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# 2SC4926

Silicon NPN Epitaxial

# HITACHI

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## Application

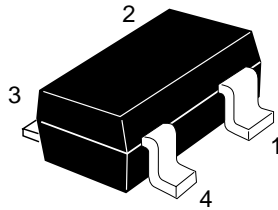
VHF / UHF wide band amplifier

## Features

- High gain bandwidth product  
 $f_T = 11 \text{ GHz Typ}$
- High gain, low noise figure  
 $PG = 16.5 \text{ dB Typ}$ ,  $NF = 1.1 \text{ dB Typ}$  at  $f = 900 \text{ MHz}$

## Outline

MPAK-4



- 1. Collector
- 2. Emitter
- 3. Base
- 4. Emitter

**Absolute Maximum Ratings** (Ta = 25°C)

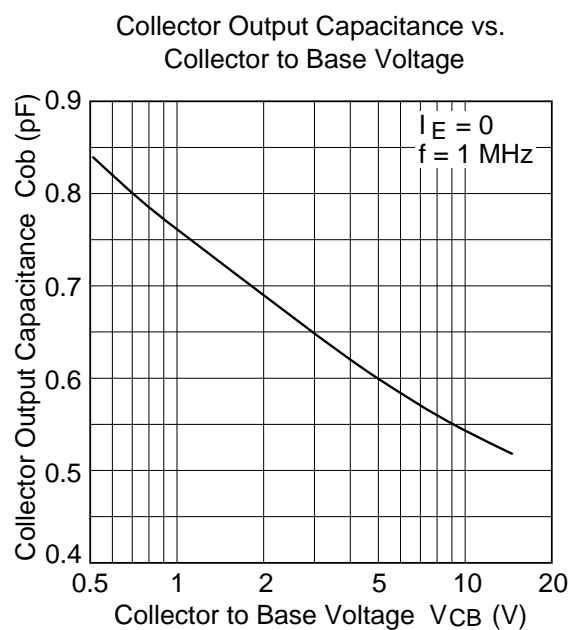
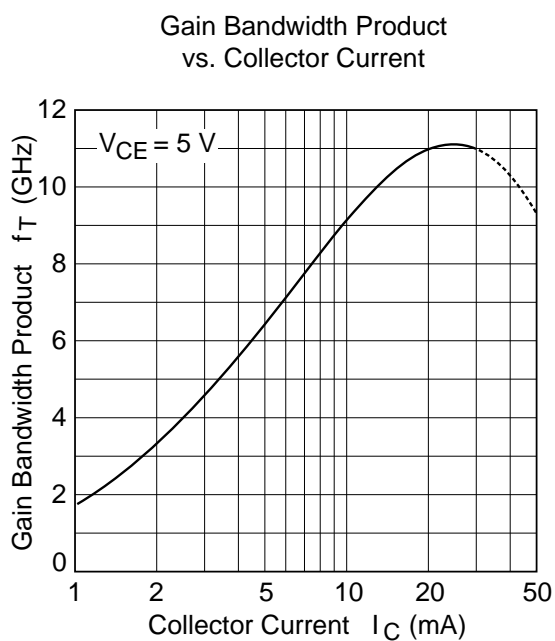
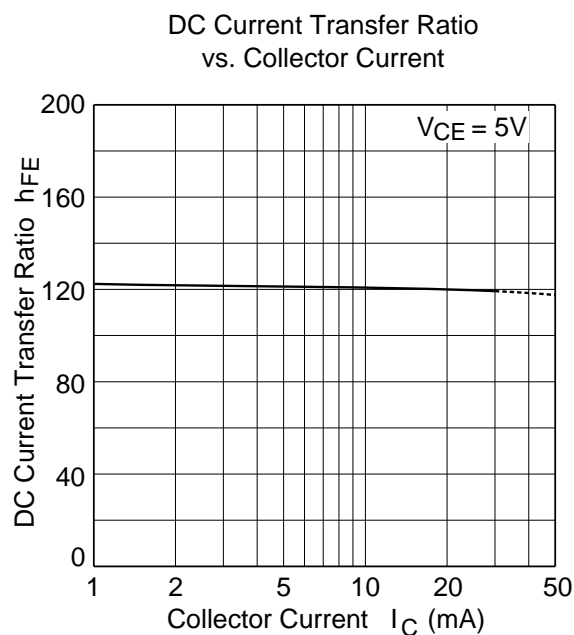
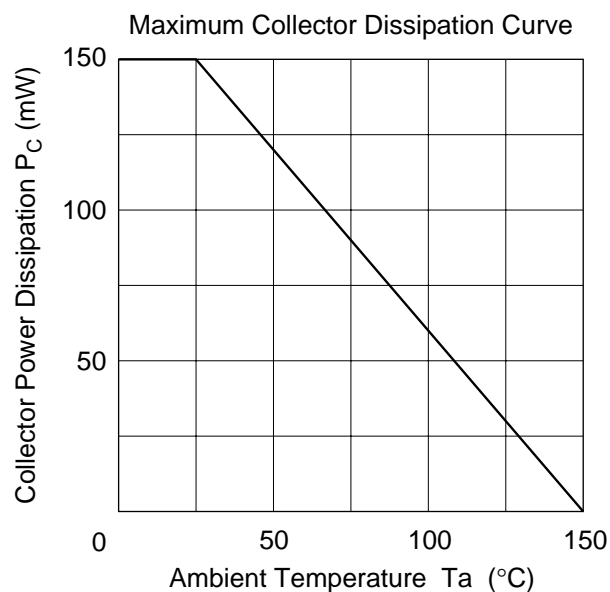
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	8	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	50	mA
Collector power dissipation	$P_C$	150	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	–55 to +150	°C

