

Ordering number:EN5185

NPN Epitaxial Planar Silicon Transistor



2SC5275

UHF to S Band Low-Noise Amplifier, OSC Applications

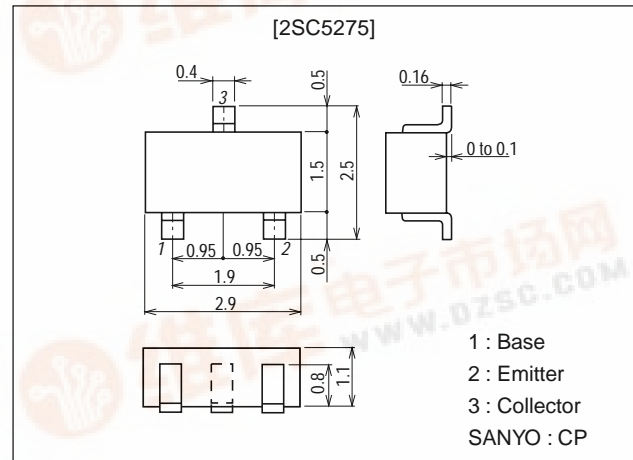
Features

- Low noise : NF=0.9dB typ (f=1GHz).
: NF=1.4dB typ (f=1.5GHz).
- High gain : $|S_{21e}|^2=10\text{dB}$ typ (f=1.5GHz).
- High cutoff frequency : $f_T=11\text{GHz}$ typ.
- Low-voltage, low-current operation ($V_{CE}=1\text{V}$, $I_C=1\text{mA}$)
: $f_T=7\text{GHz}$ type.
: $|S_{21e}|^2=5.5\text{dB}$ typ (f=1.5GHz).

Package Dimensions

unit:mm

2018B



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CB0}		20	V
Collector-to-Emitter Voltage	V_{CE0}		10	V
Emitter-to-Base Voltage	V_{EB0}		1.5	V
Collector Current	I_C		30	mA
Collector Dissipation	P_C		200	mW
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CB0}	$V_{CB}=10\text{V}$, $I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EB0}	$V_{EB}=1\text{V}$, $I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	60*		270*	
Gain-Bandwidth Product	f_{T1}	$V_{CE}=5\text{V}$, $I_C=10\text{mA}$	8	11		GHz
	f_{T2}	$V_{CE}=1\text{V}$, $I_C=1\text{mA}$		7		GHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}$, $f=1\text{MHz}$		0.45	0.7	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=10\text{V}$, $f=1\text{MHz}$		0.30		pF

* : The 2SC5275 is classified by 10mA h_{FE} as follows :

60	3	120	90	4	180	135	5	270
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Marking : MN

