

# Silicon Transistor 2SC5336

# NPN EPITAXIAL SILICON TRANSISTOR HIGH FREQUENCY LOW DISTORTION AMPLIFIER

## FEATURES

- High gain  
|  $S_{21}$  |<sup>2</sup> = 12 dB TYP, @f = 1 GHz, V<sub>CE</sub> = 10 V, I<sub>c</sub> = 20 mA
- New power mini-mold package version of a 4-pin type gain-improved on the 2SC3357

### ABSOLUTE MAXIMUM RATINGS (T<sub>A</sub> = 25 °C)

Parameter	Symbol	Rating	Unit
Collector to Base Voltage	$V_{CBO}$	20	V
Collector to Emitter Voltage	$V_{CEO}$	12	V
Emitter to Base Voltage	$V_{EBO}$	3.0	V
Collector Current	$I_C$	100	mA
Total Power Dissipation	$P_T$ <sup>Note1</sup>	1.2	W
Junction Temperature	$T_j$	150	°C
Storage Temperature	$T_{stg}$	−65 to +150	°C

**Note 1.** 0.7 mm × 16 cm<sup>2</sup> double sided ceramic substrate (Copper plating)

### ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25 °C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Collector Cutoff Current	$I_{CB0}$	$V_{CB} = 10\text{ V}, I_E = 0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EB0}$	$V_{EB} = 1\text{ V}, I_C = 0$			1.0	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}$ <sup>Note2</sup>	50	120	250	
Gain Bandwidth Product	$f_T$	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}$		6.5		GHz
Feed-back Capacitance	$C_{re}$	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$ <sup>Note3</sup>		0.5	0.8	pF
Insertion Power Gain	$ S_{21e} ^2$	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}, f = 1.0\text{ GHz}$		12.0		dB
Noise Figure	NF	$V_{CE} = 10\text{ V}, I_C = 7\text{ mA}, f = 1.0\text{ GHz}$		1.1		dB
Noise Figure	NF	$V_{CE} = 10\text{ V}, I_C = 40\text{ mA}, f = 1.0\text{ GHz}$		1.8	3.0	dB

**Notes** 2. Pulse measurement :  $PW \leq 350 \mu S$ , Duty Cycle  $\leq 2 \%$

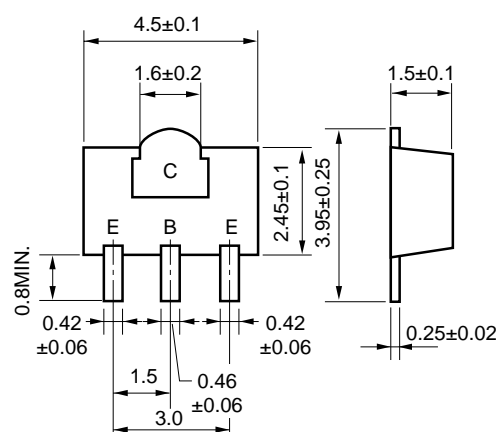
3. Measured by a 3-terminal bridge. Emitter and Case should be connected to the guard terminal.

