Ordering number:ENN6289

NPN Epitaxial Planar Silicon Transistor

2SC5490

UHF to S Band Low-Noise Amplifier Applications

Features

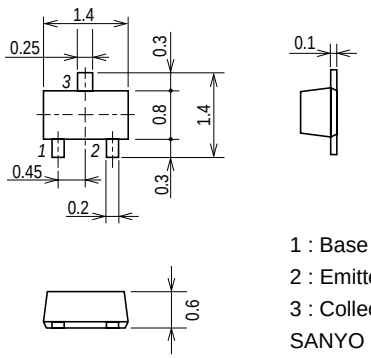
- Low noise : NF=0.9dB typ (f=1GHz).
  : NF=1.4dB typ (f=1.5GHz).
- High gain : $|S21e|^2$=10dB typ (f=1.5GHz).
- High cutoff frequency : f_T=11GHz typ.
- Ultrasmall, slim flat-lead package.
  (1.4mm×0.8mm×0.6mm)
- Low voltage, low current operation.
  (V_{CE}=1V, I_C=1mA)
  : f_T=7GHz typ.
  : $|S21e|^2$=5.5dB typ (f=1.5GHz)

Package Dimensions

unit:mm

2159

[2SC5490]



1 : Base
2 : Emitter
3 : Collector
SANYO : SSFP

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		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=10mA	90		200	
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		0.3		pF

Marking : MN

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

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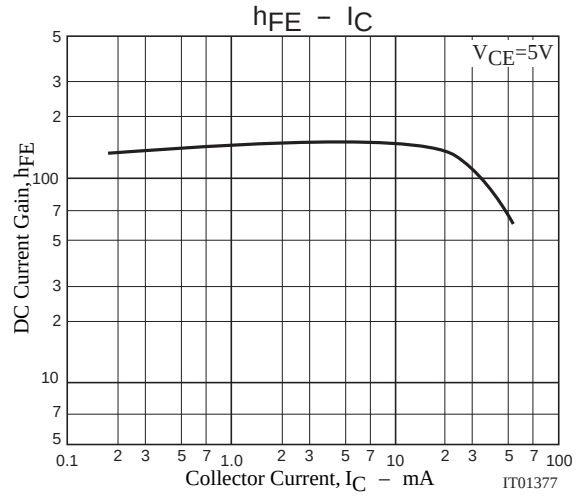
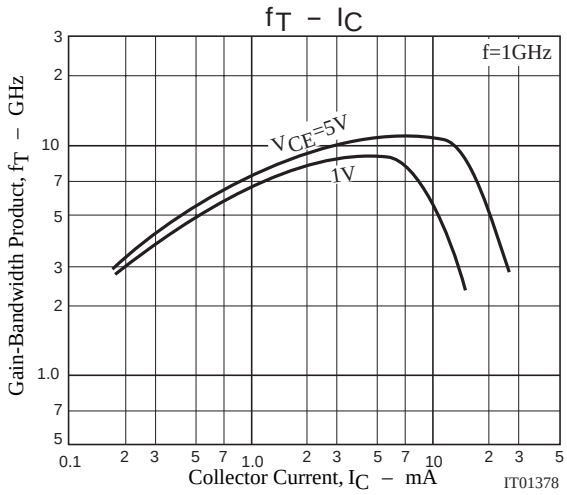
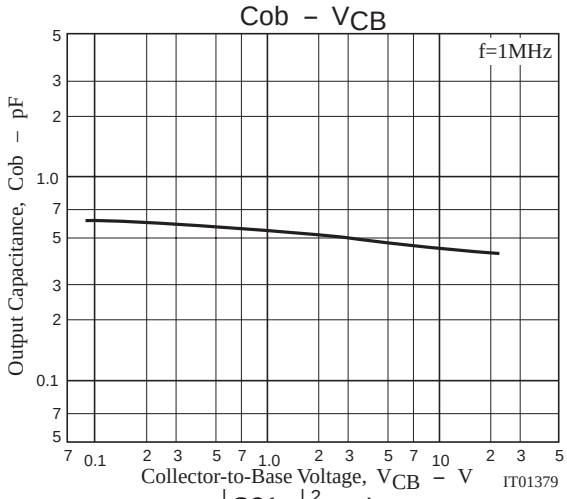
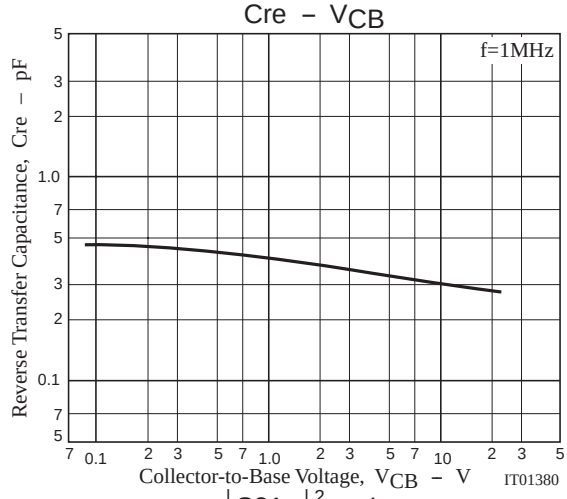
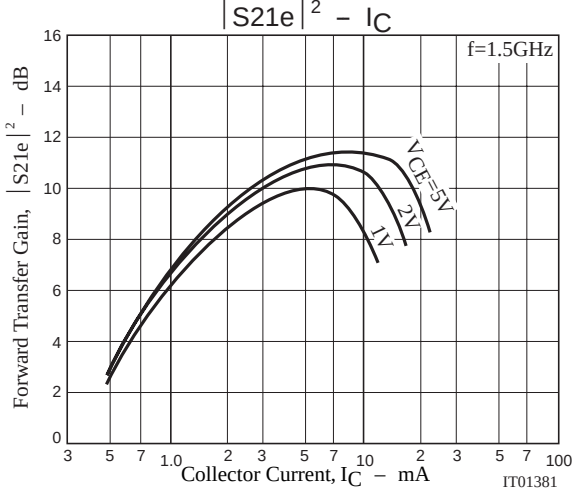
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	| S21e |^2 1	V_{CE}=5V, I_C=10mA, f=1.5GHz	8	10		dB
	| S21e |^2 2	V_{CE}=1V, I_C=1mA, f=1.5GHz		5.5		dB
Noise Figure	NF1	V_{CE}=5V, I_C=5mA, f=1.5GHz		1.4	3.0	dB
	NF2	V_{CE}=2V, I_C=3mA, f=1GHz		0.9		dB

