THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 550

NPN POWER TRANSISTOR FOR UHF APPLICATIONS

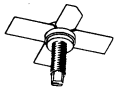
DESCRIPTION

The TH 550 is a 28 Volts gold metallized silicon NPN planar transistor designed for UHF military and commercial communications.
This device uses gold metallization and diffused emitter ballasting to achieve infinite VSWR at rated operating conditions.

FEATURES

* Designed for UHF military broadband 225-400 MHz.
* 4 W (min.) with greater than 10 dB gain.
* Gold metallization for high reliability applications.

f = 400 MHz
$P_{OUT} \geqslant 4$ W
$G_P = 10$ dB
$\eta_c \geqslant 55$ %
$V_{CC} = 28$ V



Case : CB-312 (.280 4L STUD (B))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	4	V
Collector-base (d.c.) voltage	V_{CBO}	55	V
Collector-emitter (d.c.) voltage	V_{CEO}	30	V
Collector current (d.c.)	I_C	0.75	A
Total power dissipation $T_C = 25°C$	Ptot	10	W
Storage and junction temperatures	T_{stg} T_j	$-65 \longrightarrow +200$ +200	°C °C

Thermal resistance (junction-case) $T_C = 25°C$	$R_{th\ (j-c)}$	17.5	°C/W

50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

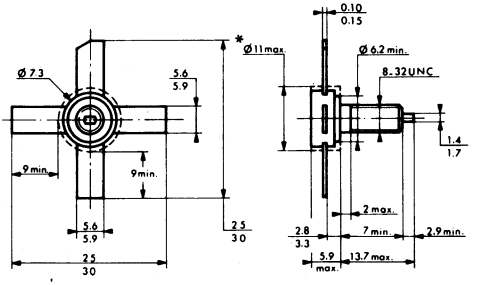
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
$V_{(BR)EBO}$	4			V	I_E = 1 mA I_C = 0
$V_{(BR)CES}$	55			V	I_C = 10 mA V_{BE} = 0
$V_{(BR)CEO}$	30			V	I_C = 50 mA I_B = 0
I_{CES}			5	mA	V_{CE} = 30 V
C_{ob}			8	pF	V_{CB} = 28 V f = 1 MHz

DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
G_P		10		dB	F = 400 MHz V_{CE} = 28 V P_{IN} = 0.4 W
η_c	55			%	
P_{out}	4			W	
z_S		2.5 - j 1		Ω	F = 225 MHz V_{CE} = 28 V P_{OUT} = 4 W
z_{CL}		25 + j 26		Ω	
z_S		2.0 - j 2.2		Ω	F = 400 MHz V_{CE} = 28 V P_{OUT} = 4 W
z_{CL}		17 + j 23		Ω	

CASE DESCRIPTION

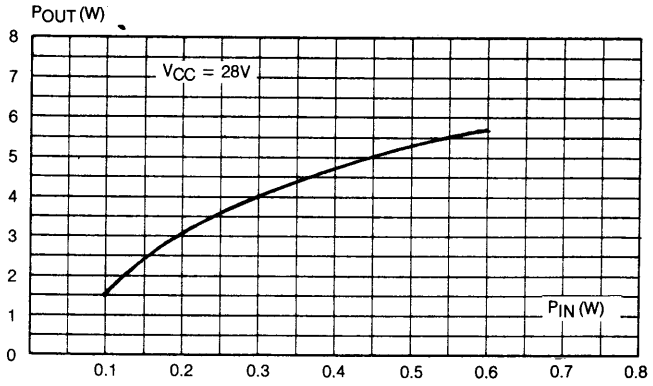


Dimensions in millimeters

* Outputs must not be bent, cut or used in this area

CB-312

(.280 4L STUD (B))



Output power versus input power (typical values)

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 552

NPN POWER TRANSISTOR FOR UHF APPLICATIONS

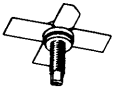
DESCRIPTION

The TH 552 is a 28 Volts gold metallized silicon NPN planar transistor designed for UHF military and commercial communications.
This device uses gold metallization and diffused emitter ballasting to achieve infinite VSWR at rated operating conditions.

FEATURES

* Designed for UHF military broadband 225-400 MHz.
* 10 W (min.) with greater than 12 dB gain.
* Gold metallization for high reliability applications.

f = 400 MHz
$P_{OUT} \geqslant$ 10 W
$G_P \geqslant$ 10 dB
$\eta_c \geqslant$ 60 %
V_{CC} = 28 V



Case : CB-312
(.280 4L STUD (B))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	4	V
Collector-base (d.c.) voltage	V_{CBO}	55	V
Collector-emitter (d.c.) voltage	V_{CEO}	30	V
Collector current (d.c.)	I_C	1.25	A
Total power dissipation T_C = 25° C	Ptot	19.5	W
Storage and junction temperatures	T_{stg} T_j	− 65 ⟶ + 200 + 200	°C °C

