

**2SC4402**

VHF/UHF Mixer, Local Oscillator, Low-Voltage Amplifier Applications

Applications

- VHF/UHF MIX/OSC, low-voltage high-frequency amplifiers.

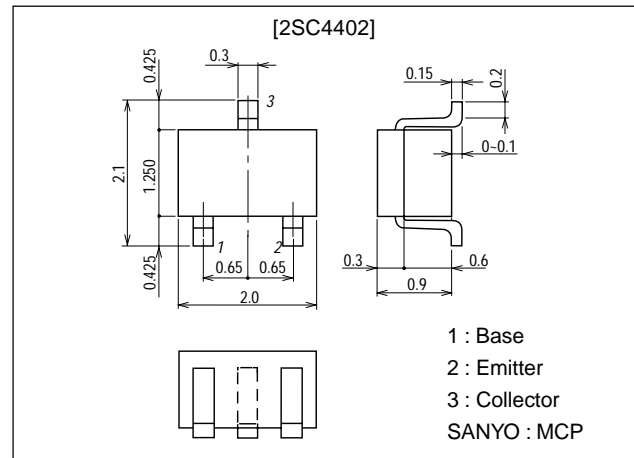
Features

- Low-voltage operation
 - : $f_T=3.0\text{GHz}$ typ ($V_{CE}=3\text{V}$)
 - : $\text{MAG}=12\text{dB}$ typ ($V_{CE}=3\text{V}$, $I_C=10\text{mA}$)
 - : $\text{NF}=1.5\text{dB}$ typ ($V_{CE}=3\text{V}$, $I_C=5\text{mA}$)
- Very small-sized package permitting 2SC4402-applied sets to be made smaller and slimmer.

Package Dimensions

unit:mm

2059B



Specifications

Absolute Maximum Ratings at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		25	V
Collector-to-Emitter Voltage	V_{CEO}		15	V
Emitter-to-Base Voltage	V_{EBO}		3	V
Collector Current	I_C		50	mA
Collector Dissipation	P_C		150	mW
Junction Temperature	T_J		150	$^\circ\text{C}$
Storage Temperature	T_{stg}		-55 to +150	$^\circ\text{C}$

Electrical Characteristics at $T_a = 25^\circ\text{C}$

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=15\text{V}$, $I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}$, $I_C=0$			1.0	μA
DC Current Gain	h_{FE}	$V_{CE}=3\text{V}$, $I_C=10\text{mA}$	40*		200*	
Gain-Bandwidth Product	f_T	$V_{CE}=3\text{V}$, $I_C=10\text{mA}$		3.0		GHz
Output Capacitance	C_{ob}	$V_{CB}=3\text{V}$, $f=1\text{MHz}$		0.85	1.5	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=3\text{V}$, $f=1\text{MHz}$		0.8		pF

* : The 2SC4402 is classified by 10mA h_{FE} as follows :

40	2	80	60	3	120	100	4	200
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(Note) Marking : PT

h_{FE} rank : 2, 3, 4

• For CP package version, use the 2SC4365.

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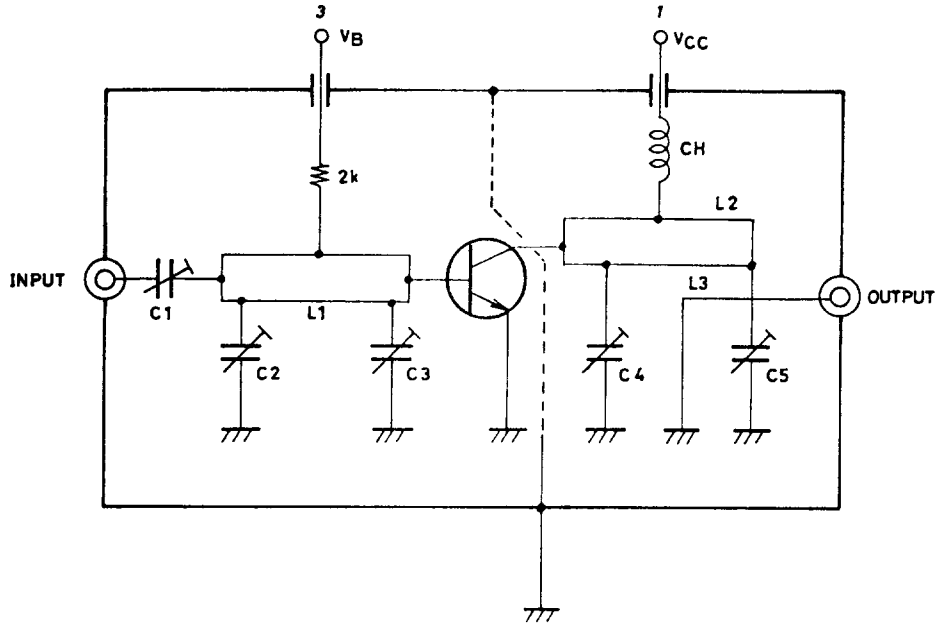
SANYO Electric Co., Ltd. Semiconductor Business Headquarters

