Ordering number:ENN6218

NPN Epitaxial Planar Silicon Composite Transistor

FH104

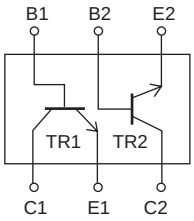
High-Frequency Low-Noise Amplifier, Differential Amplifier Applications

DISCONTINUED PRODUCT

Features

- Composite type with 2 transistors contained in the MCP package currently in use, improving the mounting efficiency greatly.
- The FH104 is formed with two chips equivalent to the 2SC4853 placed in one package.
- Excellent in thermal equilibrium and pair capability.

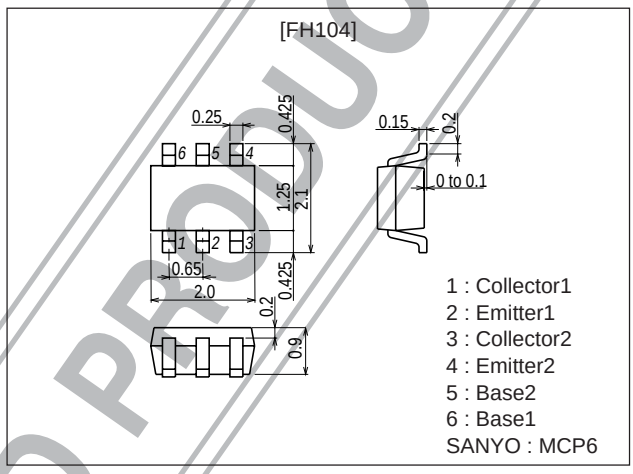
Electrical Connection



Package Dimensions

unit:mm

2149



Specifications

Absolute Maximum Ratings at Ta = 25˚C

Parameter	Symbol	Conditions	Ratings	Unit
Collector-to-Base Voltage	V_{CBO}		12	V
Collector-to-Emitter Voltage	V_{CEO}		6	V
Emitter-to-Base Voltage	V_{EBO}		1.5	V
Collector Current	I_C		15	mA
Collector Dissipation	P_C	1 unit	80	mW
Total Dissipation	P_T		150	mW
Junction Temperature	Tj		150	˚C
Storage Temperature	Tstg		–55 to +150	˚C

Electrical Characteristics at Ta = 25˚C

Parameter	Symbol	Conditions	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}=1V, I_C=1mA	90		200	
DC Current Gain Ratio	h_{FE} (small/large)	V_{CE}=1V, I_C=1mA	0.7	0.95		
Base-to-Emitter Voltage Difference	V_{BE} (large-small)	V_{CB}=1V, I_C=1mA		1.0		mV

Continued on next page.

Note) The specifications shown above are for each individual transistor. However, the ratings for h_{FE} (small/large) and V_{BE} (large-small) indicate pair characteristics.

