

# 2SC5773

Silicon NPN Epitaxial  
UHF / VHF wide band amplifier

# HITACHI

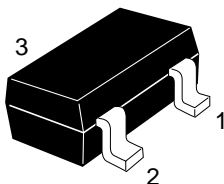
ADE-208-1391(Z)  
Preliminary 1st. Edition  
Mar. 2001

## Features

- High gain bandwidth product  
 $f_T = 10.8$  GHz typ.
- High power gain and low noise figure ;  
PG = 11.9 dB typ., NF = 1.1 dB typ. at  $f = 900$  MHz

## Outline

MPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "JR-".

This data sheet contains tentative specification for new product development. It may partially be subject to change without notice.

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

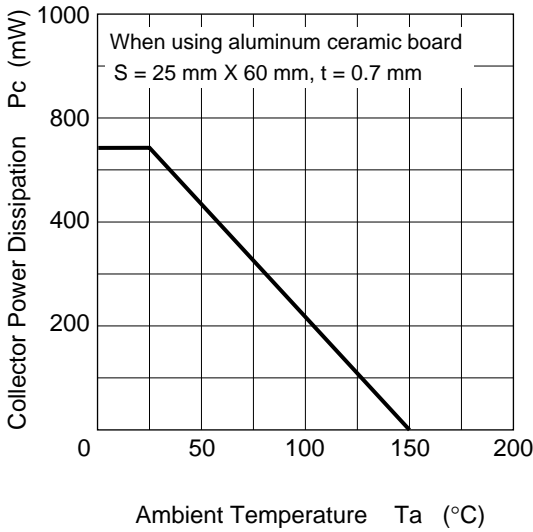
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	6	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	80	mA
Collector power dissipation	Pc	700*	mW
Junction temperature	Tj	150	°C
Storage temperature	Tstg	-55 to +150	°C

\* When using aluminium ceramic board (25 x 60 x 0.7 mm)

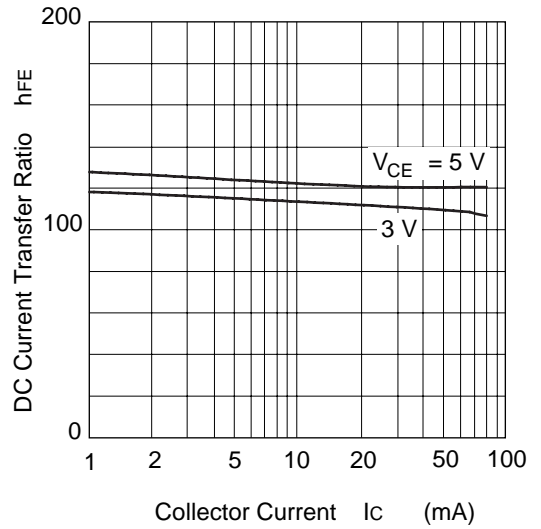
## Electrical Characteristics (Ta = 25°C)

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	$I_{CBO}$	—	—	1	$\mu A$	$V_{CB} = 12 V, I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	mA	$V_{CE} = 6 V, R_{BE} = \infty$
Emitter cutoff current	$I_{EBO}$	—	—	10	$\mu A$	$V_{EB} = 1.5 V, I_C = 0$
DC current transfer ratio	$h_{FE}$	80	120	160	V	$V_{CE} = 5 V, I_C = 50 mA$
Collector output capacitance	Cob	—	1.25	1.8	pF	$V_{CB} = 5 V, I_E = 0$ $f = 1 MHz$
Reverse transfer capacitance	Cre	—	0.98	—	pF	$V_{CB} = 5 V, I_E = 0$ $f = 1 MHz$
Gain bandwidth product	$f_T$	8	10.8	—	GHz	$V_{CE} = 5 V, I_C = 50 mA$ $f = 1 GHz$
$S_{21}$ parameter	$ S_{21} ^2$	—	11	—	dB	$V_{CE} = 5 V, I_C = 50 mA$ $f = 1 GHz$
Power gain	PG	9	11.9	—	dB	$V_{CE} = 5 V, I_C = 50 mA$ $f = 900 MHz$
Noise figure	NF	—	1.1	1.9	dB	$V_{CE} = 5 V, I_C = 5 mA$ $f = 900 MHz$

