

# XN04609 (XN4609)

Silicon NPN epitaxial planer transistor (Tr1)  
 Silicon PNP epitaxial planer transistor (Tr2)

For amplification of low frequency output (Tr1)  
 For general amplification (Tr2)

### ■ Features

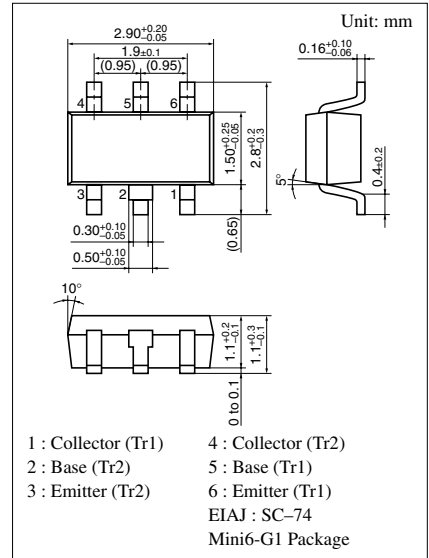
- Two elements incorporated into one package.
- Reduction of the mounting area and assembly cost by one half.

### ■ Basic Part Number of Element

- 2SD1328 + 2SB0709A(2SB709A)

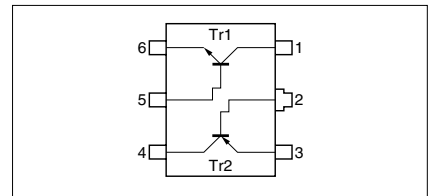
### ■ Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Ratings	Unit
Tr1	Collector to base voltage	$V_{CBO}$	25	V
	Collector to emitter voltage	$V_{CEO}$	20	V
	Emitter to base voltage	$V_{EBO}$	12	V
	Collector current	$I_C$	0.5	A
	Peak collector current	$I_{CP}$	1	A
Tr2	Collector to base voltage	$V_{CBO}$	-60	V
	Collector to emitter voltage	$V_{CEO}$	-50	V
	Emitter to base voltage	$V_{EBO}$	-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: 5F

Internal Connection



Note) The Part number in the Parenthesis shows conventional part number.

■ Electrical Characteristics (Ta=25°C)

● Tr1

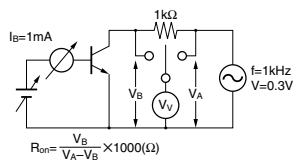
Parameter	Symbol	Conditions	min	typ	max	Unit
Collector to base voltage	$V_{CBO}$	$I_C = 10\mu A, I_E = 0$	25			V
Collector to emitter voltage	$V_{CEO}$	$I_C = 1mA, I_B = 0$	20			V
Emitter to base voltage	$V_{EBO}$	$I_E = 10\mu A, I_C = 0$	12			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = 25V, I_E = 0$			0.1	$\mu A$
Forward current transfer ratio	$h_{FE1}$	$V_{CE} = 2V, I_C = 0.5A^{*1}$	200		800	
	$h_{FE2}$	$V_{CE} = 2V, I_C = 1A^{*1}$	60			
Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_C = 0.5A, I_B = 20mA$		0.13	0.4	V
Base to emitter saturation voltage	$V_{BE(sat)}$	$I_C = 0.5A, I_B = 20mA$			1.2	V
Transition frequency	$f_T$	$V_{CB} = 10V, I_E = -50mA, f = 200MHz$		200		MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = 10V, I_E = 0, f = 1MHz$		10		pF
ON Resistance	$R_{on}^{*2}$			1.0		$\Omega$

