

# 2SC5849

Silicon NPN Epitaxial  
VHF/UHF wide band amplifier

## HITACHI

ADE-208-1469 (Z)

Rev. 0  
Nov. 2001

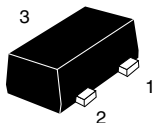
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### Features

- Super compact package: MFPAK (1.4 x 0.8 x 0.59 mm)

### Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WY-".

## Absolute Maximum Ratings

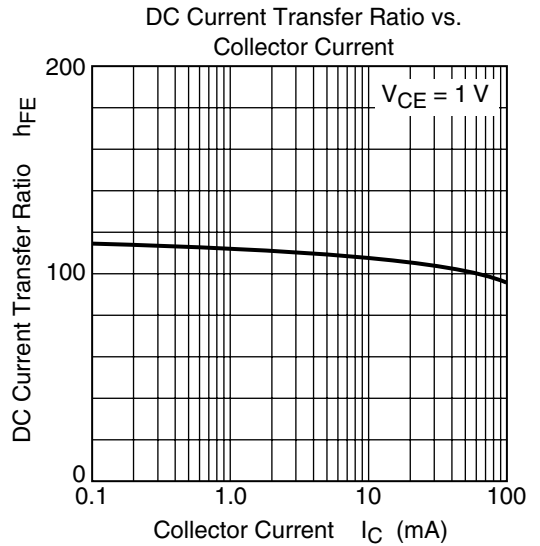
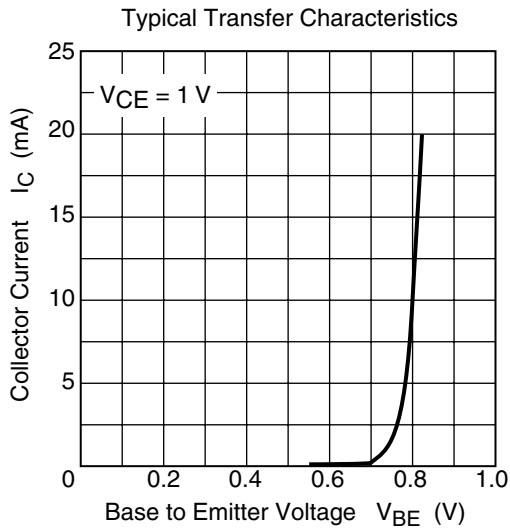
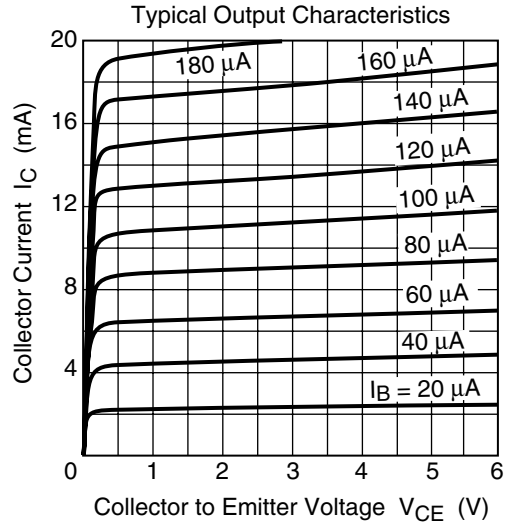
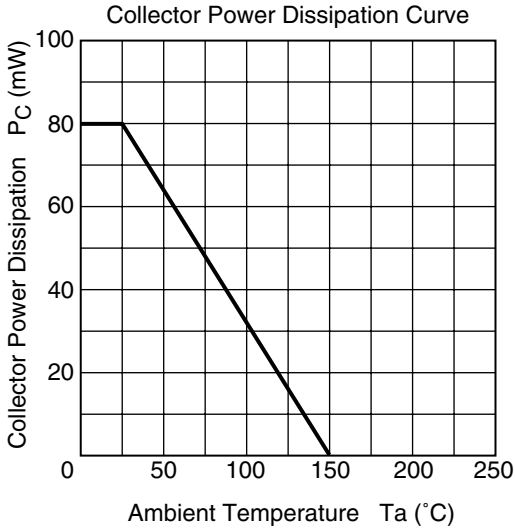
(Ta = 25°C)

