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# NE85633 / 2SC3356

Data Sheet

NPN Silicon RF Transistor

R09DS0021EJ0300

Rev.3.00

NPN Epitaxial Silicon RF Transistor for Microwave Low-Noise Amplification 3-pin Minimold

Jun 28, 2011

## FEATURES

- Low noise and high gain : NF = 1.1 dB TYP.,  $G_a = 11$  dB TYP. @  $V_{CE} = 10$  V,  $I_C = 7$  mA,  $f = 1$  GHz
- High power gain : MAG = 13 dB TYP. @  $V_{CE} = 10$  V,  $I_C = 20$  mA,  $f = 1$  GHz

## <R> ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NE85633 2SC3356	NE85633-A 2SC3356-A	3-pin Minimold (Pb-Free)	50 pcs (Non reel)	• 8 mm wide embossed taping  • Pin 3 (Collector) face the perforation side of the tape
NE85633-T1B 2SC3356-T1B	NE85633-T1B-A 2SC3356-T1BA		3 kpcs/reel	

**Remark** To order evaluation samples, please contact your nearby sales office.  
 The unit sample quantity is 50 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	$P_{tot}$ <sup>Note</sup>	200	mW
Junction Temperature	$T_j$	150	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-65 to +150	$^\circ\text{C}$

**Note** Free air

### CAUTION

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

The mark <R> shows major revised points.

The revised points can be easily searched by copying an "<R>" in the PDF file and specifying it in the "Find what:" field.

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

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I <sub>CB0</sub>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0	–	–	1.0	μA
Emitter Cut-off Current	I <sub>EB0</sub>	V <sub>EB</sub> = 1.0 V, I <sub>C</sub> = 0	–	–	1.0	μA
DC Current Gain	h <sub>FE</sub> <sup>Note 1</sup>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	50	120	250	–
RF Characteristics						
Gain Bandwidth Product	f <sub>T</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA	–	7	–	GHz
Insertion Power Gain	S <sub>21e</sub>   <sup>2</sup>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 20 mA, f = 1 GHz	–	11.5	–	dB
Noise Figure	NF	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 7 mA, f = 1 GHz	–	1.1	2.0	dB
Reverse Transfer Capacitance	C <sub>re</sub> <sup>Note 2</sup>	V <sub>CB</sub> = 10 V, I <sub>E</sub> = 0, f = 1 MHz	–	0.55	1.0	pF

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

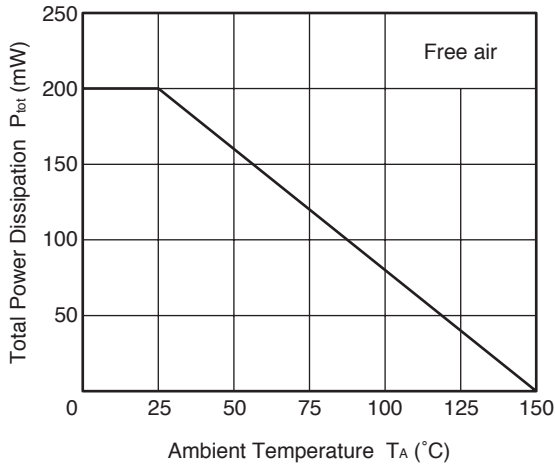
**2.** Collector to base capacitance when the emitter grounded

<R> h<sub>FE</sub> CLASSIFICATION

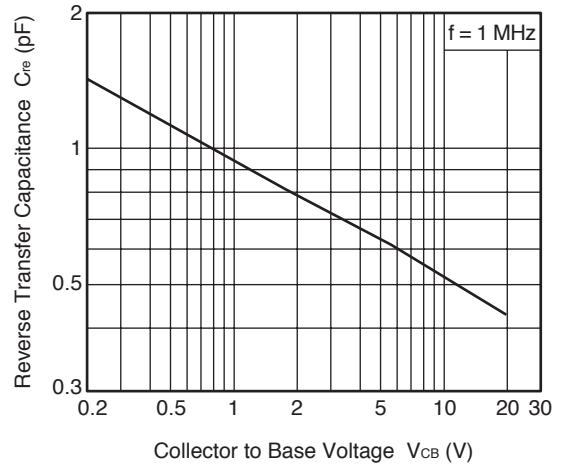
Rank	Q/YQ	R/YR	S/YS
Marking	R23	R24	R25
h <sub>FE</sub> Value	50 to 100	80 to 160	125 to 250

