

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

■ Features

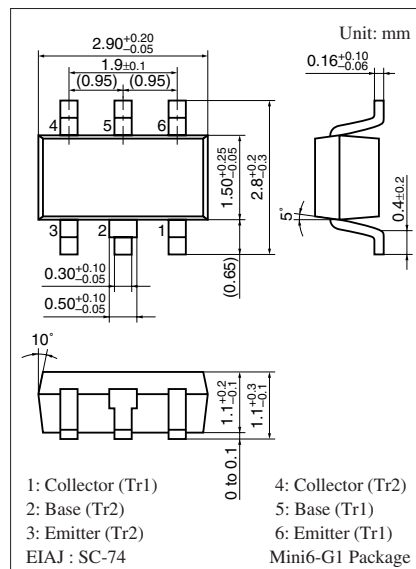
- Two elements incorporated into one package
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- 2SD1328 + 2SB0970 (2SB970)

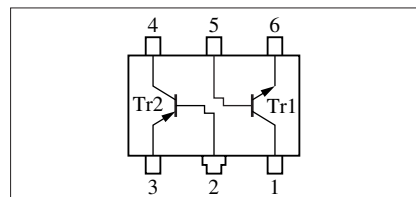
■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

	Parameter	Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	25	V
	Collector-emitter voltage (Base open)	V_{CEO}	20	V
	Emitter-base voltage (Collector open)	V_{EBO}	12	V
	Collector current	I_C	0.5	A
	Peak collector current	I_{CP}	1	A
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	−15	V
	Collector-emitter voltage (Base open)	V_{CEO}	−10	V
	Emitter-base voltage (Collector open)	V_{EBO}	−7	V
	Collector current	I_C	−0.5	A
	Peak collector current	I_{CP}	−1	A
Overall	Total power dissipation	P_T	300	mW
	Junction temperature	T_j	150	°C
	Storage temperature	T_{stg}	−55 to +150	°C



Marking Symbol: 5I

Internal Connection



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

■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

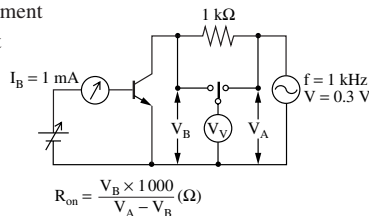
• Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10\ \mu\text{A}$, $I_E = 0$	25			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 1\ \text{mA}$, $I_B = 0$	20			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = 10\ \mu\text{A}$, $I_C = 0$	12			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 25\ \text{V}$, $I_E = 0$			0.1	μA
Forward current transfer ratio *1	h_{FE1}	$V_{CE} = 2\ \text{V}$, $I_C = 0.5\ \text{A}$	200		800	—
	h_{FE2}	$V_{CE} = 2\ \text{V}$, $I_C = 1\ \text{A}$	60			
Collector-emitter saturation voltage *1	$V_{CE(sat)}$	$I_C = 0.5\ \text{A}$, $I_B = 20\ \text{mA}$		0.13	0.40	V
Base-emitter saturation voltage *1	$V_{BE(sat)}$	$I_C = 0.5\ \text{A}$, $I_B = 20\ \text{mA}$			1.2	V
Transition frequency	f_T	$V_{CB} = 10\ \text{V}$, $I_E = -50\ \text{mA}$, $f = 200\ \text{MHz}$		200		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = 10\ \text{V}$, $I_E = 0$, $f = 1\ \text{MHz}$		10		pF
ON resistance *2	R_{on}			1.0		Ω

