

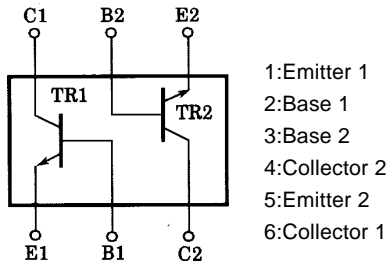
SANYO**FC157**

NPN Epitaxial Planar Silicon Composite Transistor High-Frequency Low-Noise Amp, Differential Amp Applications

Features

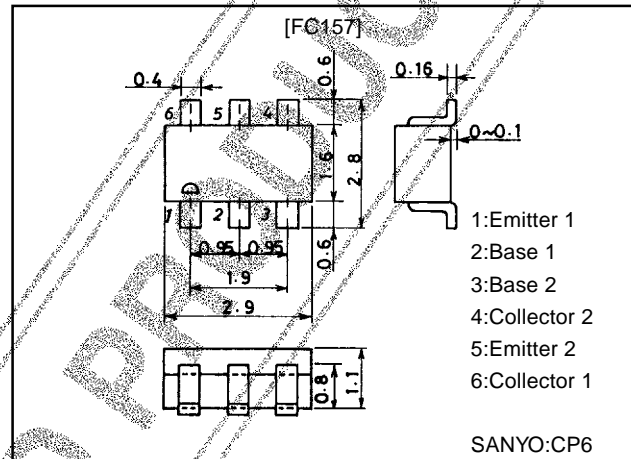
- Composite type with 2 transistors contained in the CP package currently in use, improving the mounting efficiency greatly.
- The FC157 is formed with two chips, being equivalent to the 2SC5245, placed in one package.
- Excellent in thermal equilibrium and in inter-chip characteristics matching.

Electrical Connection



Package Dimensions

unit:mm
2067A



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}		10	V
Emitter-to-Base Voltage	V_{EB0}		1.5	V
Collector Current	I_C		30	mA
Collector Dissipation	P_C	T_{unit}	200	mW
Total Dissipation	P_T		300	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_{CB0}	$V_{CB}=10\text{V}, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EB0}	$V_{EB}=1\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}, I_C=10\text{mA}$	90		200	
DC Current Gain Ratio	$h_{FE}(\text{small/large})$	$V_{CE}=5\text{V}, I_C=10\text{mA}$	0.7	0.95		
Base-to-Emitter Voltage Difference	$V_{BE}(\text{large-small})$	$V_{CE}=5\text{V}, I_C=10\text{mA}$		1.0		mV
Gain-Bandwidth Product	$f_T(1)$	$V_{CE}=5\text{V}, I_C=1\text{mA}$	8	11		GHz
	$f_T(2)$	$V_{CE}=1\text{V}, I_C=1\text{mA}$		7		GHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.45	0.7	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.30		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=10\text{mA}, f=1.5\text{GHz}$	8	10		dB
	$ S_{21e} ^2$	$V_{CE}=1\text{V}, I_C=1\text{mA}, f=1.5\text{GHz}$		5.5		dB
Noise Figure	NF(1)	$V_{CE}=5\text{V}, I_C=5\text{mA}, f=1.5\text{GHz}$		1.4	3.0	dB
	NF(2)	$V_{CE}=2\text{V}, I_C=3\text{mA}, f=1\text{GHz}$		0.9		dB

