THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 064

MICROWAVE TRANSISTOR FOR CLASS A APPLICATION

FEATURES

- Gold metallization
- Emitter ballast resistors
- Auto-aligned and glass-passivated structure
- Hermetical ceramic metal package
- Common emitter structure

APPLICATIONS

Transistor for telecommunications, used as class A amplifier

150 mW
2 GHz
CLASS A

Case : CB-294 (.250 2L FL)
CB-311 (.250 2L)

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	20	V
Collector (d.c.) current	I_C	0,125	A
Total power dissipation	P_{tot}	3,9	W
Storage and junction temperature range	T_{stg} T_j	− 65 → + 200 − 55 → + 200	°C °C

Thermal resistance (junction-case)	$R_{th\ (j-c)}$	45	°C/W

January 1982 - 1/4

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THOMSON-CSF
COMPOSANTS

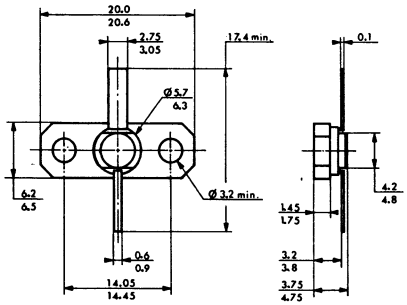
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3			V	I_E = 1 mA	I_C = 0
$V_{(BR)CBO}$	45			V	I_C = 1 mA	I_E = 0
$V_{(BR)CER}$	45			V	I_C = 5 mA	R_{BE} = 10 Ω
$V_{(BR)CEO}$	20			V	I_C = 5 mA	I_B = 0
H_{21E}	15		120		I_C = 50 mA	V_{CE} = 5 V
C_{22b}			2,5	pF	V_{CB} = 28 V	f = 1 MHz

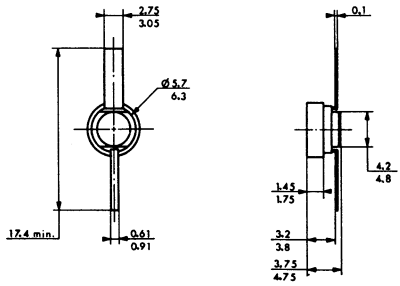
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
G_P	8	10		dB	f = 2 GHz	V_{CE} = 18 V	I_C = 50 mA
	5	7			f = 3 GHz		
P_{OUT} - 1dB compression		22		dBm	f = 2 GHz	V_{CE} = 18 V	I_C = 50 mA
f_T		3,2		GHz	V_{CE} = 18 V	I_C = 50 mA	
3 rd order intercept point		33		dBm	V_{CE} = 18 V	I_C = 50 mA	

CASE DESCRIPTION

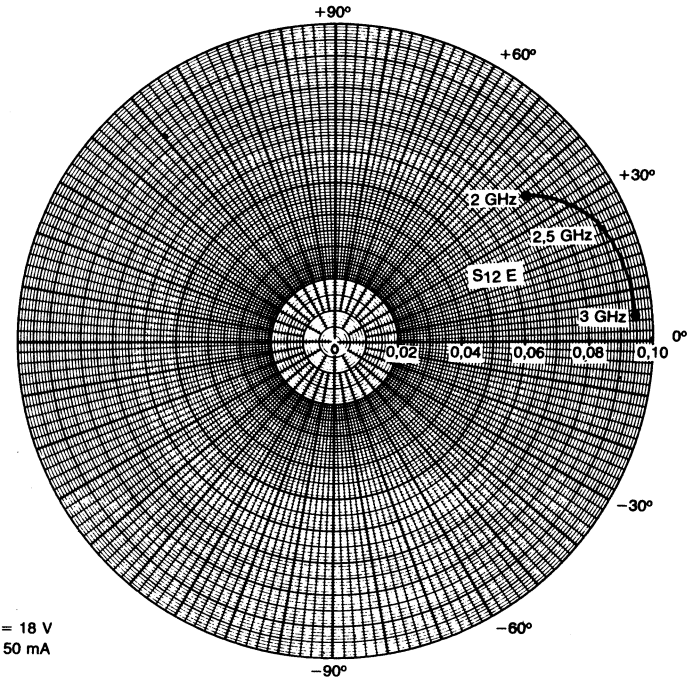


CB-294
(.250 2L FL)