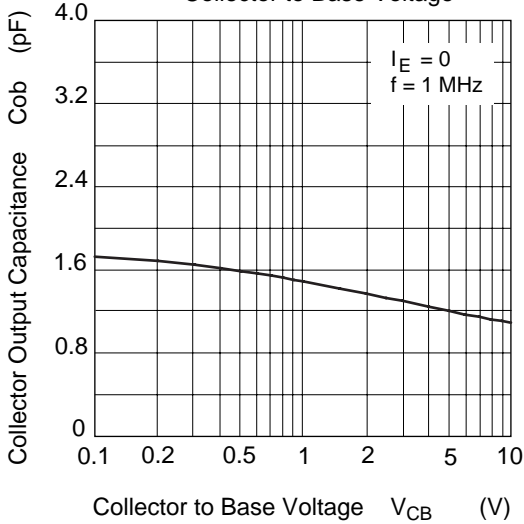
Collector Power Dissipation Curve



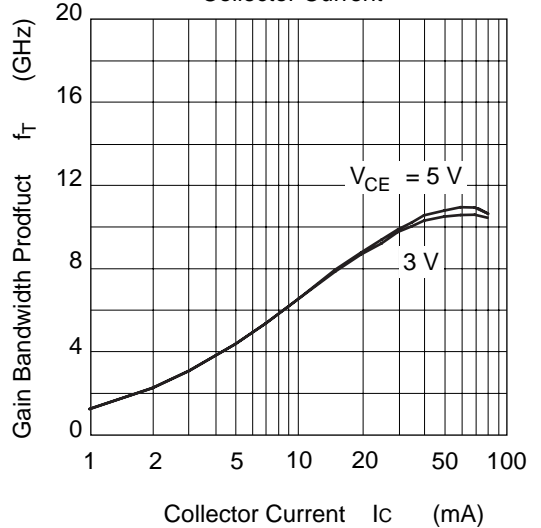
DC Current Transfer Ratio vs. Collector Current

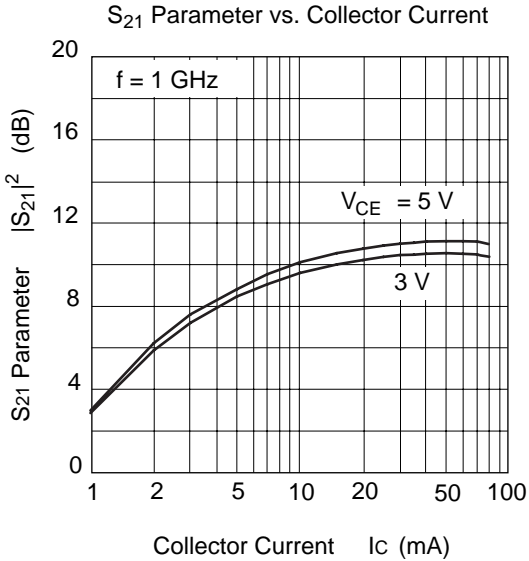
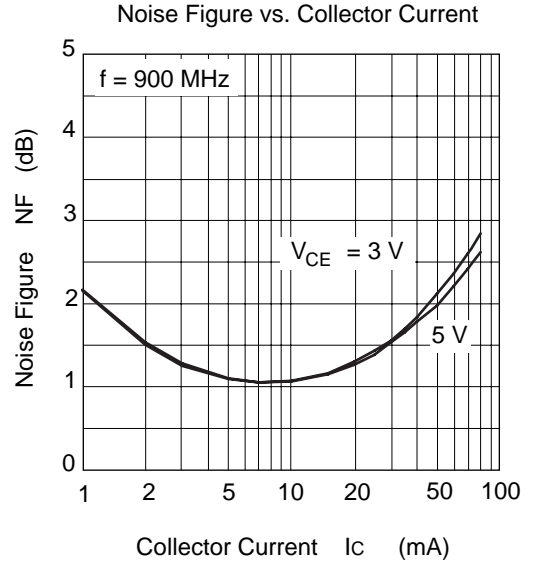
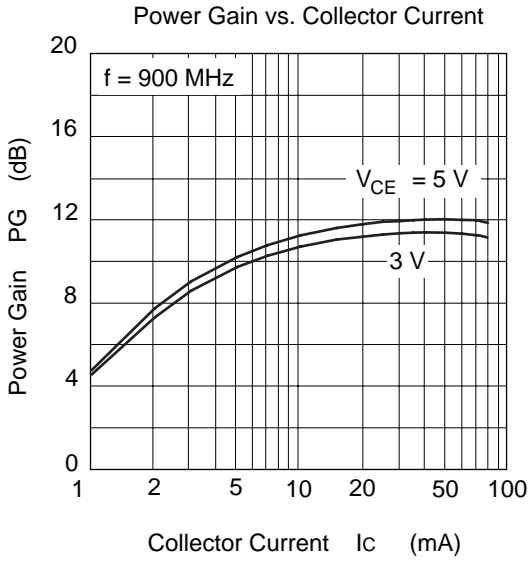


