

## NPN High-Frequency Low-Noise Transistor

### Description

The 2SC3585 is a UHF low-noise transistor that adopts a planar NPN silicon-epitaxial bipolar process. With high power gain, low noise figure, large dynamic range and ideal current characteristics, it adopts SOT-23-3L SMD package and is mainly used in VHF, UHF and CATV high frequency broadband low noise amplifiers.

### Key Features

High Gain: | S<sub>21e</sub> | 2 Type Value:5.5dB  
 Low Noise Figure: NF Type Value:2.5B  
 Gain-Bandwidth Product f<sub>T</sub> Type Value: 10GHz

@ V<sub>CE</sub>=6V, I<sub>C</sub>=10mA, f=2GHz  
 @ V<sub>CE</sub>=6V, I<sub>C</sub>=5mA, f=2GHz  
 @ V<sub>CE</sub>=6V, I<sub>C</sub>=10mA, f=1GHz

### Operating Limit Range (T<sub>A</sub>=25°C)

Parameters	Symbols	MAX/ MIN	Unit
Collector base breakdown voltage	VCBO	20	V
Collector emitter breakdown voltage	VCEO	10	V
Emitter base breakdown voltage	VEBO	1.5	V
Collector current	IC	35	mA
Power consumption	PC	200	mW
Junction Temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-65 ~ +150	°C

### HFE

Grading	A	B	C	D
Number	R43	R44	R45	
HFE	60- 100	90- 140	120- 180	170- 250



## Electrical Property (TA=25°C)

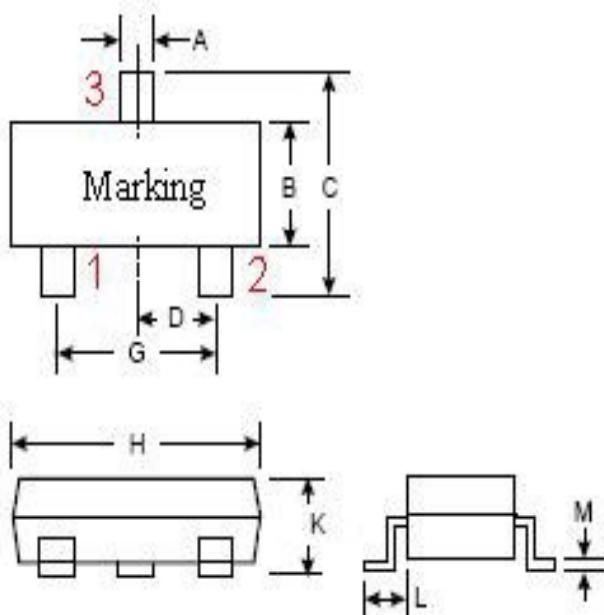
Parameters	Symbols	MIN	Typical	MAX	Unit	Testing conditions
Collector-Base Breakdown Voltage	VCBO	20			V	IC=1.0μA
Collector emitter breakdown voltage	ICBO			0.1	μA	VCB=10V
Emitter-Base Leakage Current	IEBO			0.1	μA	VEB=1V
DC gain module	HFE	60	150	250		VCE=6V,IC=10mA
Gain-Bandwidth Product	f <sub>T</sub>		10		GHz	VCE=6V,IC=10mA
Output Feedback Capacitance	Cre		0.3	0.8	pF	VCB=10V,IE=0mA,f=1MHz
Power Gain	S21e		5.5		dB	VCE=6V,IC=10mA,f=2GHz
Noise Factor	NF		2.5	3.0	dB	VCE=6V,IC=5mA,f=2GHz