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2SC4402

Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=3V, I_C=10mA, f=0.9GHz$		7		dB
Maximum Available Power Gain	MAG	$V_{CE}=3V, I_C=10mA, f=0.9GHz$		12		dB
Noise Figure	NF	$V_{CE}=3V, I_C=5mA, f=0.9GHz$ See specified Test Circuit.		1.5	3.0	dB

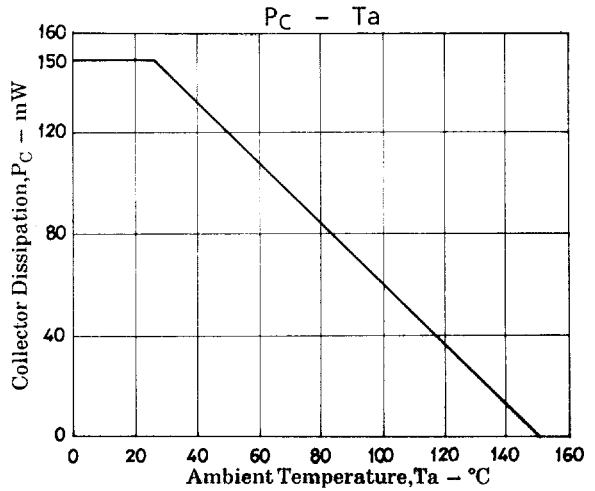
