2SC5628

Silicon NPN Epitaxial
High Frequency Amplifier / Oscillator

HITACHI

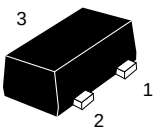
ADE-208-979A (Z)
2nd. Edition
April 2001

Features

- Super compact package;
  (1.4 × 0.8 × 0.59mm)
- High power gain and low noise figure;
  (PG = 9 dB, NF = 1.1 dB typ, at f = 900 Mhz, V_{CE} = 1 V)

Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is “XZ-”.

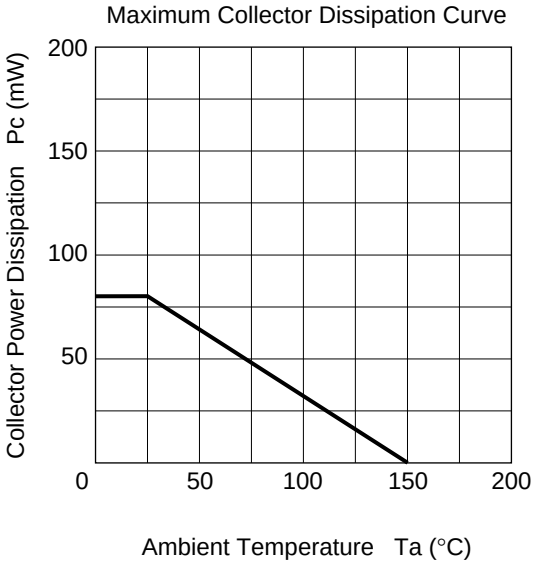
Absolute Maximum Ratings (Ta = 25°C)

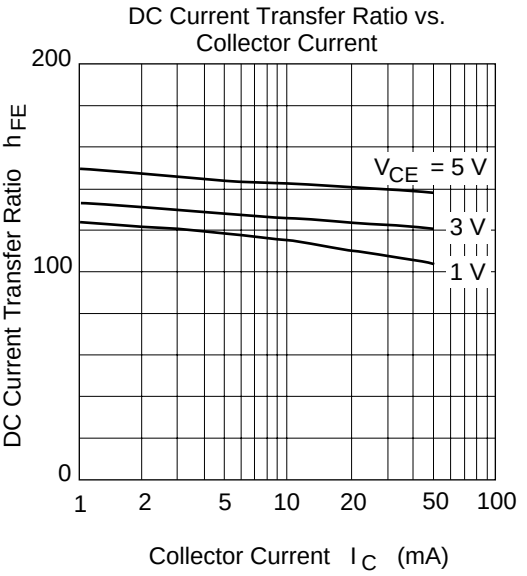
Item	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	15	V
Collector to emitter voltage	V_{CEO}	8	V
Emitter to base voltage	V_{EBO}	1.5	V
Collector current	I_C	50	mA
Collector power dissipation	Pc	80	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

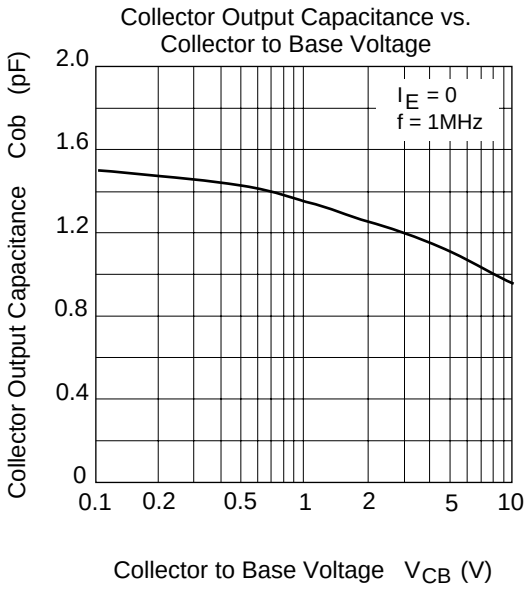
Electrical Characteristics (Ta = 25°C)