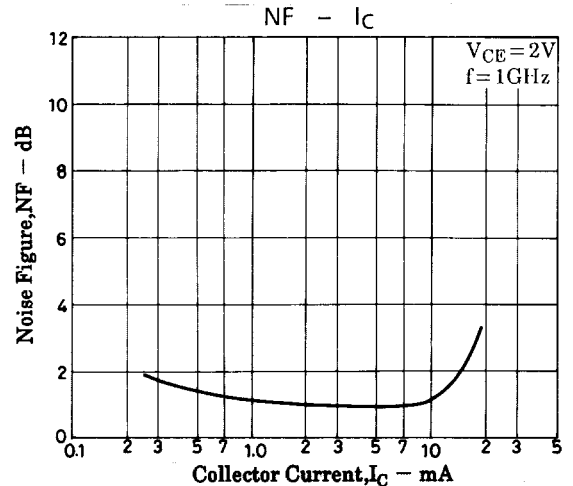
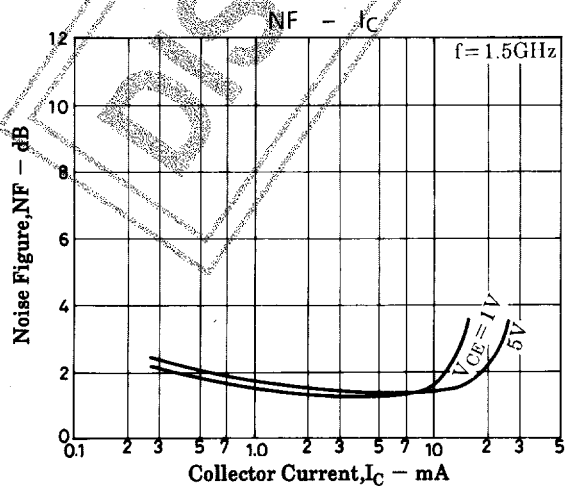
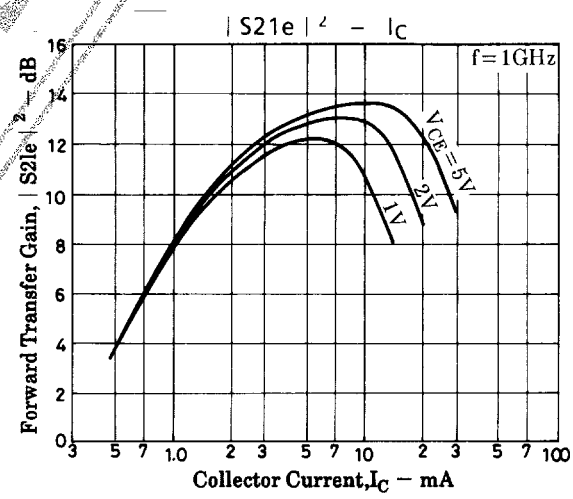
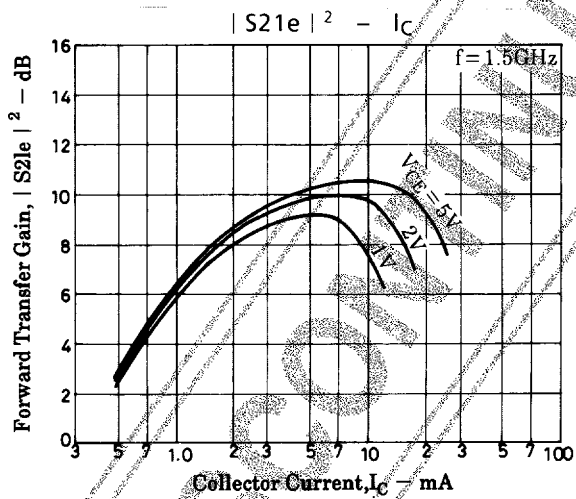
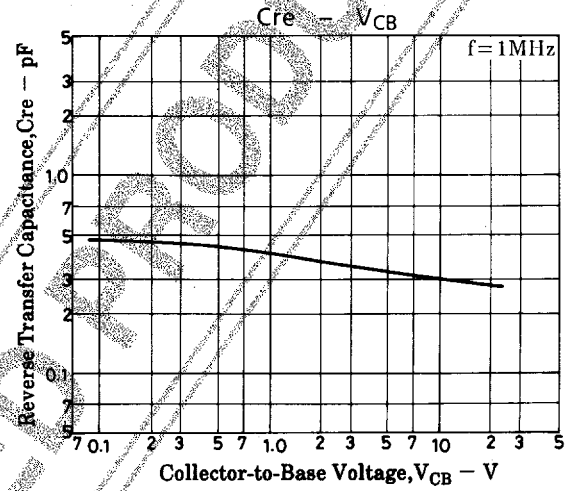
