

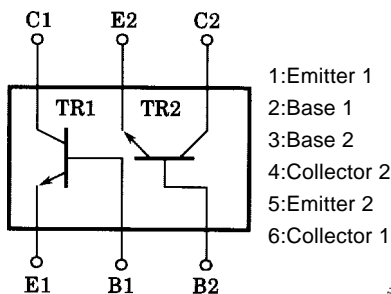
SANYO**FC156**

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

Features

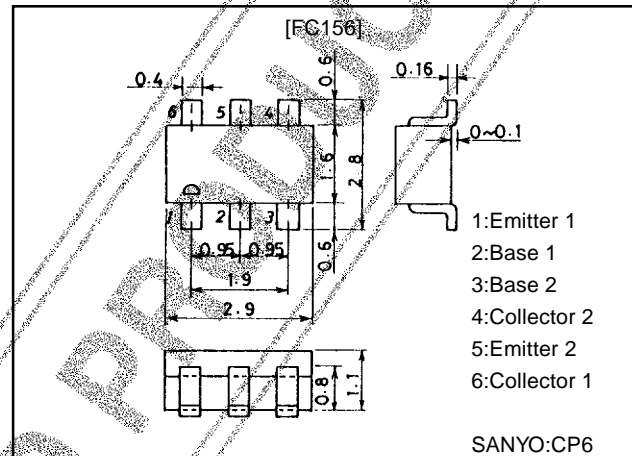
- Composite type with 2 transistors contained in the CP package currently in use, improving the mounting efficiency greatly.
- The FC156 is formed with two chips, being equivalent to the 2SC5226, placed in one package.
- Excellent in thermal equilibrium and in inter-chip characteristics matching.

Electrical Connection



Package Dimensions

unit:mm
2104A



Specifications

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

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}		2	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C	1 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 $T_a = 25^\circ\text{C}$

