CEL

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 dBm TYP. @ V_{CE} = 6 V, P_{in} = 15 dBm, f = 460 MHz
  P_{out} = 30 dBm TYP. @ V_{CE} = 6 V, P_{in} = 20 dBm, f = 900 MHz
- MSG (Maximum Stable Gain) = 23 dB TYP. @ V_{CE} = 6 V, Ic = 100 mA, f = 460 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°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	°C
Storage Temperature	T_{stg}	−65 to +150	°C

Note Mounted on 34.2 cm^2 × 0.8 mm (t) glass epoxy PWB

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

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The mark ★ shows major revised points.

THERMAL RESISTANCE (T_A = +25°C)

Parameter	Symbol	Ratings	Unit
Termal Resistance from Junction to Ambient [Note]	Rth_{j-a}	65	°C/W

Note Mounted on 34.2 cm^2 × 0.8 mm (t) glass epoxy PWB

RECOMMENDED OPERATING RANGE (T_A = +25°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 $V_{CE} \leq 6.0$ V, f = 460 MHz

ELECTRICAL CHARACTERISTICS (T_A = +25°C)

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

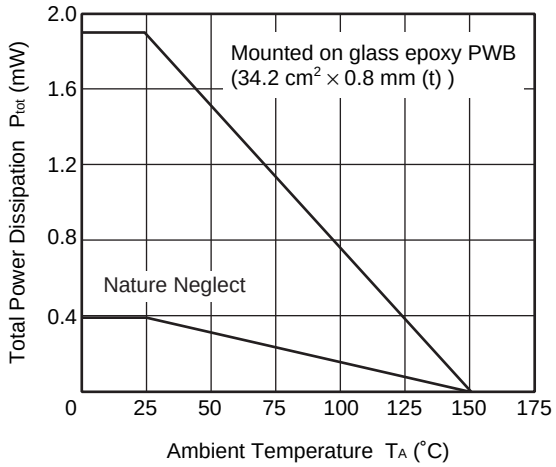
Note Pulse measurement: PW ≤ 350 μs, Duty Cycle ≤ 2%

h_{FE} CLASSIFICATION

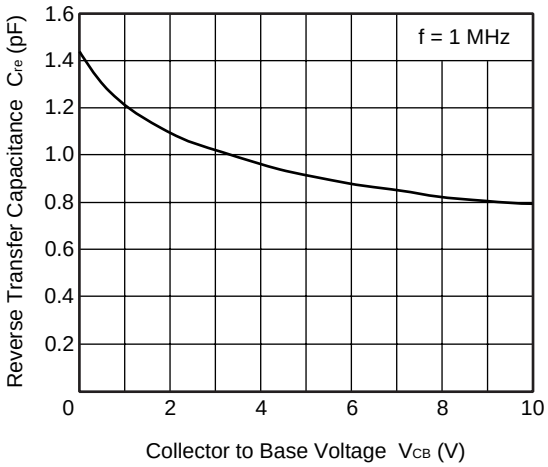
Rank	FB
Marking	SP
h_{FE} Value	80 to 180

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

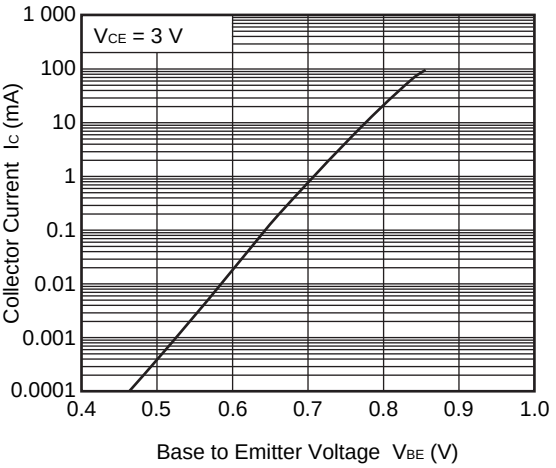
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



