

# 2SC5828

Silicon NPN Epitaxial  
VHF/UHF Wide band amplifier

# HITACHI

ADE-208-1465(Z)

Rev.0  
Nov. 2001

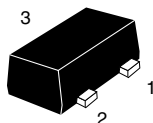
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## Features

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

## Outline

MFPAK



1. Emitter
2. Base
3. Collector

Note: Marking is "WX-".

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### Absolute Maximum Ratings

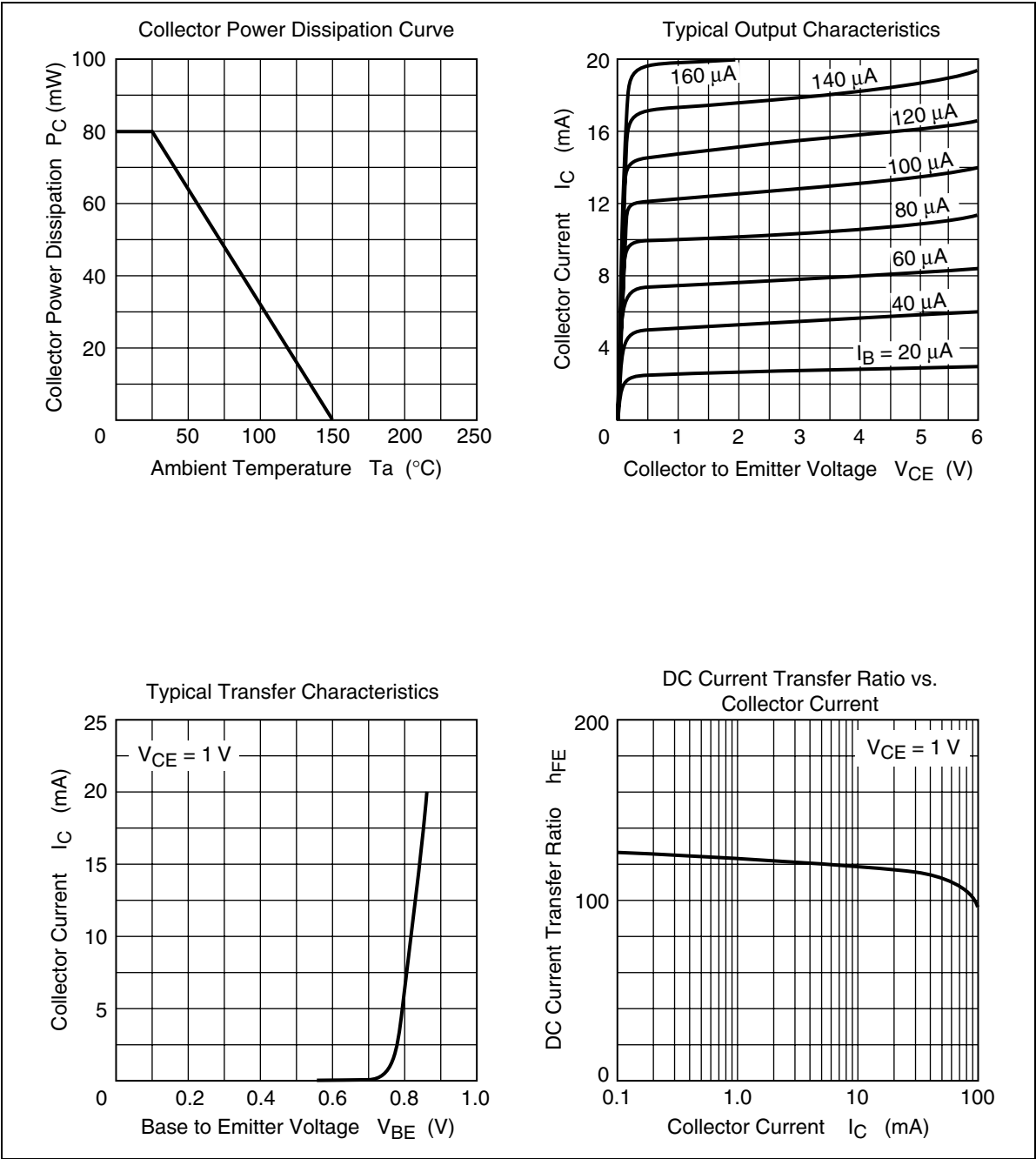
( $T_a = 25\text{ }^\circ\text{C}$ )

