

**NPN SILICON EPITAXIAL TRANSISTOR
POWER MINI MOLD**

DESCRIPTION

The 2SC3357 is an NPN silicon epitaxial transistor designed for low noise amplifier at VHF, UHF and CATV band.

It has large dynamic range and good current characteristic.

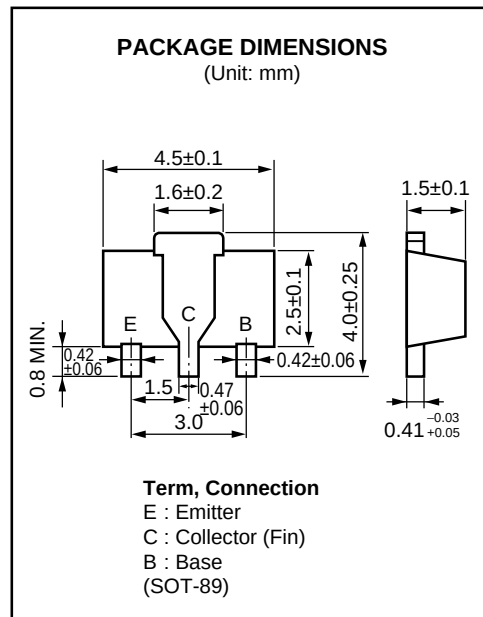
FEATURES

- Low Noise and High Gain
 $NF = 1.1 \text{ dB TYP.}$, $G_a = 8.0 \text{ dB TYP.}$ @ $V_{CE} = 10 \text{ V}$,
 $I_C = 7 \text{ mA}$, $f = 1.0 \text{ GHz}$
 $NF = 1.8 \text{ dB TYP.}$, $G_a = 9.0 \text{ dB TYP.}$ @ $V_{CE} = 10 \text{ V}$,
 $I_C = 40 \text{ mA}$, $f = 1.0 \text{ GHz}$
- Large P_T in Small Package
 $P_T : 2 \text{ W}$ with $16 \text{ cm}^2 \times 0.7 \text{ mm}$ Ceramic Substrate.

ABSOLUTE MAXIMUM RATINGS (T_A = 25 °C)

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^*	1.2	W
Thermal Resistance	$R_{th(j-a)}^*$	62.5	$^{\circ}C/W$
Junction Temperature	T_j	150	$^{\circ}C$
Storage Temperature	T_{stg}	-65 to +150	$^{\circ}C$

* mounted on $16\text{ cm}^2 \times 0.7\text{ mm}$ Ceramic Substrate



ELECTRICAL CHARACTERISTICS (T_A = 25 °C)

CHARACTERISTIC	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITIONS
Collector Cutoff Current	I _{CBO}			1.0	μA	V _{CB} = 10 V, I _E = 0
Emitter Cutoff Current	I _{EBO}			1.0	μA	V _{EB} = 1.0 V, I _C = 0
DC Current Gain	h _{FE} *	50	120	300		V _{CE} = 10 V, I _C = 20 mA
Gain Bandwidth Product	f _T		6.5		GHz	V _{CE} = 10 V, I _C = 20 mA
Feed-Back Capacitance	C _{re} **		0.65	1.0	pF	V _{CB} = 10 V, I _E = 0, f = 1.0 MHz
Insertion Power Gain	S _{21e} ²		9		dB	V _{CE} = 10 V, I _C = 20 mA, f = 1.0 GHz
Noise Figure	NF		1.1		dB	V _{CE} = 10 V, I _C = 7 mA, f = 1.0 GHz
Noise Figure	NF		1.8	3.0	dB	V _{CE} = 10 V, I _C = 40 mA, f = 1.0 GHz