**TYPICAL CHARACTERISTICS (T<sub>A</sub> = +25°C, unless otherwise specified)**

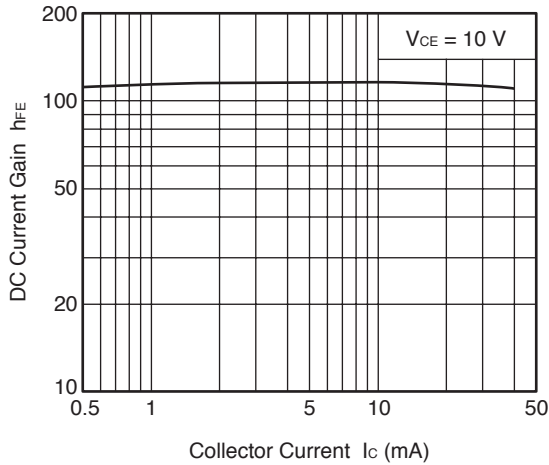
**TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE**



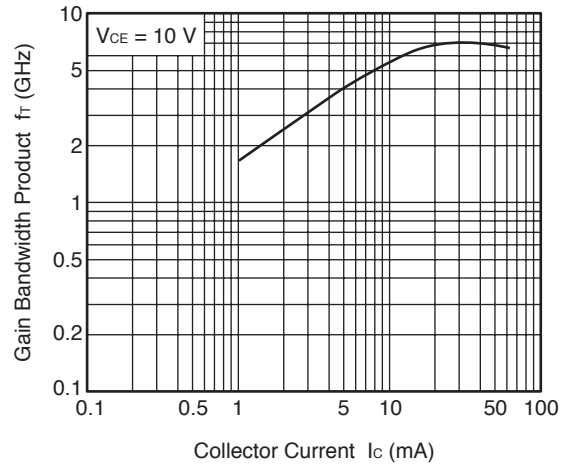
**REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE**



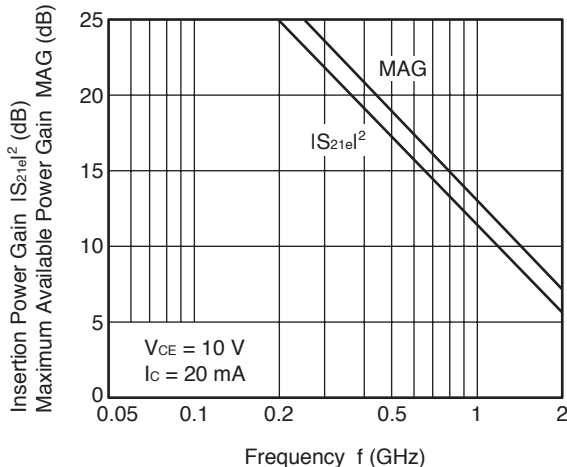
**DC CURRENT GAIN vs. COLLECTOR CURRENT**



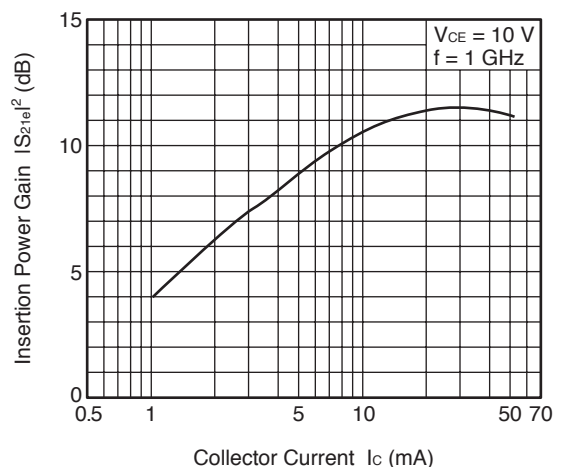
**GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT**



