

DATA SHEET



NPN SILICON RF TRANSISTOR NE85634 / 2SC3357 JEITA Part No.

NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION 3-PIN POWER MINIMOLD

FEATURES

- Low noise and high gain
- ★ $NF = 1.1 \text{ dB TYP.}, G_a = 7.5 \text{ dB TYP. @ } V_{CE} = 10 \text{ V}, I_c = 7 \text{ mA}, f = 1 \text{ GHz}$
 $NF = 1.8 \text{ dB TYP.}, G_a = 9.0 \text{ dB TYP. @ } V_{CE} = 10 \text{ V}, I_c = 40 \text{ mA}, f = 1 \text{ GHz}$
- ★ • High power gain : $MAG = 10 \text{ dB TYP. @ } I_c = 40 \text{ mA}, f = 1 \text{ GHz}$
- Large P_{tot} : $P_{tot} = 1.2 \text{ W}$ (Mounted on $16 \text{ cm}^2 \times 0.7 \text{ mm}$ (t) ceramic substrate)
- Small package : 3-pin power minimold package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE85634-A 2SC3357-A	25 pcs (Non reel)	<ul style="list-style-type: none"> • 12 mm wide embossed taping • Collector face the perforation side of the tape
NE85634-T1-A 2SC3357-T1-A	1 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.
The unit sample quantity is 25 pcs.

ABSOLUTE MAXIMUM RATINGS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	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_{tot}^{Note}	1.2	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Note Mounted on $16 \text{ cm}^2 \times 0.7 \text{ mm}$ (t) ceramic substrate

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

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THERMAL RESISTANCE

Parameter	Symbol	Value	Unit
Junction to Ambient Resistance	$R_{th(j-a)}$ ^{Note}	62.5	°C/W

Note Mounted on 16 cm² × 0.7 mm (t) ceramic substrate

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}$	–	–	1.0	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1.0\text{ V}, I_C = 0\text{ mA}$	–	–	1.0	μA
DC Current Gain	h_{FE} ^{Note 1}	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}$	50	120	250	–
RF Characteristics						
Gain Bandwidth Product	f_T	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}$	–	6.5	–	GHz
Insertion Power Gain	$ S_{21e} ^2$	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}, f = 1\text{ GHz}$	–	9.0	–	dB
Noise Figure (1)	NF	$V_{CE} = 10\text{ V}, I_C = 7\text{ mA}, f = 1\text{ GHz}$	–	1.1	–	dB
Noise Figure (2)	NF	$V_{CE} = 10\text{ V}, I_C = 40\text{ mA}, f = 1\text{ GHz}$	–	1.8	3.0	dB
Reverse Transfer Capacitance	C_{re} ^{Note 2}	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}, f = 1\text{ MHz}$	–	0.65	1.0	pF

Notes 1. Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

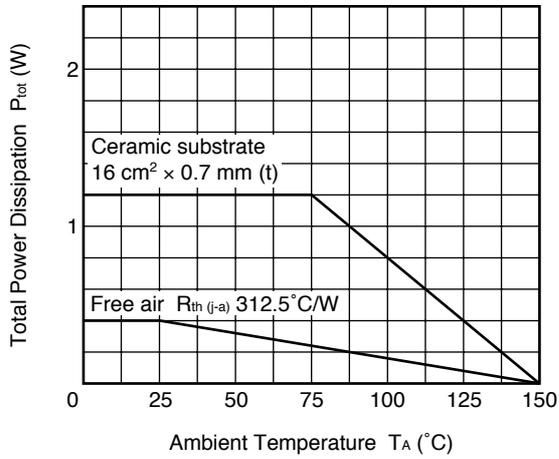
2. The emitter terminal and the case shall be connected to the guard terminal of the three-terminal capacitance bridge.

