

NPN SILICON TRANSISTOR

NE688M13

FEATURES

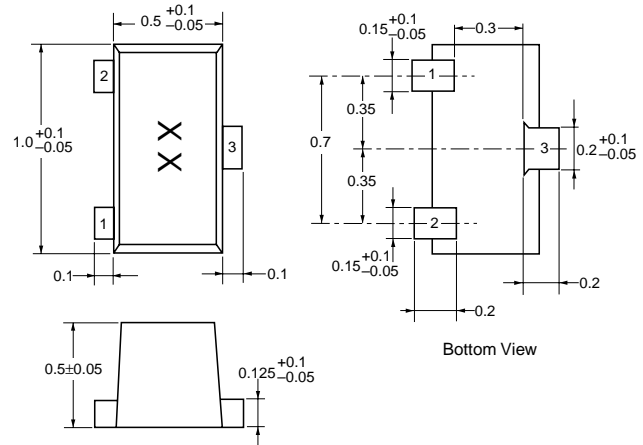
- **NEW MINIATURE M13 PACKAGE:**
 - Small transistor outline –
1.0 X 0.5 X 0.5 mm
 - Low profile / 0.50 mm package height
 - Flat lead style for better RF performance
- **HIGH GAIN BANDWIDTH PRODUCT:**
ft = 9.5 GHz
- **LOW NOISE FIGURE:**
NF = 1.7 dB at 2 GHz
- **HIGH COLLECTOR CURRENT:**
Ic MAX = 100 mA

DESCRIPTION

The NE688M13 transistor is designed for low cost amplifier and oscillator applications. Low noise figure, high gain and high current capability equate to wide dynamic range and excellent linearity. NEC's new low profile/flat lead style "M13" package is ideal for today's portable wireless applications. The NE688 is also available in chip 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		NE688M13 2SC5616 M13			
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
ft	Gain Bandwidth at VCE = 1 V, IC = 3 mA, f = 2 GHz VCE = 3 V, IC = 20 mA, f = 2 GHz	GHz	4	5	
		GHz		9.5	
NF	Noise Figure at VCE = 1 V, IC = 3 mA, f = 2 GHz VCE = 3 V, IC = 7 mA, f = 2 GHz	dB		1.9	2.5
		dB		1.7	
S21E ²	Insertion Power Gain at VCE = 1 V, IC = 3 mA, f = 2 GHz VCE = 3 V, IC = 20 mA, f = 2 GHz	dB	3	4	
		dB		8	
hFE ²	Forward Current Gain at VCE = 1 V, IC = 3 mA		80		145
ICBO	Collector Cutoff Current at VCB = 5 V, IE = 0	μA			0.1
IEBO	Emitter Cutoff Current at VEB = 1 V, IC = 0	μA			0.1
CRE ³	Feedback Capacitance at VCB = 1 V, IE = 0, f = 1 MHz	pF		0.7	0.8

Notes:

1. Electronic Industrial Association of Japan.
2. Pulsed measurement, pulse width $\leq 350 \mu\text{s}$, duty cycle $\leq 2 \%$.
3. Capacitance is measured with emitter and case connected to the guard terminal at the bridge.

ABSOLUTE MAXIMUM RATINGS¹ (T_A = 25°C)

SYMBOLS	PARAMETERS	UNITS	RATINGS
V _{CBO}	Collector to Base Voltage	V	9
V _{CEO}	Collector to Emitter Voltage	V	6
V _{EB0}	Emitter to Base Voltage	V	2
I _C	Collector Current	mA	100
P _T ²	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°C)

