2SC3127, 2SC3128, 2SC3510

Silicon NPN Epitaxial

HITACHI

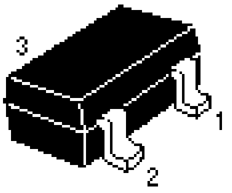
Application

UHF/VHF wide band amplifier

Outline

MPAK

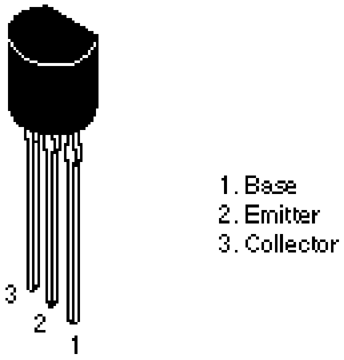
2SC3127



1. Emitter
2. Base
3. Collector

TO-92 (2)

2SC3128, 2SC3510



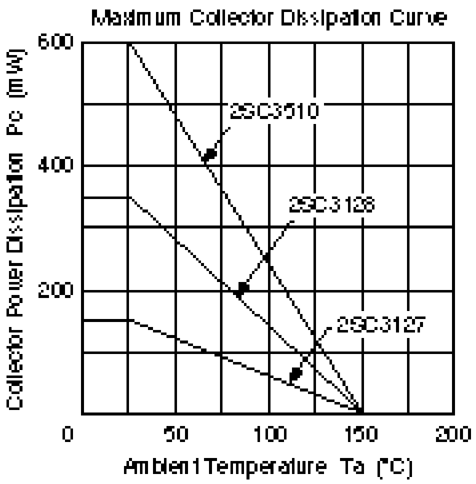
Absolute Maximum Ratings (Ta = 25°C)

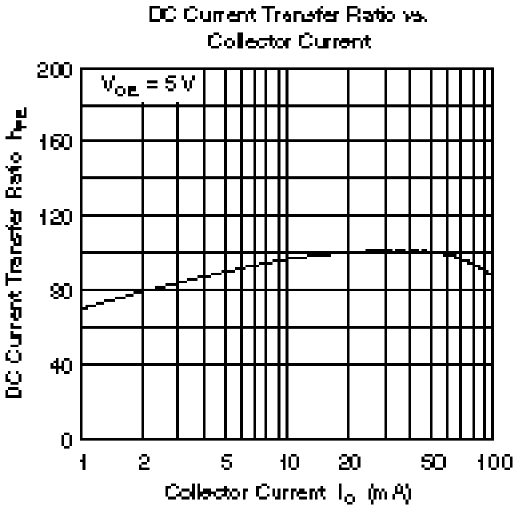
Item	**Symbol**	**2SC3127***1	**2SC3128**	**2SC3510**	**Unit**
Collector to base voltage	V_{CBO}	20	20	20	V
Collector to emitter voltage	V_{CEO}	12	12	12	V
Emitter to base voltage	V_{EBO}	3	3	3	V
Collector current	I_C	50	50	50	mA
Collector power dissipation	P_C	150	350	600	mW
Junction temperature	Tj	150	150	150	°C
Storage temperature	Tstg	–55 to +150	–55 to +150	–55 to +150	°C

Note: 1. Marking for 2SC3127 is “ID–”.

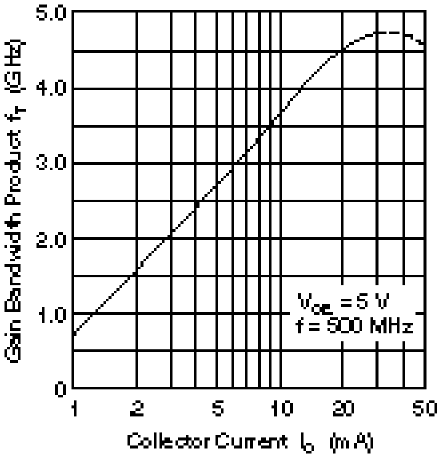
Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min	Typ	Max	Unit	Test conditions
Collector to base breakdown voltage	$V_{(BR)CBO}$	20	—	—	V	I_C = 10 µA, I_E = 0
Collector to emitter breakdown voltage	$V_{(BR)CEO}$	12	—	—	V	I_C = 1 mA, R_{BE} = ∞
Emitter cutoff current	I_{EBO}	—	—	10	µA	V_{EB} = 3 V, I_C = 0
Collector cutoff current	I_{CBO}	—	—	0.5	µA	V_{CB} = 12 V, I_E = 0
DC current transfer ratio	h_{FE}	30	90	200		V_{CE} = 5 V, I_C = 20 mA
Collector output capacitance	Cob	—	0.9	1.5	pF	V_{CB} = 5 V, I_E = 0, f = 1 MHz
Gain bandwidth product	f_T	3.5	4.5	—	GHz	V_{CE} = 5 V, I_C = 20 mA
Power gain	PG	—	10.5	—	dB	V_{CE} = 5 V, I_C = 20 mA, f = 900 MHz
Noise figure	NF	—	2.2	—	dB	V_{CE} = 5 V, I_C = 5 mA, f = 900 MHz

