Ordering number:EN5433

FC157

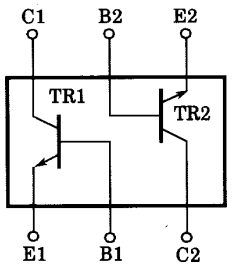
NPN Epitaxial Planar Silicon Composite Transistor

High-Frequency Low-Noise Amp, Differential Amp Applications

Features

- Composite type with 2 transistors contained in the CP package currently in use, improving the mounting efficiency greatly.
- The FC157 is formed with two chips, being equivalent to the 2SC5245, placed in one package.
- Excellent in thermal equilibrium and in inter-chip characteristics matching.

Electrical Connection

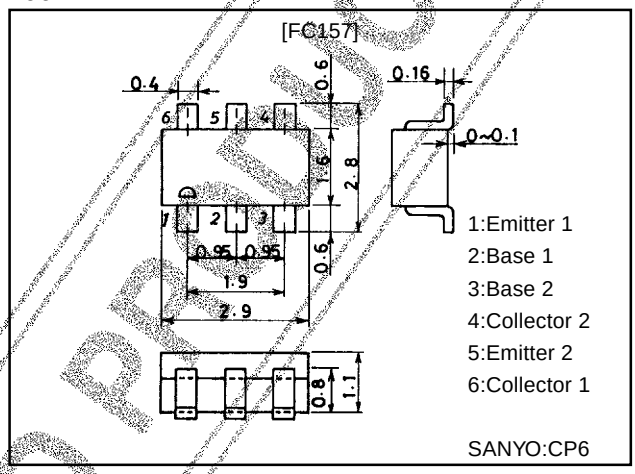


1:Emitter 1
2:Base 1
3:Base 2
4:Collector 2
5:Emitter 2
6:Collector 1

Package Dimensions

unit:mm

2067A



Specifications

Absolute Maximum Ratings at Ta = 25°C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		20	V
Collector-to-Emitter Voltage	V_{CEO}		10	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		30	mA
Collector Dissipation	P_C	1 unit	200	mW
Total Dissipation	P_T		300	mW
Junction Temperature	Tj		150	°C
Storage Temperature	Tstg		–55 to +150	°C

Electrical Characteristics at Ta = 25°C

Parameter	Symbol	Conditons	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	V_{CB}=10V, I_E=0			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=10mA	90		200	
DC Current Gain Ratio	h_{FE}(small/large)	V_{CE}=5V, I_C=10mA	0.7	0.95		
Base-to-Emitter Voltage Difference	V_{BE}(large-small)	V_{CE}=5V, I_C=10mA		1.0		mV
Gain-Bandwidth Product	f_T(1)	V_{CE}=5V, I_C=1mA	8	11		GHz
	f_T(2)	V_{CE}=1V, I_C=1mA		7		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.45	0.7	pF
Reverse Tranfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.30		pF
Forward Transfer Gain	$\|S21e\|^2$	V_{CE}=5V, I_C=10mA, f=1.5GHz	8	10		dB
	$\|S21e\|^2$	V_{CE}=1V, I_C=1mA, f=1.5GHz		5.5		dB
Noise Figure	NF(1)	V_{CE}=5V, I_C=5mA, f=1.5GHz		1.4	3.0	dB
	NF(2)	V_{CE}=2V, I_C=3mA, f=1GHz		0.9		dB

Note:The specifications shown above are for each individual transistor.

