

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: S21e 2 Type Value:10dB	@ V _{CE} =10V, I _C =20mA, f=1GHz
Low Noise Figure: 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	Symbols	MAX/MIN	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	°C
Storage temperature	Tstg	-65 ~ +150	°C

*Using heat sink

HFE

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

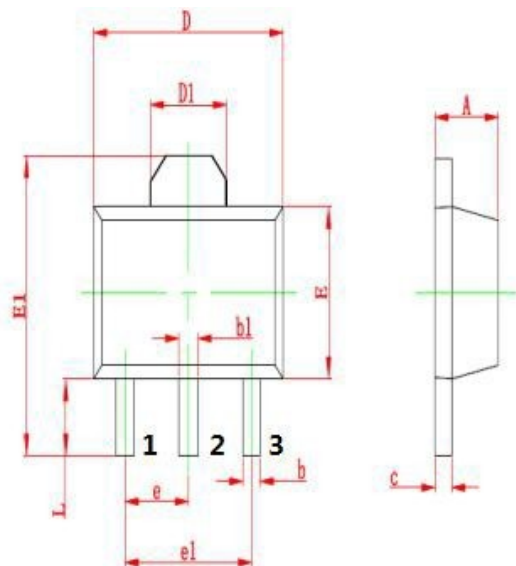
Electrical Property (TA=25°C)

Parameters	Symbols	MIN	Typical	MAX	Unit	Testing conditions
Collector-Base Breakdown Voltage	VCBO	20			V	IC=1.0μA
Collector emitter breakdown voltage	VCEO	12			V	IC=100μA
Emitter base breakdown voltage	ICBO			0.1	μA	VCB=10V
Emitter base leakage current	IEBO			0.1	μA	VEB=1V
DC gain module	hFE	60	150	250		VCE=10V,IC=20mA
Gain-Bandwidth Product	f _r		6.5		GHz	VCE=10V,IC=20mA
Output Feedback Capacitance	Cre		0.65		pF	VCB=10V,IE=0mA,f=1MHz
Inserted power gain	S _{21e} ₂	9	10		dB	VCE=10V,IC=20mA,f=1GHz

Package mode

SOT-89

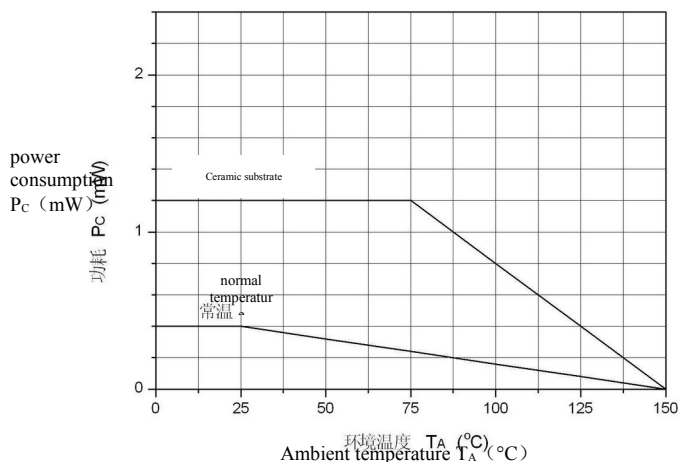
Pin definition : 1. Base 2. Collector 3. Emitter



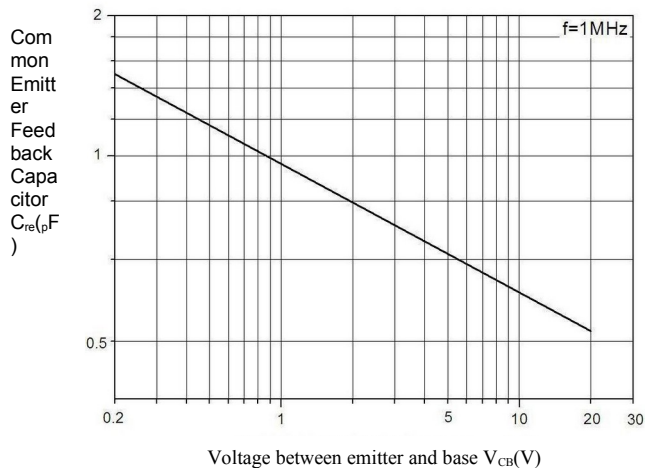
Symbol	Min(mm)	Max(mm)
A	1.4	1.6
b	0.32	0.52
b1	0.4	0.58
c	0.35	0.44
D	4.4	4.6
D1	1.55	
E	2.3	2.6
E1	3.94	4.25
e	1.5	
e1	3	
L	0.9	1.2

Typical Features (TA =25°C)