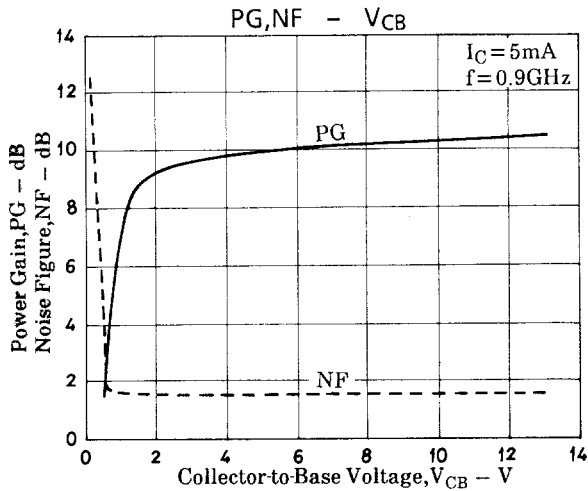
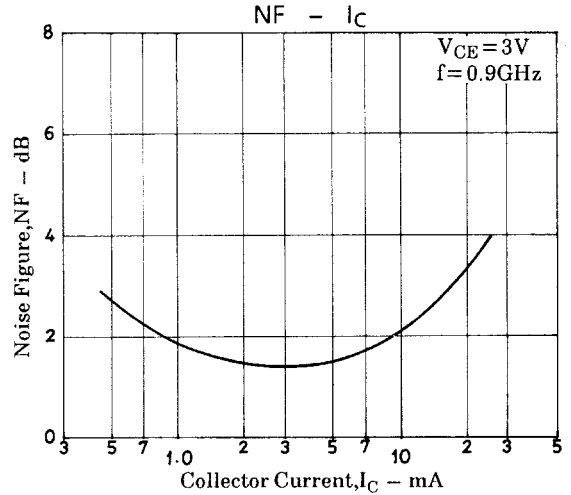
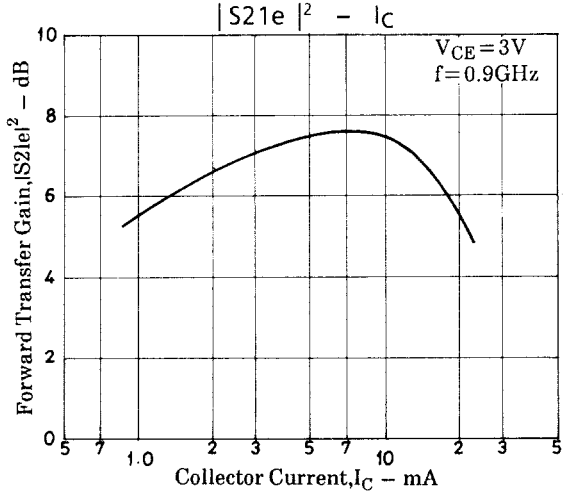
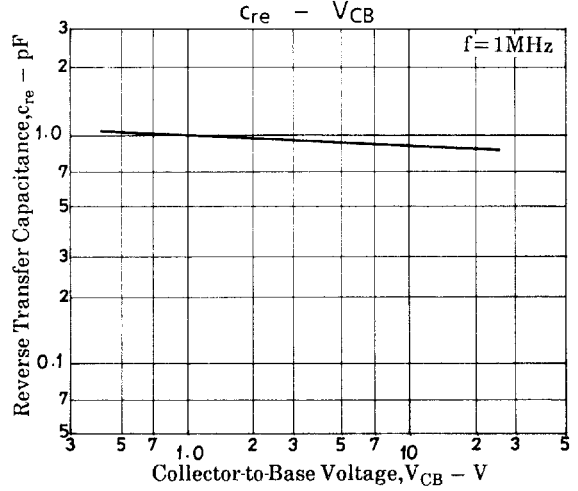
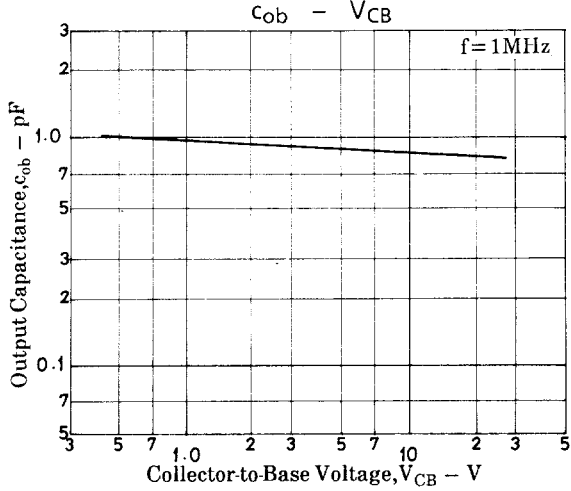
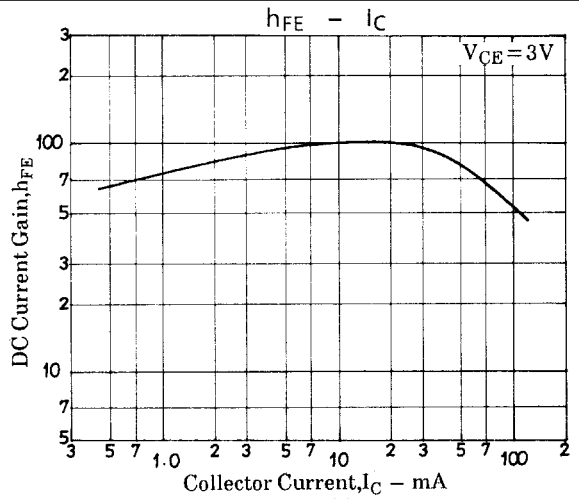
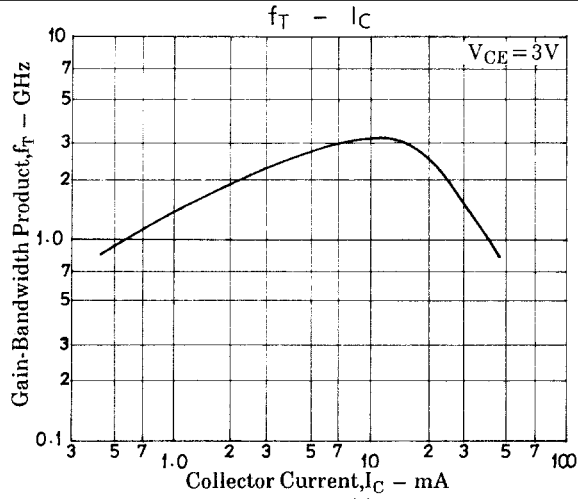
NF Test Circuit



Unit (resistance : Ω)

