Ordering number : ENA1125

SANYO Semiconductors
DATA SHEET

NPN Epitaxial Planar Silicon Composite Transistor

FH102A — High-Frequency Low-Noise Amplifier, Differential Amplifier Applications

Features

- Composite type with 2 transistors contained in the MCP package currently in use, improving the mounting efficiency greatly.
- The FH102A is formed with two chips, being equivalent to the 2SC5226A, placed in one package.
- Optimal for differential amplification due to excellent thermal equilibrium and pair capability.

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}		2	V
Collector Current	I_C		70	mA
Collector Dissipation	P_C	When mounted on ceramic substrate (250mm²X0.8mm) 1unit	300	mW
Total Dissipation	P_T	When mounted on ceramic substrate (250mm²X0.8mm)	500	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=0A			1.0	μA
Emitter Cutoff Current	I_{EBO}	V_{EB}=1V, I_C=0A			10	μA
DC Current Gain	h_{FE}	V_{CE}=5V, I_C=20mA	90		200	

Marking : 102

Continued on next page.

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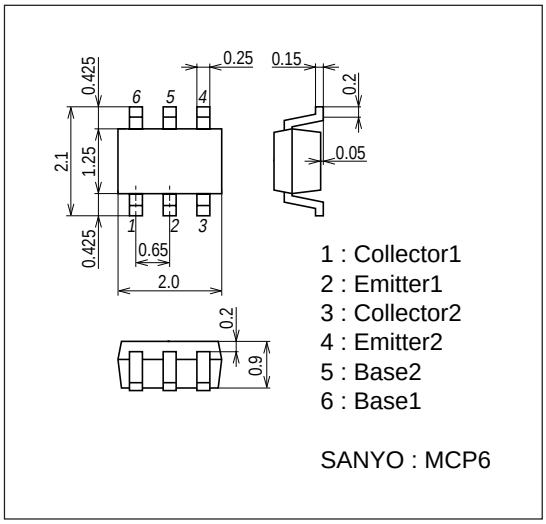
Parameter	Symbol	Conditions	Ratings			Unit
			min	typ	max	
DC Current Gain Ratio	h_{FE}(small/large)	V_{CE}=5V, I_C=20mA	0.7	0.95		
Base-to-Emitter Voltage Diffrence	V_{BE}(largel-smal)	V_{CE}=5V, I_C=20mA		1.0		mV
Gain-Bandwidth Product	f_T	V_{CE}=5V, I_C=20mA	5	7		GHz
Output Capacitance	Cob	V_{CB}=10V, f=1MHz		0.75	1.2	pF
Reverse Transfer Capacitance	Cre	V_{CB}=10V, f=1MHz		0.5		pF
Forward Transfer Gain	$|S21e|^2$1	V_{CE}=5V, I_C=20mA, f=1GHz	9	12		dB
	$|S21e|^2$2	V_{CE}=2V, I_C=3mA, f=1GHz		8		dB
Noise Figure	NF	V_{CE}=5V, I_C=7mA, f=1GHz		1.0	1.8	dB

Note) The specifications shown above are for each individual transistor except the h_{FE}(small/large) and V_{BE} (large-small) for which pair capability is also shown.

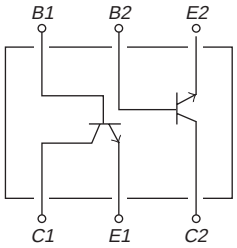
Package Dimensions

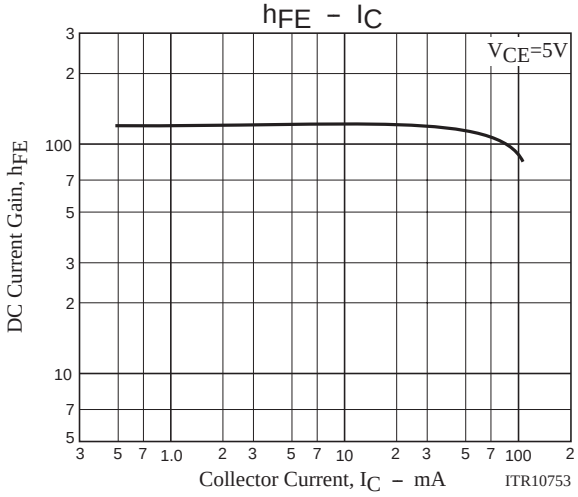
unit : mm (typ)

