

2SC5629

Silicon NPN Epitaxial
High Frequency Amplifier / Oscillator

HITACHI

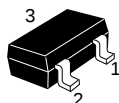
ADE-208-980 (Z)
1st. Edition
Nov. 2000

Features

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

Outline

SMPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "XZ-".

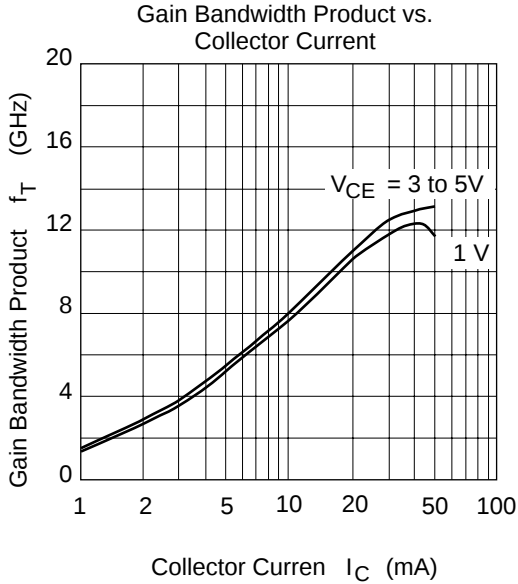
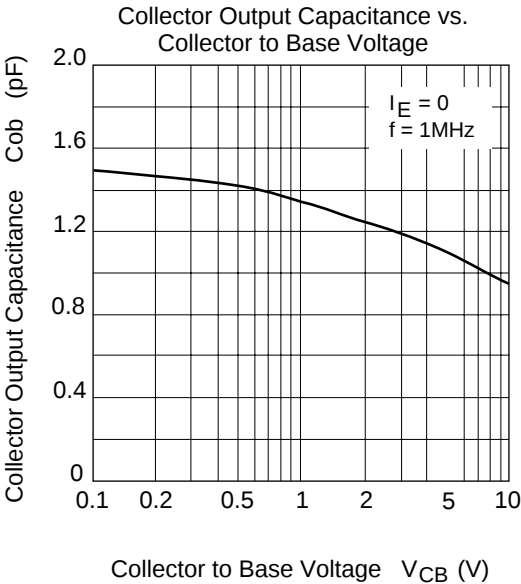
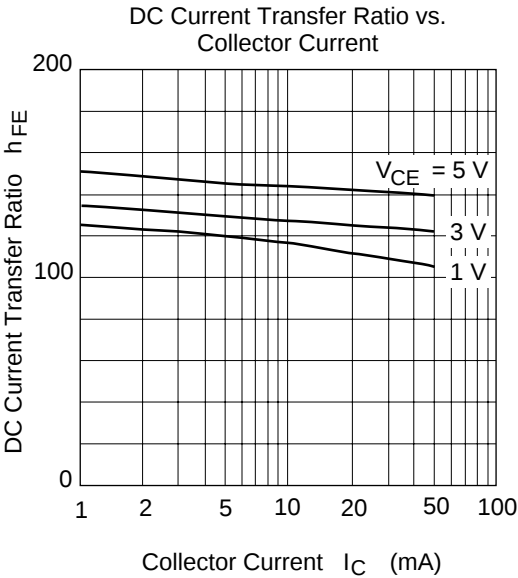
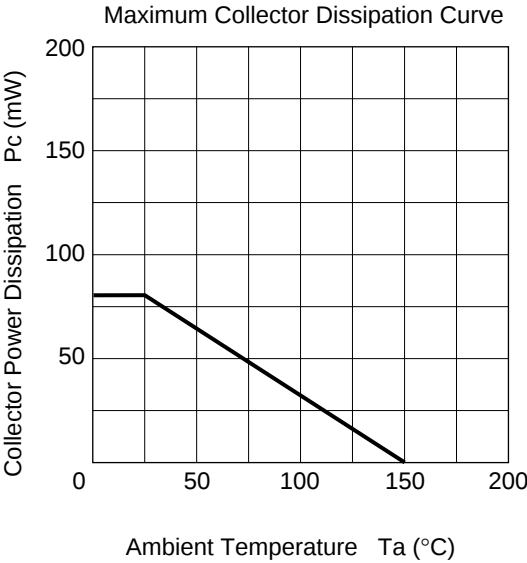
Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

