

isc Silicon NPN RF Transistor

2SC5227

DESCRIPTION

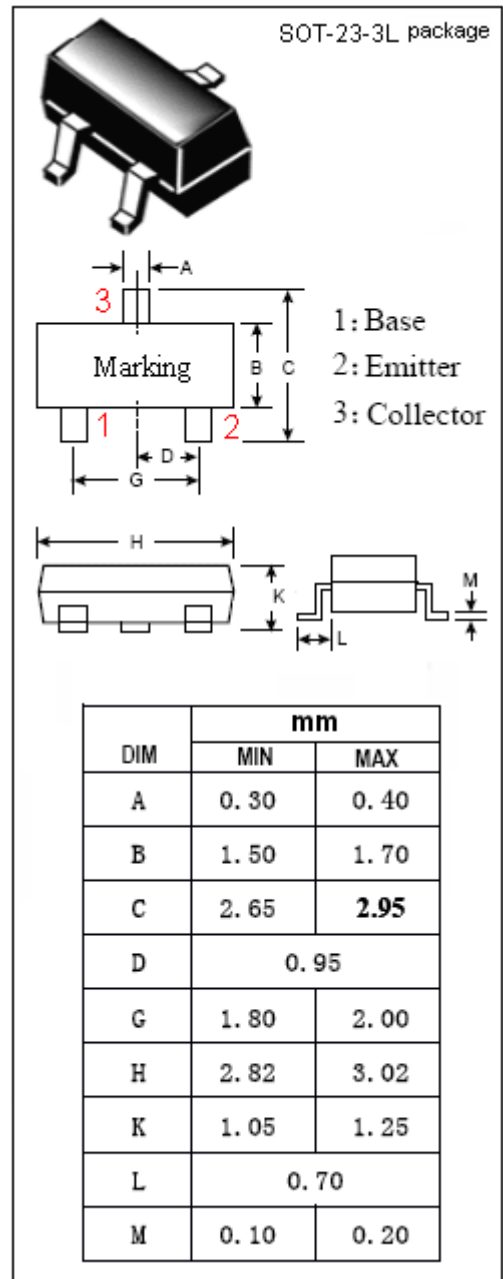
- High Gain Bandwidth Product
 $f_T = 7 \text{ GHz TYP.}$
- High Gain, Low Noise Figure
 $|S_{21e}|^2 = 12 \text{ dB TYP., NF} = 1.0 \text{ dB TYP @ } f = 1 \text{ GHz}$

APPLICATIONS

- Designed for VHF~UHF wideband low noise amplifier applications.

ABSOLUTE MAXIMUM RATINGS($T_a=25^\circ\text{C}$)

SYMBOL	PARAMETER	VALUE	UNIT
V_{CBO}	Collector-Base Voltage	20	V
V_{CEO}	Collector-Emitter Voltage	10	V
V_{EBO}	Emitter-Base Voltage	2	V
I_C	Collector Current-Continuous	70	mA
P_C	Collector Power Dissipation @ $T_C=25^\circ\text{C}$	0.2	W
T_J	Junction Temperature	150	$^\circ\text{C}$
T_{stg}	Storage Temperature Range	-55~150	$^\circ\text{C}$