h_{FE} CLASSIFICATION

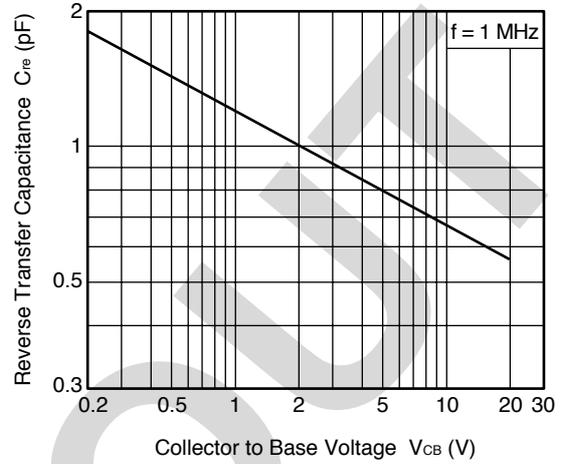
Rank	RH	RF	RE
Marking	RH	RF	RE
h _{FE} Value	50 to 100	80 to 160	125 to 250

★ TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

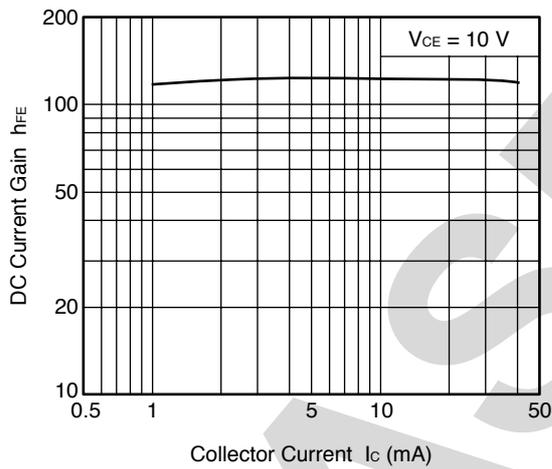
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



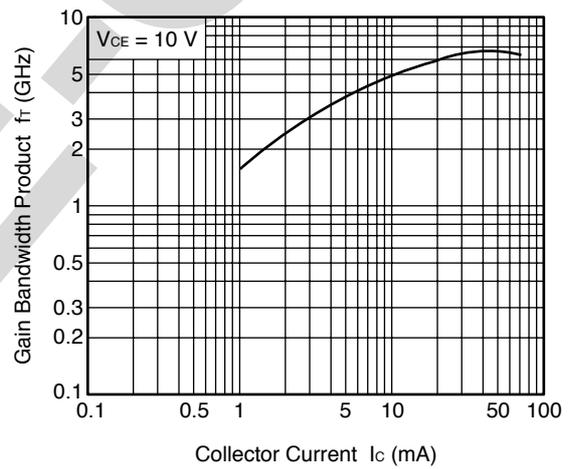
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



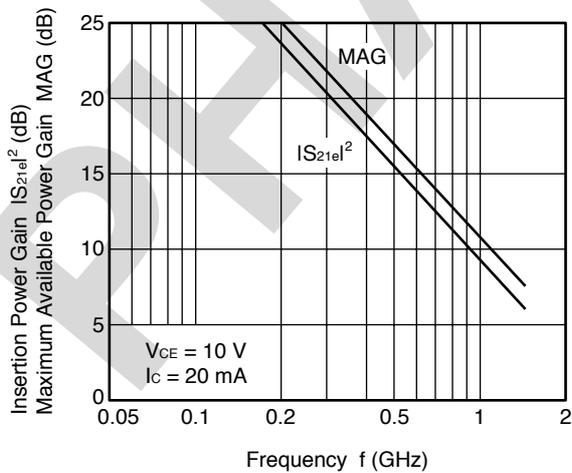
DC CURRENT GAIN vs. COLLECTOR CURRENT



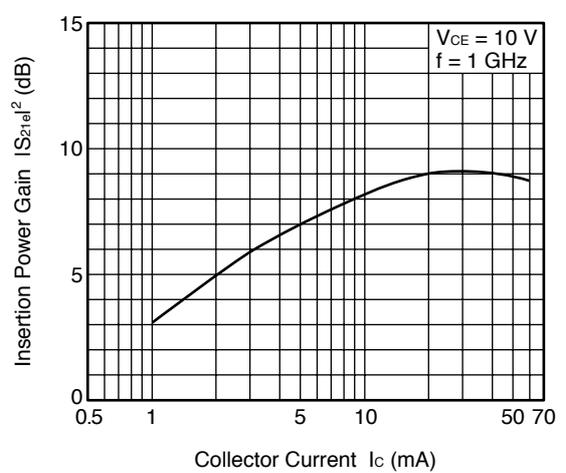
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT

