



NPN SILICON GERMANIUM RF TRANSISTOR

NESG260234

NPN SiGe RF TRANSISTOR FOR MEDIUM OUTPUT POWER AMPLIFICATION (1 W) 3-PIN POWER MINIMOLD (34 PKG)

FEATURES

- This product is suitable for medium output power (1 W) amplification
 $P_{out} = 30 \text{ dBm TYP. @ } V_{CE} = 6 \text{ V, } P_{in} = 15 \text{ dBm, } f = 460 \text{ MHz}$
 $P_{out} = 30 \text{ dBm TYP. @ } V_{CE} = 6 \text{ V, } P_{in} = 20 \text{ dBm, } f = 900 \text{ MHz}$
- MSG (Maximum Stable Gain) = 23 dB TYP. @ $V_{CE} = 6 \text{ V, } I_c = 100 \text{ mA, } f = 460 \text{ MHz}$
- Using UHS2-HV process (SiGe technology), V_{CBO} (ABSOLUTE MAXIMUM RATINGS) = 25 V
- 3-pin power minimold (34 PKG)

ORDERING INFORMATION

Part Number	Order Number	Package	Quantity	Supplying Form
NESG260234	NESG260234-AZ	3-pin power minimold (Pb-Free) ^{Note1, 2}	25 pcs (Non reel)	• Magazine case
NESG260234-T1	NESG260234-T1-AZ		1 kpcs/reel	• 12 mm wide embossed taping • Pin 2 (Emitter) face the perforation side of the tape

Notes 1. Contains Lead in the part except the electrode terminals.

- 2.** With regards to terminal solder (the solder contains lead) plated products (conventionally plated), contact your nearby sales office.

Remark To order evaluation samples, contact your nearby sales office.
Unit sample quantity is 25 pcs.

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

Parameter	Symbol	Ratings	Unit
Collector to Base Voltage	V_{CBO}	25	V
Collector to Emitter Voltage	V_{CEO}	9.2	V
Emitter to Base Voltage	V_{EBO}	2.8	V
Collector Current	I_c	600	mA
Total Power Dissipation	P_{tot} ^{Note}	1.9	W
Junction Temperature	T_j	150	$^\circ\text{C}$
Storage Temperature	T_{stg}	-65 to +150	$^\circ\text{C}$

Note Mounted on $34.2 \text{ cm}^2 \times 0.8 \text{ mm (t)}$ glass epoxy PWB

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.

THERMAL RESISTANCE ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Ratings	Unit
Thermal Resistance from Junction to Ambient ^{Note}	R_{thj-a}	65	$^\circ\text{C/W}$

Note Mounted on $34.2\text{ cm}^2 \times 0.8\text{ mm}$ (t) glass epoxy PWB

RECOMMENDED OPERATING RANGE ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Collector to Emitter Voltage	V_{CE}	—	6.0	7.2	V
Collector Current	I_C	—	400	500	mA
Input Power ^{Note}	P_{in}	—	15	20	dBm

Note Input power under conditions of $V_{CE} \leq 6.0\text{ V}$, $f = 460\text{ MHz}$

ELECTRICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
DC Characteristics						
Collector Cut-off Current	I_{CBO}	$V_{CB} = 9.2\text{ V}$, $I_E = 0\text{ mA}$	–	–	1	μA
Emitter Cut-off Current	I_{EBO}	$V_{EB} = 1.0\text{ V}$, $I_C = 0\text{ mA}$	–	–	1	μA
DC Current Gain	h_{FE} ^{Note}	$V_{CE} = 3\text{ V}$, $I_C = 100\text{ mA}$	80	120	180	–
RF Characteristics						
Linner Gain (1)	G_L	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 460\text{ MHz}$, $P_{in} = 0\text{ dBm}$	19	22	–	dB
Linner Gain (2)	G_L	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 900\text{ MHz}$, $P_{in} = 0\text{ dBm}$	–	19	–	dB
Output Power (1)	P_{out}	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 460\text{ MHz}$, $P_{in} = 15\text{ dBm}$	28.5	30.0	–	dBm
Output Power (2)	P_{out}	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 900\text{ MHz}$, $P_{in} = 20\text{ dBm}$	–	30.0	–	dBm
Collector Efficiency (1)	η_C	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 460\text{ MHz}$, $P_{in} = 15\text{ dBm}$	–	50	–	%
Collector Efficiency (2)	η_C	$V_{CE} = 6\text{ V}$, $I_{C(\text{set})} = 30\text{ mA}$ (RF OFF), $f = 900\text{ MHz}$, $P_{in} = 20\text{ dBm}$	–	60	–	%