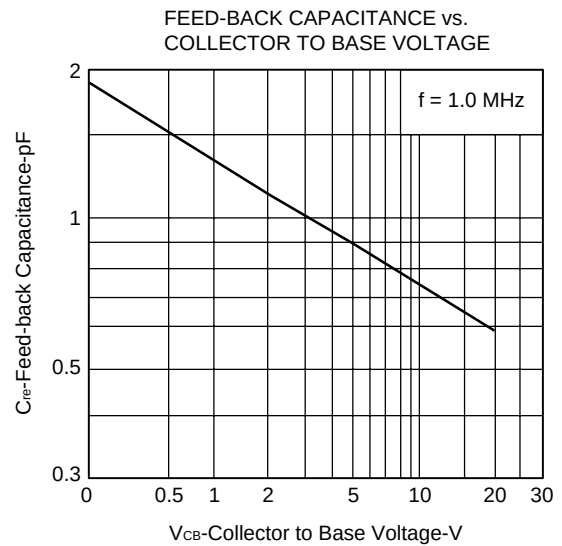
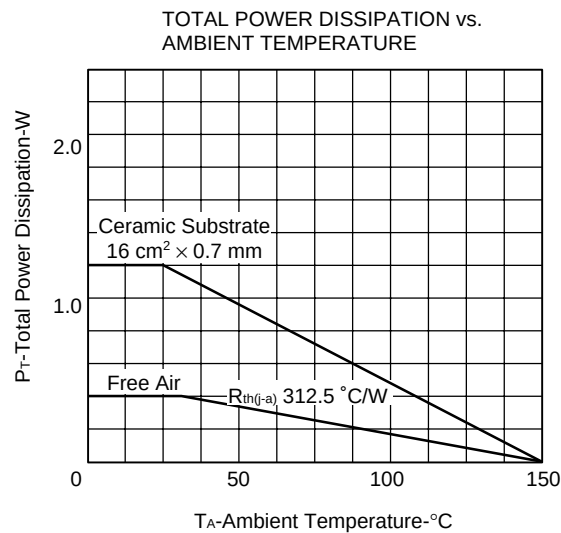
* Pulse Measurement PW ≤ 350 μs, Duty Cycle ≤ 2 %