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ELECTRICAL CHARACTERISTICS

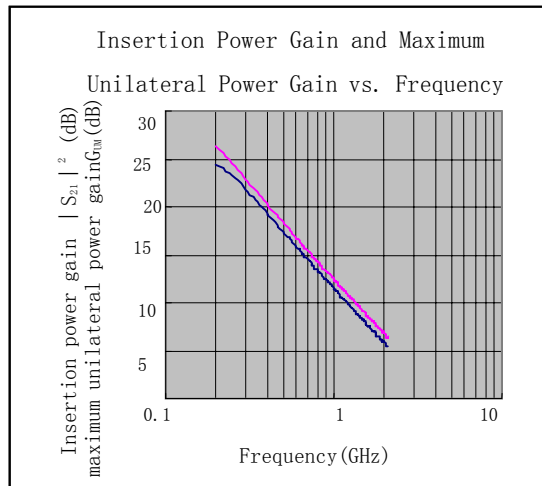
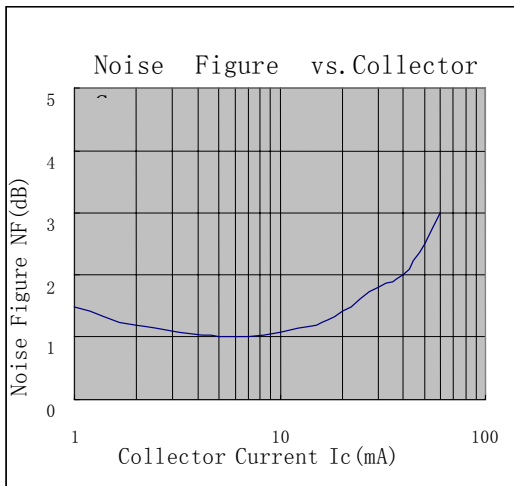
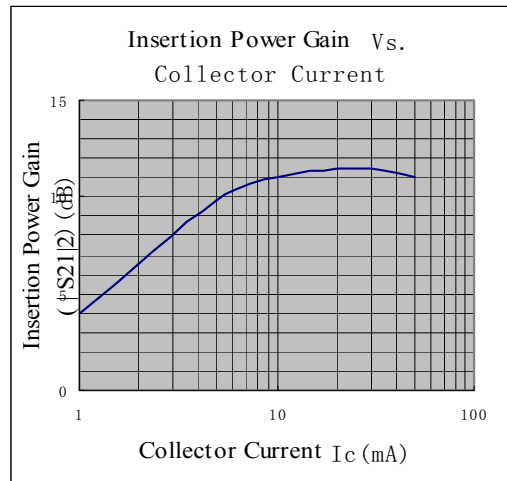
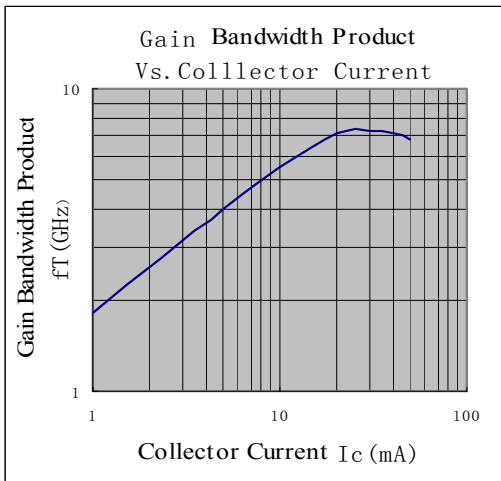
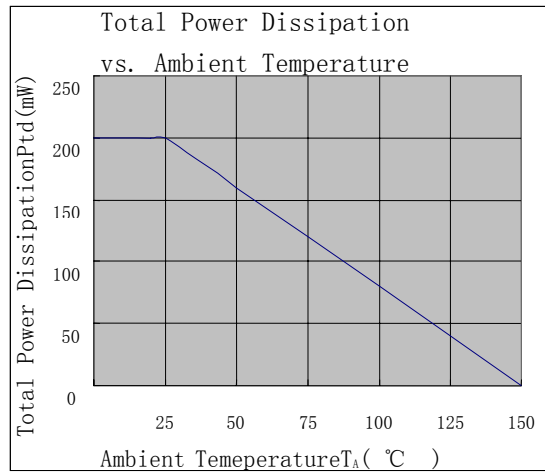
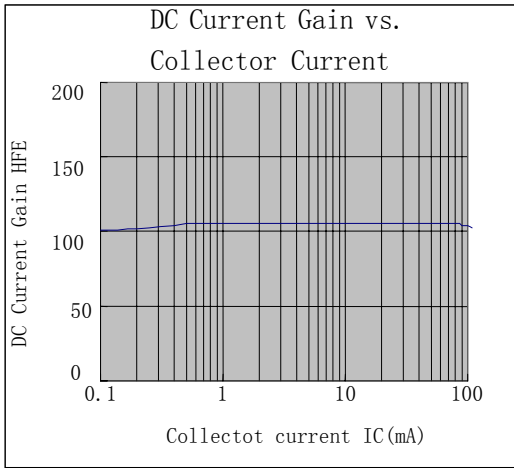
 $T_c=25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP.	MAX	UNIT
I_{CBO}	Collector Cutoff Current	$V_{CB}=10\text{V}; I_E=0$			1	μA
I_{EBO}	Emitter Cutoff Current	$V_{EB}=1\text{V}; I_C=0$			10	μA
h_{FE}	DC Current Gain	$I_C=20\text{mA}; V_{CE}=5\text{V}$	60		270	
$ S_{21e} ^2$	Insertion Power Gain	$I_C=20\text{mA}; V_{CE}=5\text{V}; f=1\text{GHz}$	9	12		dB
$ S_{21e} ^2$	Insertion Power Gain	$I_C=3\text{mA}; V_{CE}=2\text{V}; f=1\text{GHz}$		8		dB
f_T	Current-Gain—Bandwidth Product	$I_C=20\text{mA}; V_{CE}=5\text{V}$	5	7		GHz
C_{OB}	Output Capacitance	$I_E=0; V_{CB}=10\text{V}; f=1.0\text{MHz}$		0.75	1.2	pF
C_{re}	Feedback Capacitance	$I_E=0; V_{CB}=10\text{V}; f=1.0\text{MHz}$		0.5		pF
NF	Noise Figure	$I_C=7\text{mA}; V_{CE}=5\text{V}; f=1\text{GHz}$		1.0	1.8	dB

◆ h_{FE} Classification

3	4	5
60-120	90-180	135-270

TYPICAL CHARACTERISTICS (T_a=25°C)