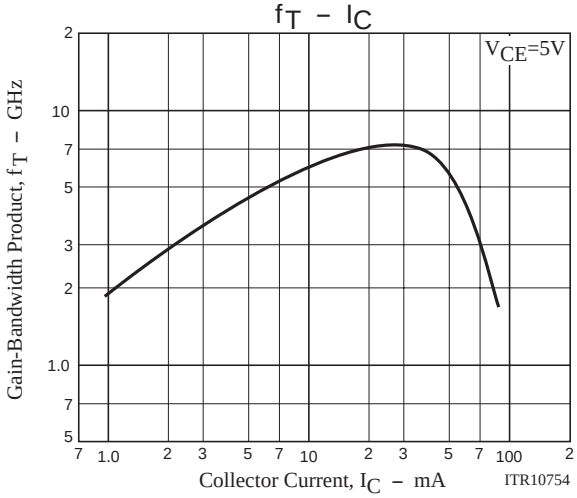
7026-002



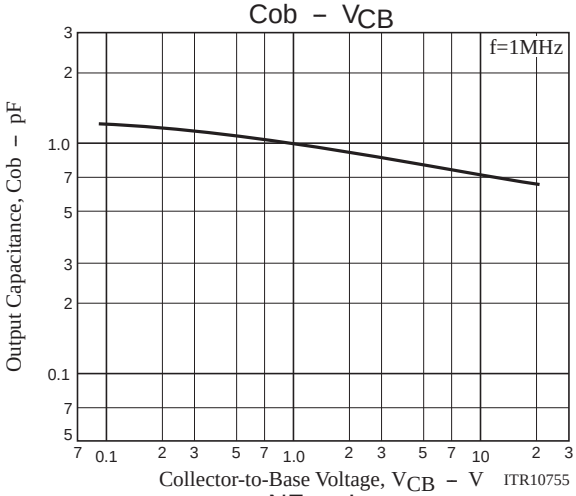
Electrical Connection



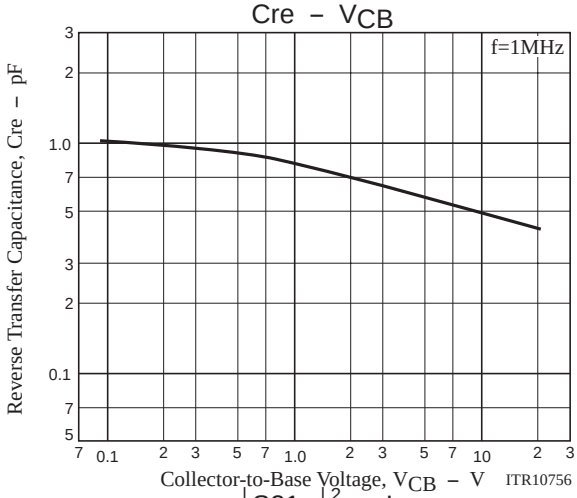




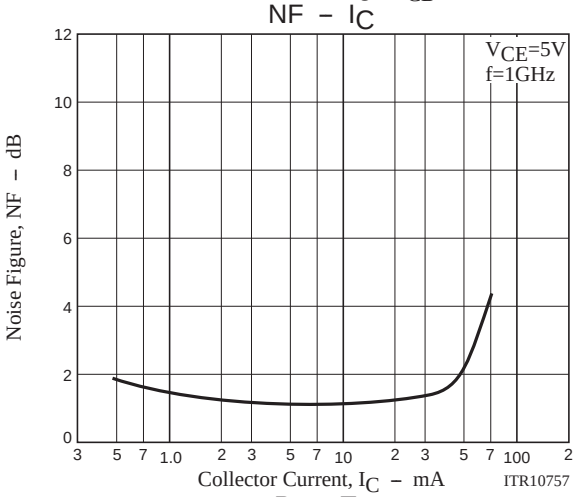
Cob – V_{CB}



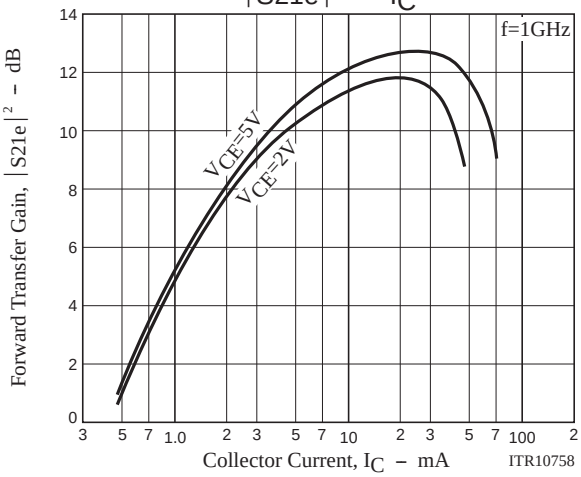
Cre – V_{CB}



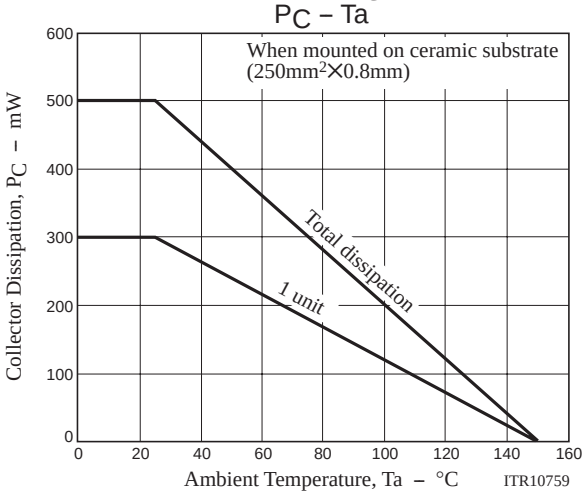
NF – I_C



$|S21e|^2$ – I_C

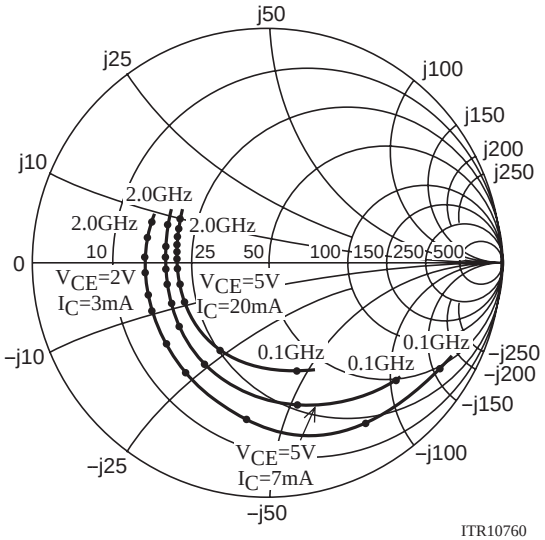


P_C – Ta



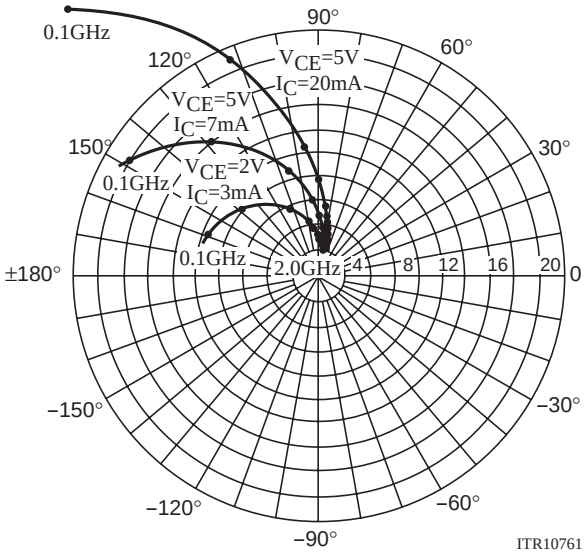
S Parameter

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



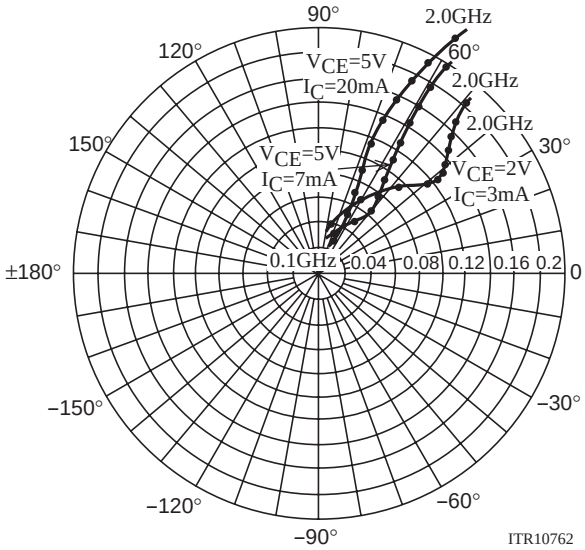
ITR10760

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



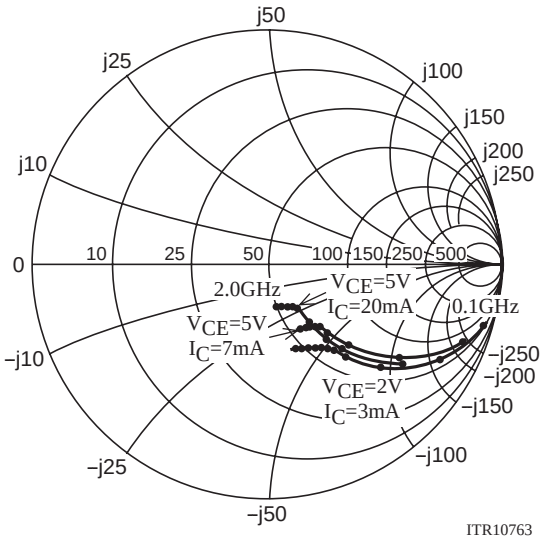
ITR10761

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



ITR10762

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



ITR10763

S Parameters (Common emitter)

V_{CE}=5V, I_C=7mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.720	–46.0	17.973	148.5	0.030	68.5	0.880	–23.6