Thermal resistance (junction-case)	Rth (j-c)	9	°C/W

50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

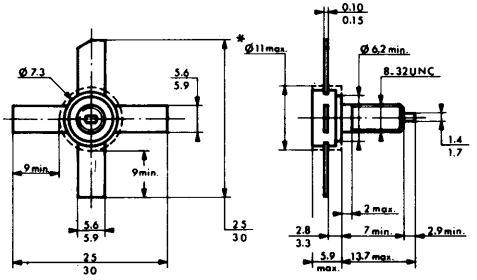
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
$V_{(BR)EBO}$	4			V	I_E = 20 mA I_C = 0
$V_{(BR)CES}$	60			V	I_C = 20 mA V_{BE} = 0
$V_{(BR)CEO}$	30			V	I_C = 20 mA I_B = 0
I_{CES}			1.0	mA	V_{CB} = 30 V I_{EO} = 0
C_{ob}			12	pF	V_{CB} = 28 V f = 1 MHz I_E = 0

DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
G_P	10			dB	F = 400 MHz P_{IN} = 1 W V_{CC} = 28 V
η_c	60			%	
P_{OUT}	10			W	
z_S		1.7 - j 0.8		Ω	F = 225 MHz P_{OUT} = 10 W V_{CC} = 28 V
z_{CL}		20 + j 25		Ω	
z_S		1.5 - j 2.5		Ω	F = 400 MHz P_{OUT} = 10 W V_{CC} = 28 V
z_{CL}		15 + j20		Ω	

CASE DESCRIPTION

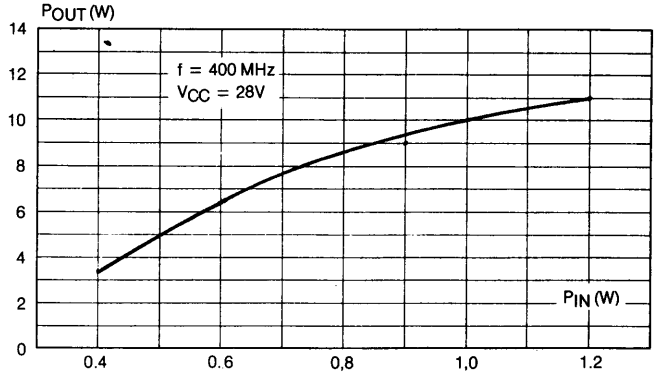


Dimensions in millimeters

* Outputs must not be bent, cut or used in this area

CB-312

(.280 4L STUD(B))



Output power versus input power (minimum values)

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 553

NPN POWER TRANSISTOR FOR UHF APPLICATIONS

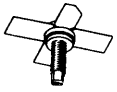
DESCRIPTION

The TH 553 is a 28 Volts gold metallized silicon NPN planar transistor designed for UHF military and commercial communications.
This device uses gold metallization and diffused emitter ballasting to achieve infinite VSWR at rated operating conditions.

FEATURES

* Designed for UHF military broadband 225-400 MHz.
* 16 W (min.) with greater than 6.5 dB gain.
* Gold metallization for high reliability applications.

f = 400 MHz
$P_{OUT} \geqslant$ 16 W
$G_P \geqslant$ 7 dB
$\eta_c \geqslant$ 65 %
V_{CC} = 28 V



Case : CB-312
(.280 4L STUD (B))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	4	V
Collector-base (d.c.) voltage	V_{CBO}	60	V
Collector-emitter (d.c.) voltage	V_{CEO}	30	V
Collector current (d.c.)	I_C	4.5	A
Total power dissipation T_C = 75° C	P_{tot}	25	W
Storage and junction temperatures	T_{stg} T_j	− 65 ⟶ + 200 + 200	°C °C

Thermal resistance (junction-case)	$R_{th\ (j-c)}$	5.0	°C/W

50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

THOMSON-CSF COMPOSANTS

STATIC CHARACTERISTICS at T_{amb} = 25°C

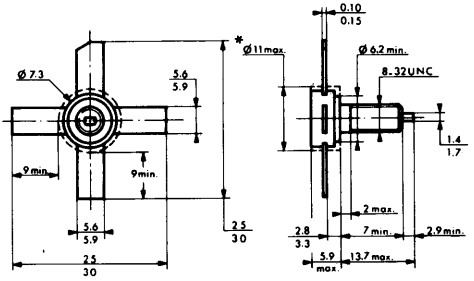
Symbols	Values			Units	Test conditions
	min.	typ.	max.		
V(BR)EBO	4			V	I_E = 5 mA I_C = 0
V(BR)CES	60			V	I_C = 100 mA V_{BE} = 0
V(BR)CEO	30			V	I_C = 100 mA *
I_{CES}			10	mA	V_{CE} = 30 V V_{BE} = 0
C_{ob}			16	pF	V_{CB} = 30 V f = 1 MHz