**Electrical Characteristics** (Ta = 25°C)

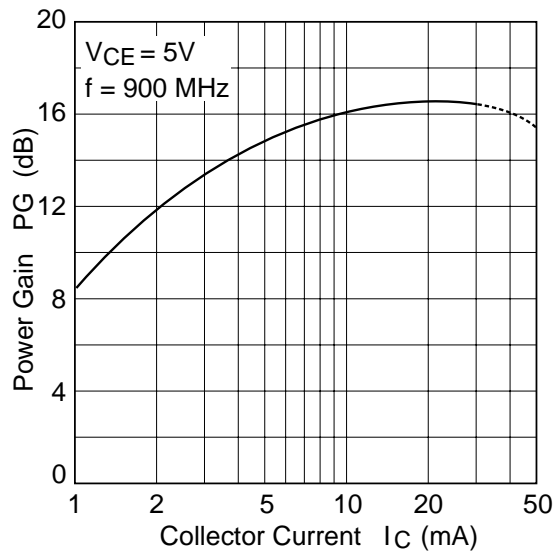
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A$ , $I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	10	$\mu A$	$V_{CB} = 12 V$ , $I_E = 0$
	$I_{CEO}$	—	—	1	mA	$V_{CE} = 8 V$ , $R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 1.5 V$ , $I_C = 0$
DC current transfer ratio	$h_{FE}$	50	120	250		$V_{CE} = 5 V$ , $I_C = 20 mA$
Collector output capacitance	Cob	—	0.6	1.1	pF	$V_{CB} = 5 V$ , $I_E = 0$ , $f = 1 MHz$
Gain bandwidth product	$f_T$	8.0	11.0	—	GHz	$V_{CE} = 5 V$ , $I_C = 20 mA$
S <sub>21</sub> Parameter	$ S_{21} $	—	16	—	dB	$V_{CE} = 5 V$ , $I_C = 20 mA$ , $f = 1000 MHz$
Power gain	PG	13.5	16.5	—	dB	$V_{CE} = 5 V$ , $I_C = 20 mA$ , $f = 900 MHz$
Noise figure	NF	—	1.1	2.0	dB	$V_{CE} = 5 V$ , $I_C = 5 mA$ , $f = 900 MHz$

Note: Marking is “YD–”.