Marking : 104

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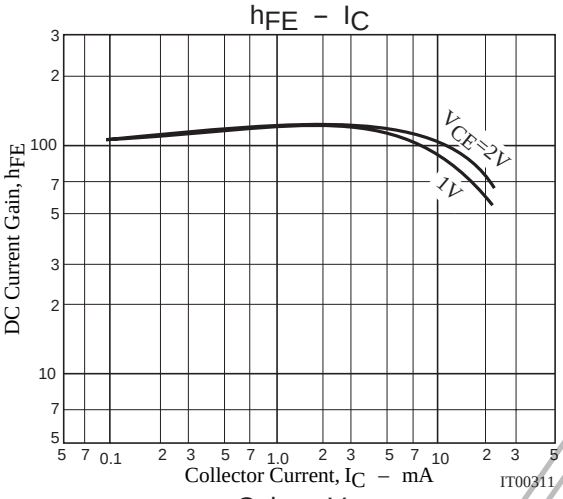
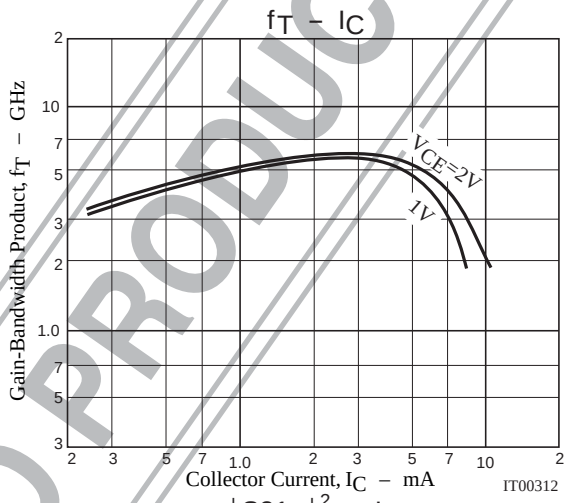
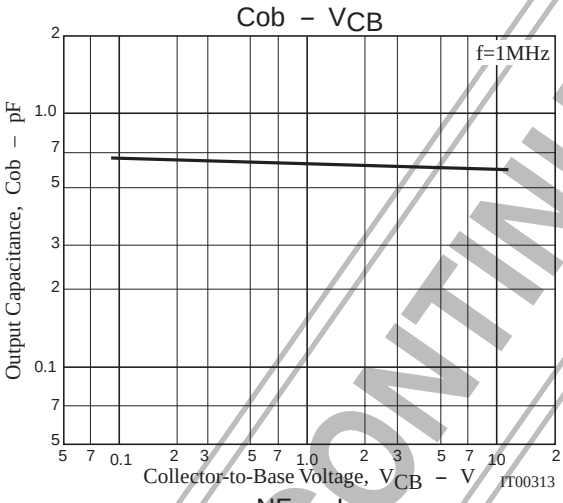
Continued from preceding page.

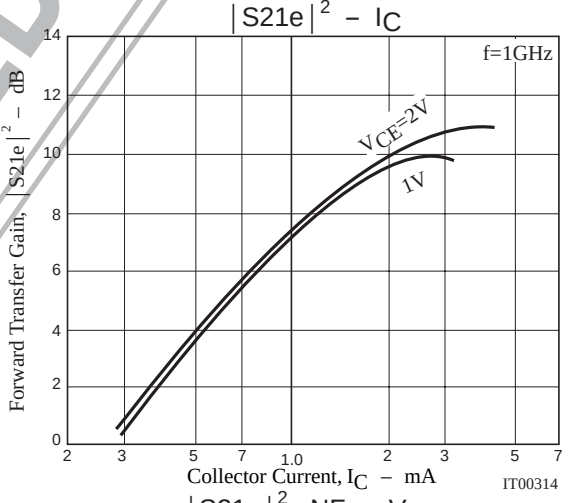
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
Gain-Bandwidth Product	f_T	V_{CE}=1V, I_C=1mA		5		GHz
Output Capacitance	Cob	V_{CB}=1V, f=1MHz		0.6	1.0	pF
Forward Transfer Gain	$\|S21e\|^2$ 1	V_{CE}=1V, I_C=1mA, f=1GHz	4.5	7		dB
	$\|S21e\|^2$ 2	V_{CE}=2V, I_C=3mA, f=1GHz		10.5		dB
Noise Figure	NF	V_{CE}=1V, I_C=1mA, f=1GHz		2.6	4.5	dB

