

DATA SHEET

NEC

NPN SILICON RF TRANSISTOR NE685M33

NPN SILICON RF TRANSISTOR FOR HIGH-FREQUENCY LOW NOISE 3-PIN SUPER LEAD-LESS MINIMOLD (M33)

FEATURES

- Low noise
NF = 1.5 dB TYP. @ $V_{CE} = 3\text{ V}$, $I_C = 3\text{ mA}$, $f = 2\text{ GHz}$
- $|S_{21e}|^2 = 11\text{ dB}$ TYP. @ $V_{CE} = 3\text{ V}$, $I_C = 10\text{ mA}$, $f = 2\text{ GHz}$
- ★ • 3-pin super lead-less minimold (M33) package

ORDERING INFORMATION

Part Number	Quantity	Supplying Form
NE685M33	50 pcs (Non reel)	• 8 mm wide embossed taping • Pin 2 (Base) face the perforation side of the tape
NE685M33-T3	10 kpcs/reel	

Remark To order evaluation samples, contact your nearby sales office.
The unit sample quantity is 50 pcs.

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

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	9.0	V
Collector to Emitter Voltage	V_{CEO}	6.0	V
Emitter to Base Voltage	V_{EBO}	2.0	V
Collector Current	I_C	30	mA
Total Power Dissipation	P_{tot} ^{Note}	130	mW
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Note Mounted on $1.08\text{ cm}^2 \times 1.0\text{ mm}$ (t) glass epoxy PCB

Caution Observe precautions when handling because these devices are sensitive to electrostatic discharge.

The information in this document is subject to change without notice. Before using this document, please confirm that this is the latest version.
Not all devices/types available in every country. Please check with local NEC Compound Semiconductor Devices representative for availability and additional information.

ELECTRICAL CHARACTERISTICS (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} = 3 V, I _C = 10 mA	75	110	150	–
RF Characteristics						
Gain Bandwidth Product	f _T	V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz	10	12	–	GHz
Insertion Power Gain	S _{21e} ²	V _{CE} = 3 V, I _C = 10 mA, f = 2 GHz	7	11	–	dB
Noise Figure	NF	V _{CE} = 3 V, I _C = 3 mA, f = 2 GHz, Z _S = Z _{opt}	–	1.5	2.5	dB
Reverse Transfer Capacitance	C _{re} ^{Note 2}	V _{CB} = 3 V, I _C = 0 mA, f = 1 MHz	–	0.4	0.7	pF

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

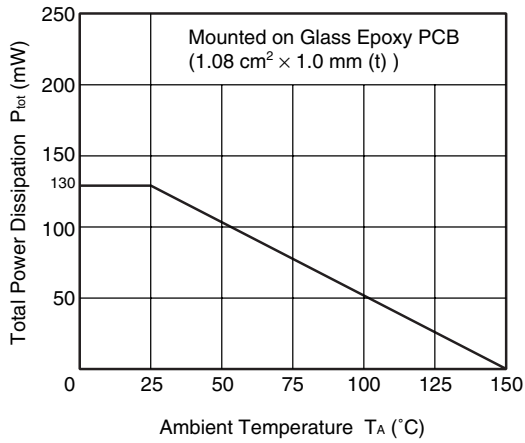
2. Collector to base capacitance when the emitter grounded

h_{FE} CLASSIFICATION

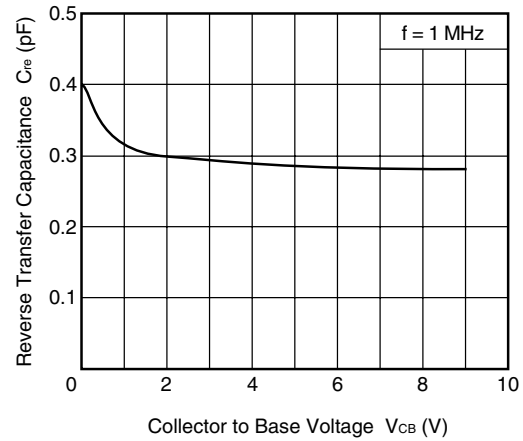
Rank	FB
Marking	Y2
h _{FE} Value	75 to 150

★ TYPICAL CHARACTERISTICS (T_A = +25°C ,unless otherwise specified)

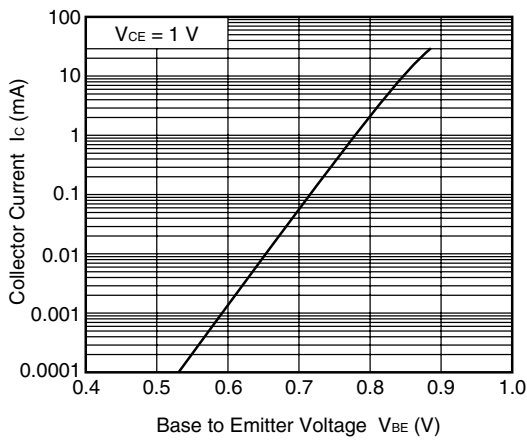
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



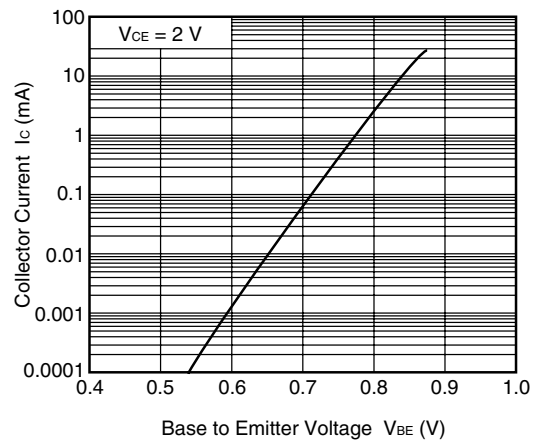
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



