

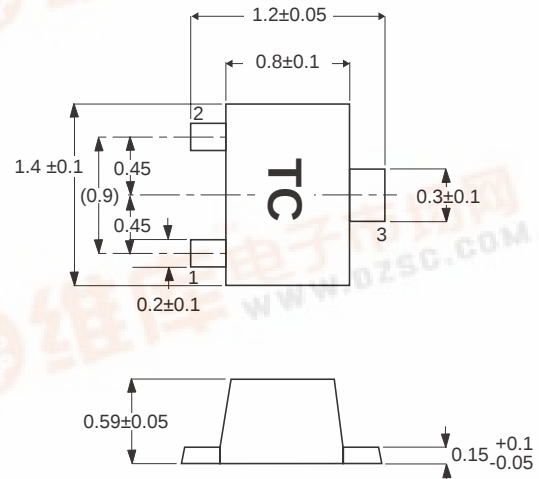
PRELIMINARY DATA SHEET

NEC**NPN SILICON TRANSISTOR****NE856M03****FEATURES**

- **NEW M03 PACKAGE:**
 - Smallest transistor outline package available
 - Low profile/0.59 mm package height
 - Flat lead style for better RF performance
- **LOW NOISE FIGURE:**
NF = 1.4 dB at 1 GHz
- **HIGH COLLECTOR CURRENT:**
I_CMAX = 100 mA

DESCRIPTION

The NE856M03 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 "M03" package is ideal for today's portable wireless applications. The NE856 is also available in chip, Micro-x, and eight different low cost plastic surface mount package styles.

OUTLINE DIMENSIONS (Units in mm)**PACKAGE OUTLINE M03****PIN CONNECTIONS**

1. Emitter
2. Base
3. Collector

ELECTRICAL CHARACTERISTICS (T_A = 25°C)

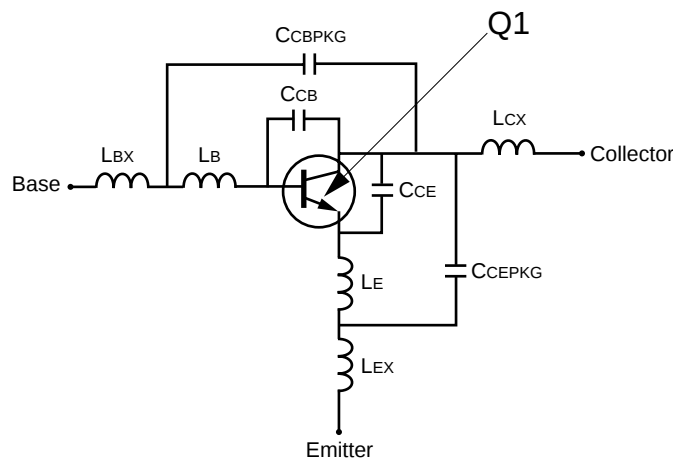
PART NUMBER EIAJ ¹ REGISTERED NUMBER PACKAGE OUTLINE		NE856M03 2SC5432 M03			
SYMBOLS	PARAMETERS AND CONDITIONS	UNITS	MIN	TYP	MAX
f _T	Gain Bandwidth at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	GHz	3.0	4.5	
NF	Noise Figure at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	dB		1.4	2.5
S _{21E} ²	Insertion Power Gain at V _{CE} = 3 V, I _C = 7 mA, f = 1 GHz	dB	7.0	10.0	
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	μA			1.0
I _{EBO}	Emitter Cutoff Current at V _{EB} = 1 V, I _C = 0	μA			1.0
C _{RE} ³	Feedback Capacitance at V _{CB} = 3 V, I _E = 0, f = 1 MHz	pF		0.7	1.5

Notes:

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

NONLINEAR MODEL

SCHEMATIC



BJT NONLINEAR MODEL PARAMETERS (1)

Parameters	Q1	Parameters	Q1
IS	9.2e-16	MJC	0.55
BF	110.3	XCJC	0.3
NF	1.01	CJS	0
VAF	18	VJS	0.75
IKF	1	MJS	0
ISE	4.89e-9	FC	0.5
NE	4.37	TF	4e-12
BR	10.08	XTF	30
NR	1.0	VTF	0.69
VAR	8	ITF	0.06
IKR	0.03	PTF	0
ISC	3.32e-11	TR	1e-9
NC	3.95	EG	1.11
RE	0.33	XTB	0
RB	1.26	XTI	3
RBM	2	KF	1.56e-18
IRB	0.05	AF	1.49
RC	6.63		
CJE	2.8e-12		
VJE	1.3		
MJE	0.5		
CJC	1.1e-12		
VJC	0.7		