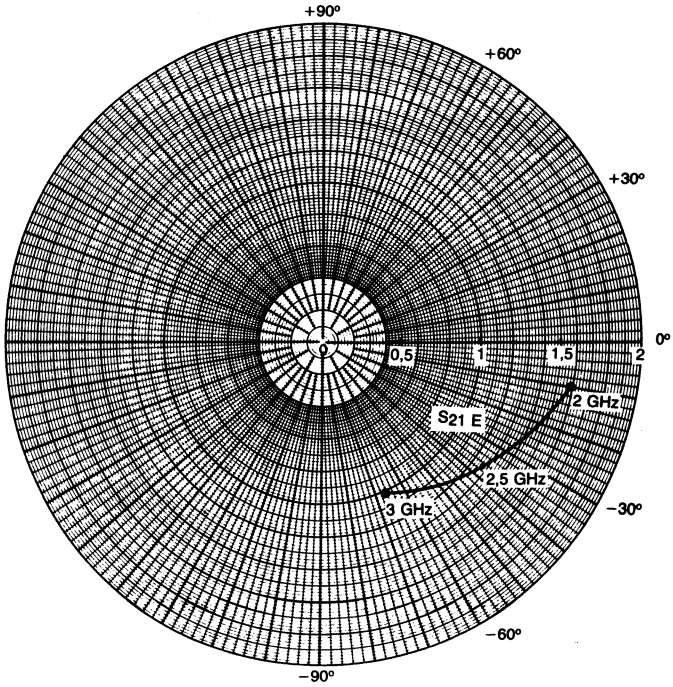


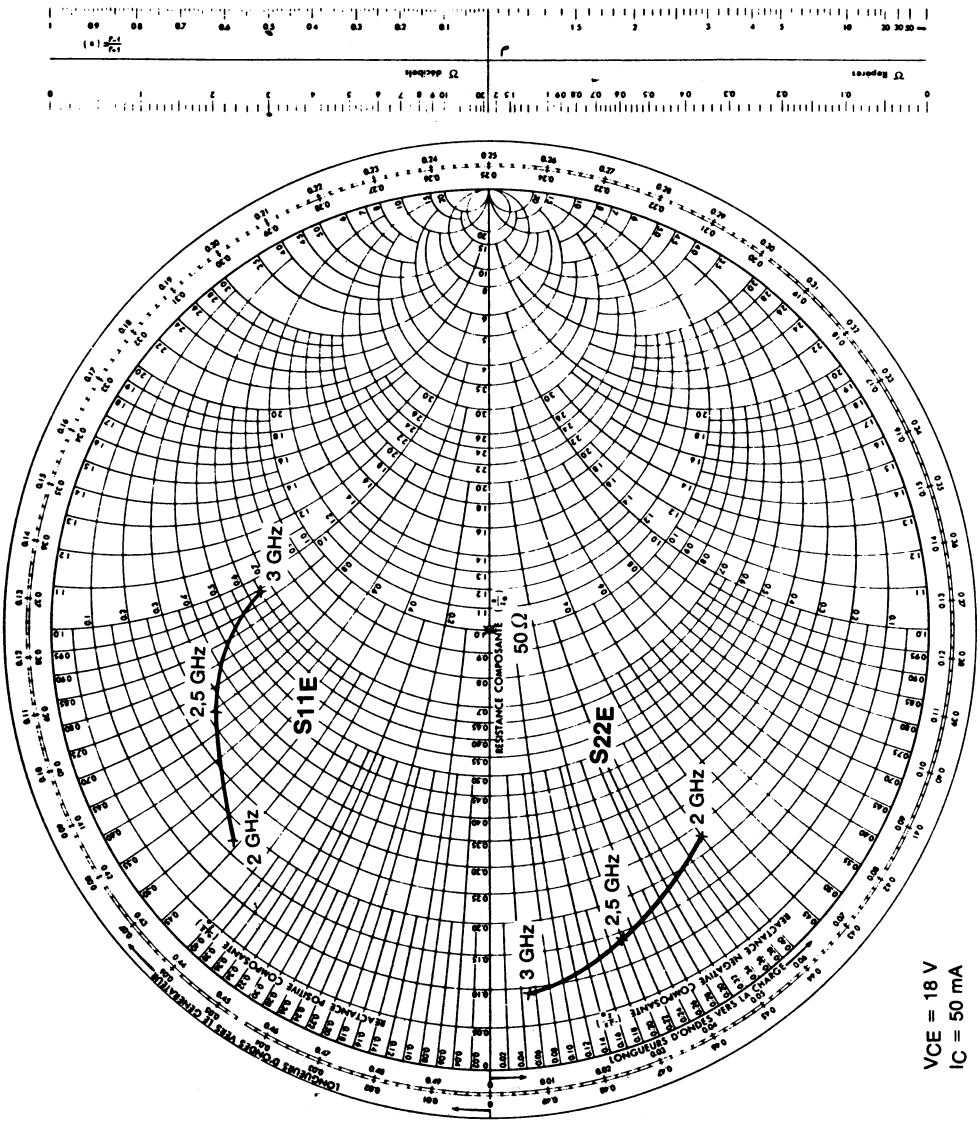
CB-311
(.250 2L)

Dimensions in millimeters



V_{CE} = 18 V
I_C = 50 mA




S11E
S22E
2 GHz
2,5 GHz
3 GHz
50 Ω
RESISTANCE COMPOSANTE
VCE = 18 V
IC = 50 mA

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 195

MICROWAVE TRANSISTOR FOR CLASS A APPLICATION

FEATURES

- Gold metallization
- Emitter ballast resistors
- Auto-aligned and glass-passivated structure
- Hermetical ceramic metal package
- Common emitter structure