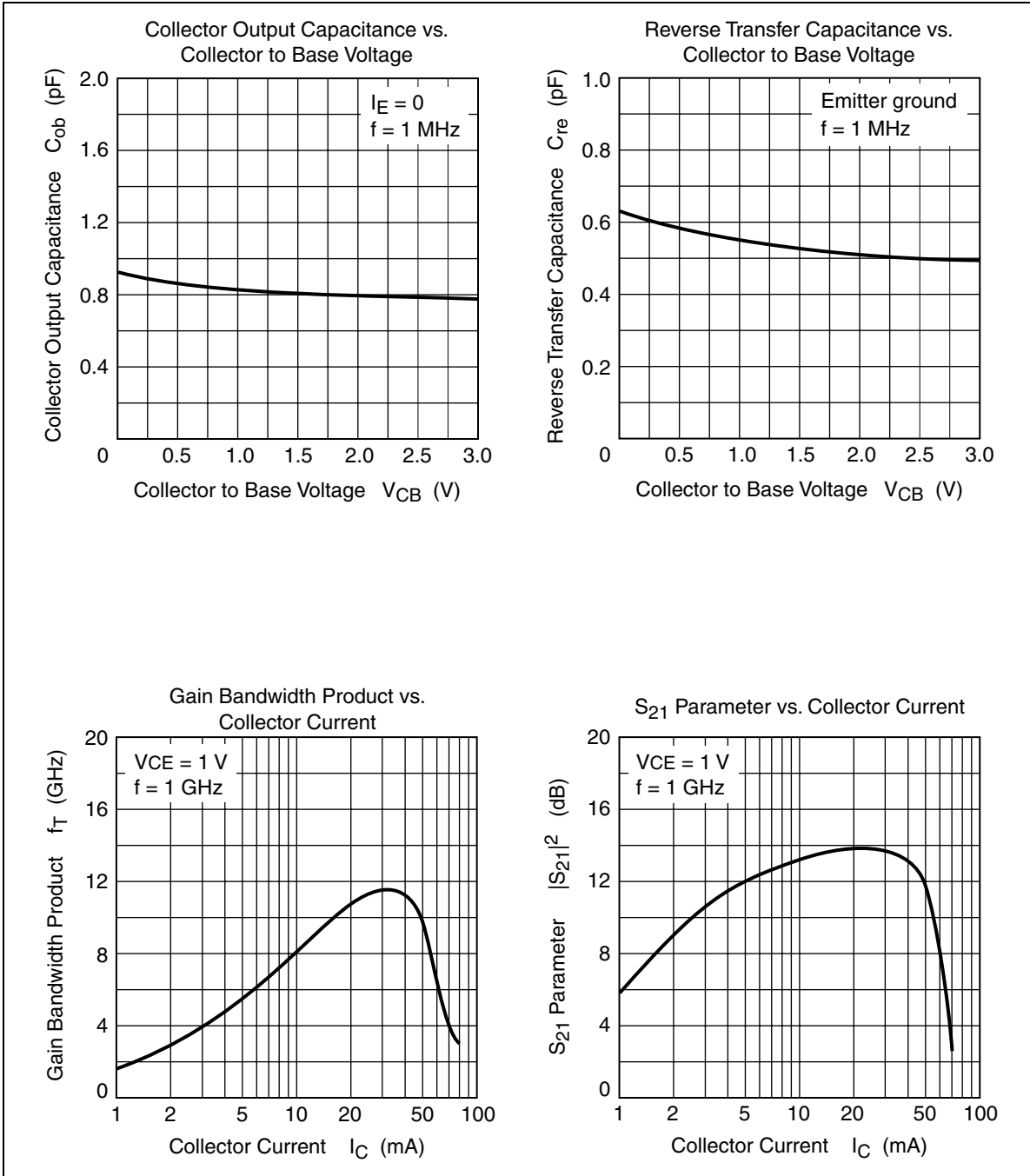
Item	Symbol	Ratings	Unit
Collector to base voltage	$V_{CBO}$	15	V
Collector to emitter voltage	$V_{CEO}$	5.5	V
Emitter to base voltage	$V_{EBO}$	1.5	V
Collector current	$I_C$	80	mA
Collector power dissipation	$P_C$	80	mW
Junction temperature	$T_j$	150	$^\circ\text{C}$
Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