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *1: Pulse measurement

*2: R_{on} test circuit



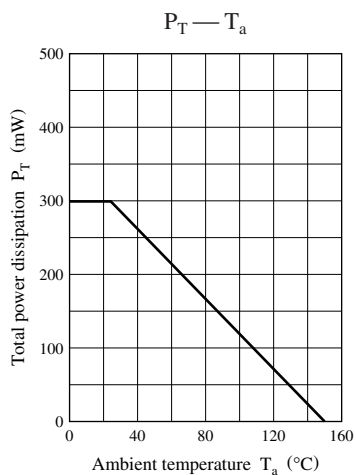
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10\ \mu\text{A}$, $I_E = 0$	-15			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -1\ \text{mA}$, $I_B = 0$	-10			V
Emitter-base voltage (Collector open)	V_{EBO}	$I_E = -10\ \mu\text{A}$, $I_C = 0$	-7			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -10\ \text{V}$, $I_E = 0$			-0.1	μA
Forward current transfer ratio *	h_{FE1}	$V_{CE} = -2\ \text{V}$, $I_C = -0.5\ \text{A}$	100		350	—
	h_{FE2}	$V_{CE} = -2\ \text{V}$, $I_C = -1\ \text{A}$	60			
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -0.4\ \text{A}$, $I_B = -8\ \text{mA}$		-0.16	-0.30	V
Base-emitter saturation voltage	$V_{BE(sat)}$	$I_C = -0.4\ \text{A}$, $I_B = -8\ \text{mA}$		-0.8	-1.2	V
Transition frequency	f_T	$V_{CB} = -10\ \text{V}$, $I_E = 50\ \text{mA}$, $f = 200\ \text{MHz}$		130		MHz
Collector output capacitance (Common base, input open circuited)	C_{ob}	$V_{CB} = -10\ \text{V}$, $I_E = 0$, $f = 1\ \text{MHz}$		22		pF

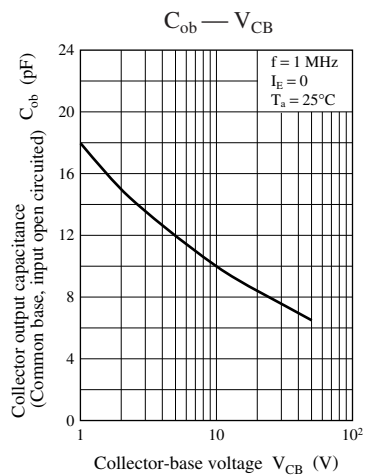
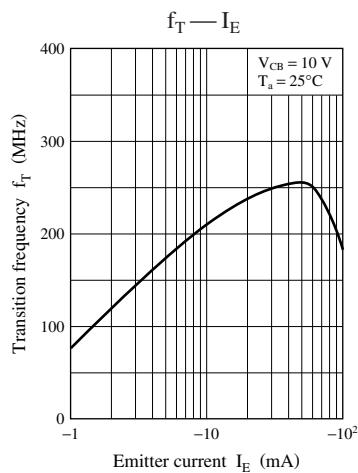
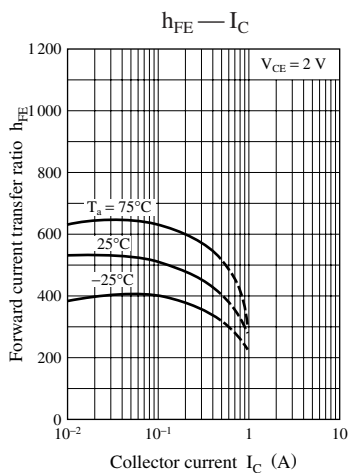
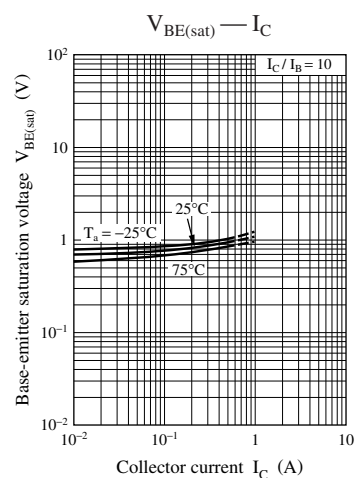
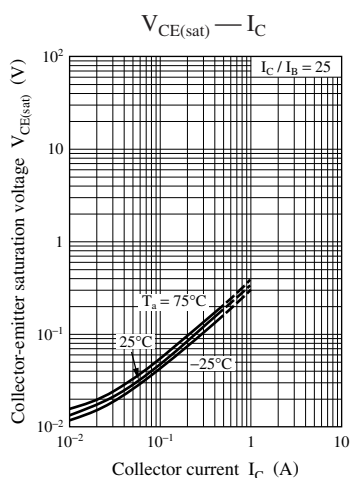
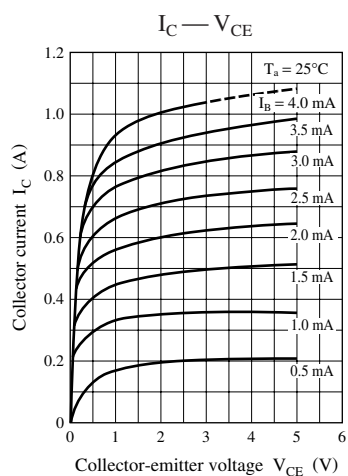
Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *: Pulse measurement

