BF 357S

EPITAXIAL PLANAR NPN

PRELIMINARY DATA

VHF - UHF AMPLIFIER

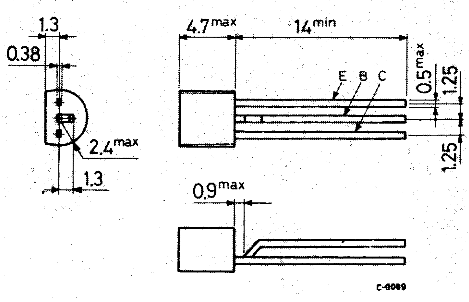
The BF 357S is a silicon planar epitaxial NPN transistor in TO-92 plastic package. It features very low noise over a wide current range, high gain and good intermodulation properties. It is intended for use as mixer and oscillator or wide-band amplifier up to 1 GHz.

ABSOLUTE MAXIMUM RATINGS

V_{CES}	Collector-emitter voltage ($V_{BE} = 0$)	25	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	15	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	3	V
I_C	Collector current	50	mA
P_{tot}	Total power dissipation at $T_{amb} \leqslant 45°C$	250	mW
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

MECHANICAL DATA

Dimensions in mm



(sim. to **TO-92**)

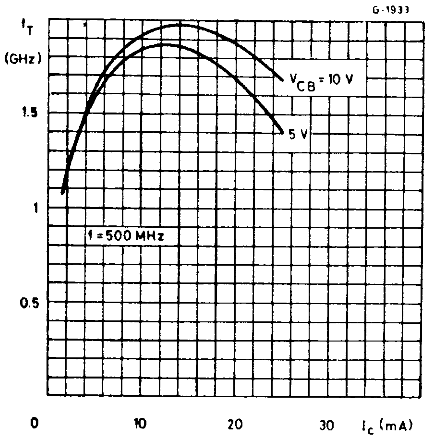
THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	420	°C/W

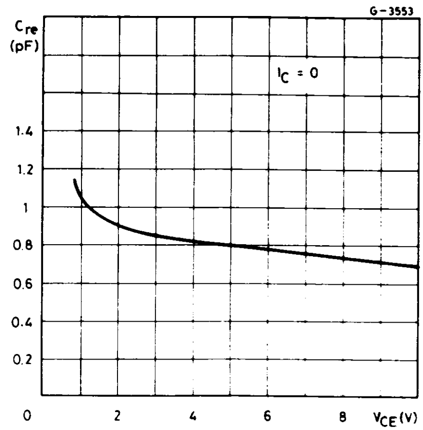
ELECTRICAL CHARACTERISTICS (T_{amb}= 25°C unless otherwise specified)

Symbol	Parameter	Test conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector cutoff current (V_{BE}= 0)	V_{CE} = 10V				50	nA
$V_{(BR)CES}$	Collector-emitter breakdown voltage (V_{BE}= 0)	I_C = 10 μA		25			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = 2 mA		15			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_C = 10 μA		3			V
h_{FE}	DC current gain	I_C = 2 mA	V_{CE}= 1V	25		250	–
		I_C = 25 mA	V_{CE}= 1V		90		–
f_T	Transition frequency	V_{CE} = 5V	f = 100 MHz				
		I_C = 2 mA		1	1.2		GHz
		I_C = 25 mA		1.3	1.5		GHz
C_{re}	Reverse capacitance	I_E = 0 f = 1 MHz	V_{CE}= 10V		0.7		pF
$\vert S_{21e}\vert^2$	Forward transmission gain	I_C = 15 mA f = 500 MHz	V_{CE}= 10V R_g= R_L=50Ω		10		dB
NF	Noise figure	R_g = 50Ω	f = 500 MHz				
		I_C = 2 mA	V_{CE}= 10V		3.5	4.5	dB
		I_C = 15 mA	V_{CE}= 10V		4.5		dB