h_{FE} rank : 3, 4, 5

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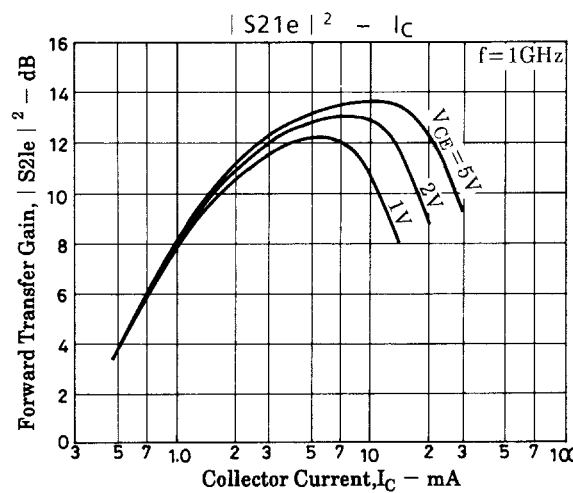
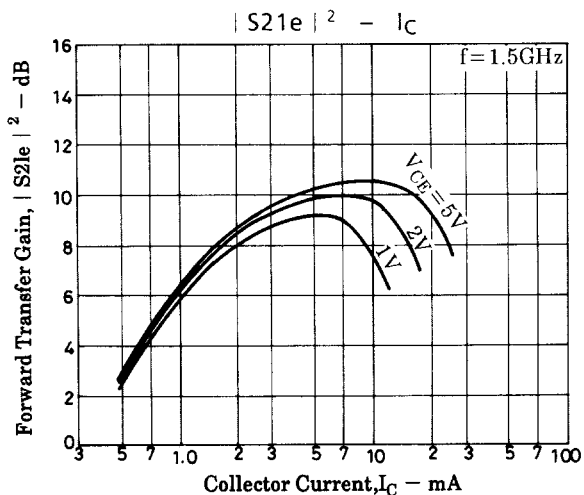
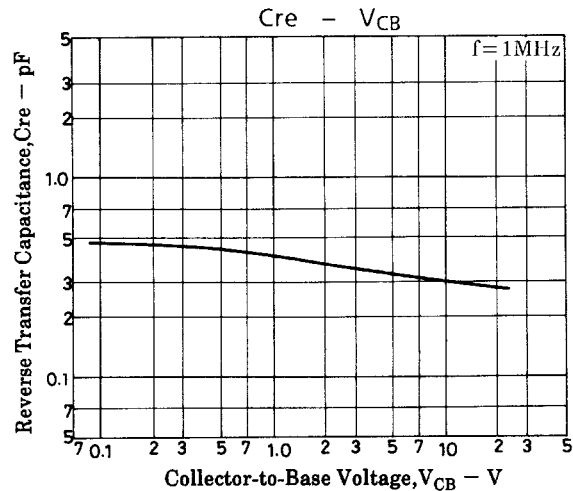
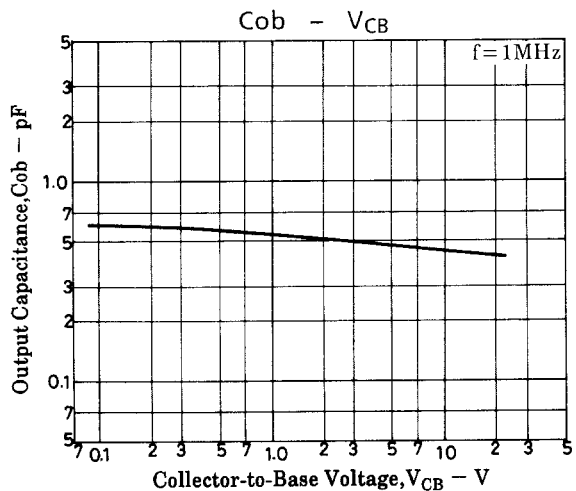
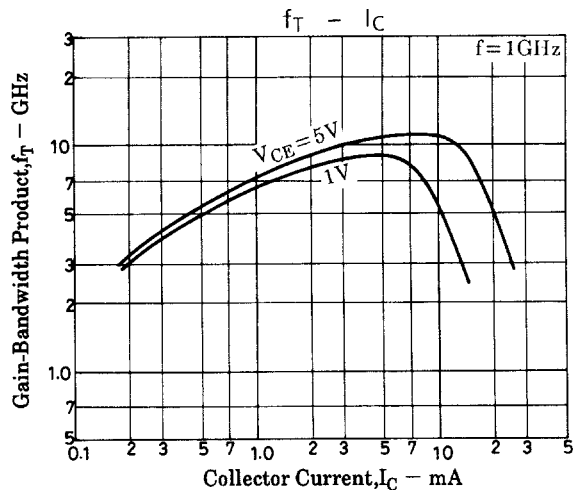
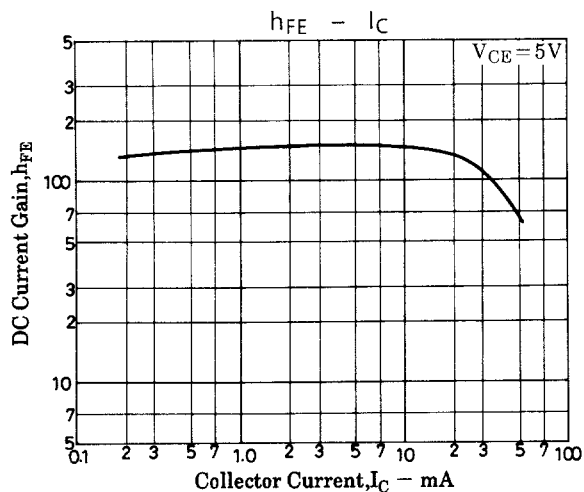
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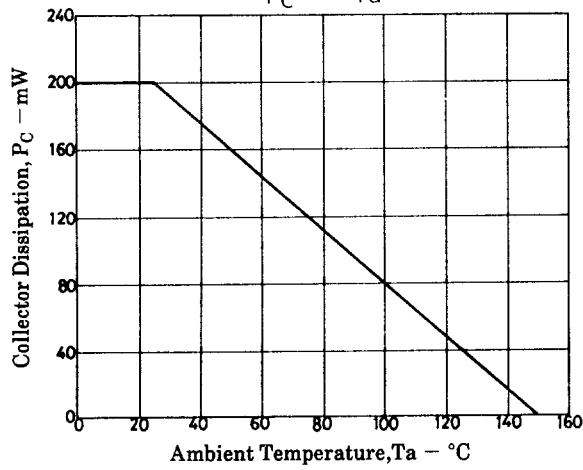
