NPN High-Frequency Low-Noise Transistor

Description

The 2SC3357 is a UHF low-noise transistor that adopts a planar NPN silicon-epitaxial bipolar process. It features high-power gain, low noise figure, wide dynamic range and perfect current linearity. Being packaged with SOT-89, the transistor is mainly used in VHFUHF and CATV low-noise amplifiers with high-frequency broadband.

Key Features

High Gain: $|S_{21e}|^2$ Type Value:10dB @ VCE=10V, IC=20mA, f=1GHz
Low Noise: NF Type Value:1.7dB @ V_{CE}=10V, I_C=7mA, f=1GHz
Gain-Bandwidth Product f_T Type Value: 6.5GHz @ V_{CE}=10V, I_C=20mA, f=1GHz

Operating Limit Range (TA=25°C)

Parameters	Symbol	extremum	Unit
Collector-Base Breakdown Voltage	VCBO	20	V
Collector Emitter Breakdown Voltage	VCEO	12	V
Emitter base breakdown voltage	VEBO	2.5	V
Collector current	IC	100	mA
*Power consumption	PC	1200	mW
Junction Temperature	Tj	150	℃
Storage temperature	Tstg	-65 ~ +150	℃

*Using heat sink

HFE

Grading	A	B	C	D
Number	RH	RF	RE	
HFE	60-100	90-140	120-180	170-250

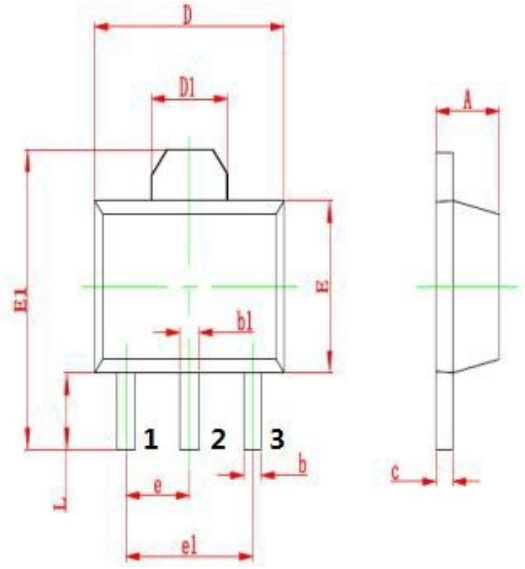
Electrical characteristics (TA=25℃)

Parameters	Symbol	MIN	Typical	MAX	Unit	Test condition
Collector-Base Breakdown Voltage	VCBO	20			V	IC=1.0 μA
Collector Emitter Breakdown Voltage	VCEO	12			V	IC=100μA
Collector base leakage current	ICBO			0.1	μA	VCB=10V
Emitter-Base Leakage Current	IEBO			0.1	μA	VEB=1 V
DC gain module	hFE	60	150	250		VCE=10V,IC=20mA
Gain-Bandwidth Product	f_T		6.5		GHz	VCE=10V,IC=20mA
Output Feedback Capacitance	Cre		0.65		pF	VCB=10V,IE=0mA,f=1MHz
Inserted power gain	$\|S21e\|^2$	9	10		dB	VCE=10V,IC=20mA,f=1GHz

Package mode

SOT-89

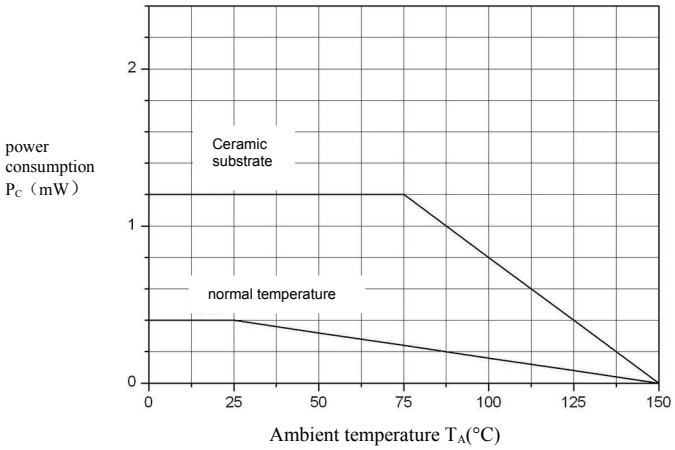
Definitions of pins： 1. Base 2. Collector 3. Emitter