Collector Output Capacitance vs. Collector to Base Voltage

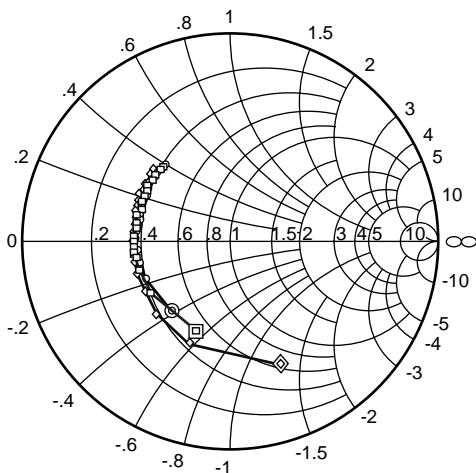


Gain Bandwidth Product vs. Collector Current



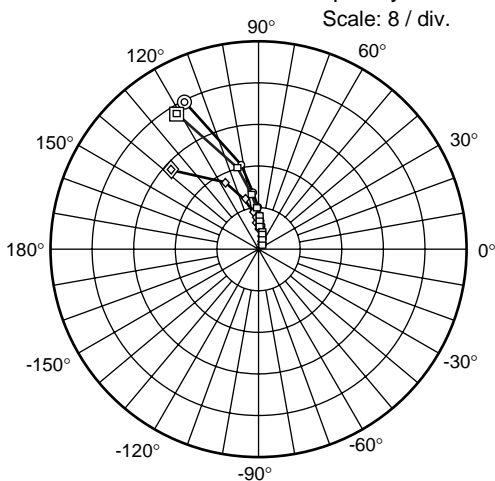


S11 Parameter vs. Frequency



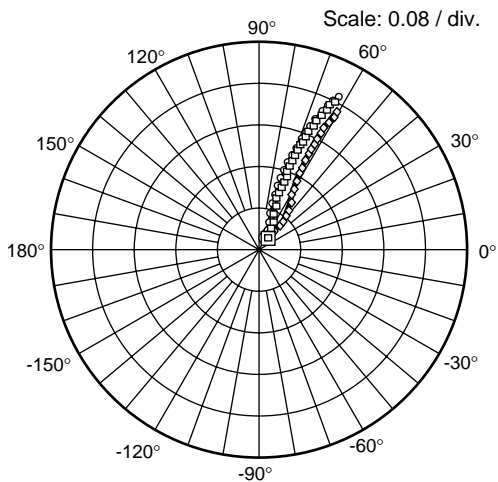
Condition: VCE = 3 V, ZO = 50 Ω  
 100 to 2000 MHz (100 MHz Step)  
 ○ ( IC = 50 mA)  
 □ ( IC = 30 mA)  
 ◇ ( IC = 10 mA)