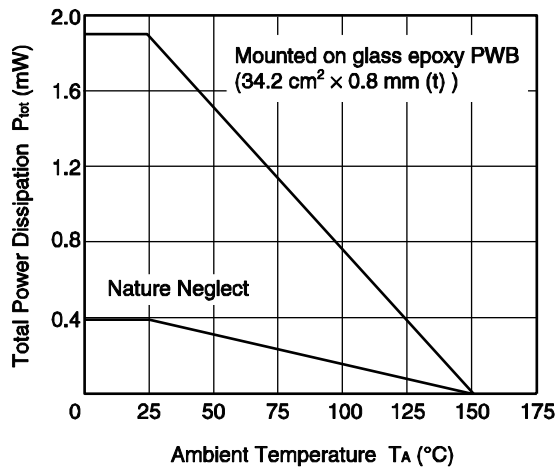
Note Pulse measurement: $PW \leq 350\text{ }\mu\text{s}$, Duty Cycle $\leq 2\%$

 h_{FE} CLASSIFICATION

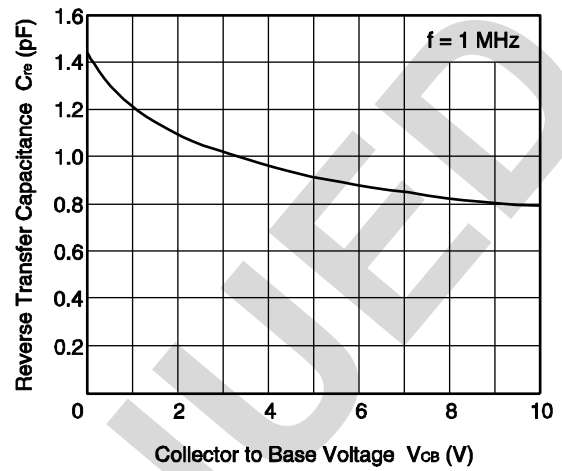
Rank	FB
Marking	SP
h_{FE} Value	80 to 180

■ TYPICAL CHARACTERISTICS ($T_A = +25^\circ\text{C}$, unless otherwise specified)

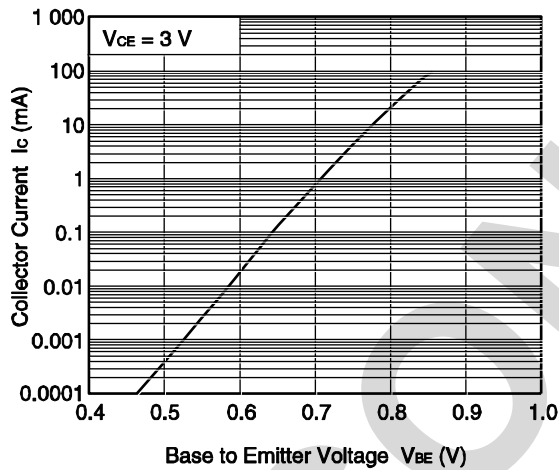
TOTAL POWER DISSIPATION
vs. AMBIENT TEMPERATURE



