XN05601 (XN5601)

Silicon PNP epitaxial planar type (Tr1)
Silicon NPN epitaxial planar type (Tr2)

For general amplification

■ Features

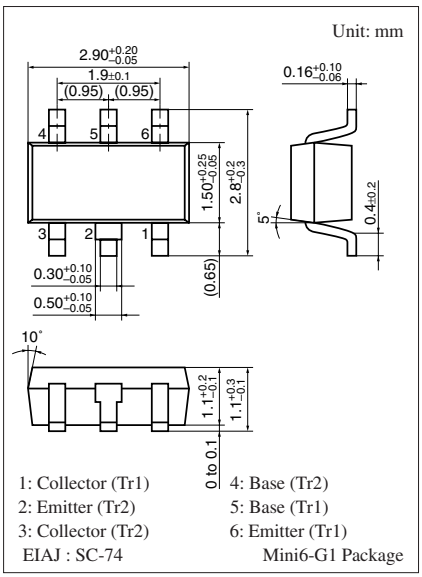
- Two elements incorporated into one package
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- 2SB0709A (2SB709A) + 2SD0601A (2SD601A)

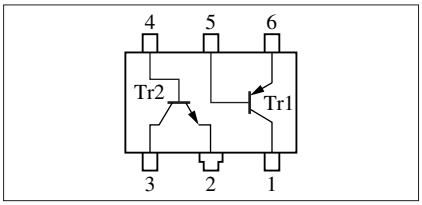
■ Absolute Maximum Ratings $T_a = 25°C$

Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	−60	V
	Collector-emitter voltage (Base open)	V_{CEO}	−50	V
	Emitter-base voltage (Collector open)	V_{EBO}	−7	V
	Collector current	I_C	−100	mA
	Peak collector current	I_{CP}	−200	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	60	V
	Collector-emitter voltage (Base open)	V_{CEO}	50	V
	Emitter-base voltage (Collector open)	V_{EBO}	7	V
	Collector current	I_C	100	mA
	Peak collector current	I_{CP}	200	mA
Overall	Total power dissipation	P_T	300	mW
	Junction temperature	T_j	150	°C
	Storage temperature	T_{stg}	−55 to +150	°C



Marking Symbol: 4N

Internal Connection



Note) The part number in the parenthesis shows conventional part number.

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

• Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10$ µA, $I_E = 0$	−60			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -2$ mA, $I_B = 0$	−50			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = -10$ µA, $I_C = 0$	−7			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -20$ V, $I_E = 0$			− 0.1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = -10$ V, $I_B = 0$			−100	µA
Forward current transfer ratio	h_{FE}	$V_{CE} = -10$ V, $I_C = -2$ mA	160		460	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -100$ mA, $I_B = -10$ mA		− 0.3	− 0.5	V
Transition frequency	f_T	$V_{CB} = -10$ V, $I_E = 1$ mA, f = 200 MHz		80		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = -10$ V, $I_E = 0$, f = 1 MHz		2.7		pF

Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

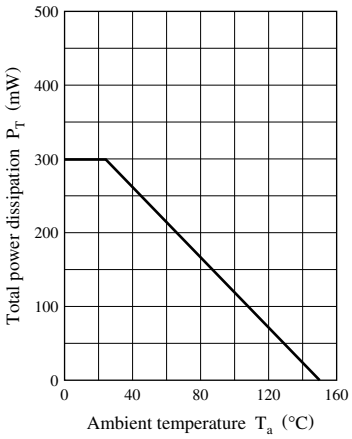
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10$ µA, $I_E = 0$	60			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 2$ mA, $I_B = 0$	50			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = 10$ µA, $I_C = 0$	7			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 20$ V, $I_E = 0$			0.1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = 10$ V, $I_B = 0$			100	µA
Forward current transfer ratio	h_{FE}	$V_{CE} = 10$ V, $I_C = 2$ mA	160		460	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 100$ mA, $I_B = 10$ mA		0.1	0.3	V
Transition frequency	f_T	$V_{CB} = 10$ V, $I_E = -2$ mA, f = 200 MHz		150		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = 10$ V, $I_E = 0$, f = 1 MHz		3.5		pF

Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

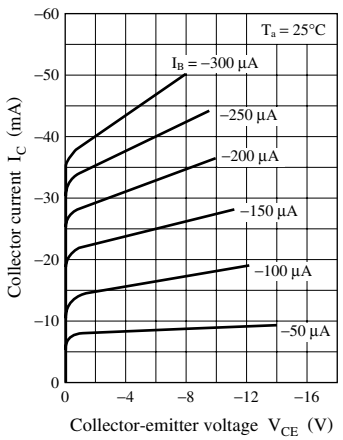
Common characteristics chart

P_T — T_a

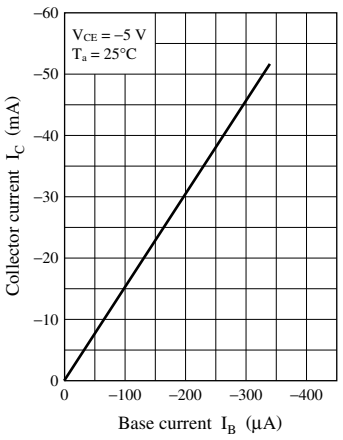


Characteristics charts of Tr1

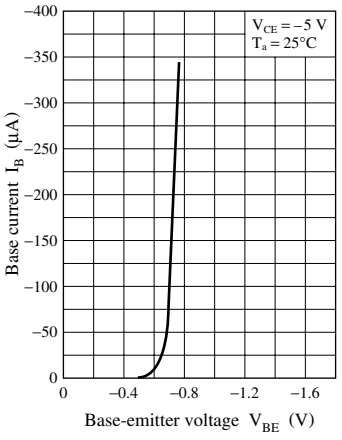
I_C — V_{CE}



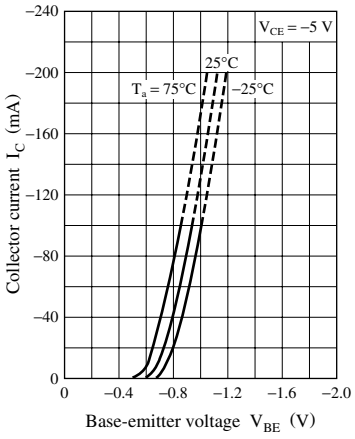
I_C — I_B



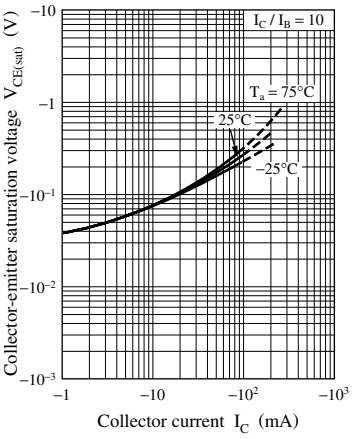
I_B — V_{BE}



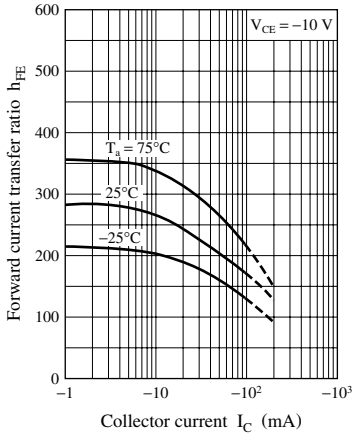
I_C — V_{BE}



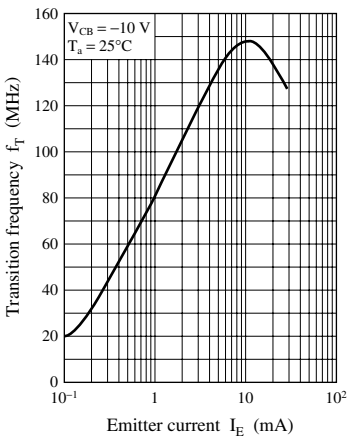
$V_{CE(sat)}$ — I_C



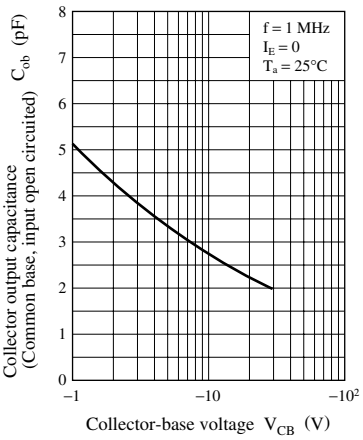
h_{FE} — I_C