## Package mode

SOT-23-3L

Pin Description: 1: Base 2: Emitter

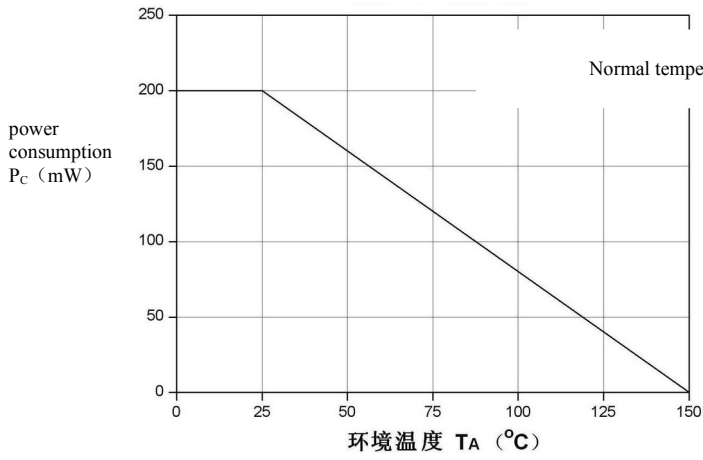
3: Collector



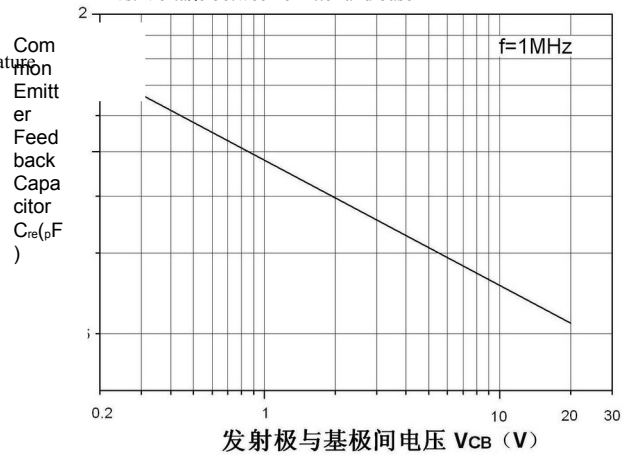
SOT-23-3L		
Symbol	Min. value (mm)	Max (mm)
A	0.35	0.5
B	1.4	1.7
C	2.7	3.1
D	0.95	
G	1.7	2.1
H	2.7	3.1
K	1	1.3
L	0.5	0.85
M	0.1	0.35



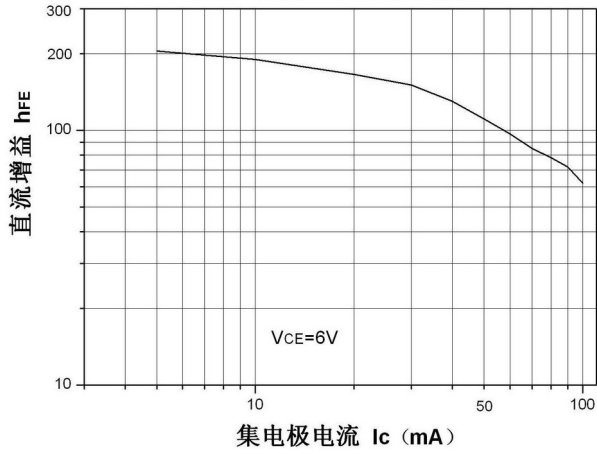
power consumption VS Environment temperature



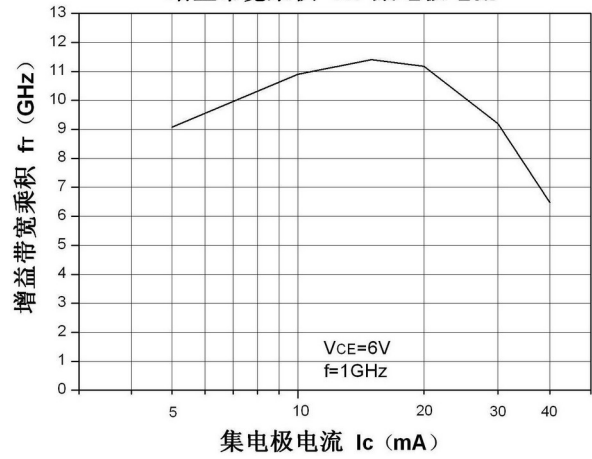
Common Emitter Feedback Capacitor vs. Voltage between emitter and base