* pulsed through to 25 mH inductor, duty factor 50 %

DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
GP	7			dB	F = 400 MHz V_{CC} = 28 V P_{IN} = 3.2 W
η_c	65			%	
P_{OUT}	16			W	
Z_S		1.4 - j 0.5		Ω	F = 225 MHz V_{CE} = 28 V P_{OUT} = 16 W
Z_{CL}		12 + j 13		Ω	
Z_S		1.3 - j 1.5		Ω	F = 400 MHz V_{CE} = 28 V P_{OUT} = 16 W
Z_{CL}		0.9 + j 12		Ω	

CASE DESCRIPTION



Dimensions in millimeters

* Outputs must not be bent, cut or used in this area

CB-312

(.280 4L STUD(B))

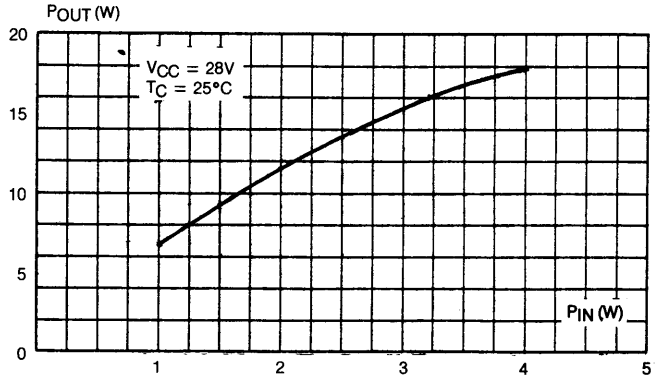


Fig. 1 - Output power versus input power (minimum values)

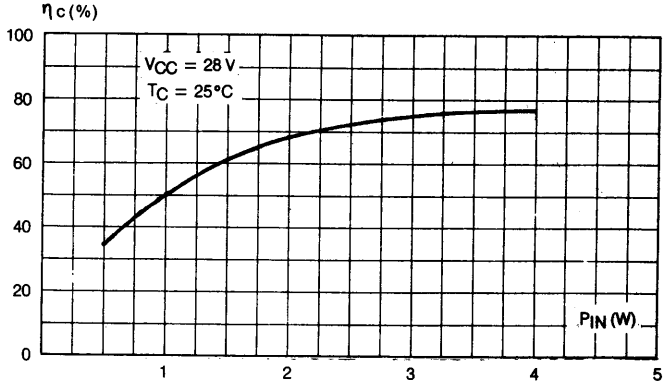


Fig. 2 - Collector efficiency versus input power (typical values)

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 596

UHF LINEAR TRANSISTOR FOR BANDS 4 AND 5 TV TRANSPOSER

FEATURES

— NPN silicon transistor
— Gold metallization
— Diffused emitter ballast resistors structure
— Ceramic cap package

APPLICATIONS

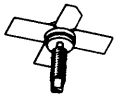
Linear transistor for TV applications bands 4 and 5

f = 860 MHz

P_{OUT} = 0,5 W

G_P = 12 dB

IMD* = − 60 dB



Case : CB-289 (.280 4L STUD (C))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3,5	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	24	V
Collector (d.c.) current	I_C	0,7	A
Total power dissipation	P_{tot}	8,75	W
Storage and junction temperature range	T_{stg} T_j	− 65 → + 200 − 55 → + 200	°C °C

Thermal resistance (junction-heatsink)	$R_{th\ (j-h)}$	20	°C/W

* 3 tones test

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50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

THOMSON-CSF COMPOSANTS

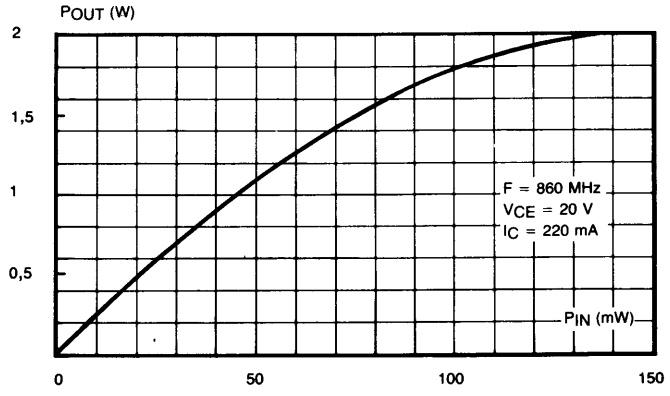
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3,5			V	I_E = 0,25 mA	
$V_{(BR)CBO}$	45			V	I_C = 1 mA	I_B = 0
$V_{(BR)CEO}$	24			V	I_C = 20 mA	I_B = 0
H_{FE}	20		120		I_C = 0,1 A	V_{CE} = 5 V
C_{cb}			5	pF	V_{CB} = 28 V	f = 1 MHz