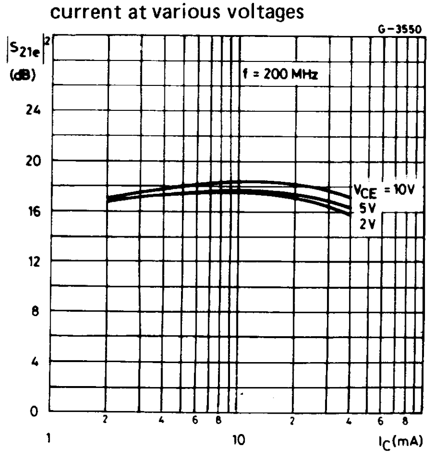
Transition frequency



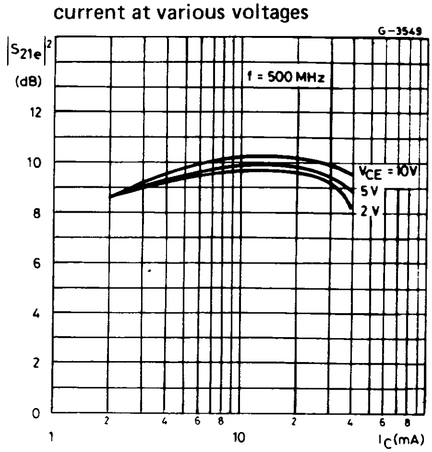
Reverse capacitance



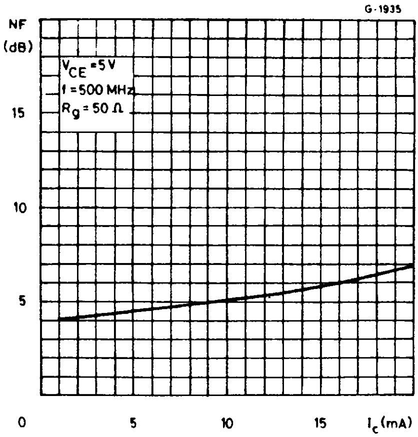
Forward transmission gain vs. collector current at various voltages



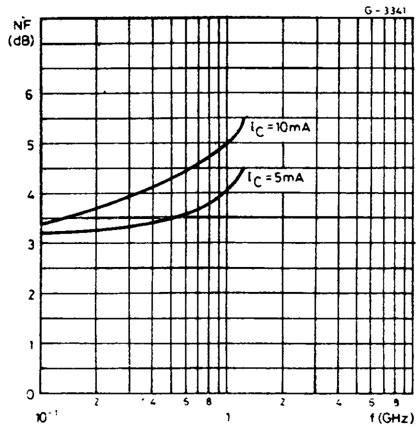
Forward transmission gain vs. collector current at various voltages



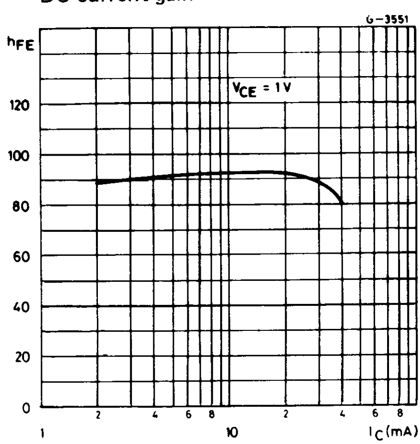
Noise figure vs. collector current



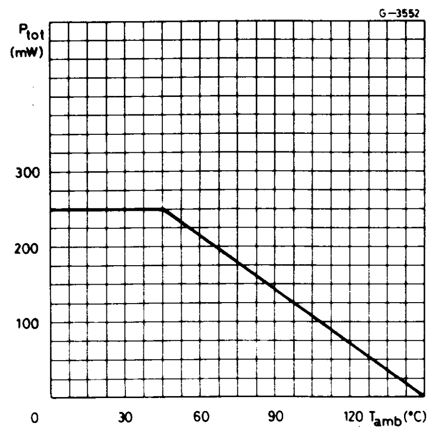
Noise figure vs. frequency



DC current gain



Power rating chart



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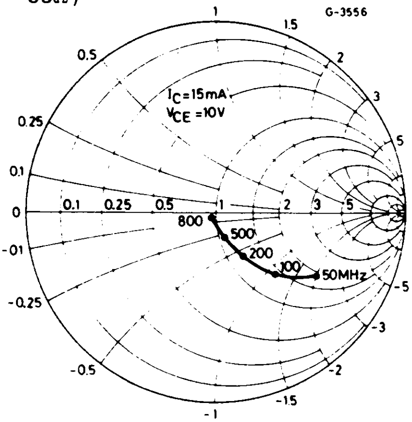
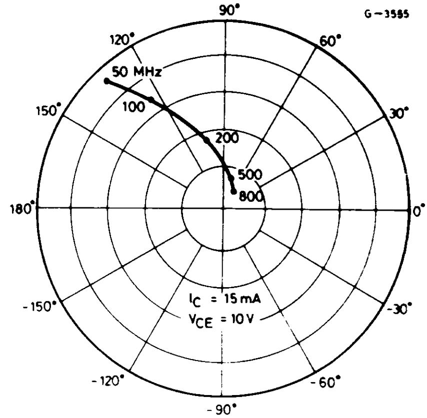
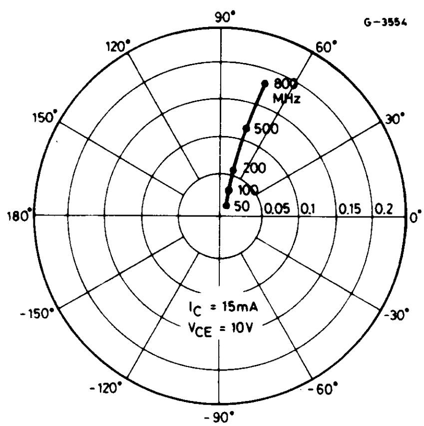
Input impedance S_{11e} (normalized 50Ω)