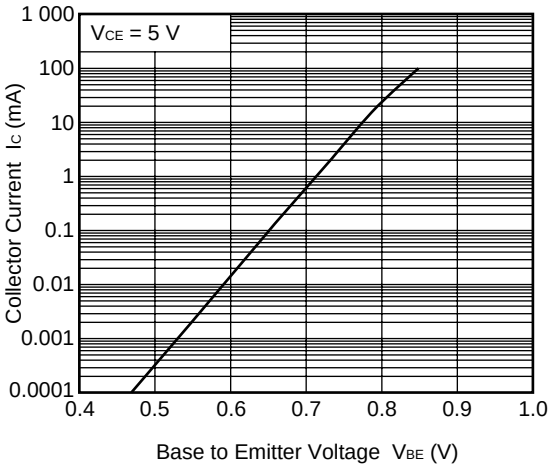
REVERSE TRANSFER CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



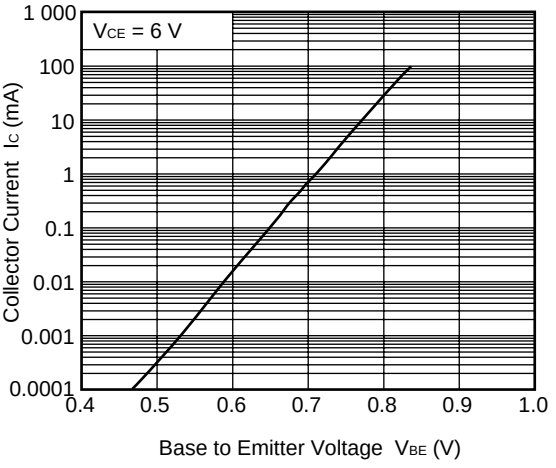
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



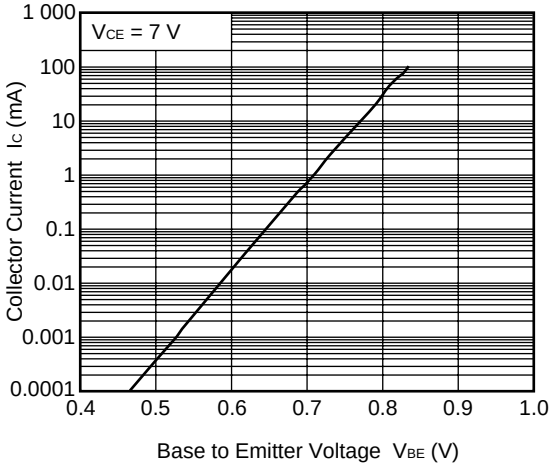
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

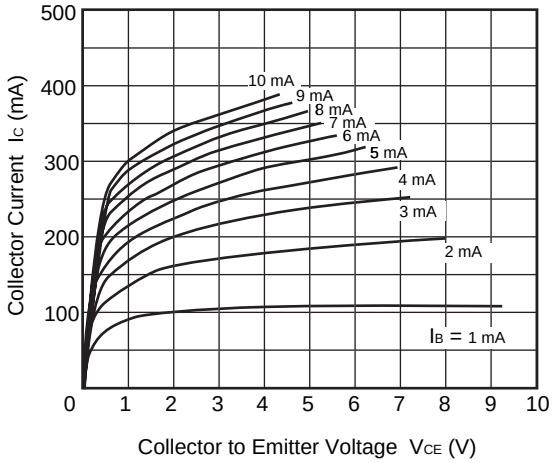


COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE

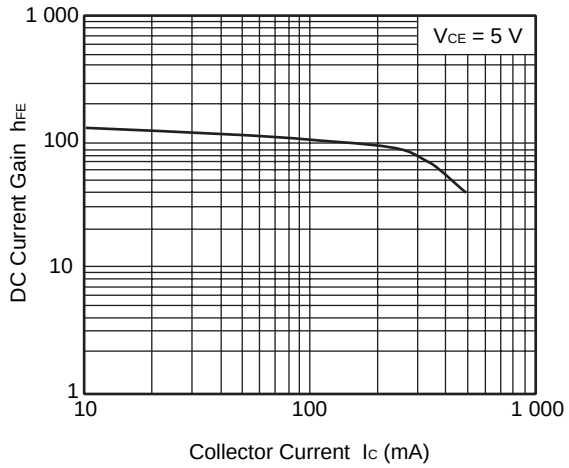


Remark The graphs indicate nominal characteristics.