直流增益 vs. 集电极电流

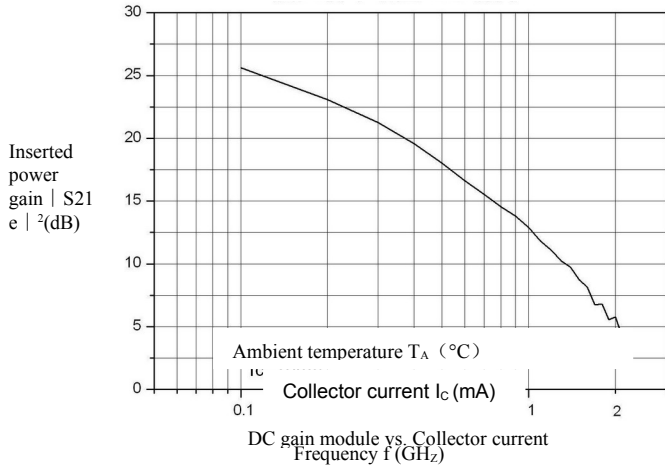


增益带宽乘积 vs. 集电极电流

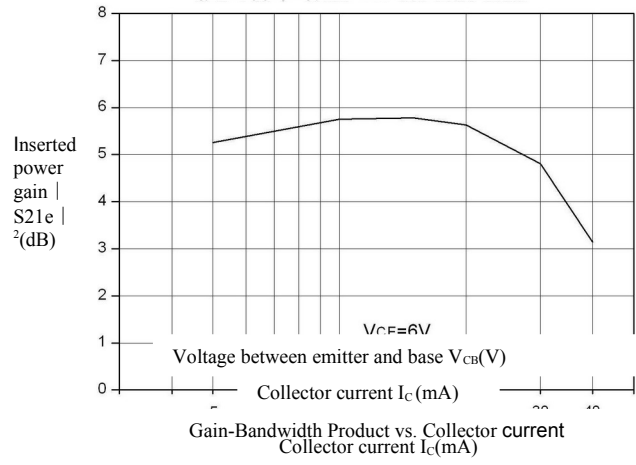




Insert power gain vs. frequency



Insert power gain vs. Collector current

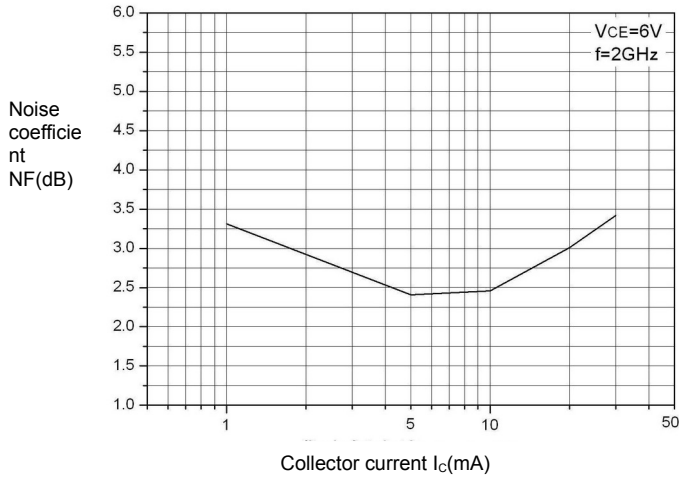


DC  
gain  
module  
hFE

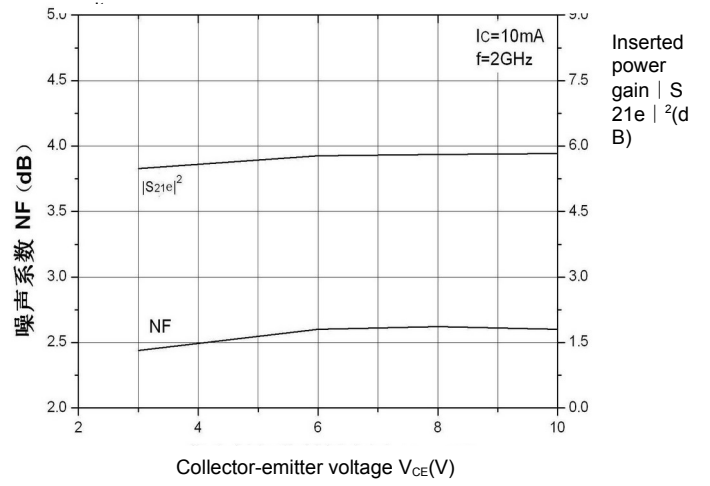
Gain-  
Band  
width  
Produ  
ct  
 $f_T$ (GH  
z)