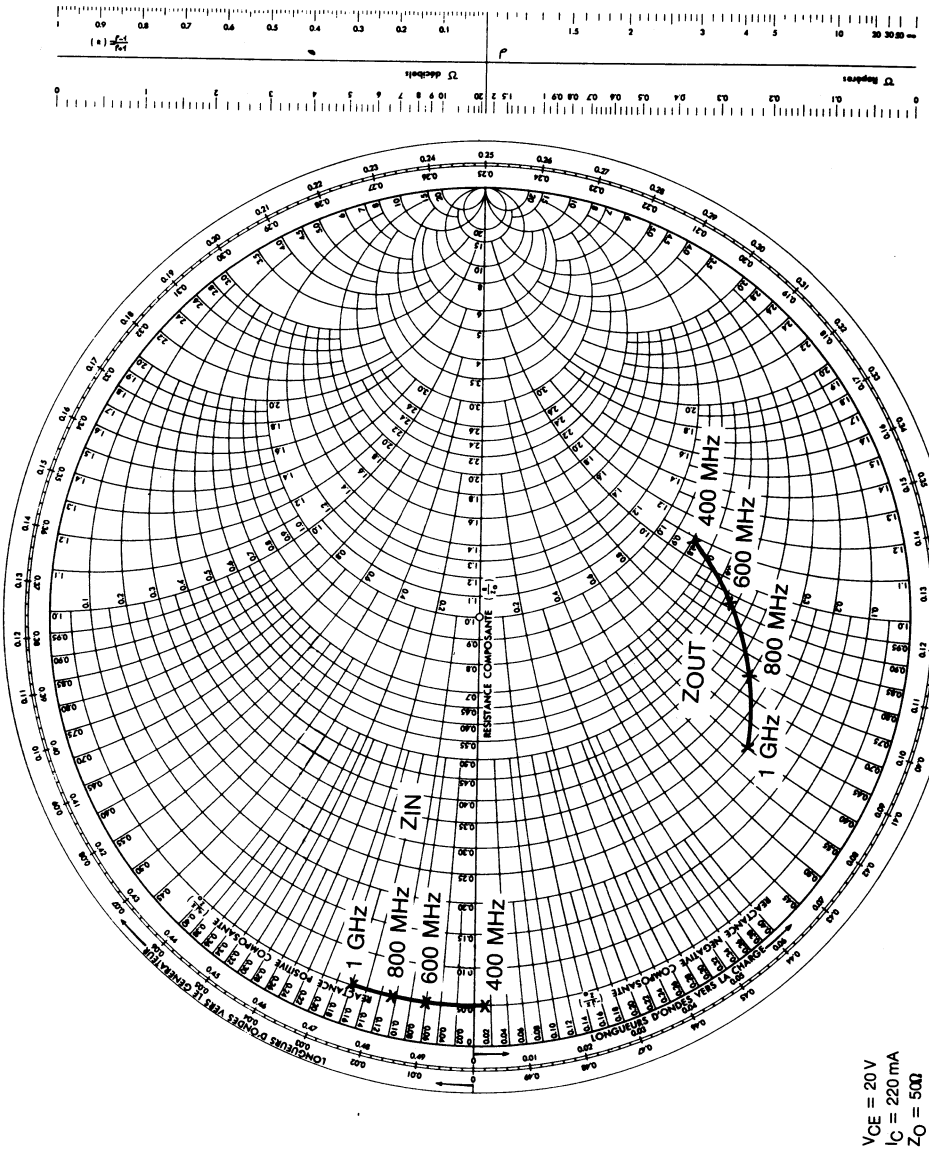
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
G_P		12		dB	f = 860 MHz	V_{CE} = 20 V
IMD*		– 60		dB	P_{OUT} = 0,5 W	I_C = 0,22 A
f_T		2,5		GHz	V_{CE} = 20 V	I_C = 0,22 A

* 3 tones test - Vision carrier - 8dB/ref
Sound carrier - 7dB/ref
Sideband carrier -16dB/ref