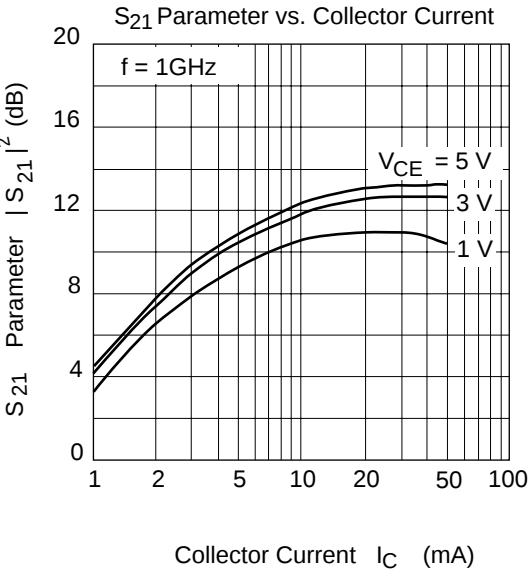
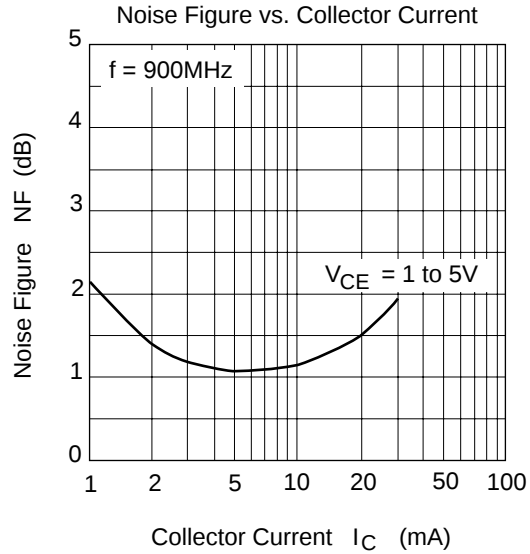
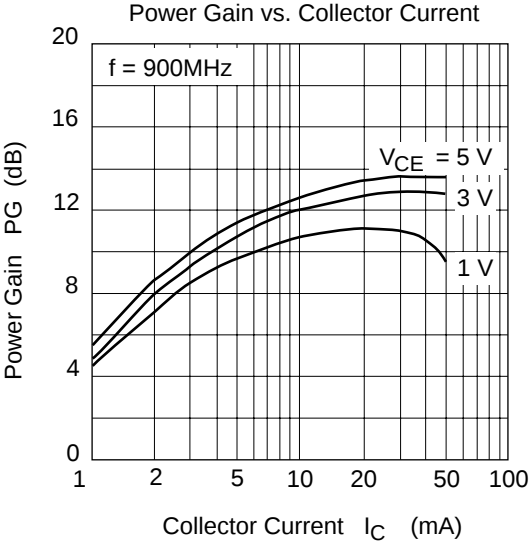
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	6	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_{C}	50	mA
Collector power dissipation	P_{c}	80	mW
Junction temperature	T_{j}	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

Electrical Characteristics ($T_a = 25^\circ\text{C}$)

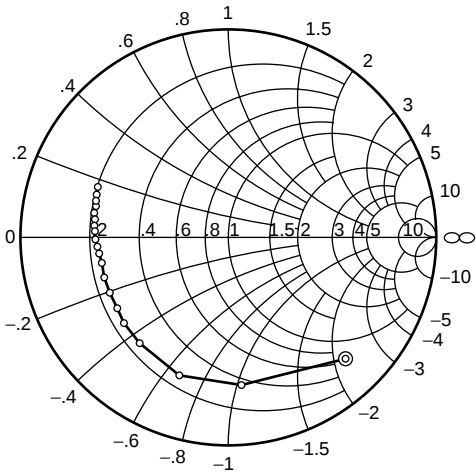
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(\text{BR})\text{CBO}}$	15	—	—	V	$I_{\text{C}} = 10\mu\text{A}$, $I_{\text{E}} = 0$
Collector cutoff current	I_{CBO}	—	—	1	μA	$V_{\text{CB}} = 12\text{V}$, $I_{\text{E}} = 0$
Collector cutoff current	I_{CEO}	—	—	1	mA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

