Ordering number:EN5184A

NPN Epitaxial Planar Silicon Transistor

2SC5245

UHF to S-Band Low-Noise Amplifier, OSC Applications

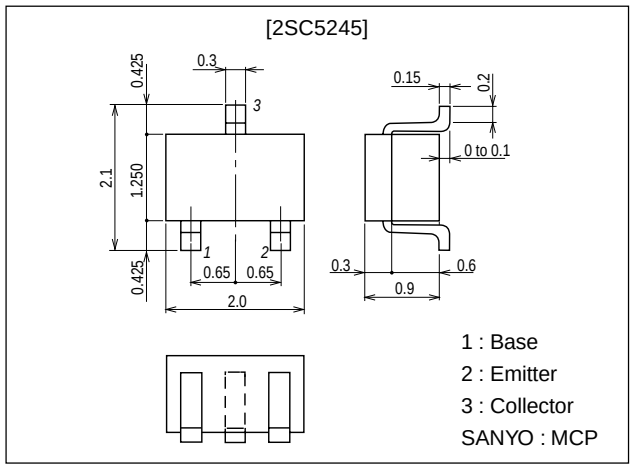
Features

- Low noise : NF=0.9dB typ (f=1GHz).
  : NF=1.4dB typ (f=1.5GHz).
- High gain : $|S21e|^2$=10dB 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.
  : $|S21e|^2$=5.5dB typ (f=1.5GHz).

Package Dimensions

unit:mm

2059B



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		150	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		0.30		pF

* : The 2SC5245 is classified by 10mA h_{FE} as follows :

60	3	120	90	4	180	135	5	270

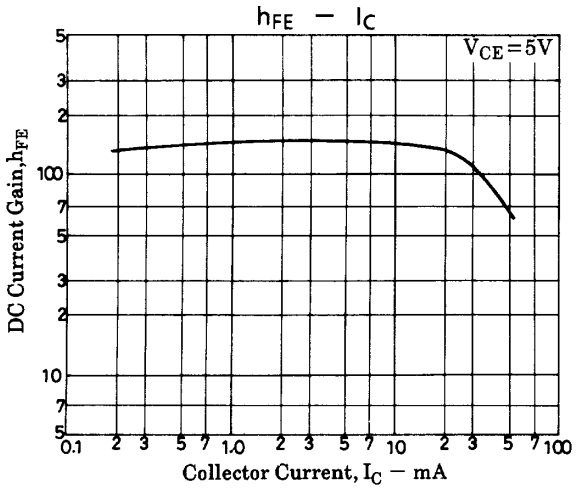
Marking : MN
h_{FE} rank : 3, 4, 5

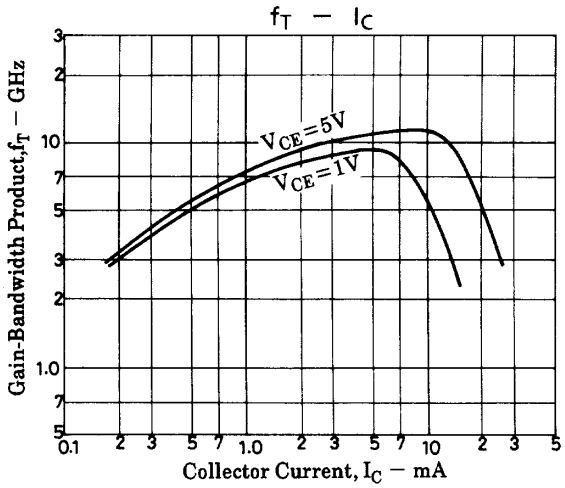
Continued on next page.

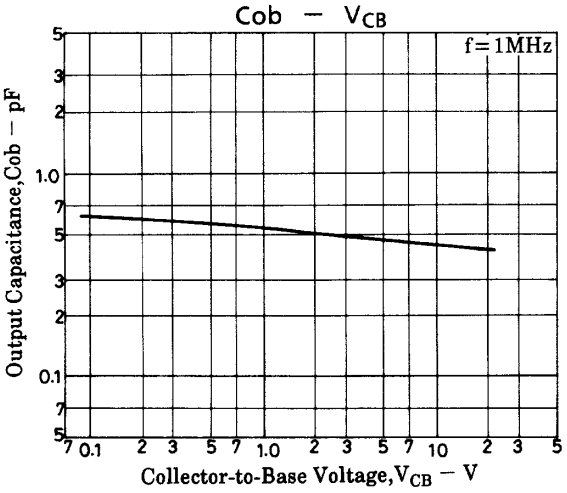
SANYO Electric Co.,Ltd. Semiconductor Bussiness Headquaters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

