PRELIMINARY DATA SHEET

NEC

# NPN SILICON GERMANIUM RF TRANSISTOR
# NESG2046M33

## NPN SiGe RF TRANSISTOR FOR LOW NOISE, HIGH-GAIN AMPLIFICATION 3-PIN SUPER LEAD-LESS MINIMOLD (M33, 0804 PACKAGE)

### FEATURES

- The device is an ideal choice for low noise, high-gain amplification
  NF = 0.8 dB TYP., $G_a$ = 11.5 dB TYP. @ $V_{CE}$ = 1 V, $I_C$ = 3 mA, f = 2 GHz
- High breakdown voltage technology for SiGe Tr. adopted: $V_{CEO}$ (absolute maximum ratings) = 5.0 V
- 3-pin super lead-less minimold (M33, 0804 package)

### ORDERING INFORMATION

| Part Number | Quantity | Supplying Form |
|---|---|---|
| NESG2046M33 | 50 pcs (Non reel) | • 8 mm wide embossed taping |
| NESG2046M33-T3 | 10 kpcs/reel | • Pin 2 (Base) face the perforation side of the tape |

**Remark** To order evaluation samples, contact your nearby sales office.
Unit sample quantity is 50 pcs.

### ABSOLUTE MAXIMUM RATINGS ($T_A$ = +25°C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to Base Voltage | $V_{CBO}$ | 13 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | 5 | V |
| Emitter to Base Voltage | $V_{EBO}$ | 1.5 | V |
| Collector Current | $I_C$ | 40 | 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 $cm^2 \times$ 1.0 mm (t) glass epoxy PCB

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



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## 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 | – | – | 100 | nA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$ = 0.5 V, $I_C$ = 0 mA | – | – | 100 | nA |
| DC Current Gain | $h_{FE}$ Note 1 | $V_{CE}$ = 1 V, $I_C$ = 2 mA | 140 | 180 | 220 | – |
| RF Characteristics | | | | | | |
| Gain Bandwidth Product | $f_T$ | $V_{CE}$ = 1 V, $I_C$ = 15 mA, f = 2 GHz | 15 | 18 | – | GHz |
| Insertion Power Gain | $\lvert S_{21e} \rvert^2$ | $V_{CE}$ = 1 V, $I_C$ = 15 mA, f = 2 GHz | 11 | 13 | – | dB |
| Noise Figure | NF | $V_{CE}$ = 1 V, $I_C$ = 3 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$ | – | 0.8 | 1.5 | dB |
| Associated Gain | $G_a$ | $V_{CE}$ = 1 V, $I_C$ = 3 mA, f = 2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$ | 9.5 | 11.5 | – | dB |
| Reverse Transfer Capacitance | $C_{re}$ Note 2 | $V_{CB}$ = 1 V, $I_E$ = 0 mA, f = 1 MHz | – | 0.2 | 0.4 | pF |

**Notes 1.** Pulse measurement: PW ≤ 350 $\mu$s, Duty Cycle ≤ 2%

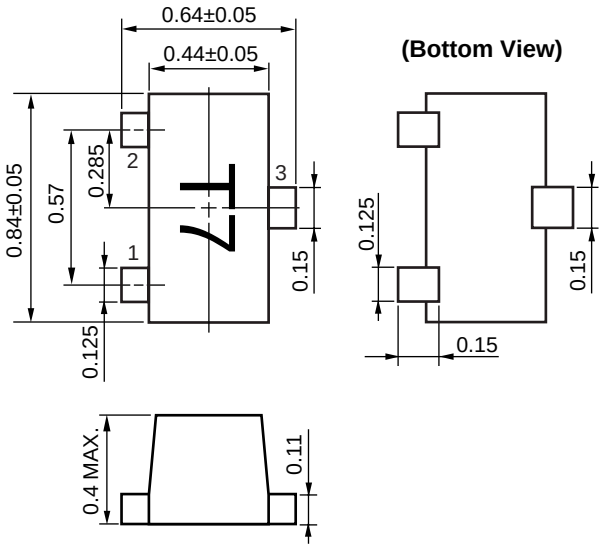
**2.** Collector to base capacitance when the emitter grounded

## $h_{FE}$ CLASSIFICATION

| Rank | FB |
|---|---|
| Marking | T7 |
| $h_{FE}$ Value | 140 to 220 |

## PACKAGE DIMENSIONS

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




### PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

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