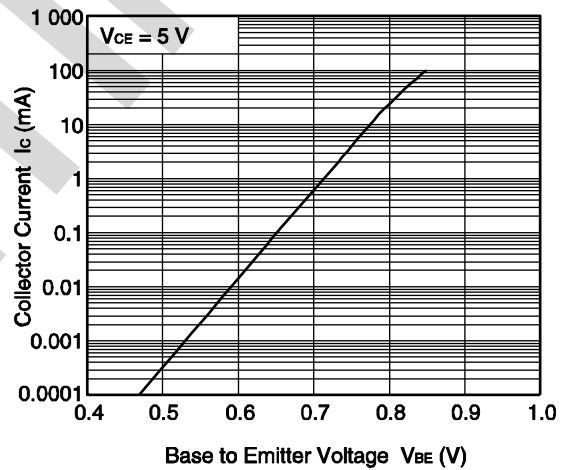
REVERSE TRANSFER CAPACITANCE
vs. COLLECTOR TO BASE VOLTAGE



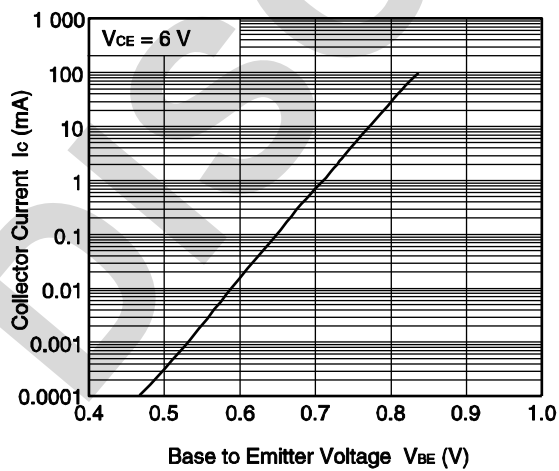
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



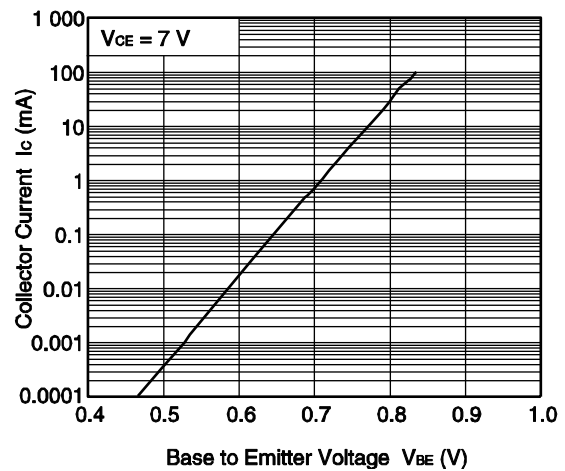
COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE

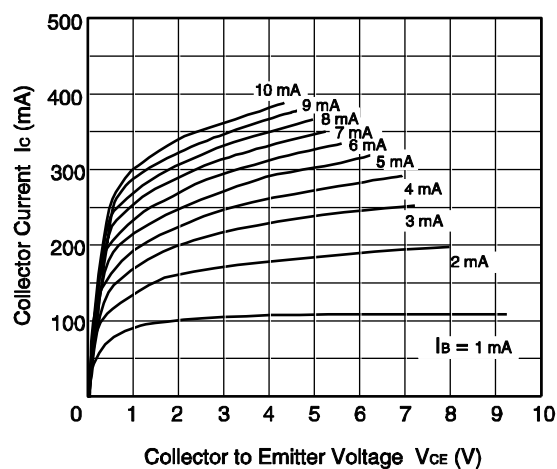


COLLECTOR CURRENT vs.
BASE TO EMITTER VOLTAGE

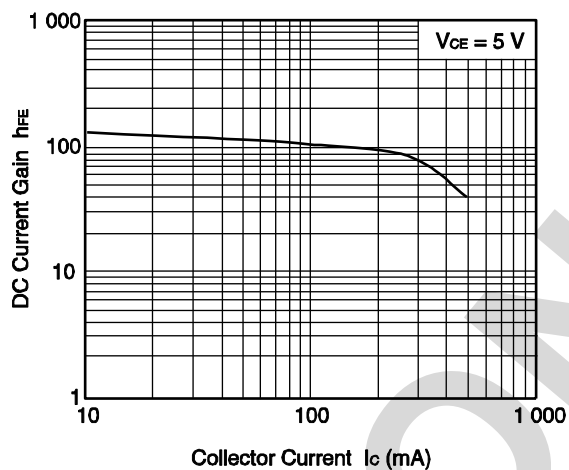


Remark The graphs indicate nominal characteristics.