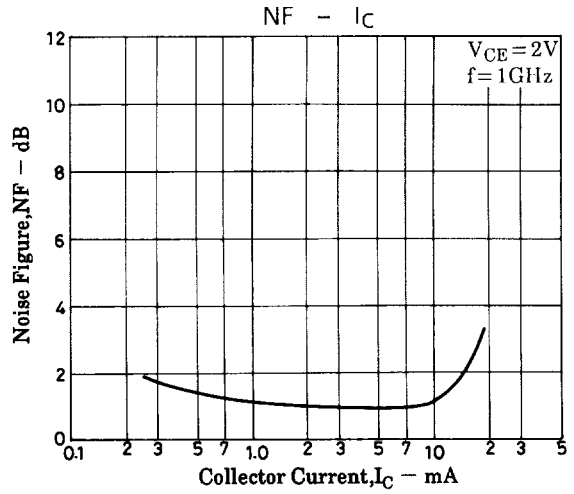
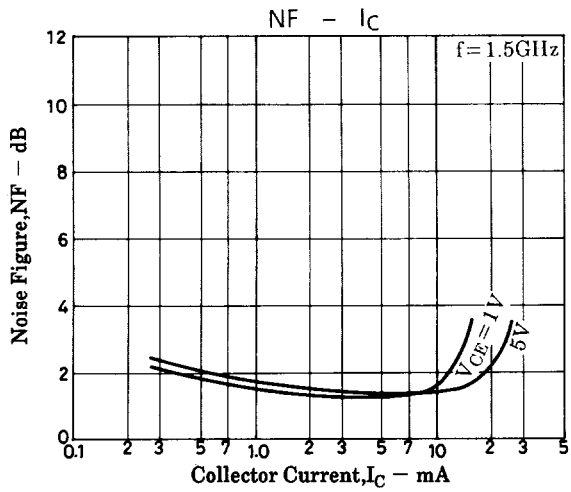
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2 - 1$	$V_{CE}=5V, I_C=10mA, f=1.5GHz$	8	10		dB
	$ S_{21e} ^2 - 2$	$V_{CE}=1V, I_C=1mA, f=1.5GHz$		5.5		dB
Noise Figure	NF1	$V_{CE}=5V, I_C=5mA, f=1.5GHz$		1.4	3.0	dB
	NF2	$V_{CE}=2V, I_C=3mA, f=1GHz$		0.9		dB