UNITS

Parameter	Units
time	seconds
capacitance	farads
inductance	henries
resistance	ohms
voltage	volts
current	amps

ADDITIONAL PARAMETERS

Parameters	856M03
CCB	0.087e-12
CCE	0.16e-12
LB	0.5e-9
LE	0.6e-9
CCBPKG	0.08e-12
CCEPKG	0.08e-12
LBX	0.12e-9
LCX	0.10e-9
LEX	0.12e-9

MODEL RANGE

Frequency: 0.1 to 4.0 GHz
Bias: VCE = 0.5 V to 10 V, Ic = 0.5 mA to 10 mA
Date: 11/98

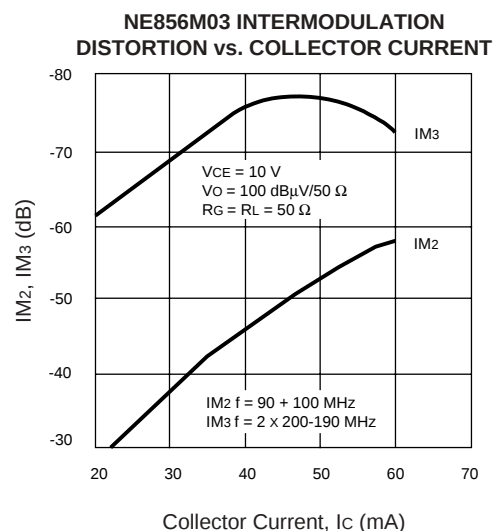
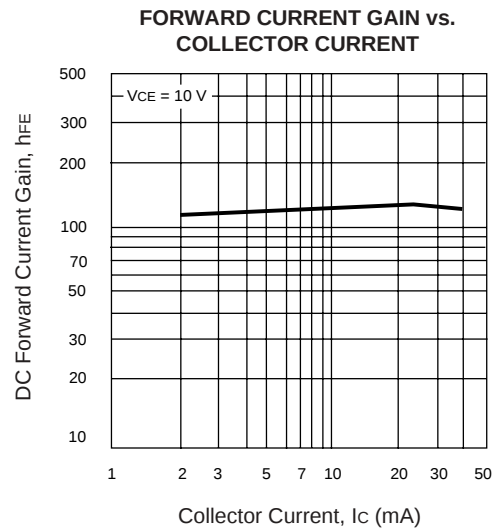
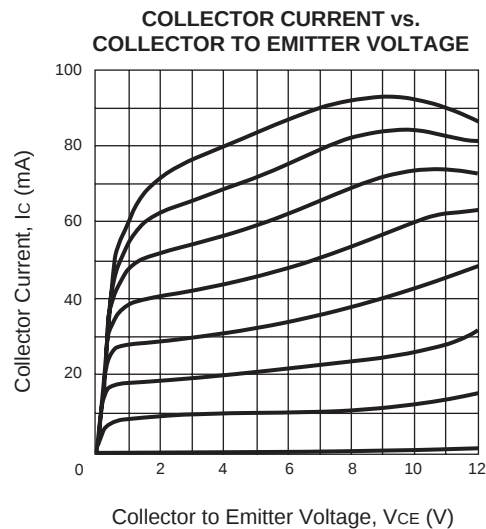
(1) Gummel-Poon Model

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

SYMBOLS	PARAMETERS	UNITS	RATINGS
V_{CBO}	Collector to Base Voltage	V	20
V_{CEO}	Collector to Emitter Voltage	V	12
V_{EBO}	Emitter to Base Voltage	V	3
I_C	Collector Current	mA	100
P_T	Total Power Dissipation	mW	125
T_J	Junction Temperature	$^\circ\text{C}$	150
T_{STG}	Storage Temperature	$^\circ\text{C}$	-65 to +150

Note:

1. Operation in excess of any one of these parameters may result in permanent damage.

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

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