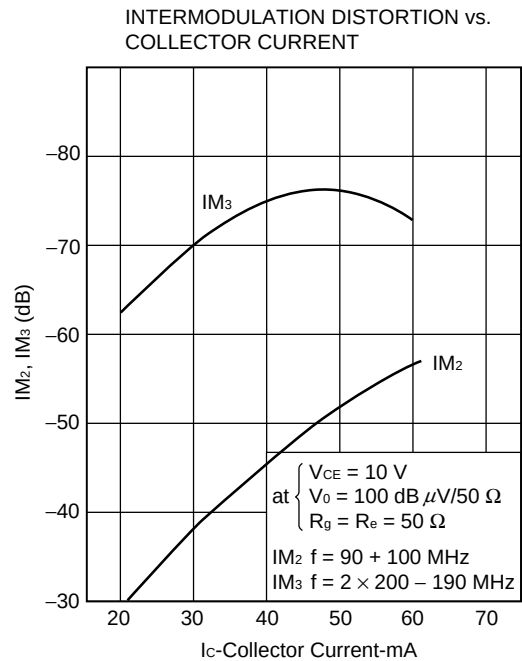
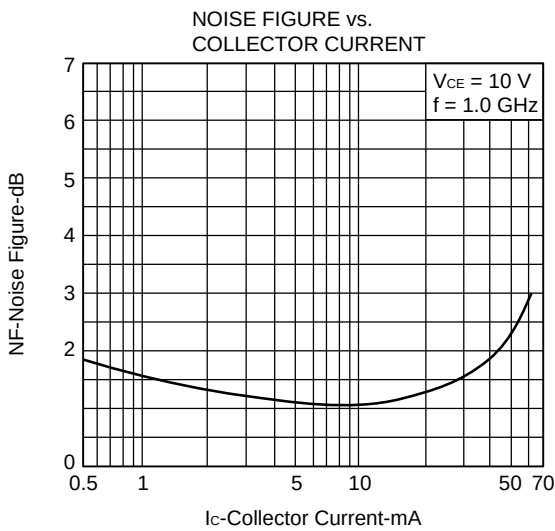
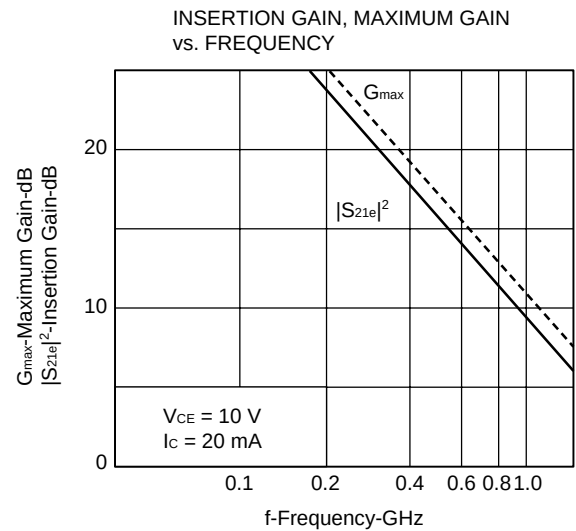
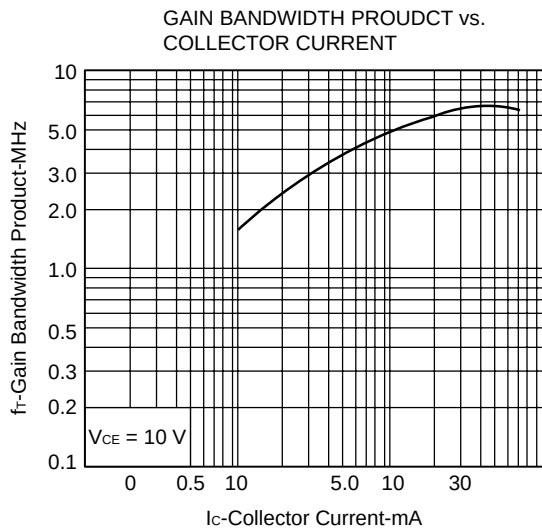
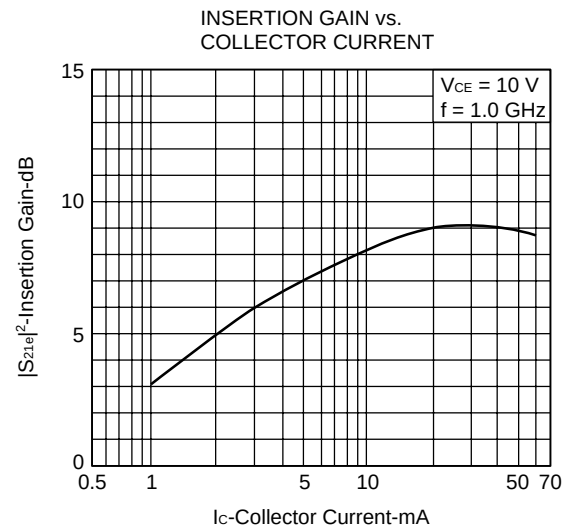
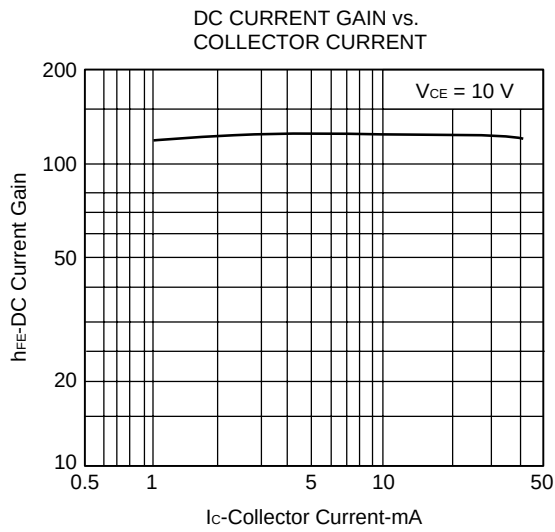
** The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h_{FE} Classification

Class	RH	RF	RE
Marking	RH	RF	RE
h _{FE}	50 to 100	80 to 160	125 to 250

TYPICAL CHARACTERISTICS (T_A = 25 °C)