S21 Parameter vs. Frequency



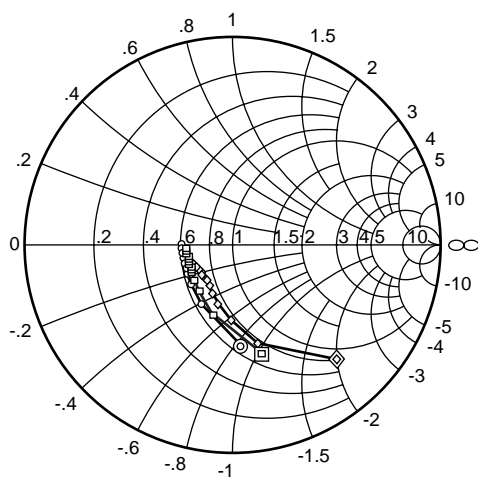
Condition: VCE = 3 V, ZO = 50 Ω  
 100 ~ 2000 MHz (100 MHz Step)  
 ○ ( IC = 50 mA)  
 □ ( IC = 30 mA)  
 ◇ ( IC = 10 mA)

S12 Parameter vs. Frequency



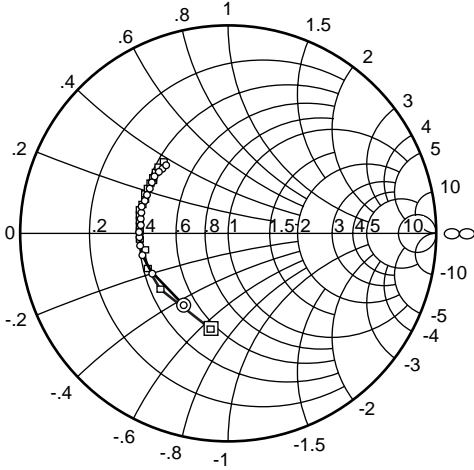
Condition: VCE = 3 V, ZO = 50 Ω  
 100 to 2000 MHz (100 MHz Step)  
 ○ ( IC = 50 mA)  
 □ ( IC = 30 mA)  
 ◇ ( IC = 10 mA)

S22 Parameter vs. Frequency



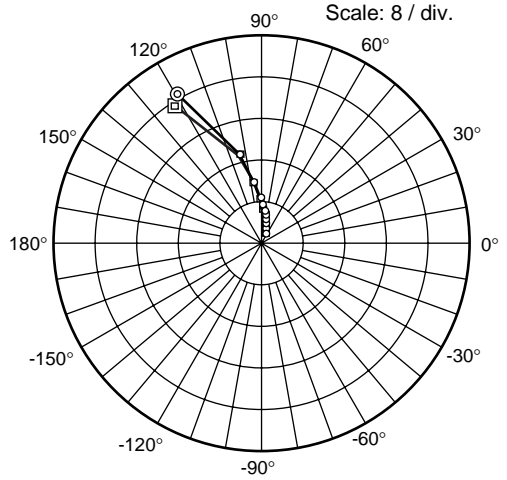
Condition: VCE = 3 V, ZO = 50 Ω  
 100 to 2000 MHz (100 MHz Step)  
 ○ ( IC = 50 mA)  
 □ ( IC = 30 mA)  
 ◇ ( IC = 10 mA)

S11 Parameter vs. Frequency



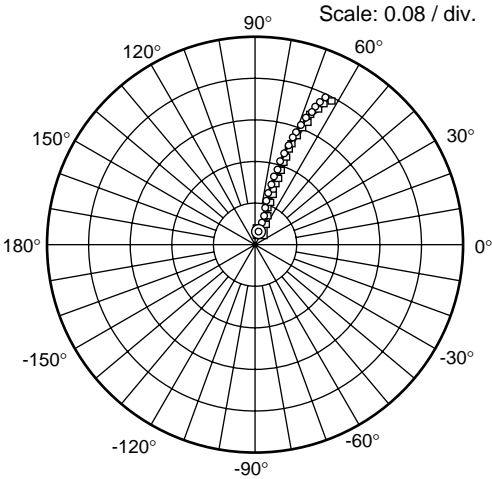
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz Step)  
 ○—○ (  $I_C = 50\text{ mA}$  )  
 □—□ (  $I_C = 30\text{ mA}$  )