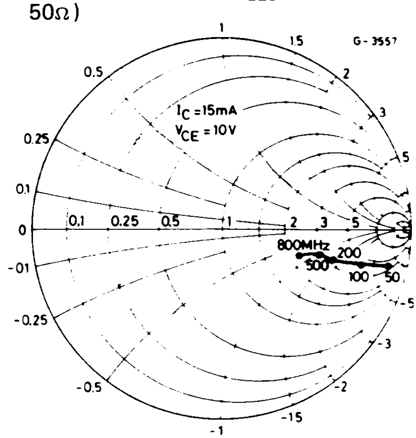
Forward transfer coefficient S_{21e}



Reverse transfer coefficient S_{12e}



Output impedance S_{22e} (normalized 50Ω)



SGS ATES

SILICON PLANAR PNP

BF 479S

PRELIMINARY DATA

LOW-NOISE ULTRA LINEAR UHF-VHF AMPLIFIER

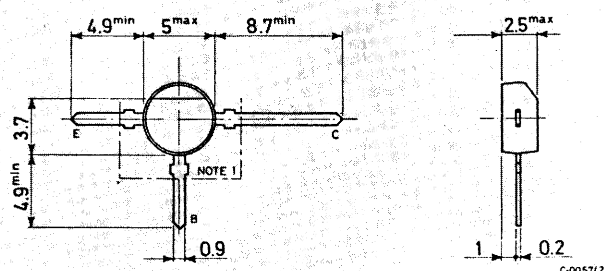
The BF 479S is a silicon planar epitaxial PNP transistor in a T-plastic package mainly ntended for high current UHF-VHF stages of TV tuners.
In this application, combined with a **PIN diode attenuator** circuit, it presents very low noise and very good cross modulation performances up to 900 MHz.
The BF 479S is a pin to pin silicon replacement of germanium AF 379.

ABSOLUTE MAXIMUM RATINGS

V_{CBO}	Collector-base voltage ($I_E = 0$)	-25	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-25	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	-3	V
I_C	Collector current	-50	mA
P_{tot}	Total power dissipation at $T_{amb} \leq 45°C$	170	mW
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

MECHANICAL DATA

Dimensions in mm



NOTE 1 : Within this region the cross-section of the leads is uncontrolled

BF 479S

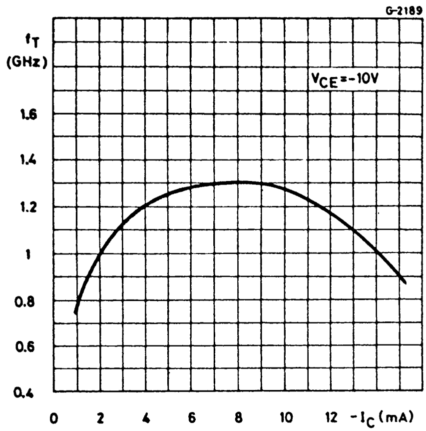
THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	600	°C/W

