PRELIMINARY DATA SHEET

NEC

Silicon Transistor
2SC5336

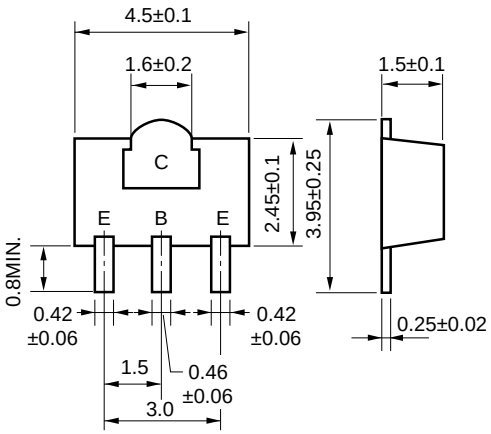
NPN EPITAXIAL SILICON TRANSISTOR
HIGH FREQUENCY LOW DISTORTION AMPLIFIER

FEATURES

- High gain
  $|S_{21}|^2$ = 12 dB TYP, @f = 1 GHz, V_{CE} = 10 V, Ic = 20 mA
- New power mini-mold package version of a 4-pin type gain-improved on the 2SC3357

PACKAGE DIMENSIONS

(in millimeters)



PIN CONNECTIONS
E: Emitter
C: Collector
B: Base

ABSOLUTE MAXIMUM RATINGS (T_A = 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 Note1	1.2	W
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	–65 to +150	°C

Note 1. 0.7 mm × 16 cm^2 double sided ceramic substrate (Copper plating)

ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

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

Notes 2. Pulse measurement : PW ≤ 350 μS, Duty Cycle ≤ 2 %
3. Mesured by a 3-terminal bridge. Emitter and Case should be connected to the guard terminal.

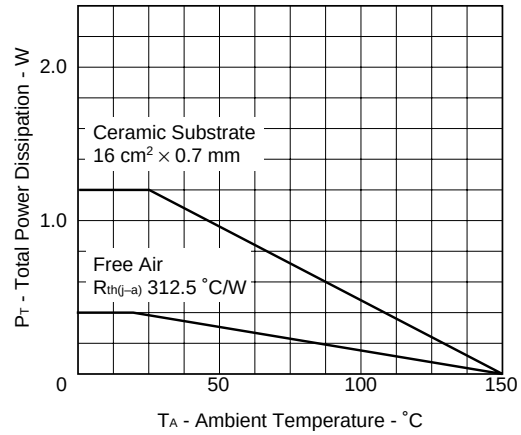
h_{FE} Classification

Rank	RH	RF	RE
Marking	RH	RF	RE
h_{FE}	50 to 100	80 to 160	125 to 250

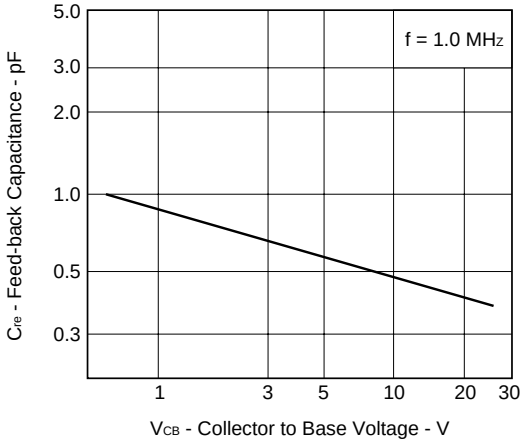
Document No. P10938EJ1V0DS00 (1st edition)
Date Published April 1996 P
Printed in Japan

TYPICAL CHARACTERISTICS (T_A = 25 °C)

