2SC5629

Silicon NPN Epitaxial
High Frequency Amplifier / Oscillator

HITACHI

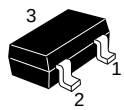
ADE-208-980 (Z)
1st. Edition
Nov. 2000

Features

- Super compact package;
  $(1.6 \times 0.8 \times 0.7\text{mm})$
- High power gain and low noise figure;
  (PG = 9 dB typ., NF = 1.1 dB typ., at f = 900MHz, V_{CE} = 1 V)

Outline

SMPAK



1. Emitter
2. Base
3. Collector

Note: Marking is “XZ-”.

Hitachi semiconductor

Absolute Maximum Ratings (Ta = 25°C)

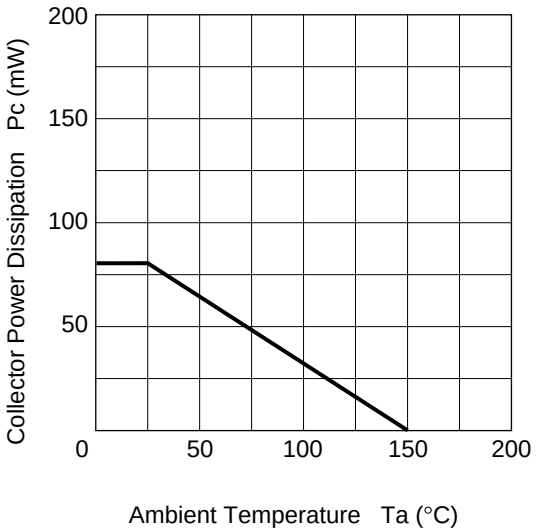
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	6	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	Pc	80	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

Electrical Characteristics (Ta = 25°C)

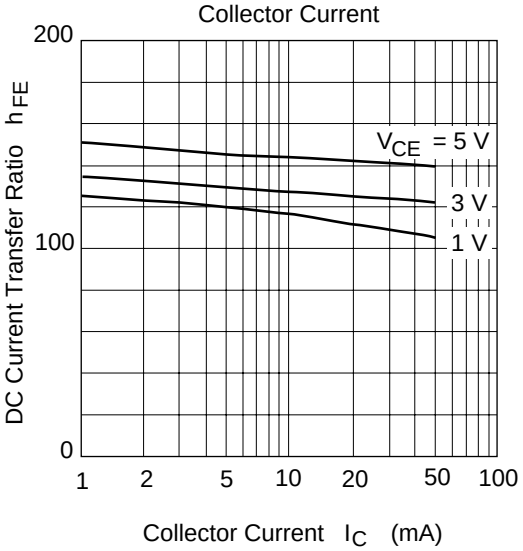
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10µA , I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	µA	V_{CB} = 12V , I_E = 0
Collector cutoff current	I_{CEO}	—	—	1	mA	V_{CE} = 6V , R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	V_{EB} = 1.5V , I_C = 0
DC current transfer ratio	h_{FE}	80	120	160	V	V_{CE} = 1V , I_C = 5mA
Collector output capacitance	Cob	—	1.4	1.9	pF	V_{CB} = 1V , I_E = 0 f = 1MHz
Gain bandwidth product	f_T	2	5	—	GHz	V_{CE} = 1V , I_C = 5mA
Power gain	PG	6	9	—	dB	V_{CE} = 1V, I_C = 5mA f = 900MHz
Noise figure	NF	—	1.1	1.9	dB	V_{CE} = 1V, I_C = 5mA f = 900MHz

