Ordering number : ENN6574

NPN Epitaxial Planar Type Silicon Transistor

EC3H05B

VHF to UHF Wide-Band Low-Noise Amplifier Applications

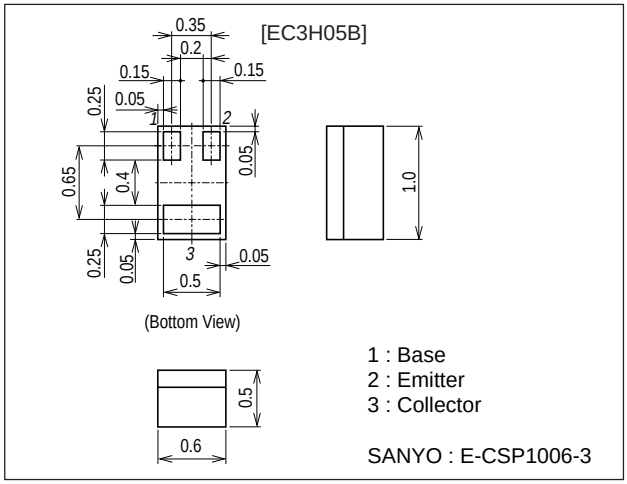
Features

- Low noise : NF=1.2dB typ (f=1GHz).
- High gain : $|S21e|^2$=13dB typ (f=1GHz).
- Hige cutoff frequency : f_T=9.0GHz typ.
- Ultraminiature (1006 size) and thin (0.5mm) leadless package.

Package Dimensions

unit : mm

2183



Specifications

Absolute Maximum Ratings at Ta=25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		16	V
Collector-to-Emitter Voltage	V_{CEO}		8	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		50	mA
Collector Dissipation	P_C		100	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=15mA	100		180	
Gain Bandwidth Product	f_T	V_{CE}=5V, I_C=15mA		9.0		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.55	1.2	pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=15mA, f=1GHz	10	13		dB
Noise Figure	NF	V_{CE}=5V, I_C=5mA, f=1GHz		1.2	2.5	dB

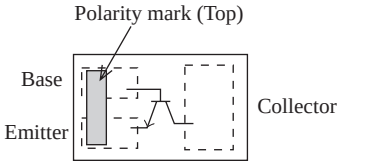
SANYO Electric Co.,Ltd. Semiconductor Company

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

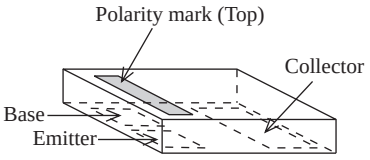
Type No. Indication (Top view)

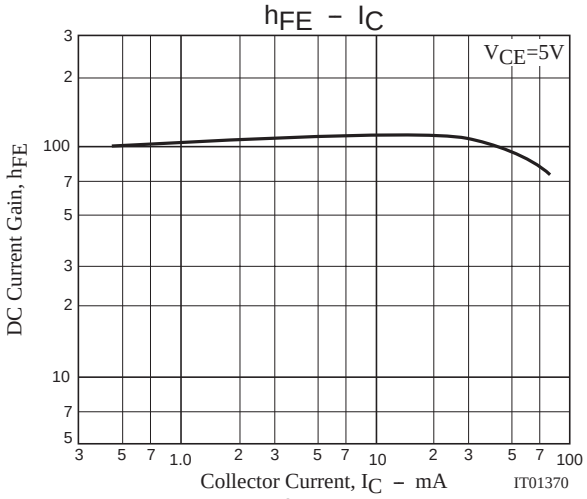
This product adopts a high-frequency process. Please be careful when handling it beause it is susceptible to static electricity.