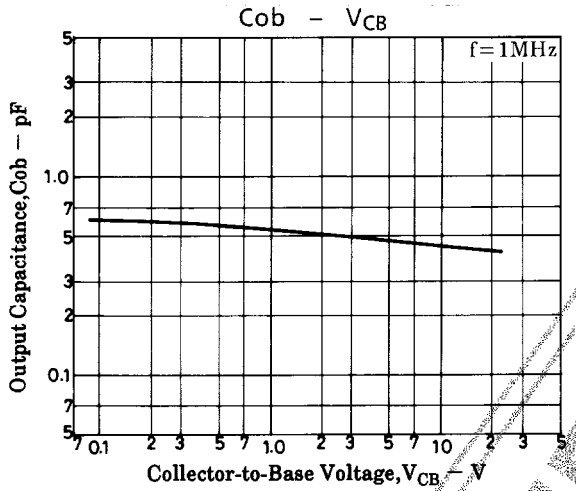
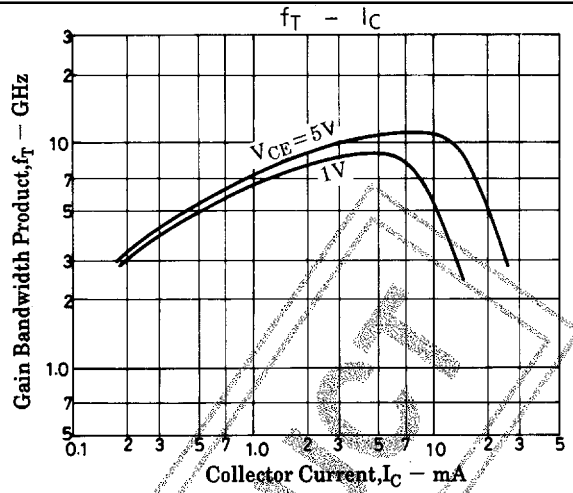
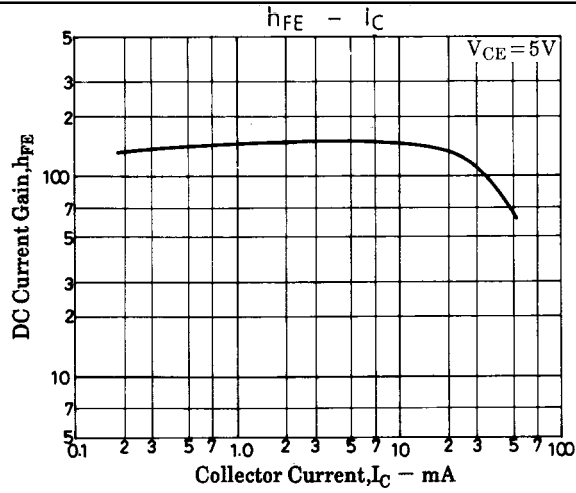
Note: The specifications shown above are for each individual transistor.

