

DATA SHEET

NEC

NPN SILICON RF TRANSISTOR NE851M33

NPN SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW NOISE 3-PIN SUPER LEAD-LESS MINIMOLD (M33, 0804 PKG)

FEATURES

- Low phase distortion, low voltage operation
- Ideal for OSC applications
- 3-pin super lead-less minimold (M33, 0804 PKG) package

<R> ORDERING INFORMATION

| Part Number | Order Number | Package | Quantity | Supplying Form |
|-------------|---------------|--|-------------------|--|
| NE851M33 | NE851M33-A | 3-pin super lead-less minimold (M33, 0804 PKG) (Pb-Free) | 50 pcs (Non reel) | • 8 mm wide embossed taping • Pin 2 (Base) face the perforation side of the tape |
| NE851M33-T3 | NE851M33-T3-A | | 10 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°C)

| Parameter | Symbol | Ratings | Unit |
|------------------------------|----------------------------------|-------------|------|
| Collector to Base Voltage | V _{CBO} | 9.0 | V |
| Collector to Emitter Voltage | V _{CEO} | 5.5 | V |
| Emitter to Base Voltage | V _{EBO} | 1.5 | V |
| Collector Current | I _C | 100 | mA |
| Total Power Dissipation | P _{tot} ^{Note} | 130 | mW |
| Junction Temperature | T _J | 150 | °C |
| Storage Temperature | T _{stg} | -65 to +150 | °C |

Note Mounted on 1.08 cm² × 1.0 mm (t) glass epoxy PCB

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

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Not all products and/or types are available in every country. Please check with an NEC Electronics sales representative for availability and additional information.

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

| Parameter | Symbol | Test Conditions | MIN. | TYP. | MAX. | Unit |
|------------------------------|-----------------------------------|--|------|------|------|------|
| DC Characteristics | | | | | | |
| Collector Cut-off Current | I _{CBO} | V _{CB} = 5 V, I _E = 0 mA | – | – | 600 | nA |
| Emitter Cut-off Current | I _{EBO} | V _{EB} = 1 V, I _C = 0 mA | – | – | 600 | nA |
| DC Current Gain | h _{FE} ^{Note 1} | V _{CE} = 1 V, I _C = 5 mA | 100 | 120 | 145 | – |
| RF Characteristics | | | | | | |
| Gain Bandwidth Product (1) | f _T | V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz | 3.0 | 4.5 | – | GHz |
| Gain Bandwidth Product (2) | f _T | V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz | 5.0 | 6.5 | – | GHz |
| Insertion Power Gain (1) | S _{21e} ² | V _{CE} = 1 V, I _C = 5 mA, f = 2 GHz | 3.0 | 4.0 | – | dB |
| Insertion Power Gain (2) | S _{21e} ² | V _{CE} = 1 V, I _C = 15 mA, f = 2 GHz | 4.5 | 5.5 | – | dB |
| Noise Figure | NF | V _{CE} = 1 V, I _C = 10 mA, f = 2 GHz, Z _S = Z _{opt} | – | 1.9 | 2.5 | dB |
| Reverse Transfer Capacitance | C _{re} ^{Note 2} | V _{CB} = 0.5 V, I _E = 0 mA, f = 1 MHz | – | 0.6 | 0.8 | pF |

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

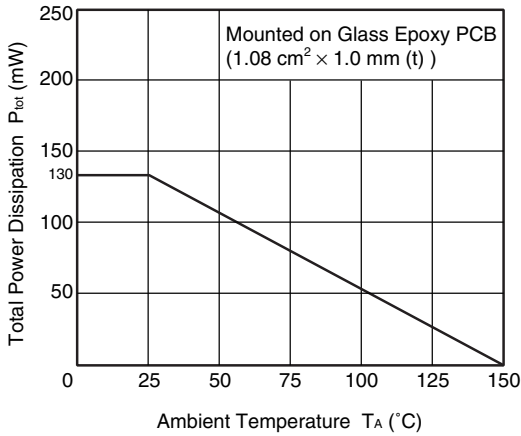
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