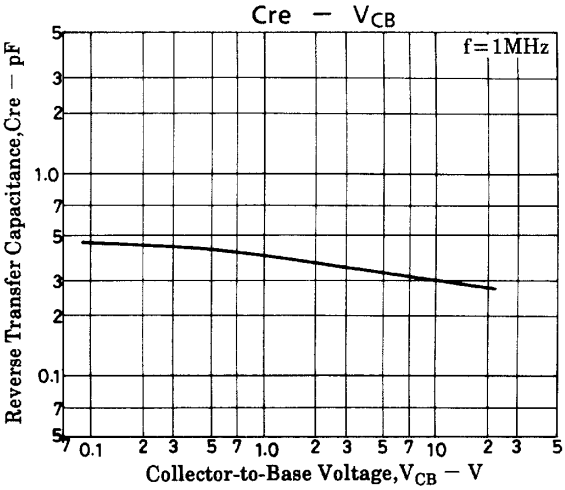
Continued from preceding page.

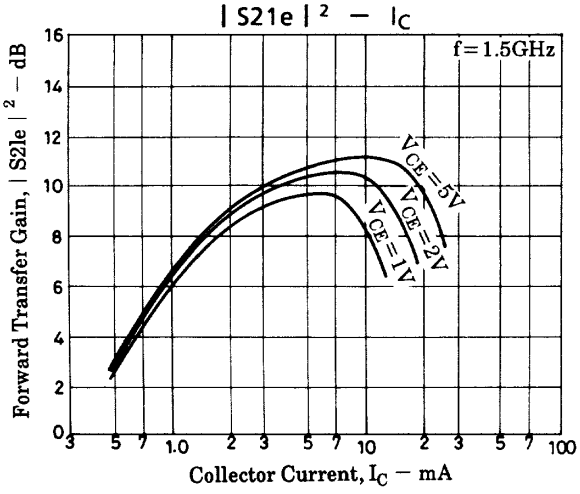
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	| S21e |^2 1	V_{CE}=5V, I_C=10mA, f=1.5GHz	8	10		dB
	| S21e |^2 2	V_{CE}=1V, I_C=1mA, f=1.5GHz		5.5		dB
Noise Figure	NF1	V_{CE}=5V, I_C=5mA, f=1.5GHz		1.4	3.0	dB
	NF2	V_{CE}=2V, I_C=3mA, f=1GHz		0.9		dB