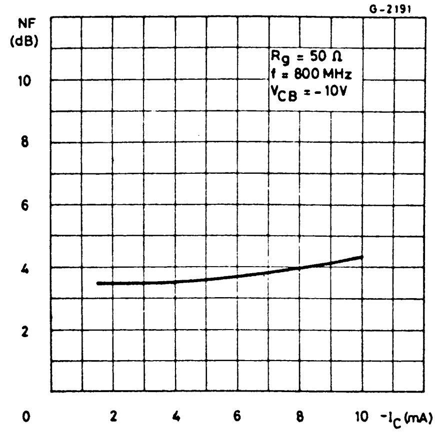
ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current (I_E = 0)	V_{CB} = -15V				-100	nA
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = -100 μA		-25			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = -5 mA		-25			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = -10 μA		-3			V
h_{FE}	DC current gain	I_C = -8 mA	V_{CE} = -10V		60		–
f_T	Transition frequency	I_C = -8 mA f = 100 MHz	V_{CE} = -10V		1.3		GHz
C_{CBO}	Collector-base capacitance	I_E = 0 f = 1 MHz	V_{CB} = -10V		0.5		pF
NF	Noise figure	V_{CB} = -10V	R_g = 50Ω				
		I_C = -2 mA	f = 200 MHz		2.5		dB
		I_C = -8 mA	f = 200 MHz		3.3		dB
		I_C = -2 mA	f = 800 MHz		3.5	4.5	dB
		I_C = -8 mA	f = 800 MHz		4		dB
G_{pb}	Power gain	I_C = -8 mA R_L = 500Ω	V_{CB} = -10V f = 800 MHz	12.5	15		dB
$\|S_{12b}\|^2$	Reverse attenuation	I_C = -8 mA f = 800 MHz	V_{CB} = -10V	28	30		dB
V_{int}	Interferring voltage for 1% cross modulation (e.m.f. in 75Ω)	I_C = -8 mA	V_{CB} = -10V		260		mV

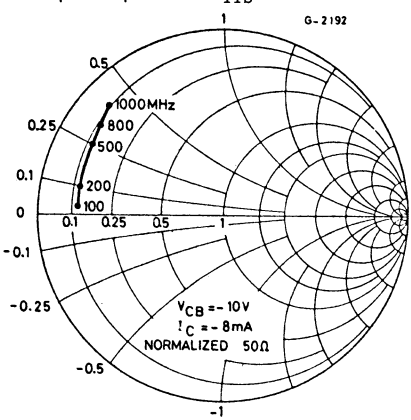
Typical transition frequency



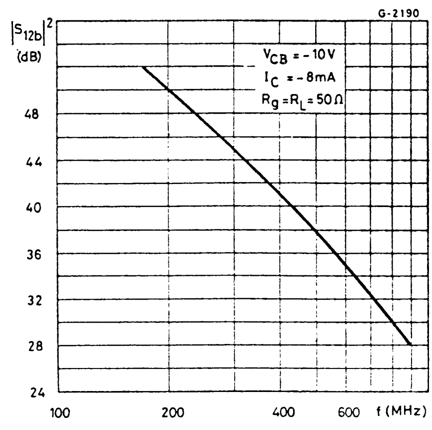
Typical noise figure



Input impedance S_{11b}



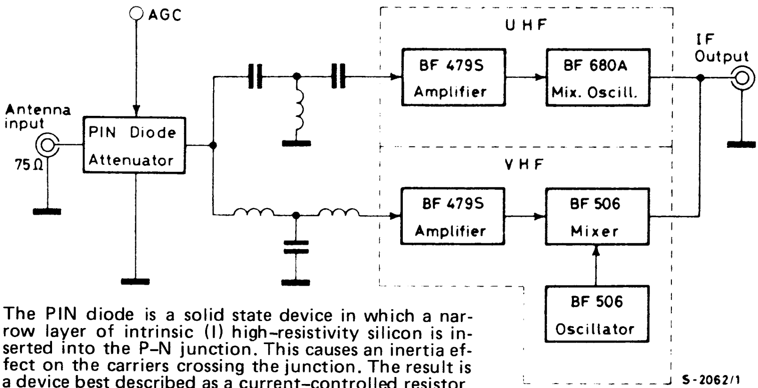
Typical reverse attenuation



BF 479S

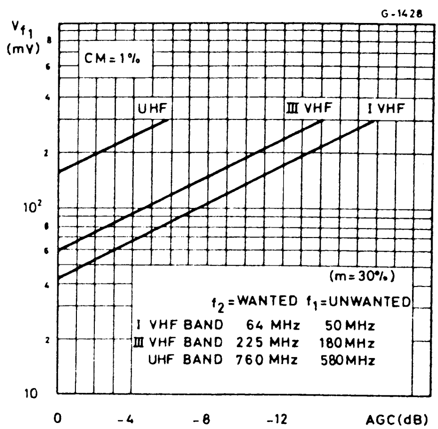
APPLICATION INFORMATION

Block diagram of VHF-UHF TV tuner with PIN diode attenuator



The PIN diode is a solid state device in which a narrow layer of intrinsic (I) high-resistivity silicon is inserted into the P-N junction. This causes an inertia effect on the carriers crossing the junction. The result is a device best described as a current-controlled resistor, whose behaviour is almost independent of frequency up to UHF.