## h<sub>FE</sub> Classification

Rank	RH	RF	RE
Marking	RH	RF	RE
h <sub>FE</sub>	50 to 100	80 to 160	125 to 250

## PACKAGE DIMENSIONS

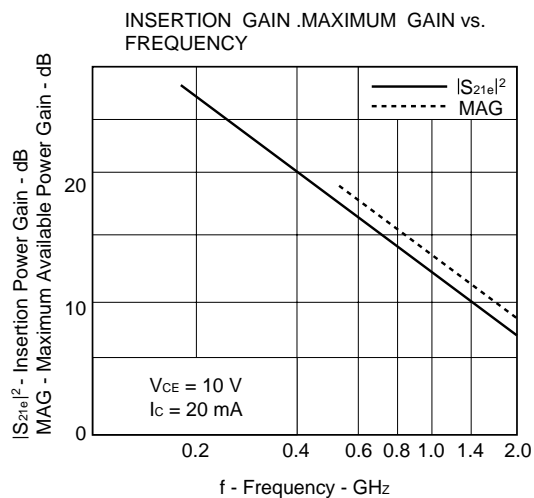
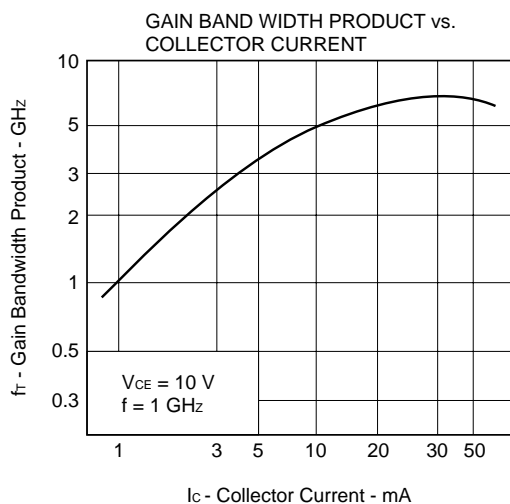
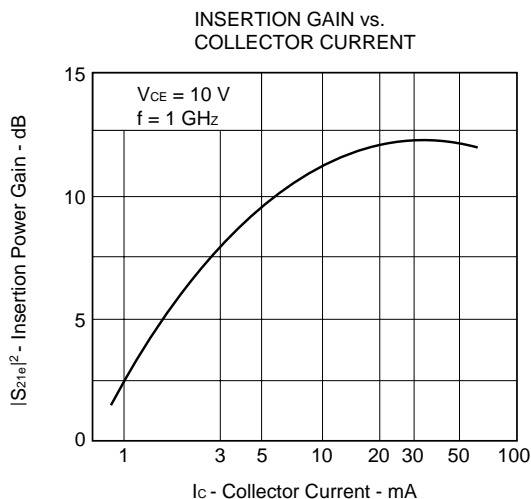
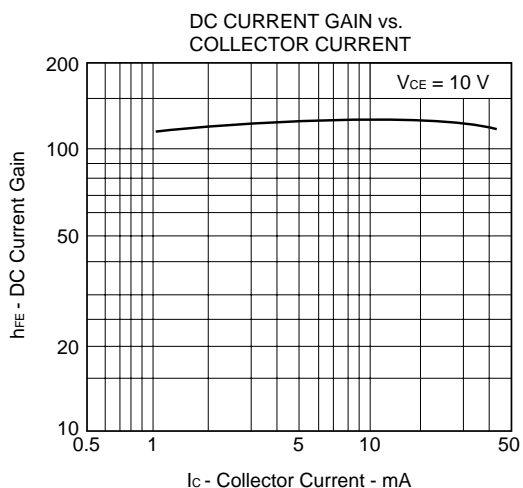
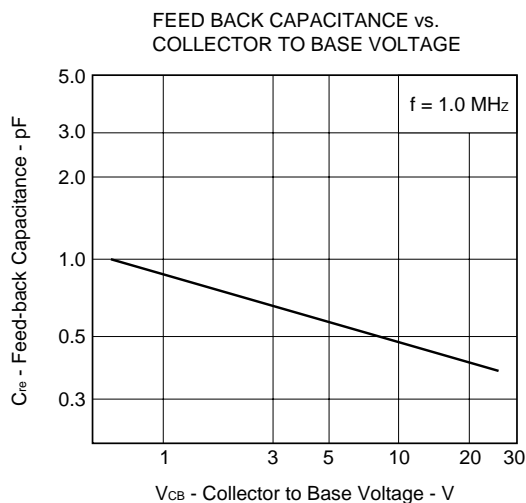
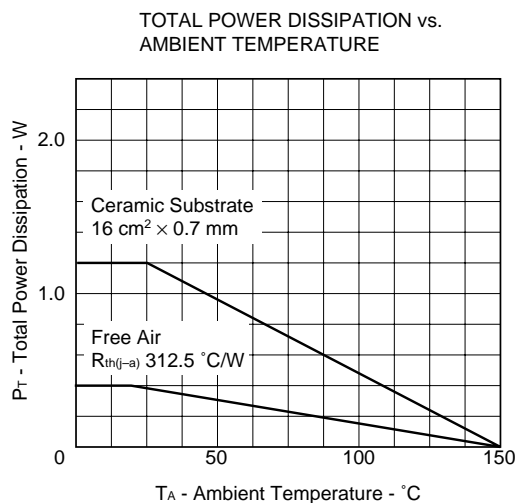
(in millimeters)

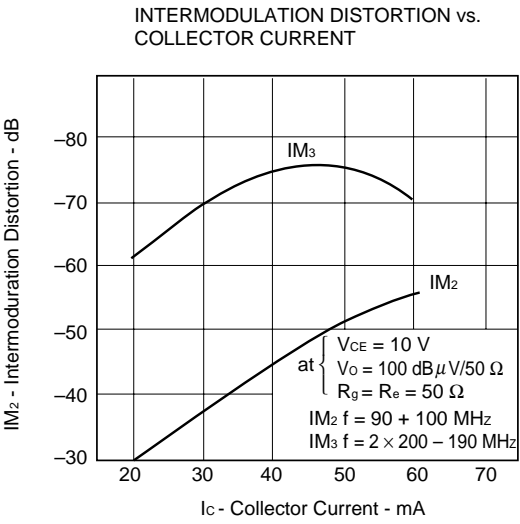
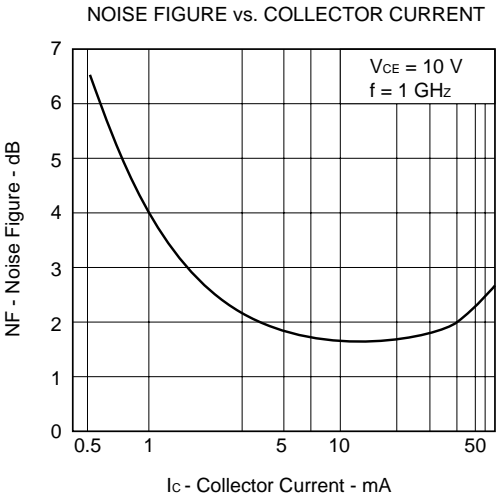


