

XN04321

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

For switching/digital circuits

■ Features

- Two elements incorporated into one package
(Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number of Element

- UNR2221 (UN2221) + UNR2121 (UN2121)

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

Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	50	V
	Collector-emitter voltage (Base open)	V_{CEO}	50	V
	Collector current	I_C	500	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	-50	V
	Collector-emitter voltage (Base open)	V_{CEO}	-50	V
	Collector current	I_C	-500	mA
Overall	Total power dissipation	P_T	300	mW
	Junction temperature	T_j	150	$^\circ\text{C}$
	Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

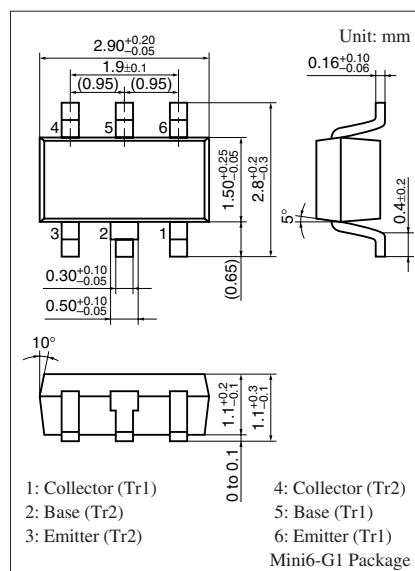
■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

- Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10\ \mu\text{A}$, $I_E = 0$	50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 2\ \text{mA}$, $I_B = 0$	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 50\ \text{V}$, $I_E = 0$			1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = 50\ \text{V}$, $I_B = 0$			1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = 6\ \text{V}$, $I_C = 0$			5	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = 10\ \text{V}$, $I_C = 100\ \text{mA}$	40			—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 100\ \text{mA}$, $I_B = 5\ \text{mA}$			0.25	V
Output voltage high level	V_{OH}	$V_{CC} = 5\ \text{V}$, $V_B = 0.5\ \text{V}$, $R_L = 500\ \Omega$	4.9			V
Output voltage low level	V_{OL}	$V_{CC} = 5\ \text{V}$, $V_B = 3.5\ \text{V}$, $R_L = 500\ \Omega$			0.2	V
Input resistance	R_1		-30%	2.2	+30%	k Ω
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = 10\ \text{V}$, $I_E = -50\ \text{mA}$, $f = 200\ \text{MHz}$		200		MHz

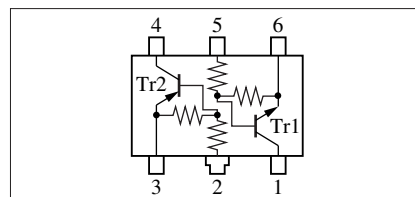
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

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



Marking Symbol: EB

Internal Connection



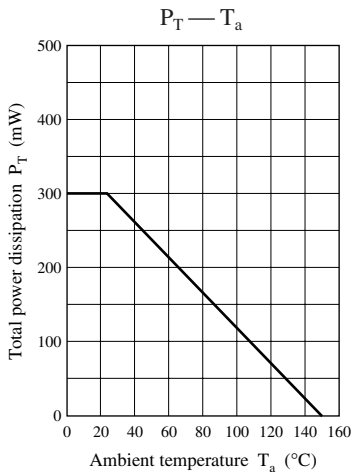
■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

• Tr2

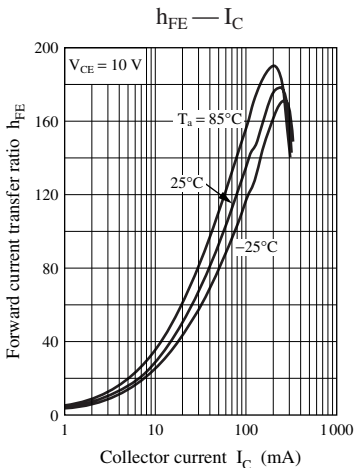
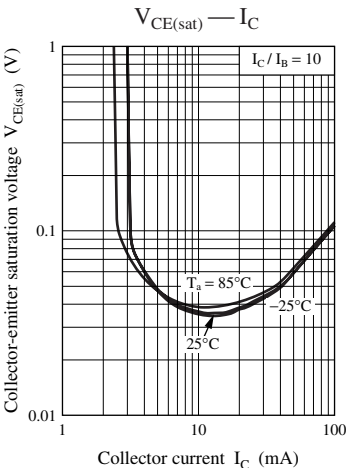
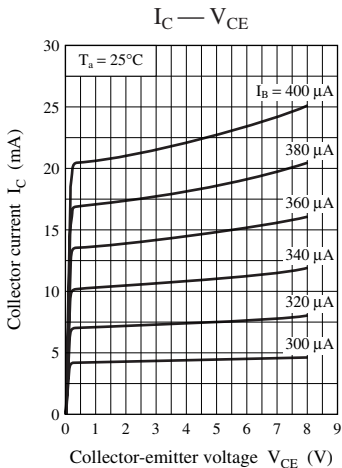
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10\ \mu\text{A}$, $I_E = 0$	-50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -2\ \text{mA}$, $I_B = 0$	-50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -50\ \text{V}$, $I_E = 0$			-1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = -50\ \text{V}$, $I_B = 0$			-1	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = -6\ \text{V}$, $I_C = 0$			-5	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = -10\ \text{V}$, $I_C = -100\ \text{mA}$	40			—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -100\ \text{mA}$, $I_B = -5\ \text{mA}$			-0.25	V
Output voltage high level	V_{OH}	$V_{CC} = -5\ \text{V}$, $V_B = -0.5\ \text{V}$, $R_L = 500\ \Omega$	-4.9			V
Output voltage low level	V_{OL}	$V_{CC} = -5\ \text{V}$, $V_B = -3.5\ \text{V}$, $R_L = 500\ \Omega$			-0.2	V
Input resistance	R_i		-30%	2.2	+30%	$\text{k}\Omega$
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = -10\ \text{V}$, $I_E = 50\ \text{mA}$, $f = 200\ \text{MHz}$		200		MHz