Cross-modulation vs. AGC of complete tuner



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SGS ATES

EPITAXIAL PLANAR PNP

BF 679 S

PRELIMINARY DATA

VERY LOW NOISE UHF-VHF AGC AMPLIFIER

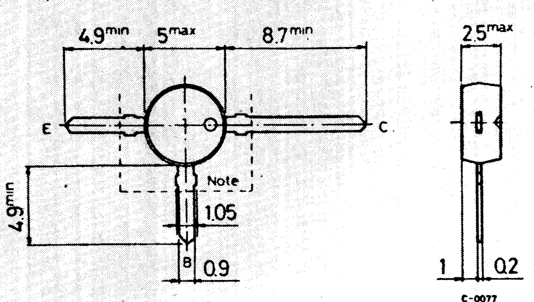
The BF 679S is a silicon epitaxial planar PNP transistor in T-plastic package intended for use as UHF-VHF amplifier up to 900 MHz. Because of its low noise and gain characteristics versus current, it is particularly suited for use as a controlled amplifier stage in TV varicap tuners.

ABSOLUTE MAXIMUM RATINGS

V_{CBO}	Collector-base voltage ($I_E = 0$)	-40	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	-35	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	-3	V
I_C	Collector current	-30	mA
I_B	Base current	-5	mA
P_{tot}	Total power dissipation at $T_{amb} \leqslant 45°C$	170	mW
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

MECHANICAL DATA

Dimensions in mm



Note: Within this region the cross section of the leads is uncontrolled

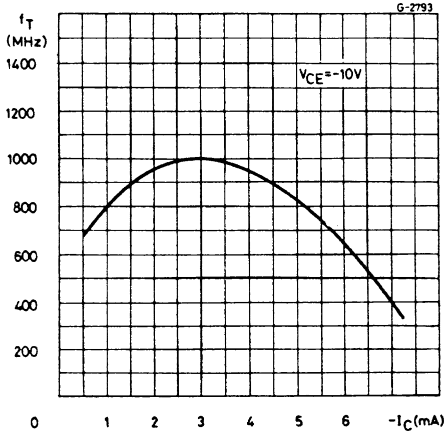
THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	600	°C/W

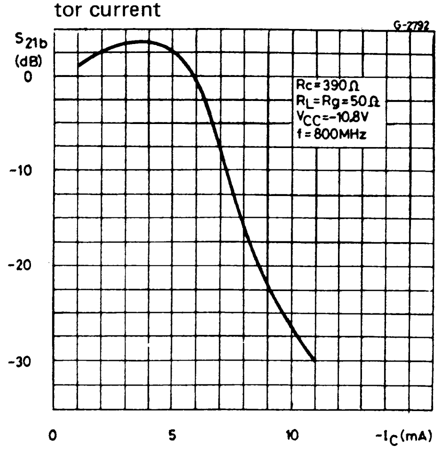
ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Parameter		Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cutoff current ($I_E = 0$)	V_{CB} = -20V			-100	nA
$V_{(BR)CBO}$	Collector-base breakdown voltage ($I_E = 0$)	I_C = -100 μA	-40			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage ($I_B = 0$)	I_C = -5 mA	-35			V
$V_{(BR)EBO}$	Emitter-base breakdown voltage ($I_C = 0$)	I_E = -10 μA	-3			V
h_{FE}	DC current gain	I_C = -3 mA V_{CE} = -10V	25	60		–
f_T	Transition frequency	I_C = -3 mA V_{CE} = -10V f = 100 MHz	700	1000		MHz
C_{CBO}	Collector-base capacitance	I_E = 0 V_{CB} = -10V f = 100 MHz		0.6		pF
C_{rb}	Reverse capacitance	I_C = 0 V_{CB} = -10V f = 100 MHz		0.07		pF
NF	Noise figure	I_C = -3 mA V_{CB} = -10V R_g = opt. f = 800MHz		3	3.9	dB
G_{pb}	Power gain	I_C = -3 mA V_{CB} = -10V R_L = 2 kΩ f = 800 MHz	14			dB
$I_{C(AGC)}$	Collector current for ΔG_{pb} = 30 dB	V_{CC} = -10.8V f = 800MHz	-6.4		-8	mA

