



EC3H05B

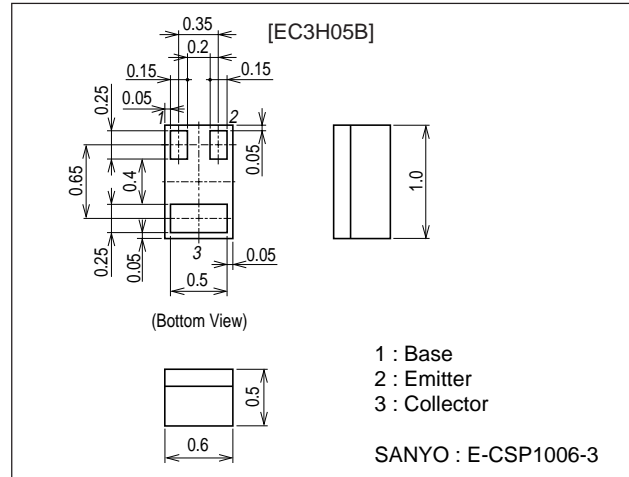
VHF to UHF Wide-Band Low-Noise Amplifier Applications

Features

- Low noise : NF=1.2dB typ (f=1GHz).
- High gain : $|S_{21e}|^2=13\text{dB}$ typ (f=1GHz).
- High cutoff frequency : $f_T=9.0\text{GHz}$ typ.
- Ultraminiature (1006 size) and thin (0.5mm) leadless package.

Package Dimensions

unit : mm
2183



Specifications

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

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CB0}		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	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_{CBO}	$V_{CB}=10\text{V}, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}, I_C=15\text{mA}$	100		180	
Gain Bandwidth Product	f_T	$V_{CE}=5\text{V}, I_C=15\text{mA}$		9.0		GHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.55	1.2	pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=15\text{mA}, f=1\text{GHz}$	10	13		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=5\text{mA}, f=1\text{GHz}$		1.2	2.5	dB

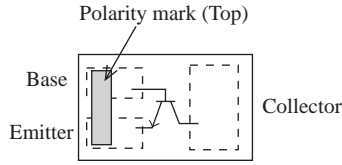
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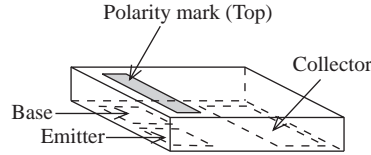
Type No. Indication (Top view)