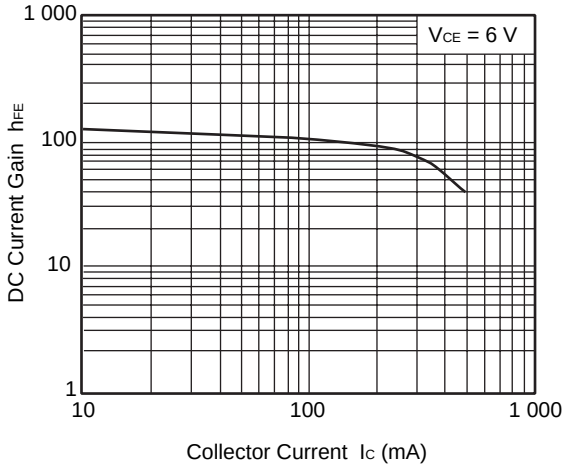
COLLECTOR CURRENT vs.
COLLECTOR TO EMITTER VOLTAGE



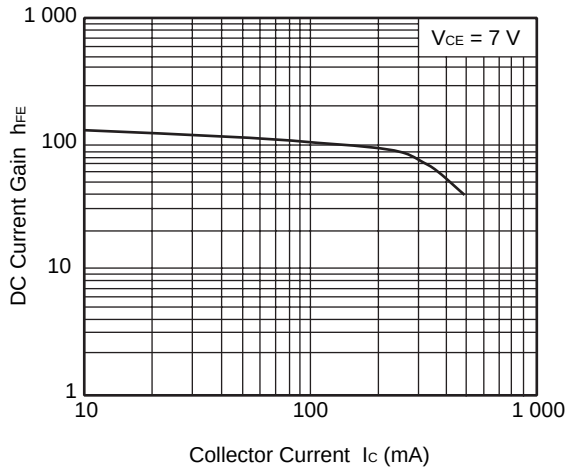
DC CURRENT GAIN vs.
COLLECTOR CURRENT



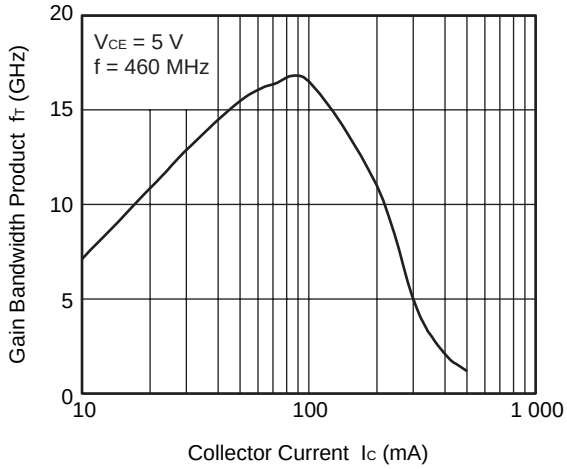
DC CURRENT GAIN vs.
COLLECTOR CURRENT



DC CURRENT GAIN vs.
COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT
vs. COLLECTOR CURRENT