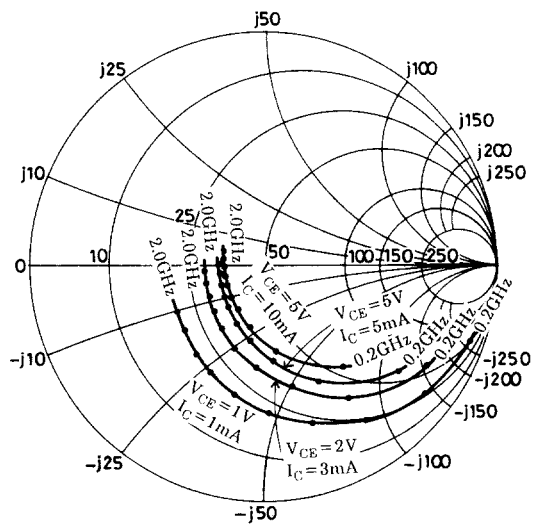


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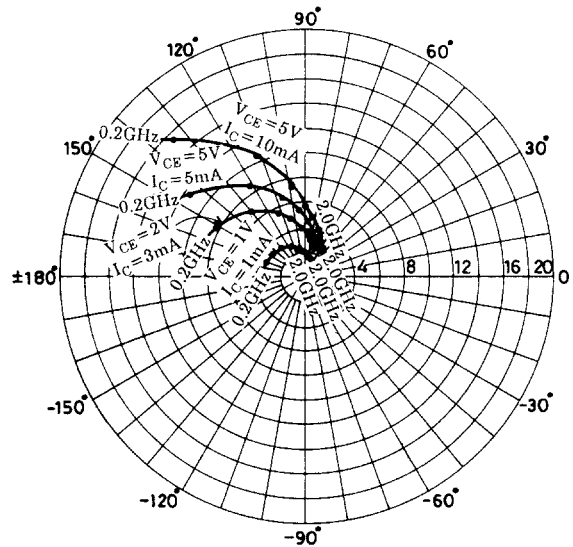


S Parameters

S11e : $f = 200$ to 2000MHz (200MHz step)

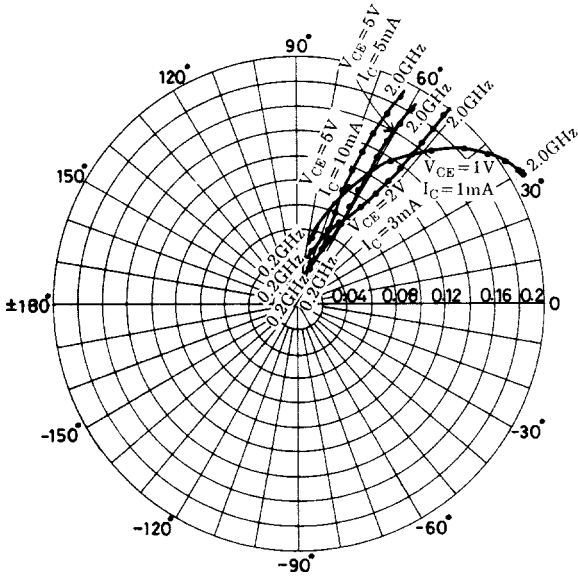


S21e : $f = 200$ to 2000MHz (200MHz step)

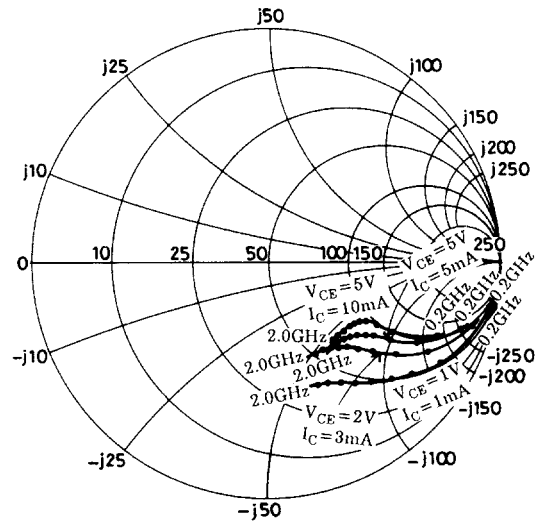


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S12e : f= 200 to 2000MHz (200MHz step)