APPLICATIONS

Transistor for telecommunications, used as class A amplifier

600 mW
2 GHz
CLASS A

Case : CB-294 (.250 2L FL)
CB-311 (.250 2L)

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	20	V
Collector (d.c.) current	I_C	0,3	A
Total power dissipation	P_{tot}	5	W
Storage and junction temperature range	T_{stg} T_j	$-65 \rightarrow +200$ $-55 \rightarrow +200$	°C °C

Thermal resistance (junction-case)	$R_{th\ (j-c)}$	35	°C/W

January 1982 - 1/4

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THOMSON-CSF COMPOSANTS

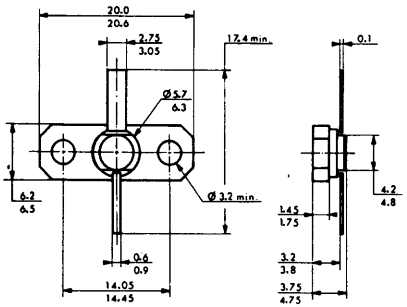
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3			V	I_E = 1 mA	I_C = 0
$V_{(BR)CBO}$	45			V	I_C = 5 mA	I_E = 0
$V_{(BR)CER}$	45			V	I_C = 5 mA	R_{BE} = 10 Ω
$V_{(BR)CEO}$	20			V	I_C = 5 mA	I_B = 0
H_{21E}	15		120		I_C = 100 mA	V_{CE} = 5 V
C_{22b}			3,5	pF	V_{CB} = 28 V	f = 1 MHz

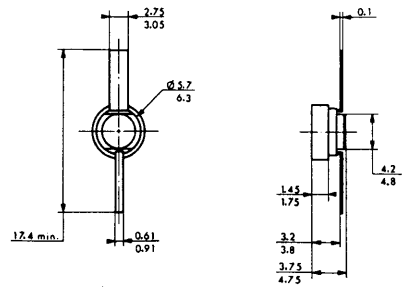
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
G_P	8	9		dB	f = 2 GHz	V_{CE} = 18 V	I_C = 140 mA
		5			f = 3 GHz		
P_{OUT} - 1dB compression		28		dBm	f = 2 GHz	V_{CE} = 18 V	I_C = 140 mA
f_T		3,2		GHz	V_{CE} = 18 V	I_C = 140 mA	
3 rd order intercept point		36		dBm	V_{CE} = 18 V	I_C = 140 mA	

CASE DESCRIPTION

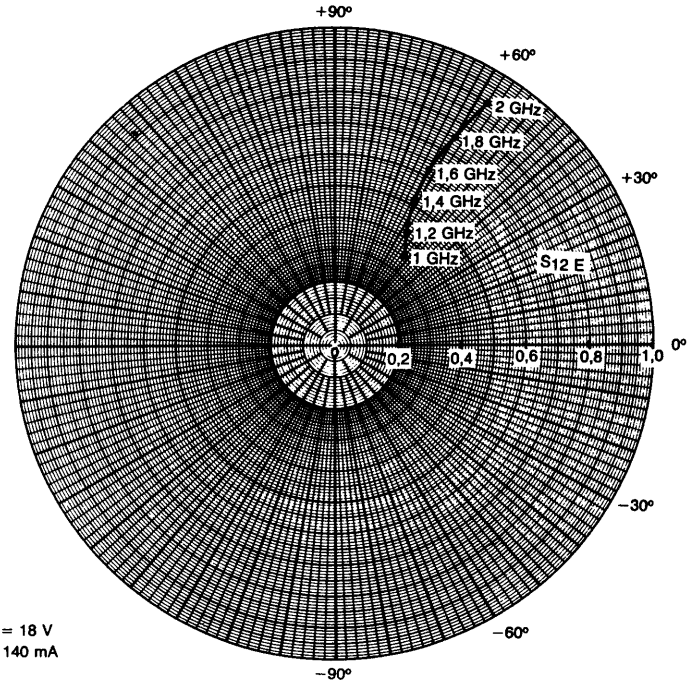


CB-294
(.250 2L FL)