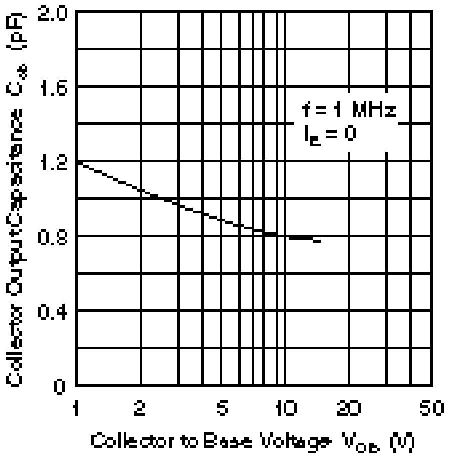




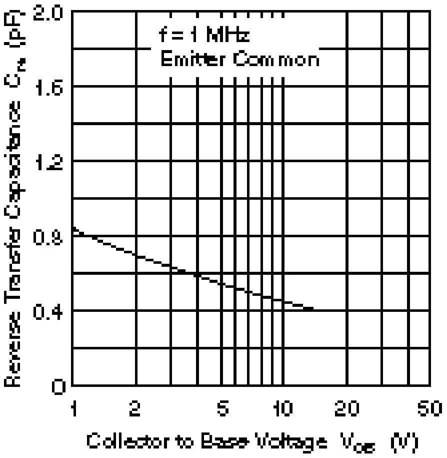
Gain Bandwidth Product vs. Collector Current



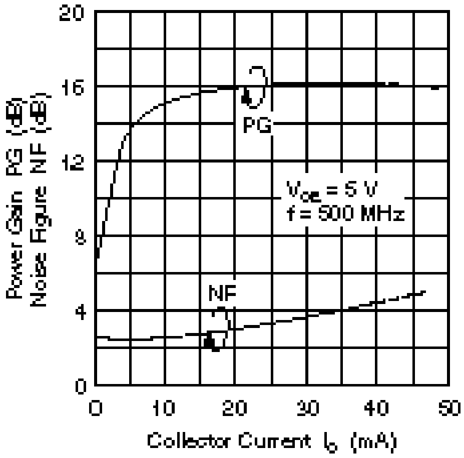
Collector Output Capacitance vs. Collector to Base Voltage



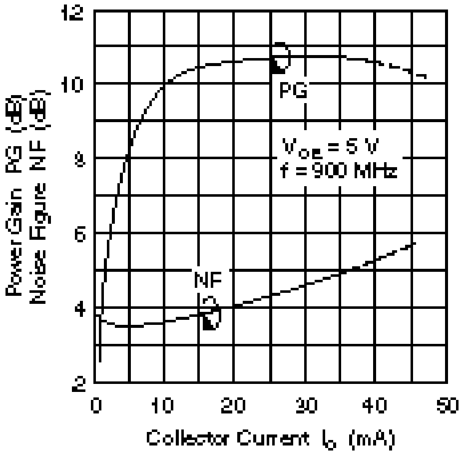
Reverse Transfer Capacitance vs. Collector to Base Voltage



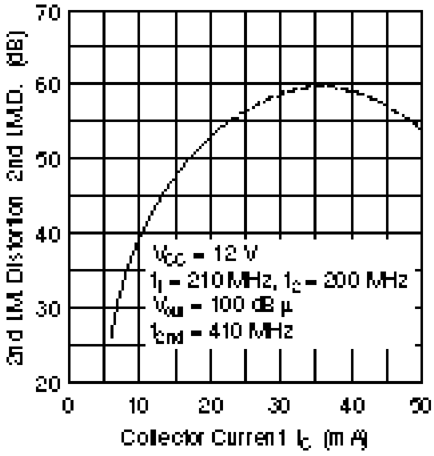
Power Gain and Noise Figure vs. Collector Current