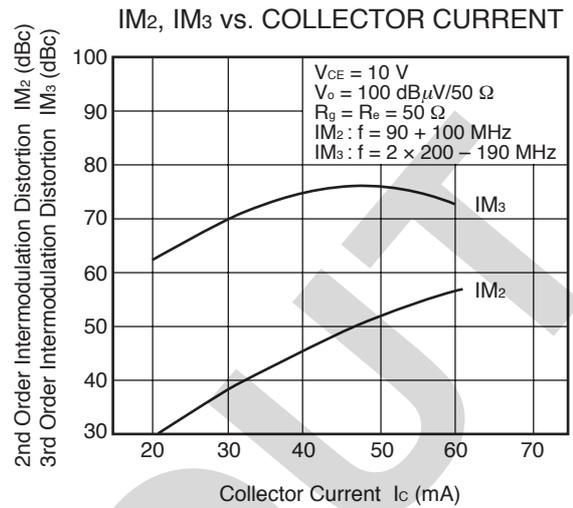
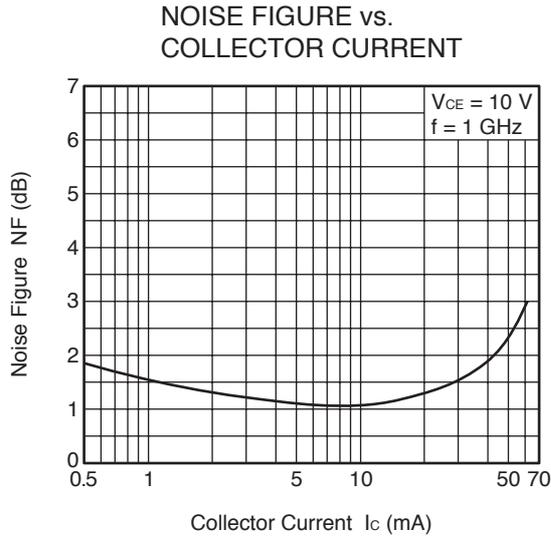


INSERTION POWER GAIN, MAG vs. FREQUENCY



INSERTION POWER GAIN vs. COLLECTOR CURRENT





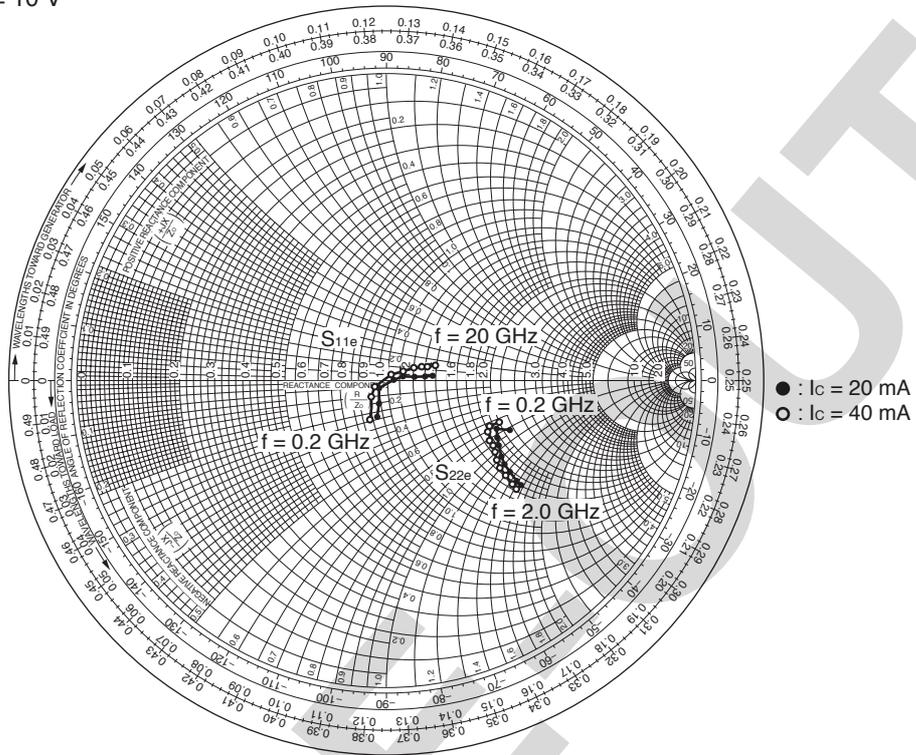
Remark The graphs indicate nominal characteristics.