Main Characteristics





S11 Parameter vs. Frequency

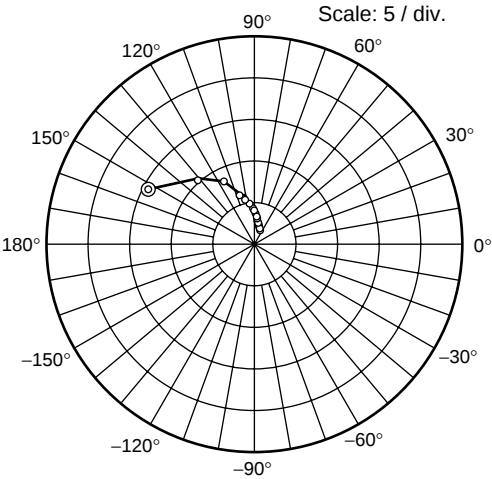


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S21 Parameter vs. Frequency

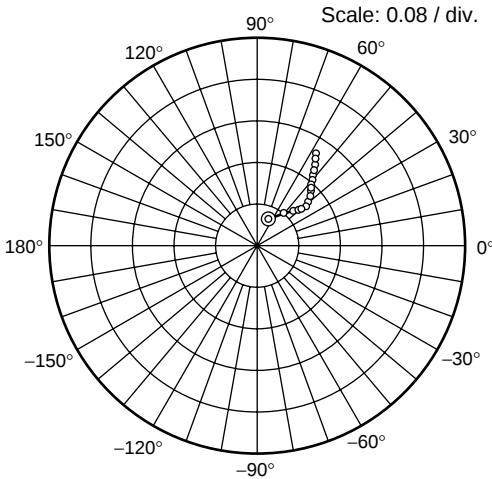


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S12 Parameter vs. Frequency

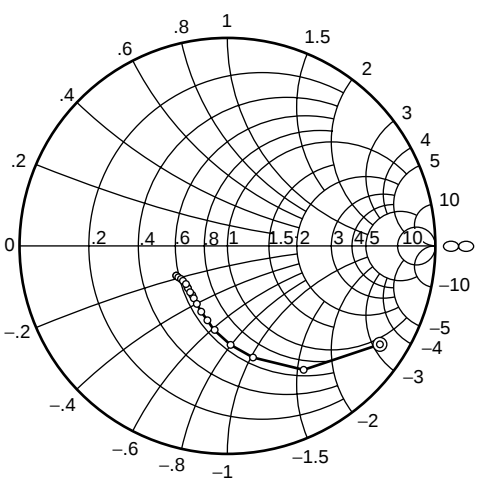


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S22 Parameter vs. Frequency

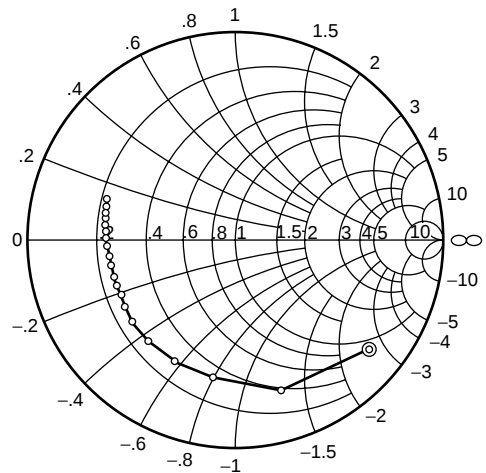


Condition : $V_{CE} = 1\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)



