

NPN Epitaxial Planar Silicon Transistor



# 2SC4405

## UHF, Low-Noise, Wide-Band Amplifier Applications

### Applications

- UHF, low-noise amplifiers, wide-band amplifiers.

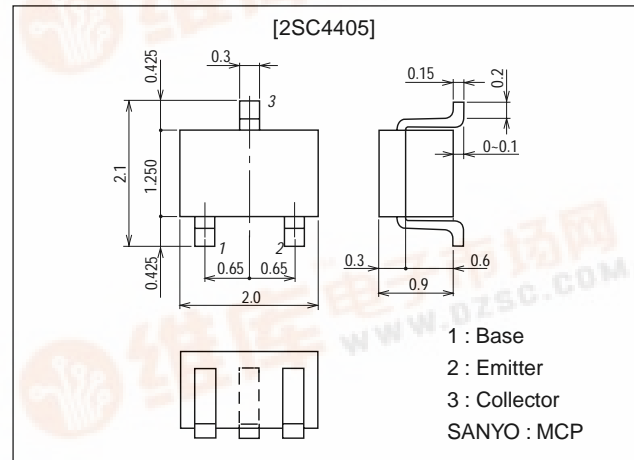
### Features

- High cutoff frequency :  $f_T=5.0\text{GHz}$  typ
- High power gain :  $\text{MAG}=14\text{dB}$  typ ( $f=0.9\text{GHz}$ )
- Small noise figure :  $\text{NF}=1.5\text{dB}$  typ ( $f=0.9\text{GHz}$ )
- Very small-sized package permitting 2SC4405-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	$V_{CB0}$		20	V
Collector-to-Emitter Voltage	$V_{CE0}$		12	V
Emitter-to-Base Voltage	$V_{EB0}$		3	V
Collector Current	$I_C$		100	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	$I_{CBO}$	$V_{CB}=12\text{V}, I_E=0$			1.0	$\mu\text{A}$
Emitter Cutoff Current	$I_{EBO}$	$V_{EB}=2\text{V}, I_C=0$			10	$\mu\text{A}$
DC Current Gain	$h_{FE}$	$V_{CE}=10\text{V}, I_C=20\text{mA}$	40*		200*	
Gain-Bandwidth Product	$f_T$	$V_{CE}=10\text{V}, I_C=20\text{mA}$		5.0		GHz
Output Capacitance	$C_{ob}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.9	1.5	pF
Reverse Transfer Capacitance	$C_{re}$	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.6		pF

\* : The 2SC4405 is classified by 20mA  $h_{FE}$  as follows :

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

$h_{FE}$  rank : 2, 3, 4

- For CP package version, use the 2SC3775.

