

**2SC4402**

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

Applications

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

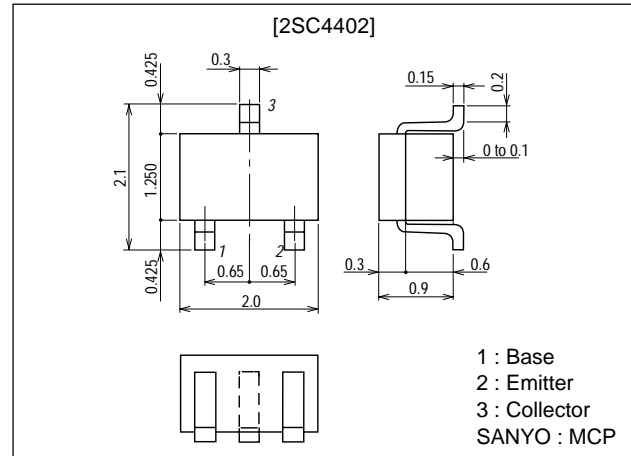
Features

- 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 ($V_{CE}=3\text{V}$, $I_C=5\text{mA}$)
- Ultrasmall-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 :

Continued on next page.

(Note) Marking : PT

 h_{FE} rank : 2, 3, 4

• For CP package version, use the 2SC4365.

Rank	2	3	4
h_{FE}	40 to 80	60 to 120	100 to 200

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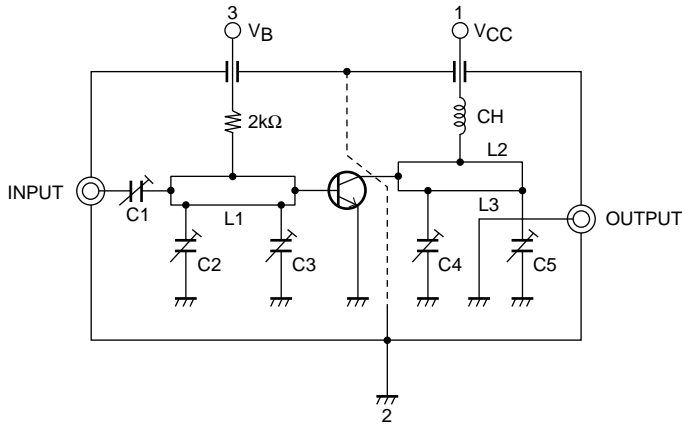
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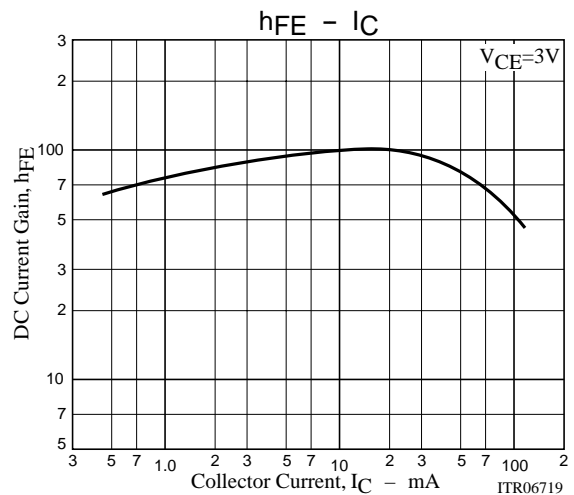
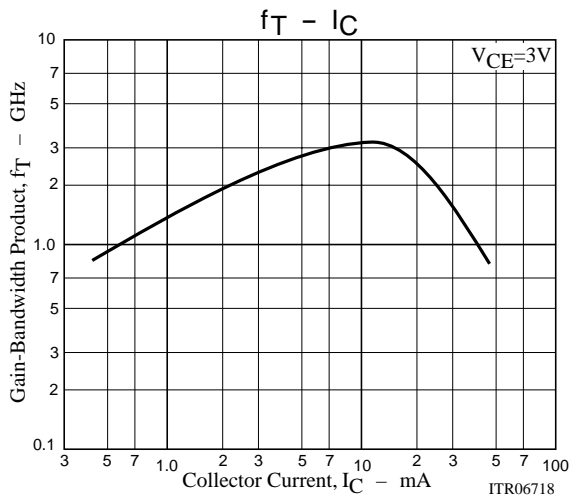
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Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=3V, I_C=10mA, f=0.9GHz$		7		dB
Maximum Available Power Gain	MAG	$V_{CE}=3V, I_C=10mA, f=0.9GHz$		12		dB
Noise Figure	NF	$V_{CE}=3V, I_C=5mA, f=0.9GHz$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