Main Characteristics

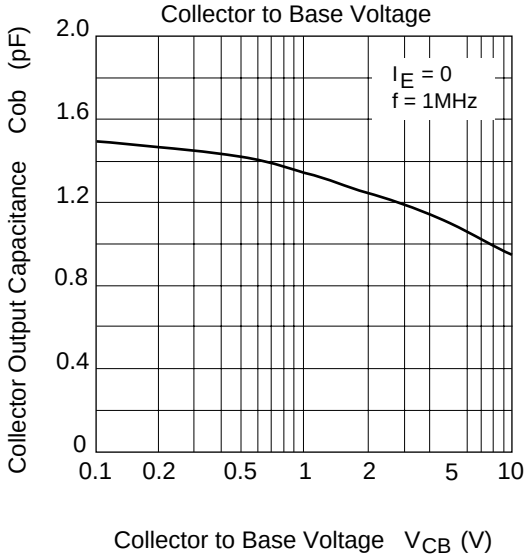
Maximum Collector Dissipation Curve



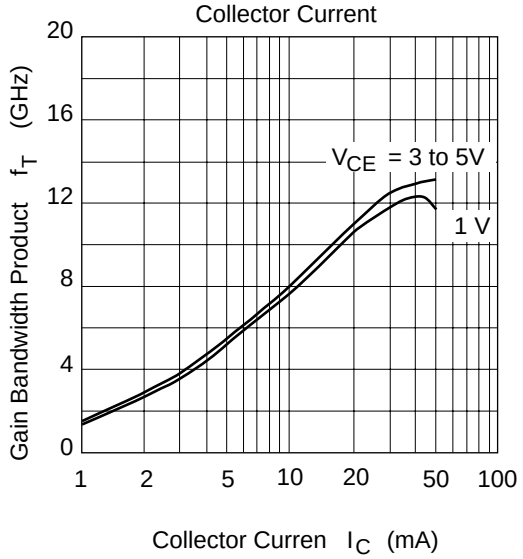
DC Current Transfer Ratio vs. Collector Current



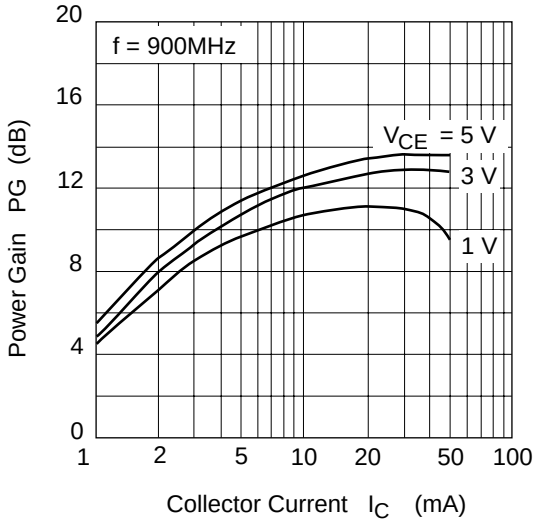
Collector Output Capacitance vs. Collector to Base Voltage



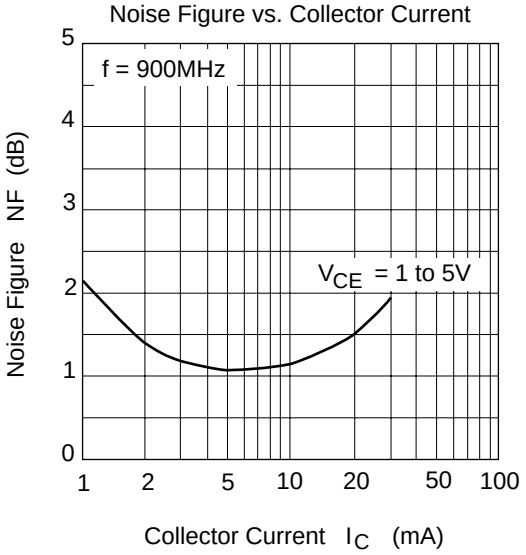
Gain Bandwidth Product vs. Collector Current