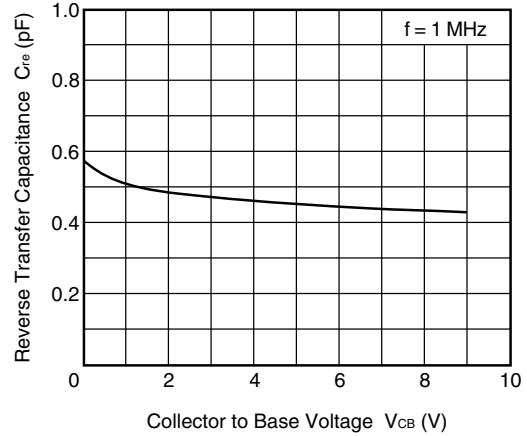
| | |
|-----------------------|------------|
| Rank | FB |
| Marking | E7 |
| h _{FE} Value | 100 to 145 |

<R> TYPICAL CHARACTERISTICS (T_A = +25°C, unless otherwise specified)

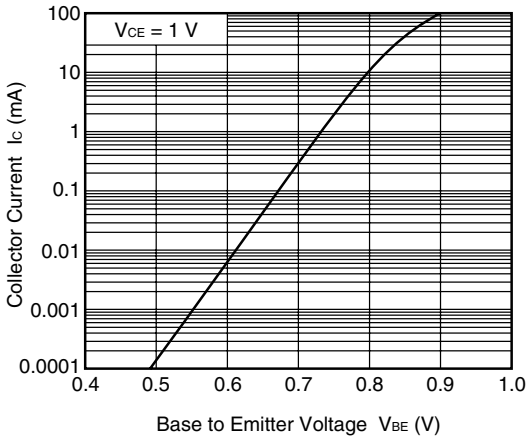
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



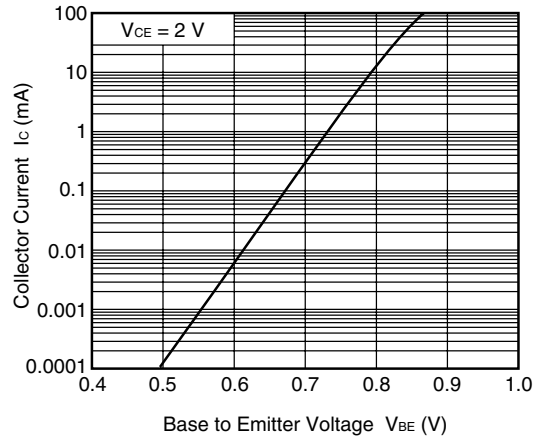
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



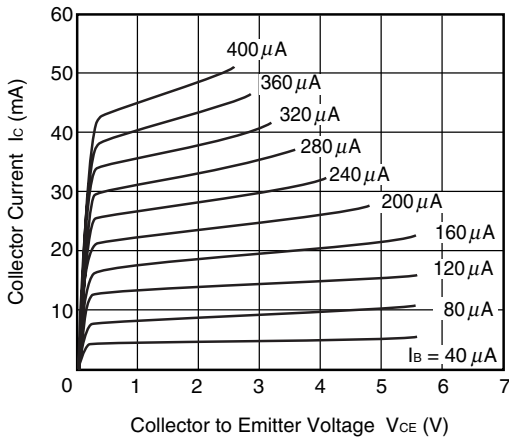
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