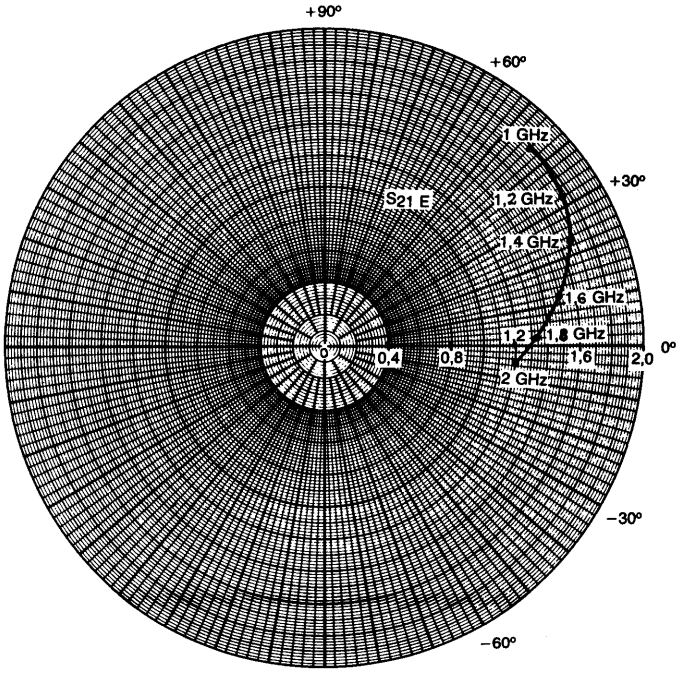


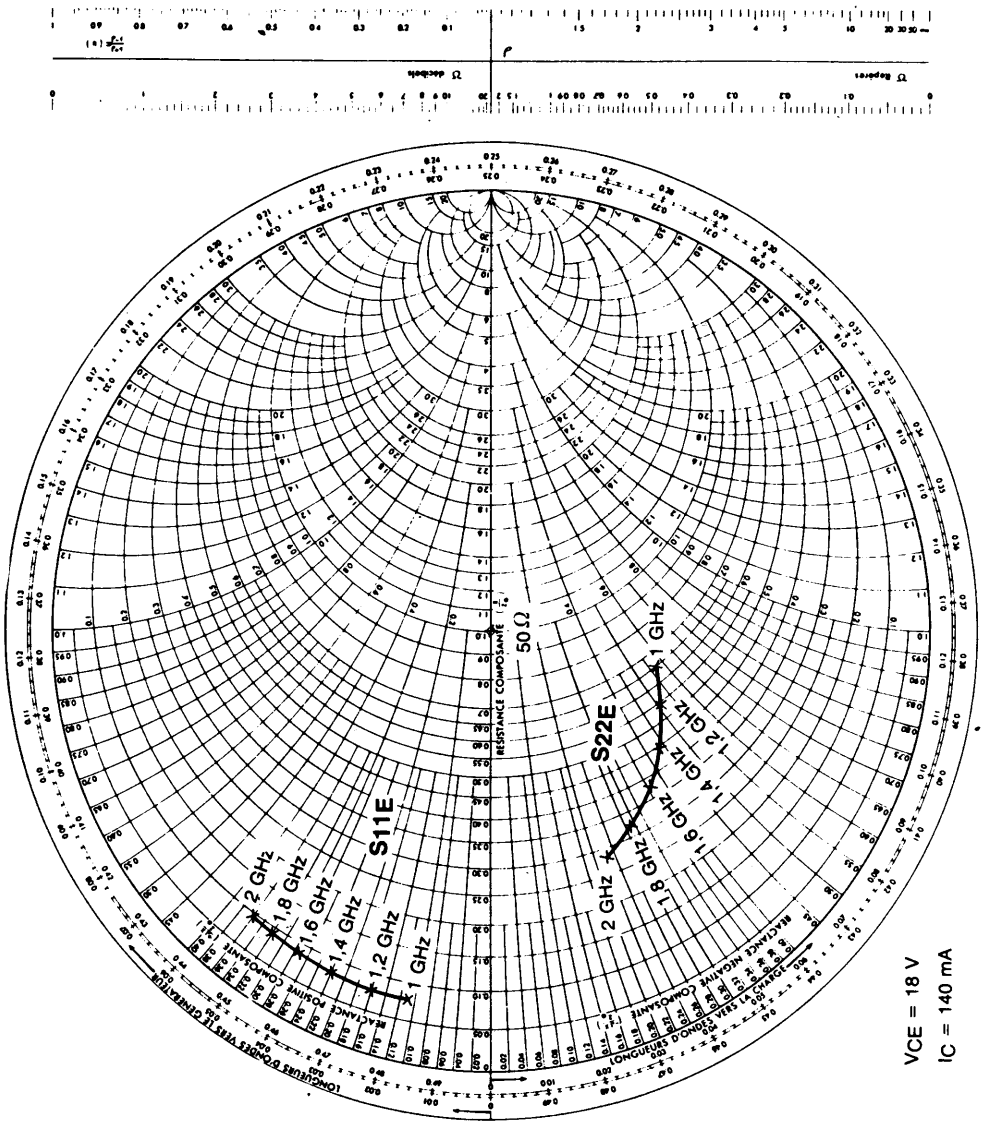
CB-311
(.250 2L)

Dimensions in millimeters



V_{CE} = 18 V
I_C = 140 mA




S11E
S22E
1 GHz
1,2 GHz
1,4 GHz
1,6 GHz
1,8 GHz
2 GHz
50 Ω
RESISTANCE COMPOSANTE
REACTANCE POSITIVE COMPOSANTE
REACTANCE NEGATIVE COMPOSANTE
LONGUEURS D'ONDES VERS LA CHARGE
LONGUEURS D'ONDES VERS LE GENERATEUR
VCE = 18 V
IC = 140 mA