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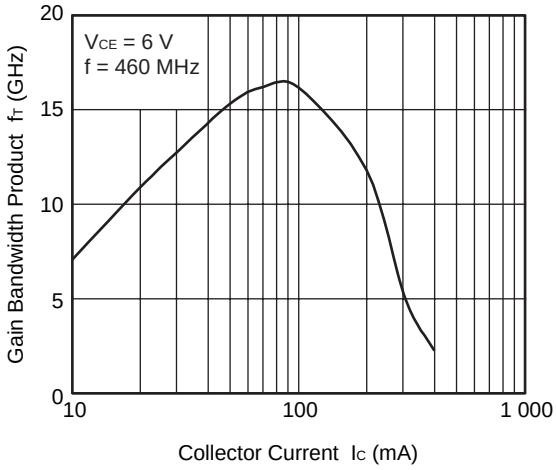
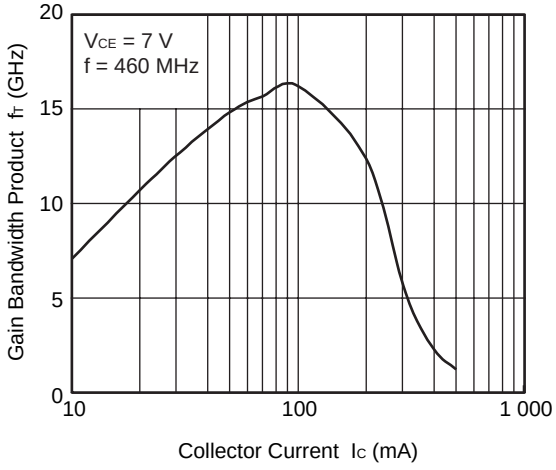
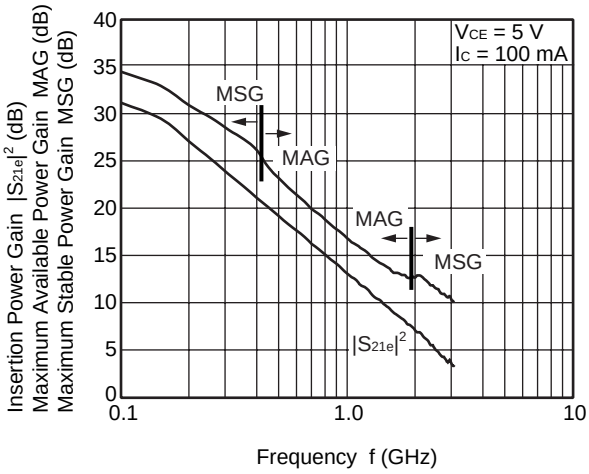
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



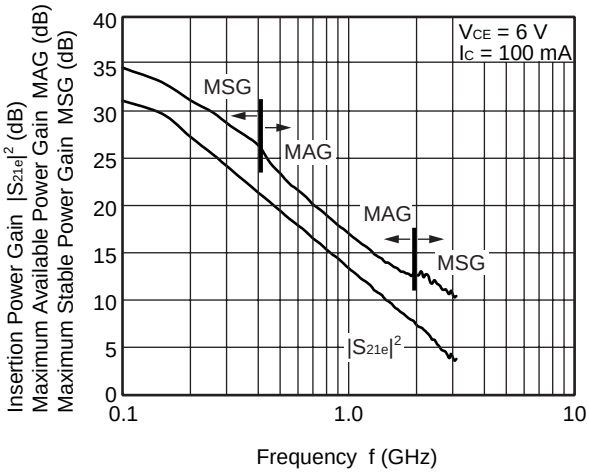
GAIN BANDWIDTH PRODUCT vs. COLLECTOR CURRENT



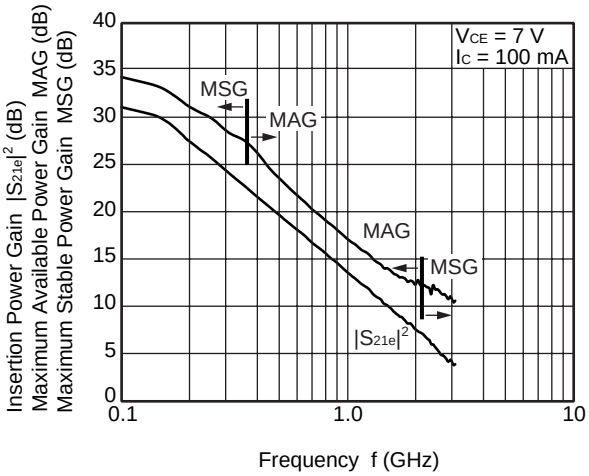
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



