : Collector load impedance

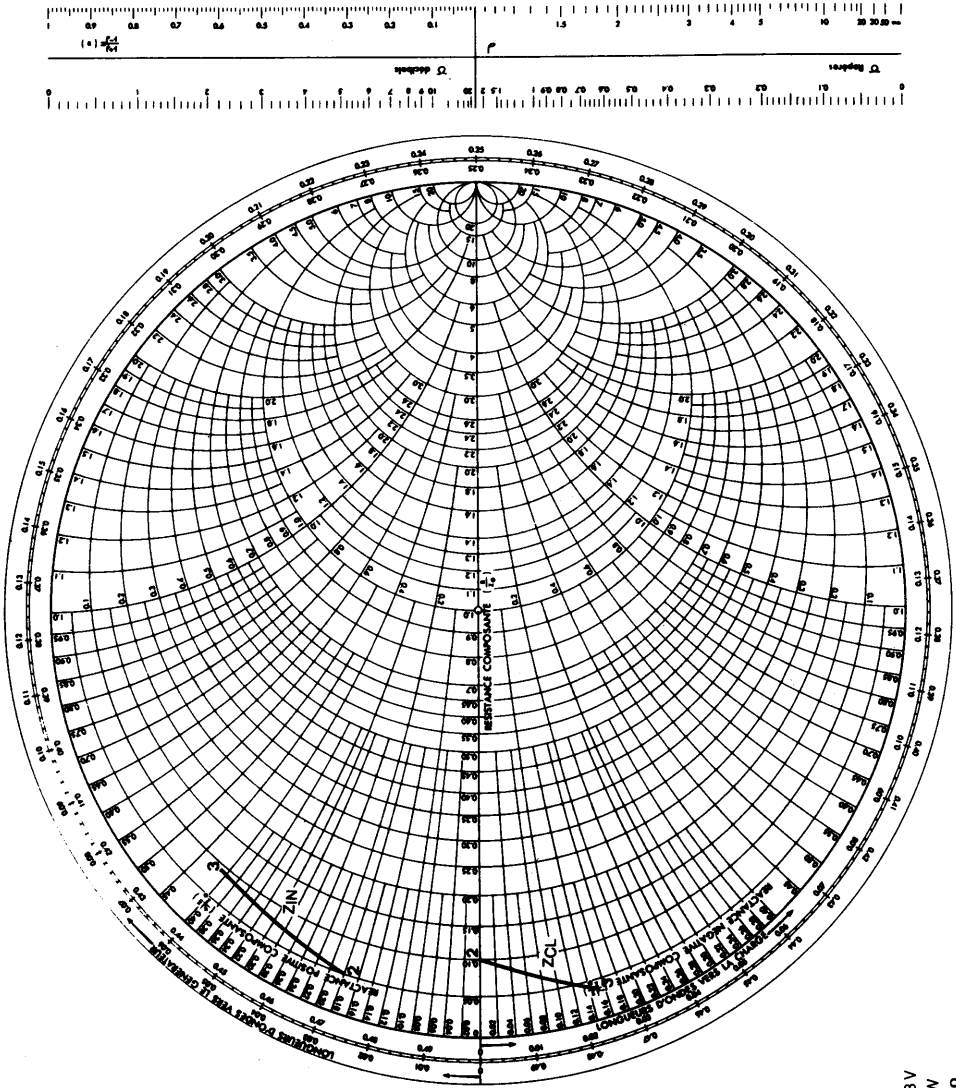


Fig. 4 - Smith chart

$V_{CC} = 28V$
 $P_{IN} = 1W$
 $Z_0 = 50\Omega$