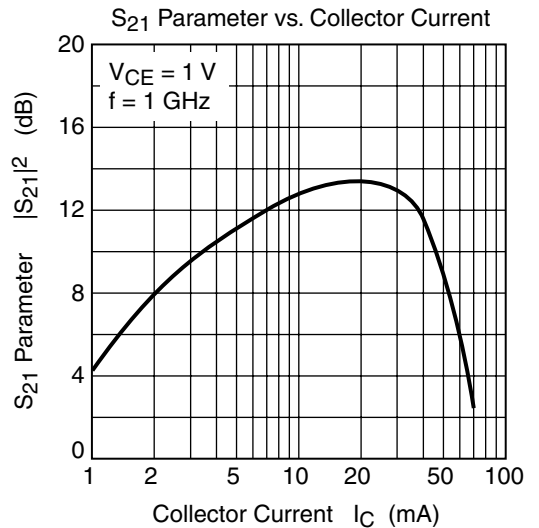
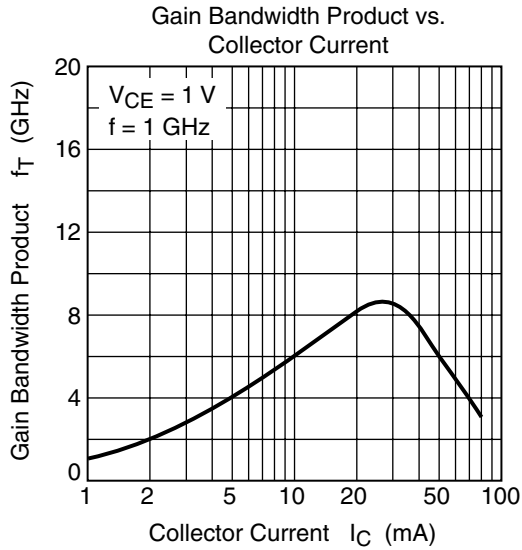
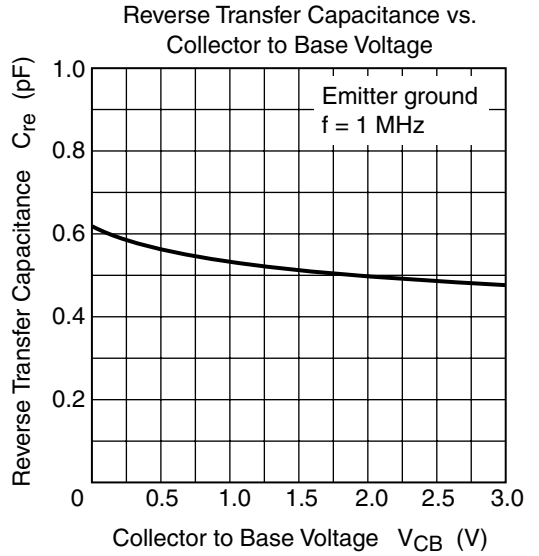
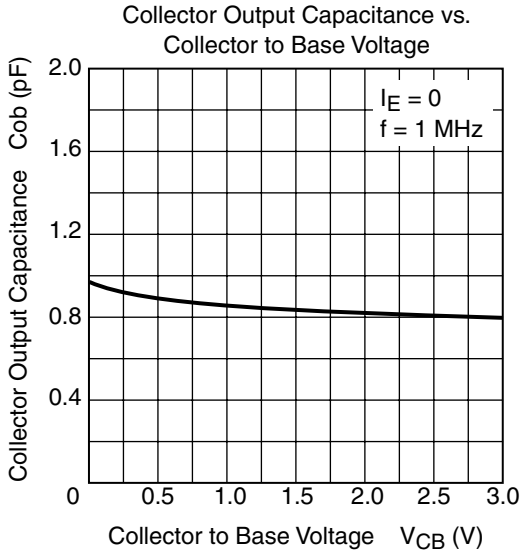
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	6.0	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	80	mA
Collector power dissipation	$P_C$	80	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to 150	°C