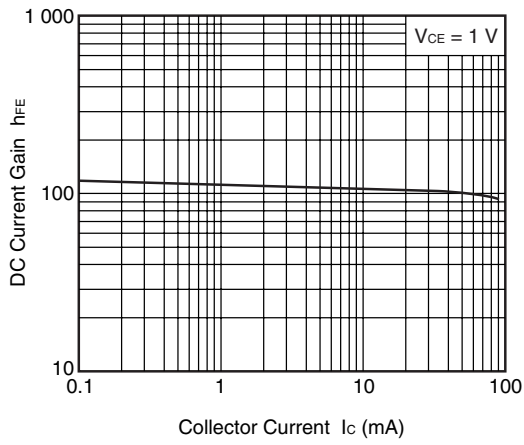


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

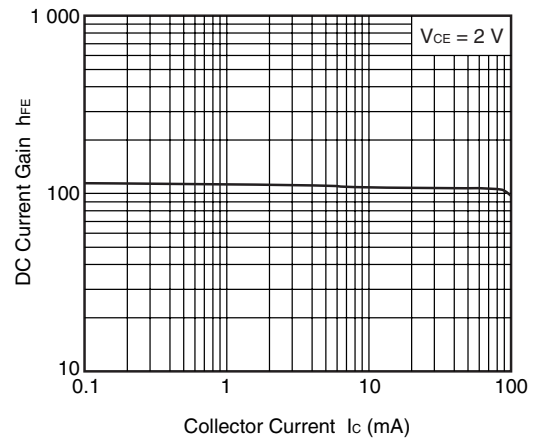


Remark The graphs indicate nominal characteristics.

DC CURRENT GAIN vs.
COLLECTOR CURRENT

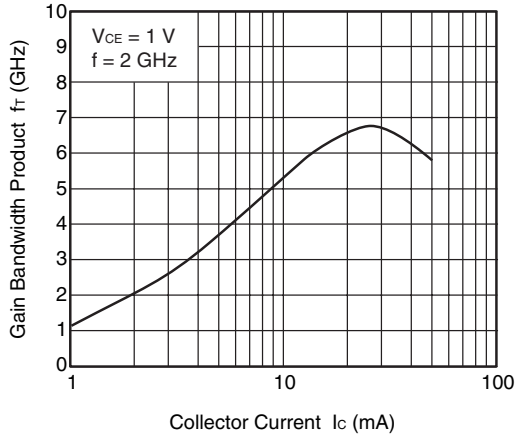


DC CURRENT GAIN vs.
COLLECTOR CURRENT

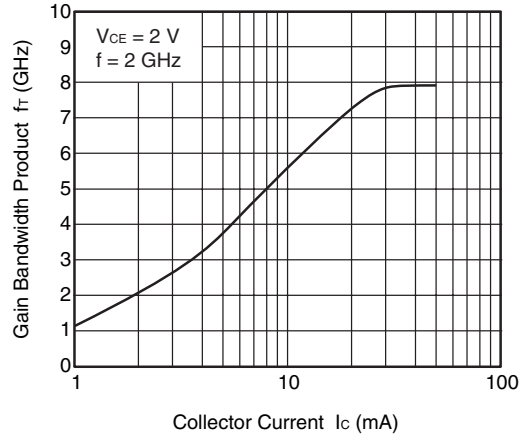


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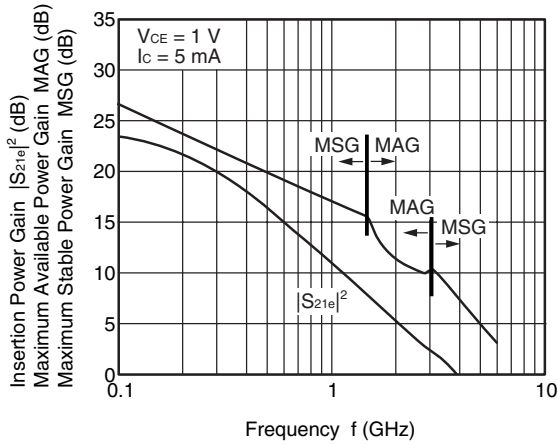
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



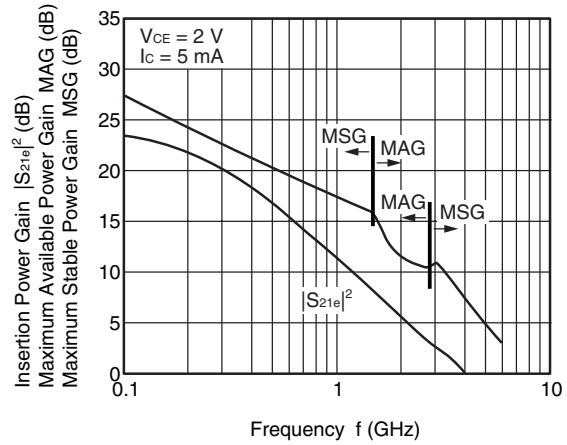
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