THOMSON-CSF

DIVISION SEMICONDUCTEURS DISCRETS

TH 196

MICROWAVE TRANSISTOR FOR CLASS A APPLICATION

FEATURES

- Gold metallization
- Emitter ballast resistors
- Auto-aligned and glass-passivated structure
- Hermetical ceramic metal package
- Common emitter structure

APPLICATIONS

Transistor for telecommunications, used as class A amplifier

1 W
2 GHz
CLASS A

Case : CB-294 (.250 2L FL)
CB-311 (.250 2L)

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	20	V
Collector (d.c.) current	I_C	0,55	A
Total power dissipation	P_{tot}	*	W
Storage and junction temperatures	T_{stg} T_j	− 65 ⟶ + 200 + 200	°C °C

Thermal resistance (junction-case)	V_{CB} = 10 V I_C = 225 mA	$R_{th\ (j-c)}$	17,5	°C/W

* See safe area.

January 1982 1/5

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THOMSON-CSF COMPOSANTS

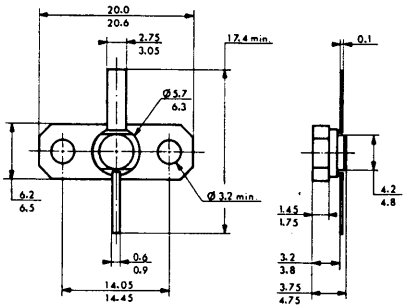
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3			V	I_E = 1 mA	I_C = 0
$V_{(BR)CBO}$	45			V	I_C = 5 mA	I_E = 0
$V_{(BR)CER}$	45			V	I_C = 5 mA	R_{BE} = 10 Ω
$V_{(BR)CEO}$	20			V	I_C = 5 mA	I_B = 0
I_{CBO}			500	μA	V_{CB} = 28 V	I_E = 0
H_{21E}	15		120		I_C = 250 mA	V_{CE} = 5 V
C_{22b}		5		pF	V_{CB} = 18 V	f = 1 MHz

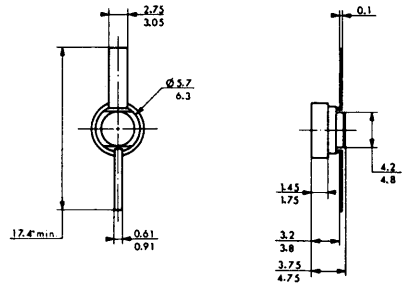
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
G_P	11	13		dB	f = 1 GHz	I_C = 220 mA V_{CE} = 18 V	
	8				f = 2 GHz		
		5			f = 3 GHz		
P_{OUT} - 1dB compression		30,5		dBm	V_{CE} = 18 V	I_C = 220 mA	f = 2 GHz
f_T		3,2		GHz	V_{CE} = 18 V	I_C = 90 mA	
3 rd order intercept point		38		dBm	V_{CE} = 18 V	I_C = 220 mA	