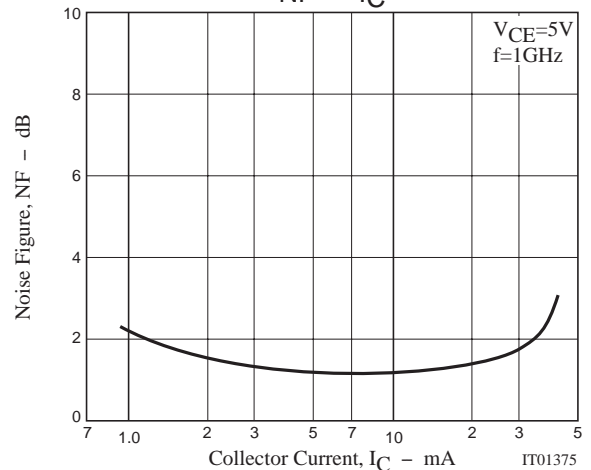
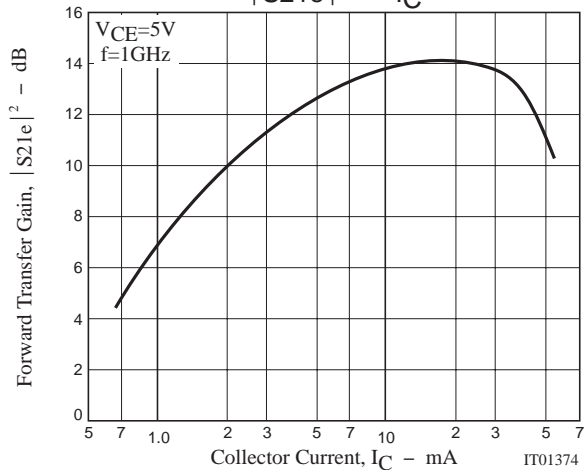
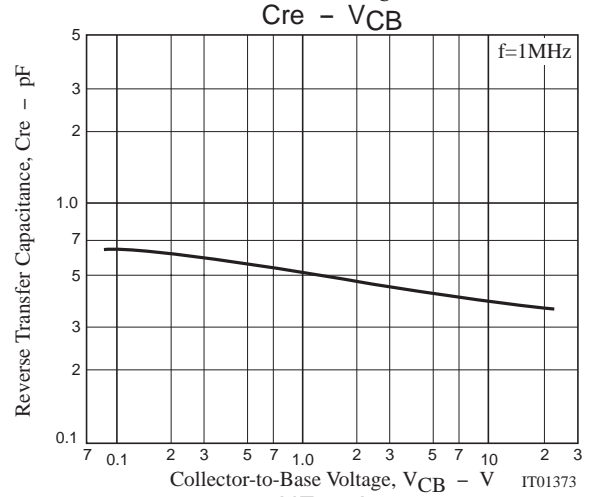
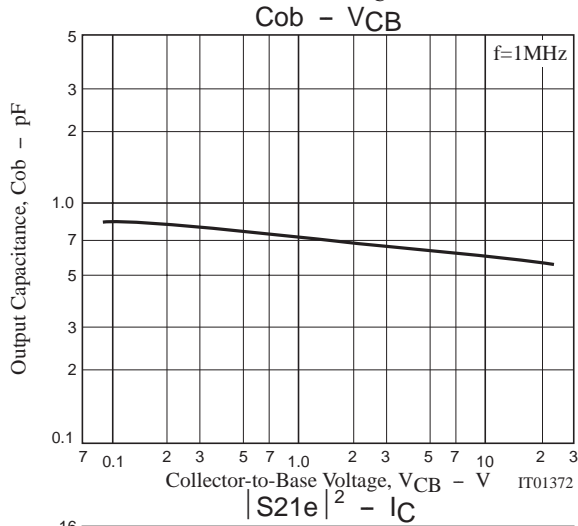
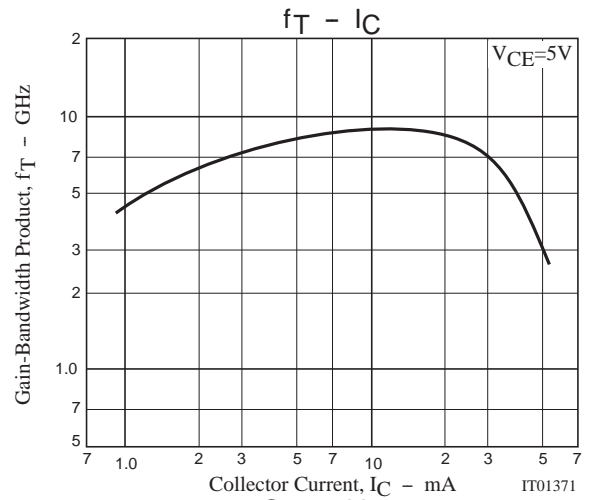
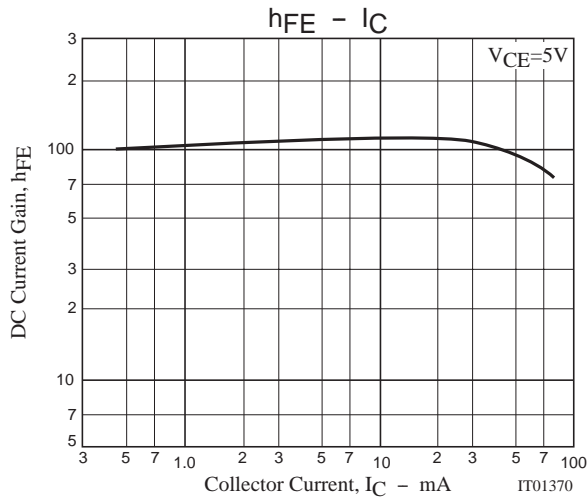
Electrical Connection (Top view)



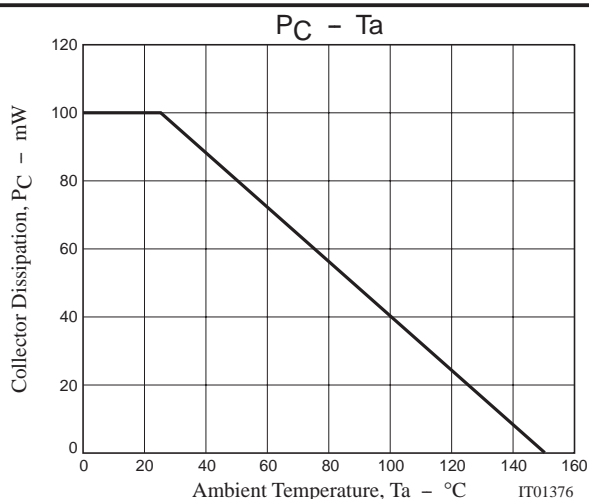
*Electrodes : on the bottom



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



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S Parameters (Common emitter)

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

Freq(MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
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

$V_{CE}=1V, I_C=3mA, Z_O=50\Omega$

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

$V_{CE}=1V, I_C=10mA, Z_O=50\Omega$

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

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V_{CE}=5V, I_C=1mA, Z_O=50Ω

Freq(MHz)	S ₁₁	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠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	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠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	∠S ₁₁	S ₂₁	∠S ₂₁	S ₁₂	∠S ₁₂	S ₂₂	∠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

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