

FEATURES

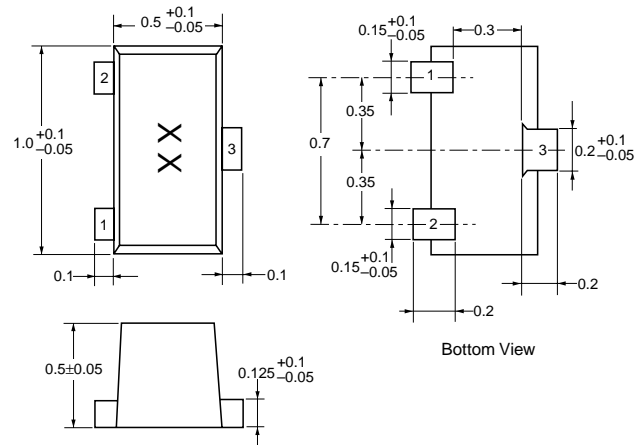
- **NEW MINIATURE M13 PACKAGE:**
 - Small transistor outline –
 - 1.0 X 0.5 X 0.5 mm
 - Low profile / 0.50 mm package height
 - Flat lead style for better RF performance
- **HIGH GAIN BANDWIDTH PRODUCT:**
 $f_T = 7$ GHz
- **LOW NOISE FIGURE:**
 $NF = 1.4$ dB

DESCRIPTION

The NE681M13 transistor is ideal for low noise, high gain, and low cost amplifier applications. NEC's new low profile/flat lead style "M13" package is ideal for today's portable wireless applications. The NE681 is also available in chip, Micro-x, and six different low cost plastic surface mount package styles.

OUTLINE DIMENSIONS (Units in mm)

PACKAGE OUTLINE M13



PIN CONNECTIONS

1. Emitter
2. Base
3. Collector

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE		NE681M13 2SC5615 M13			
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
f_T	Gain Bandwidth at $V_{CE} = 3$ V, $I_C = 7$ mA, $f = 1$ GHz	GHz	4.5	7	
NF	Noise Figure at $V_{CE} = 3$ V, $I_C = 7$ mA, $f = 1$ GHz	dB		1.4	2.7
$ S_{21E} ^2$	Insertion Power Gain at $V_{CE} = 3$ V, $I_C = 7$ mA, $f = 1$ GHz	dB	10	12	
h_{FE}^2	Forward Current Gain at $V_{CE} = 3$ V, $I_C = 7$ mA		80		145
I_{CBO}	Collector Cutoff Current at $V_{CB} = 10$ V, $I_E = 0$	μ A			0.8
I_{EBO}	Emitter Cutoff Current at $V_{EB} = 1$ V, $I_C = 0$	μ A			0.8
C_{RE}^3	Feedback Capacitance at $V_{CB} = 3$ V, $I_E = 0$, $f = 1$ MHz	pF			0.9

Notes:

1. Electronic Industrial Association of Japan.
2. Pulsed measurement, pulse width ≤ 350 μ s, duty cycle ≤ 2 %.
3. Capacitance is measured with emitter and case connected to the guard terminal at the bridge.

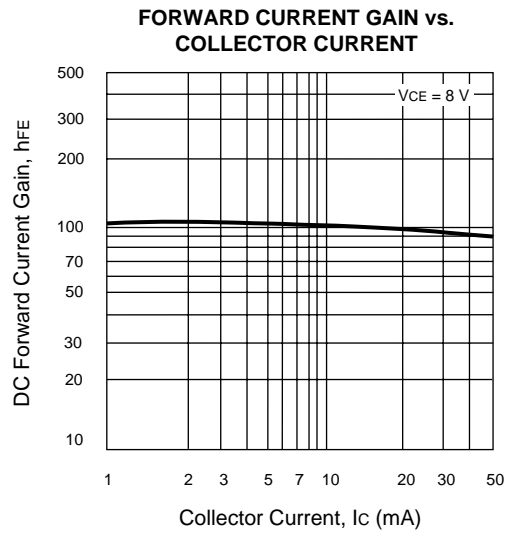
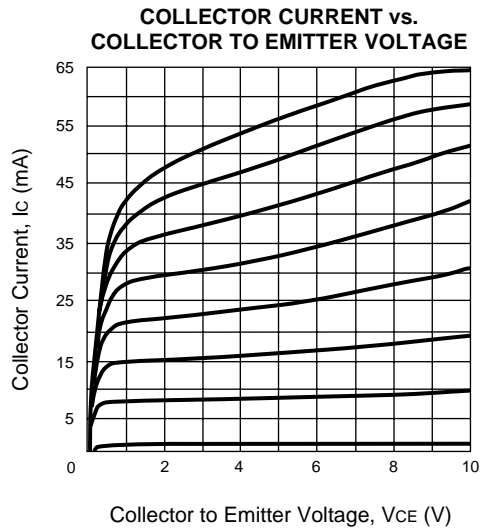
ABSOLUTE MAXIMUM RATINGS¹ ($T_A = 25^\circ\text{C}$)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CB0}	Collector to Base Voltage	V	20
V _{CE0}	Collector to Emitter Voltage	V	10
V _{EB0}	Emitter to Base Voltage	V	1.5
I _c	Collector Current	mA	65
P _{T2}	Total Power Dissipation	mW	140
T _J	Junction Temperature	°C	150
T _{STG}	Storage Temperature	°C	-65 to +150

Notes:

1. Operation in excess of any one of these parameters may result in permanent damage.
2. With device mounted on 1.08 cm² X 1.2 mm glass epoxy board.

TYPICAL PERFORMANCE CURVES ($T_A = 25^\circ\text{C}$)



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