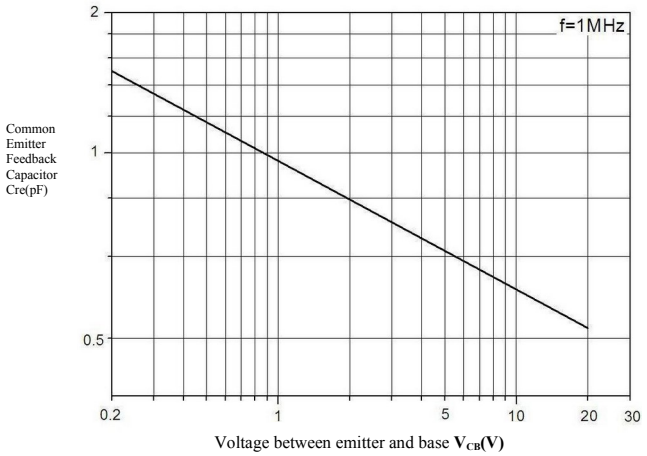
Symbol	Min(mm)	Max(mm)
A	1.4	1.6
b	0.32	0.52
b1	0.4	0.58
c	0.35	0.44
D	4.4	4.6
D1	1.55	
E	2.3	2.6
E1	3.94	4.25
e	1.5	
e1	3	

Typical characteristic curve (TA =25ºC)

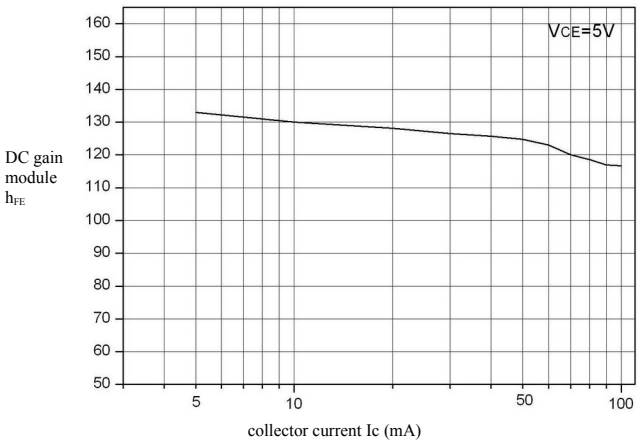
power consumption VS Environment temperature



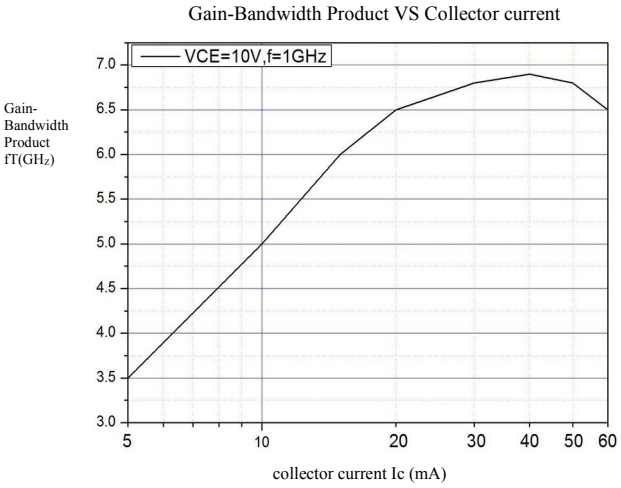
Common Emitter Feedback Capacitor VS. Voltage between emitter and base