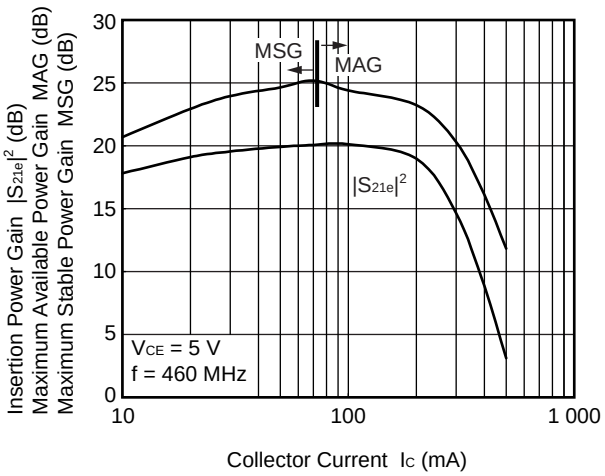
INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN, MAG, MSG vs. FREQUENCY



INSERTION POWER GAIN, MAG, MSG vs. COLLECTOR CURRENT



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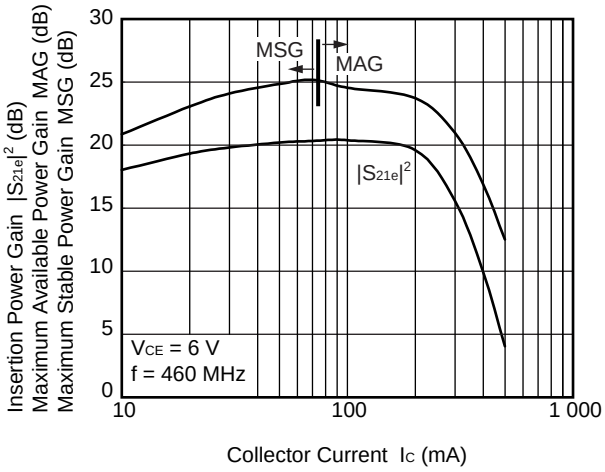
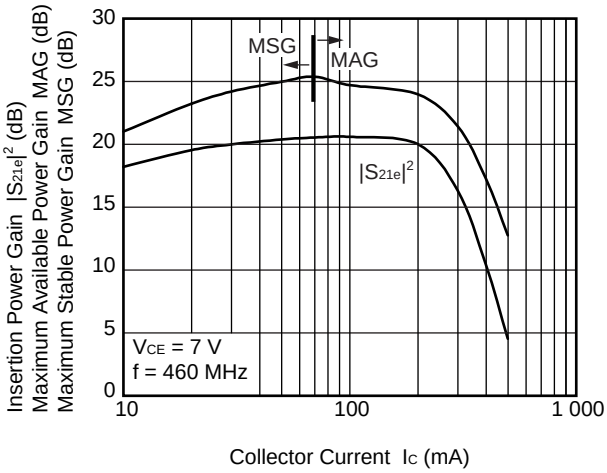
INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



INSERTION POWER GAIN, MAG, MSG
vs. COLLECTOR CURRENT



★ S-PARAMETERS

S-parameters/Noise parameters are provided on the NEC Compound Semiconductor Devices Web site in a form (S2P) that enables direct import to a microwave circuit simulator without keyboard input.