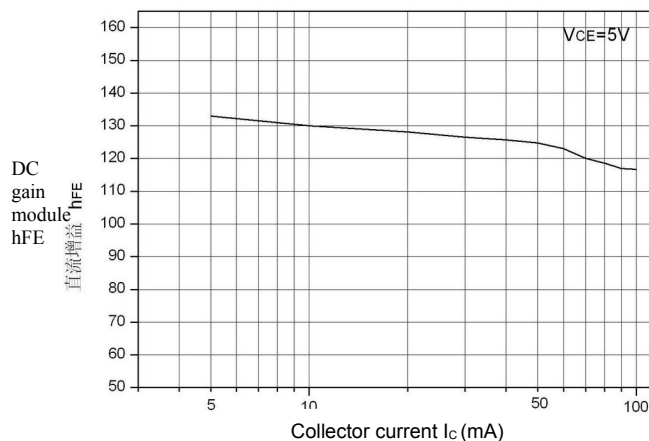
power consumption vs. Environment temperature
功耗 vs. 环境温度



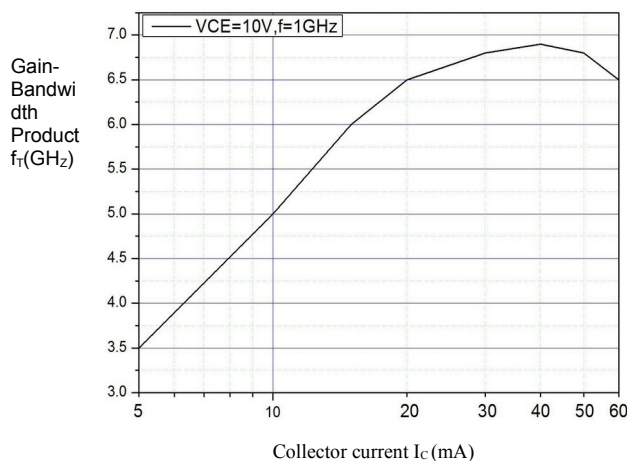
Common Emitter Feedback Capacitor vs. Voltage between emitter and base



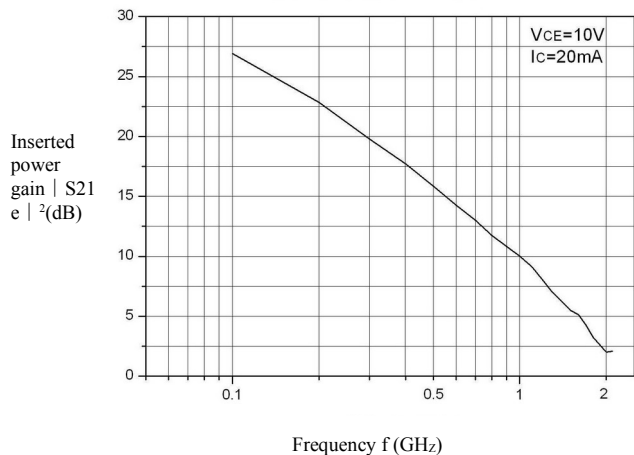
DC gain module vs. Collector current
直流增益 vs. 集电极电流



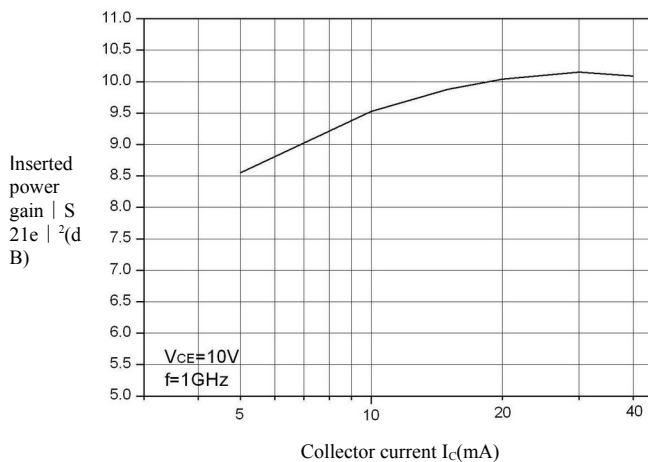
Gain-Bandwidth Product vs. Collector current

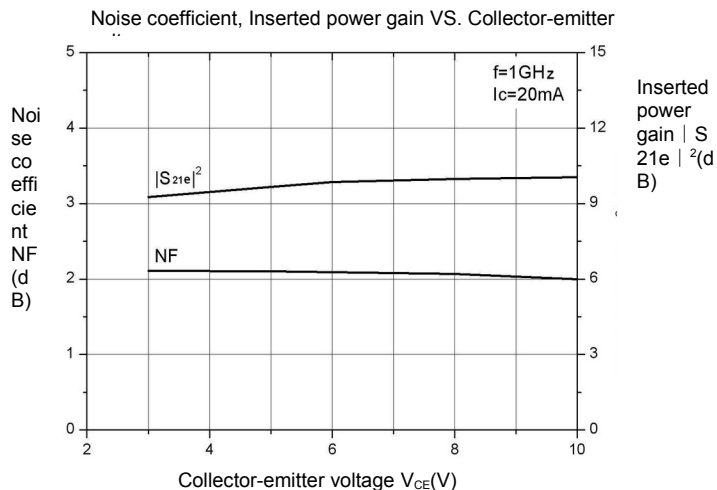
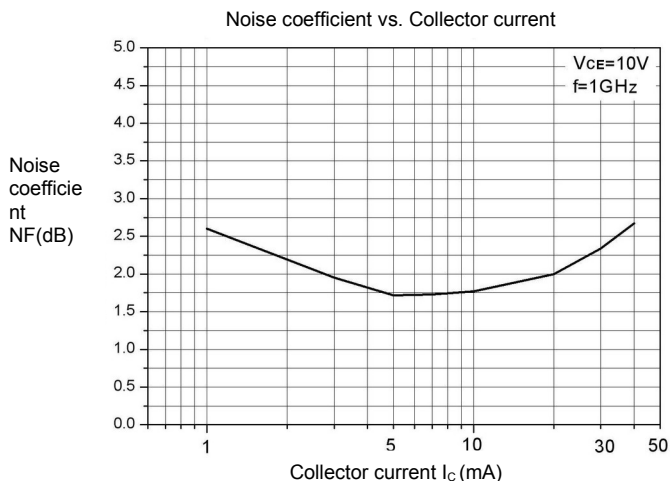


