CEL

NEC's NPN SiGe HIGH FREQUENCY TRANSISTOR

NESG3031M05

FEATURES

- **LOW NOISE FIGURE AND HIGH-GAIN**
  NF = 0.95 dB TYP, G_a = 10 dB TYP @ V_{CE} = 2 V, I_C = 6 mA, f = 5.2 GHz
  NF = 1.1 dB TYP, G_a = 9.5 dB TYP @ V_{CE} = 2 V, I_C = 6 mA, f = 5.8 GHz
- **MAXIMUM STABLE POWER GAIN:**
  MSG = 14.0 dB TYP @ V_{CE} = 3 V, I_C = 20 mA, f = 5.8 GHz
- **SiGe HBT TECHNOLOGY:**
  USH3 process, f_{max} = 110 GHz
- **M05 PACKAGE:**
  Flat-lead 4 pin thin-type super minimold package

ORDERING INFORMATION

PART NUMBER	QUANTITY	SUPPLYING FORM
NESG3031M05	50 pcs (Non reel)	• 8 mm wide embossed taping
NESG3031M05-T1	3 kpcs/reel	• Pin 3 (Collector), Pin 4 (Emitter) 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}	12.0	V
Collector to Emitter Voltage	V_{CEO}	4.3	V
Emitter to Base Voltage	V_{EBO}	1.5	V
Collector Current	I_C	35	mA
Total Power Dissipation	P_{tot} **Note**	150	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Note Mounted on 38 × 38 mm, t = 0.4 mm polyimide PCB

ELECTRICAL CHARACHTERISTICS (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} = 1 V, I_C = 0 mA	−	−	100	nA
DC Current Gain	h_{FE} Note 1	V_{CE} = 2 V, I_C = 6 mA	220	300	380	−
RF Characteristics						
Insertion Power Gain	$\|S_{21e}\|^2$	V_{CE} = 3 V, I_C = 20 mA, f = 5.8 GHz	6.0	8.5	−	dB
Noise Figure (1)	NF	V_{CE} = 2 V, I_C = 6 mA, f = 5.2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	−	0.95	−	dB
Noise Figure (2)	NF	V_{CE} = 2 V, I_C = 6 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	−	1.1	1.5	dB
Associated Gain (1)	G_a	V_{CE} = 2 V, I_C = 6 mA, f = 5.2 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	−	10.0	−	dB
Associated Gain (2)	G_a	V_{CE} = 2 V, I_C = 6 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	7.5	9.5	−	dB
Reverse Transfer Capacitance	C_{re} Note 2	V_{CB} = 2 V, I_E = 0 mA, f = 1 MHz	−	0.15	0.25	pF
Maximum Stable Power Gain	MSG Note 3	V_{CE} = 3 V, I_C = 20 mA, f = 5.8 GHz	11.0	14.0	−	dB
Gain 1 dB Compression Output Power	$P_{O\ (1\ dB)}$	V_{CE} = 3 V, $I_{C\ (set)}$ = 20 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	−	13.0	−	dBm
3rd Order Intermodulation Distortion Output Intercept Point	OIP_3	V_{CE} = 3 V, $I_{C\ (set)}$ = 20 mA, f = 5.8 GHz, $Z_S = Z_{Sopt}$, $Z_L = Z_{Lopt}$	−	18.0	−	dBm

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

2. Collector to base capacitance when the emitter grounded

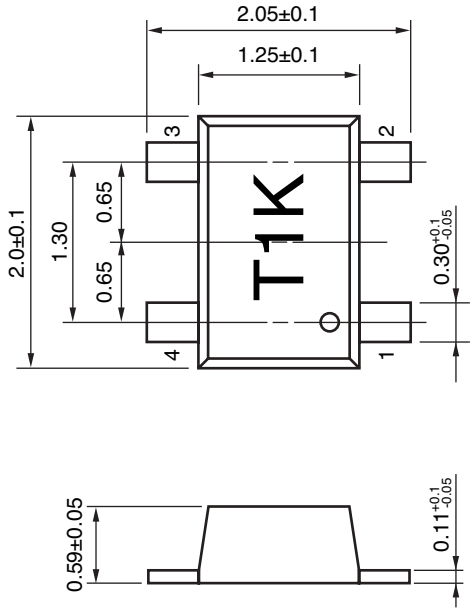
3. $MSG = \left| \frac{S_{21}}{S_{12}} \right|$

h_{FE} CLASSIFICATION

RANK	FB
Marking	T1K
h_{FE} Value	220 to 380

PACKAGE DIMENSIONS (Units in mm)

FLAT LEAD 4-PIN THIN TYPE SUPER MINIMOLD (M05, 2012 PACKAGE



PIN CONNECTIONS

1. Base
2. Emitter
3. Collector
4. 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.