CASE DESCRIPTION

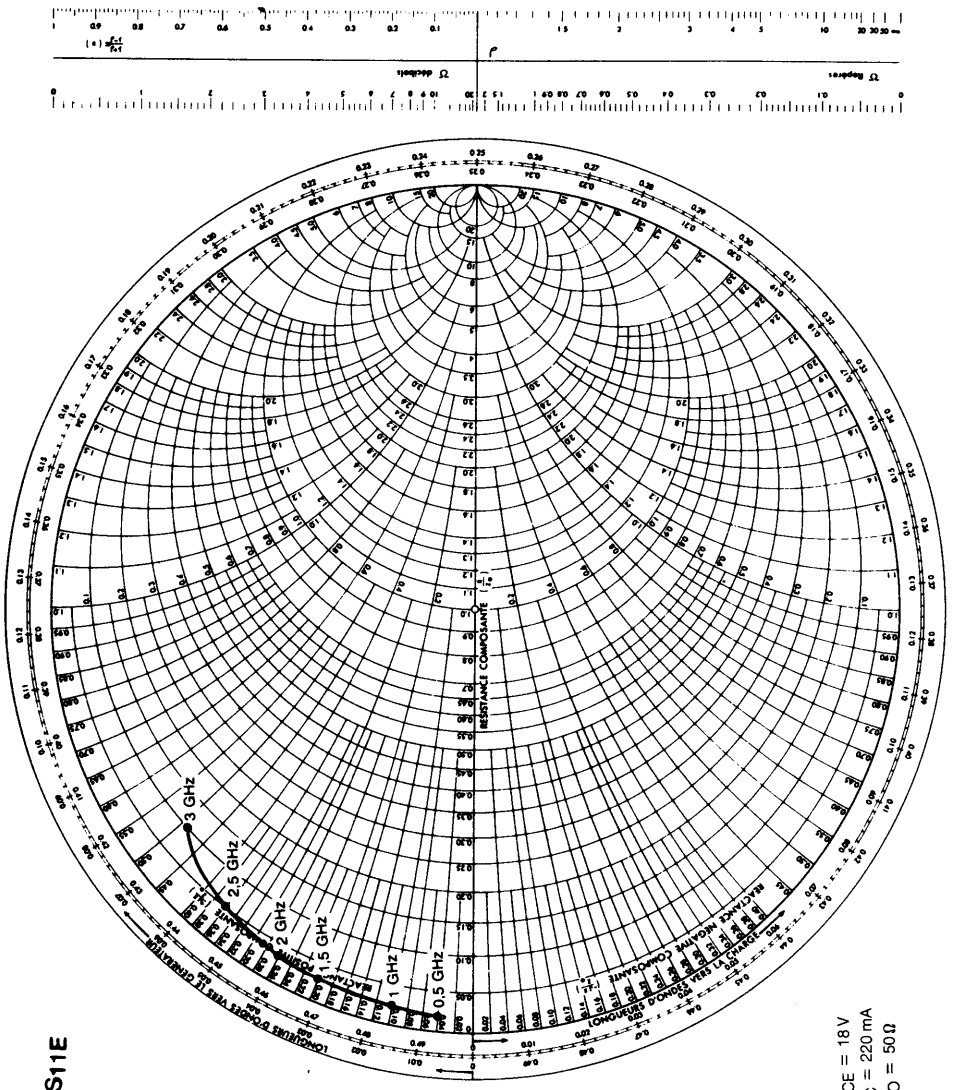


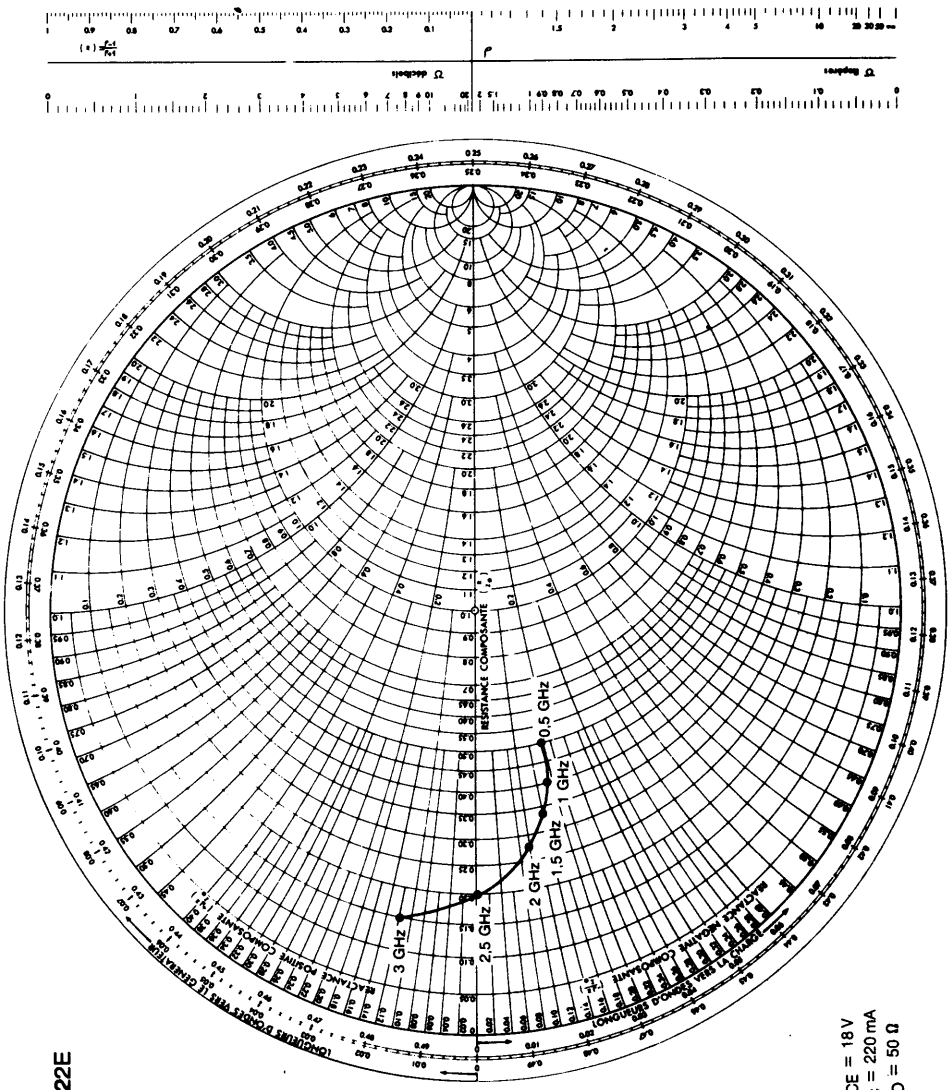
CB-294
(.250 2L FL)