Marking:157

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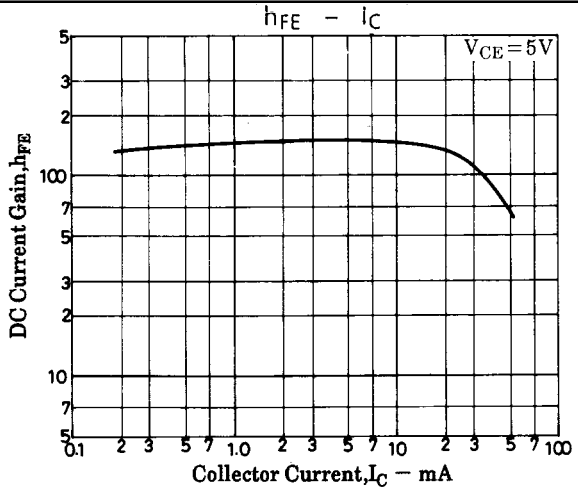
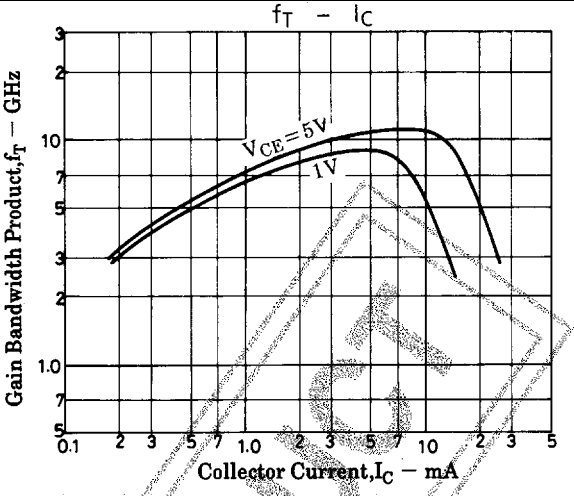
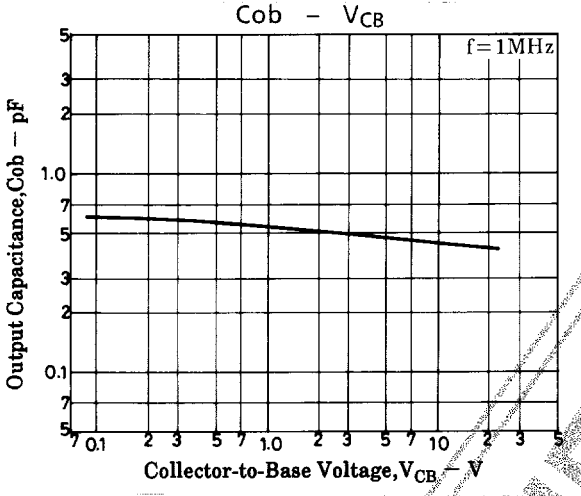
h_{FE} – I_C



