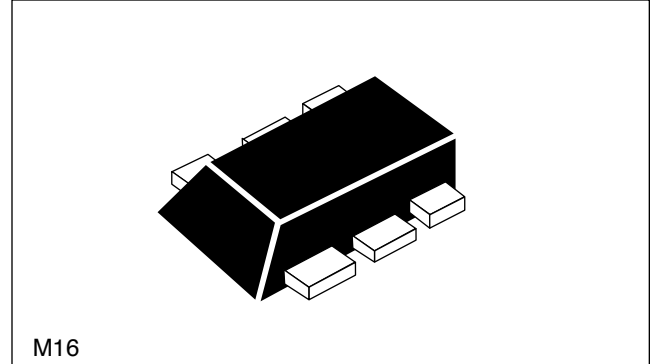


### FEATURES

- **HIGH BREAKDOWN VOLTAGE SiGe TECHNOLOGY**  
V<sub>CEO</sub> = 5 V (Absolute Maximum)
- **LOW NOISE FIGURE:**  
NF = 0.8 dBm at 2 GHz  
NF = 1.3 dBm at 5.2 GHz
- **HIGH MAXIMUM STABLE GAIN:**  
MSG = 21.5 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<sub>A</sub> = 25°C)

PART NUMBER PACKAGE OUTLINE		NESG2031M16 M16				
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX	
RF	NF	Noise Figure at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 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> = 5 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> = 5 mA, f = 2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB		0.8	1.1
	G <sub>a</sub>	Associated Gain at V <sub>CE</sub> = 2 V, I <sub>C</sub> = 5 mA, f = 2 GHz, Z <sub>S</sub> = Z <sub>SOPT</sub> , Z <sub>L</sub> = Z <sub>LOPT</sub>	dB	15.0	17.0	
	MSG	Maximum Stable Gain <sup>1</sup> at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2 GHz	dB	19.0	21.5	
	S <sub>21E</sub>   <sup>2</sup>	Insertion Power Gain at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 mA, f = 2 GHz	dB	16.0	18.0	
	P <sub>1dB</sub>	Output Power at 1dB Compression Point at V <sub>CE</sub> = 3 V, I <sub>CQ</sub> = 20 mA, f = 2 GHz	dBm		13	
	OIP <sub>3</sub>	Output 3rd Order Intercept Point at V <sub>CE</sub> = 3 V, I <sub>CQ</sub> = 20 mA, f = 2 GHz	dBm		23	
	f <sub>T</sub>	Gain Bandwidth Product at V <sub>CE</sub> = 3 V, I <sub>C</sub> = 20 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		0.15	0.25
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	260

Notes:

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

2. Collector to base capacitance when the emitter pin is 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>CEO</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:

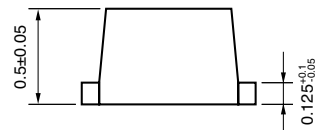
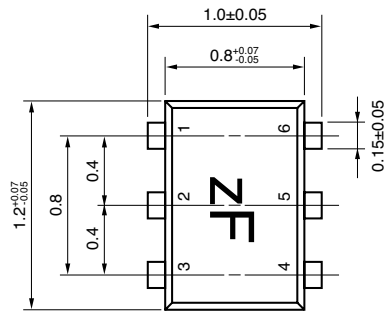
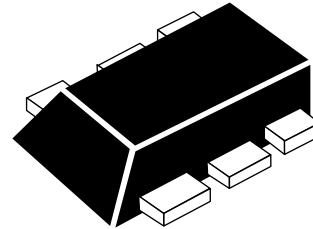
1. Operation in excess of any one of these parameters may result in permanent damage.
2. Mounted on 1.08 cm<sup>2</sup> x 1.0 mm (t) glass epoxy PCB.

**ORDERING INFORMATION**

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

DATA SUBJECT TO CHANGE WITHOUT NOTICE

11/13/2003

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

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.

Important Information and Disclaimer: Information provided by CEL on its website or in other communications concerning the substance content of its products represents knowledge and belief as of the date that it is provided. CEL bases its knowledge and belief on information provided by third parties and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. CEL has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. CEL and CEL suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall CEL’s liability arising out of such information exceed the total purchase price of the CEL part(s) at issue sold by CEL to customer on an annual basis.

See CEL Terms and Conditions for additional clarification of warranties and liability.