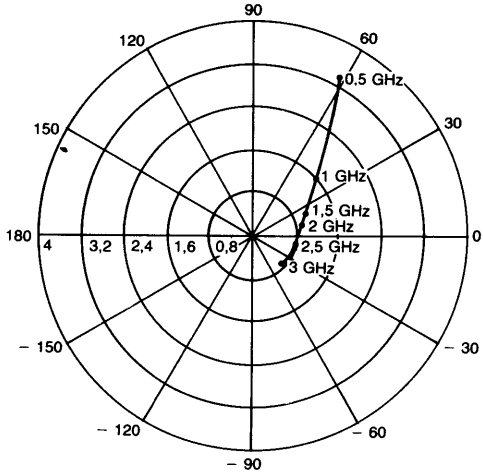
CB-311
(.250 2L)

Dimensions in millimeters


S11E
V_{CE} = 18 V
I_C = 220 mA
Z_O = 50 Ω
3 GHz
2,5 GHz
2 GHz
1,5 GHz
1 GHz
0,5 GHz
RESISTANCE COMPOSANTE
RÉACTANCE COMPOSANTE
LONGUEURS D'ONDES VERS LA CHARGE
LONGUEURS D'ONDES VERS LE GÉNÉRATEUR

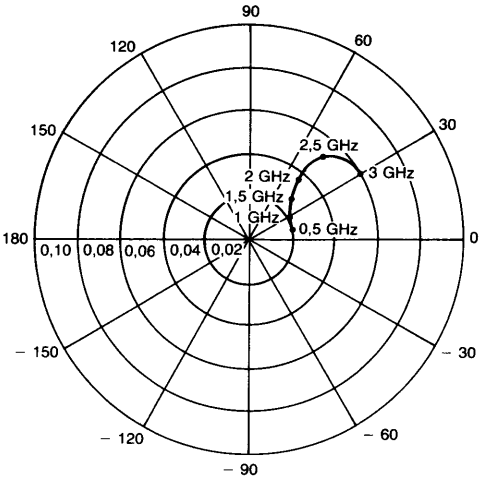

S22E
V_{CE} = 18 V
I_C = 220 mA
Z_O = 50 Ω
0.5 GHz
1 GHz
1.5 GHz
2 GHz
2.5 GHz
3 GHz
RESISTANCE COMPONENT
REACTANCE INDUCTIVE COMPONENT
REACTANCE CAPACITIVE COMPONENT

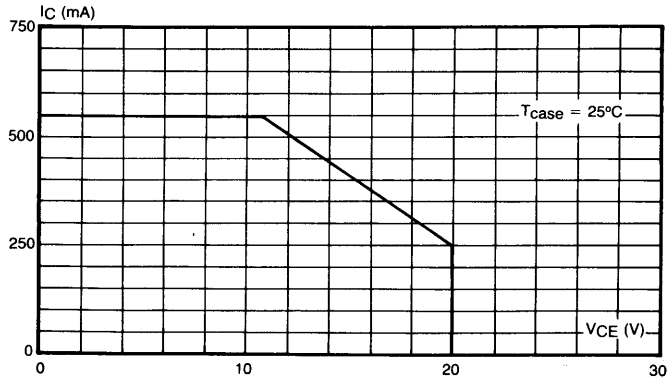
S_{21E}



S_{12E}

V_{CE} = 18 V
I_C = 220 mA





Safe operating area (derating coefficient 38 mV/°C)

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 197

MICROWAVE TRANSISTOR FOR CLASS A APPLICATION

ADVANCE INFORMATION

FEATURES

- Gold metallization
- Emitter ballast resistors
- Auto-aligned and glass-passivated structure
- Hermetical ceramic metal package
- Common emitter structure

APPLICATIONS

Transistor for telecommunications, used as class A amplifier

1,5 W
2 GHz
CLASS A

Case : CB-294 (.250 2L FL)
CB-311 (.250 2L)

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter-base (d.c.) voltage	V_{EBO}	3	V
Collector-base (d.c.) voltage	V_{CBO}	45	V
Collector-emitter (d.c.) voltage	V_{CEO}	20	V
Collector (d.c.) current	I_C	0,85	A
Total power dissipation	P_{tot}	12	W
Storage and junction temperature range	T_{stg} T_j	− 65 ⟶ + 200 − 55 ⟶ + 200	°C °C

Thermal resistance (junction-case)	$R_{th\ (j-c)}$	15	°C/W

September 1981 1/2

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THOMSON-CSF
COMPOSANTS

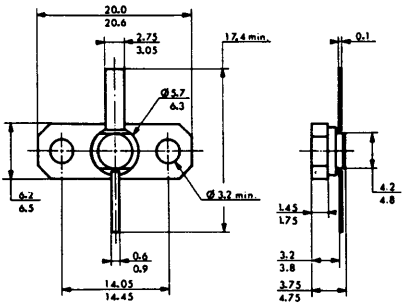
STATIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions	
	min.	typ.	max.			
$V_{(BR)EBO}$	3			V	I_E = 2 mA	I_C = 0
$V_{(BR)CBO}$	45			V	I_C = 10 mA	I_E = 0
$V_{(BR)CER}$	45			V	I_C = 10 mA	R_{BE} = 10 Ω
$V_{(BR)CEO}$	20			V	I_C = 10 mA	I_B = 0
H_{21E}	15		120		I_C = 400 mA	V_{CE} = 5 V
C_{22b}			7	pF	V_{CB} = 28 V	f = 1 MHz