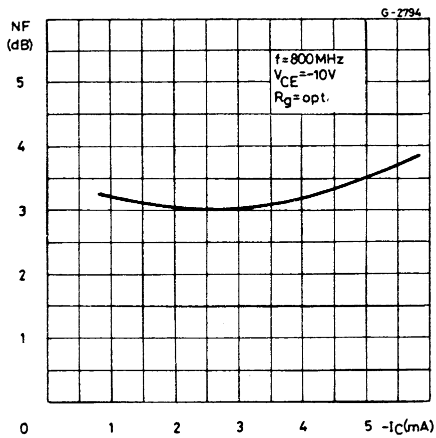
Transition frequency



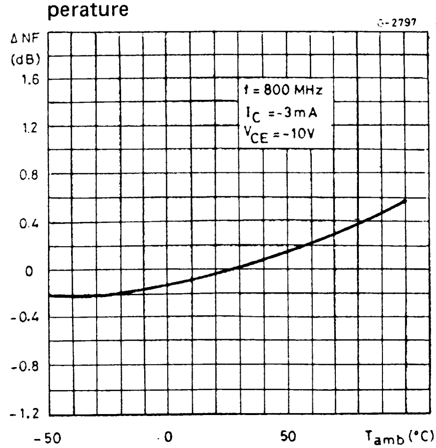
Forward transmission gain vs. collector current



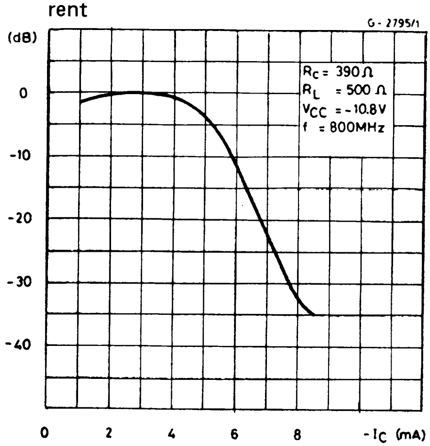
Noise figure vs. collector current



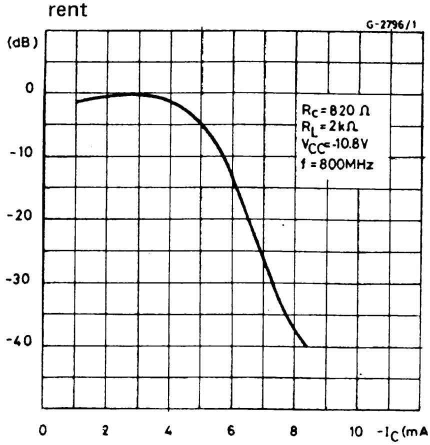
Noise figure variation vs. ambient temperature



Typical attenuation vs. collector current

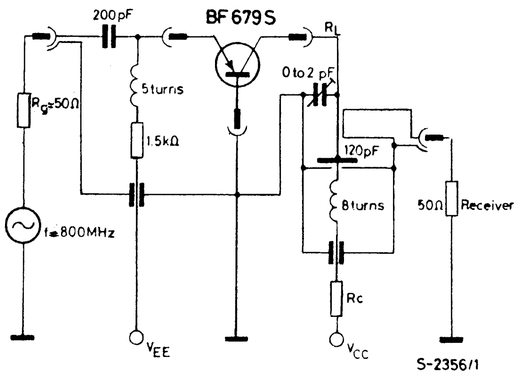


Typical attenuation vs. collector current



TEST CIRCUIT

Power gain, AGC and noise figure



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BF 921S

EPITAXIAL PLANAR NPN

PRELIMINARY DATA

VHF-UHF AMPLIFIER

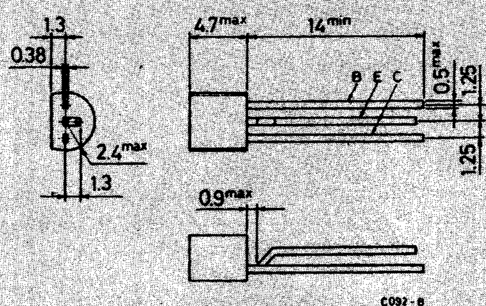
The BF 921S is a silicon planar epitaxial NPN transistor in TO-92 plastic package. It is specially intended for use as preamplifier for surface wave TV IF filters. Thanks to its good properties up to 1 GHz it can be also used as VHF-UHF wide band amplifier.