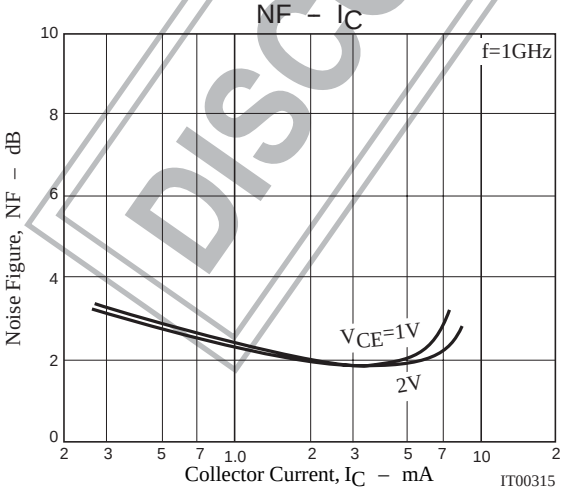
DISCONTINUED PRODUCT

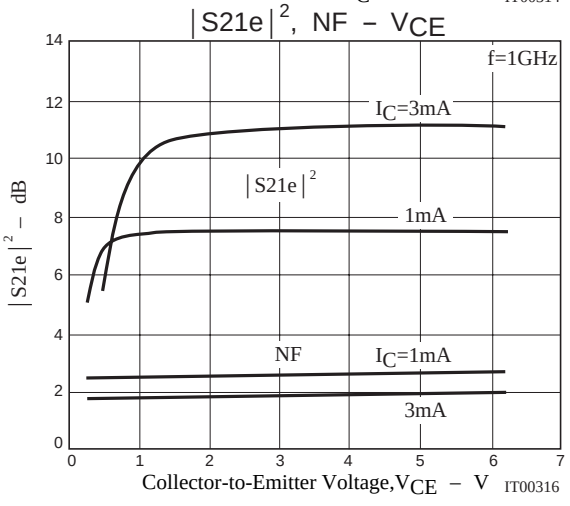


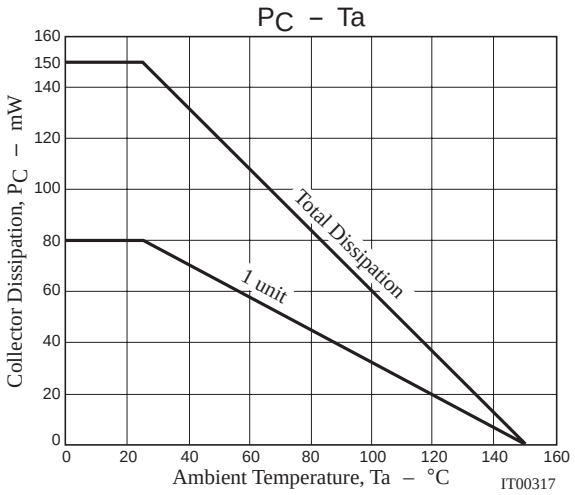






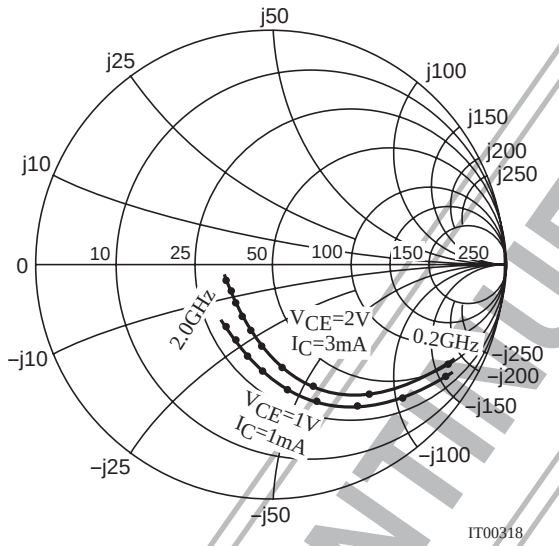




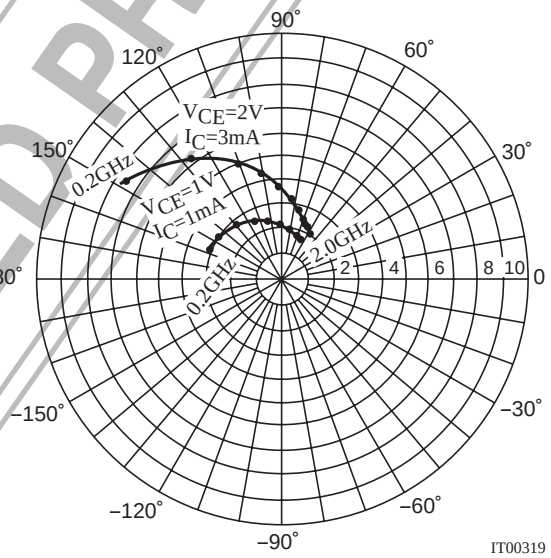


S parameter

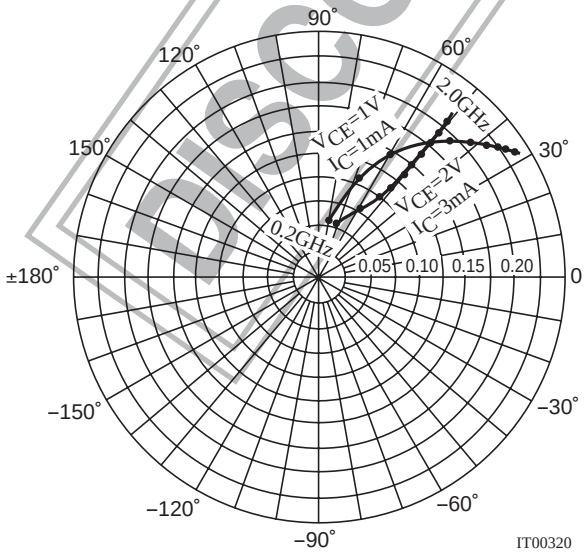
f=200MHz to 2000MHz(200MHz Step)
S11e



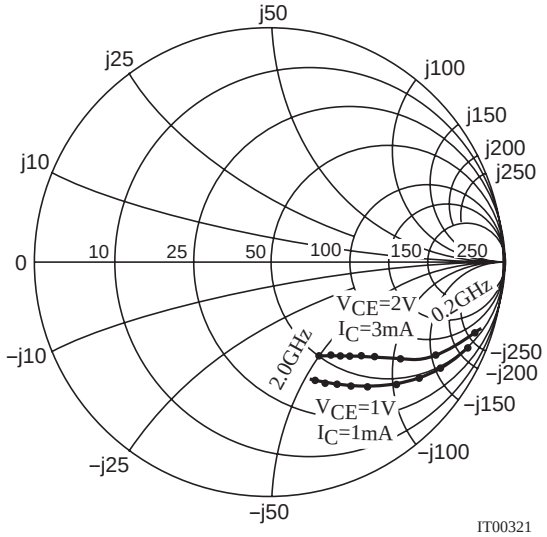
f=200MHz to 2000MHz(200MHz Step)
S21e



f=200MHz to 2000MHz(200MHz Step)
S12e



f=200MHz to 2000MHz(200MHz Step)
S22e



DISCONTINUED PRODUCT

S Parameters (Common emitter)

V_{CE}=1V, I_C=1mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.940	–17.9	3.228	159.6	0.058	77.1	0.972	–12.2
400	0.863	–33.7	2.983	143.7	0.107	66.6	0.914	–22.7
600	0.778	–48.0	2.732	129.9	0.145	58.1	0.844	–31.7
800	0.698	–60.5	2.469	117.7	0.173	50.9	0.773	–39.6
1000	0.608	–73.5	2.320	106.2	0.195	45.4	0.717	–46.0
1200	0.546	–84.7	2.106	96.3	0.210	40.9	0.668	–51.7