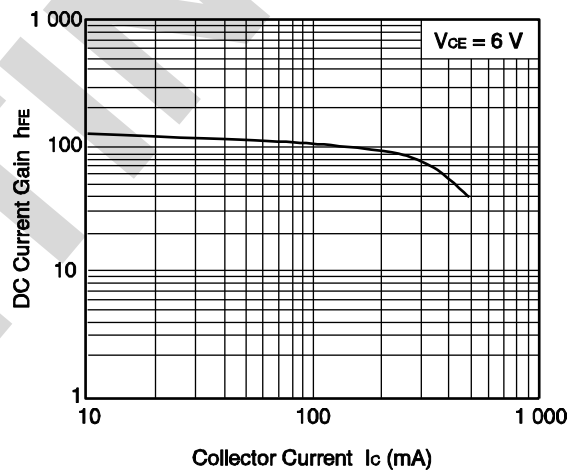
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



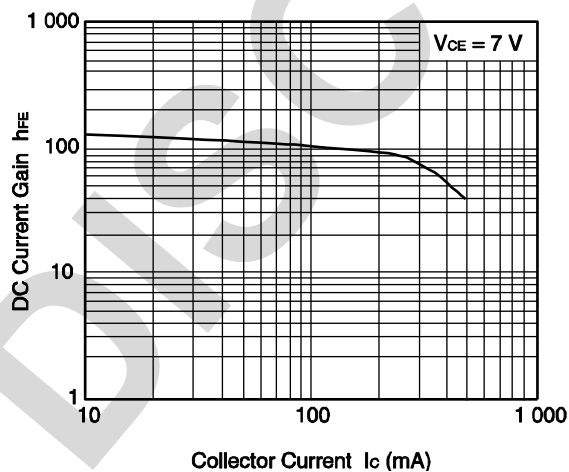
DC CURRENT GAIN vs.
COLLECTOR CURRENT



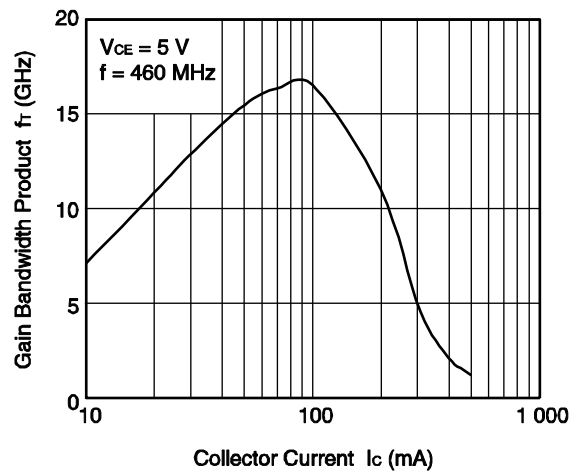
DC CURRENT GAIN vs.
COLLECTOR CURRENT