S22e : f= 200 to 2000MHz (200MHz step)



S parameters (Common emitter)

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.725	-37.6	11.573	144.6	0.035	71.3	0.885	-18.7
400	0.540	-64.0	8.744	122.0	0.058	63.0	0.731	-27.7
600	0.400	-83.2	6.691	107.0	0.074	60.6	0.628	-31.4
800	0.320	-98.5	5.357	96.6	0.089	60.8	0.562	-33.3
1000	0.263	-112.1	4.503	88.5	0.104	61.0	0.527	-35.1
1200	0.221	-127.8	3.874	81.2	0.119	60.7	0.503	-37.5
1400	0.199	-140.4	3.409	74.6	0.135	60.7	0.487	-40.1
1600	0.180	-154.5	2.984	68.5	0.150	60.7	0.473	-43.3
1800	0.169	-169.9	2.710	63.0	0.167	59.9	0.463	-46.8
2000	0.168	176.2	2.486	58.2	0.183	59.4	0.462	-50.4

V_{CE}=5V, I_C=10mA, Z_O=50Ω

Freq (MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠S ₂₂
200	0.547	-51.4	15.617	133.5	0.031	69.6	0.799	-22.7
400	0.364	-80.4	10.257	111.4	0.049	65.8	0.628	-27.9
600	0.261	-99.7	7.389	98.8	0.065	66.3	0.548	-28.7
800	0.202	-116.9	5.761	89.9	0.081	67.4	0.501	-29.6
1000	0.177	-132.9	4.763	83.2	0.099	67.7	0.481	-31.1
1200	0.157	-150.3	4.055	76.5	0.117	67.0	0.467	-33.5
1400	0.150	-164.6	3.545	71.0	0.134	66.4	0.458	-36.3
1600	0.148	-179.2	3.111	65.6	0.151	65.7	0.448	-40.0
1800	0.154	169.8	2.814	60.5	0.170	64.3	0.441	-43.9
2000	0.162	157.5	2.565	56.0	0.187	63.4	0.440	-47.8

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$V_{CE}=2V, I_C=3mA, Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.814	-31.0	8.333	151.1	0.044	72.9	0.924	-17.0
400	0.664	-56.7	6.925	129.6	0.074	61.9	0.793	-28.4
600	0.526	-75.9	5.576	113.7	0.094	56.2	0.683	-34.9
800	0.430	-92.7	4.639	101.8	0.109	54.1	0.598	-39.1
1000	0.364	-107.1	3.950	92.7	0.124	53.1	0.547	-42.1
1200	0.310	-121.7	3.449	84.3	0.138	52.3	0.510	-44.9
1400	0.274	-134.9	3.048	76.9	0.152	52.2	0.485	-48.0
1600	0.247	-148.7	2.706	70.1	0.165	52.1	0.464	-51.6
1800	0.237	-162.4	2.446	64.0	0.180	52.0	0.450	-55.2
2000	0.233	-174.5	2.250	58.7	0.193	52.0	0.444	-58.8

$V_{CE}=1V, I_C=1mA, Z_O=50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.937	-19.9	3.404	161.1	0.055	77.0	0.978	-11.1
400	0.876	-38.2	3.198	144.6	0.102	65.7	0.926	-21.1
600	0.780	-56.2	2.929	128.8	0.138	56.2	0.858	-29.5
800	0.699	-72.0	2.656	115.8	0.164	48.7	0.784	-36.7
1000	0.619	-87.4	2.478	104.2	0.185	42.8	0.734	-42.1
1200	0.553	-101.1	2.224	93.8	0.196	37.8	0.677	-47.7
1400	0.498	-114.4	2.062	84.1	0.204	34.1	0.639	-52.5
1600	0.457	-125.9	1.843	75.6	0.209	31.5	0.610	-56.9
1800	0.418	-139.7	1.722	67.5	0.201	30.5	0.580	-61.4
2000	0.398	-151.1	1.592	60.9	0.210	30.3	0.567	-65.2

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