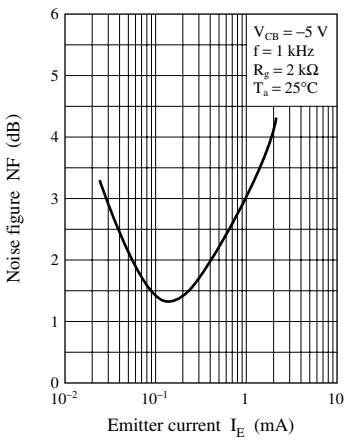
f_T — I_E



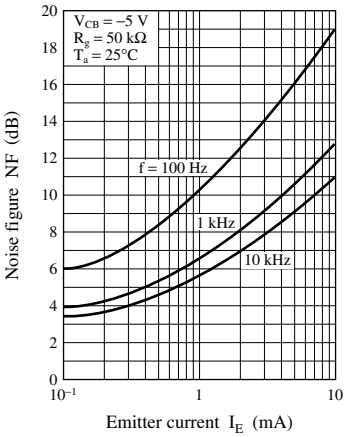
C_{ob} — V_{CB}



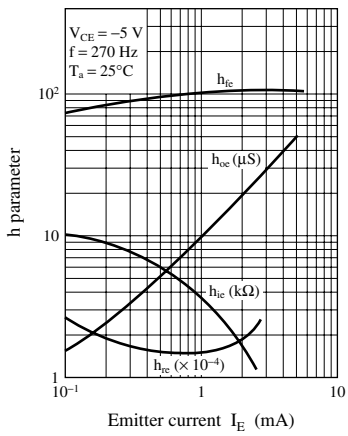
NF — I_E



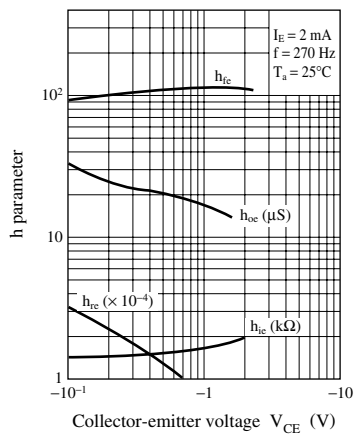
NF — I_E



h parameter — I_E

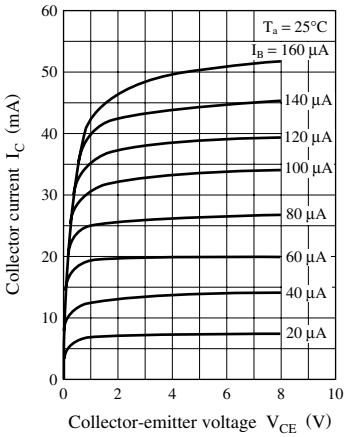


h parameter — V_{CE}

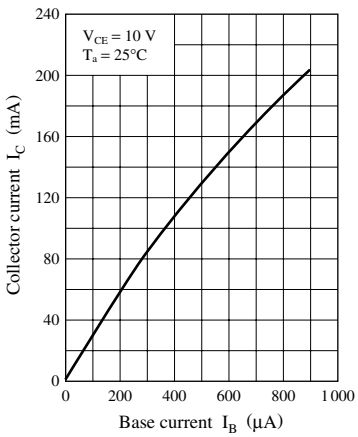


Characteristics charts of Tr2

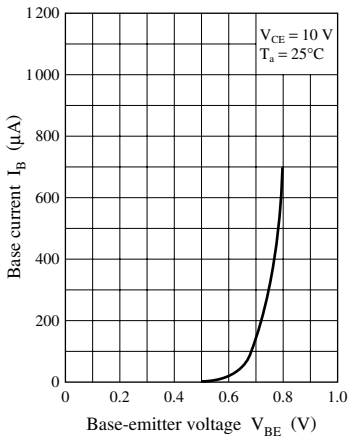
I_C — V_{CE}



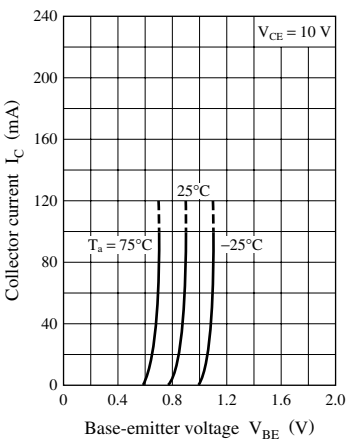
I_C — I_B



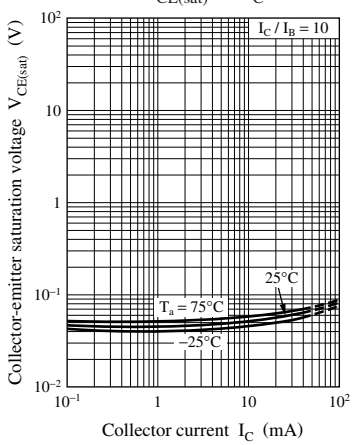
I_B — V_{BE}



