



NPN SILICON RF TRANSISTOR

NE85639 / 2SC4093

JEITA
Part No.

NPN EPITAXIAL SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW-NOISE AMPLIFICATION 4-PIN MINIMOLD

DESCRIPTION

The NE85639 / 2SC4093 is a NPN silicon epitaxial transistor designed for low noise amplifier at VHF, UHF and CATV band.

It has large dynamic range and good current characteristics, and is contained in a 4-pin minimold package which enables high-isolation gain.

FEATURES

- Low Noise
 $NF = 1.1 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 7 \text{ mA, } f = 1 \text{ GHz}$
- High Power gain
 $|S_{21e}|^2 = 13 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 20 \text{ mA, } f = 1 \text{ GHz}$
- Maximum available power gain: $MAG = 14.2 \text{ dB TYP. @ } V_{CE} = 10 \text{ V, } I_C = 20 \text{ mA, } f = 1 \text{ GHz}$
- 4-pin minimold Package

★ ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE85639-A 2SC4093-A	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 3 (Base), Pin 4 (Emitter) face to perforation side of the tape
NE85639-T1-A 2SC4093-T1-A	3 kpcs/reel	

Remark To order evaluation samples, 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} ^{Note}	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

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ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$)

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}	$V_{EB} = 1\text{ V}, I_C = 0\text{ mA}$	–	–	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	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}$	–	7.0	–	GHz
Insertion Power Gain	$ S_{21e} ^2$	$V_{CE} = 10\text{ V}, I_C = 20\text{ mA}, f = 1.0\text{ GHz}$	11	13	–	dB
Noise Figure	NF	$V_{CE} = 10\text{ V}, I_C = 7\text{ mA}, f = 1.0\text{ GHz}$	–	1.1	2.0	dB
Reverse Transfer Capacitance	C_{re} ^{Note 2}	$V_{CB} = 10\text{ V}, I_E = 0\text{ mA}, f = 1.0\text{ MHz}$	–	0.6	0.95	pF

Notes 1. Pulse measurement: $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

2. Collector to base capacitance when the emitter grounded

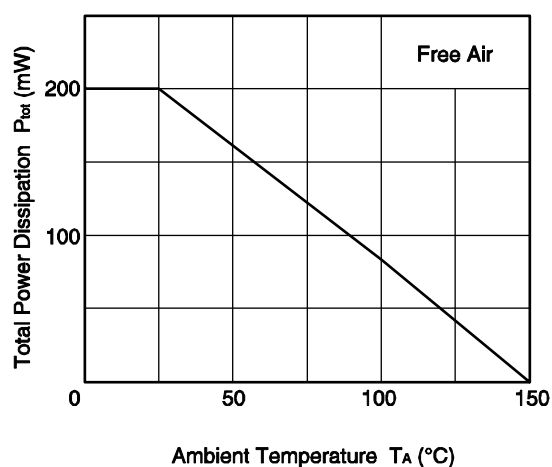
 h_{FE} CLASSIFICATION

Rank	R26/RBF ^{Note}	R27/RBG ^{Note}	R28/RBH ^{Note}
Marking	R26	R27	R28
Range	50 to 100	80 to 160	125 to 250

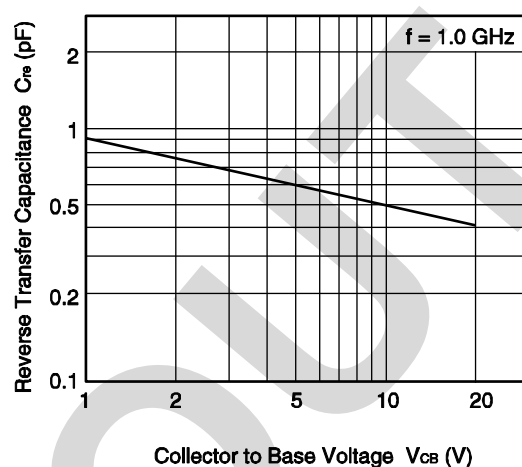
Note Old Specification / New Specification

TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise specified)

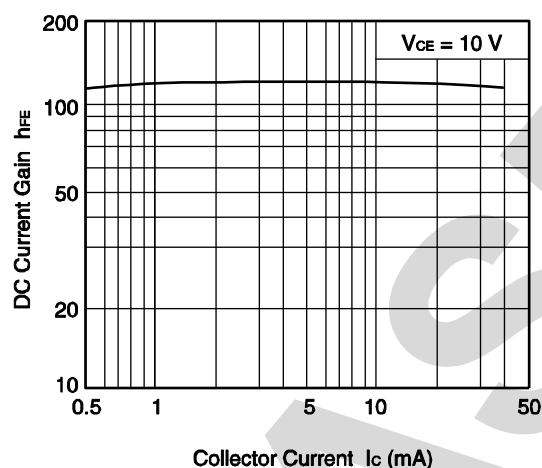
TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