## PIN CONNECTIONS

E: Emitter  
C: Collector  
B: Base

TYPICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ )





**S-PARAMETER**

$V_{CE} = 10\text{ V}$ ,  $I_C = 20\text{ mA}$

f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	.519	– 74.5	30.931	131.9	.017	60.6	.752	– 30.2
200	.413	– 112.9	18.965	111.5	.031	61.9	.570	– 39.7
300	.413	– 133.4	13.324	101.9	.038	65.1	.465	– 39.8
400	.345	– 145.7	10.164	95.9	.045	69.8	.428	– 40.1
500	.331	– 153.8	8.177	91.8	.055	71.8	.436	– 41.1
600	.320	– 159.6	6.834	89.1	.064	70.9	.438	– 43.5
700	.302	– 166.8	5.832	86.7	.074	73.9	.434	– 47.5
800	.296	– 169.2	5.107	84.3	.077	74.4	.429	– 47.8
900	.283	– 173.2	4.600	83.1	.088	71.2	.436	– 46.5
1000	.285	– 179.8	4.200	82.3	.097	74.5	.455	– 47.8
1100	.265	175.2	3.930	80.8	.100	76.3	.467	– 46.8
1200	.260	174.1	3.979	78.5	.109	75.9	.529	– 47.4
1300	.263	166.0	3.741	68.6	.114	76.8	.551	– 55.8
1400	.242	163.0	3.115	66.6	.119	78.3	.509	– 55.8
1500	.252	160.1	2.844	65.7	.133	82.0	.510	– 58.5
1600	.253	154.0	2.595	64.1	.140	81.0	.496	– 55.2
1700	.253	149.9	2.420	63.7	.158	80.9	.515	– 54.8
1800	.257	147.2	2.305	63.0	.165	82.2	.518	– 56.5
1900	.262	143.0	2.171	62.6	.172	80.5	.536	– 58.6
2000	.273	141.5	2.049	61.2	.177	78.3	.524	– 61.5

S-PARAMETER

$V_{CE} = 10\text{ V}$ ,  $I_C = 40\text{ mA}$

f (MHz)	S <sub>11</sub>		S <sub>21</sub>		S <sub>12</sub>		S <sub>22</sub>	
	MAG	ANG	MAG	ANG	MAG	ANG	MAG	ANG
100	.378	– 97.1	32.908	123.3	.017	71.1	.665	– 34.7
200	.317	– 131.8	18.819	106.0	.027	71.2	.487	– 38.7
300	.308	– 150.1	12.955	97.5	.035	71.8	.398	– 38.5
400	.299	– 158.7	9.775	93.1	.042	78.1	.393	– 36.9
500	.297	– 165.5	7.899	89.8	.052	78.5	.399	– 37.6
600	.288	– 169.2	6.586	87.6	.061	79.1	.407	– 39.9
700	.274	– 173.7	5.607	85.2	.071	77.4	.400	– 44.6
800	.261	– 177.3	4.879	83.5	.081	76.4	.415	– 47.4
900	.255	178.9	4.435	82.2	.092	76.5	.399	– 46.2
1000	.260	173.0	4.024	81.4	.095	77.6	.440	– 44.3
1100	.243	169.4	3.801	80.6	.098	77.1	.441	– 45.2
1200	.239	169.3	3.827	78.2	.109	78.3	.494	– 46.2
1300	.245	160.3	3.587	68.4	.117	78.0	.517	– 55.4
1400	.216	157.8	2.980	66.0	.125	80.3	.486	– 54.5
1500	.235	155.3	2.726	66.1	.137	86.5	.500	– 59.0
1600	.243	148.8	2.537	64.0	.143	80.6	.474	– 53.7
1700	.233	146.0	2.348	64.2	.159	81.2	.496	– 56.8
1800	.242	144.6	2.200	63.5	.163	80.4	.491	– 53.6
1900	.249	141.9	2.073	63.3	.171	81.7	.534	– 58.0
2000	.260	140.4	1.986	61.7	.184	77.5	.535	– 61.3

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