Insert power gain vs. frequency



Insert power gain vs. Collector current



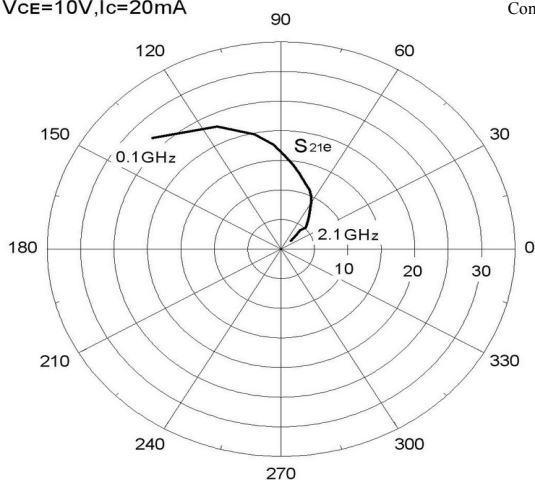


SMITH

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

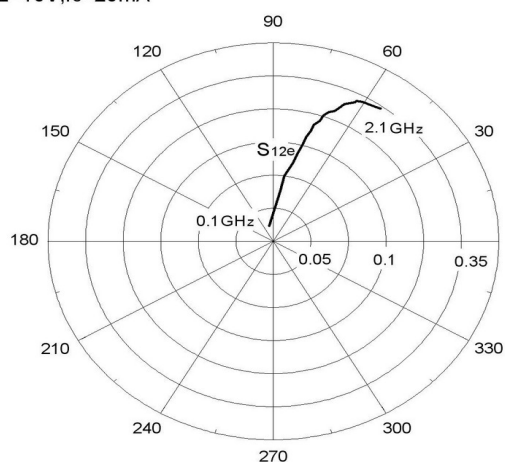
S_{21e} -FREQUENCY

Conditions: $V_{CE}=10V, I_c=20mA$



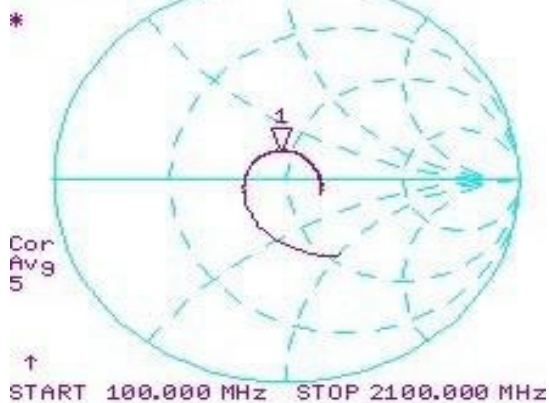
S_{12e} -FREQUENCY

Conditions: $V_{CE}=10V, I_c=20mA$



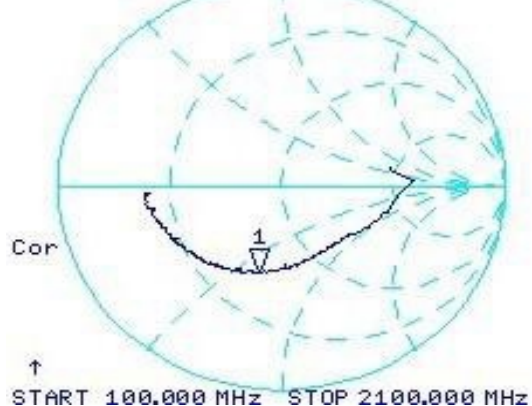
S_{11e} -FREQUENCY

1: 45.182 Ω 13.434 Ω 2.1380 nH
1 000.000 000 MHz



S_{22e} -FREQUENCY

1: 29.025 Ω -30.086 Ω 5.2900 pF
1 000.000 000 MHz



Scattering Parameter (S-PARAMETER)

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

Test Frequency	S ₁₁		S ₂₁		S ₁₂		S ₂₂	
	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