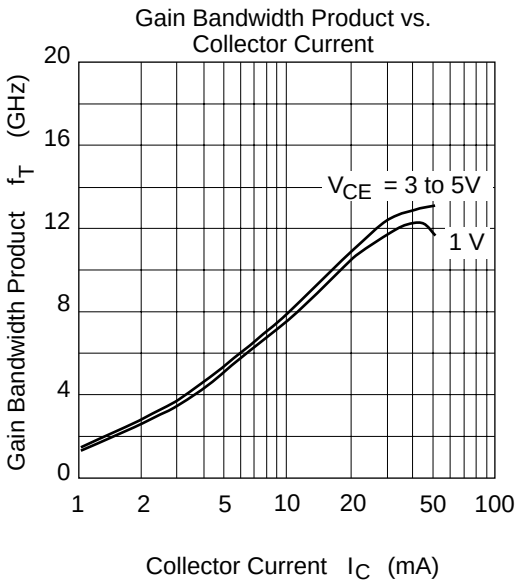
Item	Symbol	Min	Typ	Max	Unit	Test Conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	I_C = 10μA , I_E = 0
Collector cutoff current	I_{CBO}	—	—	1	μA	V_{CB} = 12V , I_E = 0
Collector cutoff current	I_{CEO}	—	—	1	mA	V_{CE} = 8V , R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	μA	V_{EB} = 1.5V , I_C = 0
DC current transfer ratio	h_{FE}	50	100	160	V	V_{CE} = 1V , I_C = 5mA
Collector output capacitance	Cob	—	0.55	0.85	pF	V_{CB} = 1V , I_E = 0 f = 1MHz
Gain bandwidth product	f_T	6	9	—	GHz	V_{CE} = 1V , I_C = 5mA
Power gain	PG	11	14	—	dB	V_{CE} = 1V, I_C = 5mA f = 900MHz
Noise figure	NF	—	1.1	2.0	dB	V_{CE} = 1V, I_C = 5mA f = 900MHz