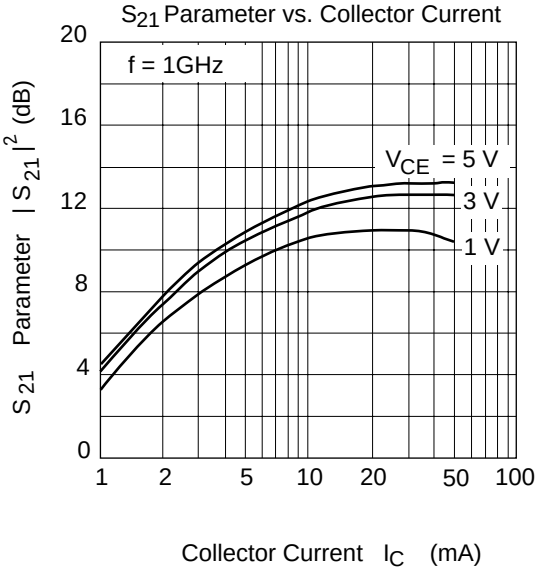
Power Gain vs. Collector Current



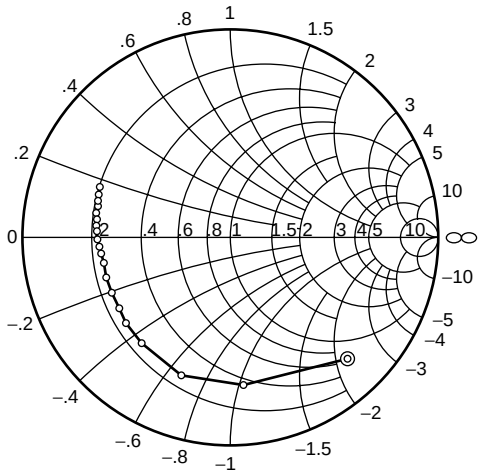
Noise Figure vs. Collector Current



S_{21} Parameter vs. Collector Current



S11 Parameter vs. Frequency

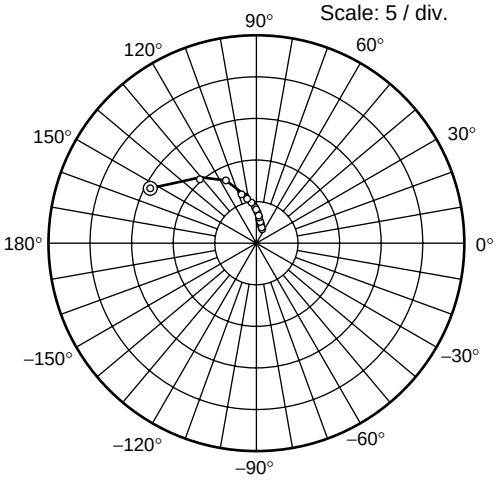


Condition : V_{CE} = 1 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

S21 Parameter vs. Frequency

Scale: 5 / div.

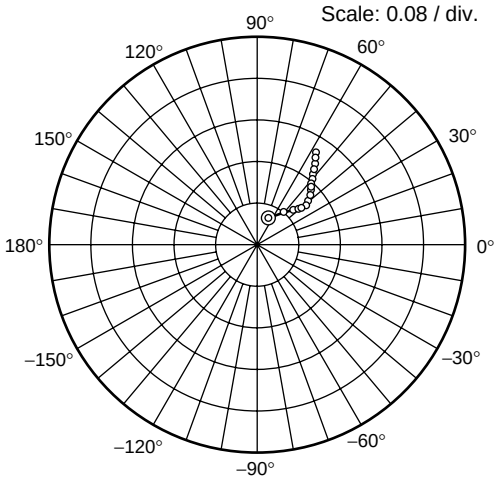


Condition : V_{CE} = 1 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

S12 Parameter vs. Frequency

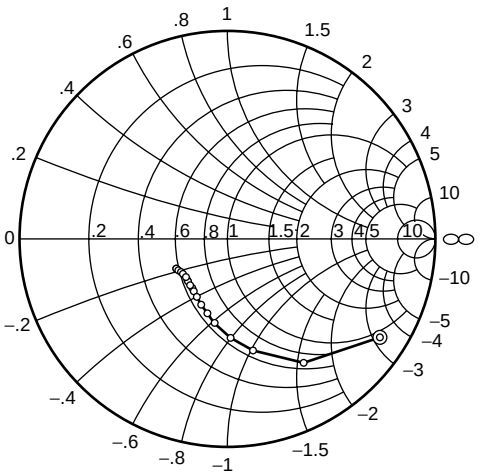
Scale: 0.08 / div.