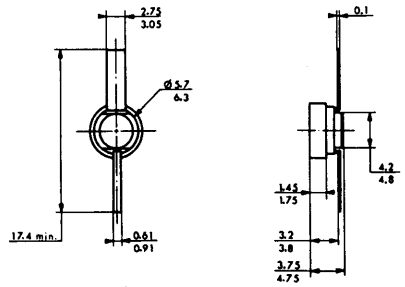
DYNAMIC CHARACTERISTICS at T_{amb} = 25°C

Symbols	Values			Units	Test conditions		
	min.	typ.	max.				
G_P	6	7		dB	f = 2 GHz	V_{CE} = 18 V	I_C = 360 mA
P_{OUT} - 1dB compression		31,7		dBm			
f_T		3,2		GHz	V_{CE} = 18 V	I_C = 360 mA	
3 rd order intercept point		39		dBm	V_{CE} = 18 V	I_C = 360 mA	

CASE DESCRIPTION



CB-294
(.250 2L FL)



CB-311
(.250 2L)

Dimensions in millimeters

THOMSON-CSF
DIVISION SEMICONDUCTEURS DISCRETS

TH 264

MICROWAVE TRANSISTOR FOR CLASS A APPLICATION

ADVANCE INFORMATION

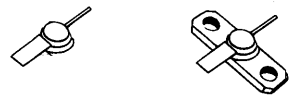
FEATURES

- Gold metallization
- Auto-aligned and glass-passivated structure
- Hermetical ceramic metal package
- Common emitter structure

APPLICATIONS

Transistor for telecommunications, used as class A amplifier

f = 4 GHz
POUT = 0,1 W
GP = 6 dB
VCC = 12 V
IC = 60 mA



Case : CB-294 (.250 2LFL)
CB-311 (.250 2L)

ABSOLUTE RATINGS (LIMITING VALUES)	Symbols	Values	Units
Emitter - base (d.c.) voltage	V_{EBO}	1,5	V
Collector - base (d.c.) voltage	V_{CBO}	30	V
Collector - emitter (d.c.) voltage	V_{CEO}	15	V
Collector (d.c.) current	I_C	200	mA
Total power dissipation	P_{tot}	*	W
Storage and junction temperature range	T_{stg} T_j	-55 → +200 -55 → +175	°C °C

Thermal resistance (junction-case)	T_C = 25 °C I_C = 60 mA V_{CE} = 12 V	$R_{th(j-c)}$	45	°C/W

* See safe area

May 1981 1/3

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THOMSON-CSF COMPOSANTS

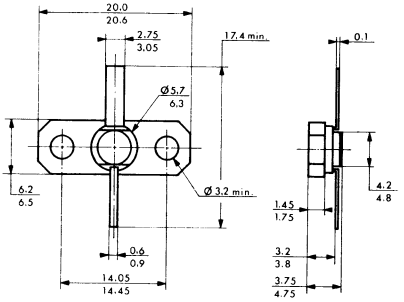
STATIC CHARACTERISTICS at T_{amb} = 25° C

Symbols	Values			Units	Test conditions
	min.	typ.	max.		
I_{CBO}			5	mA	V_{CB} = 30 V - I_E = 0
I_{CES}			5	mA	V_{CE} = 15 V - I_B = 0
I_{EBO}			1	mA	V_{BE} = 1,5 V - I_C = 0
H_{FE}	15		120		I_C = 60 mA - V_{CE} = 12 V
C_{cb}		2,5		pF	V_{CB} = 12 V - f = 1 MHz

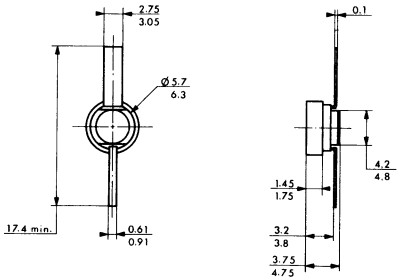
DYNAMIC CHARACTERISTICS at T_{amb} = 25° C

Symbols	Values			Units	Test conditions
	min.	typ.	Max.		
G_p	6	7		dB	I_C = 60 mA - V_{CE} = 12 V - f = 4 GHz
f_T		5		GHz	I_C = 60 mA - V_{CE} = 12 V

CASE DESCRIPTION



CB-294 (.250 2LFL)



CB-311 (.250 2L)

Dimensions in millimeters

SAFE AREA (CLASS A) IN STATIC OPERATING WITHOUT HF POWER