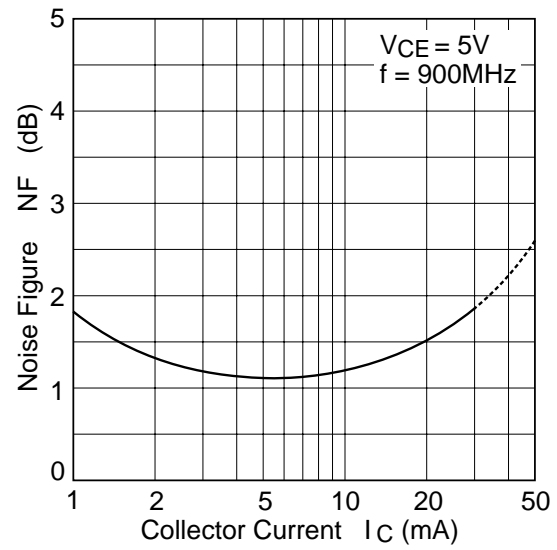
Attention: This is electrostatic sensitive device.



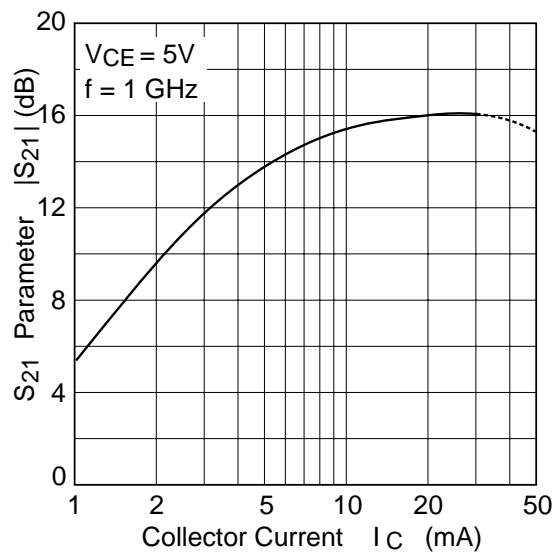
Power Gain vs. Collector Current



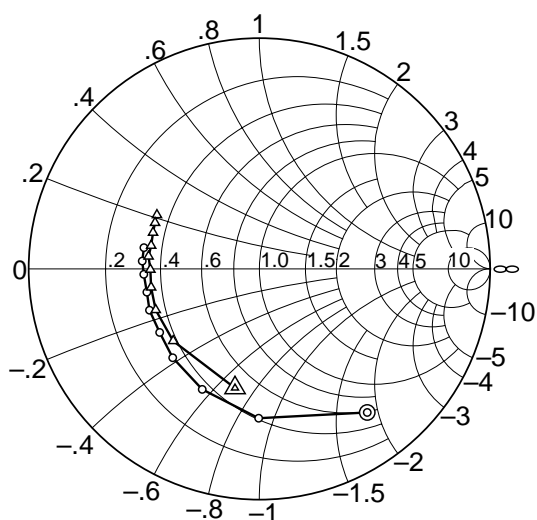
Noise Figure vs. Collector Current



S21 Parameter vs. Collector Current



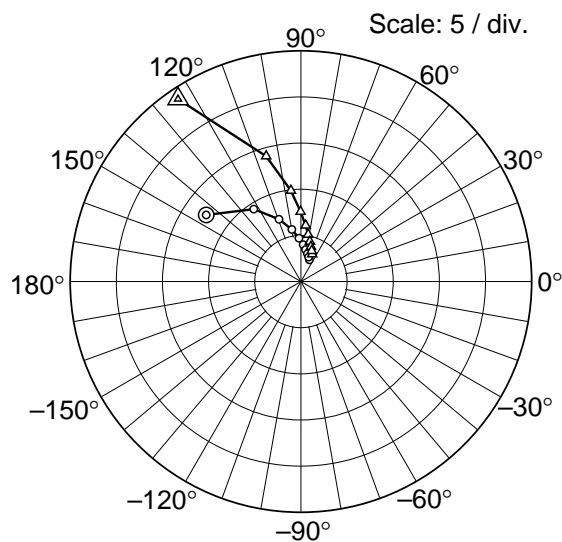
S11 Parameter vs. Frequency



Condition:  $V_{CE} = 5 \text{ V}$ ,  $Z_o = 50 \Omega$   
200 to 2000 MHz (200 MHz step)

○ — ○ ( $I_C = 5 \text{ mA}$ )  
△ — △ ( $I_C = 20 \text{ mA}$ )