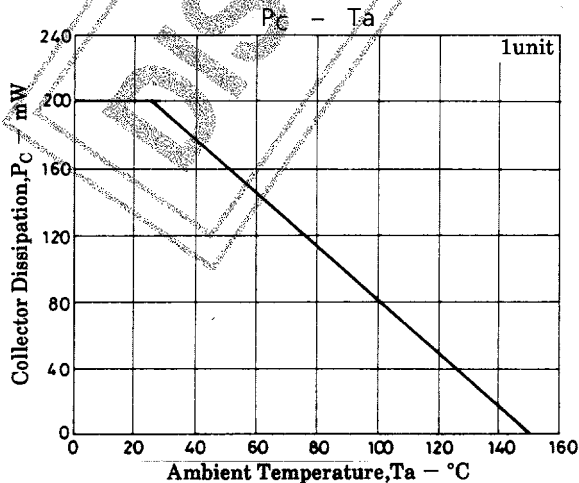
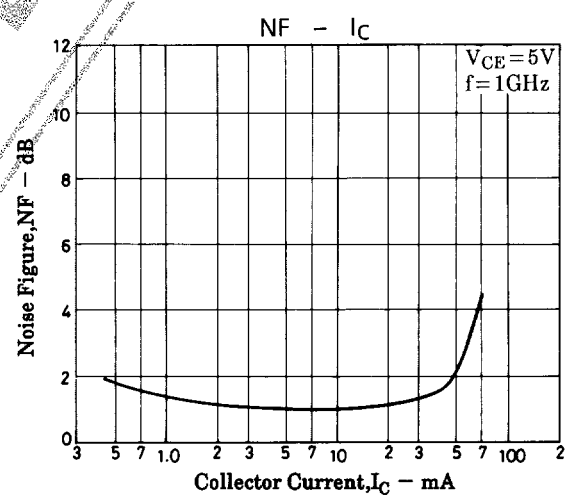
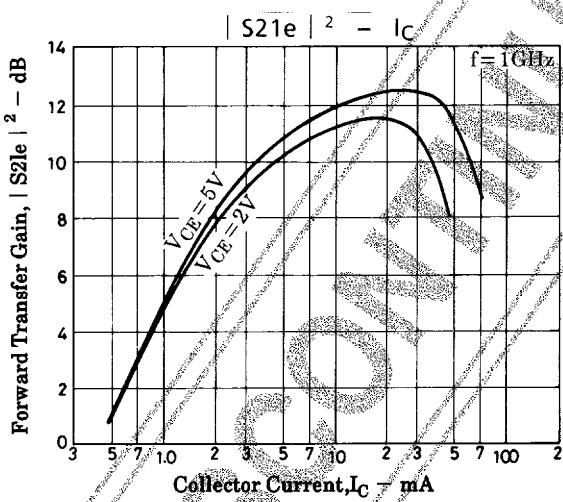
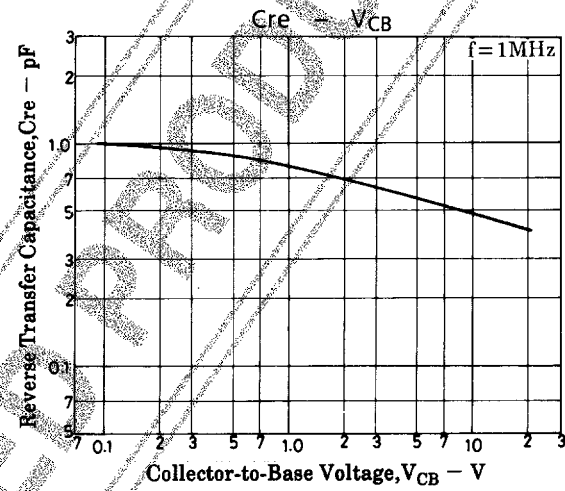
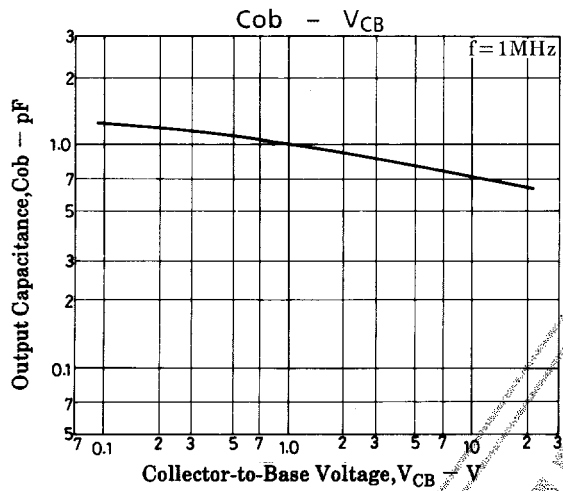
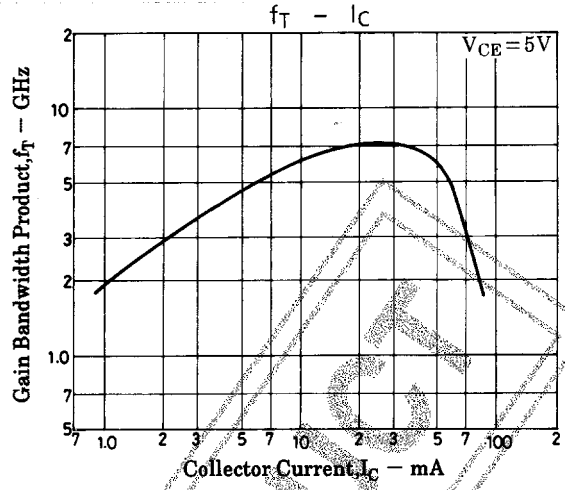
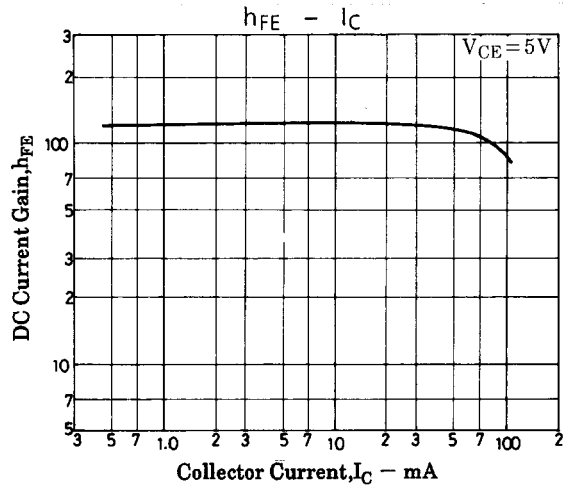
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Collector Cutoff Current	I_{CBO}	$V_{CB}=10\text{V}, I_E=0$			1.0	μA
Emitter Cutoff Current	I_{EBO}	$V_{EB}=1\text{V}, I_C=0$			10	μA
DC Current Gain	h_{FE}	$V_{CE}=5\text{V}, I_C=20\text{mA}$	90		200	
DC Current Gain Ratio	h_{FE} (small/large)	$V_{CE}=5\text{V}, I_C=20\text{mA}$	0.7	0.95		
Base-to-Emitter Voltage Difference	V_{BE} (large-small)	$V_{CE}=5\text{V}, I_C=20\text{mA}$		1.0		mV
Gain-Bandwidth Product	f_T	$V_{CE}=5\text{V}, I_C=20\text{mA}$	5	7		GHz
Output Capacitance	C_{ob}	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.75	1.2	pF
Reverse Transfer Capacitance	C_{re}	$V_{CB}=10\text{V}, f=1\text{MHz}$		0.5		pF
Forward Transfer Gain	$ S_{21e} ^2$	$V_{CE}=5\text{V}, I_C=20\text{mA}, f=1\text{GHz}$	9	12		dB
	$ S_{21e} ^2$	$V_{CE}=2\text{V}, I_C=3\text{mA}, f=1\text{GHz}$		8		dB
Noise Figure	NF	$V_{CE}=5\text{V}, I_C=7\text{mA}, f=1\text{GHz}$	1.0	1.8		dB