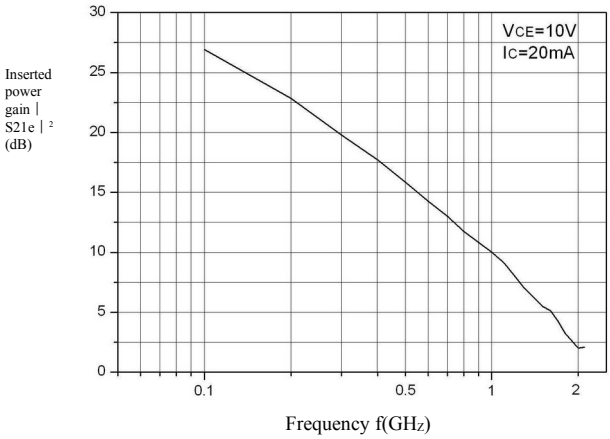
DC gain module vs. collector current



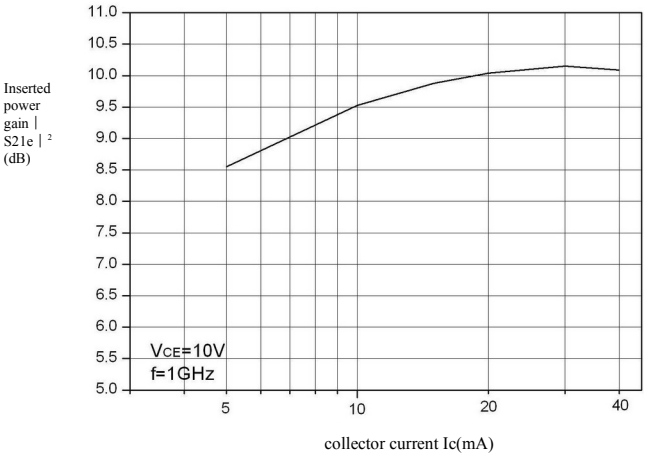
Gain-Bandwidth Product VS Collector current



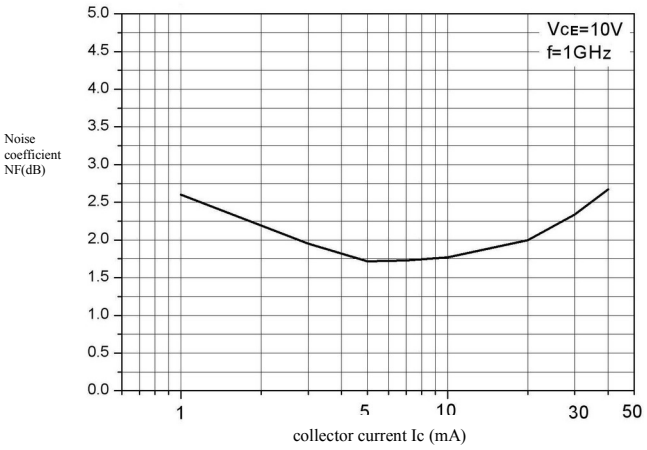
Inserted power gain vs. Frequency



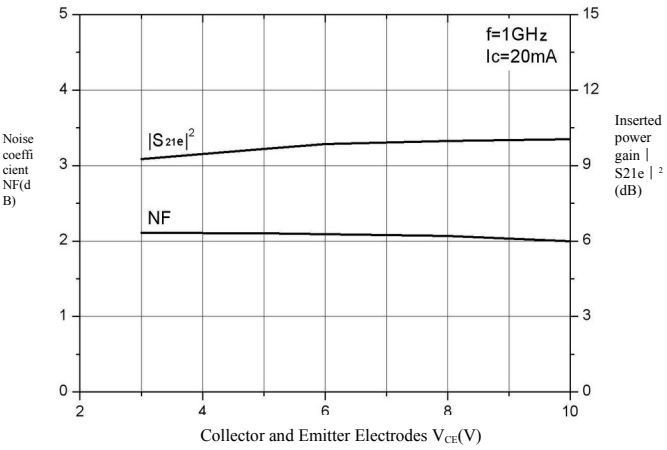
Inserted power gain vs. collector current