● Tr2

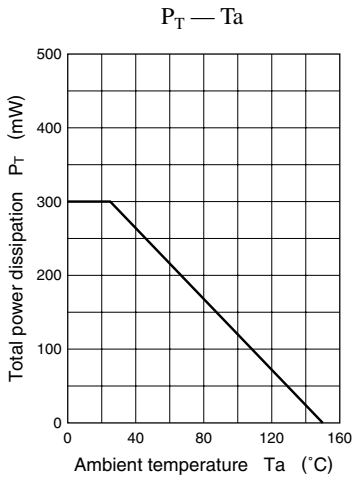
Parameter	Symbol	Conditions	min	typ	max	Unit
Collector to base voltage	$V_{CBO}$	$I_C = -10\mu A, I_E = 0$	-60			V
Collector to emitter voltage	$V_{CEO}$	$I_C = -2mA, I_B = 0$	-50			V
Emitter to base voltage	$V_{EBO}$	$I_E = -10\mu A, I_C = 0$	-7			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = -20V, I_E = 0$			-0.1	$\mu A$
	$I_{CEO}$	$V_{CE} = -10V, I_E = 0$			-100	$\mu A$
Forward current transfer ratio	$h_{FE}$	$V_{CE} = -10V, I_C = -2mA$	160		460	
Collector to emitter saturation voltage	$V_{CE(sat)}$	$I_C = -100mA, I_B = -10mA$		-0.3		V
Transition frequency	$f_T$	$V_{CB} = -10V, I_E = 1mA, f = 200MHz$		80		MHz
Collector output capacitance	$C_{ob}$	$V_{CB} = -10V, I_E = 0, f = 1MHz$		2.7		pF

\*1 Pulse measurement

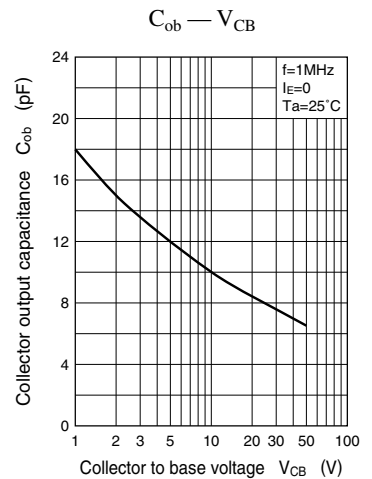
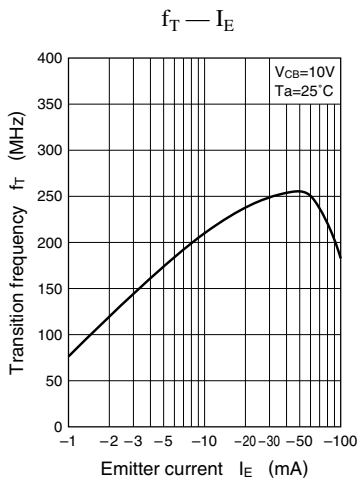
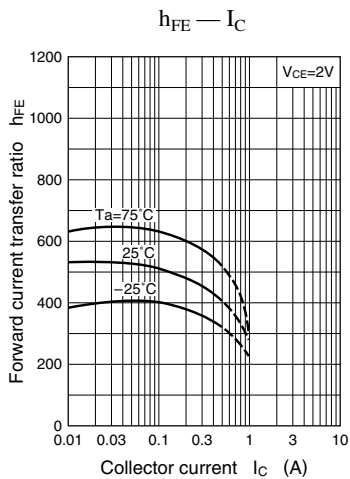
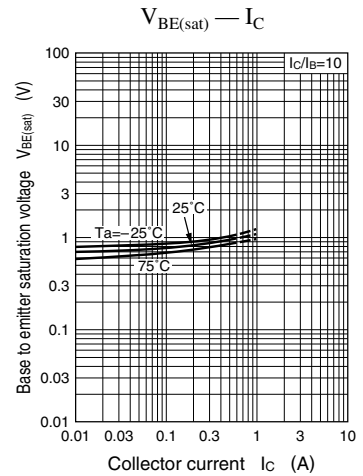
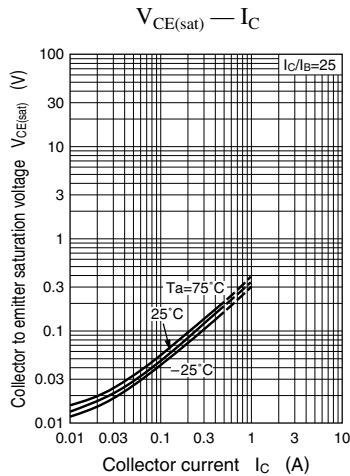
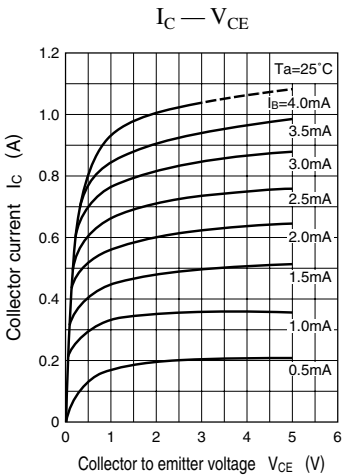
\*2  $R_{on}$  test circuit