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

Marking: 156

SANYO Electric Co., Ltd. Semiconductor Business Headquarters
TOKYO OFFICE Tokyo Bldg., 1-10, 1 Chome, Ueno, Taito-ku, TOKYO, 110-8534 JAPAN

FC156

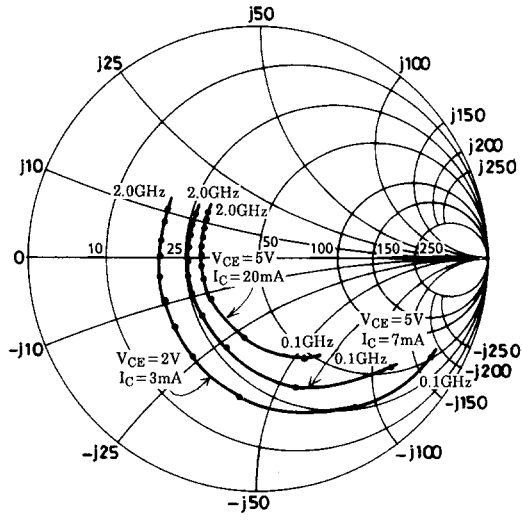


FC156

S Parameters

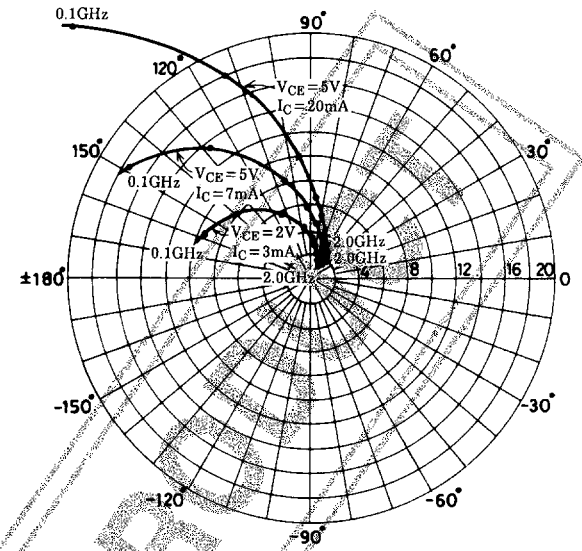
S11e

f = 100MHz, 200 to 2000MHz (200MHz step)



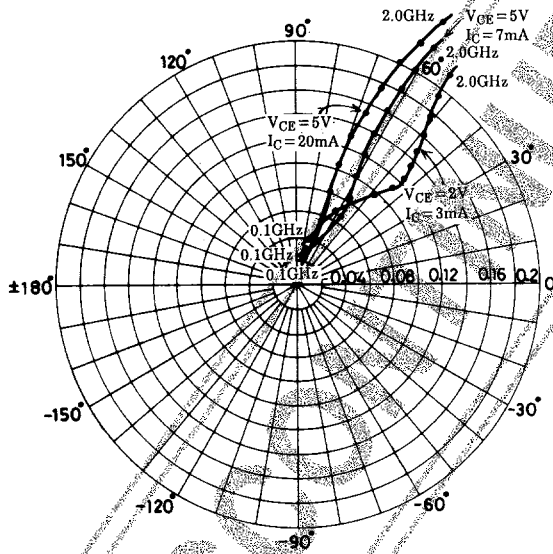
S21e

f = 100MHz, 200 to 2000MHz (200MHz step)