200	0.612	–80.9	13.927	127.3	0.047	57.1	0.697	–37.6
400	0.497	–121.3	8.656	105.0	0.066	51.3	0.479	–47.6
600	0.456	–143.5	6.080	92.8	0.079	52.9	0.382	–50.5
800	0.440	–157.6	4.725	84.3	0.094	55.4	0.339	–51.8
1000	0.436	–167.5	3.864	77.0	0.110	56.8	0.323	–53.4
1200	0.434	–176.1	3.258	70.3	0.126	57.9	0.312	–55.8
1400	0.433	176.6	2.847	64.5	0.143	58.4	0.304	–58.3
1600	0.433	170.9	2.329	57.4	0.160	58.9	0.296	–62.0
1800	0.434	165.0	2.252	54.2	0.178	58.6	0.293	–65.0
2000	0.439	159.6	2.057	49.2	0.197	58.1	0.294	–68.1

V_{CE}=5V, I_C=20mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.481	–78.8	29.795	132.9	0.022	63.9	0.707	–38.2
200	0.420	–119.2	19.008	112.2	0.033	60.8	0.470	–51.1
400	0.391	–151.6	10.416	95.4	0.052	64.7	0.296	–55.3
600	0.386	–166.4	7.084	86.6	0.071	67.2	0.236	–56.1
800	0.381	–175.9	5.407	80.1	0.092	68.4	0.213	–56.6
1000	0.382	178.2	4.401	74.1	0.114	67.8	0.208	–57.9
1200	0.385	172.1	3.701	68.5	0.134	66.8	0.204	–60.7