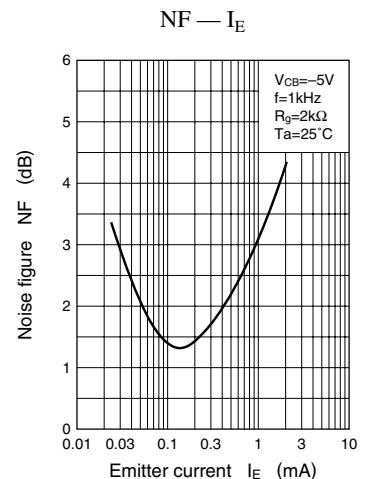
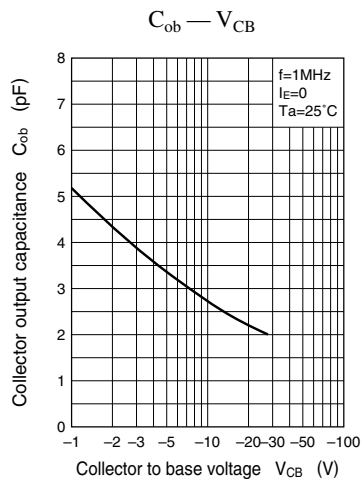
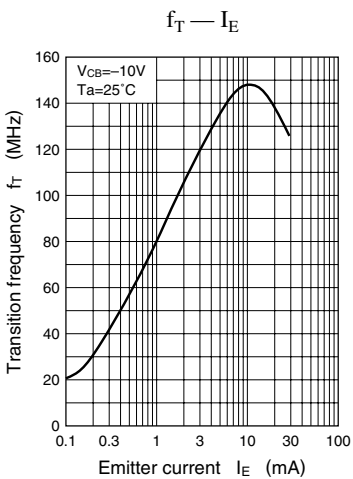
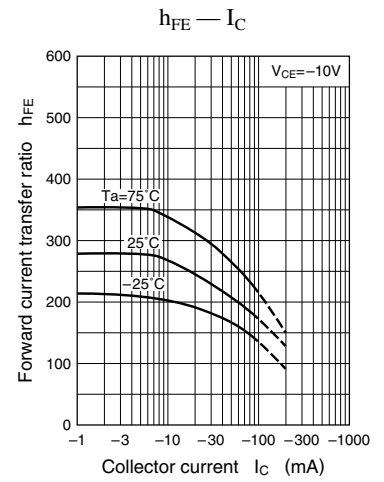
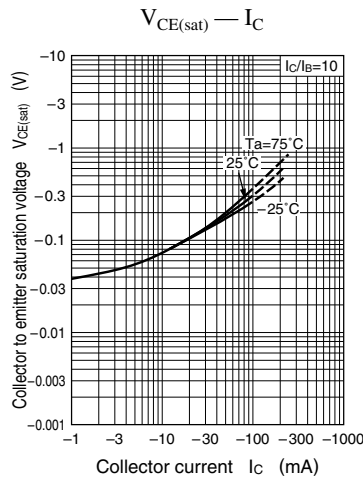
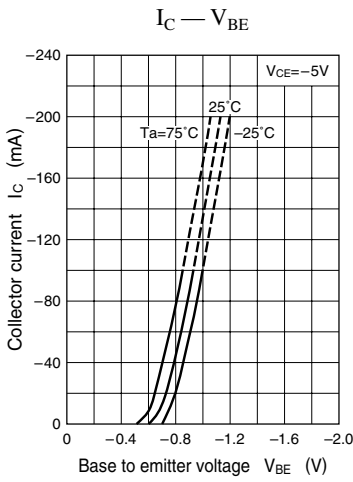
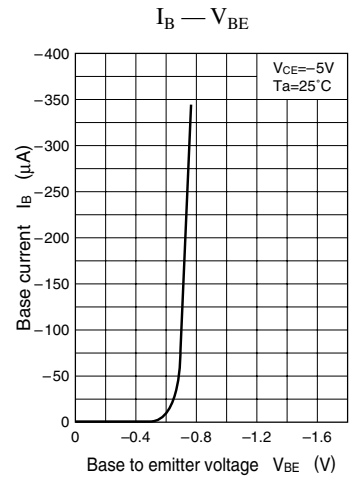
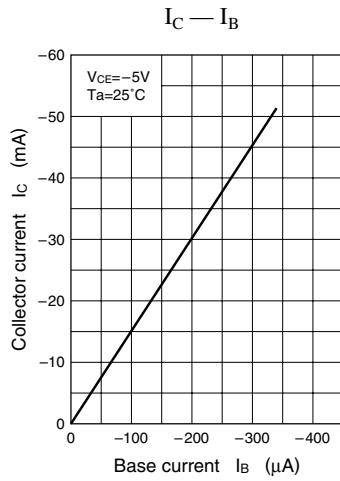
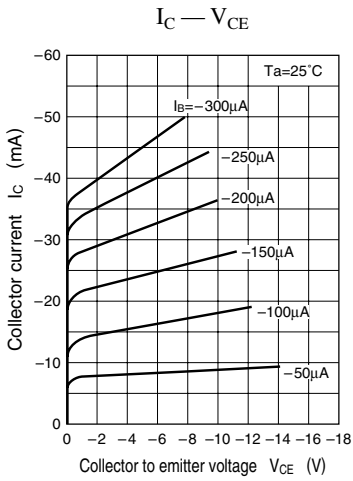
Common characteristics chart