S21 Parameter vs. Frequency



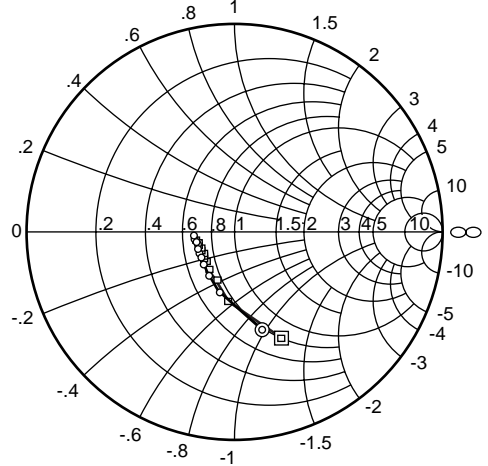
Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz Step)  
 ○—○ (  $I_C = 50\text{ mA}$  )  
 □—□ (  $I_C = 30\text{ mA}$  )

S12 Parameter vs. Frequency



Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz Step)  
 ○—○ (  $I_C = 50\text{ mA}$  )  
 □—□ (  $I_C = 30\text{ mA}$  )

S22 Parameter vs. Frequency



Condition:  $V_{CE} = 5\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz Step)  
 ○—○ (  $I_C = 50\text{ mA}$  )  
 □—□ (  $I_C = 30\text{ mA}$  )

Sparameter ( $V_{CE} = 3 \text{ V}$ ,  $I_C = 10 \text{ mA}$ ,  $Z_o = 50 \Omega$ )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.643	-68.8	21.09	137.1	0.042	60.3	0.740	-47.5
200	0.532	-112.2	13.52	114.6	0.061	51.4	0.487	-74.5
300	0.496	-135.9	9.42	103.2	0.073	51.7	0.355	-90.4
400	0.475	-150.6	7.19	96.2	0.085	53.9	0.288	-100.9
500	0.471	-160.9	5.80	91.1	0.097	56.1	0.250	-109.7
600	0.468	-168.0	4.88	87.0	0.109	57.8	0.225	-116.6
700	0.468	-174.7	4.21	83.2	0.121	59.5	0.210	-122.2
800	0.464	179.4	3.71	79.9	0.134	60.8	0.199	-126.8
900	0.467	174.7	3.30	77.0	0.148	61.7	0.193	-131.1
1000	0.465	169.9	3.00	74.1	0.161	62.2	0.187	-134.2
1100	0.468	166.5	2.75	71.6	0.174	62.5	0.185	-137.4
1200	0.477	162.7	2.55	69.1	0.188	62.9	0.184	-139.9
1300	0.478	159.2	2.38	66.6	0.201	62.7	0.182	-142.2
1400	0.479	155.7	2.23	64.4	0.215	62.7	0.182	-144.0
1500	0.483	152.8	2.10	62.2	0.227	62.8	0.183	-146.1
1600	0.486	149.7	1.98	59.9	0.242	62.4	0.185	-147.5
1700	0.490	146.0	1.89	58.0	0.255	62.2	0.186	-149.0
1800	0.489	143.6	1.80	55.9	0.268	61.8	0.187	-150.8
1900	0.492	140.7	1.73	54.1	0.281	61.3	0.190	-152.1
2000	0.497	137.9	1.67	51.9	0.292	60.8	0.192	-152.9