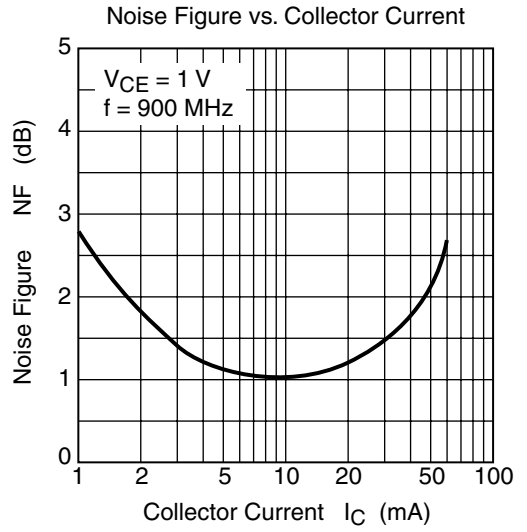
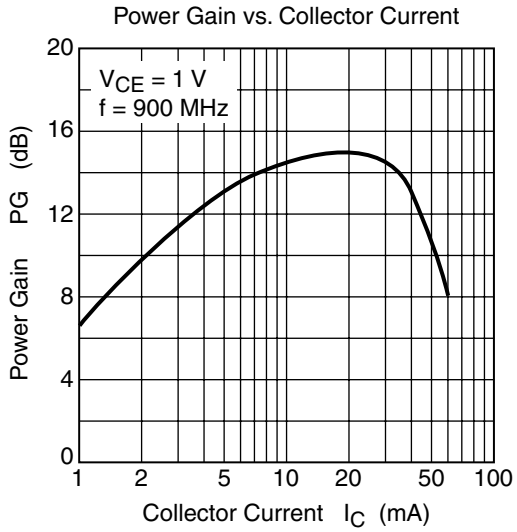
## Electrical Characteristics

(Ta = 25°C)

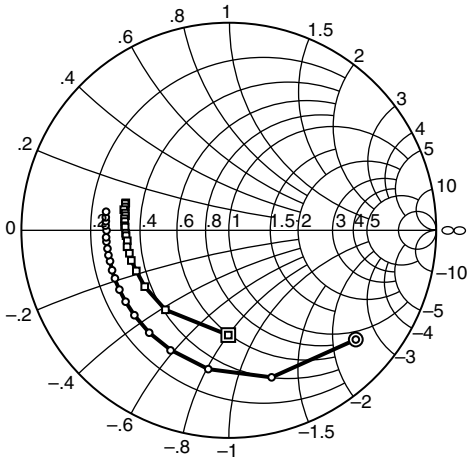
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10 \mu A, I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.1	$\mu A$	$V_{CB} = 15 V, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	0.1	$\mu A$	$V_{CE} = 6.0 V, R_{BE} = \text{Infinite}$
Emitter cutoff current	$I_{EBO}$	—	—	0.1	$\mu A$	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	90	110	140	—	$V_{CE} = 1 V, I_C = 5 mA$
Reverse transfer capacitance	$C_{re}$	—	0.5	—	pF	$V_{CE} = 1 V, \text{Emitter ground, } f = 1 \text{ MHz}$
Collector output capacitance	$C_{ob}$	—	0.85	1.15	pF	$V_{CB} = 1 V, I_E = 0, f = 1 \text{ MHz}$
Gain bandwidth product	$f_t(1)$	1.0	4.0	—	GHz	$V_{CE} = 1 V, I_C = 5 mA$
Gain bandwidth product	$f_t(2)$	—	9.0	—	GHz	$V_{CE} = 1 V, I_C = 30 mA$
Power gain	PG	10	13	—	dB	$V_{CE} = 1 V, I_C = 5 mA, f = 900 \text{ MHz}$
Noise figure	NF	—	1.1	1.8	dB	$V_{CE} = 1 V, I_C = 5 mA, f = 900 \text{ MHz}$