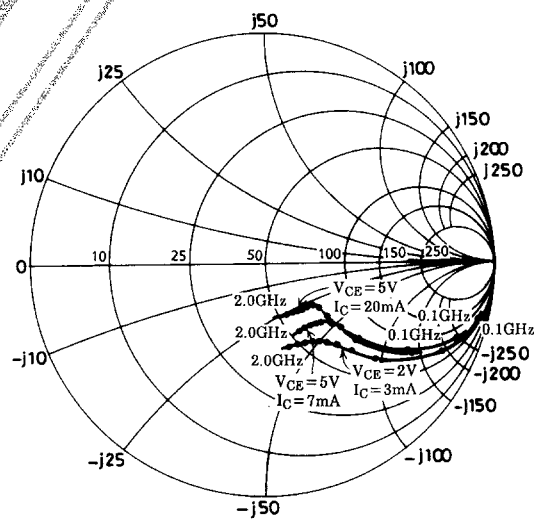
S12e

f = 100MHz, 200 to 2000MHz (200MHz step)



S22e

f = 100MHz, 200 to 2000MHz (200MHz step)



DISCONTINUED PRODUCT

FC156

S Parameters (Common emitter)

$V_{CE} = 5V, I_C = 7mA, Z_0 = 50\Omega$

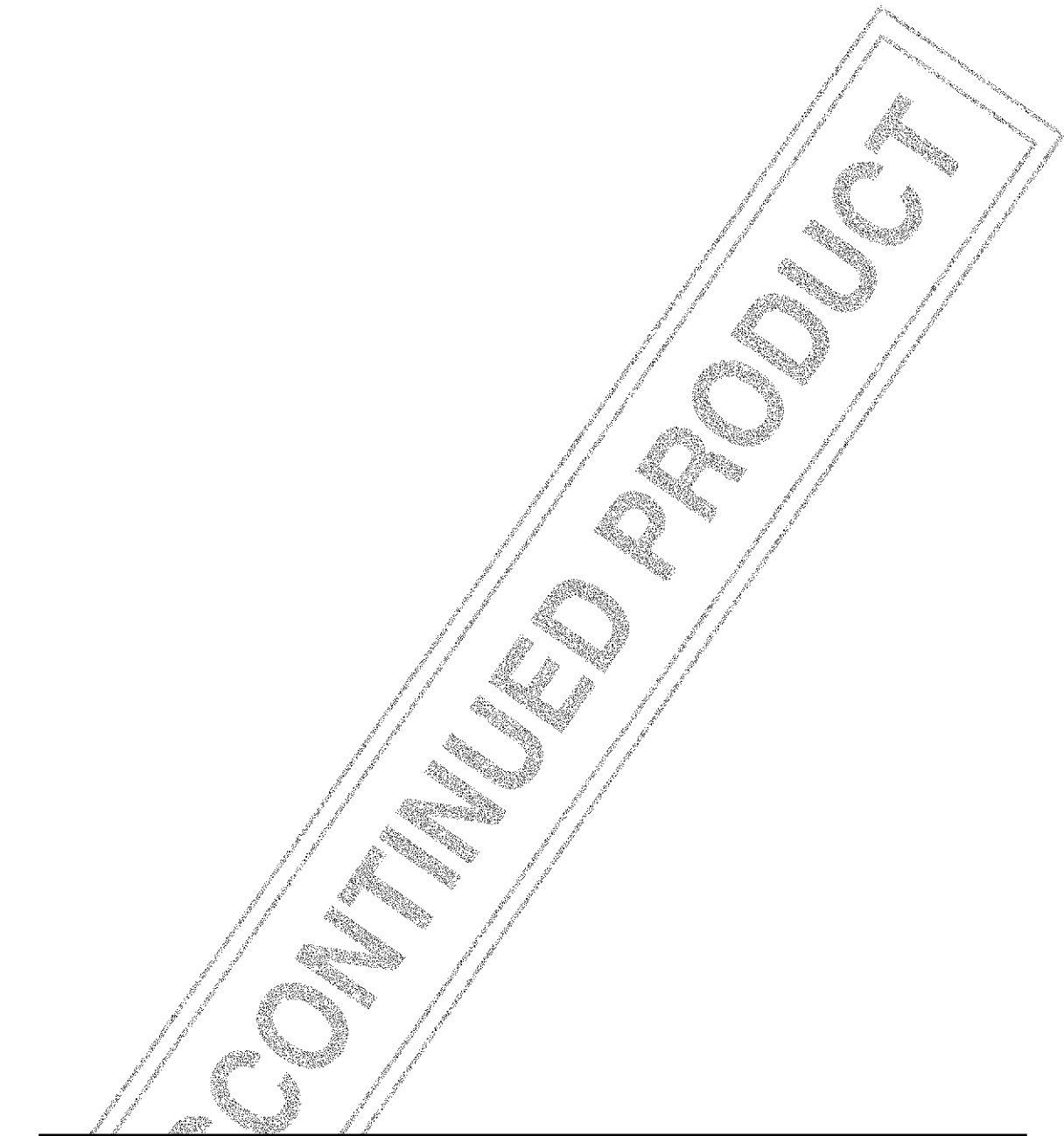
Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.722	-41.6	17.352	148.7	0.029	70.9	0.883	-21.3
200	0.587	-73.2	13.419	127.6	0.046	60.8	0.710	-33.1
400	0.426	-113.0	8.371	105.1	0.067	56.9	0.507	-40.7
600	0.369	-136.6	5.914	92.7	0.084	58.4	0.423	-42.5
800	0.344	-152.9	4.593	83.9	0.102	60.3	0.382	-43.9
1000	0.334	-165.7	3.750	76.7	0.121	61.5	0.360	-46.3
1200	0.326	-177.9	3.178	70.3	0.141	62.0	0.350	-49.1
1400	0.324	172.3	2.784	64.9	0.162	61.8	0.341	-52.2
1600	0.328	163.4	2.476	59.5	0.183	61.2	0.334	-56.4
1800	0.335	154.5	2.246	54.6	0.204	60.5	0.328	-60.8
2000	0.346	147.5	3.073	50.0	0.226	59.6	0.328	-65.4