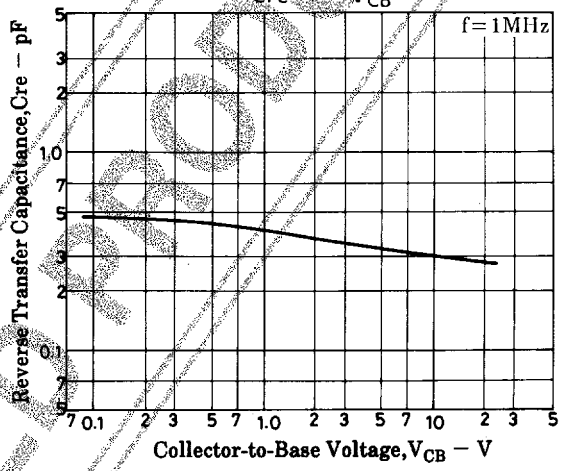
f_T – I_C



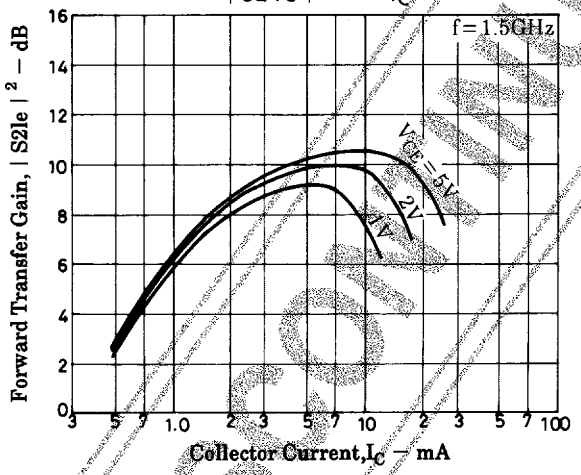
Cob – V_{CB}



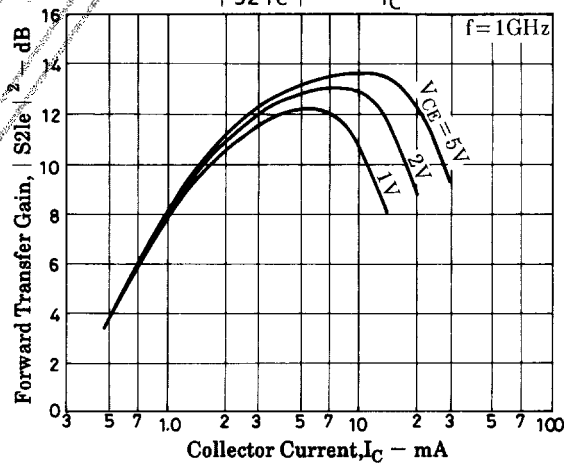
Cre – V_{CB}



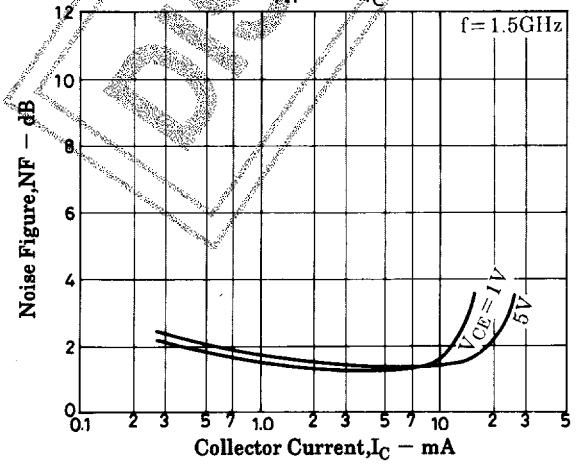
$|S21e|^2$ – I_C



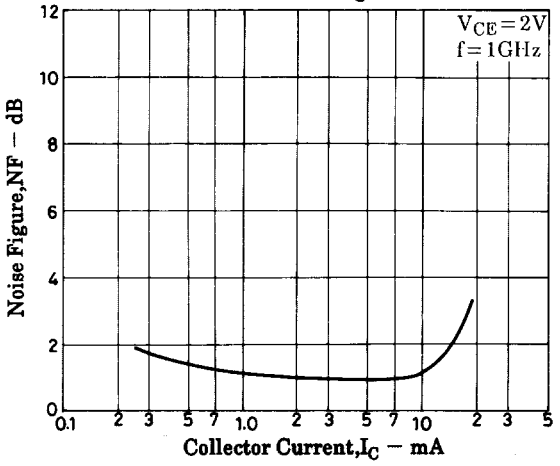
$|S21e|^2$ – I_C

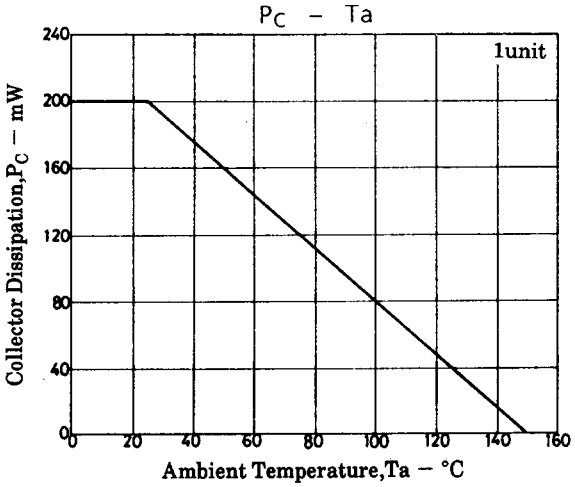


NF – I_C