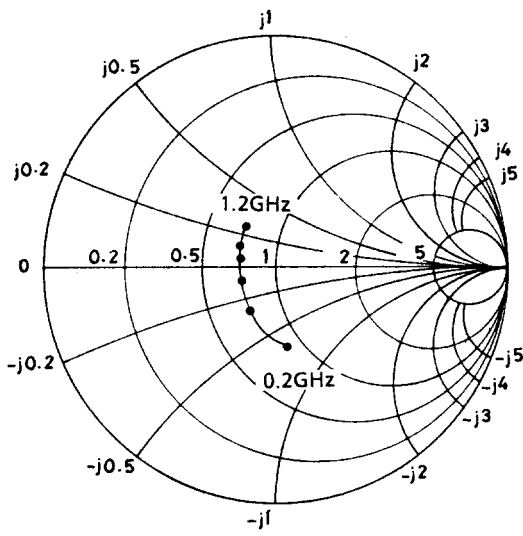
900MHz	
C1	~5pF
C2	~10pF
C3	~10pF
C4	~10pF
C5	~10pF
L1	W \approx 1.5mm, l \approx 25mm Strip line
L2	W \approx 4mm, l \approx 25mm Strip line
L3	0.5 ϕ , l \approx 40mm
CH	2t+bead core

2SC4402

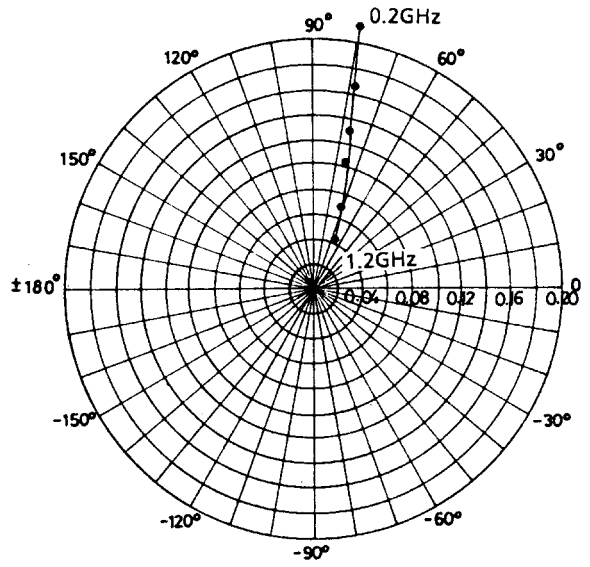


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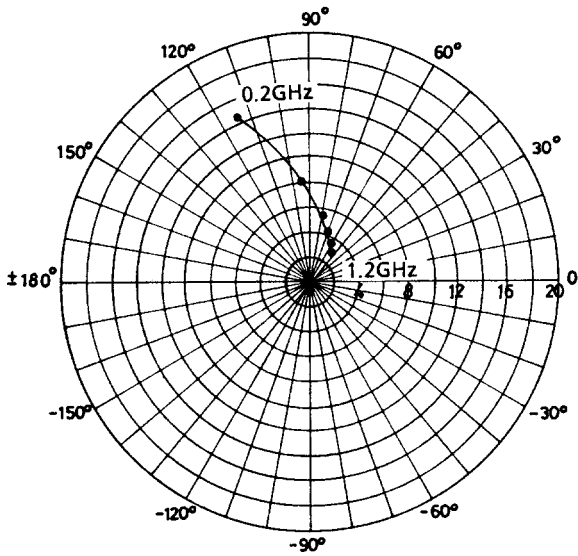
S11e: $V_{CE} = 3V$
 $I_C = 5mA$
 $f = 0.2GHz$ step



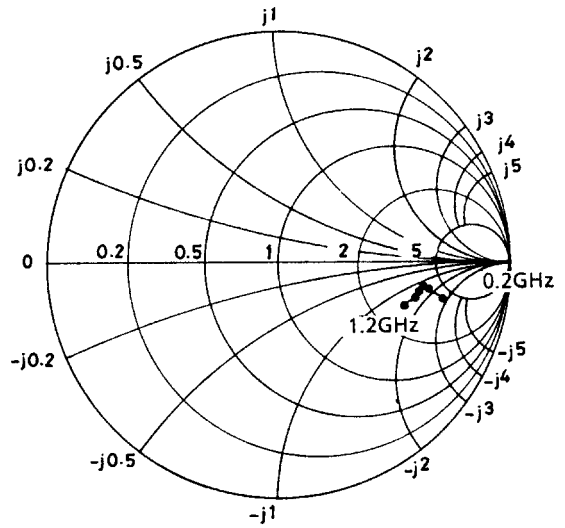
S12e: $V_{CE} = 3V$
 $I_C = 5mA$
 $f = 0.2GHz$ step



S21e: $V_{CE} = 3V$
 $I_C = 5mA$
 $f = 0.2GHz$ step



S22e: $V_{CE} = 3V$
 $I_C = 5mA$
 $f = 0.2GHz$ step



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