

**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.

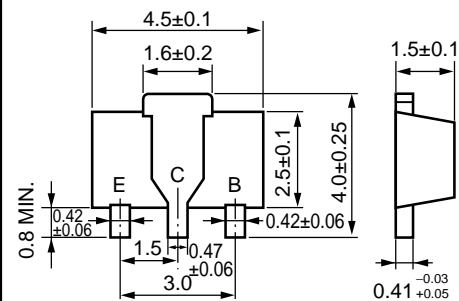
**FEATURES**

- 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 ( $T_A = 25^\circ\text{C}$ )**

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	$^\circ\text{C/W}$
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$

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

**PACKAGE DIMENSIONS**  
(Unit: mm)**Term, Connection**

E : Emitter  
 C : Collector (Fin)  
 B : Base  
 (SOT-89)

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

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

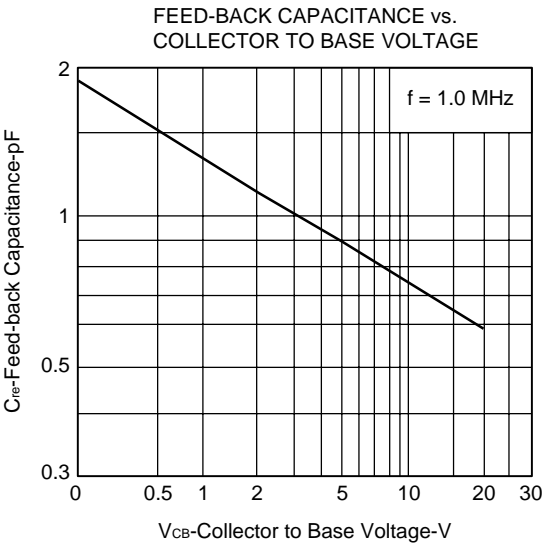
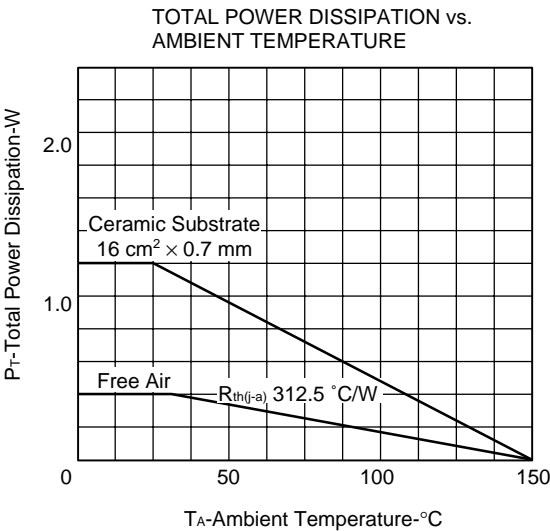
\* Pulse Measurement PW ≤ 350 μs, Duty Cycle ≤ 2 %