1400	0.470	–96.2	1.977	87.1	0.129	37.6	0.624	–56.5
1600	0.418	–106.4	1.826	78.8	0.224	35.3	0.590	–60.6
1800	0.388	–117.3	1.700	72.2	0.230	33.8	0.562	–64.3
2000	0.354	–127.0	1.615	65.9	0.234	32.9	0.546	–67.5

V_{CE}=2V, I_C=3mA, Z_O=50Ω

Freq (MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
200	0.839	–30.6	7.428	149.3	0.050	71.4	0.916	–18.3
400	0.672	–53.7	6.016	128.5	0.083	60.6	0.778	–30.2
600	0.536	–71.7	4.908	113.6	0.105	55.1	0.672	–37.1
800	0.431	–85.7	4.073	101.9	0.121	52.5	0.597	–41.9
1000	0.360	–99.0	3.494	92.7	0.135	51.4	0.548	–45.7
1200	0.310	–111.4	3.033	84.4	0.150	50.9	0.514	–49.2
1400	0.265	–122.6	2.694	77.4	0.162	50.9	0.492	–52.3
1600	0.242	–134.7	2.422	70.9	0.175	51.0	0.475	–55.6
1800	0.228	–148.0	2.205	65.9	0.189	51.1	0.461	–59.0
2000	0.217	–157.2	2.061	60.8	0.205	51.0	0.456	–61.8

DISCONTINUED PRODUCT

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