$V_{CE} = 5V, I_C = 20mA, Z_0 = 50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.477	-66.8	28.090	133.6	0.022	67.7	0.726	-32.7
200	0.358	-104.1	17.995	112.9	0.035	65.3	0.506	-41.6
400	0.288	-142.2	9.903	95.9	0.057	68.3	0.350	-42.4
600	0.273	-159.8	6.777	86.7	0.081	69.9	0.299	-41.8
800	0.270	-171.7	5.181	79.9	0.104	70.2	0.278	-43.2
1000	0.271	178.7	4.209	73.9	0.129	69.1	0.269	-45.9
1200	0.273	169.4	3.554	68.5	0.153	67.9	0.264	-49.6
1400	0.275	161.1	3.085	63.6	0.177	66.2	0.258	-53.3
1600	0.284	153.4	2.749	59.1	0.202	64.3	0.253	-58.3
1800	0.294	145.6	2.479	54.6	0.224	62.5	0.249	-63.4
2000	0.302	140.8	2.295	50.6	0.248	60.4	0.248	-68.7

$V_{CE} = 2V, I_C = 3mA, Z_0 = 50\Omega$

Freq (MHz)	$ S_{11} $	$\angle S_{11}$	$ S_{21} $	$\angle S_{21}$	$ S_{12} $	$\angle S_{12}$	$ S_{22} $	$\angle S_{22}$
100	0.858	-30.5	9.283	157.3	0.039	73.6	0.944	-15.6
200	0.769	-57.4	8.036	138.7	0.068	61.4	0.834	-27.5
400	0.607	-97.1	5.756	113.9	0.099	48.4	0.641	-40.5
600	0.528	-123.2	4.302	98.1	0.114	44.4	0.525	-46.5
800	0.486	-141.6	3.414	87.0	0.125	43.9	0.465	-50.2
1000	0.460	-156.4	2.834	78.0	0.137	45.4	0.429	-53.7
1200	0.453	-169.4	2.429	70.3	0.149	47.5	0.408	-57.3
1400	0.440	179.8	2.143	63.6	0.163	49.2	0.395	-60.9
1600	0.441	170.1	1.919	57.4	0.179	50.8	0.385	-65.4
1800	0.447	160.4	1.739	51.7	0.196	52.3	0.381	-70.1
2000	0.454	152.5	1.621	46.4	0.215	53.3	0.379	-75.2



■ 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.