Noise coefficient vs. Collector current

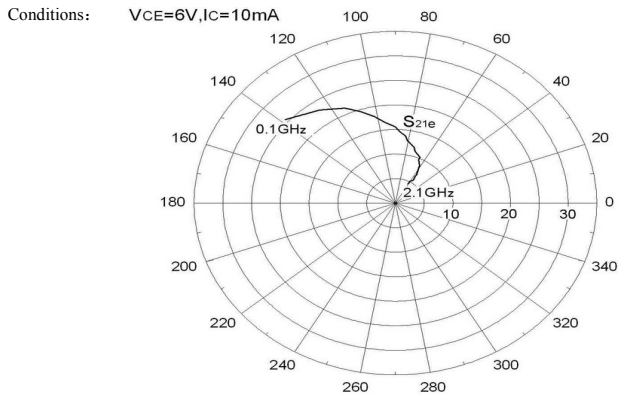


Noise coefficient, Inserted power gain VS. Collector-emitter

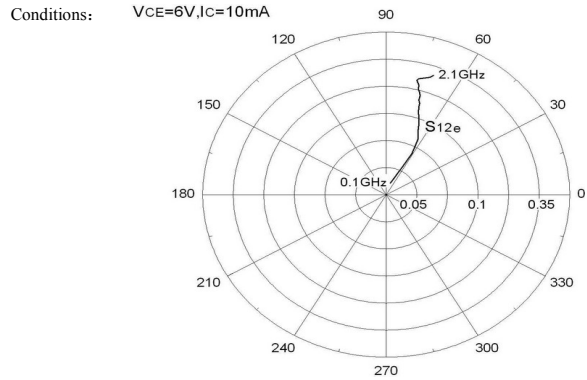


## SMITH

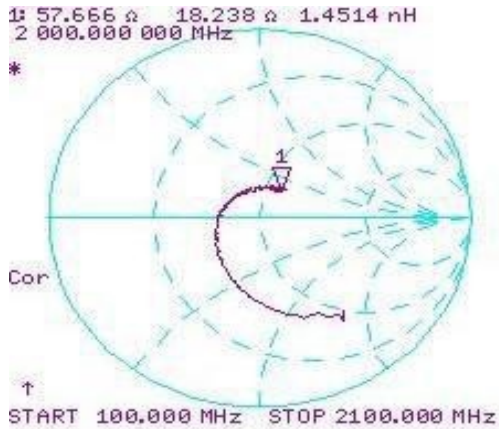
S21e -FREQUENCY



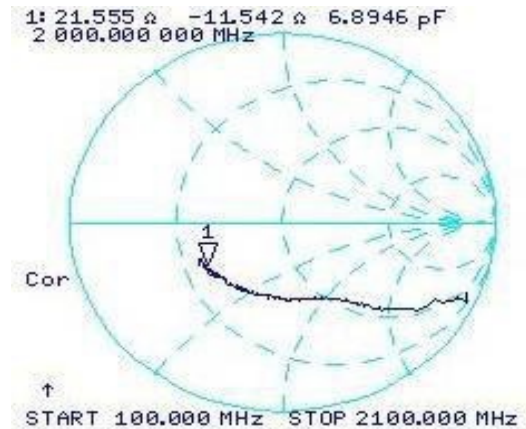
S12e -FREQUENCY



S11e -FREQUENCY



S22e -FREQUENCY





## Scattering Parameter (S-PARAMETER)

Test Condition:  $V_{CE}=6V$ ,  $I_C=10mA$ ,  $Z_O=50\Omega$

Test Frequency	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.1	0.606	-51.368	19.070	138.27	0.023	70.41	0.908	-22.132
0.2	0.518	-77.739	14.243	124.69	0.034	70.41	0.727	-40.023
0.3	0.394	-99.576	11.550	114.38	0.048	70.41	0.586	-48.554
0.4	0.324	-117.74	9.522	108.01	0.057	70.41	0.510	-53.937
0.5	0.280	-132.78	7.968	101.63	0.067	70.41	0.474	-58.933
0.6	0.248	-147.46	6.768	96.468	0.078	70.41	0.443	-63.31
0.7	0.219	-161.53	5.979	90.103	0.089	70.41	0.434	-68.85
0.8	0.203	-173.71	5.342	86.881	0.096	70.41	0.418	-73.843
0.9	0.189	174.27	4.910	80.73	0.106	70.41	0.415	-79.324
1	0.176	162.27	4.425	80.638	0.112	70.41	0.409	-86.129
1.1	0.170	149.78	3.895	74.155	0.127	70.41	0.407	-91.361
1.2	0.166	139.57	3.577	72.048	0.136	70.41	0.392	-99.5
1.3	0.156	128.37	3.245	65.426	0.145	70.41	0.395	-103.49
1.4	0.162	117.71	3.071	65.638	0.160	70.41	0.393	-110.83
1.5	0.150	111.08	2.725	61.089	0.171	70.41	0.396	-113.86



1.6	0.158	97.67 5	2.562	63.58 7	0.181	70.4 1	0.400	- 122.82
1.7	0.157	90.95 4	2.172	57.09 7	0.199	70.4 1	0.415	- 125.46
1.8	0.173	79.57 1	2.182	57.93 6	0.217	70.4 1	0.415	- 135.65
1.9	0.160	69.71 9	1.898	56.33 7	0.225	70.4 1	0.408	- 136.44
2	0.181	58.60 2	1.940	60.14 3	0.245	70.4 1	0.428	- 148.92