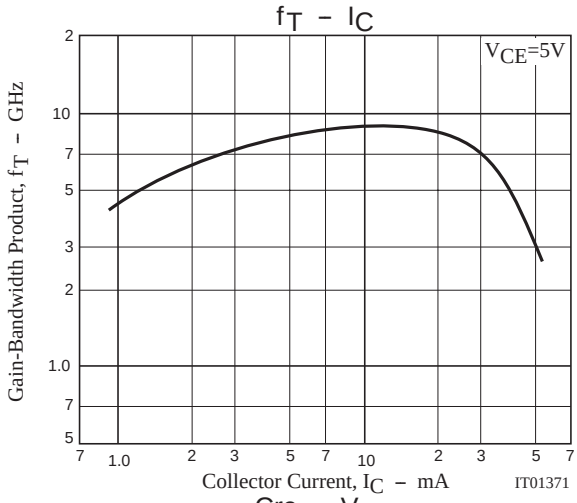
Electrical Connection (Top view)

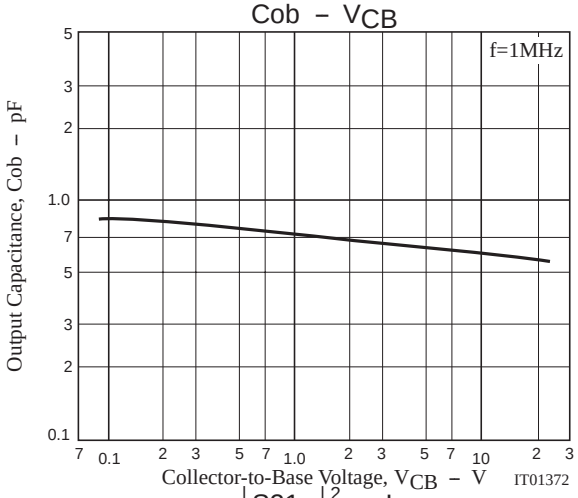


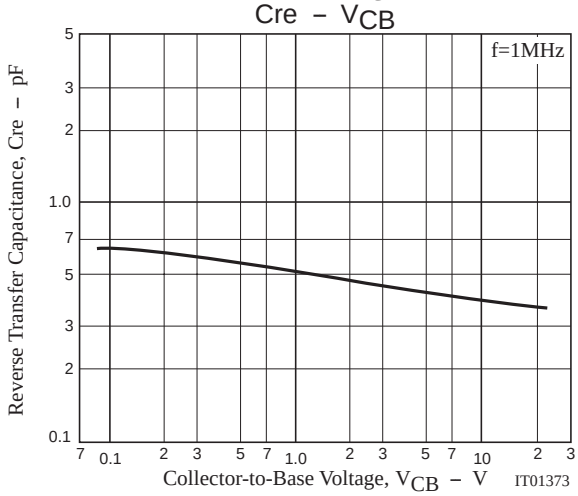
*Electrodes : on the bottom

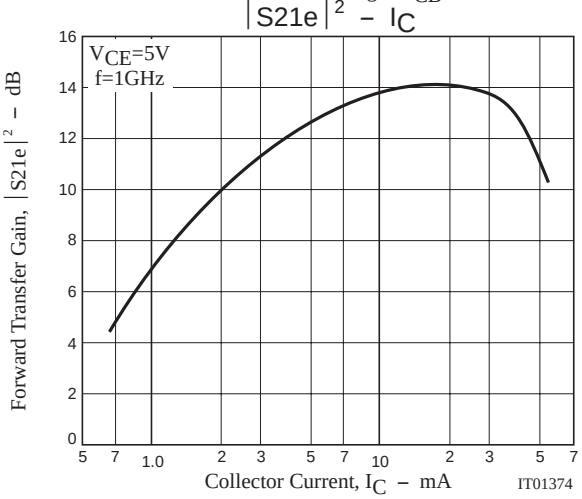


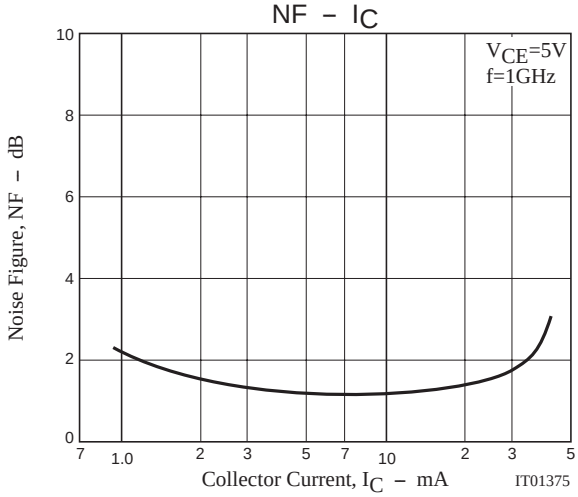


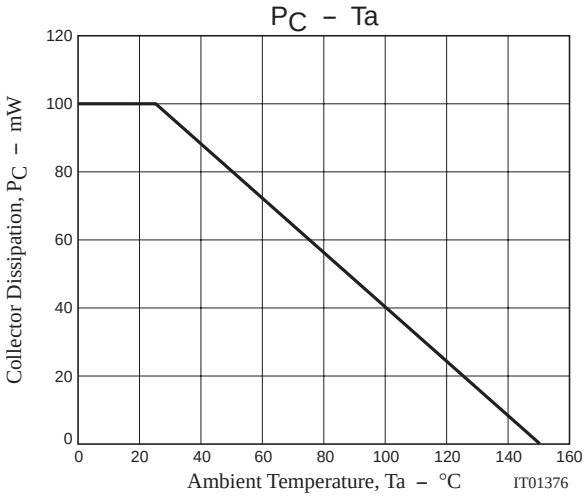












S Parameters (Common emitter)

V_{CE}=1V, I_C=1mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.964	–14.7	3.332	168.4	0.039	80.6	0.987	–7.4
200	0.944	–28.5	3.286	157.5	0.075	71.2	0.960	–14.4
400	0.886	–54.5	2.977	138.4	0.132	55.9	0.879	–26.3
600	0.819	–76.8	2.529	122.1	0.168	44.4	0.789	–35.6
800	0.766	–94.6	2.223	109.1	0.190	35.9	0.714	–42.2
1000	0.737	–108.1	2.010	98.2	0.200	29.6	0.663	–47.1
1200	0.701	–120.2	1.742	89.2	0.206	24.8	0.620	–51.7
1400	0.681	–129.2	1.593	81.6	0.204	21.3	0.591	–54.9