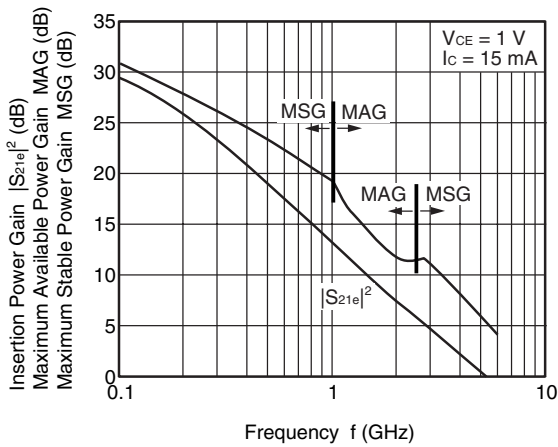
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



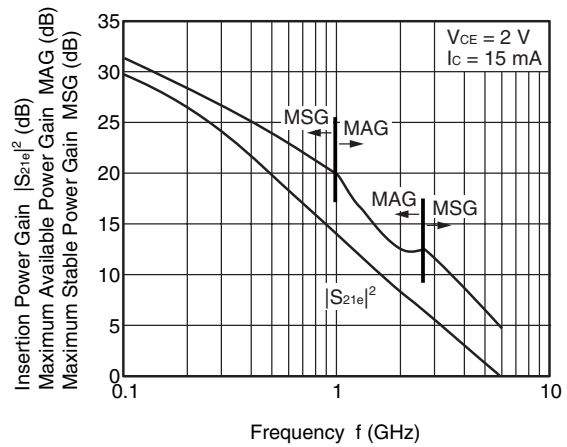
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY

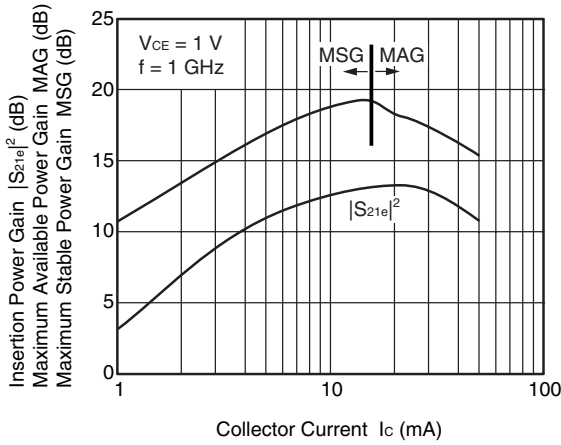


INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY

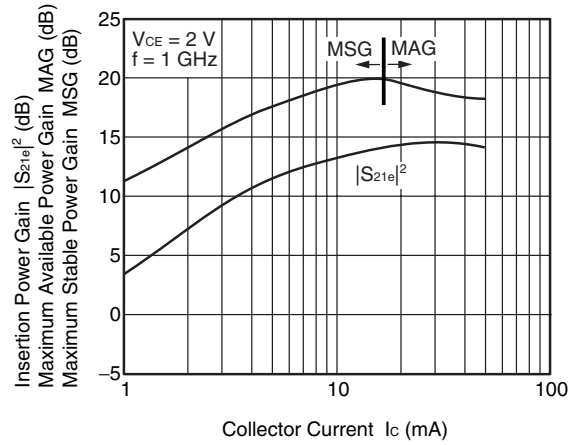


Remark The graphs indicate nominal characteristics.