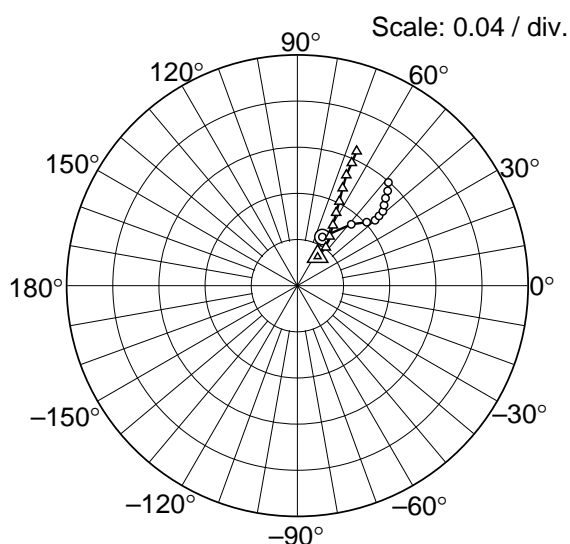
S21 Parameter vs. Frequency



Condition:  $V_{CE} = 5 \text{ V}$ ,  $Z_o = 50 \Omega$   
200 to 2000 MHz (200 MHz step)

○ — ○ ( $I_C = 5 \text{ mA}$ )  
△ — △ ( $I_C = 20 \text{ mA}$ )

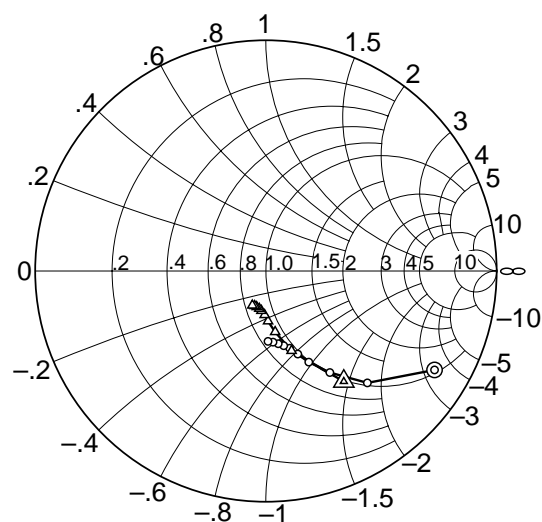
S12 Parameter vs. Frequency



Condition:  $V_{CE} = 5 \text{ V}$ ,  $Z_o = 50 \Omega$   
200 to 2000 MHz (200 MHz step)

○ — ○ ( $I_C = 5 \text{ mA}$ )  
△ — △ ( $I_C = 20 \text{ mA}$ )

S22 Parameter vs. Frequency



Condition:  $V_{CE} = 5 \text{ V}$ ,  $Z_o = 50 \Omega$   
200 to 2000 MHz (200 MHz step)

○ — ○ ( $I_C = 5 \text{ mA}$ )  
△ — △ ( $I_C = 20 \text{ mA}$ )