ABSOLUTE MAXIMUM RATINGS

V_{CES}	Collector-emitter voltage ($V_{BE}=0$)	25	V
V_{CEO}	Collector-emitter voltage ($I_B=0$)	15	V
V_{EBO}	Emitter-base voltage ($I_C=0$)	3	V
I_C	Collector current	50	mA
P_{tot}	Total power dissipation at $T_{amb} \leqslant 25°C$	360	mW
T_{stg}, T_j	Storage and junction temperature	-55 to 150	°C

MECHANICAL DATA

Dimensions in mm



(sim. to TO-92)

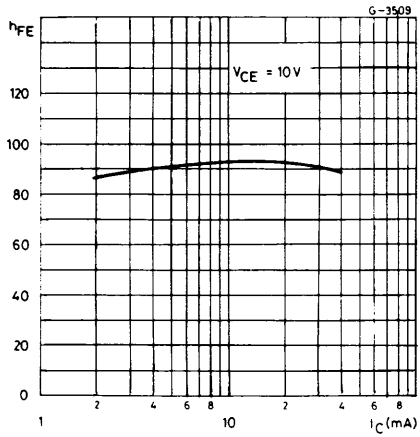
THERMAL DATA

$R_{th\ j\text{-}amb}$	Thermal resistance junction-ambient	max	350	°C/W

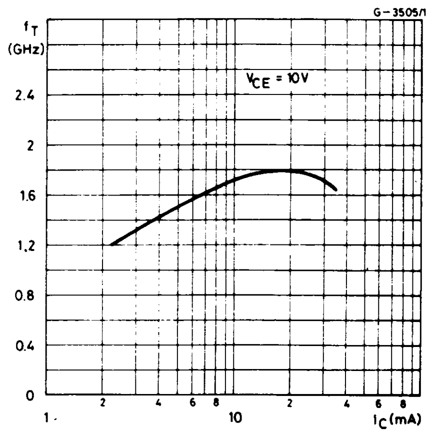
ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C unless otherwise specified)

Parameter		Test conditions		Min.	Typ.	Max.	Unit
I_{CES}	Collector cutoff current (V_{BE} = 0)	V_{CB} = 10V				50	nA
$V_{BR(CEO)}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = 2 mA		15			V
$V_{BR(CES)}$	Collector-emitter brekdown voltage (V_{BE} = 0)	I_C = 100 μA		25			V
$V_{BR(EBO)}$	Emitter-base breakdown voltage (I_C = 0)	I_E = 10 μA		3			V
h_{FE}	DC current gain	I_C = 5 mA I_C = 20 mA	V_{CE} = 10V V_{CE} = 10V	35 40	100 80		– –
f_T	Transition frequency	I_C = 5 mA I_C = 20 mA	V_{CE} = 10V V_{CE} = 10V		1.5 1.8		GHz GHz
C_{re}	Reverse capacitance	I_C = 0	V_{CE} = 10V		0.6		pF
$\|S_{21e}\|^2$	Forward transmission gain	I_C = 15 mA R_g = R_L = 50Ω f = 40 MHz f = 500 MHz	V_{CE} = 10V		 27 11		 dB dB
NF	Noise figure	I_C = 15 mA R_g = 50Ω f = 200 MHz f = 500 MHz	V_{CE} = 10V		 3 4.5		 dB dB

