

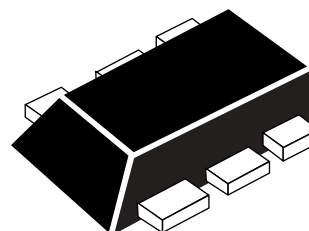
**CEL**

# NEC's NPN SiGe HIGH FREQUENCY TRANSISTOR

**NESG2021M16**

## FEATURES

- **HIGH BREAKDOWN VOLTAGE SiGe TECHNOLOGY**  
V<sub>CEO</sub> = 5 V (Absolute Maximum)
- **LOW NOISE FIGURE:**  
NF = 0.9 dB at 2 GHz  
NF = 1.3 dB at 5.2 GHz
- **HIGH MAXIMUM STABLE GAIN:**  
MSG = 22.5 dB at 2 GHz
- **LOW PROFILE M16 PACKAGE:**  
6-pin lead-less minimold



M16

## DESCRIPTION

NEC's NESG2021M16 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<sub>A</sub> = 25°C)

PART NUMBER PACKAGE OUTLINE		NESG2021M16 M16			
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
RF	NF	Noise Figure at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 mA, f = 5.2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB	1.3	
	G <sub>a</sub>	Associated Gain at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 mA, f = 5.2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB	10.0	
	NF	Noise Figure at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 mA, f = 2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB	0.9	1.2
	G <sub>a</sub>	Associated Gain at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 3 mA, f = 2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB	15.0	18.0
	MSG	Maximum Stable Gain <sup>1</sup> at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	dB	20.0	22.5
	S <sub>21E</sub>   <sup>2</sup>	Insertion Power Gain at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	dB	17.0	19.0
	P <sub>1dB</sub>	Output Power at 1dB Compression Point at V <sub>CE</sub> = 3 V, I <sub>CQ</sub> = 12 mA, f = 2 GHz	dBm		9
	OIP <sub>3</sub>	Output 3rd Order Intercept Point at V <sub>CE</sub> = 3 V, I <sub>CQ</sub> = 12 mA, f = 2 GHz	dBm		17
	f <sub>T</sub>	Gain Bandwidth Product at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 10 mA, f = 2 GHz	GHz	20	25
C <sub>re</sub>	Reverse Transfer Capacitance <sup>2</sup> at V <sub>CB</sub> = 2 V, I <sub>E</sub> = 0 mA, f = 1 GHz	pF		0.1	0.2
DC	I <sub>CBO</sub>	Collector Cutoff Current at V <sub>CB</sub> = 5V, I <sub>E</sub> = 0	nA		100
	I <sub>EBO</sub>	Emitter Cutoff Current at V <sub>EB</sub> = 1 V, I <sub>C</sub> = 0	nA		100
	h <sub>FE</sub>	DC Current Gain <sup>3</sup> at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 mA		130	190

Notes:

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

2. Collector to base capacitance when the emitter grounded.

3. Pulsed measurement, pulse width ≤ 350 μs, duty cycle ≤ 2 %.

**ABSOLUTE MAXIMUM RATINGS<sup>1</sup>** (T<sub>A</sub> = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V <sub>CB0</sub>	Collector to Base Voltage	V	13.0
V <sub>CE0</sub>	Collector to Emitter Voltage	V	5.0
V <sub>EB0</sub>	Emitter to Base Voltage	V	1.5
I <sub>C</sub>	Collector Current	mA	35
P <sub>T</sub> <sup>2</sup>	Total Power Dissipation	mW	175
T <sub>J</sub>	Junction Temperature	°C	150
T <sub>STG</sub>	Storage Temperature	°C	-65 to +150

Note:

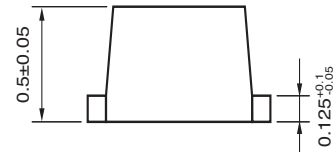
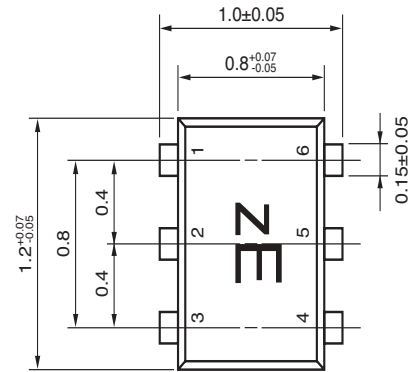
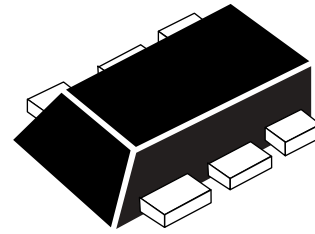
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on 1.08 cm<sup>2</sup> x 1.0 mm (t) glass epoxy PCB.

**ORDERING INFORMATION**

PART NUMBER	QUANTITY	SUPPLYING FORM
NESG2021M16-T3	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.

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4590 Patrick Henry Drive • Santa Clara, CA 95054-1817 • (408) 988-3500 • FAX (408) 988-0279 • [www.cel.com](http://www.cel.com)

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