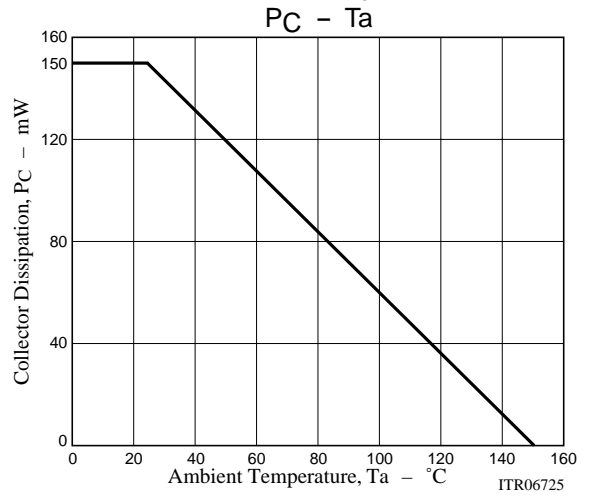
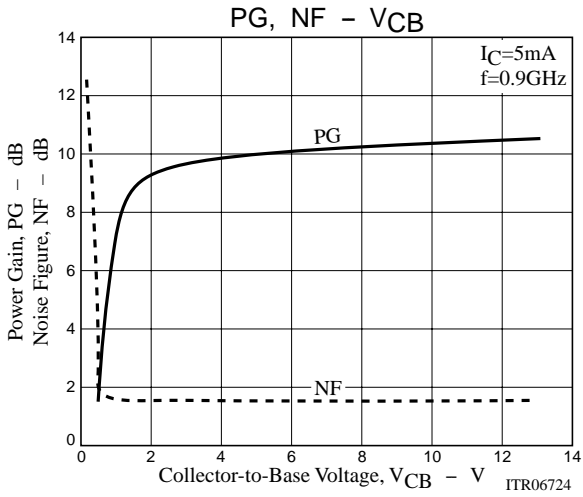
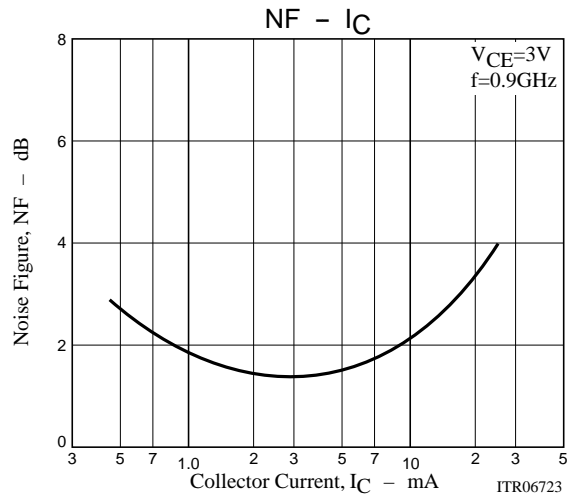
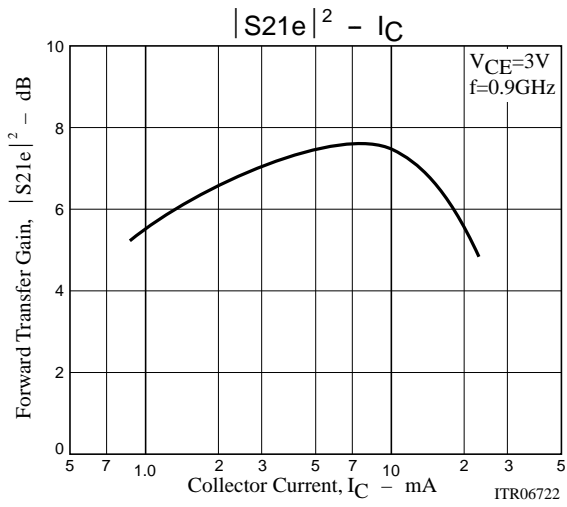
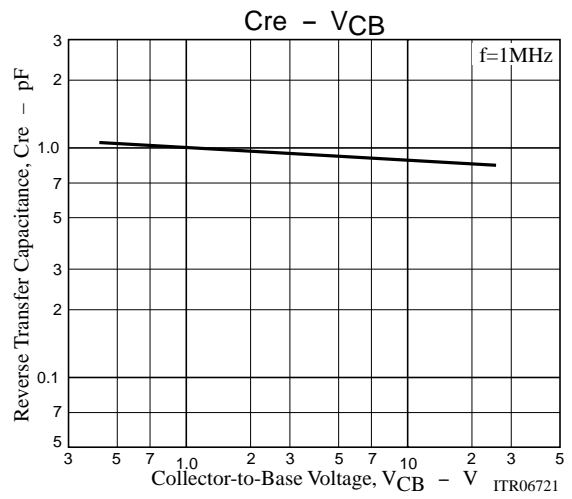
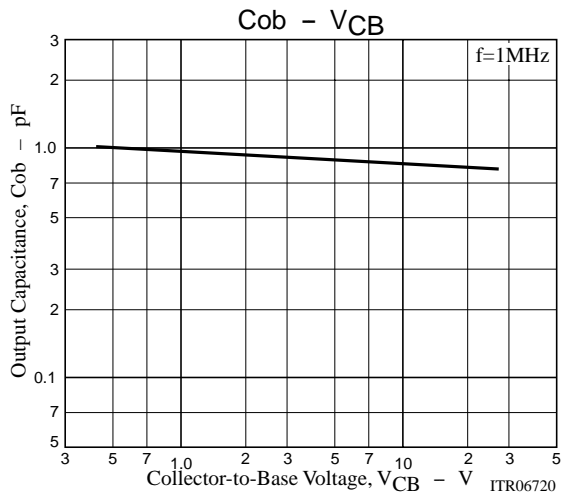
NF Test Circuit