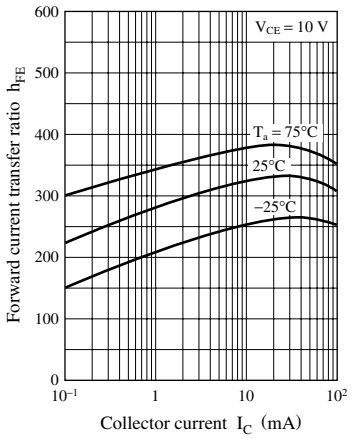
I_C — V_{BE}



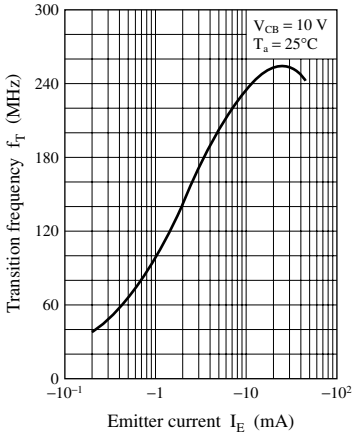
$V_{CE(sat)}$ — I_C



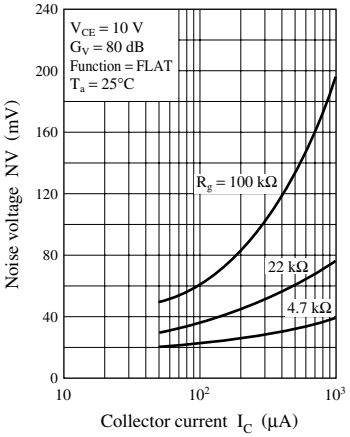
h_{FE} — I_C



f_T — I_E


300
240
180
120
60
0
V_{CB} = 10 V
T_a = 25°C
Transition frequency f_T (MHz)
-10^{-1}
−1
−10
-10^{2}
Emitter current I_E (mA)

NV — I_C


240
200
160
120
80
40
0
V_{CE} = 10 V
G_V = 80 dB
Function = FLAT
T_a = 25°C
R_g = 100 kΩ
22 kΩ
4.7 kΩ
Noise voltage NV (mV)
10
10^{2}
10^{3}
Collector current I_C (μA)

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