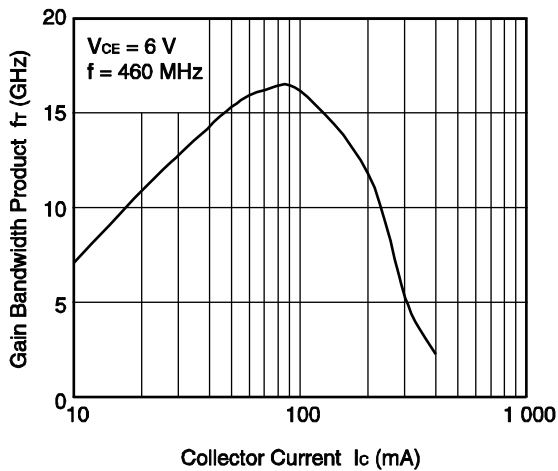
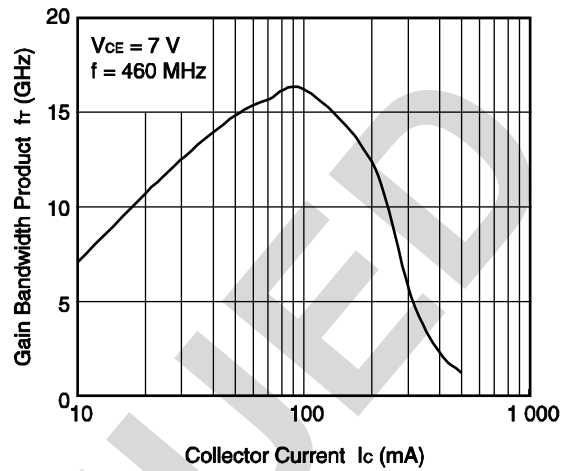
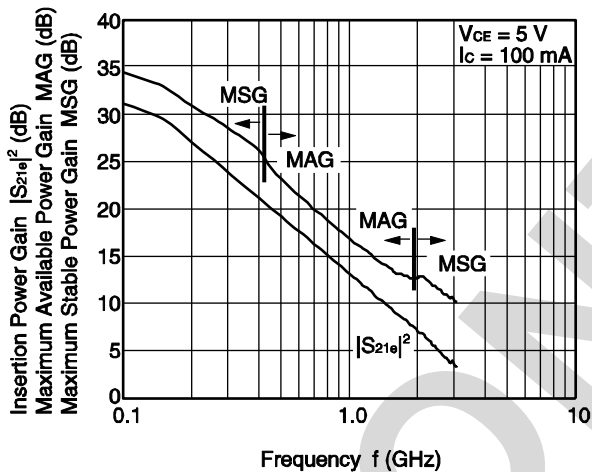
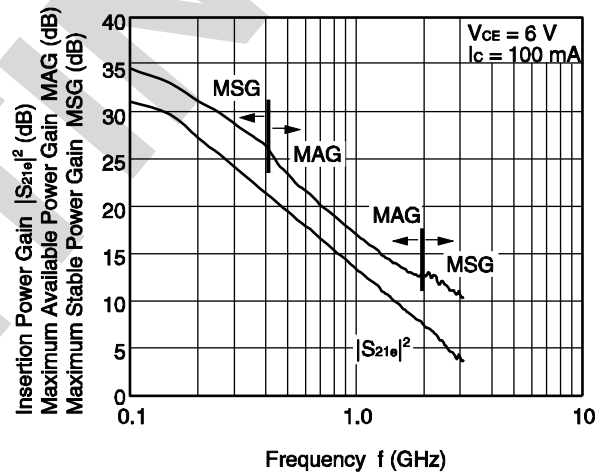
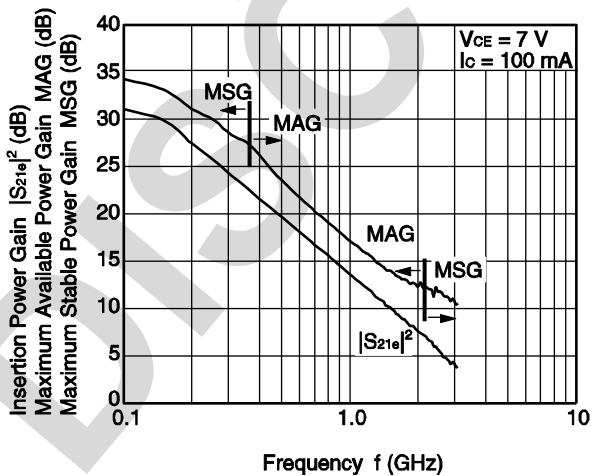
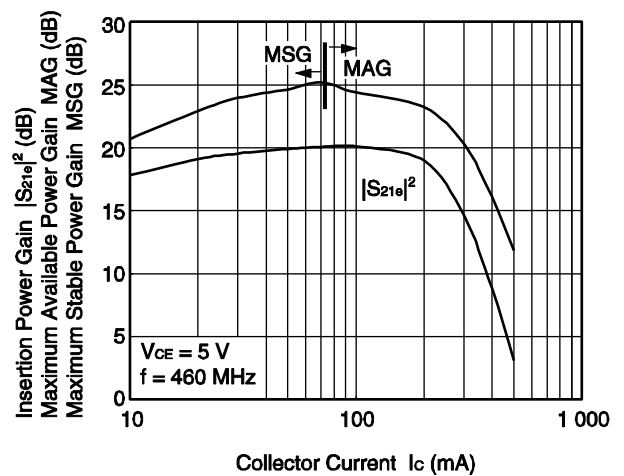
DC CURRENT GAIN vs.
COLLECTOR CURRENT