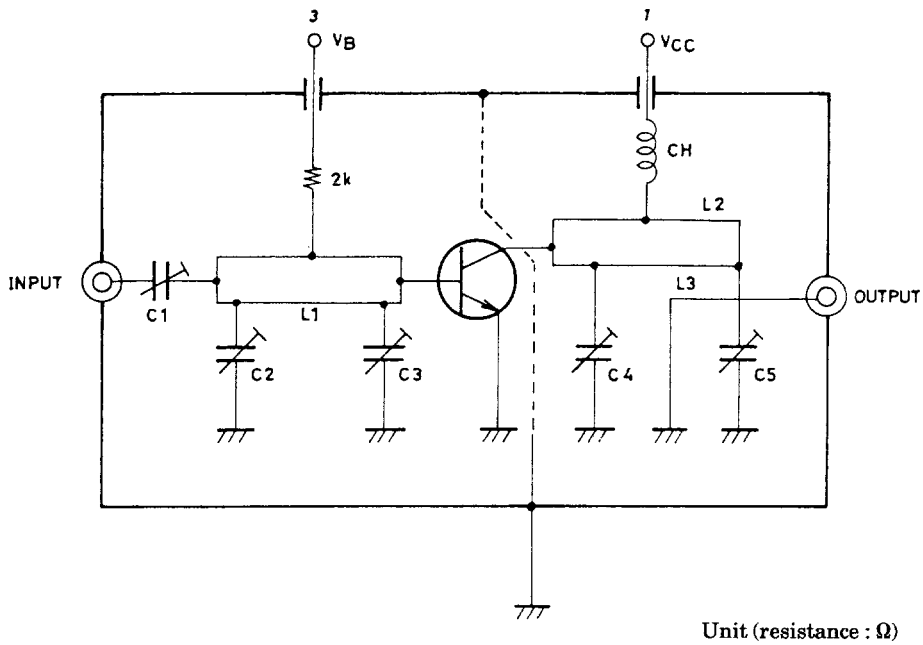
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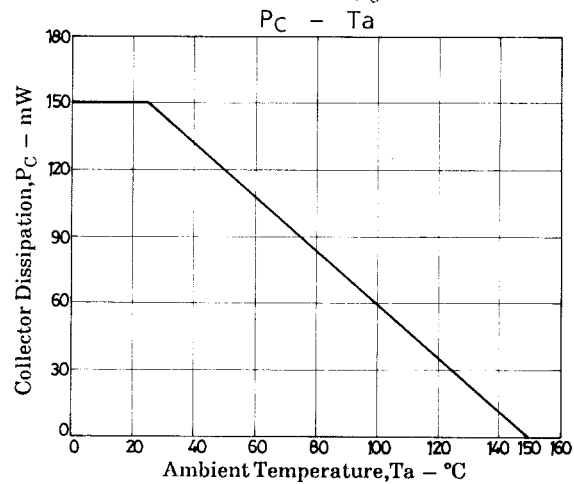
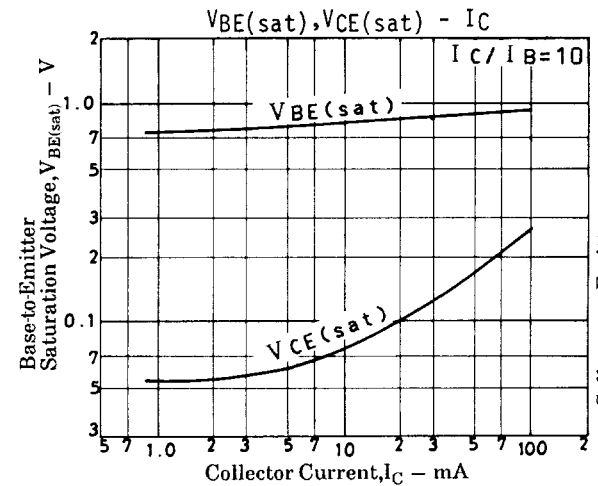
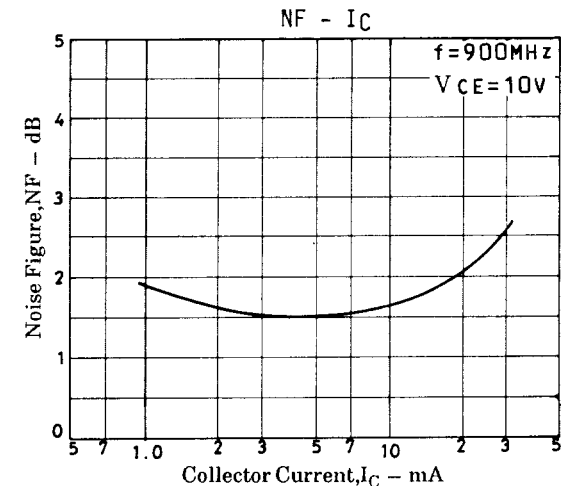
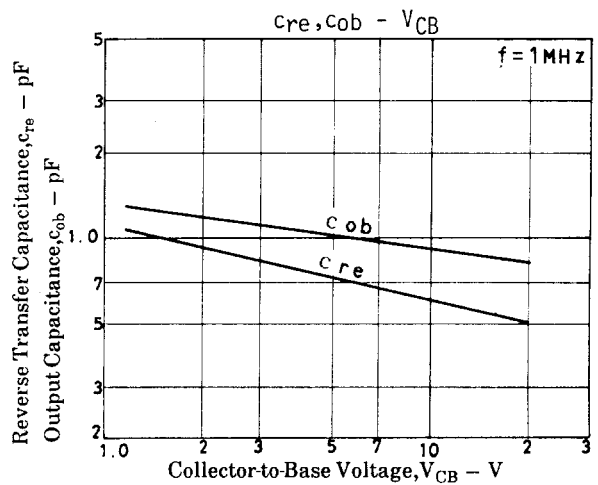
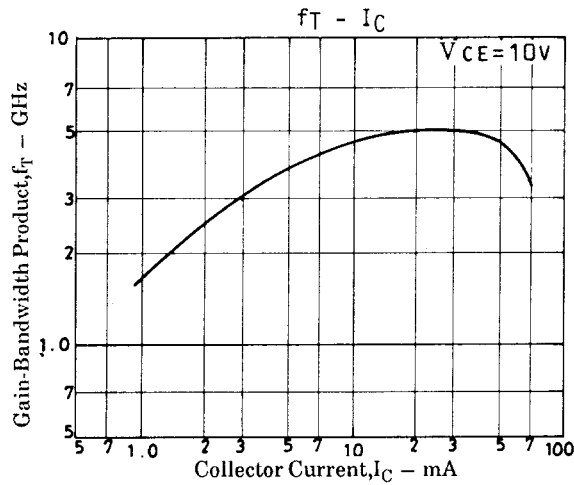