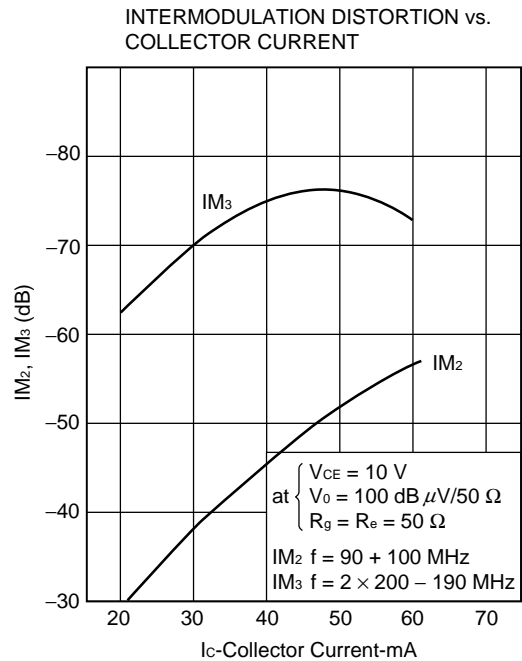
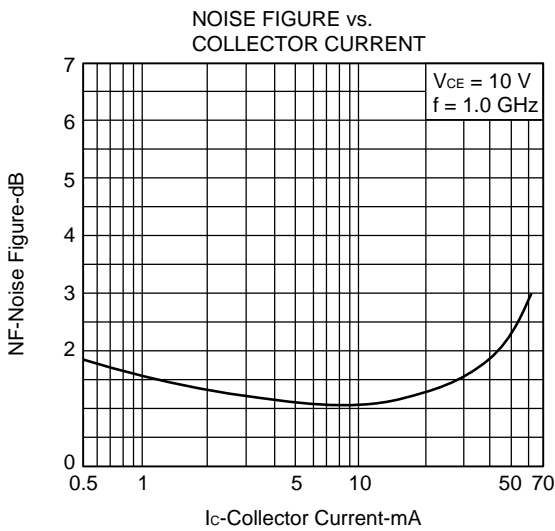
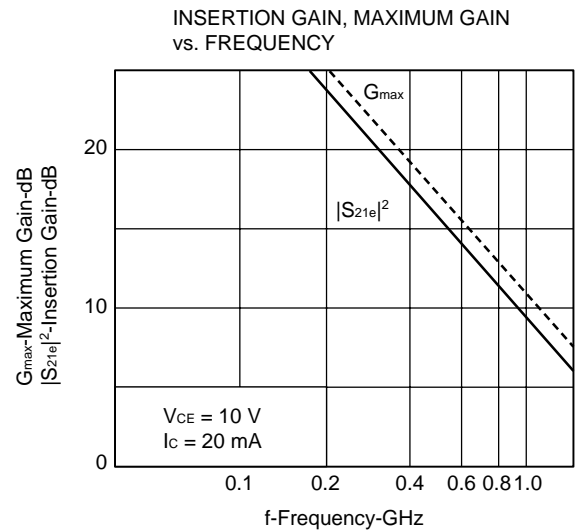
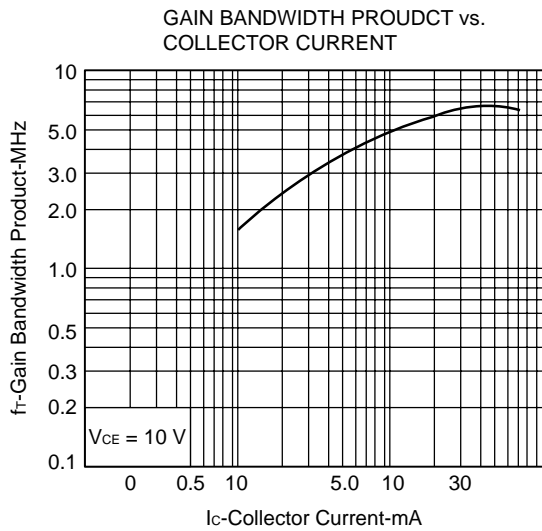
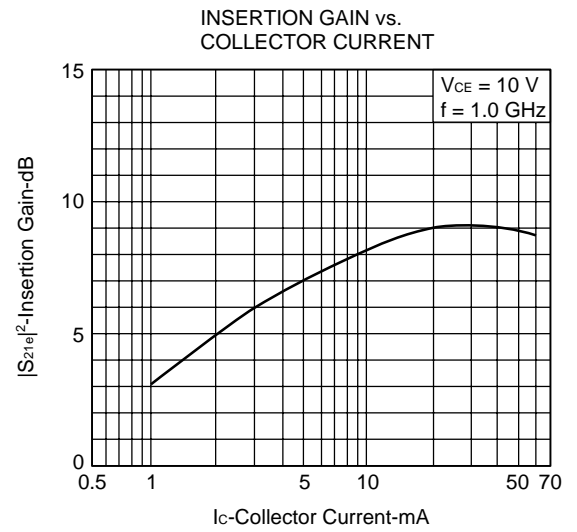
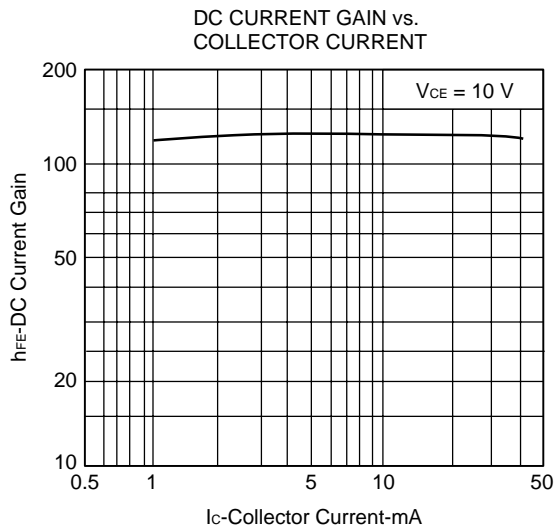
\*\* The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h<sub>FE</sub> Classification