Marking: 157

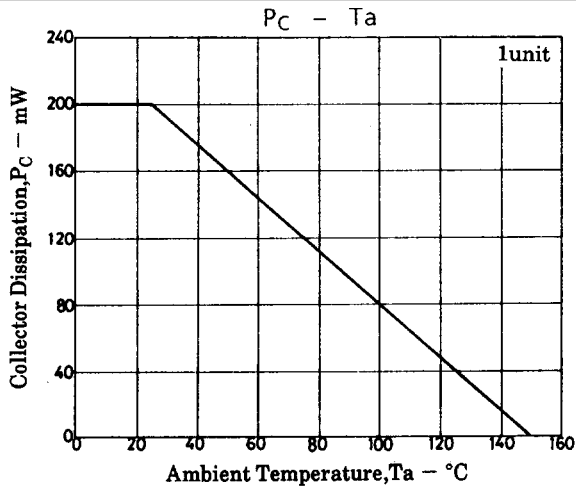
SANYO Electric Co., Ltd. Semiconductor Business Headquarters

TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

FC157

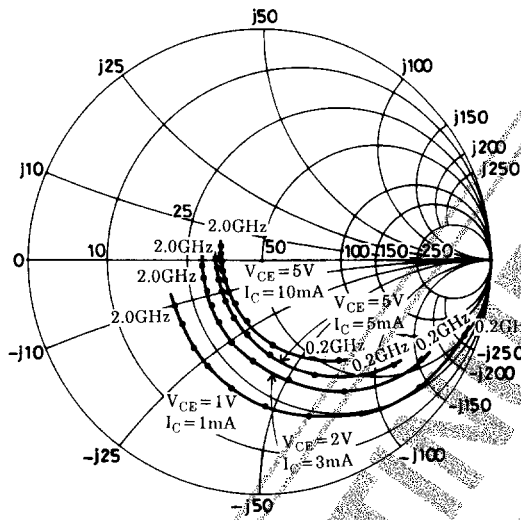


FC157

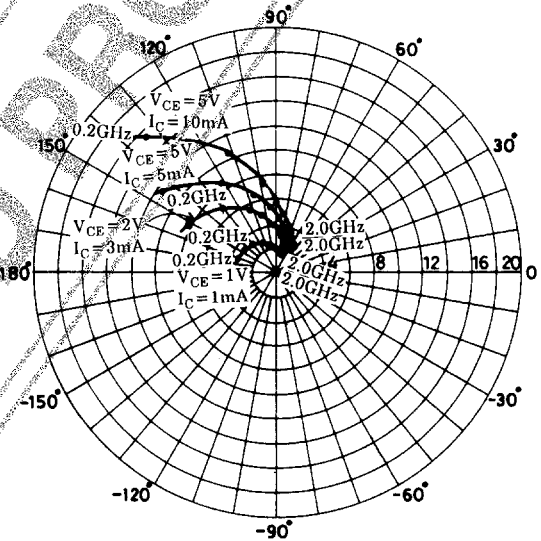


S Parameters

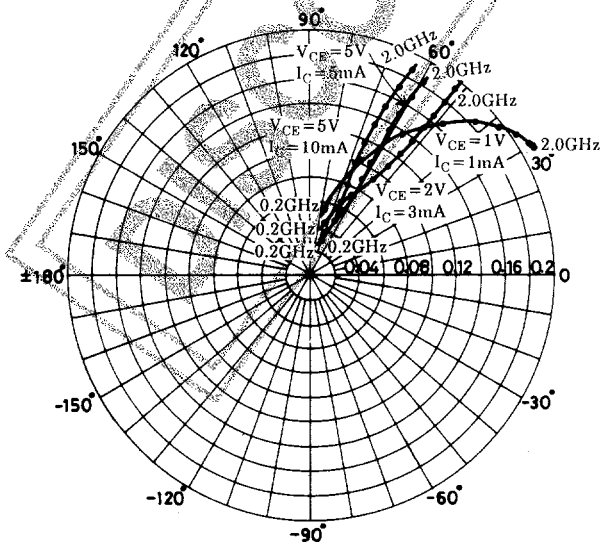
S11e : f = 200 to 2000MHz (200MHz step)



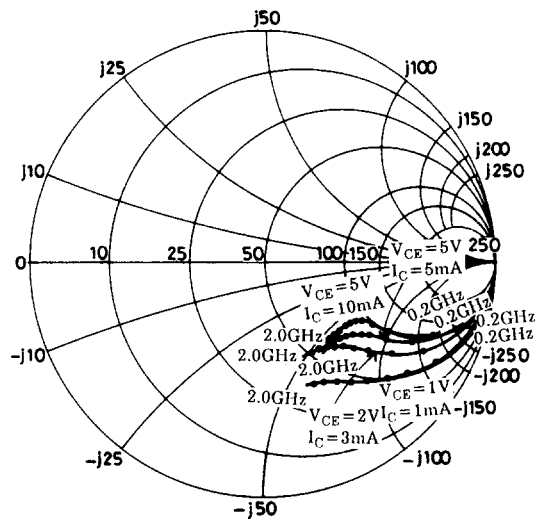
S21e : f = 200 to 2000MHz (200MHz step)



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



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



FC157

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

FC157

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

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

■ No products described or contained herein are intended for use in surgical implants, life-support systems, aerospace equipment, nuclear power control systems, vehicles, disaster/crime-prevention equipment and the like, the failure of which may directly or indirectly cause injury, death or property loss.

■ Anyone purchasing any products described or contained herein for an above-mentioned use shall:

- ① Accept full responsibility and indemnify and defend SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors and all their officers and employees, jointly and severally, against any and all claims and litigation and all damages, cost and expenses associated with such use:
- ② Not impose any responsibility for any fault or negligence which may be cited in any such claim or litigation on SANYO ELECTRIC CO., LTD., its affiliates, subsidiaries and distributors or any of their officers and employees jointly or severally.

■ Information (including circuit diagrams and circuit parameters) herein is for example only; it is not guaranteed for volume production. SANYO believes information herein is accurate and reliable, but no guarantees are made or implied regarding its use or any infringements of intellectual property rights or other rights of third parties.

This catalog provides information as of May, 1998. Specifications and information herein are subject to change without notice.