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



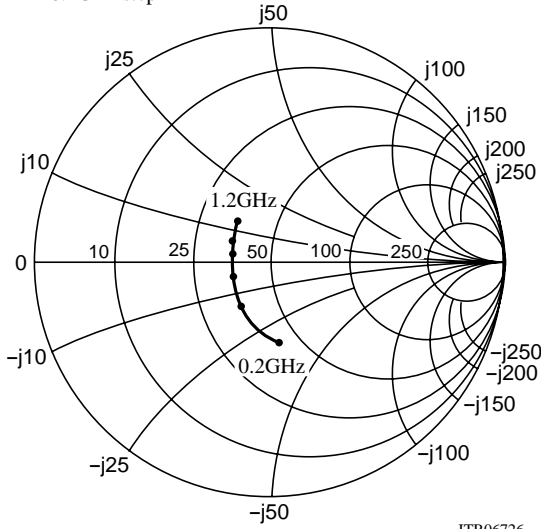
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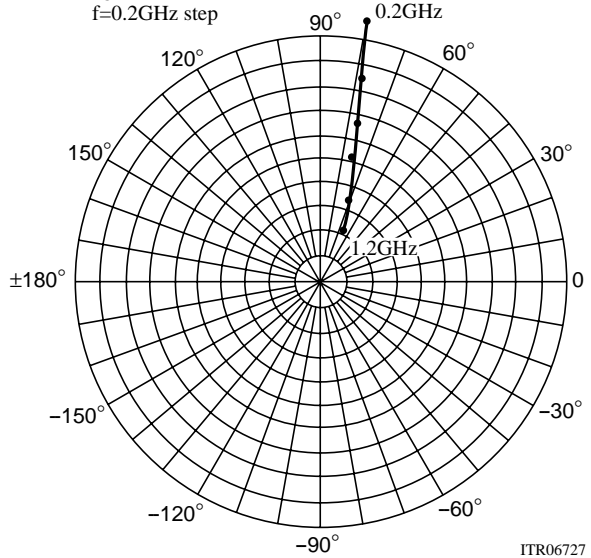
S parameter

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



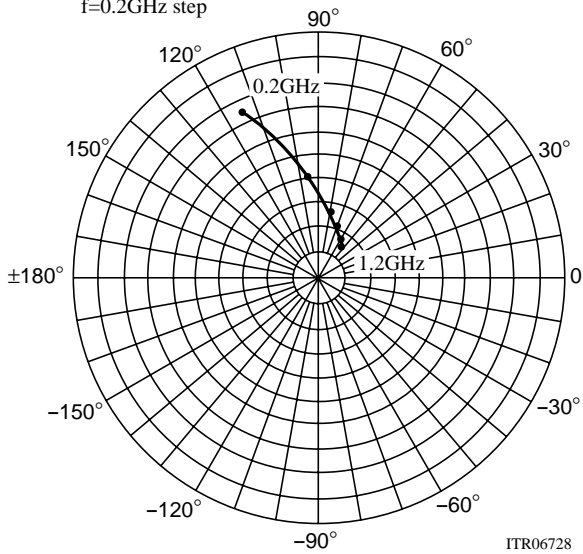
ITR06726

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



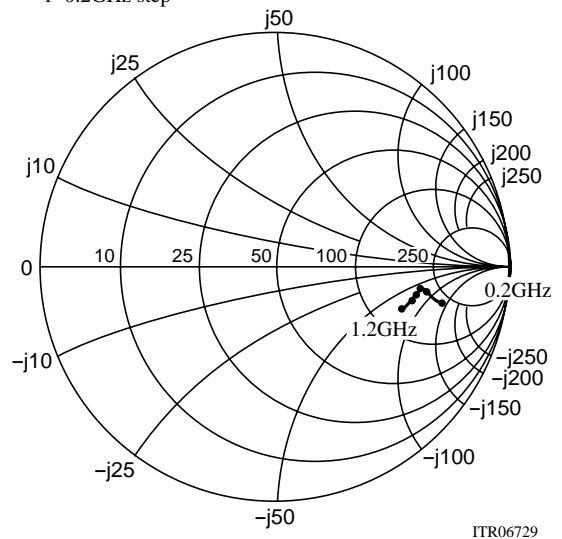
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S21e: $V_{CE}=3V$
 $I_C=5mA$
 $f=0.2GHz$ step



ITR06728

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



ITR06729

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