# XN07651 (XN7651)

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

### For motor drive

### ■ Features

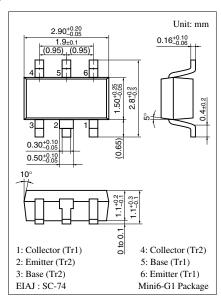
- Two elements incorporated into one package
- Reduction of the mounting area and assembly cost by one half

# ■ Basic Part Number of Element

• 2SB0970 (2SB970) + ARN-5

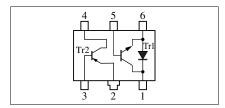
# ■ Abosolute Maximum Ratings $T_a = 25$ °C

	Parameter	Symbol	Rating	Unit
Tr1	Collector to base voltage	$V_{CBO}$	20	V
	Collector to emitter voltage	$V_{CEO}$	15	V
	Emitter to base voltage	$V_{EBO}$	7	V
	Collector current	$I_C$	0.55	A
	Peak collector current	$I_{CP}$	1.1	A
	Collector current *1	$I_{C}$	0.7	A
Tr2	Collector to base voltage	V <sub>CBO</sub>	-15	V
	Collector to emitter voltage	$V_{CEO}$	-10	V
	Emitter to base voltage	$V_{EBO}$	-7	V
	Collector current	$I_{C}$	- 0.55	A
	Peak collector current	$I_{CP}$	-1.1	A
	Collector current*1	$I_{C}$	- 0.7	A
Overall	Total power dissipation	$P_{T}$	350	mW
	Total power dissipation*2	$P_{T}$	750	mW
	Junction temperature	$T_{j}$	150	°C
	Storage temperature	$T_{stg}$	-55 to +150	°C



Marking Symbol: 9W

## Internal Connection



Note) \*1:  $T_a = -20^{\circ}C \pm 2^{\circ}C$ 

<sup>\*2:</sup> An instantaneous total power dissipation (for the single pulse of 50 ms)

# ■ Electrical characteristics $T_a = 25$ °C $\pm 2$ °C

#### • Tr1

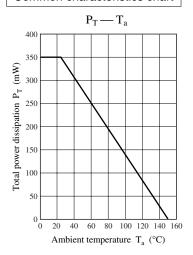
Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Collector to base voltage	V <sub>CBO</sub>	$I_C = 10 \ \mu A, I_E = 0$	20			V
Collector to emitter voltage	V <sub>CEO</sub>	$I_C = 1 \text{ mA}, I_B = 0$	15			V
Emitter to base voltage	$V_{EBO}$	$I_E = 10 \ \mu A, \ I_C = 0$	7			V
Collector cutoff current	I <sub>CBO</sub>	$V_{CB} = 15 \text{ V}, I_E = 0$			0.1	μΑ
Forward current transfer ratio	h <sub>FE1</sub> *1	$V_{CE} = 2 \text{ V}, I_{C} = 0.5 \text{ A}$	200		800	_
	h <sub>FE2</sub> *1	$V_{CE} = 2 V, I_C = 1 A$	60			_
Collector to emitter saturation voltage	V <sub>CE(sat)1</sub> *1	$I_C = 0.3 \text{ A}, I_B = 8 \text{ mA}$			0.2	V
	V <sub>CE(sat)2</sub> *1	$I_C = 0.7 \text{ A}, I_B = 8 \text{ mA}$			0.5	V
Diode forward voltage	V <sub>F</sub> *2	$I_F = 0.55 \text{ A}$			1.4	V
Transition frequency	$f_T$	$V_{CB} = 10 \text{ V}, I_E = -50 \text{ mA}, f = 200 \text{ MHz}$		200		MHz
Collector output capacitance	C <sub>ob</sub>	$V_{CB} = 10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$		10		pF

# • Tr2

Parameter	Symbol	Conditions	Min	Тур	Max	Unit
Collector to base voltage	V <sub>CBO</sub>	$I_C = -10 \ \mu A, \ I_E = 0$	-15			V
Collector to emitter voltage	V <sub>CEO</sub>	$I_{\rm C} = -1  \text{mA},  I_{\rm B} = 0$	-10			V
Emitter to base voltage	$V_{EBO}$	$I_E = -10 \ \mu A, \ I_C = 0$	-7			V
Collector cutoff current	$I_{CBO}$	$V_{CB} = -10 \text{ V}, I_E = 0$			- 0.1	μΑ
Forward current transfer ratio	h <sub>FE1</sub> *1	$V_{CE} = -2 \text{ V}, I_C = -0.5 \text{ A}$	100		350	_
	h <sub>FE2</sub> *1	$V_{CE} = -2 \text{ V}, I_C = -1 \text{ A}$	60			_
Collector to emitter saturation voltage	V <sub>CE(sat)1</sub> *1	$I_C = -0.3 \text{ A}, I_B = -8 \text{ mA}$			- 0.22	V
	V <sub>CE(sat)2</sub> *1	$I_C = -0.7 \text{ A}, I_B = -8 \text{ mA}$			- 0.6	V
Transition frequency	$f_T$	$V_{CB} = -10 \text{ V}, I_E = 50 \text{ mA}, f = 200 \text{ MHz}$		130		MHz
Collector output capacitance	C <sub>ob</sub>	$V_{CB} = -10 \text{ V}, I_E = 0, f = 1 \text{ MHz}$		22		pF

Note) \*1: Pulse measurement

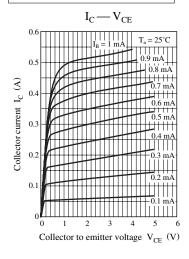
# Common characteristics chart

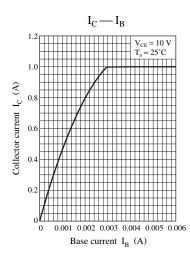


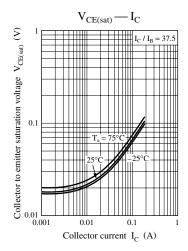
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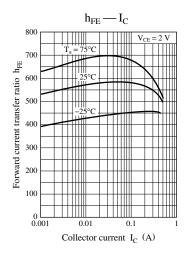
<sup>\*2:</sup> Effective for the transistor with a built-in diode

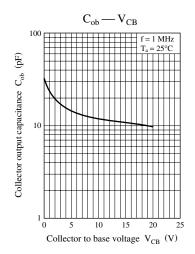
## Characteristics charts of Tr1



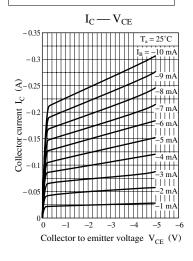


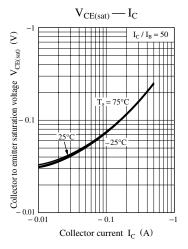


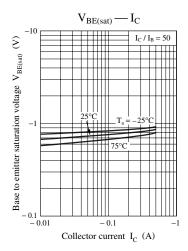




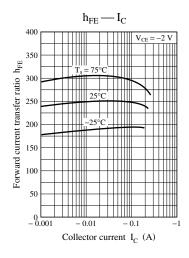
# Characteristics charts of Tr2

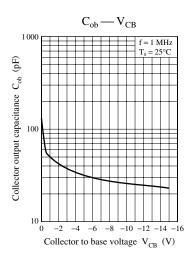






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