THE DATASHEET OF

BFS520-C

NPN high frequency low noise transistors

Description

The BFS520 is a high-frequency low-noise transistor manufactured using planar NPN silicon epitaxial bipolar technology. It features high power gain and low noise characteristics. Packagedin an ultra-compact SOT-323 package, it is suitable for high-density surface-mount applications,primarily used in VHF, UHF, CATV, and other high-frequency low-noise amplifiers.

Characteristics

High Gain: $|S21e|^2$ Typical Value:12.5dBLow Noise: NF Typical Value:1.5dB @ V_{CE}=6V，I_C=20mA，f=0.9GHz

Gain-Bandwidth Product: f_T Typical Value:8GHz @ V_{CE}=6V，I_C=5mA，f=1GHz

@ V_{CE}=6V，I_C=20mA，f=1GHz

Purchase information

Product	Standard package
BFS520	3K/Disk

Limiting working range(TA=25℃)

Parameter	Symbol	Max.	Unit
collector-base breakdown voltage	V_{CBO}	20	V
collector-emitter breakdown voltage	V_{CEO}	12	V
emitter-base breakdown voltage	V_{EBO}	2	V
collector current	I_C	100	mA
power consumption	P_C	150	mW
junction temperature	T_J	150	℃
storage temperature	T_{stg}	-65～+150	℃

HFE range

Grade	B	C	D
designation	N2		
HFE	90-140	120-180	170-250

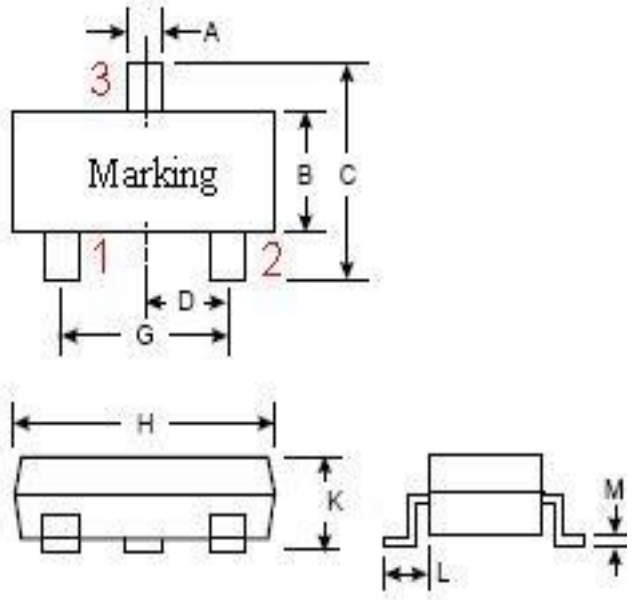
Electrical characteristics (TA=25℃)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
collector-base breakdown voltage	V_{CBO}	20			V	I_C=1.0μA
collector -base cutoff current	I_{CBO}			0.1	μA	V_{CB}=10V
emitter-base cutoff current	I_{EBO}			0.1	μA	V_{EB}=1V
DC gain	h_{FE}	90	150	250		V_{CE}=6V，I_C=20mA
characteristic frequency	f_T		8		GHz	V_{CE}=6V,I_C=20mA,f=1GHz
output feedback capacitance	C_{re}		0.4	0.7	pF	V_{CB}=6V,I_E=0mA,f=1MHz
power gain	$\|S21e\|^2$		12.5		dB	V_{CE}=6V,I_C=20mA,f=1GHz
noise factor	NF		1.5	2.0	dB	V_{CE}=6V,I_C=5mA,f=1GHz

Package form

SOT-323

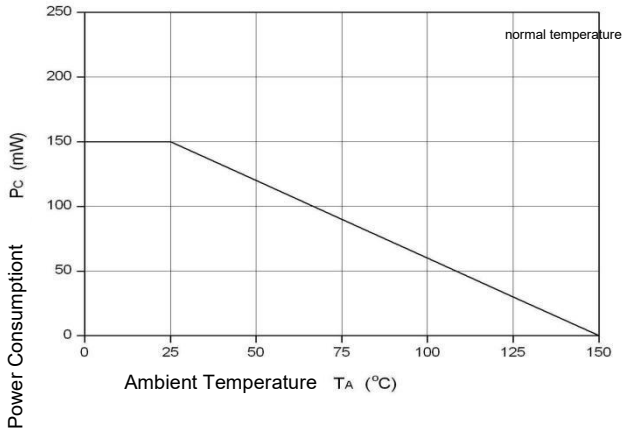
Pin definition：1: Base 2: Emitter 3: Collector



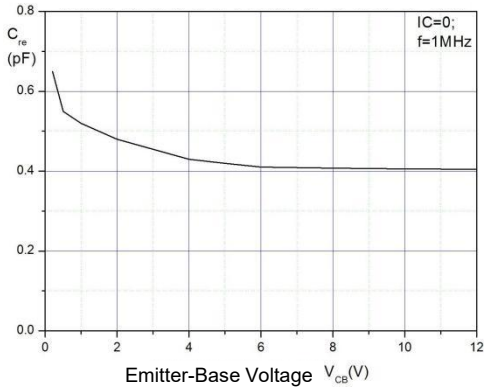
Symbol	Min.（mm）	Max.（mm）
A	0.200	0.400
B	1.150	1.350
C	2.150	2.450
D	0.650	
G	1.200	1.400
H	2.000	2.200
K	0.900	1.100
L	0.525	
M	0.080	0.150