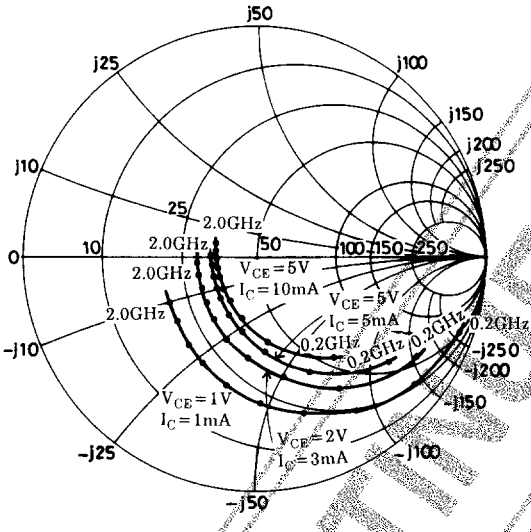
NF – I_C



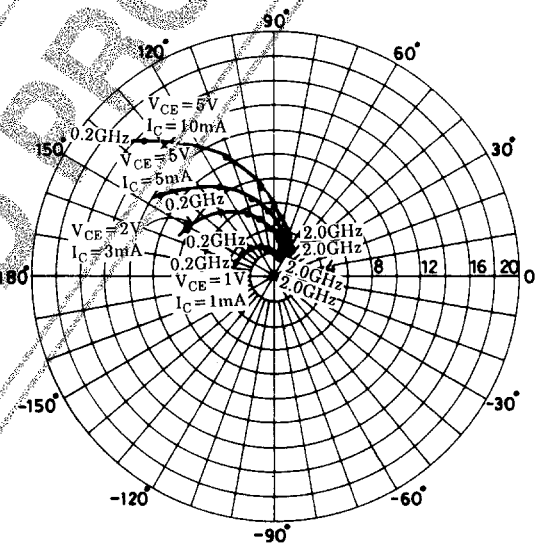


S Parameters

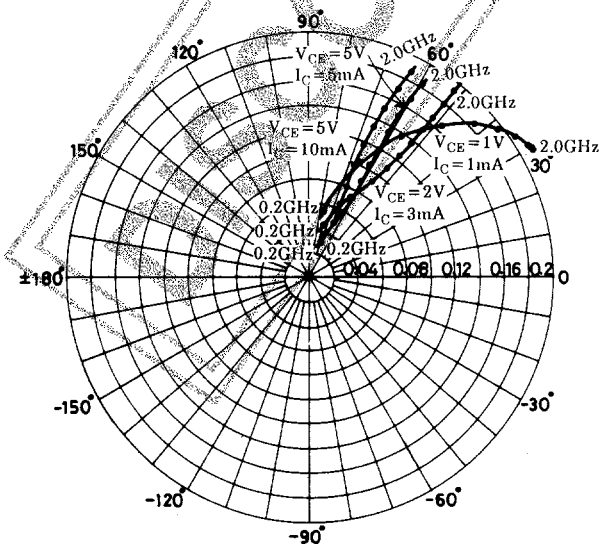
S11e : f=200 to 2000MHz (200MHz step)



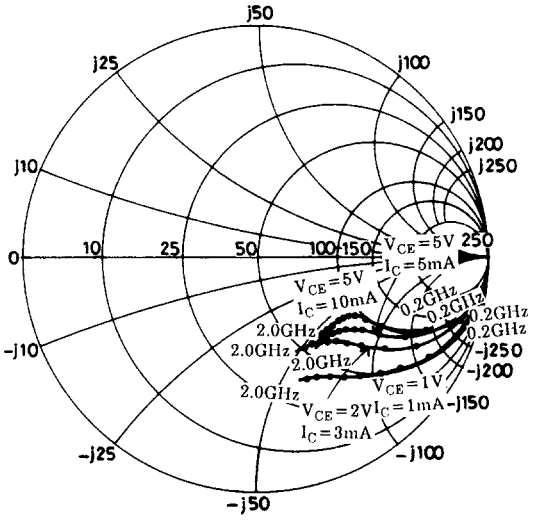
S21e : f=200 to 2000MHz (200MHz step)



S12e : f=200 to 2000MHz (200MHz step)



S22e : f=200 to 2000MHz (200MHz step)