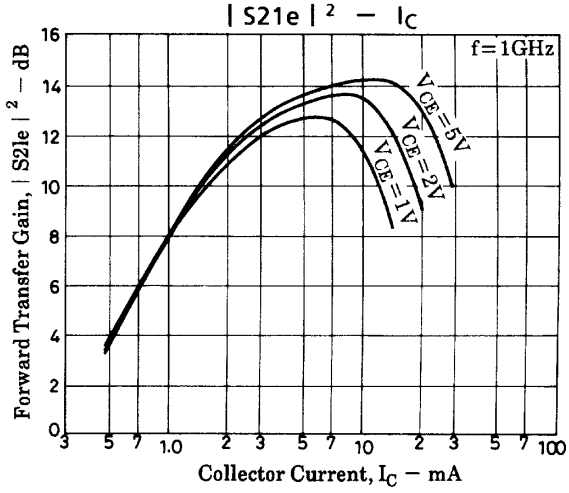


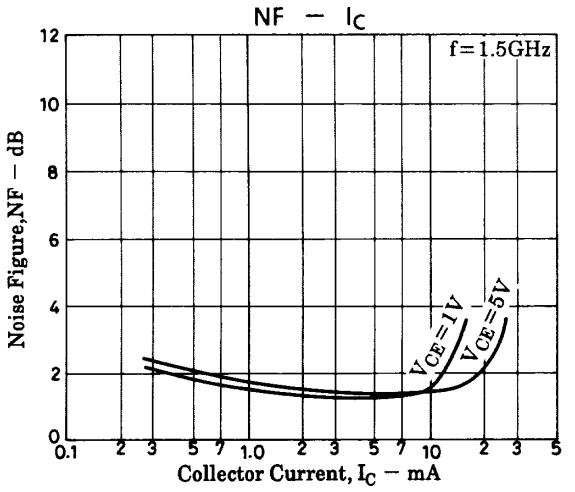


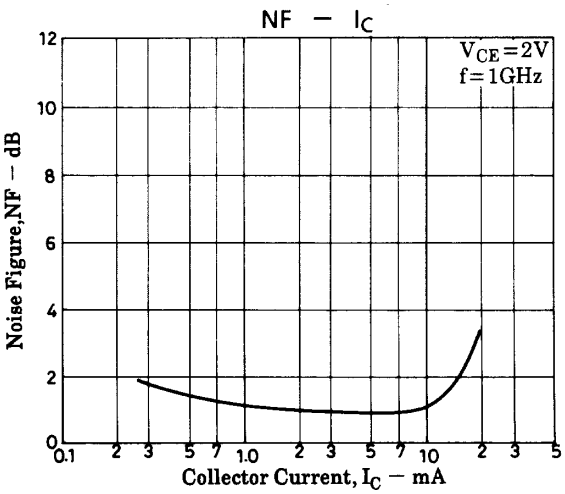


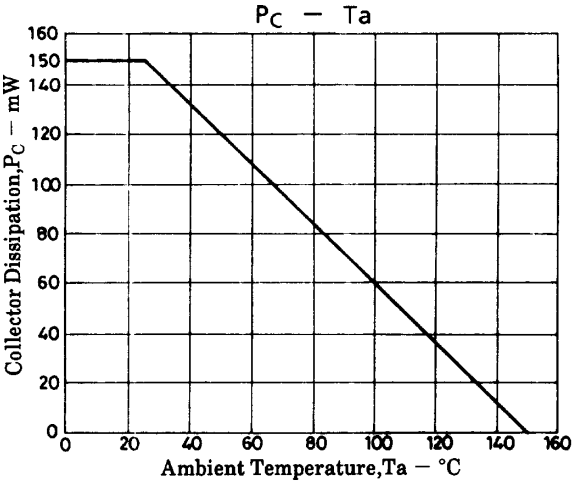






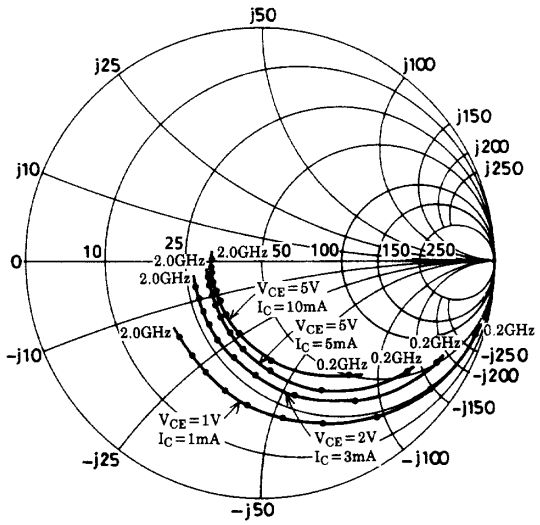




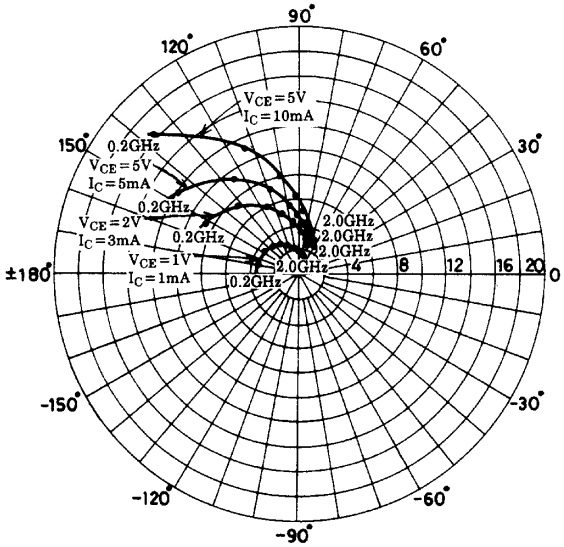


S Parameters

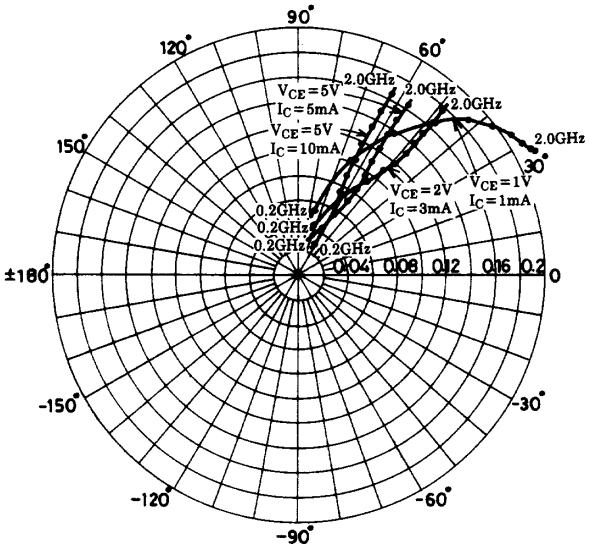
S11e : f=200 to 2000MHz (200MHz step)



