Ordering number:EN5186

NPN Epitaxial Planar Silicon Transistor

2SC5276

UHF to S Band Low-Noise Amplifier, OSC Applications

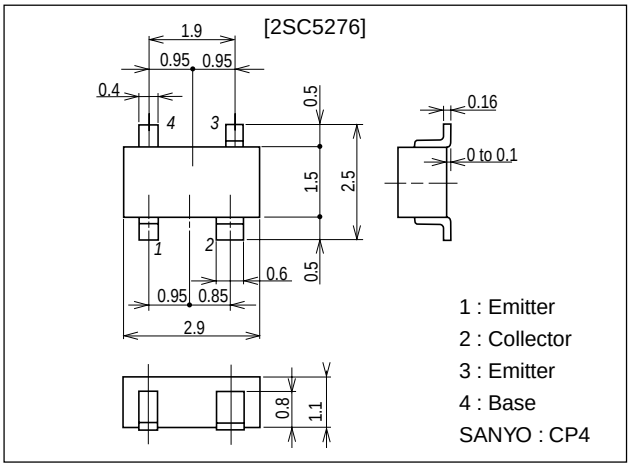
Features

- Low noise : NF=0.9dB typ (f=1GHz).
  : NF=1.4dB typ (f=1.5GHz).
- High gain : $|S21e|^2$=11dB typ (f=1.5GHz).
- High cutoff frequency : f_T=11GHz typ.
- Low-voltage, low-current operation (V_{CE}=1V, I_C=1mA)
  : f_T=7GHz type.
  : $|S21e|^2$=6dB typ (f=1.5GHz).

Package Dimensions

unit:mm

2110A



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		30	mA
Collector Dissipation	P_C		200	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10mA	60*		270*	
Gain-Bandwidth Product	f_T1	V_{CE}=5V, I_C=10mA	8	11		GHz
	f_T2	V_{CE}=1V, I_C=1mA		7		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.45	0.7	pF
Reverse Transfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.25		pF

* : The 2SC5276 is classified by 10mA h_{FE} as follows :

60	3	120	90	4	180	135	5	270

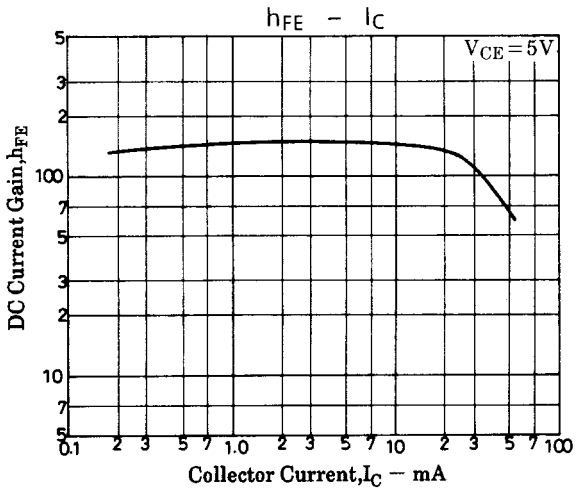
Marking : MN
h_{FE} rank : 3, 4, 5

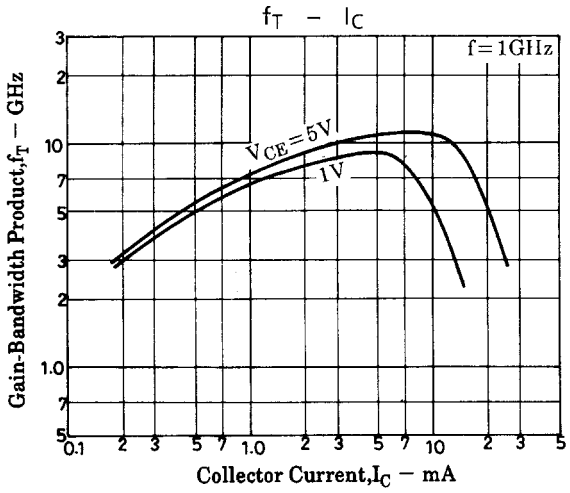
Continued on next page.