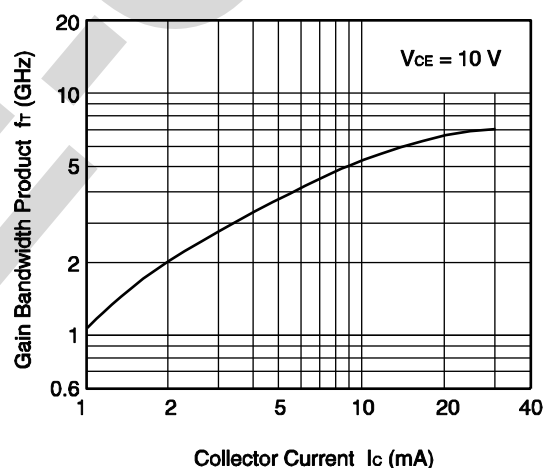
REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



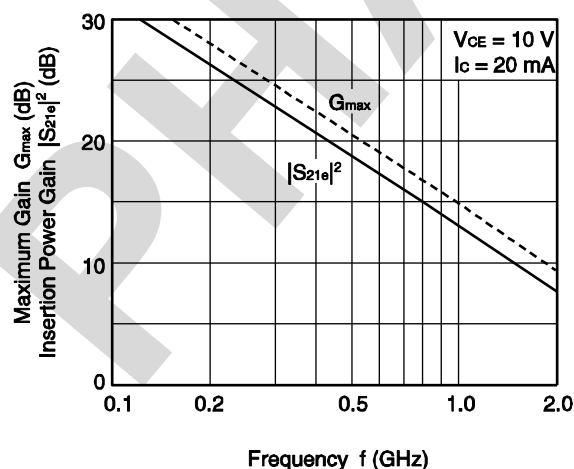
DC CURRENT GAIN vs.
COLLECTOR CURRENT



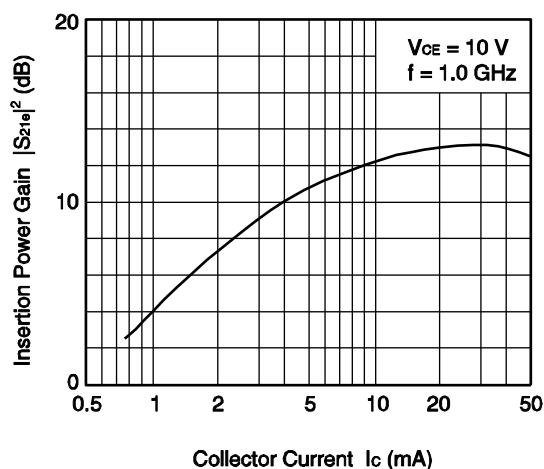
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



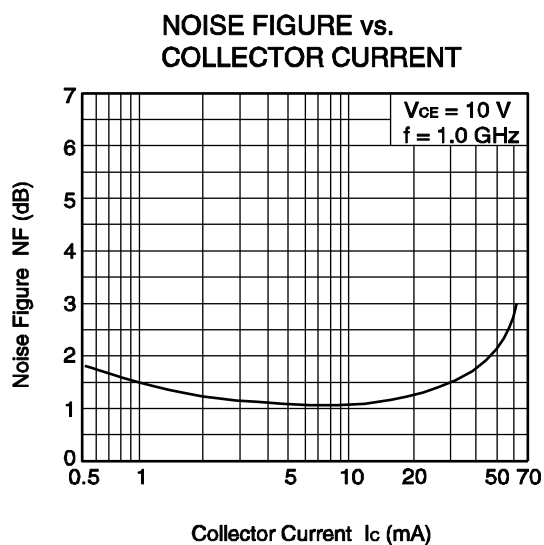
MAXIMUM GAIN/INSERTION
POWER GAIN vs. FREQUENCY



INSERTION POWER GAIN
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

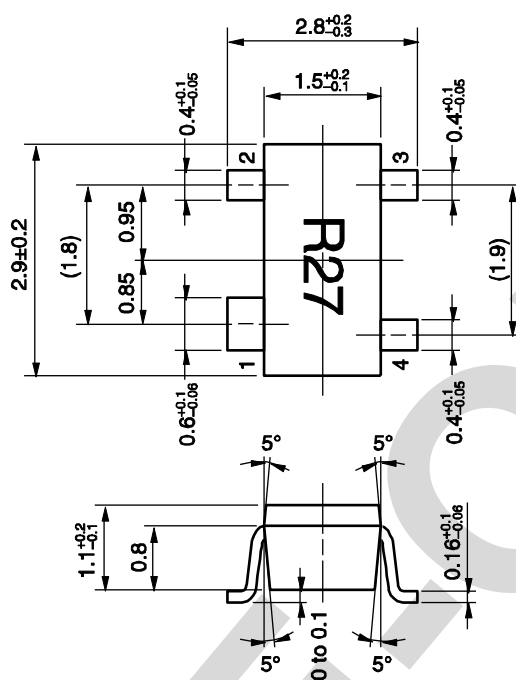


Remark The graph indicates nominal characteristics.

★ **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/>

4-PIN MINIMOLD PACKAGE (UNIT: mm)



PIN CONNECTIONS

1. Collector
2. Emitter
3. Base
4. Emitter

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