**Sparameter** ( $V_{CE} = 3\text{ V}$ ,  $I_C = 30\text{ mA}$ ,  $Z_o = 50\ \Omega$ )

<b>f (MHz)</b>	<b>S11</b>		<b>S21</b>		<b>S12</b>		<b>S22</b>	
	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>
100	0.449	-112.7	29.89	120.9	0.029	59.9	0.534	-74.7
200	0.445	-148.0	16.17	103.3	0.044	62.6	0.336	-106.4
300	0.449	-163.2	10.77	95.7	0.059	66.4	0.269	-124.9
400	0.456	-171.8	8.08	90.8	0.075	68.8	0.242	-136.3
500	0.454	-178.9	6.47	87.2	0.092	70.0	0.230	-144.6
600	0.451	176.4	5.42	83.9	0.108	71.0	0.223	-150.6
700	0.455	171.6	4.65	81.1	0.124	71.0	0.219	-155.1
800	0.458	167.4	4.09	78.4	0.141	70.9	0.216	-158.9
900	0.462	163.5	3.65	76.0	0.158	70.6	0.216	-161.6
1000	0.455	160.3	3.32	73.5	0.173	70.1	0.214	-164.2
1100	0.463	156.4	3.02	71.6	0.190	69.7	0.215	-166.5
1200	0.469	153.6	2.80	69.1	0.205	69.0	0.215	-168.1
1300	0.465	150.9	2.61	67.3	0.220	68.1	0.214	-170.0
1400	0.471	147.1	2.45	65.3	0.236	67.6	0.216	-171.3
1500	0.477	144.9	2.30	63.3	0.251	66.8	0.216	-172.5
1600	0.477	142.5	2.17	61.2	0.268	66.0	0.217	-173.9
1700	0.473	138.9	2.08	59.5	0.282	65.2	0.218	-174.8
1800	0.483	136.9	1.98	57.7	0.296	64.0	0.219	-175.5
1900	0.479	133.8	1.90	55.9	0.311	63.3	0.220	-176.5
2000	0.482	131.3	1.84	53.8	0.322	62.3	0.220	-177.2



Sparameter ( $V_{CE} = 3 \text{ V}$ ,  $I_C = 50 \text{ mA}$ ,  $Z_o = 50 \Omega$ )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.421	-130.8	31.68	116.2	0.025	62.9	0.468	-84.7
200	0.437	-159.1	16.57	100.7	0.040	67.3	0.308	-117.4
300	0.448	-169.5	10.94	93.9	0.058	71.0	0.261	-135.2
400	0.449	-177.1	8.18	89.5	0.075	72.9	0.243	-145.5
500	0.461	177.1	6.57	86.2	0.092	73.4	0.236	-152.5
600	0.455	173.0	5.48	83.2	0.109	73.7	0.232	-158.0
700	0.459	168.3	4.71	80.5	0.126	73.5	0.230	-161.8
800	0.463	164.8	4.15	78.1	0.143	73.0	0.229	-164.9
900	0.465	161.9	3.68	75.9	0.161	72.6	0.229	-167.4
1000	0.464	158.2	3.35	73.3	0.177	71.9	0.228	-169.6
1100	0.467	154.9	3.07	71.3	0.193	70.8	0.229	-171.7
1200	0.468	152.0	2.83	69.3	0.210	70.2	0.229	-173.2
1300	0.467	148.7	2.64	67.2	0.225	69.0	0.229	-174.7
1400	0.475	145.2	2.47	65.2	0.241	68.4	0.230	-175.7
1500	0.477	143.4	2.33	63.5	0.257	67.5	0.230	-177.1
1600	0.482	141.3	2.20	61.4	0.273	66.5	0.231	-178.2
1700	0.480	137.3	2.11	59.7	0.288	65.6	0.232	-179.0
1800	0.485	135.5	2.01	57.8	0.303	64.6	0.232	-179.9
1900	0.481	132.8	1.92	56.1	0.318	63.7	0.234	179.0
2000	0.484	129.6	1.85	54.4	0.330	62.6	0.232	178.6