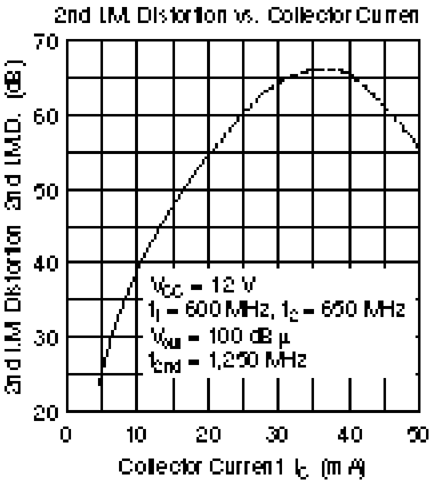


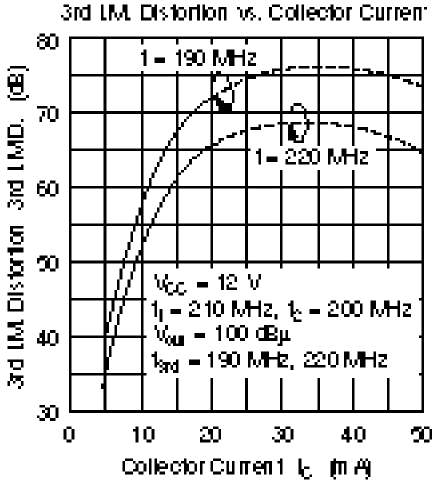
Power Gain and Noise Figure vs. Collector Current

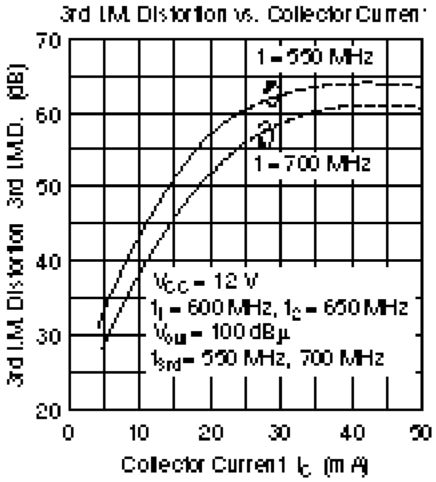


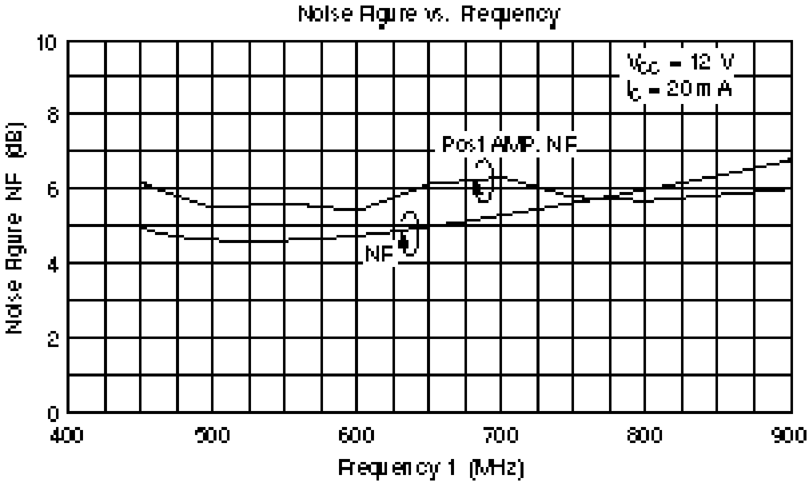
2nd I.M. Distortion vs. Collector Curren