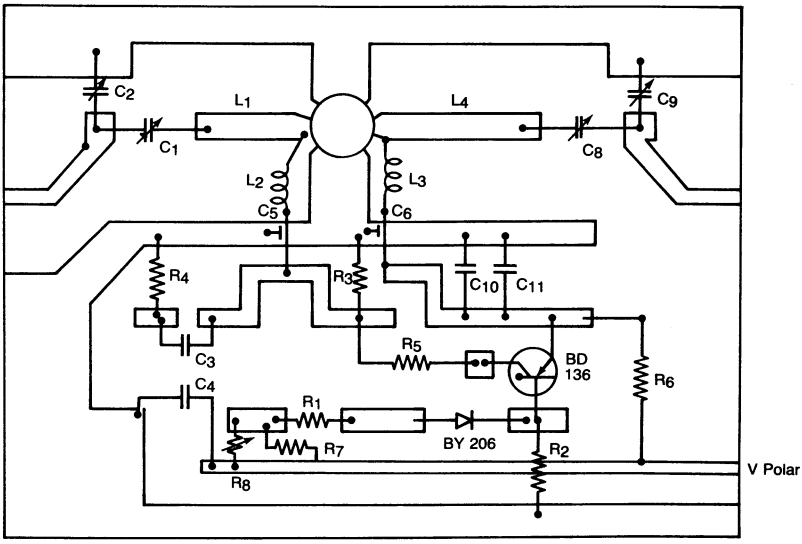
Output power versus input power



Smit h chart

V_{CE} = 20 V
I_C = 220 mA
Z_O = 50Ω

TEST MOUNTING IN CLASS A AT F = 860 MHz

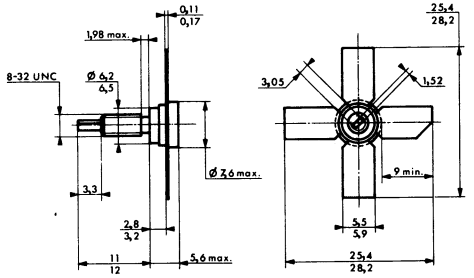


C_1 = C_8	=	Variable capacitors 2 to 18 pF
C_2 = C_9	=	Variable capacitors 2 to 9 pF
C_3 = C_4	=	100 nF capacitors
C_5 = C_6	=	By-pass capacitors 1 nF
C_{10}	=	Chemical capacitor 10 μF/40 V
C_{11}	=	Ceramic capacitor 15 nF

R_1 = 150 Ω
R_2 = 1,3 kΩ
R_3 = 33 Ω
R_4 = 3 × 100 Ω in parallel
R_5 = 220 Ω (1 W)
R_6 = 4 × 12 Ω in parallel (4 × 1 W)
R_7 = 1 kΩ
R_8 = 220 Ω

L_1 = Line of 22 mm × 5 mm on glass teflon ε = 4,8 and thickness = 1,6 mm
L_2 = 5 μH
L_3 = Coil made of one copper turn of ø 1 mm and interior ø = 5,5 mm, length of leads = 5 mm each
L_4 = Line of 32 mm × 5 mm on glass teflon ε = 4,8 and thickness = 1,6 mm

CASE DESCRIPTION



Dimensions in millimeters

CB-289
(.280 4L STUD (C))

THOMSON-CSF

DIVISION SEMICONDUCTEURS DISCRETS

TH 597

UHF LINEAR TRANSISTOR FOR BANDS 4 AND 5 TV TRANSPOSER

FEATURES

- NPN silicon transistor
- Gold metallization
- Diffused emitter ballast resistors structure
- Ceramic cap package

APPLICATIONS

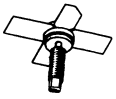
Linear transistor for TV applications bands 4 and 5

f = 860 MHz

P_{OUT} = 1 W

G_P = 11 dB

IMD* = – 60 dB



Case : CB-289 (.280 4L STUD (C))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3,5	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	24	V
Collector (d.c.) current	I_C	1,4	A
Total power dissipation	P_{tot}	19	W
Storage and junction temperature range	T_{stg} T_j	– 65 → + 200 – 55 → + 200	°C °C

Thermal resistance (junction-heatsink)	$R_{th\ (j-h)}$	9	°C/W

* 3 tones test

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50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

THOMSON-CSF COMPOSANTS

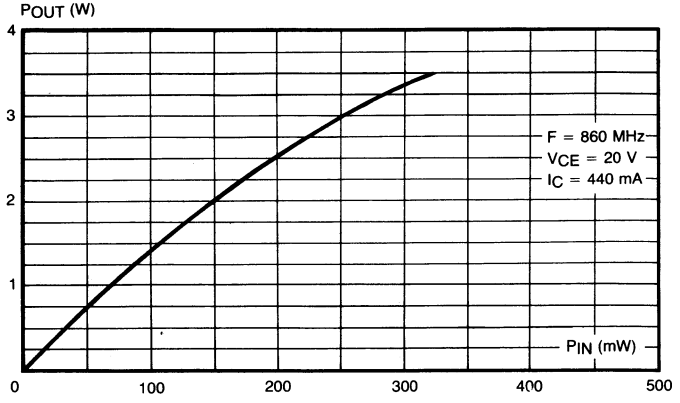
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3,5			V	I_E = 0,5 mA	
$V_{(BR)CBO}$	45			V	I_C = 2 mA	I_B = 0
$V_{(BR)CEO}$	24			V	I_C = 40 mA	I_B = 0
H_{FE}	20		120		I_C = 0,2 A	V_{CE} = 5 V
C_{cb}			7	pF	V_{CB} = 28 V	f = 1 MHz