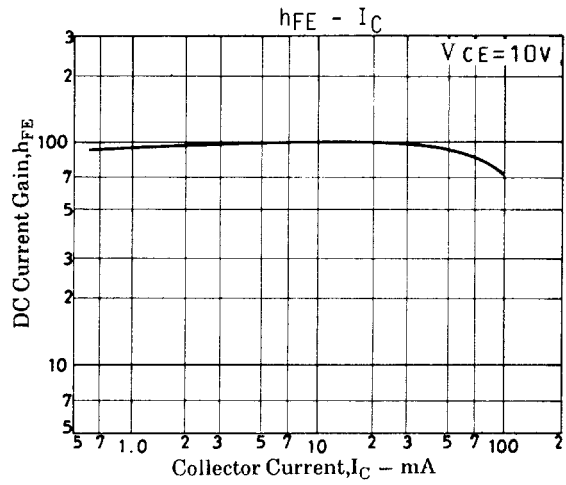
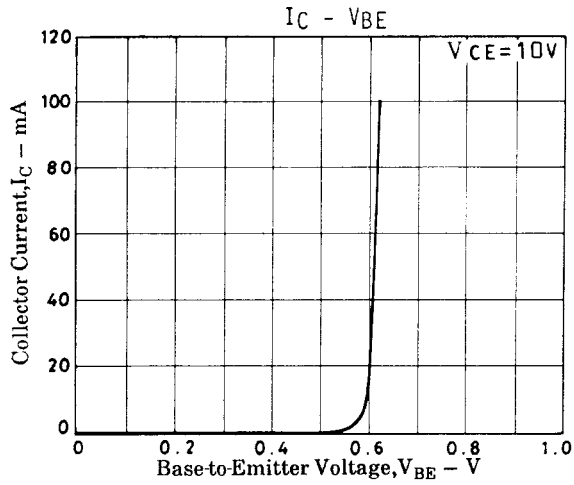
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=10V, I_C=20mA, f=0.9GHz$	8.5	10		dB
Maximum Available Power Gain	MAG	$V_{CE}=10V, I_C=20mA, f=0.9GHz$		14		dB
Noise Figure	NF	$V_{CE}=10V, I_C=5mA, f=0.9GHz$ See specified Test Circuit.		1.5		dB