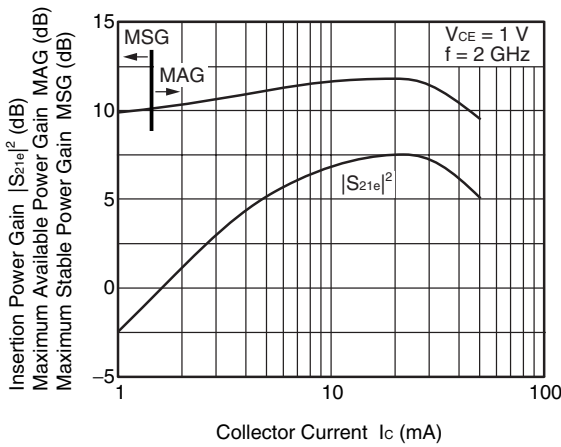
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



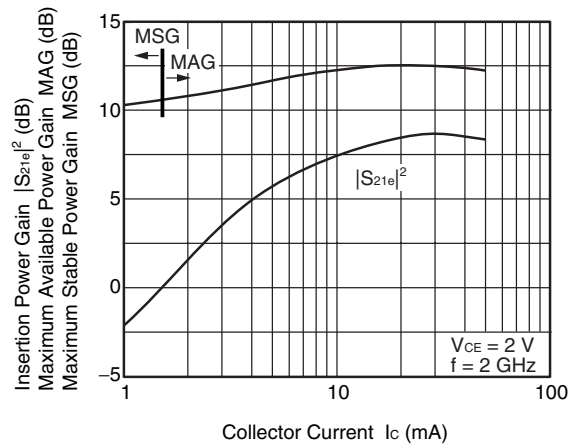
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



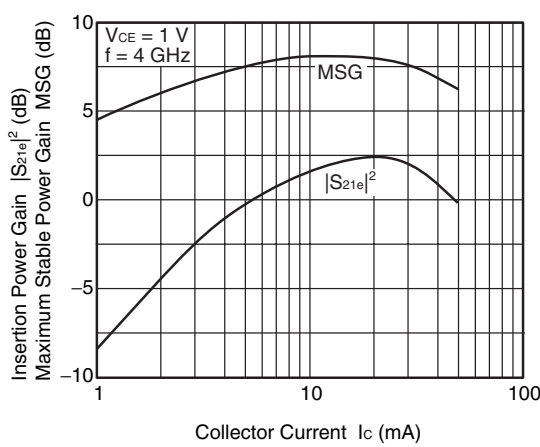
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



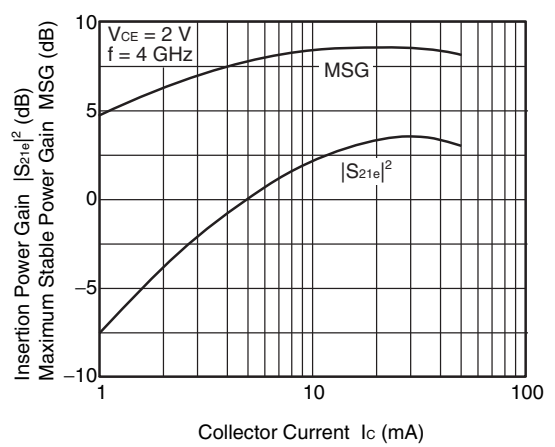
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MSG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MSG
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

<R> S-PARAMETERS

S-parameters/Noise parameters are provided on our web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

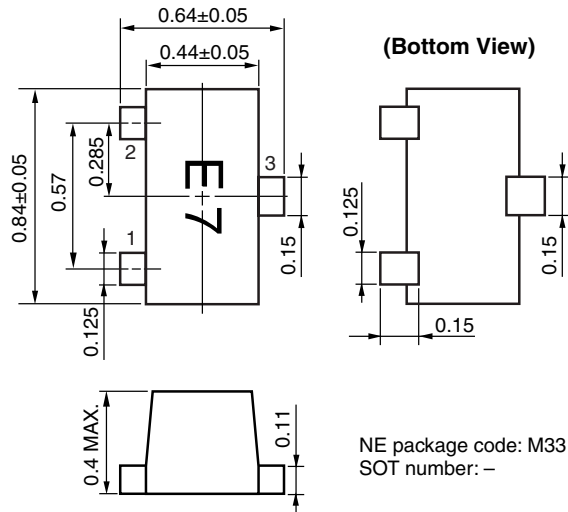
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

URL <http://www.ncsd.necel.com/microwave/index.html>

<R> PACKAGE DIMENSIONS

3-PIN SUPER LEAD-LESS MINIMOLD (M33, 0804 PKG) (UNIT: mm)



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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