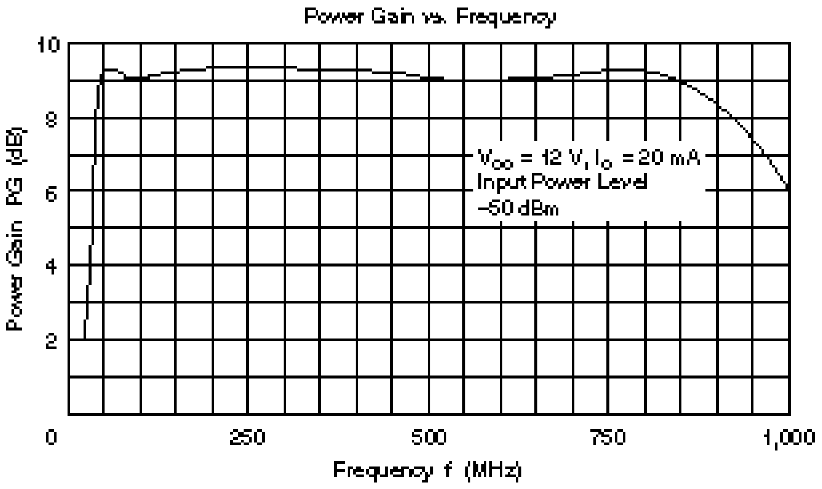



2nd I.M. Distortion vs. Collector Current
2nd I.M. Distortion 2nd I.M.D. (dB)
70
60
50
40
30
20
0
10
20
30
40
50
Collector Current Ic (mA)
V_{CC} = 12 V
f_1 = 600 MHz, f_2 = 650 MHz
V_{out} = 100 dBµ
f_{2nd} = 1,250 MHz

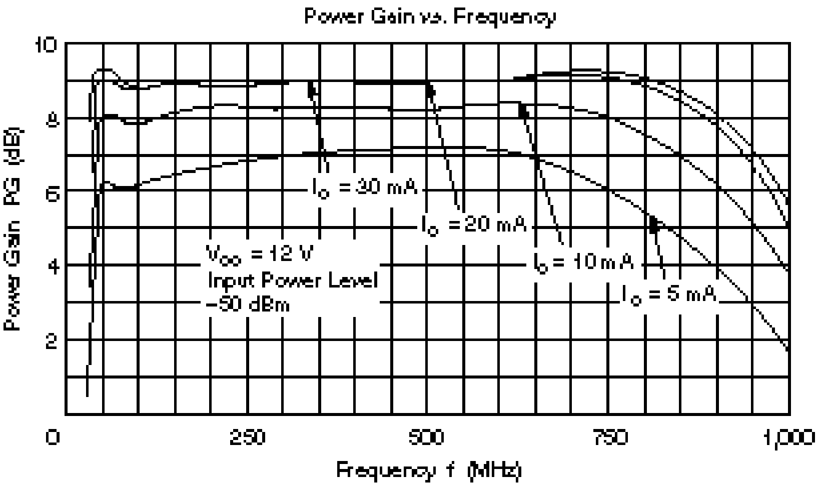

3rd I.M. Distortion vs. Collector Current
3rd I.M. Distortion 3rd I.M.D. (dB)
80
70
60
50
40
30
0
10
20
30
40
50
Collector Current Ic (mA)
f = 190 MHz
f = 220 MHz
V_{CC} = 12 V
f_1 = 210 MHz, f_2 = 200 MHz
V_{out} = 100 dBµ
f_{3rd} = 190 MHz, 220 MHz


3rd I.M. Distortion vs. Collector Current
3rd I.M. Distortion 3rd I.M.D. (dB)
70
60
50
40
30
20
0
10
20
30
40
50
Collector Current Ic (mA)
f = 550 MHz
f = 700 MHz
V_{CC} = 12 V
f_1 = 600 MHz, f_2 = 650 MHz
V_{out} = 100 dBµ
f_{3rd} = 550 MHz, 700 MHz


Noise Figure vs. Frequency
Noise Figure NF (dB)
10
8
6
4
2
0
400
500
600
700
800
900
Frequency f (MHz)
V_{CC} = 12 V
I_C = 20 mA
Post AMP. NF
NF