**INSERTION POWER GAIN, MAG vs. FREQUENCY**

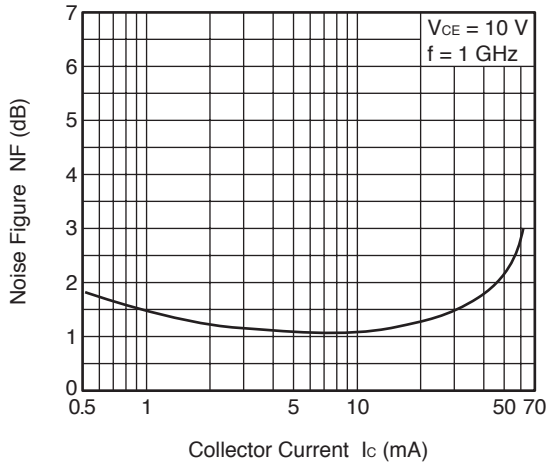


**INSERTION POWER GAIN vs. COLLECTOR CURRENT**

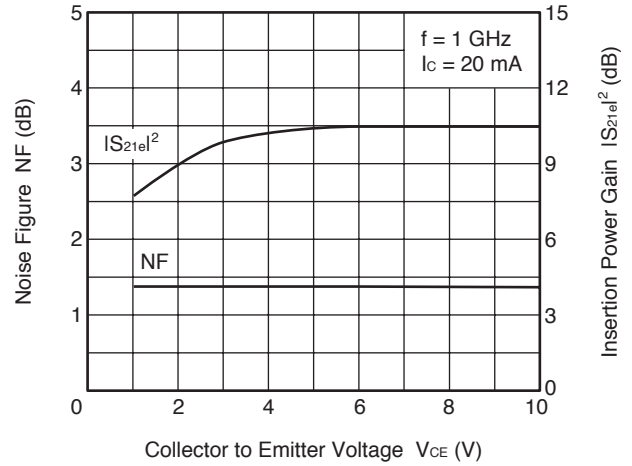


**Remark** The graphs indicate nominal characteristics.

NOISE FIGURE vs.  
COLLECTOR CURRENT



NOISE FIGURE, INSERTION POWER GAIN  
vs. COLLECTOR TO EMITTER VOLTAGE

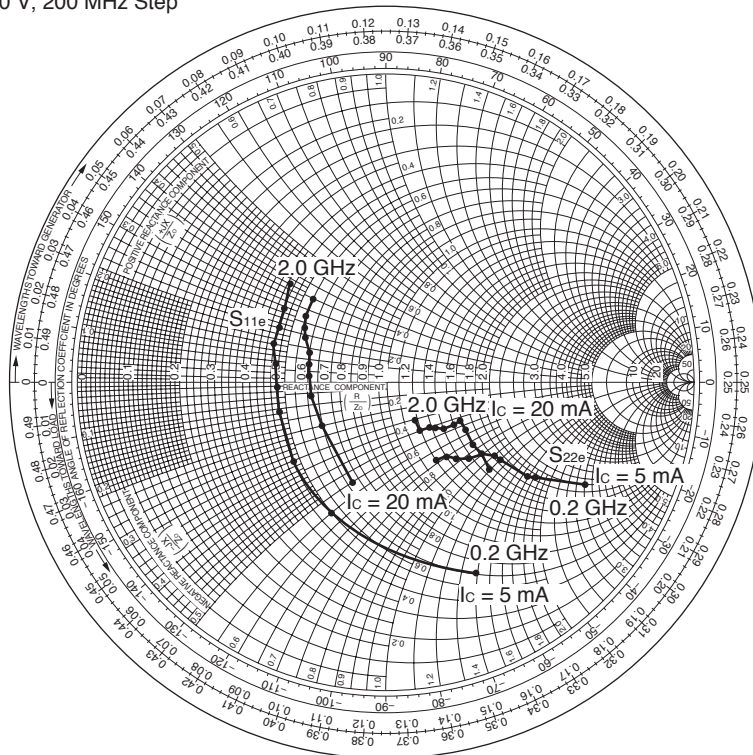


**Remark** The graphs indicate nominal characteristics.

**SMITH CHART**

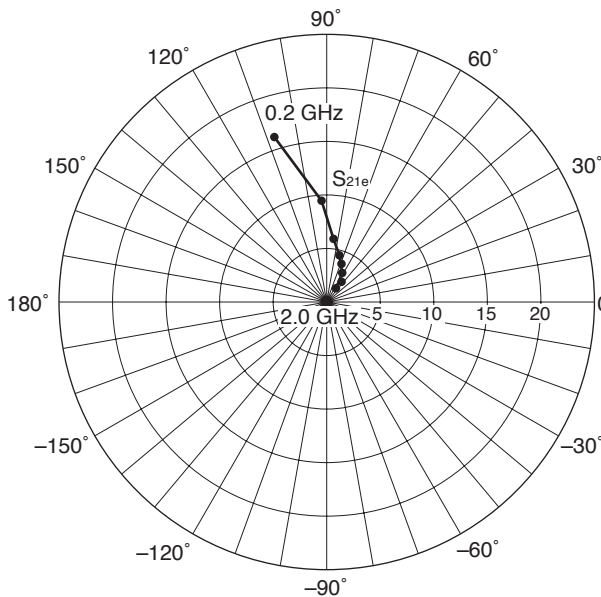
**S<sub>11e</sub>, S<sub>22e</sub>-FREQUENCY**

CONDITION : V<sub>CE</sub> = 10 V, 200 MHz Step



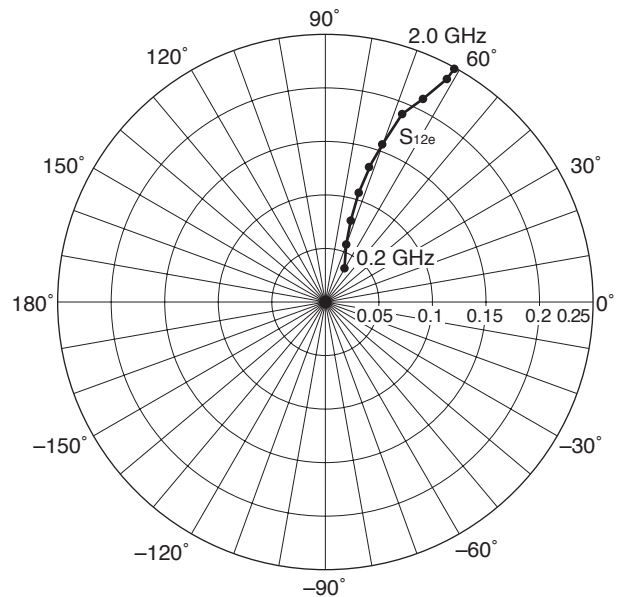
**S<sub>21e</sub>-FREQUENCY**

CONDITION : V<sub>CE</sub> = 10 V, I<sub>c</sub> = 20 mA