**Sparameter** ( $V_{CE} = 5 \text{ V}$ ,  $I_C = 30 \text{ mA}$ ,  $Z_o = 50 \Omega$ )

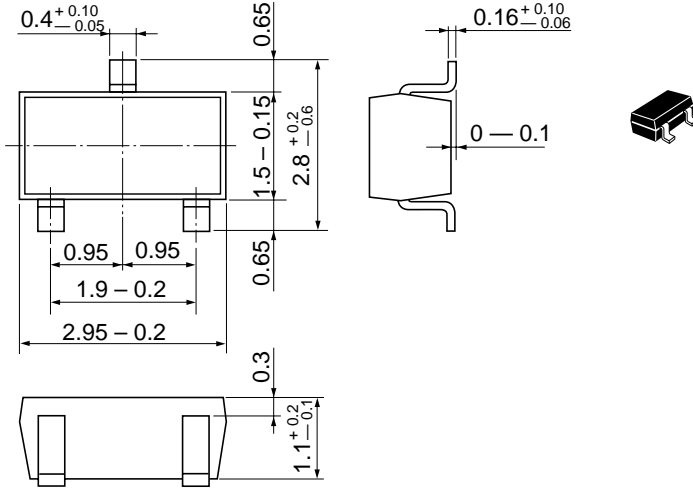
<b>f (MHz)</b>	<b>S11</b>		<b>S21</b>		<b>S12</b>		<b>S22</b>	
	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>	<b>MAG</b>	<b>ANG</b>
100	0.447	-102.8	31.04	123.3	0.028	60.6	0.552	-66.3
200	0.419	-142.1	17.16	105.0	0.042	62.5	0.333	-94.7
300	0.416	-158.2	11.49	96.8	0.057	66.4	0.250	-112.0
400	0.414	-168.7	8.63	91.7	0.072	69.2	0.214	-123.3
500	0.421	-176.4	6.92	88.0	0.088	70.2	0.196	-132.1
600	0.419	178.3	5.79	84.8	0.103	70.9	0.185	-138.6
700	0.418	173.3	4.98	81.8	0.119	70.9	0.179	-144.0
800	0.426	168.4	4.37	79.3	0.135	70.9	0.174	-148.5
900	0.425	165.9	3.89	76.6	0.151	70.7	0.173	-151.8
1000	0.423	161.7	3.53	74.2	0.166	70.5	0.171	-154.9
1100	0.428	157.9	3.23	72.1	0.181	69.8	0.171	-157.2
1200	0.432	154.3	2.98	70.0	0.196	69.3	0.171	-159.2
1300	0.429	151.6	2.79	67.9	0.211	68.4	0.170	-161.5
1400	0.436	148.6	2.60	66.1	0.226	67.9	0.171	-162.7
1500	0.437	145.5	2.45	64.1	0.240	67.0	0.172	-163.9
1600	0.447	143.3	2.31	61.9	0.256	66.3	0.173	-165.5
1700	0.445	140.2	2.20	60.1	0.270	65.8	0.174	-166.5
1800	0.450	137.2	2.09	58.5	0.283	64.5	0.174	-167.8
1900	0.447	134.6	2.01	56.3	0.298	63.8	0.177	-168.6
2000	0.453	131.5	1.94	54.7	0.309	62.8	0.177	-169.4

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

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.402	-120.1	33.23	118.6	0.024	63.7	0.485	-74.9
200	0.406	-152.6	17.68	102.1	0.039	67.2	0.296	-104.7
300	0.414	-166.1	11.71	95.0	0.055	70.7	0.233	-122.4
400	0.413	-174.2	8.78	90.4	0.072	72.4	0.207	-133.6
500	0.417	179.5	7.03	87.0	0.088	73.0	0.195	-141.7
600	0.419	174.7	5.88	84.0	0.104	73.5	0.188	-147.9
700	0.419	169.9	5.05	81.3	0.121	73.2	0.185	-152.6
800	0.423	166.2	4.44	78.7	0.137	72.7	0.182	-156.4
900	0.427	161.6	3.94	76.4	0.154	72.3	0.182	-159.3
1000	0.423	158.2	3.58	73.9	0.169	71.6	0.180	-161.8
1100	0.428	154.7	3.27	71.9	0.185	70.9	0.181	-164.2
1200	0.428	152.5	3.02	70.0	0.201	70.4	0.181	-165.9
1300	0.435	148.6	2.82	67.8	0.216	69.3	0.181	-167.5
1400	0.434	145.2	2.65	65.9	0.231	68.8	0.182	-168.9
1500	0.443	143.0	2.48	64.2	0.246	67.8	0.182	-170.1
1600	0.447	140.4	2.35	62.1	0.262	66.9	0.184	-171.4
1700	0.444	137.3	2.24	60.4	0.275	65.9	0.185	-172.2
1800	0.451	134.1	2.13	58.6	0.290	64.9	0.186	-173.5
1900	0.445	132.1	2.05	56.7	0.304	64.2	0.187	-174.2
2000	0.454	129.3	1.96	54.9	0.316	63.0	0.187	-174.7

Package Dimensions

Unit: mm



Hitachi Code	MPAK
JEDEC	
EIAJ	Conforms
Mass (reference value)	0.011 g

## Cautions

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