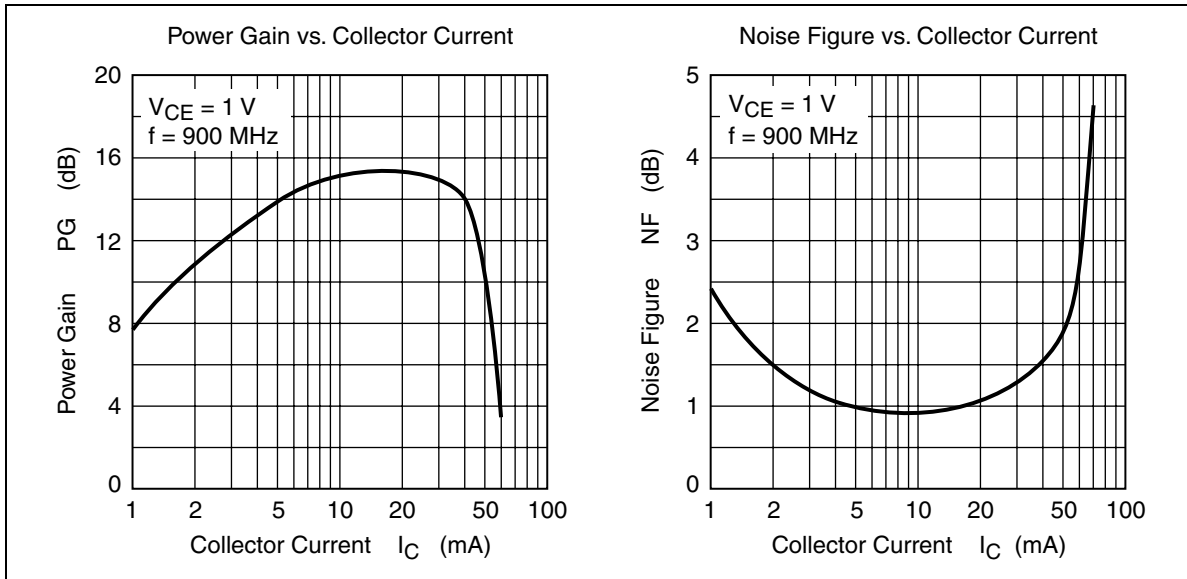
### Electrical Characteristics

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

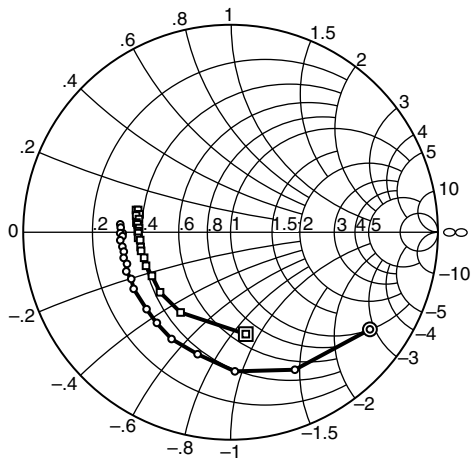
Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	15	—	—	V	$I_C = 10\text{ }\mu\text{A}$ , $I_E = 0$
Collector cutoff current	$I_{CBO}$	—	—	0.1	$\mu\text{A}$	$V_{CB} = 15\text{ V}$ , $I_E = 0$
Collector cutoff current	$I_{CEO}$	—	—	1	$\mu\text{A}$	$V_{CE} = 5.5\text{ V}$ , $R_{BE} = \text{Infinite}$
Emitter cutoff current	$I_{EBO}$	—	—	0.1	$\mu\text{A}$	$V_{EB} = 1.5\text{ V}$ , $I_C = 0$
DC current transfer ratio	$h_{FE}$	100	120	150	—	$V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$
Collector output capacitance	$C_{ob}$	—	0.85	1.15	pF	$V_{CB} = 1\text{ V}$ , $I_E = 0$ , $f = 1\text{ MHz}$
Gain bandwidth product	$f_T$	2.5	5.5	—	GHz	$V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$
Power gain	PG	11	14	—	dB	$V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 900\text{ MHz}$
Noise figure	NF	—	1.0	1.7	dB	$V_{CE} = 1\text{ V}$ , $I_C = 5\text{ mA}$ , $f = 900\text{ MHz}$