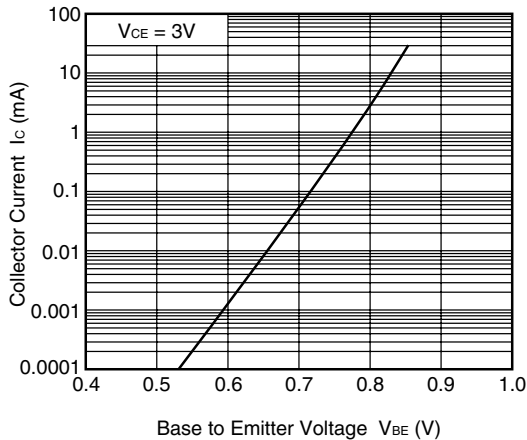
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



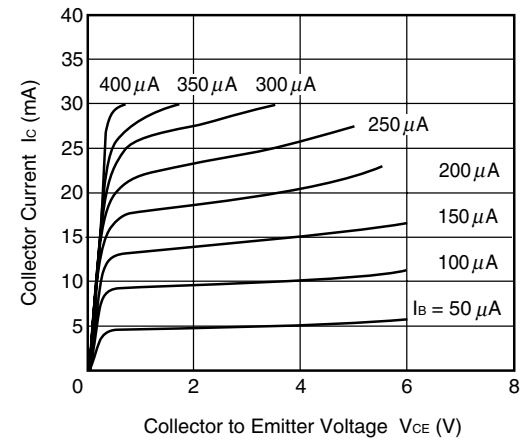
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

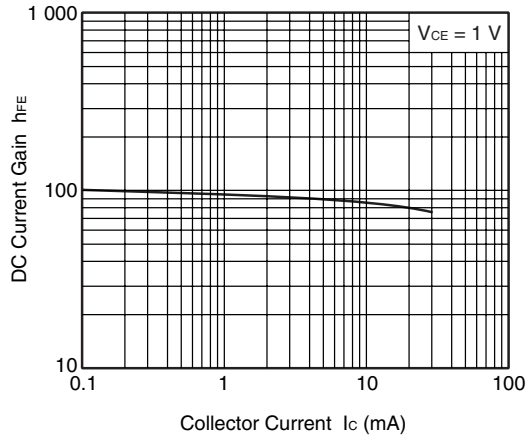


COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE

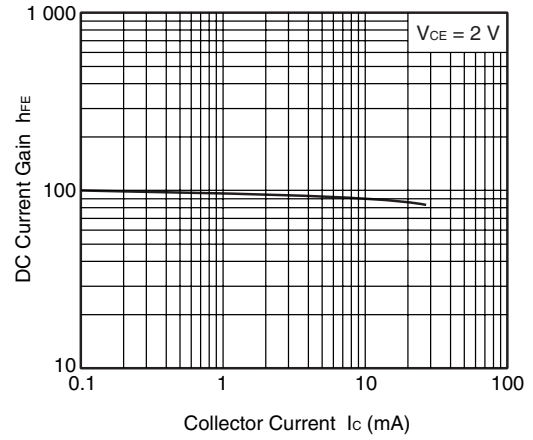


Remark The graphs indicate nominal characteristics.

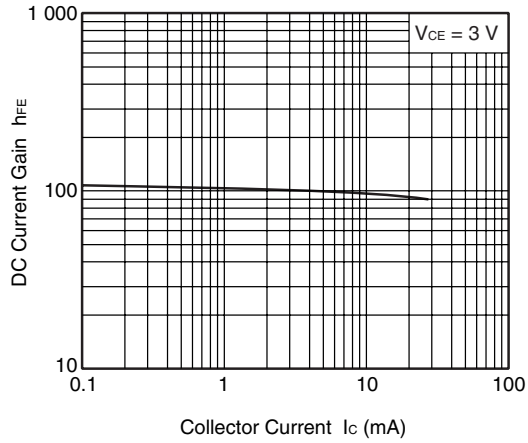
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



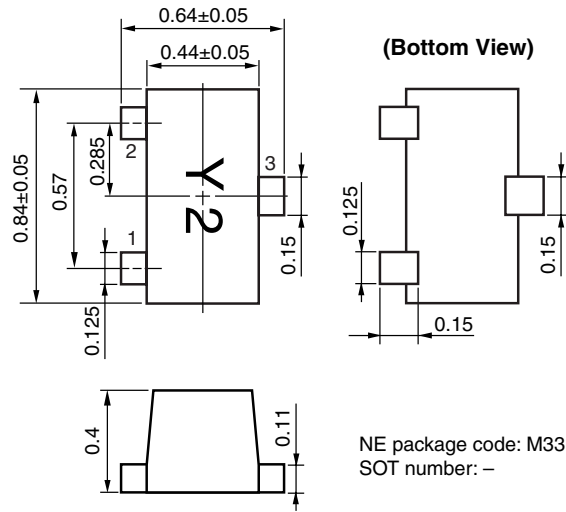
DC CURRENT GAIN vs.
COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

PACKAGE DIMENSIONS

3-PIN SUPER LEAD-LESS MINIMOLD (M33) (UNIT: mm)



PIN CONNECTIONS

- 1. Emitter
- 2. Base
- 3. Collector

- **The information in this document is current as of August, 2003. The information is subject to change without notice. For actual design-in, refer to the latest publications of NEC's data sheets or data books, etc., for the most up-to-date specifications of NEC semiconductor products. Not all products and/or types are available in every country. Please check with an NEC sales representative for availability and additional information.**
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