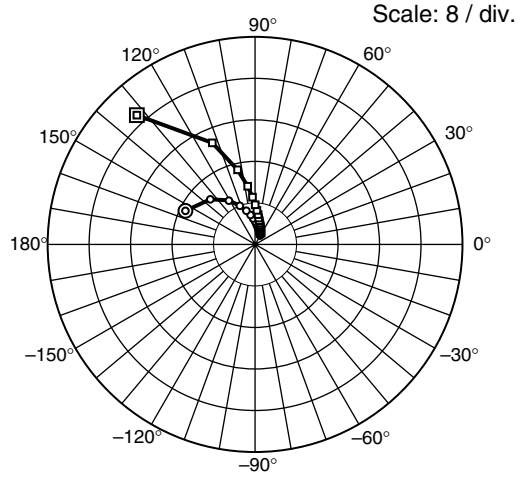


S<sub>11</sub> Parameter vs. Frequency



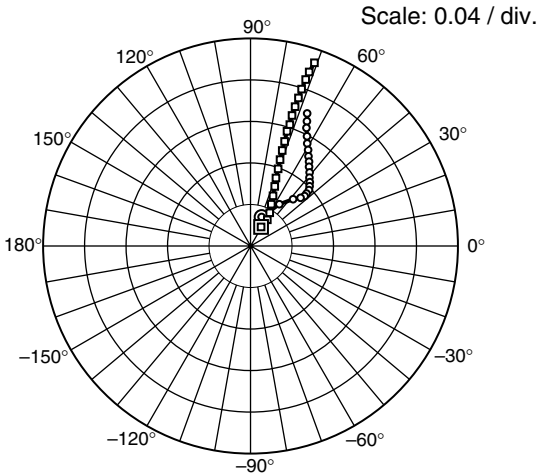
Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

S<sub>21</sub> Parameter vs. Frequency



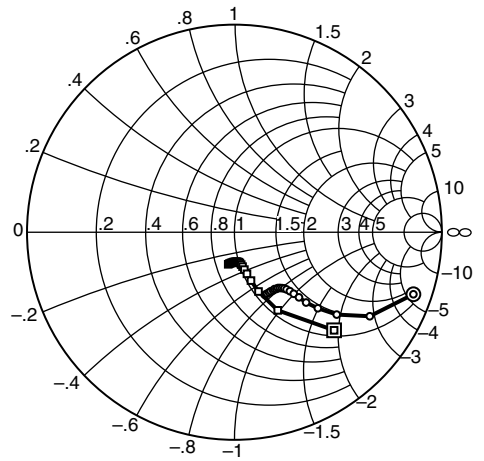
Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

S<sub>12</sub> Parameter vs. Frequency



Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

S<sub>22</sub> Parameter vs. Frequency



Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

**S Parameter** $(V_{CE} = 1 \text{ V}, I_C = 5 \text{ mA}, Z_o = 50 \Omega)$ 

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.807	-40.6	14.95	154.2	0.030	69.3	0.913	-19.1
200	0.737	-73.7	12.30	135.0	0.049	55.5	0.768	-31.8
300	0.675	-98.4	9.86	121.2	0.061	47.8	0.633	-38.8
400	0.642	-115.9	8.03	111.9	0.067	44.0	0.544	-42.3
500	0.624	-127.9	6.72	105.0	0.071	42.8	0.484	-44.4
600	0.611	-138.1	5.75	99.4	0.074	43.2	0.442	-45.2
700	0.604	-145.4	5.02	95.0	0.078	43.8	0.412	-46.0
800	0.599	-151.6	4.45	90.9	0.081	45.4	0.390	-46.7
900	0.595	-157.2	3.98	87.6	0.084	47.2	0.373	-47.6
1000	0.594	-161.2	3.62	84.5	0.087	49.3	0.362	-48.4
1100	0.591	-165.5	3.33	81.8	0.091	51.3	0.354	-49.5
1200	0.592	-168.4	3.06	79.0	0.095	53.6	0.347	-50.7
1300	0.591	-171.5	2.86	76.4	0.099	55.3	0.341	-52.0
1400	0.592	-174.8	2.66	74.1	0.103	57.2	0.340	-53.5
1500	0.592	-176.8	2.51	72.0	0.108	59.1	0.335	-54.8
1600	0.589	-180.0	2.35	69.7	0.113	61.1	0.337	-56.3
1700	0.594	177.7	2.23	67.8	0.119	62.8	0.334	-58.3
1800	0.594	175.7	2.13	65.7	0.126	64.7	0.335	-60.0
1900	0.596	173.9	2.03	63.7	0.132	65.7	0.335	-62.0
2000	0.598	171.3	1.94	61.9	0.139	66.9	0.335	-64.0

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( $V_{CE} = 1 \text{ V}$ ,  $I_C = 20 \text{ mA}$ ,  $Z_o = 50 \Omega$ )