S Parameters (Common emitter)

$V_{CE}=5V$, $I_C=5mA$, $Z_O=50\Omega$

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.725	−37.6	11.573	144.6	0.035	71.3	0.885	−18.7
400	0.540	−64.0	8.744	122.0	0.058	63.0	0.731	−27.7
600	0.400	−83.2	6.691	107.0	0.074	60.6	0.628	−31.4
800	0.320	−98.5	5.357	96.6	0.089	60.8	0.562	−33.3
1000	0.263	−112.1	4.503	88.5	0.104	61.0	0.527	−35.1
1200	0.221	−127.8	3.874	81.2	0.119	60.7	0.503	−37.5
1400	0.199	−140.4	3.409	74.6	0.135	60.7	0.487	−40.1
1600	0.180	−154.5	2.984	68.5	0.150	60.7	0.473	−43.3
1800	0.169	−169.9	2.710	63.0	0.167	59.9	0.463	−46.8
2000	0.168	176.2	2.486	58.2	0.183	59.4	0.462	−50.4

$V_{CE}=5V$, $I_C=10mA$, $Z_O=50\Omega$

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.547	−51.4	15.617	133.5	0.031	69.6	0.799	−22.7
400	0.364	−80.4	10.257	111.4	0.049	65.8	0.628	−27.9
600	0.261	−99.7	7.389	98.8	0.065	66.3	0.548	−28.7
800	0.202	−116.9	5.761	89.9	0.081	67.4	0.501	−29.6
1000	0.177	−132.9	4.763	83.2	0.099	67.7	0.481	−31.1
1200	0.157	−150.3	4.055	76.5	0.117	67.0	0.467	−33.5
1400	0.150	−164.6	3.545	71.0	0.134	66.4	0.458	−36.3
1600	0.148	−179.2	3.111	65.6	0.151	65.7	0.448	−40.0
1800	0.154	169.8	2.814	60.5	0.170	64.3	0.441	−43.9
2000	0.162	157.5	2.565	56.0	0.187	63.4	0.440	−47.8

$V_{CE}=2V$, $I_C=3mA$, $Z_O=50\Omega$

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.814	−31.0	8.333	151.1	0.044	72.9	0.924	−17.0
400	0.664	−56.7	6.925	129.6	0.074	61.9	0.793	−28.4
600	0.526	−75.9	5.576	113.7	0.094	56.2	0.683	−34.9
800	0.430	−92.7	4.639	101.8	0.109	54.1	0.598	−39.1
1000	0.364	−107.1	3.950	92.7	0.124	53.1	0.547	−42.1
1200	0.310	−121.7	3.449	84.3	0.138	52.3	0.510	−44.9
1400	0.274	−134.9	3.048	76.9	0.152	52.2	0.485	−48.0
1600	0.247	−148.7	2.706	70.1	0.165	52.1	0.464	−51.6
1800	0.237	−162.4	2.446	64.0	0.180	52.0	0.450	−55.2
2000	0.233	−174.5	2.250	58.7	0.193	52.0	0.444	−58.8

$V_{CE}=1V, I_C=1mA, Z_O=50\Omega$

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.937	−19.9	3.404	161.1	0.055	77.0	0.978	−11.1
400	0.876	−38.2	3.198	144.6	0.102	65.7	0.926	−21.1
600	0.780	−56.2	2.929	128.8	0.138	56.2	0.858	−29.5
800	0.699	−72.0	2.656	115.8	0.164	48.7	0.784	−36.7
1000	0.619	−87.4	2.478	104.2	0.185	42.8	0.734	−42.1
1200	0.553	−101.1	2.224	93.8	0.196	37.8	0.677	−47.7
1400	0.498	−114.4	2.062	84.1	0.204	34.1	0.639	−52.5
1600	0.457	−125.9	1.843	75.6	0.209	31.5	0.610	−56.9
1800	0.418	−139.7	1.722	67.5	0.201	30.5	0.580	−61.4
2000	0.398	−151.1	1.592	60.9	0.210	30.3	0.567	−65.2