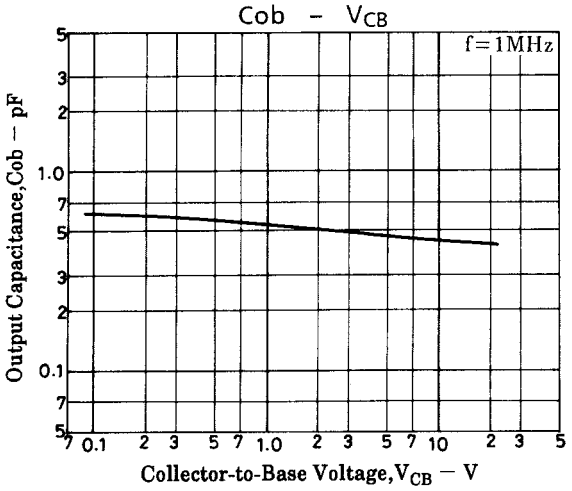
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

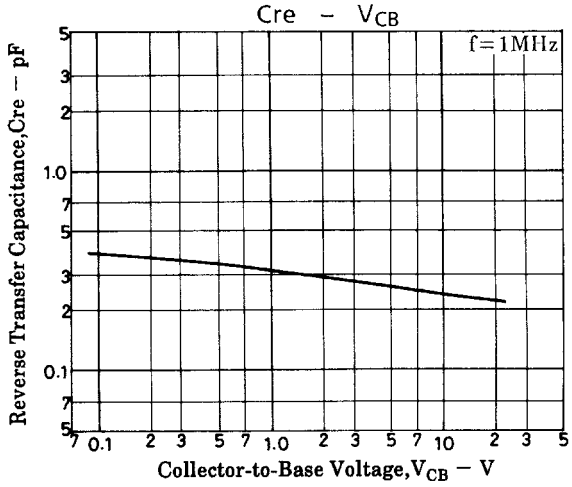
Continued from preceding page.

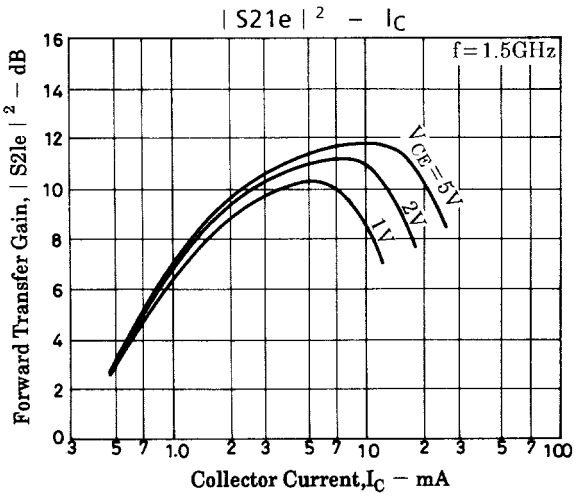
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	| S21e |^2 1	V_{CE}=5V, I_C=10mA, f=1.5GHz	9	11		dB
	| S21e |^2 2	V_{CE}=1V, I_C=1mA, f=1.5GHz		6		dB
Noise Figure	NF1	V_{CE}=5V, I_C=5mA, f=1.5GHz		1.4	3.0	dB
	NF2	V_{CE}=2V, I_C=3mA, f=1GHz		0.9		dB