Main Characteristics

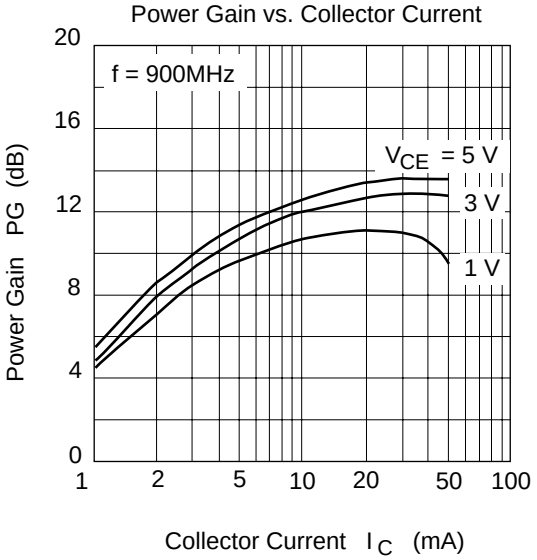




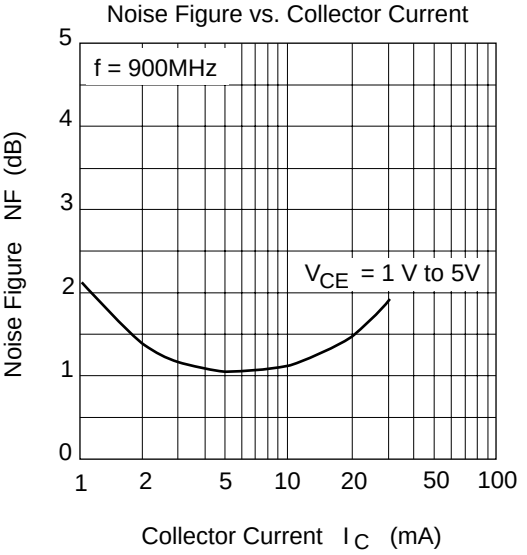




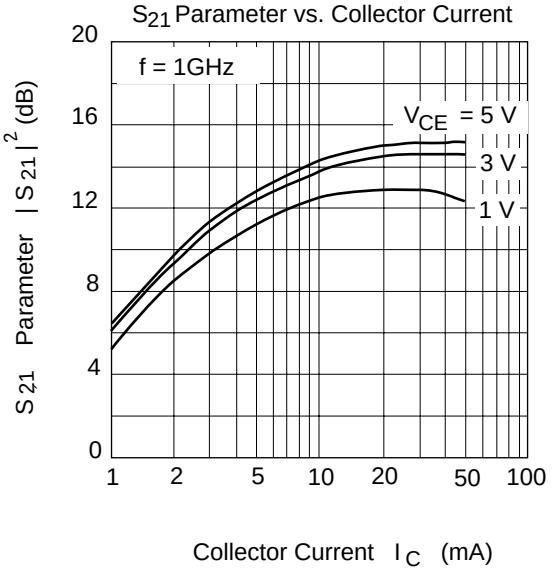
Power Gain vs. Collector Current



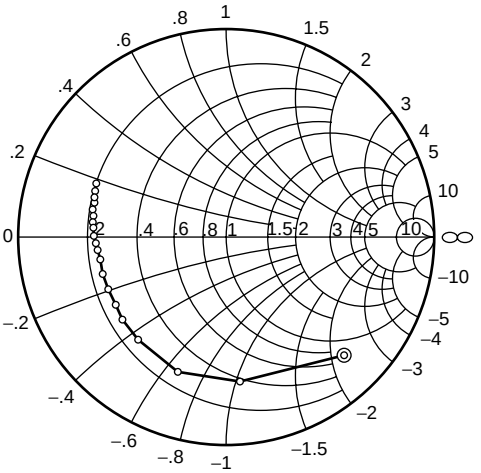
Noise Figure vs. Collector Current



S_{21} Parameter vs. Collector Current



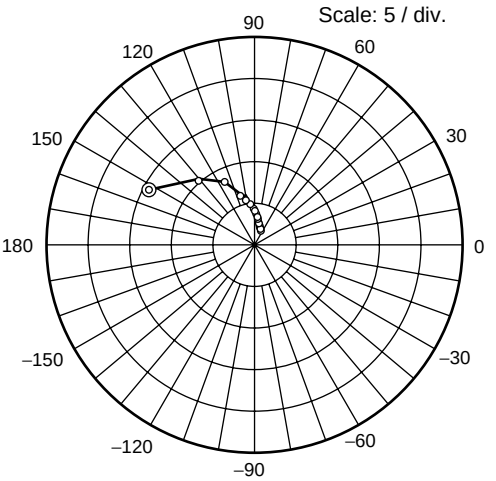
S11 Parameter vs. Frequency



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

100 to 2000 MHz (100 MHz step)

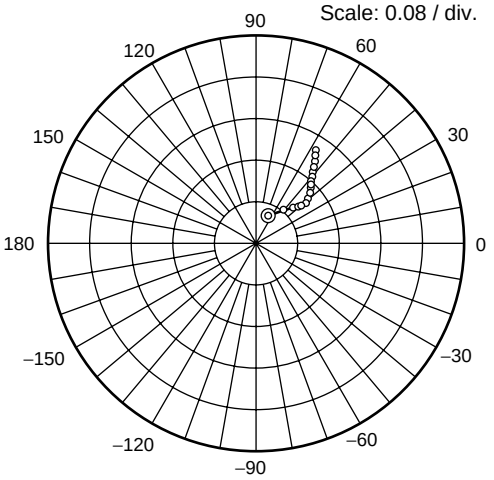
S21 Parameter vs. Frequency



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

100 to 2000 MHz (100 MHz step)