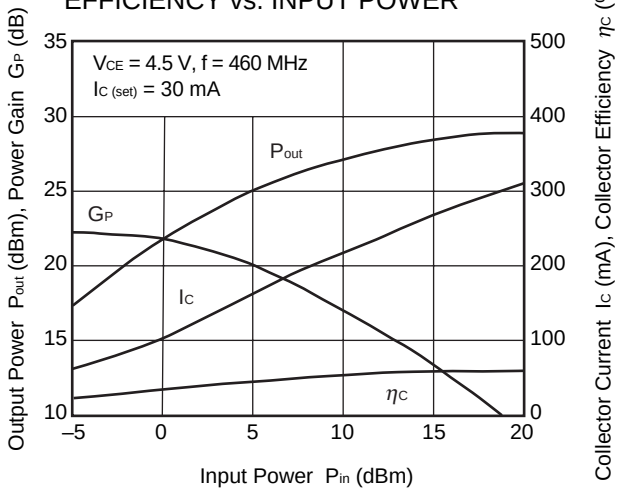
Click here to download S-parameters.

[RF and Microwave] → [Device Parameters]

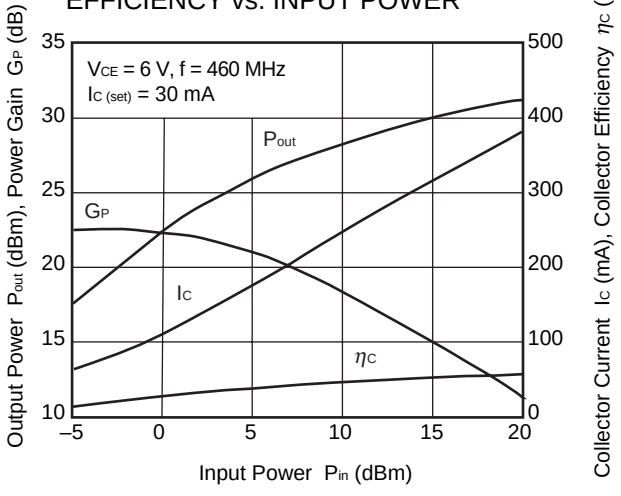
URL http://www.ncsd.necel.com/

★ PA EVALUATION CIRCUIT TYPICAL CHARACTERISTICS

OUTPUT POWER, POWER GAIN,
COLLECTOR CURRENT, COLLECTOR
EFFICIENCY vs. INPUT POWER

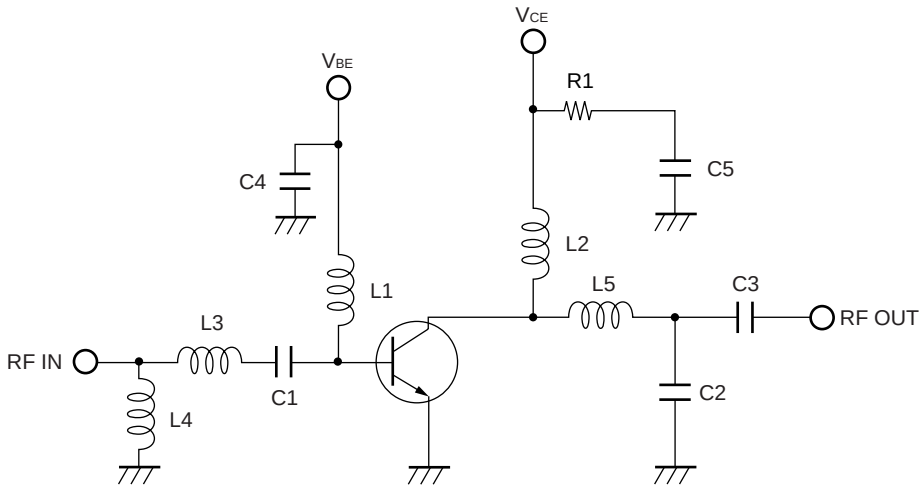


OUTPUT POWER, POWER GAIN,
COLLECTOR CURRENT, COLLECTOR
EFFICIENCY vs. INPUT POWER



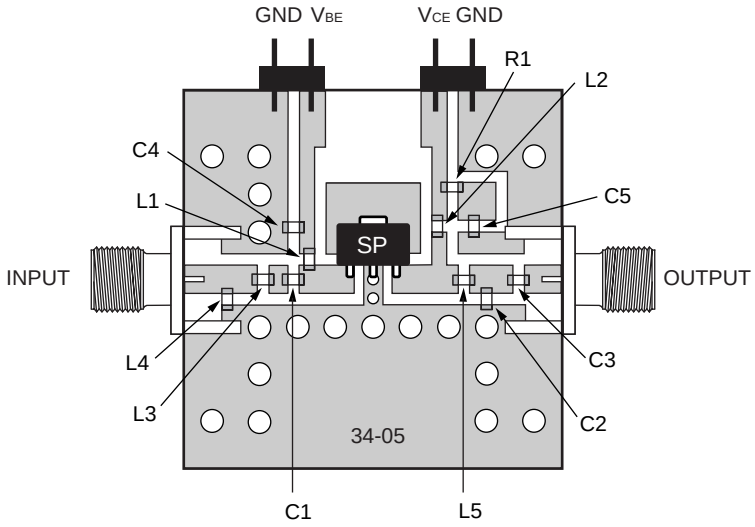
Remark The graphs indicate nominal characteristics.

★ EVALUATION CIRCUIT (f = 460 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 MHz)



Notes

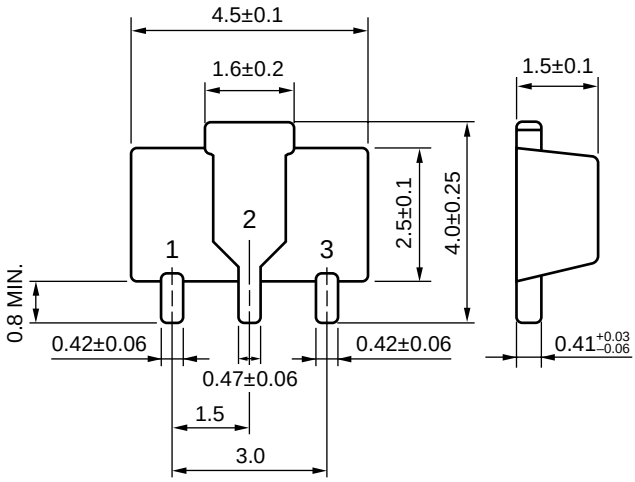
1. 20 × 20 mm, t = 0.8 mm double sided copper clad glass epoxy PWB.
2. Back side: GND pattern
3. Solder gold plated on pattern
4. ○: Through holes

★ 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 μF	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

CEL California Eastern Laboratories

4590 Patrick Henry Drive
Santa Clara, CA 95054-1817
Telephone: (408) 919-2500
Facsimile: (408) 988-0279

Subject: Compliance with EU Directives