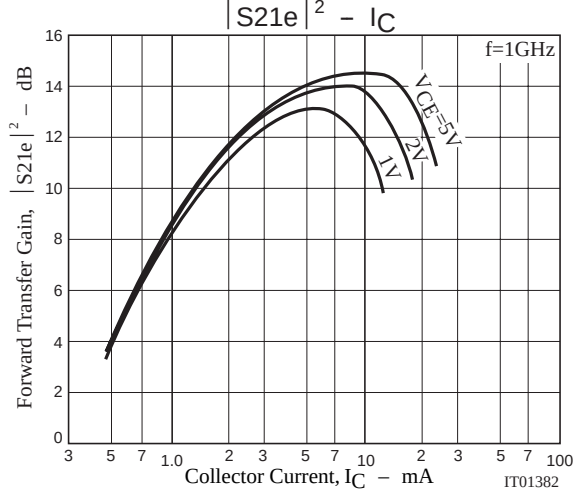


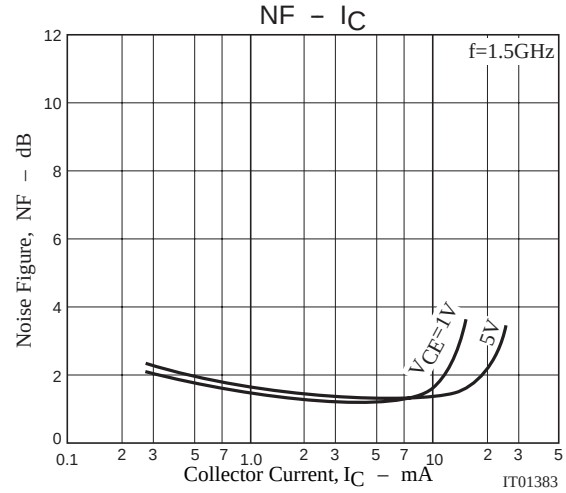


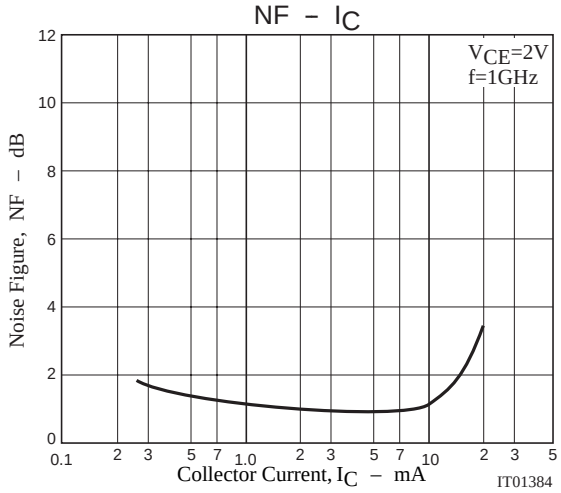


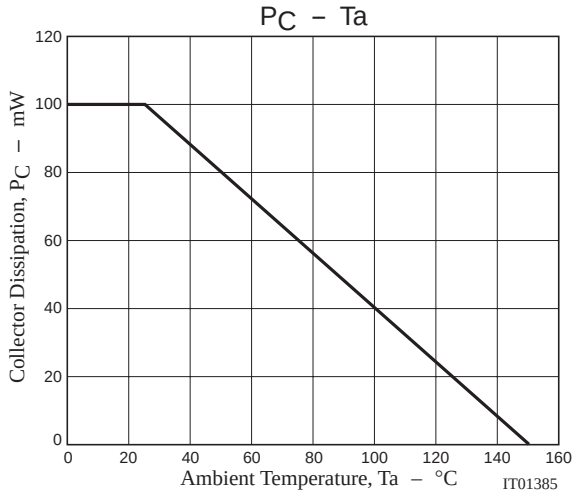












S Parameters (Common emitter)