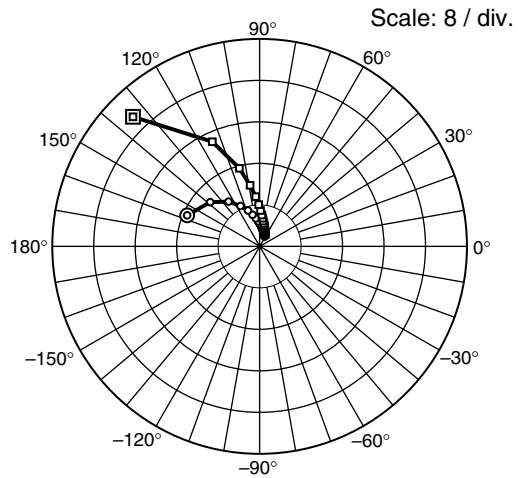


S<sub>11</sub> Parameter vs. Frequency



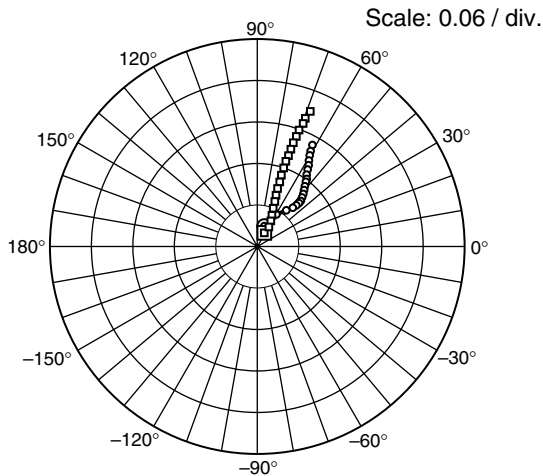
Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

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



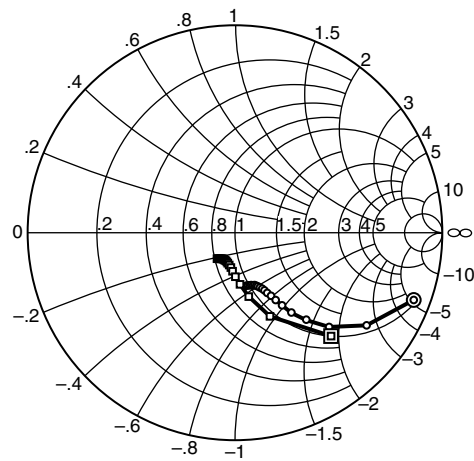
Test conditions:  $V_{CE} = 1\text{ V}$ ,  $Z_O = 50\ \Omega$   
 100 to 2000 MHz (100 MHz step)  
 ○—○ ( $I_C = 5\text{ mA}$ )  
 □—□ ( $I_C = 20\text{ mA}$ )

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<sub>CE</sub> = 1 V, I<sub>C</sub> = 5 mA, Z<sub>0</sub> = 50 Ω)

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.819	-34.8	15.22	156.8	0.031	71.2	0.921	-20.6
200	0.732	-64.9	12.81	138.1	0.054	59.1	0.776	-35.1
300	0.671	-88.2	10.54	124.7	0.067	51.3	0.642	-45.0
400	0.609	-105.1	8.65	115.3	0.076	47.5	0.542	-50.6
500	0.588	-118.9	7.31	107.9	0.082	46.5	0.471	-54.7
600	0.563	-129.1	6.28	102.6	0.087	46.1	0.417	-57.0
700	0.549	-137.5	5.47	97.8	0.091	46.3	0.379	-58.8
800	0.541	-143.8	4.87	93.6	0.096	47.6	0.350	-60.2
900	0.529	-149.7	4.40	90.2	0.101	48.8	0.329	-61.8
1000	0.537	-154.8	4.01	86.9	0.106	50.3	0.312	-62.9
1100	0.522	-159.4	3.67	84.1	0.111	51.7	0.300	-64.0
1200	0.530	-163.0	3.38	81.1	0.117	53.1	0.290	-65.5
1300	0.523	-166.5	3.15	79.0	0.121	53.8	0.281	-66.9
1400	0.526	-169.7	2.94	76.7	0.126	55.5	0.275	-68.1
1500	0.533	-172.4	2.77	74.1	0.133	56.8	0.269	-69.5
1600	0.521	-175.8	2.61	72.2	0.139	57.7	0.268	-71.0
1700	0.532	-177.9	2.46	70.2	0.145	59.0	0.264	-72.7
1800	0.520	-179.5	2.35	67.9	0.152	60.1	0.263	-74.3
1900	0.530	177.6	2.23	66.0	0.158	60.8	0.261	-76.0
2000	0.533	175.9	2.14	63.9	0.167	61.5	0.261	-77.9

