

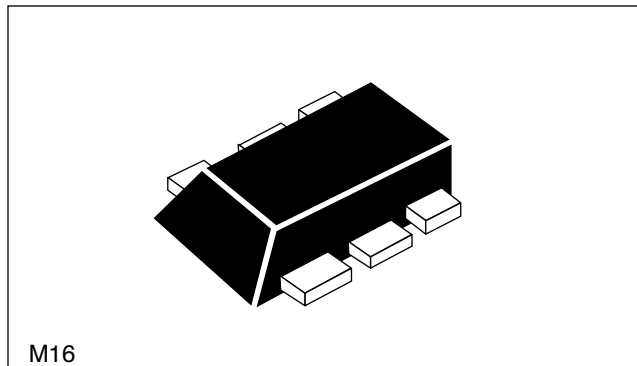


NEC's NPN SiGe HIGH FREQUENCY TRANSISTOR

NESG2031M16

FEATURES

- **HIGH BREAKDOWN VOLTAGE SiGe TECHNOLOGY**
 $V_{CE0} = 5 \text{ V}$ (Absolute Maximum)
- **LOW NOISE FIGURE:**
 $NF = 0.8 \text{ dBm}$ at 2 GHz
 $NF = 1.3 \text{ dBm}$ at 5.2 GHz
- **HIGH MAXIMUM STABLE GAIN:**
 $MSG = 21.5 \text{ dB}$ at 2 GHz
- **LOW PROFILE M16 PACKAGE:**
6-pin lead-less minimold



DESCRIPTION

NEC's NESG2031M16 is fabricated using NEC's high voltage Silicon Germanium process (UHS2-HV), and is designed for a wide range of applications including low noise amplifiers, medium power amplifiers, and oscillators.

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

| PART NUMBER PACKAGE OUTLINE | | | NESG2031M16 M16 | | | |
|--------------------------------|------------------|---|--------------------|------|------|------|
| SYMBOLS | | PARAMETERS AND CONDITIONS | UNITS | MIN | TYP | MAX |
| RF | NF | Noise Figure at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 5.2 \text{ GHz}$, $Z_S = Z_{SOPT}$, $Z_L = Z_{LOPT}$ | dB | | 1.3 | |
| | Ga | Associated Gain at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 5.2 \text{ GHz}$, $Z_S = Z_{SOPT}$, $Z_L = Z_{LOPT}$ | dB | | 10.0 | |
| | NF | Noise Figure at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 2 \text{ GHz}$, $Z_S = Z_{SOPT}$, $Z_L = Z_{LOPT}$ | dB | | 0.8 | 1.1 |
| | Ga | Associated Gain at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$, $f = 2 \text{ GHz}$, $Z_S = Z_{SOPT}$, $Z_L = Z_{LOPT}$ | dB | 15.0 | 17.0 | |
| | MSG | Maximum Stable Gain ¹ at $V_{CE} = 3 \text{ V}$, $I_C = 20 \text{ mA}$, $f = 2 \text{ GHz}$ | dB | 19.0 | 21.5 | |
| | $ S_{21} ^2$ | Insertion Power Gain at $V_{CE} = 3 \text{ V}$, $I_C = 20 \text{ mA}$, $f = 2 \text{ GHz}$ | dB | 16.0 | 18.0 | |
| | P_{1dB} | Output Power at 1dB Compression Point at $V_{CE} = 3 \text{ V}$, $I_{CQ} = 20 \text{ mA}$, $f = 2 \text{ GHz}$ | dBm | | 13 | |
| | OIP ₃ | Output 3rd Order Intercept Point at $V_{CE} = 3 \text{ V}$, $I_{CQ} = 20 \text{ mA}$, $f = 2 \text{ GHz}$ | dBm | | 23 | |
| | f_T | Gain Bandwidth Product at $V_{CE} = 3 \text{ V}$, $I_C = 20 \text{ mA}$, $f = 2 \text{ GHz}$ | GHz | 20 | 25 | |
| | C_{re} | Reverse Transfer Capacitance ² at $V_{CB} = 2 \text{ V}$, $I_E = 0 \text{ mA}$, $f = 1 \text{ GHz}$ | pF | | 0.15 | 0.25 |
| DC | I_{CBO} | Collector Cutoff Current at $V_{CB} = 5 \text{ V}$, $I_E = 0$ | nA | | | 100 |
| | I_{EBO} | Emitter Cutoff Current at $V_{EB} = 1 \text{ V}$, $I_C = 0$ | nA | | | 100 |
| | h_{FE} | DC Current Gain ³ at $V_{CE} = 2 \text{ V}$, $I_C = 5 \text{ mA}$ | | 130 | 190 | 260 |