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

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





**S-PARAMETER**

$V_{CE} = 10\text{ V}$ ,  $I_C = 40\text{ mA}$ ,  $Z_0 = 50\ \Omega$

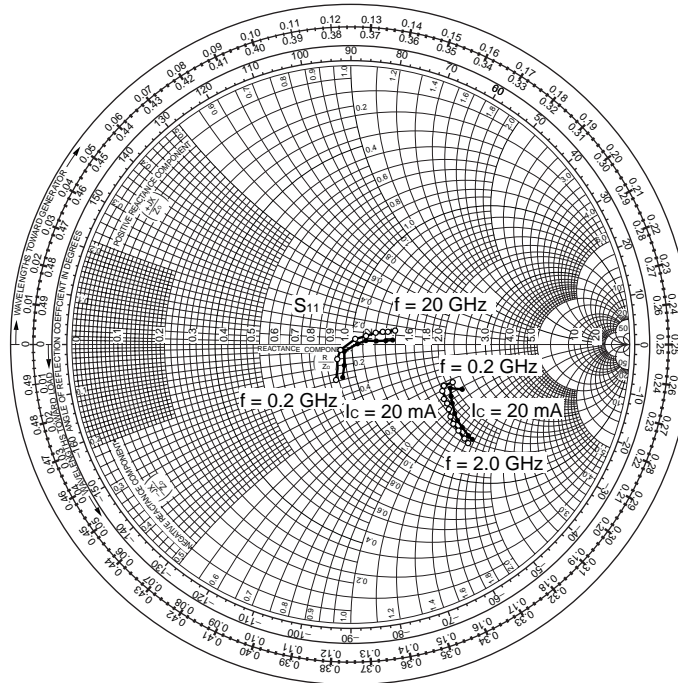
f (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
200	0.196	-94.4	13.023	102.4	0.043	74.5	0.444	-21.1
400	0.103	-118.3	6.852	89.2	0.081	77.4	0.398	-25.3
600	0.056	-131.1	4.632	78.3	0.118	77.5	0.399	-26.9
800	0.024	-43.7	3.527	75.9	0.152	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

$V_{CE} = 10\text{ V}$ ,  $I_C = 20\text{ mA}$ ,  $Z_0 = 50\ \Omega$

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

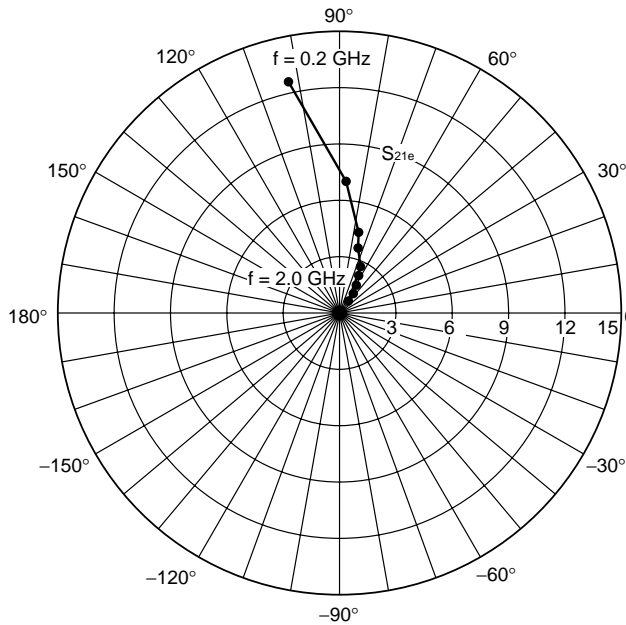
$S_{11e}$ ,  $S_{22e}$ -FREQUENCY

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



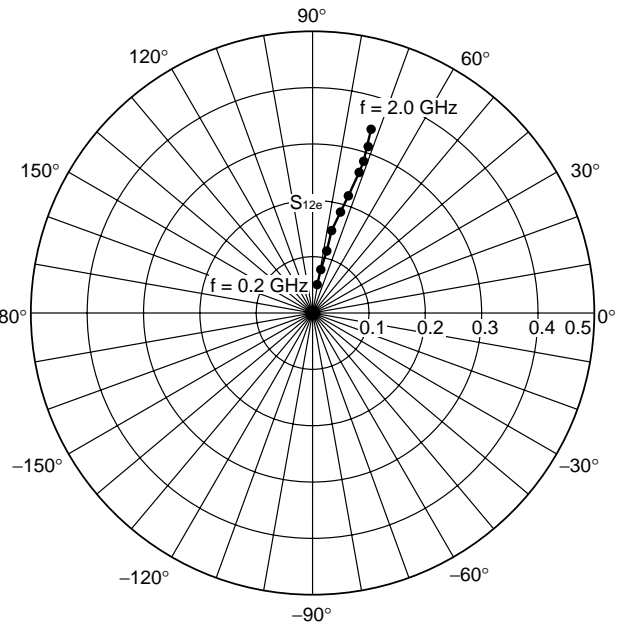
$S_{21e}$ -FREQUENCY

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



$S_{12e}$ -FREQUENCY

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



[MEMO]

[MEMO]

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Anti-radioactive design is not implemented in this product.