Typical characteristics（TA =25ºC）

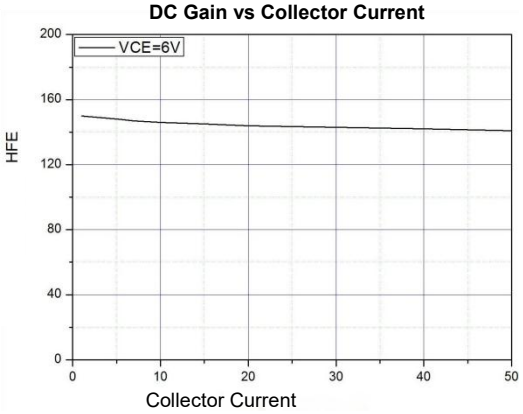
Power Consumptiont vs Ambient Temperature



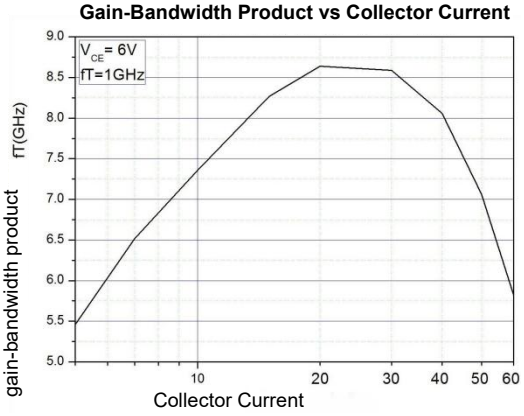
Common Emitter Feedback Capacitor vsEmitter-Base Voltage



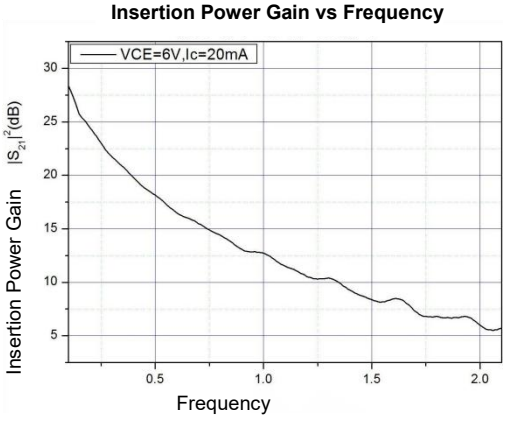
DC Gain vs Collector Current



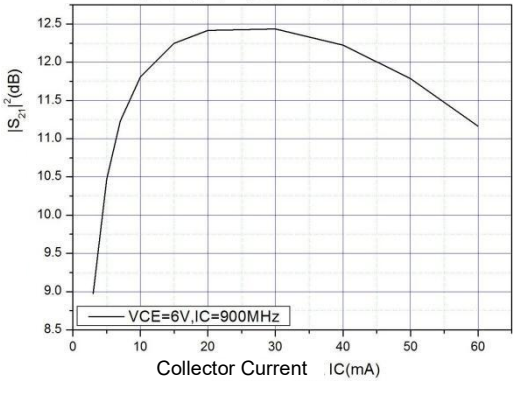
Gain-Bandwidth Product vs Collector Current



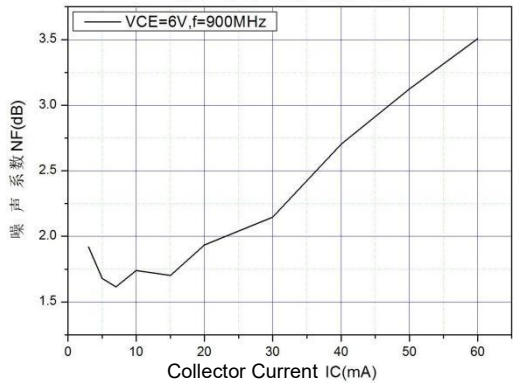
Insertion Power Gain vs Frequency



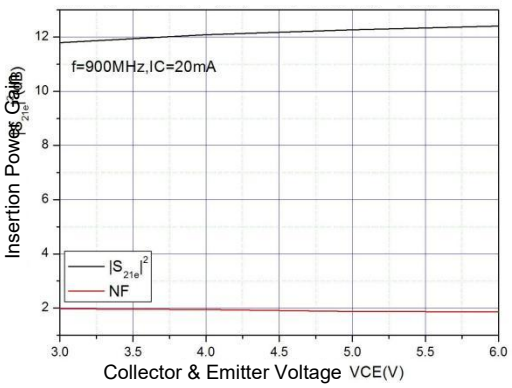
Insertion Power Gain vs Collector Current