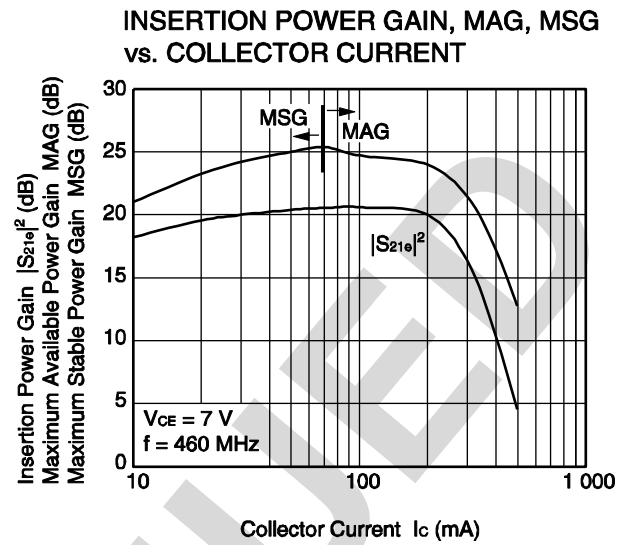
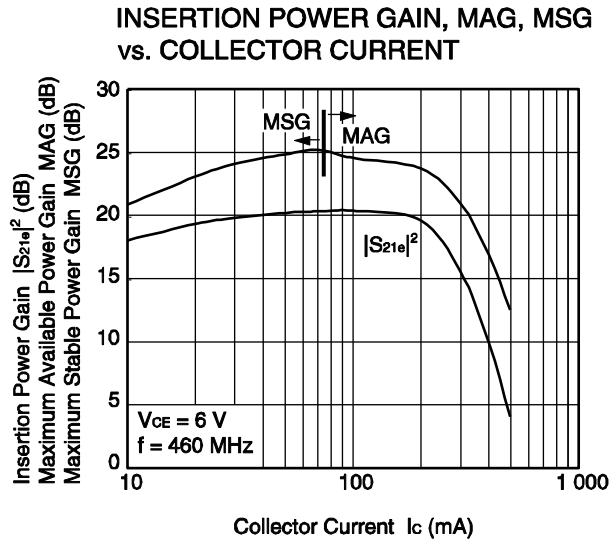
GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



Remark The graphs indicate nominal characteristics.

GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENTGAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENTINSERTION POWER GAIN,
MAG, MSG vs. FREQUENCYINSERTION POWER GAIN,
MAG, MSG vs. FREQUENCYINSERTION POWER GAIN,
MAG, MSG vs. FREQUENCYINSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT

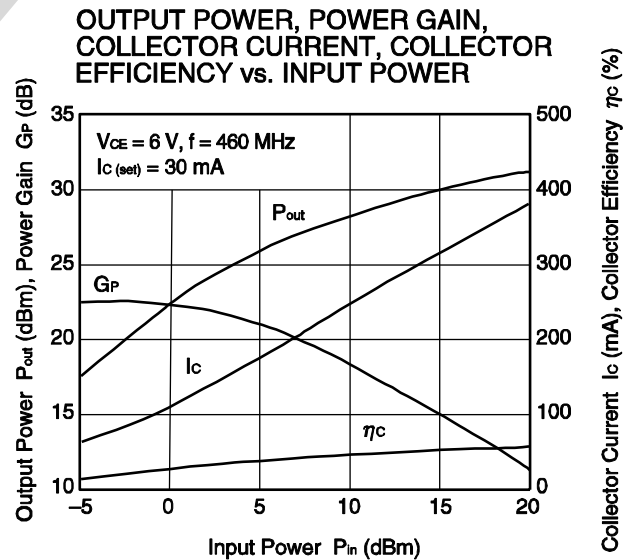
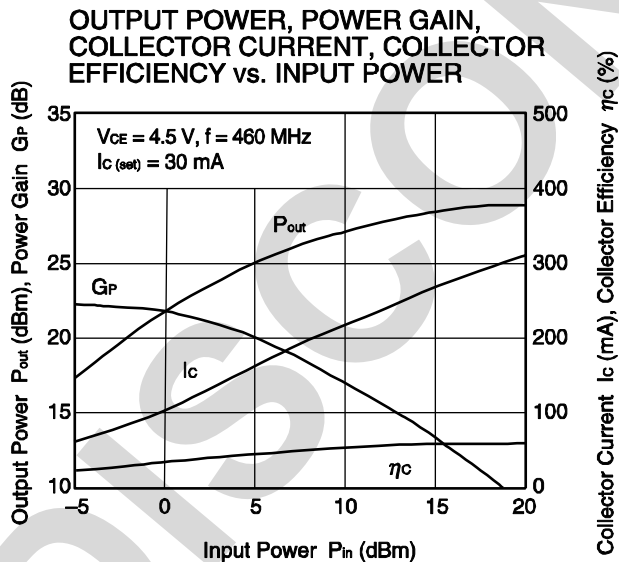
Remark The graphs indicate nominal characteristics.



S-PARAMETERS

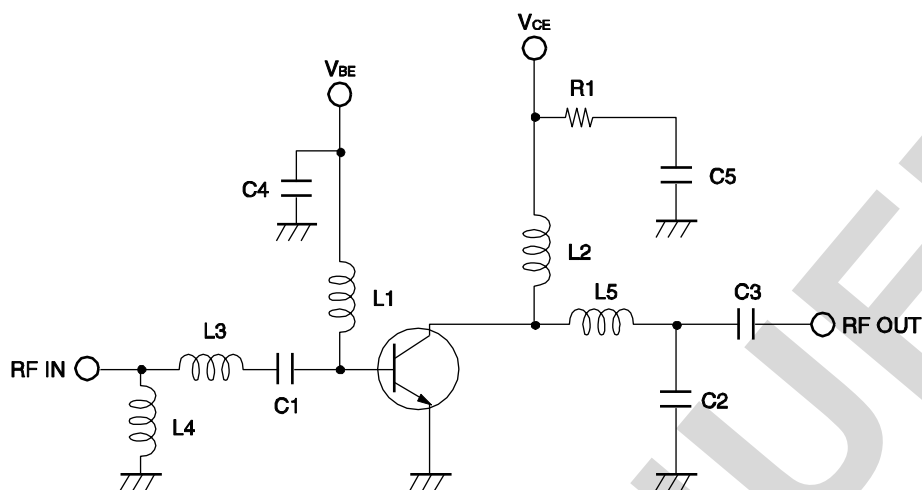
- S-parameters and noise parameters are provided on our Web site in a format (S2P) that enables the direct import of the parameters to microwave circuit simulators without the need for keyboard inputs.
- Click here to download S-parameters.
- [RF and Microwave] © [Device Parameters]
- URL <http://www.necel.com/microwave/en/>