Notes:

1. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

2. Collector to base capacitance when the emitter pin is grounded.

3. Pulsed measurement, pulse width $\leq 350 \mu\text{s}$, duty cycle $\leq 2 \%$.

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

| SYMBOLS | PARAMETERS | UNITS | RATINGS |
|-----------------------------|------------------------------|-------|-------------|
| V _{CB0} | Collector to Base Voltage | V | 13.0 |
| V _{CEO} | Collector to Emitter Voltage | V | 5.0 |
| V _{EB0} | Emitter to Base Voltage | V | 1.5 |
| I _C | Collector Current | mA | 35 |
| P _T ² | Total Power Dissipation | mW | 175 |
| T _J | Junction Temperature | °C | 150 |
| T _{STG} | Storage Temperature | °C | -65 to +150 |

Note:

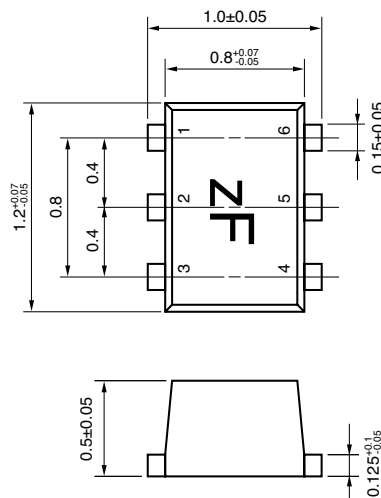
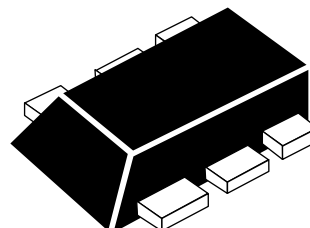
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on 1.08 cm² x 1.0 mm (t) glass epoxy PCB.

ORDERING INFORMATION

| PART NUMBER | QUANTITY | SUPPLYING FORM |
|------------------|---------------|--|
| NESG2031M16-T3-A | 10 K pcs reel | Pin 1 (Collector), Pin 6 (Emitter) face the perforation side of the tape |

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE M16 6-PIN LEAD-LESS MINIMOLD



PIN CONNECTIONS

- | | |
|--------------|------------|
| 1. Collector | 4. Base |
| 2. Emitter | 5. Emitter |
| 3. Emitter | 6. Emitter |

Life Support Applications

These NEC products are not intended for use in life support devices, appliances, or systems where the malfunction of these products can reasonably be expected to result in personal injury. The customers of CEL using or selling these products for use in such applications do so at their own risk and agree to fully indemnify CEL for all damages resulting from such improper use or sale.

CEL California Eastern Laboratories, Your source for NEC RF, Microwave, Optoelectronic, and Fiber Optic Semiconductor Devices.

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NEC

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Subject: Compliance with EU Directives

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CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

| Restricted Substance per RoHS | Concentration Limit per RoHS (values are not yet fixed) | Concentration contained in CEL devices | |
|----------------------------------|--|---|-----|
| | | -A | -AZ |
| Lead (Pb) | < 1000 PPM | Not Detected | (*) |
| Mercury | < 1000 PPM | Not Detected | |
| Cadmium | < 100 PPM | Not Detected | |
| Hexavalent Chromium | < 1000 PPM | Not Detected | |
| PBB | < 1000 PPM | Not Detected | |
| PBDE | < 1000 PPM | Not Detected | |

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.

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