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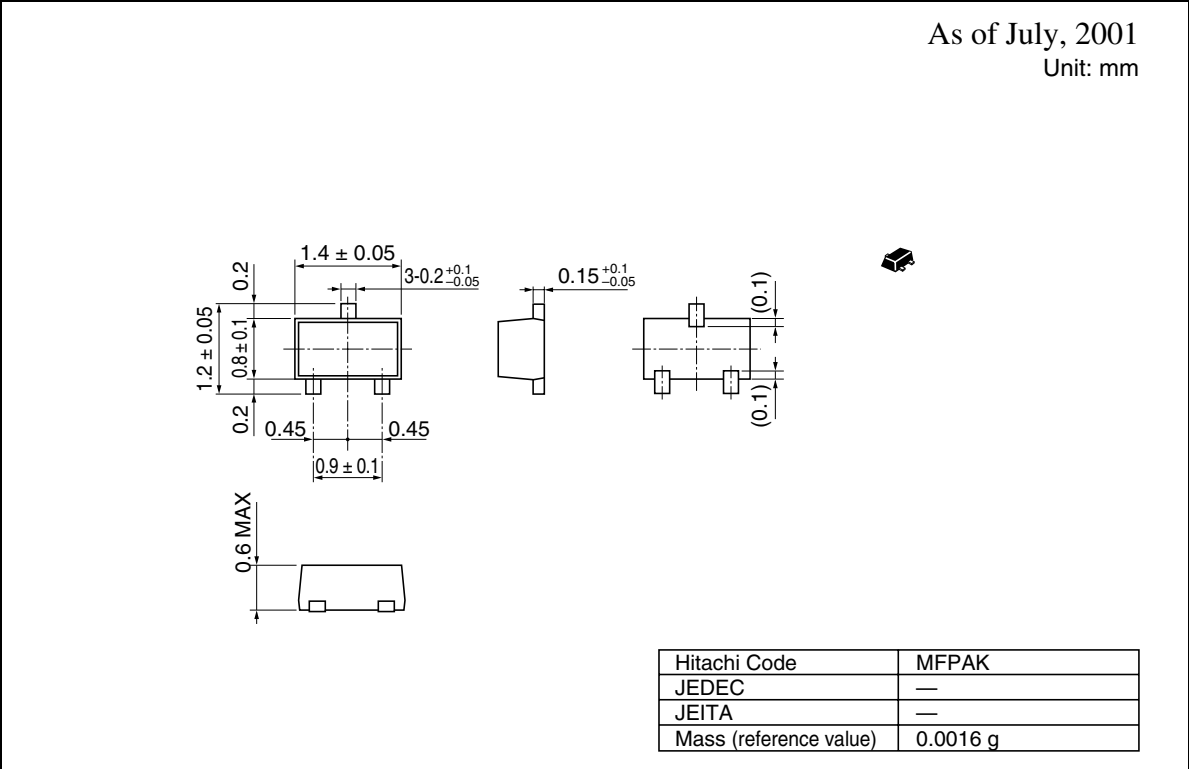
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( $V_{CE} = 1 \text{ V}$ ,  $I_C = 20 \text{ mA}$ ,  $Z_0 = 50 \Omega$ )

f (MHz)	S11		S21		S12		S22	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	0.496	-81.4	34.91	134.4	0.022	62.9	0.680	-47.1
200	0.455	-121.9	22.12	114.3	0.033	59.6	0.438	-67.3
300	0.446	-139.6	15.54	104.5	0.042	62.4	0.316	-77.8
400	0.433	-151.0	11.90	98.8	0.050	65.0	0.251	-84.4
500	0.438	-158.4	9.60	94.4	0.060	67.5	0.213	-89.4
600	0.434	-163.6	8.04	91.2	0.070	68.8	0.187	-93.5
700	0.440	-168.3	6.91	88.4	0.079	70.0	0.170	-96.6
800	0.439	-170.7	6.05	85.7	0.089	70.8	0.159	-100.0
900	0.437	-175.1	6.45	83.6	0.099	70.9	0.152	-103.1
1000	0.446	-176.6	4.92	81.6	0.109	71.4	0.147	-105.3
1100	0.444	-179.5	4.48	79.3	0.120	71.5	0.143	-107.8
1200	0.447	179.3	4.10	77.1	0.130	71.5	0.142	-110.2
1300	0.441	177.3	3.83	75.7	0.139	71.1	0.140	-112.5
1400	0.450	175.1	3.56	74.0	0.149	71.0	0.140	-114.4
1500	0.456	174.1	3.34	72.0	0.159	70.9	0.141	-116.2
1600	0.446	171.8	3.14	70.5	0.169	70.5	0.143	-117.8
1700	0.462	169.9	2.96	68.8	0.179	70.3	0.145	-119.4
1800	0.447	168.8	2.81	67.2	0.190	69.6	0.148	-121.2
1900	0.458	166.4	2.68	65.8	0.198	69.5	0.150	-122.7
2000	0.468	166.7	2.55	64.1	0.210	68.6	0.153	-124.4



Package Dimensions



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