PA EVALUATION CIRCUIT TYPICAL CHARACTERISTICS



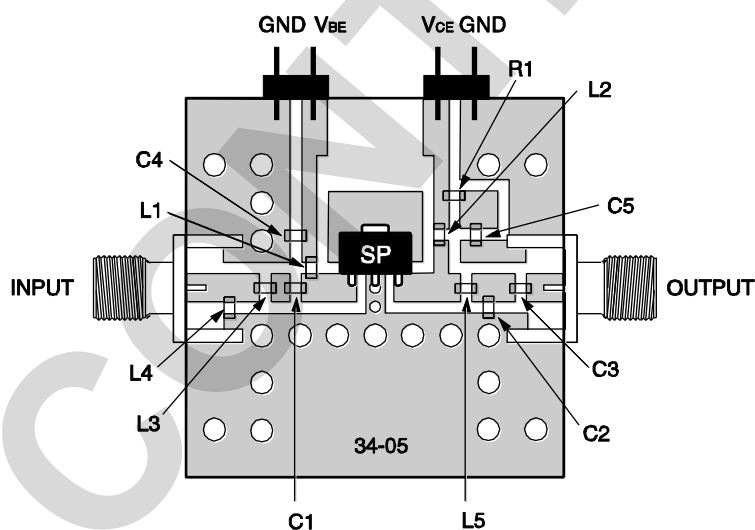
Remark The graphs indicate nominal characteristics.

■ EVALUATION CIRCUIT ($f = 460 \text{ MHz}$)



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins.

■ EVALUATION BOARD ($f = 460 \text{ MHz}$)



Notes

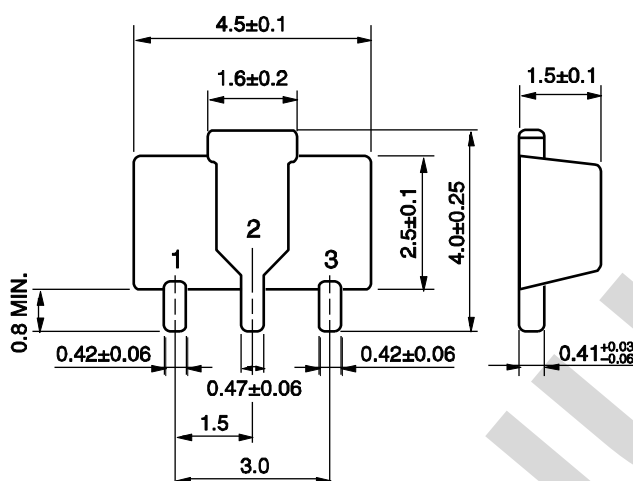
1. $20 \times 20 \text{ mm}$, $t = 0.8 \text{ mm}$ double sided copper clad glass epoxy PWB.
2. Back side: GND pattern
3. Solder gold plated on pattern
4. $\circ$: Through holes

 COMPONENT LIST

Component	Maker	Value	Size (TYPE)	Purpose
C1	Murata	10 pF	1005	Input DC Block/Input RF Matching
C2	Murata	4 pF	1005	Input RF Matching
C3	Murata	33 pF	1005	Input DC Block/Output RF Matching
C4	Murata	10 000 pF	1005	RF GND
C5	Murata	1 μ F	1608	RF GND
L1	Toko	68 nH	1005	RF Block/Input RF Matching
L2	Toko	33 nH	LLQ2021	RF Block/Output RF Matching
L3	Toko	1 nH	1005	Input RF Matching
L4	Toko	8.2 nH	1005	Input RF Matching
L5	Toko	8.2 nH	LLQ2021	Output RF Matching
R1	SSM	15 Ω	1608	Improve Stability

PACKAGE DIMENSIONS

3-PIN POWER MINIMOLD (34 PKG) (UNIT: mm)



PIN CONNECTIONS

1. Collector
2. Emitter
3. Base