Noise Factor vs Collector Current



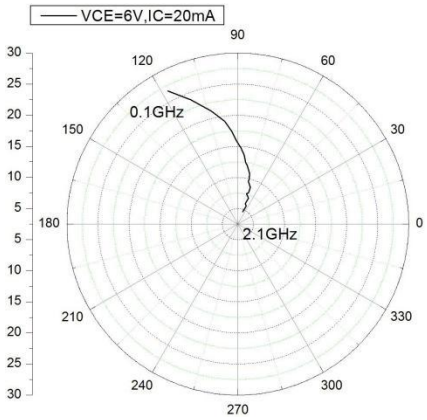
Insertion Power Gain, Noise Factor vsCollector & Emitter Voltage



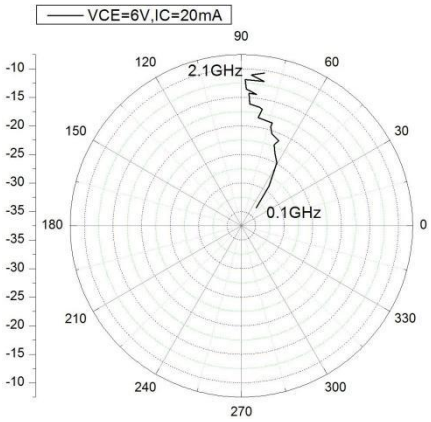
Smith chart

Conditions：V_{CE}=6V, I_C=20mA

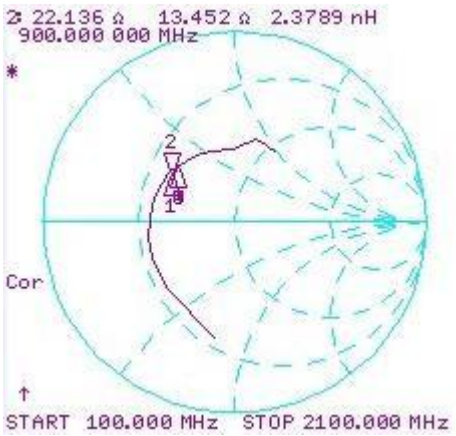
S21e -Frequency



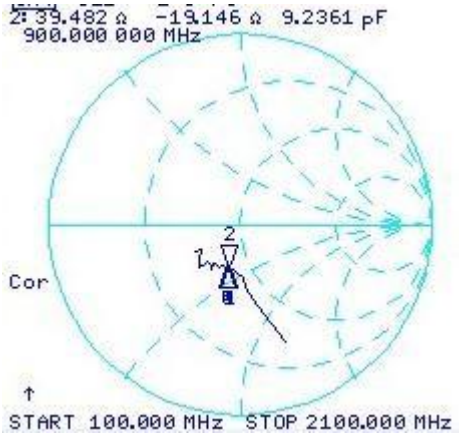
S12e -Frequency



S11e -Frequency



S22e -Frequency



S-parameter

Conditions：V_{CE}=6V, 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	-3.968	-100.19	26.697	117.75	-33.407	50.515	-3.4933	-70.359
0.2	-6.0174	-134.08	23.879	110.76	-28.98	55.092	-7.1947	-78.18
0.3	-6.6333	-156.09	21.2	103.43	-26.485	58.917	-9.6217	-84.694
0.4	-6.8898	-169.55	19.125	97.1	-24.833	60.883	-10.85	-87.512
0.5	-7.0566	178.6	17.47	93.748	-23.524	65.087	-11.788	-92.589
0.6	-7.2003	168.28	15.845	90.718	-22.174	68.075	-12.169	-96.618
0.7	-7.253	159.99	14.807	87.639	-21.273	66.418	-12.41	-99.684
0.8	-7.3099	151.63	13.648	84.548	-20.476	71.739	-12.635	-103.63
0.9	-7.508	143.8	12.417	82.532	-19.41	73.519	-12.439	-106.85
1	-7.5639	136.62	12.028	80.88	-18.72	73.217	-12.479	-109.04
1.1	-7.7841	128.65	10.862	76.867	-18.316	81.252	-12.393	-114.53
1.2	-7.9778	122.16	9.9387	75.906	-16.756	79.78	-12.073	-116.47
1.3	-8.0504	114.61	9.5905	76.073	-16.512	81.227	-12.096	-119.06
1.4	-8.1647	107.65	8.7216	71.336	-16.096	86.038	-12.346	-123.51
1.5	-8.2313	104.46	7.7844	71.039	-14.239	86.81	-11.303	-123.27
1.6	-8.2685	95.335	7.5717	73.709	-14.324	83.437	-11.656	-125.35
1.7	-8.2623	89.382	7.0271	67.552	-13.53	87.9	-11.8	-132.21
1.8	-8.0808	88.48	6.1835	69.686	-11.9	88.576	-10.235	-133.42
1.9	-7.0628	75.506	5.9958	70.012	-11.933	81.004	-11.325	-139.96
2	-7.2531	67.538	5.6937	65.499	-11.008	86.331	-12.559	-147.55
2.1	-7.3646	60.937	4.6181	69.081	-10.451	81.436	-11.198	-148.59

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