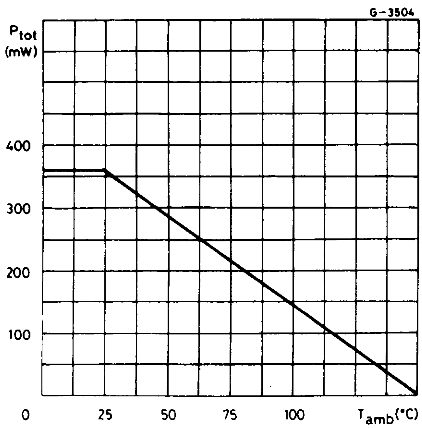
DC current gain



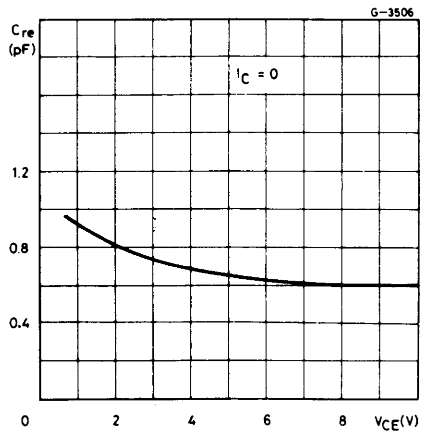
Transition frequency



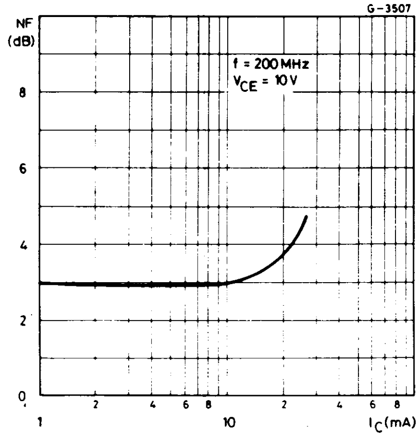
Power rating chart



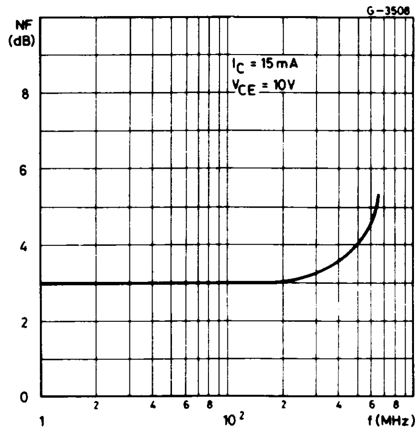
Reverse capacitance



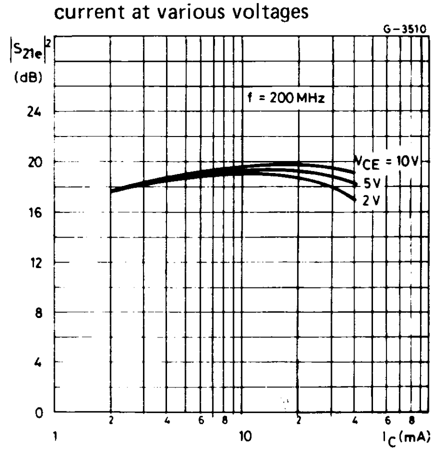
Noise figure vs. collector current



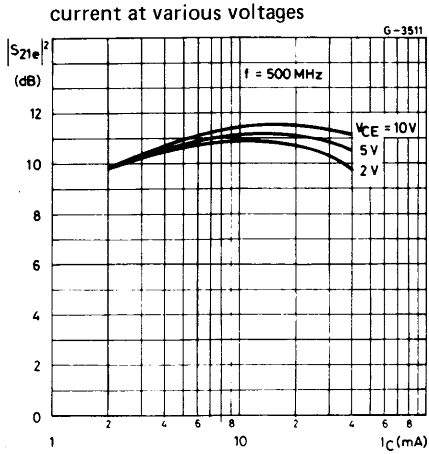
Noise figure vs. frequency



Forward transmission gain vs. collector current at various voltages

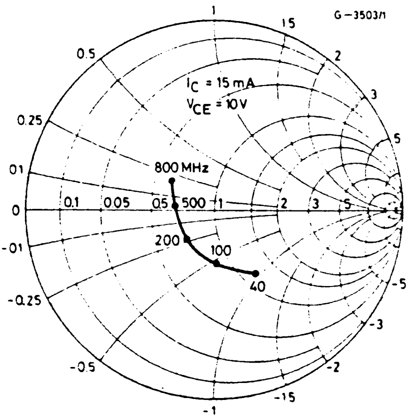


Forward transmission gain vs. collector current at various voltages

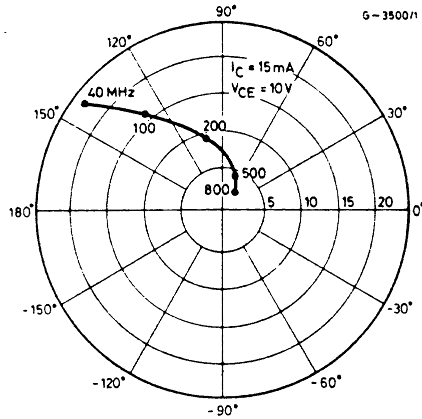


BF 921S

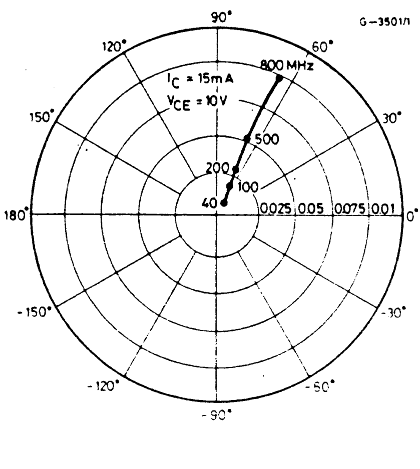
Input impedance S_{11e} (normalized 50Ω)



Forward transfer coefficient S_{21e}



Reverse transfer coefficient S_{12e}



Output impedance S_{22e} (normalized 50Ω)