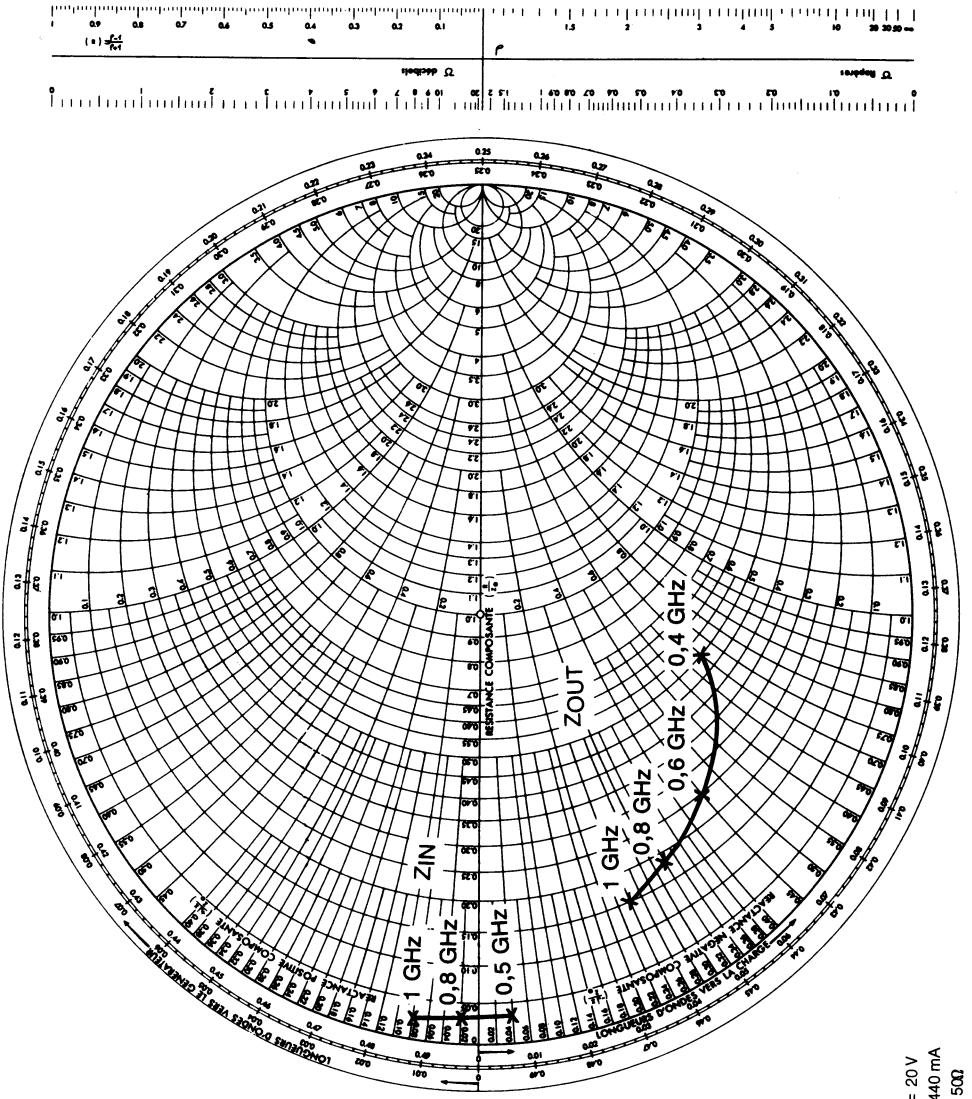
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
G_P		11		dB	f = 860 MHz	V_{CE} = 20 V
IMD*		– 60		dB	P_{OUT} = 1 W	I_C = 0,44 A
f_T		2,5		GHz	V_{CE} = 20 V	I_C = 0,44 A

* 3 tones test - Vision carrier - 8dB/ref
Sound carrier - 7dB/ref
Sideband carrier -16dB/ref



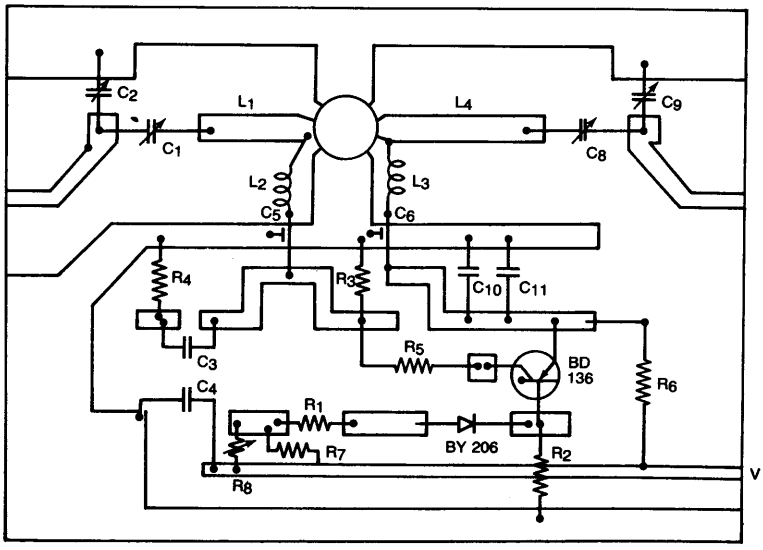
Output power versus input power



Smith chart

V_{CE} = 20 V
I_C = 440 mA
Z_O = 50Ω

TEST MOUNTING IN CLASS A AT F = 860 MHz



C_1 = C_8	=	Variable capacitors 2 to 18 pF	$R_1 = 150\,\Omega$
C_2 = C_9	=	Variable capacitors 2 to 9 pF	$R_2 = 1{,}3\ k\Omega$
C_3 = C_4	=	100 nF capacitors	$R_3 = 33\,\Omega$
C_5 = C_6	=	By-pass capacitors 1 nF	$R_4 = 3 \times 100\,\Omega$ in parallel
C_{10}	=	Chemical capacitor 10 μF/40 V	$R_5 = 220\,\Omega$ (1 W)
C_{11}	=	Ceramic capacitor 15 nF	$R_6 = 4 \times 12\,\Omega$ in parallel (4 × 1 W)
			$R_7 = 1\ k\Omega$
			$R_8 = 220\,\Omega$