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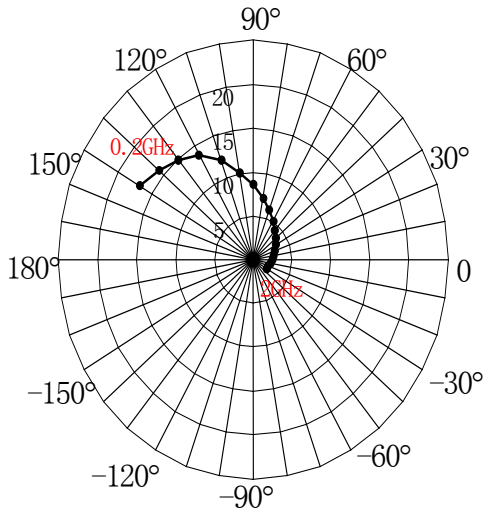
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SMITH CHART

(Test Condition: $V_{CE}=10V$, $I_C=20mA$, $Z_0=50\Omega$, $f=0.2GHz-2.0GHz$)

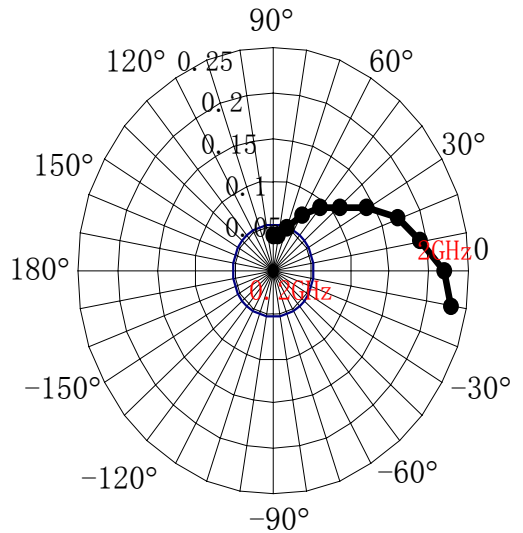
S_{21} -FREQUENCY

Condition: $V_{ce}=10V/I_c=20mA$

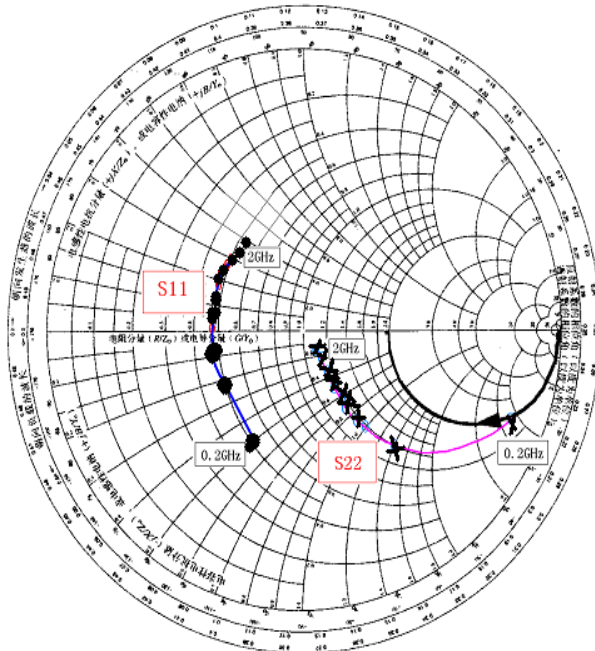


S_{12} - FREQUENCY

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



S_{11} 、 S_{22} -FREQUENCY



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S-PARAMETER $V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.2	0.45	-70.42	16.73	150.2	0.04	89.27	0.42	-12.05
0.4	0.4	-177.3	9.3	94.32	0.06	65.65	0.21	-53.52
0.6	0.41	150.4	6.2	72.41	0.07	55.63	0.17	-76.62
0.8	0.41	126.3	4.69	55.83	0.1	47.91	0.17	-97.1
1	0.42	104.6	3.75	40.65	0.12	38.96	0.17	-119
1.2	0.42	85.22	3.17	26.22	0.14	30.11	0.17	-138.9
1.4	0.42	65.91	2.74	13.54	0.17	21.39	0.18	-158.9
1.6	0.42	47.16	2.4	1.03	0.2	12.16	0.19	-177.5
1.8	0.41	27.84	2.13	-12.34	0.22	2.27	0.21	164.93
0.2	0.45	-70.42	16.73	150.2	0.04	89.27	0.42	-12.05

 $V_{CE} = 10\text{ V}$, $I_C = 5\text{ mA}$

Freque.	S_{11}		S_{21}		S_{12}		S_{22}	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
0.2	0.77	-3.8	6.78	-177.5	0.06	99.12	0.8	6.86
0.4	0.62	-112.9	6.04	117.8	0.08	50.85	0.44	-48.92
0.6	0.52	-174.9	4.82	83	0.09	36.61	0.35	-73.18
0.8	0.49	150	3.81	61.86	0.1	30.36	0.32	-93.35
1	0.48	122.4	3.09	43.61	0.11	24.14	0.31	-113.7
1.2	0.48	99.54	2.64	27.16	0.12	18.43	0.31	-133.2
1.4	0.48	78.4	2.27	13.76	0.14	13.12	0.32	-153.3
1.6	0.48	58	1.97	0.66	0.17	6.97	0.32	-172.6
1.8	0.47	37.79	1.75	-13.71	0.18	0.2	0.34	168.78
0.2	0.46	17.69	1.66	-25.39	0.2	-9.01	0.36	150.36