S11 Parameter vs. Frequency

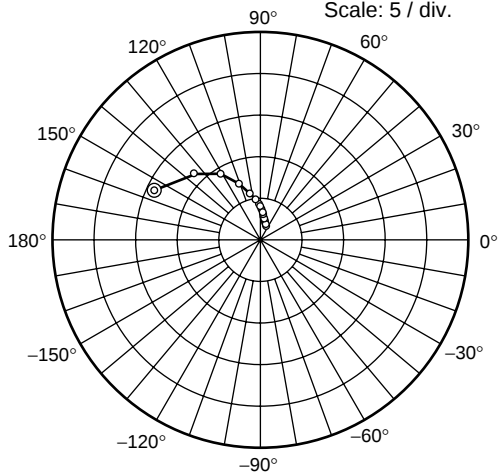


Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz(100 MHz step)

⊙—○

S21 Parameter vs. Frequency

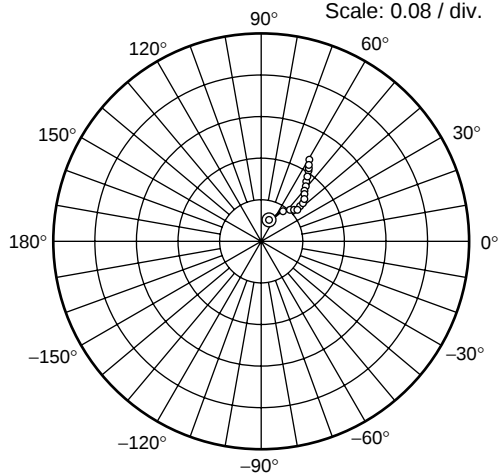


Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S12 Parameter vs. Frequency

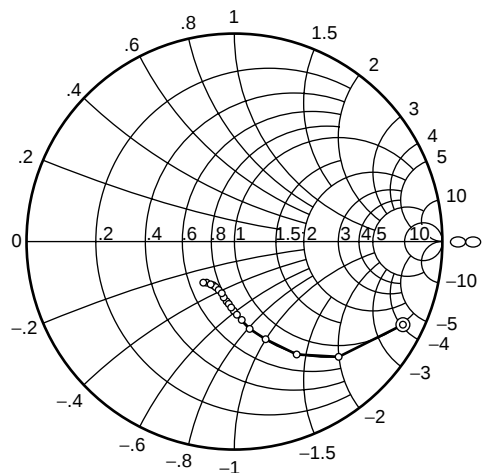


Condition : $V_{CE} = 3\text{ V}$, $I_C = 5\text{ mA}$

100 to 2000 MHz (100 MHz step)

⊙—○

S22 Parameter vs. Frequency



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

100 to 2000 MHz(100 MHz step)

⊙—○

Sparameter ($V_{CE} = 1V$, $I_C = 5mA$, $Z_o = 50\Omega$)

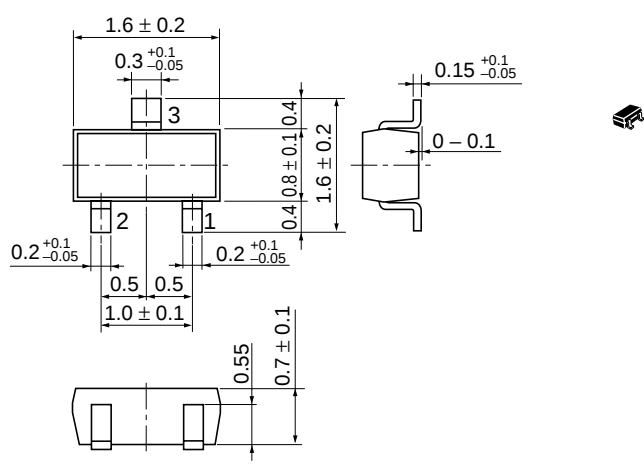
f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.734	-21.4	13.62	163.7	0.0220	78.7	0.956	-13.4
200	0.676	-41.9	12.34	148.7	0.0421	69.3	0.865	-25.5
300	0.598	-59.8	10.79	136.0	0.0572	61.9	0.753	-34.7
400	0.530	-75.6	9.38	126.5	0.0678	57.2	0.652	-41.0
500	0.471	-88.8	8.18	118.9	0.0756	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)

f(MHz)	S11		S21		S12		S22	
	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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