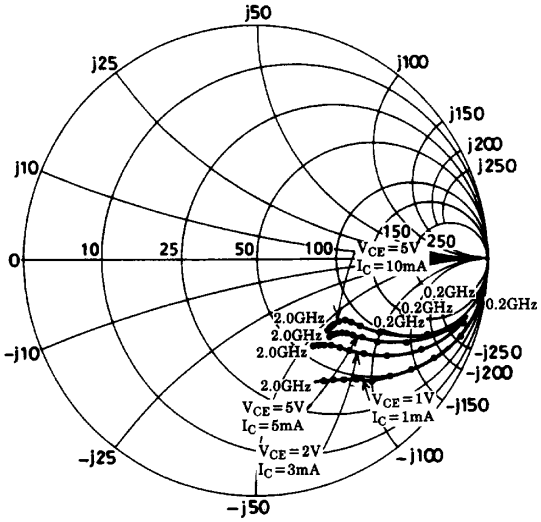
S21e : f=200 to 2000MHz (200MHz step)



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	0.763	–37.5	11.926	146.9	0.036	70.7	0.892	–19.1
400	0.590	–65.4	9.202	124.3	0.058	60.9	0.740	–29.1
600	0.456	–85.5	7.173	109.4	0.073	57.4	0.631	–33.7
800	0.374	–102.0	5.743	98.7	0.086	56.7	0.566	–35.8
1000	0.323	–115.0	4.785	90.5	0.098	56.7	0.528	–37.2
1200	0.288	–127.5	4.105	83.6	0.110	57.2	0.505	–38.4
1400	0.264	–137.7	3.599	77.5	0.123	57.7	0.488	–39.6
1600	0.248	–147.4	3.213	71.3	0.136	57.6	0.476	–41.2
1800	0.239	–156.9	2.905	66.4	0.150	57.6	0.466	–43.3
2000	0.235	–165.7	2.651	61.3	0.165	57.2	0.462	–45.4

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	0.605	–52.6	16.354	136.2	0.031	67.5	0.804	–23.9
400	0.417	–84.6	11.011	113.3	0.048	62.4	0.622	–30.5
600	0.319	–106.3	8.026	100.5	0.062	62.2	0.533	–32.0
800	0.266	–124.6	6.250	91.3	0.076	63.4	0.491	–32.4
1000	0.238	–136.5	5.115	84.7	0.090	64.3	0.469	–33.2
1200	0.225	–148.9	4.336	78.8	0.104	64.4	0.458	–34.6
1400	0.215	–158.3	3.813	73.4	0.119	64.5	0.449	–35.8
1600	0.213	–167.3	3.365	68.1	0.135	63.8	0.443	–37.7
1800	0.212	–175.6	3.030	63.5	0.150	63.1	0.436	–39.6
2000	0.216	–177.5	2.754	58.9	0.166	62.5	0.438	–41.9

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	0.842	–30.7	8.491	153.0	0.044	72.5	0.931	–17.1
400	0.704	–56.3	7.161	131.9	0.075	60.9	0.808	–28.8
600	0.579	–76.1	5.879	116.3	0.095	54.1	0.696	–36.2
800	0.480	–93.1	4.882	104.2	0.109	51.0	0.615	–40.6
1000	0.417	–106.3	4.154	95.0	0.121	49.3	0.564	–43.5
1200	0.376	–119.6	3.597	87.1	0.132	48.7	0.526	–45.8
1400	0.343	–130.2	3.212	80.2	0.143	48.6	0.496	–47.5
1600	0.319	–140.5	2.875	73.4	0.154	48.7	0.475	–49.6
1800	0.303	–150.0	2.604	67.7	0.166	48.6	0.461	–51.6
2000	0.298	–160.0	2.383	62.1	0.179	48.9	0.451	–52.9

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	0.945	–18.9	3.296	162.5	0.054	77.2	0.980	–11.0
400	0.884	–37.3	3.206	145.9	0.102	65.9	0.934	–20.5
600	0.810	–53.6	2.942	131.2	0.139	56.3	0.870	–29.0
800	0.728	–69.4	2.711	117.8	0.166	48.6	0.811	–35.5
1000	0.667	–82.5	2.449	107.0	0.187	42.5	0.763	–40.9
1200	0.605	–95.8	2.252	96.9	0.199	37.3	0.715	–45.7
1400	0.561	–106.1	2.061	88.1	0.207	33.5	0.673	–49.4
1600	0.518	–117.2	1.909	79.5	0.212	30.6	0.638	–53.4
1800	0.492	–127.5	1.766	72.2	0.215	28.6	0.611	–56.5
2000	0.465	–137.9	1.658	65.2	0.217	27.6	0.592	–59.9