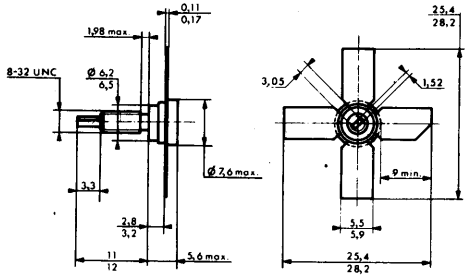
L_1 = Line of 22 mm × 5 mm on glass teflon ε = 4,8 and thickness = 1,6 mm

L_2 = 5 μH

L_3 = Coil made of one copper turn of ø 1 mm and interior ø = 5,5 mm, length of leads = 5 mm each

L_4 = Line of 32 mm × 5 mm on glass teflon ε = 4,8 and thickness = 1,6 mm

CASE DESCRIPTION



Dimensions in millimeters

CB-289
(.280 4L STUD (C))

THOMSON-CSF

DIVISION SEMICONDUCTEURS DISCRETS

TH 598

UHF LINEAR TRANSISTOR FOR BANDS 4 AND 5 TV TRANSPOSER

FEATURES

- NPN silicon transistor
- Gold metallization
- Diffused emitter ballast resistors structure
- Ceramic cap package

APPLICATIONS

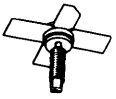
Linear high power transistor for TV applications bands 4 and 5

f = 860 MHz

P_{OUT} = 3,5 W

G_P = 9,5 dB

IMD* = − 60 dB



Case : CB-289 (.280 4L STUD (C))

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3,5	V
Collector-base (d.c.) voltage	V_{CBO}	40	V
Collector-emitter (d.c.) voltage	V_{CEO}	27	V
Peak collector current	I_{CM}	4	A
Total power dissipation (at 70°C heatsink temperature)	P_{tot}	21,5	W
Storage and junction temperature range	T_{stg} T_j	− 65 ⟶ + 200 − 55 ⟶ + 200	°C °C

Thermal resistance	— junction-case — case-heatsink	$R_{th\ (j-c)}$ $R_{th\ (c-h)}$	5,5 0,5	°C/W °C/W

* 3 tones test

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50, rue Jean-Pierre Timbaud - B.P. 5
F - 92403 Courbevoie Cedex FRANCE
Tél. : (1) 788-50-01 Telex : 610560 F

THOMSON-CSF COMPOSANTS

STATIC CHARACTERISTICS at T_{amb} = 25°C

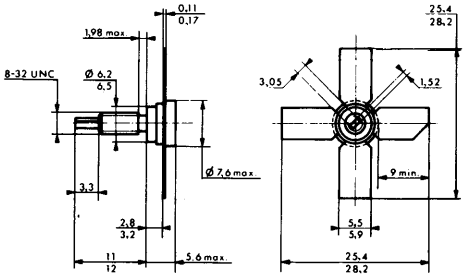
Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3,5			V	I_E = 5 mA	
$V_{(BR)CBO}$	40			V	I_C = 50 mA	I_B = 0
$V_{(BR)CEO}$	27			V	I_C = 50 mA	I_B = 0
H_{FE}	20	45			I_C = 1 A	V_{CE} = 5 V
C_{cb}		20	28	pF	V_{CB} = 25 V	f = 1 MHz

DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
G_P	8	9,5		dB	f = 860 MHz I_C = 850 mA	V_{CE} = 25 V	P_{OUT} = 3,5 W
IMD*		− 60		dB	P_{OUT} = 3,5 W	f = 860 MHz	V_{CE} = 25 V
			− 54		P_{OUT} = 5 W	I_C = 0,85 A	
f_T		2		GHz	V_{CE} = 25 V	I_C = 1 A	

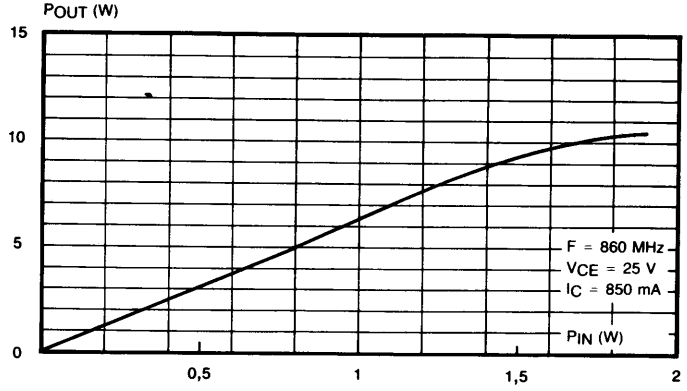
* 3 tones test - Vision carrier - 8dB/ref
Sound carrier - 7dB/ref
Sideband carrier -16dB/ref