**S<sub>12e</sub>-FREQUENCY**

CONDITION : V<sub>CE</sub> = 10 V, I<sub>c</sub> = 20 mA



## **S-PARAMETERS**

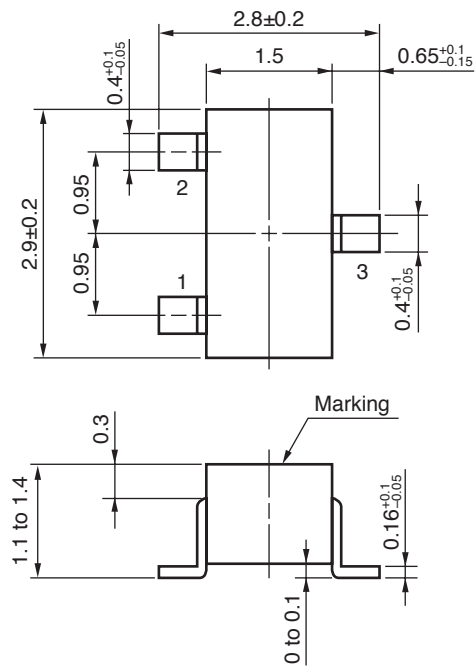
S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.

Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www2.renesas.com/microwave/en/download.html>

NE85633 / 2SC3356

**PACKAGE DIMENSIONS****3-PIN MINIMOLD (UNIT: mm)****PIN CONNECTIONS**

1. Emitter
2. Base
3. Collector



<b>Revision History</b>	<b>2SC3356 Data Sheet</b>
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Rev.	Date	Description	
		Page	Summary
-	Jun 2004	-	Previous No. :PU10209EJ02V0DS
3.00	Jun 28, 2011	p.1	Modification of <b>ORDERING INFORMATION</b>
		p.2	Modification of <b>h<sub>FE</sub> CLASSIFICATION</b>

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