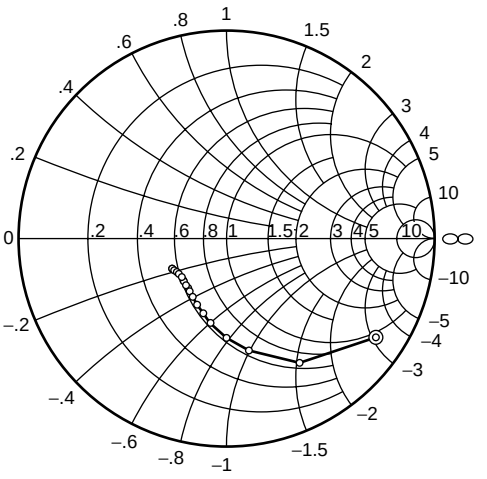
S12 Parameter vs. Frequency



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

100 to 2000 MHz (100 MHz step)

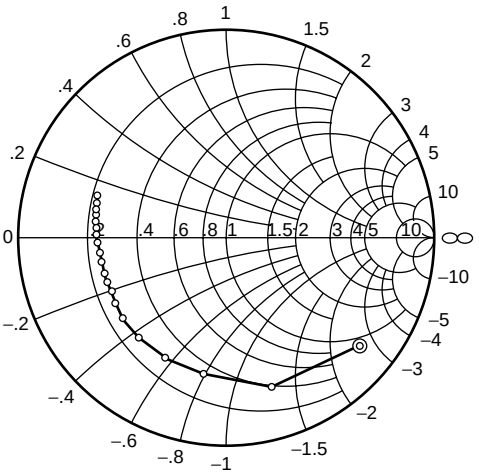
S22 Parameter vs. Frequency



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

100 to 2000 MHz (100 MHz step)

S11 Parameter vs. Frequency

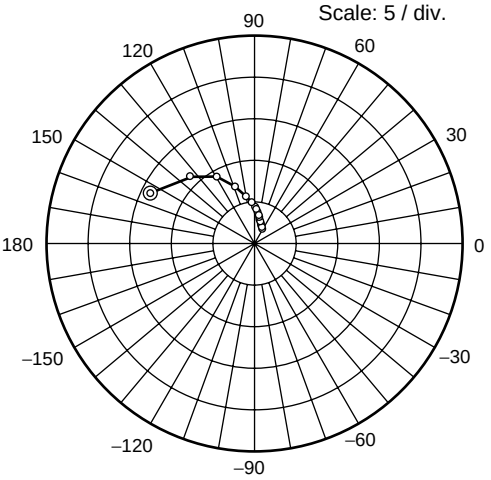


Condition : V_{CE} = 3 V , I_C = 5mA

100 to 2000 MHz (100 MHz step)

S21 Parameter vs. Frequency

Scale: 5 / div.

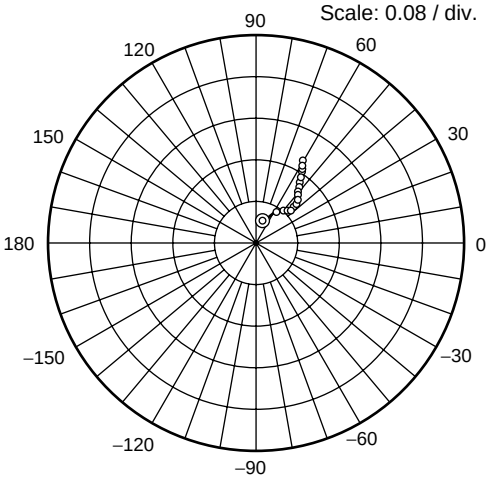


Condition : V_{CE} = 3 V , I_C = 5mA

100 to 2000 MHz (100 MHz step)