CEL certifies, to its knowledge, that semiconductor and laser products detailed below are compliant with the requirements of European Union (EU) Directive 2002/95/EC Restriction on Use of Hazardous Substances in electrical and electronic equipment (RoHS) and the requirements of EU Directive 2003/11/EC Restriction on Penta and Octa BDE.

CEL Pb-free products have the same base part number with a suffix added. The suffix –A indicates that the device is Pb-free. The –AZ suffix is used to designate devices containing Pb which are exempted from the requirement of RoHS directive (*). In all cases the devices have Pb-free terminals. All devices with these suffixes meet the requirements of the RoHS directive.

This status is based on CEL's understanding of the EU Directives and knowledge of the materials that go into its products as of the date of disclosure of this information.

Restricted Substance per RoHS	Concentration Limit per RoHS (values are not yet fixed)	Concentration contained in CEL devices	
Lead (Pb)	< 1000 PPM	-A	-AZ
		Not Detected	(*)
Mercury	< 1000 PPM	Not Detected	
Cadmium	< 100 PPM	Not Detected	
Hexavalent Chromium	< 1000 PPM	Not Detected	
PBB	< 1000 PPM	Not Detected	
PBDE	< 1000 PPM	Not Detected	

If you should have any additional questions regarding our devices and compliance to environmental standards, please do not hesitate to contact your local representative.