V_{CE}=5V, I_C=5mA, Z_O=50Ω

Freq (MHz)	$\lvert S_{11} \rvert$	$\angle S_{11}$	$\lvert S_{21} \rvert$	$\angle S_{21}$	$\lvert S_{12} \rvert$	$\angle S_{12}$	$\lvert S_{22} \rvert$	$\angle S_{22}$
200	0.782	–37.1	12.043	148.4	0.038	69.7	0.889	–19.5
400	0.623	–65.4	9.431	126.6	0.057	60.8	0.758	–28.3
600	0.502	–85.6	7.415	112.2	0.072	56.5	0.646	–33.3
800	0.420	–102.4	6.000	101.5	0.083	55.2	0.577	–35.9
1000	0.369	–114.7	5.025	93.6	0.094	55.1	0.538	–37.6
1200	0.339	–127.2	4.323	86.7	0.105	55.6	0.513	–38.7
1400	0.311	–137.2	3.785	80.6	0.115	55.6	0.490	–39.7
1600	0.296	–144.9	3.391	75.3	0.127	56.7	0.480	–41.3
1800	0.285	–156.5	3.018	70.1	0.139	56.4	0.466	–43.5
2000	0.277	–164.2	2.767	65.7	0.150	56.7	0.460	–45.5

V_{CE}=5V, I_C=10mA, Z_O=50Ω

Freq (MHz)	$\lvert S_{11} \rvert$	$\angle S_{11}$	$\lvert S_{21} \rvert$	$\angle S_{21}$	$\lvert S_{12} \rvert$	$\angle S_{12}$	$\lvert S_{22} \rvert$	$\angle S_{22}$
200	0.641	–52.7	16.527	137.8	0.031	67.4	0.820	–22.9
400	0.468	–85.4	11.299	115.7	0.048	60.5	0.643	–30.2
600	0.377	–106.6	8.303	103.1	0.060	60.0	0.549	–32.2
800	0.321	–124.1	6.502	94.0	0.072	60.9	0.499	–33.2
1000	0.293	–136.1	5.342	87.4	0.084	61.9	0.477	–33.9
1200	0.280	–146.7	4.546	81.4	0.097	62.7	0.462	–35.0
1400	0.266	–156.6	3.947	76.4	0.108	63.0	0.449	–36.2
1600	0.263	–163.2	3.527	71.4	0.123	63.7	0.444	–37.8
1800	0.263	–173.5	3.121	67.0	0.136	62.8	0.435	–39.9
2000	0.264	–179.8	2.864	62.8	0.150	62.4	0.434	–42.4

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	0.851	–30.4	8.644	154.1	0.042	73.0	0.937	–16.4
400	0.724	–55.7	7.310	133.8	0.073	61.3	0.820	–27.9
600	0.612	–76.1	6.083	118.6	0.093	54.2	0.709	–35.7
800	0.521	–93.0	5.085	106.9	0.107	50.4	0.628	–40.4
1000	0.461	–106.1	4.343	98.1	0.118	48.3	0.572	–43.7
1200	0.423	–118.6	3.806	90.0	0.128	47.5	0.536	–45.8
1400	0.382	–129.4	3.349	83.3	0.137	46.9	0.506	–47.3
1600	0.366	–138.0	3.036	77.5	0.147	47.4	0.485	–49.5
1800	0.341	–148.8	2.685	71.7	0.157	47.2	0.462	–51.9
2000	0.333	–157.7	2.479	66.7	0.167	47.6	0.453	–54.1

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	–18.7	3.431	162.9	0.053	78.1	0.982	–10.3
400	0.892	–36.9	3.263	147.1	0.099	66.9	0.939	–19.7
600	0.826	–52.9	3.004	133.2	0.136	57.5	0.879	–27.7
800	0.754	–67.9	2.765	120.4	0.164	49.7	0.815	–34.8
1000	0.691	–81.1	2.539	109.9	0.184	43.4	0.758	–40.0
1200	0.639	–94.3	2.366	99.8	0.199	38.4	0.727	–44.3
1400	0.589	–104.9	2.143	91.2	0.207	34.1	0.683	–47.8
1600	0.558	–114.1	1.969	83.6	0.213	31.7	0.653	–51.4
1800	0.522	–124.4	1.797	76.2	0.218	28.7	0.621	–54.9
2000	0.490	–134.9	1.701	69.7	0.219	27.0	0.601	–58.1