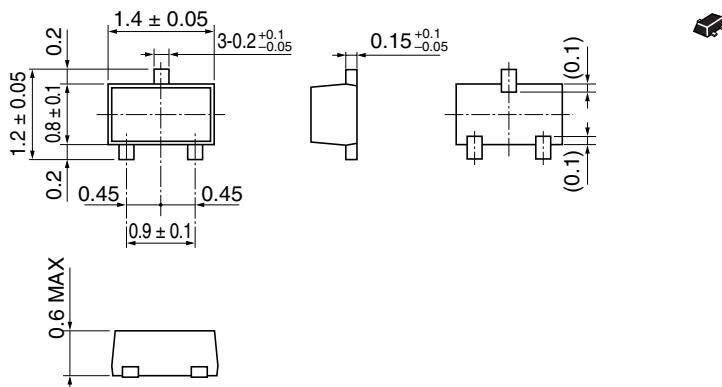
f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.504	-90.3	33.79	132.5	0.021	61.4	0.674	-44.5
200	0.490	-128.6	21.25	112.9	0.030	57.6	0.431	-61.0
300	0.488	-146.2	14.78	103.3	0.037	60.2	0.309	-67.9
400	0.487	-156.3	11.31	97.4	0.045	63.7	0.247	-71.1
500	0.492	-162.8	9.13	93.3	0.053	66.0	0.210	-73.2
600	0.492	-167.0	7.65	90.0	0.062	68.0	0.187	-75.1
700	0.497	-170.8	6.58	87.2	0.070	69.6	0.171	-76.7
800	0.492	-174.1	5.78	84.4	0.079	70.4	0.160	-78.2
900	0.496	-177.0	5.13	82.6	0.088	71.2	0.152	-79.9
1000	0.498	-178.4	4.65	80.2	0.097	71.7	0.147	-81.4
1100	0.500	178.2	4.24	78.3	0.106	72.0	0.145	-83.2
1200	0.503	177.5	3.90	76.1	0.116	72.4	0.143	-85.1
1300	0.503	175.2	3.63	74.3	0.123	72.1	0.143	-87.2
1400	0.506	173.7	3.38	72.6	0.132	72.4	0.144	-88.8
1500	0.503	172.0	3.17	70.9	0.141	72.3	0.144	-91.2
1600	0.507	170.6	2.99	69.4	0.150	72.1	0.146	-92.8
1700	0.516	168.9	2.82	67.7	0.159	72.0	0.148	-95.0
1800	0.511	167.3	2.68	66.0	0.169	71.7	0.151	-97.0
1900	0.515	165.6	2.56	64.6	0.177	71.4	0.154	-99.0
2000	0.514	165.1	2.45	63.0	0.187	70.8	0.158	-100.8



Package Dimensions

As of July, 2001

Unit: mm



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

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**For further information write to:**

Hitachi Semiconductor (America) Inc. 179 East Tasman Drive San Jose, CA 95134 Tel: <1> (408) 433-1990 Fax: <1>(408) 433-0223	Hitachi Europe Ltd. Electronic Components Group Whitebrook Park Lower Cookham Road Maidenhead Berkshire SL6 8YA, United Kingdom Tel: <44> (1628) 585000 Fax: <44> (1628) 585200
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Hitachi Europe GmbH Electronic Components Group Dornacher Straße 3 D-85622 Feldkirchen Postfach 201, D-85619 Feldkirchen Germany Tel: <49> (89) 9 9180-0 Fax: <49> (89) 9 29 30 00
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Hitachi Asia Ltd. Hitachi Tower 16 Collyer Quay #20-00 Singapore 049318 Tel : <65>-538-6533/538-8577 Fax : <65>-538-6933/538-3877 URL : <a href="http://semiconductor.hitachi.com.sg">http://semiconductor.hitachi.com.sg</a>
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Hitachi Asia Ltd. (Taipei Branch Office) 4/F, No. 167, Tun Hwa North Road Hung-Kuo Building Taipei (105), Taiwan Tel : <886>-(2)-2718-3666 Fax : <886>-(2)-2718-8180 Telex : 23222 HAS-TP URL : <a href="http://www.hitachi.com.tw">http://www.hitachi.com.tw</a>
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Hitachi Asia (Hong Kong) Ltd. Group III (Electronic Components) 7/F., North Tower World Finance Centre, Harbour City, Canton Road Tsim Sha Tsui, Kowloon Hong Kong Tel : <852>-(2)-735-9218 Fax : <852>-(2)-730-0281 URL : <a href="http://semiconductor.hitachi.com.hk">http://semiconductor.hitachi.com.hk</a>
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