### NF Test Circuit



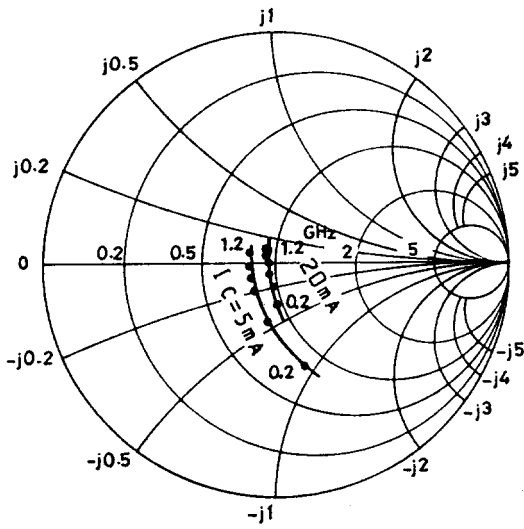
	900MHz
C1	~5pF
C2	~10pF
C3	~10pF
C4	~10pF
C5	~10pF
L1	W ≈ 1.5mm, l ≈ 25mm Strip line
L2	W ≈ 4mm, l ≈ 25mm Strip line
L3	0.5φ, l ≈ 40mm
CH	2t+bead core

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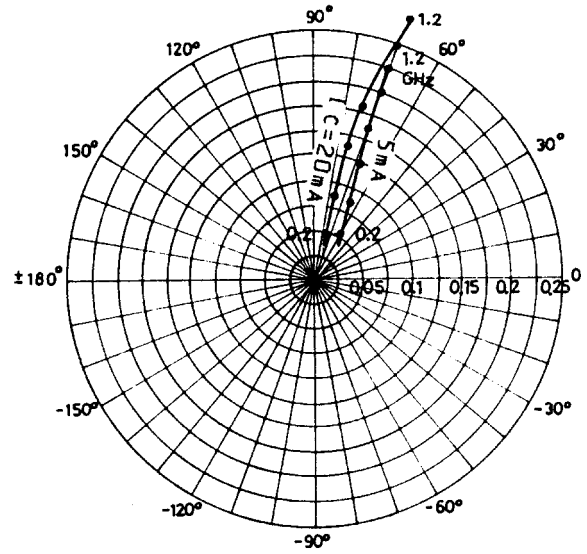


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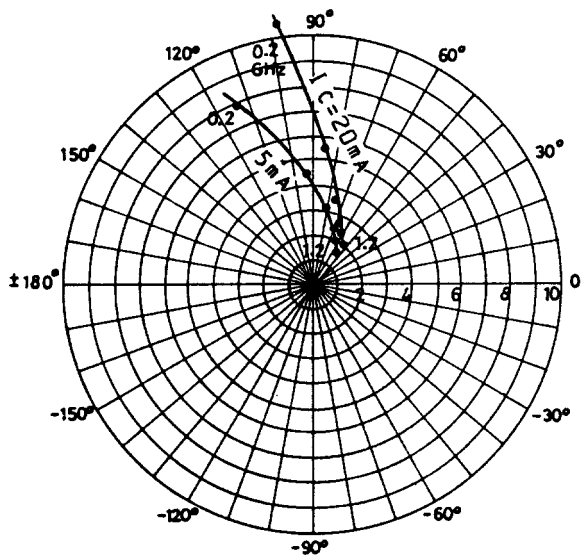
S11e : VCE=10V  
f=200MHz step



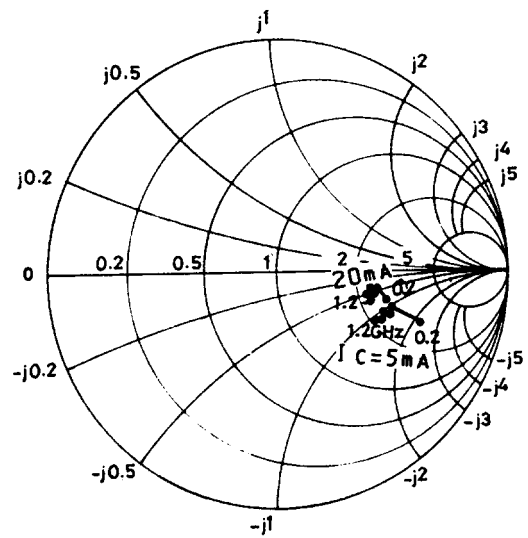
S12e : VCE=10V  
f=200MHz step



S21e : VCE=10V  
f=200MHz step



S22e : VCE=10V  
f=200MHz step



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