1600	0.672	–136.9	1.474	74.1	0.203	19.3	0.577	–58.5
1800	0.663	–144.5	1.337	67.3	0.198	18.3	0.567	–62.2
2000	0.653	–150.6	1.234	61.6	0.193	17.9	0.560	–65.5

V_{CE}=1V, I_C=3mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.908	–23.1	8.754	162.7	0.038	76.1	0.955	–14.7
200	0.849	–46.3	7.966	147.9	0.068	63.6	0.864	–28.1
400	0.745	–81.4	6.727	123.5	0.106	48.5	0.693	–44.0
600	0.673	–104.6	5.005	110.1	0.120	40.6	0.541	–55.0
800	0.625	–122.4	3.985	99.4	0.126	37.2	0.439	–62.2
1000	0.586	–137.2	3.419	90.7	0.136	34.7	0.409	–64.8
1200	0.581	–143.8	2.929	83.9	0.142	34.4	0.377	–67.5
1400	0.573	–149.7	2.561	78.1	0.151	33.5	0.371	–69.0
1600	0.566	–155.6	2.250	72.9	0.152	36.3	0.338	–72.9
1800	0.555	–161.3	2.024	68.1	0.154	38.3	0.322	–76.4
2000	0.546	–167.2	1.856	63.3	0.161	41.9	0.300	–79.5