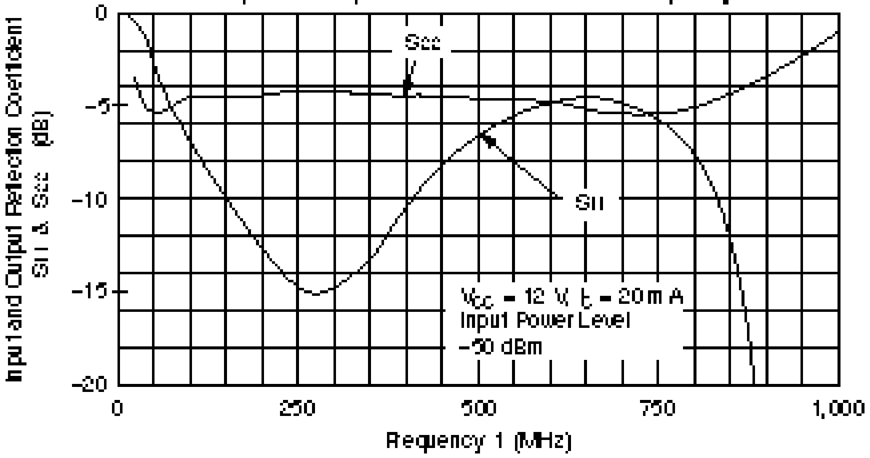


Power Gain vs. Frequency

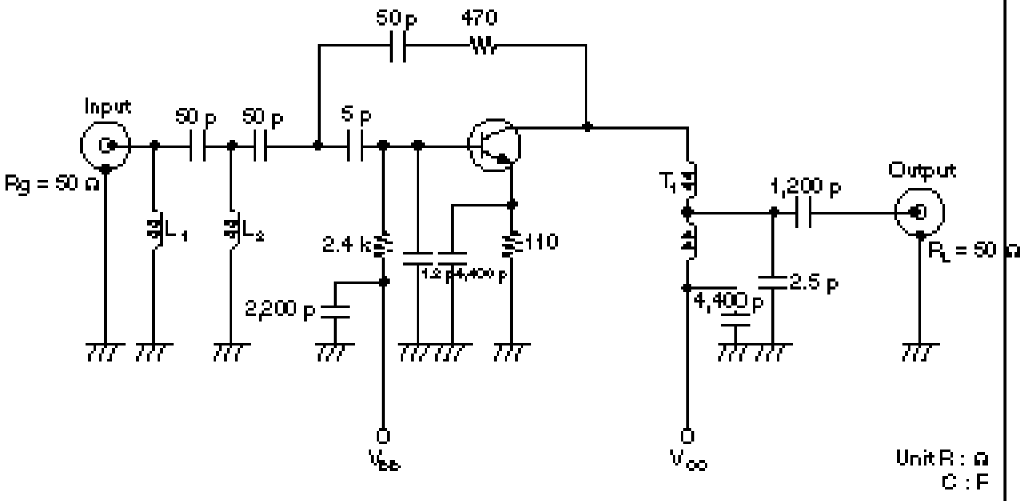


Power Gain vs. Frequency

Input and Output Reflection Coefficient vs. Frequency



Vhf to Uhf Wide Band Amp. Circuit



Parts Specification
L$_1$: Inside dia φ3.0 mm, φ0.4 mm Polyurethane Coated Copper wire 12 Turns.
L$_2$: Inside dia φ3.5 mm, φ0.5 mm Polyurethane Coated Copper wire 9 Turns.
T$_1$: Balance wind used Ferrite Core
Outside dia φ4.0 mm, Inside dia φ2.0 mm
φ0.1 mm Polyurethane Coated Copper wire 3 Turns.
Ratio Input to Output is 2 : 1

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HITACHI

Hitachi, Ltd.
Semiconductor & IC Div.
Nippon Bldg., 2-6-2, Ohte-machi, Chiyoda-ku, Tokyo 100, Japan
Tel: Tokyo (03) 3270-2111
Fax: (03) 3270-5109

For further information write to:

Hitachi America, Ltd.
Semiconductor & IC Div.
2000 Sierra Point Parkway
Brisbane, CA. 94005-1835
U S A
Tel: 415-589-8300
Fax: 415-583-4207

Hitachi Europe GmbH
Electronic Components Group
Continental Europe
Dornacher Straße 3
D-85622 Feldkirchen
München
Tel: 089-9 91 80-0
Fax: 089-9 29 30 00

Hitachi Europe Ltd.
Electronic Components Div.
Northern Europe Headquarters
Whitebrook Park
Lower Cookham Road
Maidenhead
Berkshire SL6 8YA
United Kingdom
Tel: 0628-585000
Fax: 0628-778322

Hitachi Asia Pte. Ltd.
16 Collyer Quay #20-00
Hitachi Tower
Singapore 0104
Tel: 535-2100
Fax: 535-1533

Hitachi Asia (Hong Kong) Ltd.
Unit 706, North Tower,
World Finance Centre,
Harbour City, Canton Road
Tsim Sha Tsui, Kowloon
Hong Kong
Tel: 27359218
Fax: 27306071