S-PARAMETERS

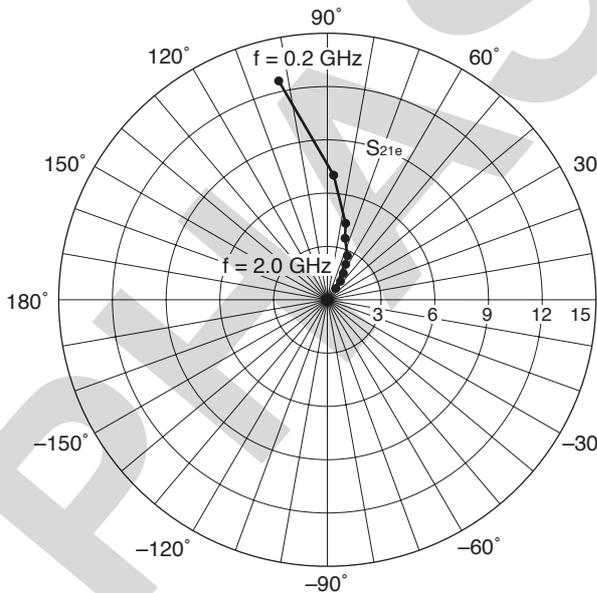
- S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.
- Click here to download S-parameters.
- [RF and Microwave] ® [Device Parameters]
- URL <http://www.necel.com/microwave/en/>

★ SMITH CHART

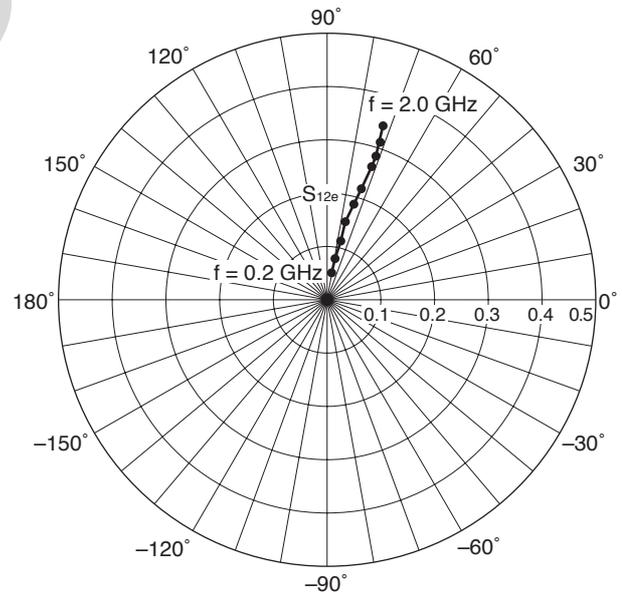
S_{11e}, S_{22e}-FREQUENCY
 CONDITION : V_{CE} = 10 V



S_{21e}-FREQUENCY
 CONDITION : V_{CE} = 10 V, I_c = 20 mA

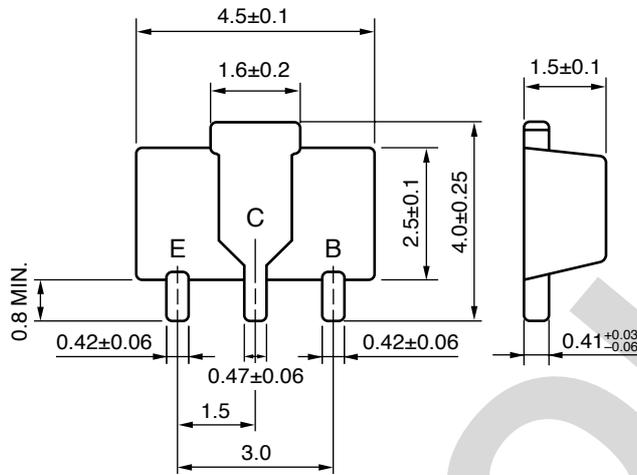


S_{12e}-FREQUENCY
 CONDITION : V_{CE} = 10 V, I_c = 20 mA



★ PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (UNIT: mm)



PIN CONNECTIONS

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

(IEC : SOT-89)

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