S-PARAMETER

$V_{CE} = 10\text{ V}$, $I_C = 40\text{ mA}$, $Z_O = 50\ \Omega$

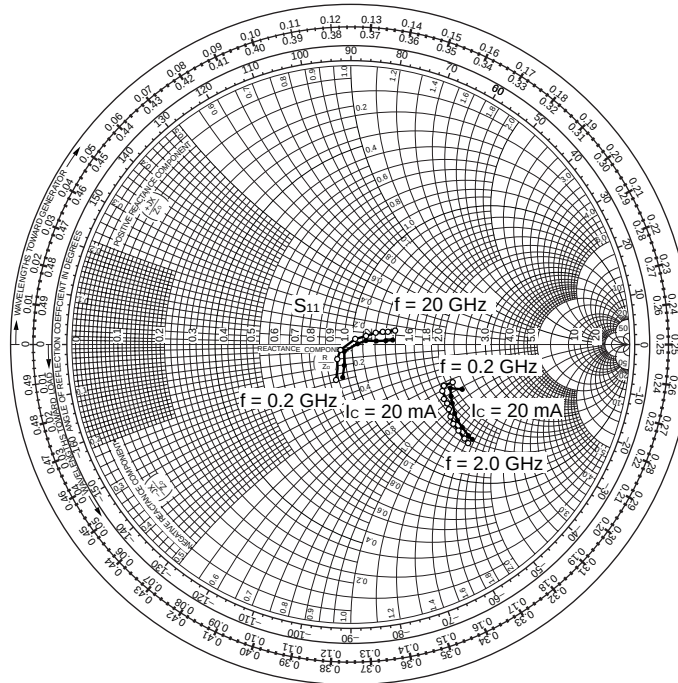
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.196	-94.4	13.023	102.4	0.043	74.5	0.444	-21.1
400	0.103	-118.3	6.852	89.2	0.081	77.4	0.398	-25.3
600	0.056	-131.1	4.632	78.3	0.118	77.5	0.399	-26.9
800	0.024	-43.7	3.527	75.9	0.152	78.0	0.414	-28.9
1000	0.008	-2.0	2.854	68.7	0.188	78.4	0.440	-33.5
1200	0.039	13.1	2.421	65.7	0.218	75.7	0.461	-33.3
1400	0.072	11.8	2.118	59.0	0.255	71.7	0.479	-36.3
1600	0.102	9.6	1.887	57.1	0.278	73.1	0.499	-35.5
1800	0.129	8.6	1.681	52.5	0.308	71.3	0.515	-38.8
2000	0.151	9.8	1.579	51.4	0.339	71.8	0.537	-35.9

$V_{CE} = 10\text{ V}$, $I_C = 20\text{ mA}$, $Z_O = 50\ \Omega$

f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.130	-109.2	13.430	98.1	0.042	79.0	0.403	-22.1
400	0.073	-134.1	6.930	87.2	0.081	80.6	0.382	-24.7
600	0.037	-146.6	4.690	79.4	0.119	79.4	0.392	-25.6
800	0.010	177.1	3.560	75.2	0.154	79.7	0.412	-27.1
1000	0.024	23.7	2.878	68.2	0.191	76.5	0.440	-31.9
1200	0.056	17.2	2.439	65.4	0.220	76.8	0.463	-32.3
1400	0.093	13.8	2.133	59.0	0.257	72.9	0.483	-35.7
1600	0.124	12.0	1.898	57.3	0.280	74.0	0.504	-35.3
1800	0.151	11.0	1.693	52.9	0.311	72.4	0.519	-38.4
2000	0.174	13.4	1.591	52.0	0.341	72.8	0.542	-36.3

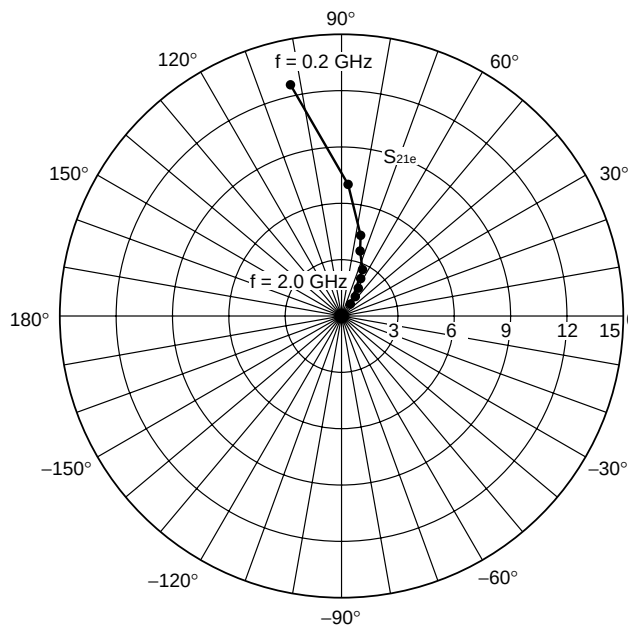
S_{11e} , S_{22e} -FREQUENCY

CONDITION $V_{CE} = 10\text{ V}$



S_{21e} -FREQUENCY

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



S_{12e} -FREQUENCY

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