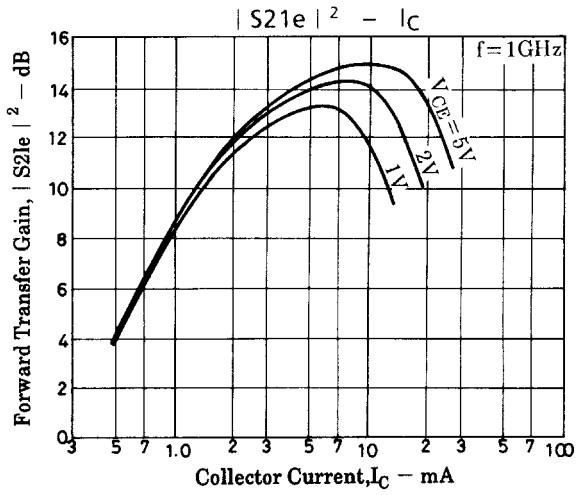


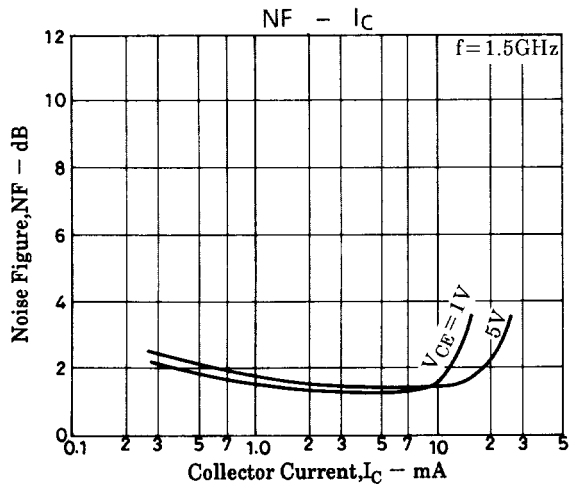


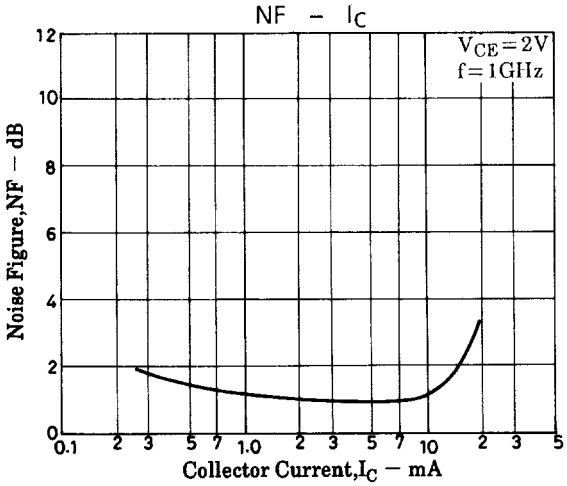


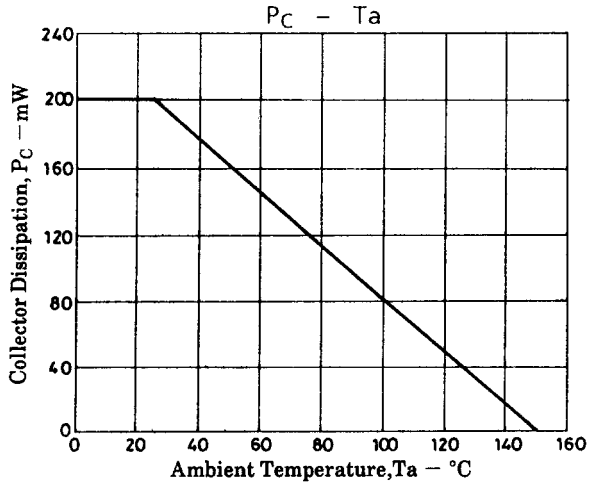






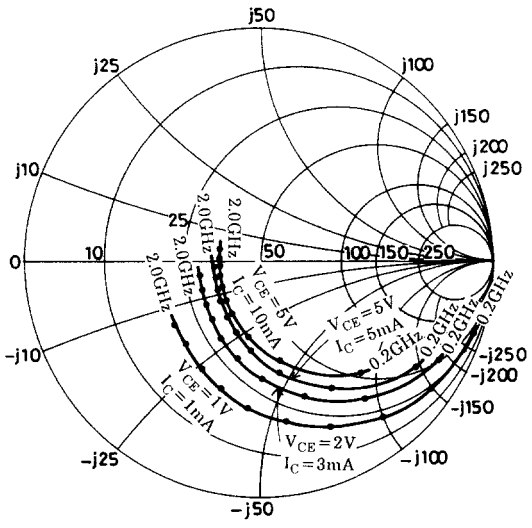




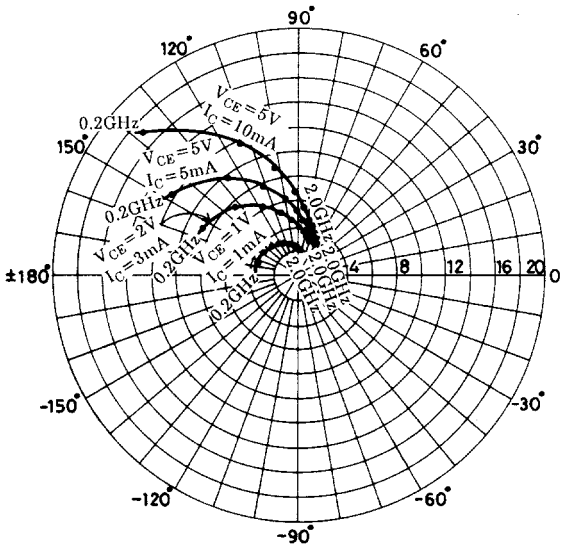


S Parameters

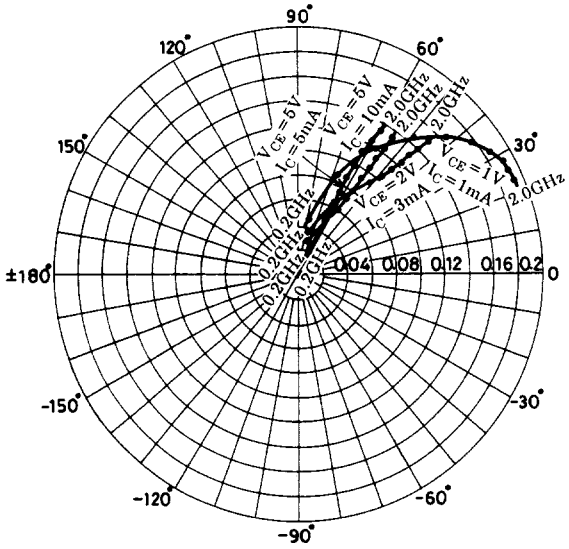
S11e : f=200 to 2000MHz (200MHz step)