Condition : V_{CE} = 1 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

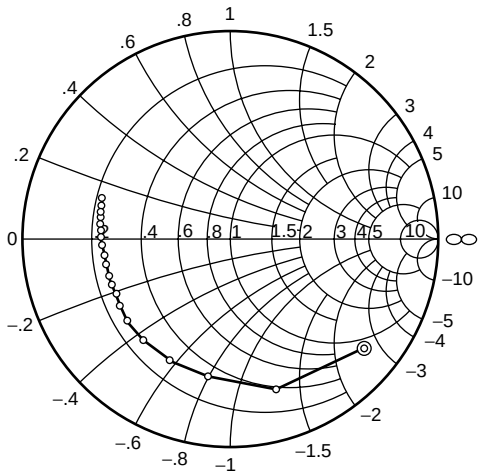
S22 Parameter vs. Frequency



Condition : V_{CE} = 1 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

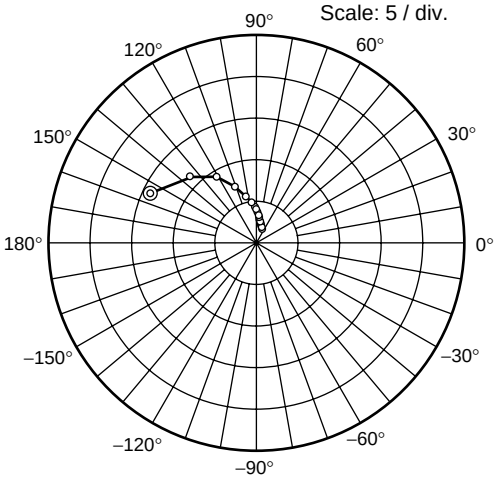
S11 Parameter vs. Frequency



Condition : V_{CE} = 3 V , I_C = 5 mA

100 to 2000 MHz(100 MHz step)

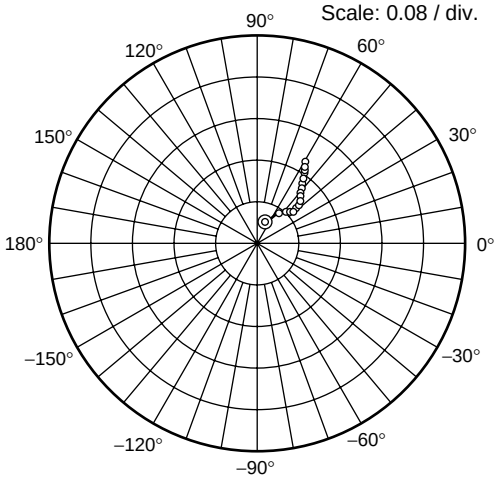
S21 Parameter vs. Frequency



Condition : V_{CE} = 3 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

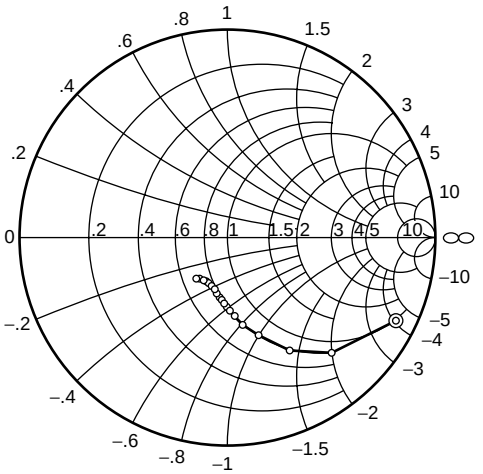
S12 Parameter vs. Frequency



Condition : V_{CE} = 3 V , I_C = 5 mA

100 to 2000 MHz (100 MHz step)

S22 Parameter vs. Frequency



Condition : V_{CE} = 3 V , I_C = 5 mA

100 to 2000 MHz(100 MHz step)

Sparameter (V_{CE} = 1V, I_C = 5mA, Zo = 50Ω)