1400	0.388	166.7	3.217	63.6	0.156	65.6	0.202	–63.5
1600	0.390	162.1	2.839	58.8	0.176	64.0	0.199	–67.9
1800	0.391	156.7	2.534	54.3	0.197	62.4	0.197	–71.2
2000	0.394	152.1	2.319	50.1	0.219	60.6	0.197	–74.2

V_{CE}=2V, I_C=3mA, Z_O=50Ω

Freq(MHz)	$\|S_{11}\|$	$\angle S_{11}$	$\|S_{21}\|$	$\angle S_{21}$	$\|S_{12}\|$	$\angle S_{12}$	$\|S_{22}\|$	$\angle S_{22}$
100	0.858	–32.4	9.413	157.2	0.040	72.6	0.945	–16.5
200	0.782	–60.7	8.187	138.5	0.070	59.2	0.833	–29.3
400	0.653	–101.1	5.855	113.8	0.101	44.5	0.637	–43.2
600	0.588	–126.5	4.337	98.4	0.114	39.1	0.515	–50.0
800	0.557	–143.7	3.444	87.7	0.122	38.0	0.454	–53.8
1000	0.543	–156.3	2.871	78.5	0.130	38.6	0.426	–57.1
1200	0.536	–166.8	2.446	70.5	0.137	40.3	0.407	–60.3
1400	0.533	–175.5	2.145	63.5	0.146	42.5	0.393	–63.8
1600	0.527	177.0	1.904	57.1	0.155	45.0	0.382	–68.0
1800	0.525	170.3	1.714	51.7	0.168	47.3	0.379	–72.0
2000	0.528	163.8	1.564	45.9	0.183	49.2	0.378	–75.8

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