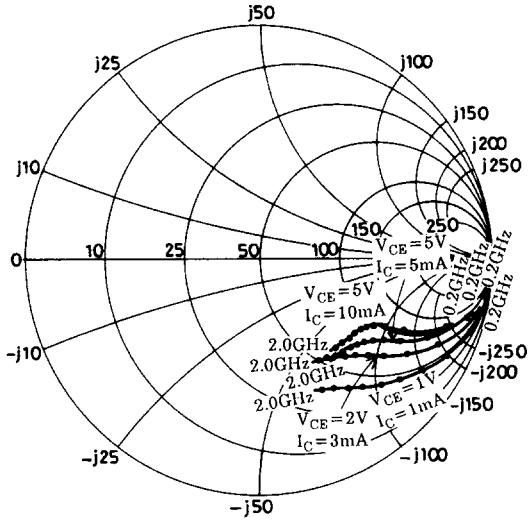
S21e : f=200 to 2000MHz (200MHz step)



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)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.789	–34.0	12.209	148.5	0.029	72.3	0.914	–16.3
400	0.610	–60.1	9.707	125.8	0.048	62.4	0.785	–25.6
600	0.474	–79.5	7.653	110.7	0.061	58.2	0.692	–25.6
800	0.372	–95.6	6.212	99.2	0.072	56.6	0.632	–33.6
1000	0.311	–108.2	5.172	90.8	0.082	56.1	0.594	–36.1
1200	0.264	–122.2	4.459	83.0	0.093	55.9	0.570	–38.6
1400	0.225	–135.5	3.905	76.3	0.103	55.5	0.553	–41.5
1600	0.204	–147.9	3.464	70.7	0.113	55.5	0.539	–44.5
1800	0.188	–161.6	3.121	64.9	0.124	54.7	0.528	–48.2
2000	0.184	–175.1	2.855	59.7	0.135	54.2	0.527	–51.6

V_{CE}=5V, I_C=10mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.629	–47.8	17.118	137.6	0.025	69.4	0.839	–20.3
400	0.421	–77.9	11.829	114.0	0.040	63.6	0.681	–26.7
600	0.316	–98.0	8.649	101.1	0.052	62.7	0.605	–28.9
800	0.245	–117.5	6.785	91.2	0.064	62.8	0.562	–30.7
1000	0.209	–130.0	5.536	84.4	0.075	63.0	0.540	–32.9
1200	0.183	–147.2	4.719	77.6	0.088	62.9	0.528	–35.2
1400	0.168	–161.6	4.103	72.0	0.100	62.5	0.517	–37.9
1600	0.162	–174.0	3.626	66.7	0.112	61.9	0.510	–41.4
1800	0.164	173.1	3.255	61.7	0.124	60.5	0.503	–45.4
2000	0.170	160.6	2.962	56.8	0.135	59.3	0.502	–49.1

V_{CE}=2V, I_C=3mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.860	–28.3	8.645	154.3	0.036	73.8	0.943	–15.2
400	0.725	–52.2	7.452	133.4	0.063	62.5	0.839	–26.1
600	0.598	–71.6	6.200	117.7	0.081	55.4	0.744	–33.3
800	0.490	–88.6	5.210	105.1	0.094	51.1	0.667	–38.4
1000	0.417	–102.6	4.458	95.5	0.104	48.9	0.615	–42.3
1200	0.358	–116.9	3.901	86.7	0.114	47.5	0.579	–45.5
1400	0.311	–129.4	3.452	79.3	0.124	46.4	0.552	–48.6
1600	0.285	–141.5	3.072	72.8	0.132	46.3	0.531	–51.9
1800	0.262	–154.3	2.783	66.4	0.141	45.6	0.513	–55.7
2000	0.252	–167.3	2.551	60.9	0.150	44.5	0.505	–59.0

V_{CE}=1V, I_C=1mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.952	–18.3	3.431	163.0	0.045	78.1	0.983	–10.2
400	0.896	–36.0	3.331	145.5	0.086	67.4	0.945	–19.6
600	0.830	–51.8	3.020	132.9	0.119	57.6	0.892	–27.7
800	0.753	–67.1	2.756	119.8	0.145	49.5	0.837	–34.9
1000	0.681	–80.9	2.543	108.6	0.163	42.6	0.782	–41.5
1200	0.617	–92.9	2.373	97.8	0.177	37.0	0.743	–46.4
1400	0.557	–107.1	2.184	88.4	0.185	32.1	0.699	–51.5
1600	0.509	–118.6	2.011	79.8	0.191	28.1	0.666	–55.9
1800	0.461	–132.1	1.888	71.6	0.191	25.5	0.640	–60.6
2000	0.440	–144.0	1.737	64.5	0.191	23.0	0.618	–64.5