S12 Parameter vs. Frequency

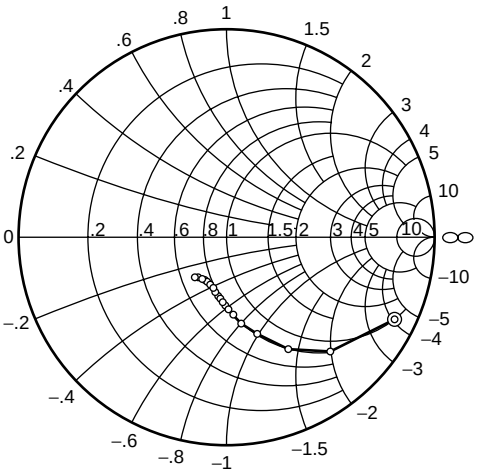
Scale: 0.08 / div.



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

100 to 2000 MHz (100 MHz step)

S22 Parameter vs. Frequency



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

100 to 2000 MHz (100 MHz step)

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

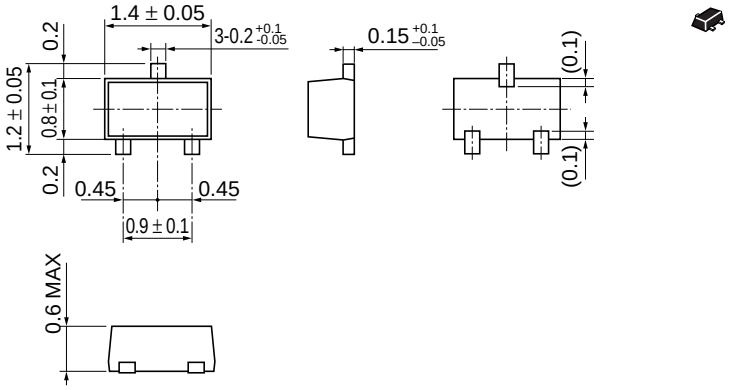
	S11		S21		S12		S22	
f (MHz)	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.815	–46.1	13.63	152.2	0.0509	67.0	0.882	–32.5
200	0.734	–84.6	10.68	130.6	0.0834	51.0	0.695	–58.5
300	0.692	–111.2	8.23	116.8	0.0998	42.9	0.550	–76.0
400	0.665	–127.4	6.58	107.9	0.108	39.5	0.459	–88.5
500	0.650	–139.6	5.44	101.4	0.114	38.0	0.399	–98.1
600	0.644	–148.8	4.61	96.3	0.120	38.3	0.360	–105.7
700	0.640	–155.6	4.03	92.2	0.124	39.0	0.333	–112.2
800	0.641	–161.6	3.56	88.6	0.128	39.9	0.315	–117.8
900	0.638	–166.9	3.20	85.3	0.134	41.8	0.301	–122.4
1000	0.638	–171.6	2.90	82.2	0.138	43.5	0.292	–126.7
1100	0.643	–175.1	2.66	79.6	0.143	44.4	0.286	–130.2
1200	0.643	–178.5	2.46	77.2	0.149	46.2	0.280	–133.6
1300	0.648	178.5	2.28	74.9	0.154	47.8	0.279	–135.6
1400	0.651	175.4	2.15	72.8	0.161	49.1	0.278	–138.6
1500	0.658	173.2	2.03	70.5	0.168	50.9	0.277	–140.9
1600	0.663	170.0	1.92	68.5	0.174	51.8	0.279	–143.3
1700	0.667	167.2	1.82	66.7	0.182	53.2	0.281	–145.0
1800	0.669	165.0	1.74	64.4	0.189	54.6	0.282	–147.1
1900	0.673	163.1	1.67	63.2	0.196	55.5	0.286	–149.3
2000	0.682	161.0	1.60	61.4	0.204	56.4	0.289	–150.6

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

	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

Unit: mm



Hitachi Code	MFPAK
JEDEC	—
EIAJ	—
Mass (reference value)	0.0016 g

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