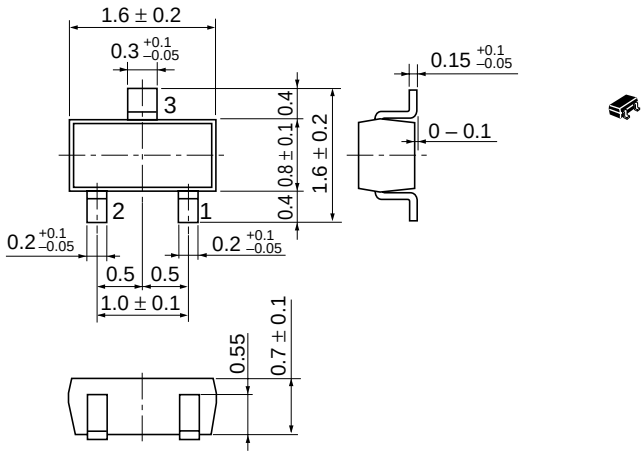
	S11		S21		S12		S22	
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.734	–21.4	13.62	163.7	0.0220	78.7	0.956	–13.4
200	0.676	–41.9	12.34	148.7	0.0421	69.3	0.865	–25.5
300	0.598	–59.8	10.79	136.0	0.0572	61.9	0.753	–34.7
400	0.530	–75.6	9.38	126.5	0.0678	57.2	0.652	–41.0
500	0.471	–88.8	8.18	118.9	0.0756	55.0	0.568	–45.4
600	0.429	–100.8	7.19	112.9	0.0821	53.9	0.498	–48.3
700	0.395	–110.8	6.40	107.8	0.0881	53.4	0.442	–50.2
800	0.370	–120.6	5.74	103.5	0.0940	53.4	0.395	–51.7
900	0.349	–130.0	5.20	100.1	0.0990	54.0	0.355	–52.3
1000	0.336	–136.4	4.74	96.9	0.104	54.6	0.323	–52.7
1100	0.332	–144.1	4.39	93.9	0.109	55.5	0.294	–52.9
1200	0.327	–151.6	4.05	91.4	0.115	56.4	0.270	–52.8
1300	0.322	–157.0	3.77	89.1	0.120	57.4	0.250	–52.2
1400	0.325	–162.9	3.54	86.9	0.125	58.0	0.230	–52.6
1500	0.322	–168.0	3.32	84.9	0.130	58.8	0.215	–52.0
1600	0.331	–172.6	3.14	82.7	0.138	59.8	0.200	–51.5
1700	0.338	–177.0	2.97	80.9	0.143	60.3	0.185	–51.5
1800	0.337	179.0	2.84	79.4	0.149	61.5	0.171	–51.2
1900	0.341	175.4	2.71	77.9	0.154	61.7	0.158	–51.1
2000	0.358	170.8	2.59	76.0	0.161	62.4	0.147	–50.9

Sparameter (V_{CE} = 3V, I_C = 5 mA, Zo =50Ω)

	S11		S21		S12		S22	
f(MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.826	–39.3	14.04	155.5	0.0412	69.9	0.906	–25.8
200	0.746	–74.6	11.47	134.9	0.0700	54.9	0.738	–47.3
300	0.685	–100.5	9.14	121.1	0.0864	46.7	0.591	–61.9
400	0.646	–117.4	7.41	111.9	0.0950	43.0	0.490	–71.9
500	0.627	–130.7	6.19	104.8	0.101	41.3	0.419	–79.9
600	0.617	–141.0	5.27	99.6	0.107	41.3	0.369	–85.7
700	0.606	–149.0	4.61	95.0	0.111	41.6	0.333	–90.7
800	0.598	–155.4	4.09	91.6	0.115	42.5	0.307	–95.3
900	0.605	–161.3	3.67	87.7	0.120	44.3	0.287	–99.0
1000	0.604	–166.1	3.35	84.7	0.124	45.6	0.273	–102.6
1100	0.604	–170.6	3.06	81.8	0.129	46.8	0.262	–106.0
1200	0.607	–174.2	2.83	79.5	0.134	49.0	0.253	–108.8
1300	0.605	–178.2	2.62	77.1	0.139	50.4	0.249	–111.0
1400	0.608	178.9	2.47	74.9	0.145	51.9	0.245	–114.3
1500	0.618	175.5	2.32	72.7	0.152	53.4	0.242	–116.6
1600	0.622	172.4	2.19	70.7	0.157	54.8	0.241	–118.9
1700	0.627	170.0	2.08	68.9	0.164	56.2	0.241	–121.3
1800	0.629	166.9	1.99	66.7	0.171	57.6	0.242	–123.4
1900	0.633	164.3	1.90	65.2	0.177	58.7	0.243	–125.9
2000	0.641	162.3	1.82	63.4	0.186	59.5	0.245	–127.7

Package Dimensions

As of January, 2001
Unit: mm



Hitachi Code	SMPAK
JEDEC	—
EIAJ	Conforms
Mass (reference value)	0.003 g

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Colophon 2.0