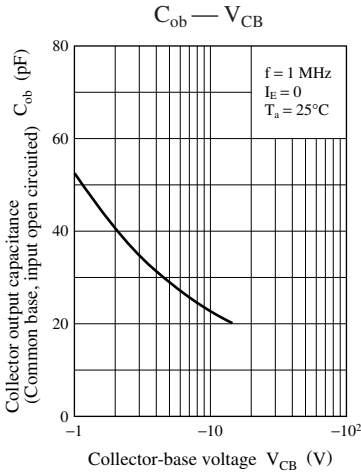
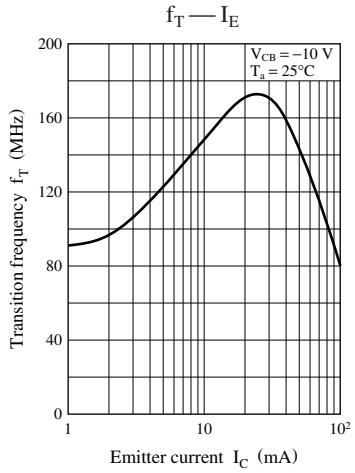
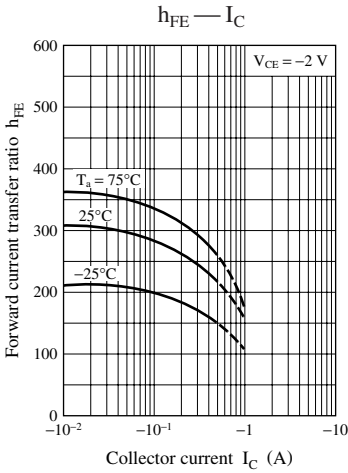
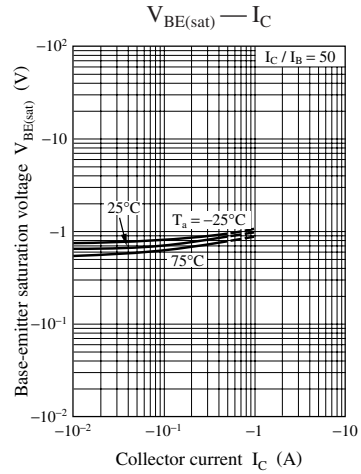
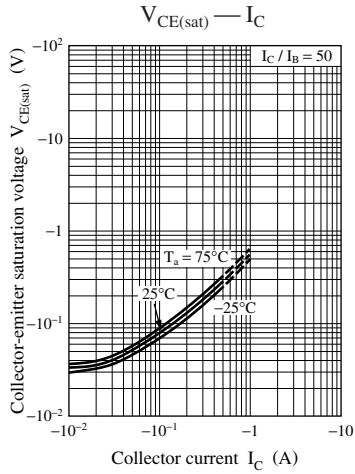
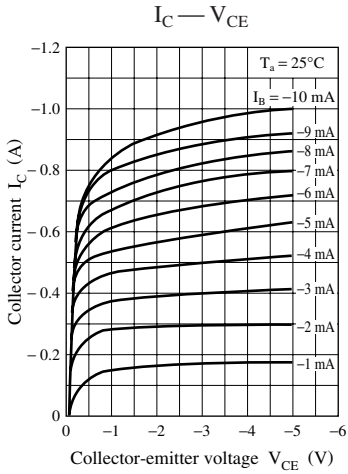
Common characteristics chart



Characteristics charts of Tr1



Characteristics charts of Tr2



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