Noise coefficient vs. collector current



Noise coefficient, Inserted power gain vs. Collector and Emitter Electrodes

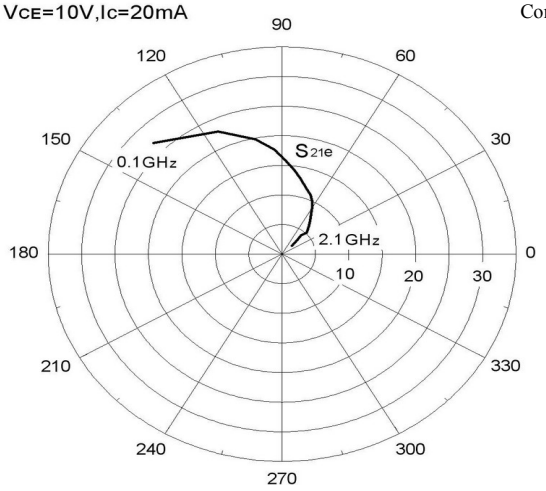


SMITH

Test Condition: V_{CE}=10V, I_C=20mA

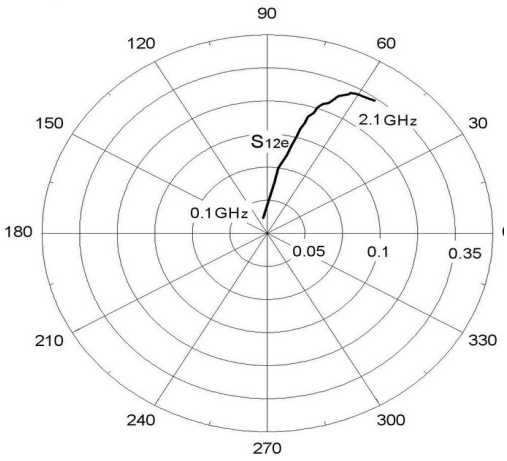
S21e -FREQUENCY

Conditions: VCE=10V,Ic=20mA

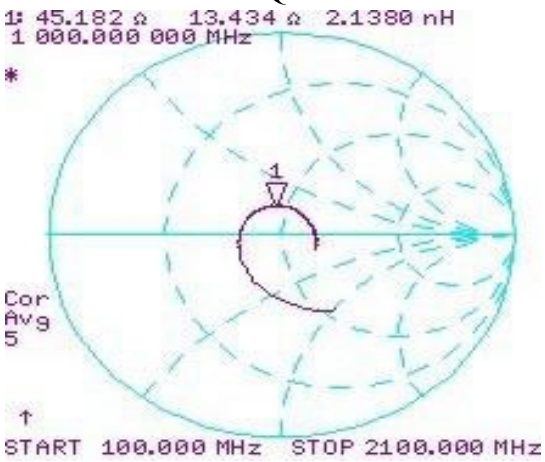


S12e -FREQUENCY

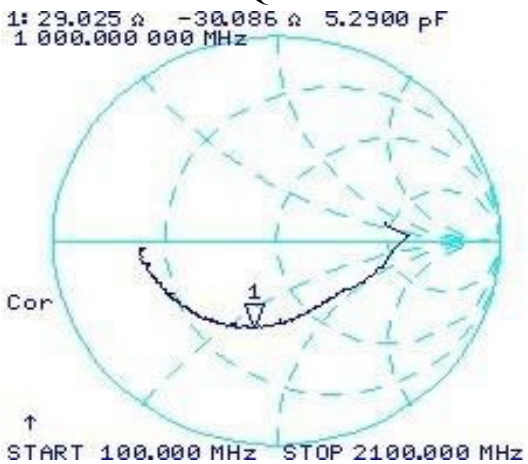
Conditions: VCE=10V,Ic=20mA



S11e -FREQUENCY



S22e -FREQUENCY



Slkor

Scattering Parameter (S-PARAMETER)

Test Condition: V_{CE}=10V, I_C=20mA, Z_O=50Ω

Test Frequency	S_{11}		S_{21}		S_{12}		S_{22}	
GHz	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.1	0.428	-60.224	22.164	145.74	0.023	104.25	0.511	7.6753
0.2	0.253	-117.89	13.861	114.86	0.043	82.102	0.417	-27.876
0.3	0.212	-145.3	9.759	101.71	0.056	81.584	0.381	-42.616
0.4	0.189	-169.34	7.674	93.823	0.072	77.728	0.370	-50.74
0.5	0.174	172.38	6.214	88.463	0.086	74.095	0.372	-61.589
0.6	0.171	154.24	5.164	82.661	0.102	74.858	0.378	-70.929
0.7	0.163	141.51	4.465	77.532	0.118	74.821	0.391	-79.882
0.8	0.160	127.18	3.868	72.492	0.132	73.33	0.400	-87.409
0.9	0.151	115.31	3.473	66.78	0.148	73.294	0.423	-95.753
1	0.151	102.36	3.168	63.403	0.162	71.299	0.435	-104.1
1.1	0.142	88.639	2.868	60.58	0.180	70.737	0.450	-112.42
1.2	0.138	77.466	2.520	57.553	0.197	69.384	0.475	-120.11
1.3	0.137	64.644	2.237	53.468	0.205	67.626	0.479	-126.83

1.4	0.135	52.022	2.053	50.386	0.221	66.669	0.503	-133.31
1.5	0.131	39.53	1.879	46.524	0.245	65.426	0.519	-139.42
1.6	0.134	28.437	1.805	44.72	0.261	62.681	0.525	-147.55
1.7	0.140	15.808	1.632	48.301	0.279	62.412	0.546	-152.46
1.8	0.139	6.0136	1.453	46.876	0.294	60.664	0.569	-159.89
1.9	0.148	-8.0118	1.349	45.758	0.300	57.496	0.585	-165.38
2	0.152	-15.281	1.260	45.023	0.316	55.64	0.611	-171.46
2.1	0.163	-25.128	1.274	44.816	0.334	54.651	0.613	-177.8