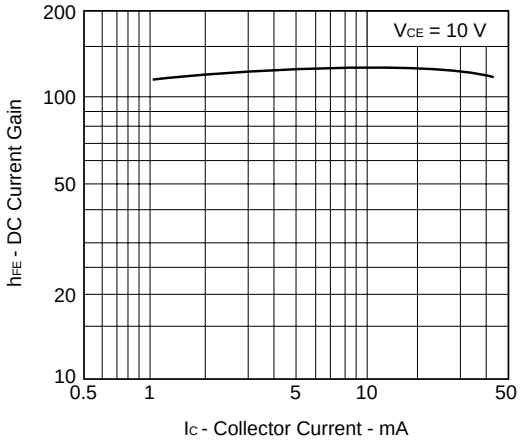
TOTAL POWER DISSIPATION vs.
AMBIENT TEMPERATURE



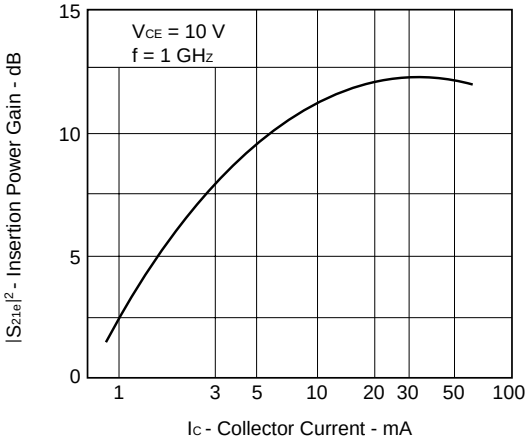
FEED BACK CAPACITANCE vs.
COLLECTOR TO BASE VOLTAGE



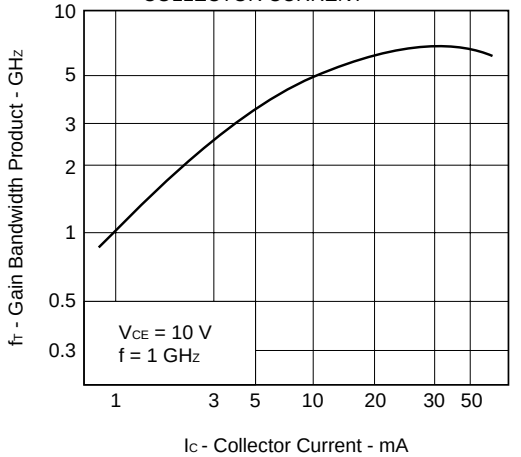
DC CURRENT GAIN vs.
COLLECTOR CURRENT



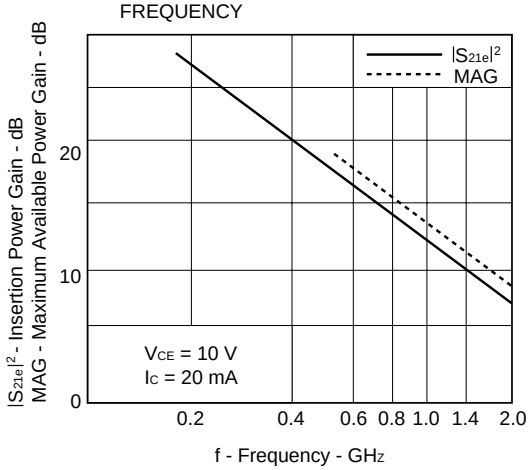
INSERTION GAIN vs.
COLLECTOR CURRENT



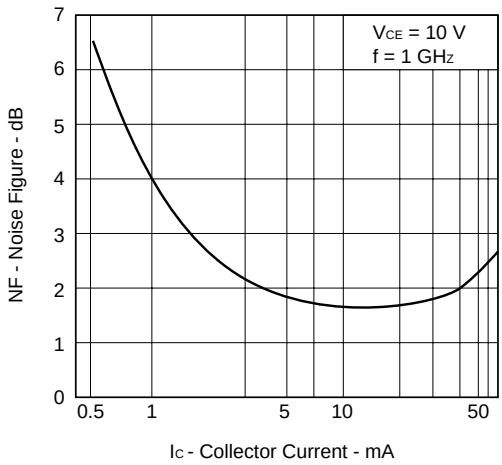
GAIN BAND WIDTH PRODUCT vs.
COLLECTOR CURRENT



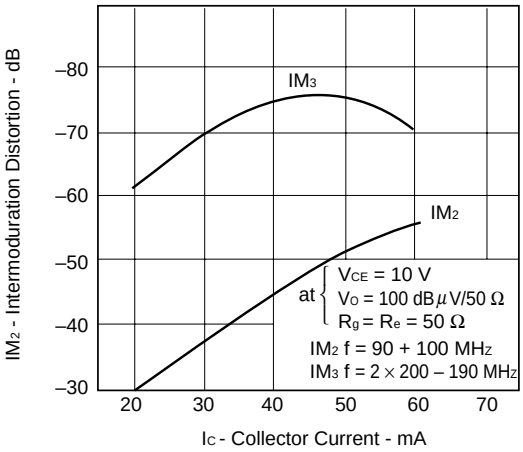
INSERTION GAIN .MAXIMUM GAIN vs.
FREQUENCY



NOISE FIGURE vs. COLLECTOR CURRENT



INTERMODULATION DISTORTION vs. COLLECTOR CURRENT



S-PARAMETER

V_{CE} = 10 V, I_C = 20 mA

	S_{11}		S_{21}		S_{12}		S_{22}	
f (MHz)	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 V, I_C = 40 mA

	S_{11}		S_{21}		S_{12}		S_{22}	
f (MHz)	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

M4 94.11