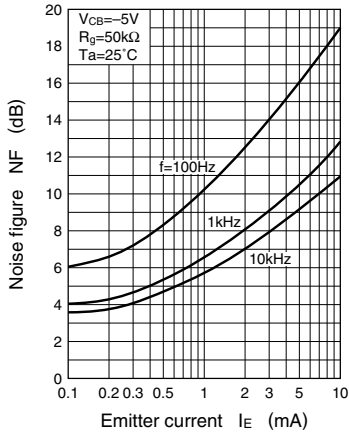
Characteristics charts of Tr1



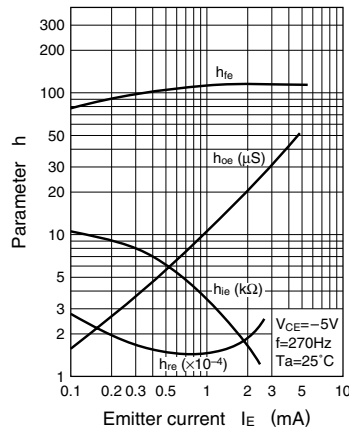
Characteristics charts of Tr2



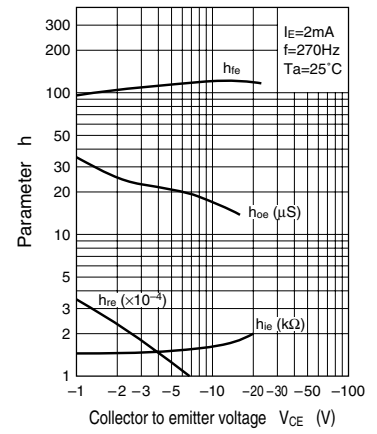
NF —  $I_E$



h Parameter —  $I_E$



h Parameter —  $V_{CE}$



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