CASE DESCRIPTION

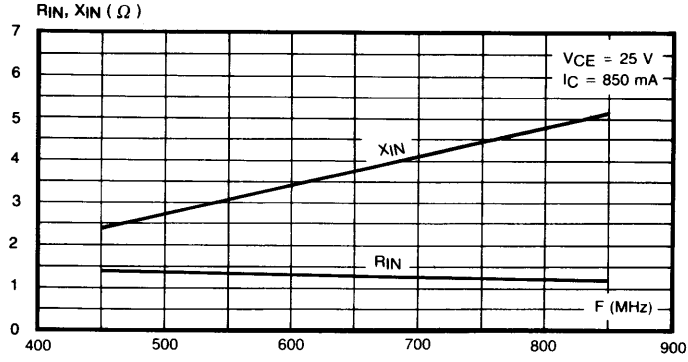


Dimensions in millimeters

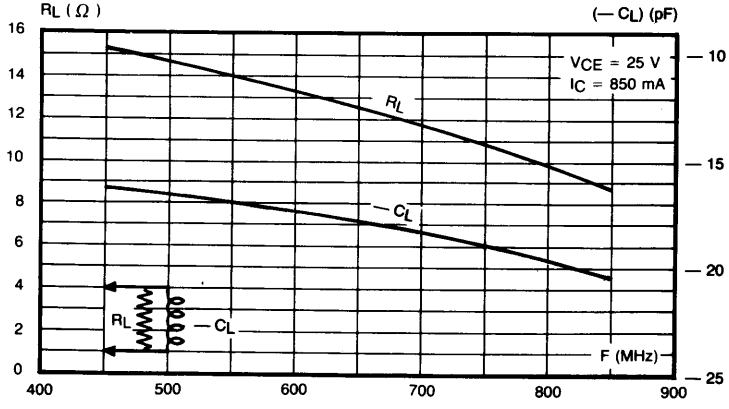
CB-289
(.280 4L STUD (C))



Output power versus input power.

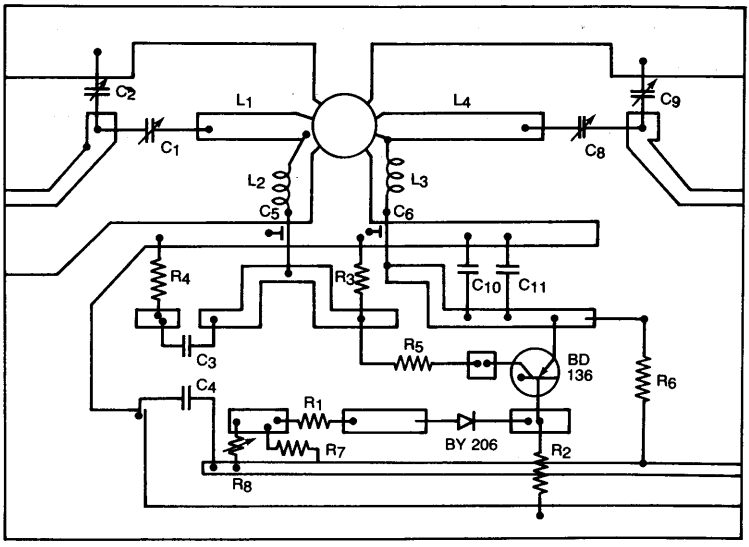


Input impedance (series terms) versus frequency (typical values).



Load impedance (parallel terms) versus frequency (typical values).

TEST MOUNTING IN CLASS A AT F = 860 MHz



$C_1 = C_8$ = Variable capacitors 2 to 18 pF
$C_2 = C_9$ = Variable capacitors 2 to 9 pF
$C_3 = C_4$ = 100 nF capacitors
$C_5 = C_6$ = By-pass capacitors 1 nF
C_{10} = Chemical capacitor 10 μF/40 V
C_{11} = Ceramic capacitor 15 nF

$R_1 = 150\,\Omega$
$R_2 = 1{,}3\ k\Omega$
$R_3 = 33\,\Omega$
$R_4 = 3 \times 100\,\Omega$ in parallel
$R_5 = 220\,\Omega$ (1 W)
$R_6 = 4 \times 12\,\Omega$ in parallel (4 × 1 W)
$R_7 = 1\ k\Omega$
$R_8 = 220\,\Omega$

L_1 = Line of 22 mm × 5 mm on glass teflon $\varepsilon = 4{,}8$ and thickness = 1,6 mm
$L_2 = 5\ \mu H$
L_3 = Coil made of one copper turn of ø 1 mm and interior ø = 5,5 mm, length of leads = 5 mm each
L_4 = Line of 32 mm × 5 mm on glass teflon $\varepsilon = 4{,}8$ and thickness = 1,6 mm