V_{CE}=1V, I_C=10mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.726	–50.3	20.231	149.3	0.032	65.0	0.847	–30.5
200	0.647	–85.2	15.627	128.7	0.051	54.0	0.653	–50.4
400	0.570	–124.4	9.732	107.4	0.067	46.6	0.411	–71.5
600	0.545	–142.7	6.844	96.7	0.079	47.9	0.302	–81.4
800	0.534	–153.7	5.269	89.1	0.090	50.1	0.249	–87.9
1000	0.527	–160.6	4.282	83.4	0.102	51.6	0.217	–93.1
1200	0.522	–166.5	3.635	78.3	0.115	54.2	0.198	–96.8
1400	0.518	–171.1	3.134	74.0	0.127	56.1	0.186	–100.1
1600	0.514	–174.9	2.769	70.1	0.141	56.3	0.178	–102.5
1800	0.512	–177.9	2.493	66.1	0.154	57.7	0.172	–106.1
2000	0.511	178.9	2.269	62.3	0.168	57.9	0.165	–107.6

V_{CE}=5V, I_C=1mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.967	–13.1	3.456	169.7	0.030	81.1	0.991	–5.8
200	0.952	–25.5	3.377	159.9	0.058	73.7	0.971	–11.4
400	0.902	–49.2	3.116	142.5	0.104	59.9	0.909	–21.1
600	0.840	–70.2	2.696	127.1	0.135	48.5	0.835	–28.9
800	0.787	–87.6	2.359	114.6	0.155	40.4	0.771	–34.7
1000	0.757	–101.1	2.164	103.6	0.164	34.1	0.726	–39.1
1200	0.718	–113.5	1.887	95.0	0.171	29.6	0.685	–43.0
1400	0.696	–122.8	1.742	87.3	0.171	26.1	0.660	–45.8
1600	0.684	–131.2	1.614	79.7	0.169	24.2	0.645	–49.2
1800	0.670	–139.1	1.463	72.9	0.165	23.5	0.634	–52.4
2000	0.658	–145.6	1.350	67.2	0.161	23.5	0.625	–55.4

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.871	–24.8	13.419	161.4	0.025	75.3	0.951	–13.6
200	0.797	–49.1	11.836	146.1	0.044	65.2	0.856	–25.3
400	0.681	–83.3	9.073	123.5	0.068	51.9	0.670	–38.5
600	0.599	–106.6	6.968	109.5	0.079	46.6	0.540	–44.4
800	0.551	–123.1	5.465	100.3	0.086	46.4	0.455	–47.4
1000	0.516	–135.9	4.585	92.5	0.095	46.9	0.419	–49.0
1200	0.505	–143.2	3.943	86.0	0.100	48.4	0.394	–49.9
1400	0.496	–150.0	3.488	80.5	0.111	49.5	0.385	–51.3
1600	0.490	–155.2	3.054	76.1	0.117	51.6	0.363	–52.7
1800	0.481	–159.9	2.741	71.9	0.125	53.6	0.351	–54.3
2000	0.476	–164.8	2.455	67.4	0.132	55.8	0.340	–55.6

V_{CE}=5V, I_C=15mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.699	–45.3	25.810	150.1	0.021	71.4	0.868	–23.7
200	0.602	–79.0	19.948	129.9	0.034	58.2	0.684	–38.1
400	0.506	–117.1	12.414	109.1	0.048	54.0	0.457	–48.4
600	0.469	–136.6	8.786	98.5	0.058	54.9	0.358	–50.1
800	0.455	–148.1	6.747	91.3	0.069	59.3	0.304	–50.5
1000	0.447	–155.8	5.482	85.8	0.081	60.8	0.277	–50.9
1200	0.440	–161.4	4.643	80.9	0.092	63.0	0.262	–51.2
1400	0.437	–166.2	4.009	76.8	0.103	63.9	0.253	–51.9
1600	0.434	–170.0	3.532	73.0	0.115	65.1	0.248	–53.3
1800	0.431	–172.6	3.163	69.5	0.127	65.7	0.242	–54.7
2000	0.432	–176.0	2.871	65.5	0.140	66.9	0.240	–55.1