## 2SC4926

**S Parameter** ( $V_{CE} = 5\text{ V}$ ,  $I_C = 5\text{ mA}$ ,  $Z_O = 50\ \Omega$ , Emitter common)

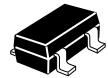
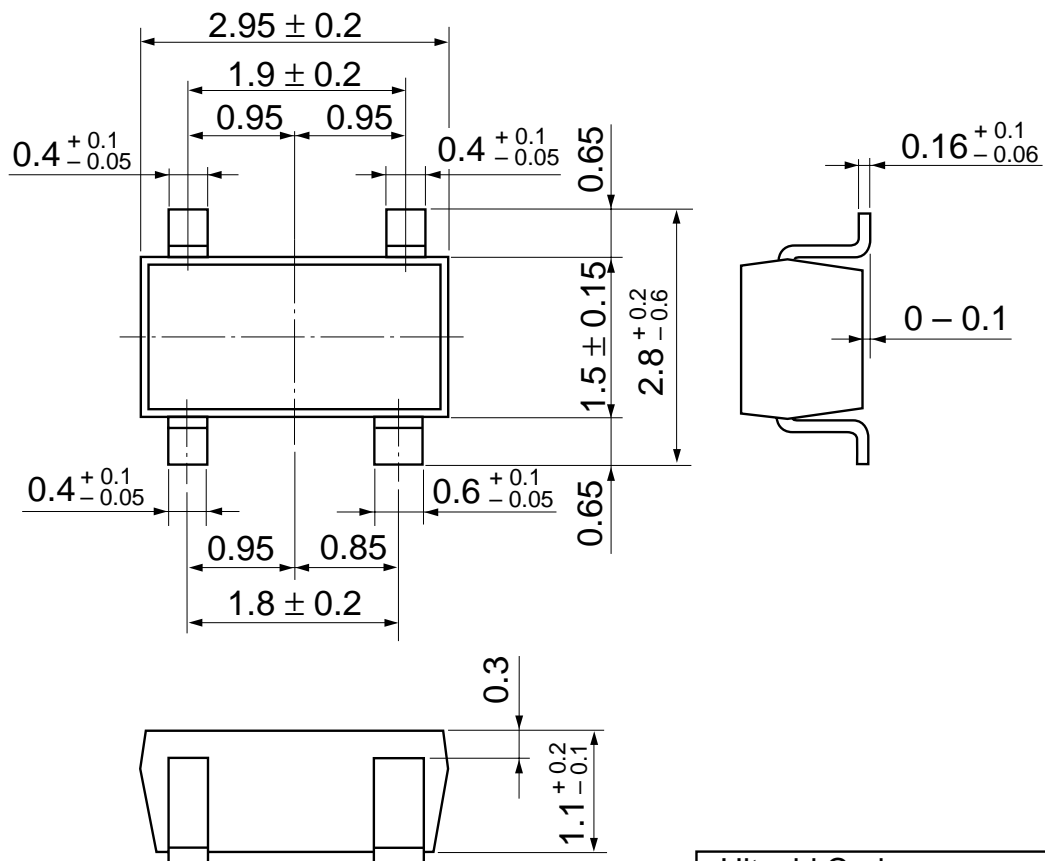
Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.777	-53.1	12.52	144.9	0.0475	62.8	0.849	-30.4
400	0.647	-90.3	9.36	123.1	0.0708	48.7	0.655	-47.8
600	0.579	-115.4	7.16	109.4	0.0817	42.5	0.522	-57.8
800	0.538	-134.3	5.73	99.9	0.0880	40.1	0.438	-64.8
1000	0.513	-147.5	4.70	92.6	0.0933	40.5	0.386	-69.0
1200	0.508	-159.4	4.00	86.5	0.0980	41.0	0.350	-72.9
1400	0.500	-168.3	3.49	81.6	0.102	42.9	0.333	-76.6
1600	0.501	-177.3	3.09	76.8	0.108	44.8	0.319	-80.4
1800	0.508	176.2	2.78	72.5	0.113	46.4	0.310	-84.3
2000	0.510	169.6	2.53	68.7	0.119	48.6	0.305	-88.3

**S Parameter** ( $V_{CE} = 5\text{ V}$ ,  $I_C = 20\text{ mA}$ ,  $Z_O = 50\ \Omega$ , Emitter common)

Freq. (MHz)	S11		S21		S12		S22	
	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.	MAG.	ANG.
200	0.527	-101.6	23.79	124.0	0.0307	55.1	0.587	-54.9
400	0.488	-140.1	14.12	105.5	0.0413	53.4	0.363	-72.2
600	0.482	-158.4	9.89	96.3	0.0510	56.8	0.267	-81.4
800	0.478	-170.3	7.56	90.3	0.0606	59.5	0.218	-87.6
1000	0.474	-179.6	6.10	85.2	0.0716	62.0	0.191	-91.7
1200	0.484	173.6	5.14	81.2	0.0817	63.5	0.174	-96.5
1400	0.481	167.9	4.44	77.4	0.0931	65.1	0.166	-100.0
1600	0.486	161.2	3.92	74.0	0.105	66.1	0.161	-104.4
1800	0.496	156.2	3.52	70.7	0.117	66.1	0.159	-107.9
2000	0.502	152.3	3.20	67.7	0.127	66.2	0.161	-111.9

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Unit: mm



Hitachi Code	MPAK-4
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.013 g

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