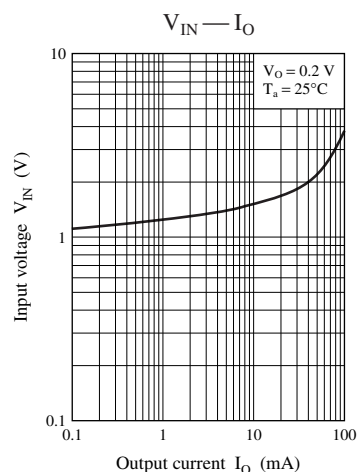
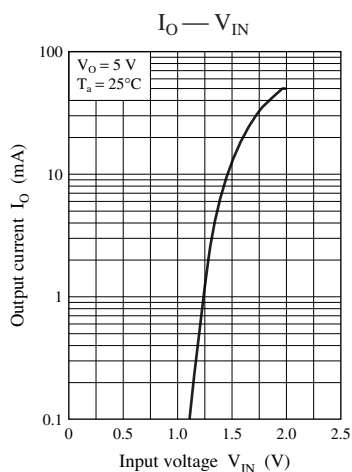
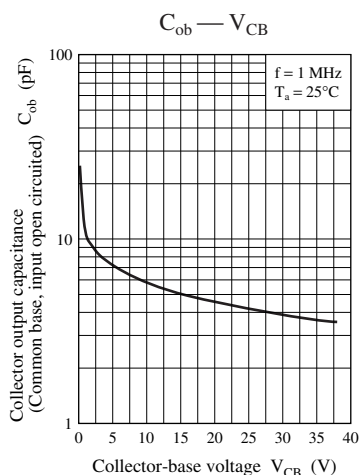
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

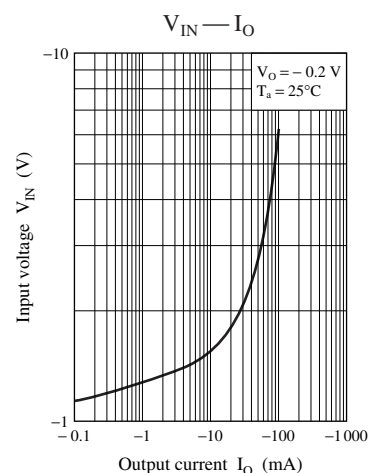
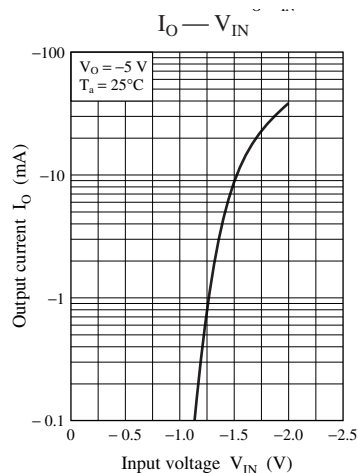
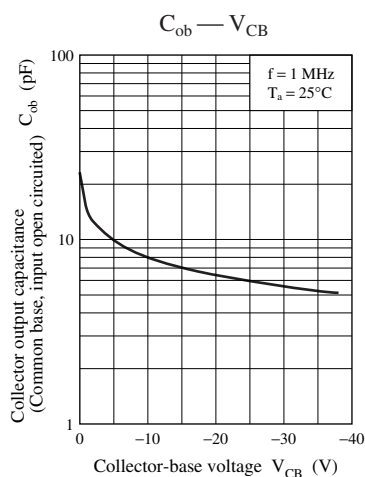
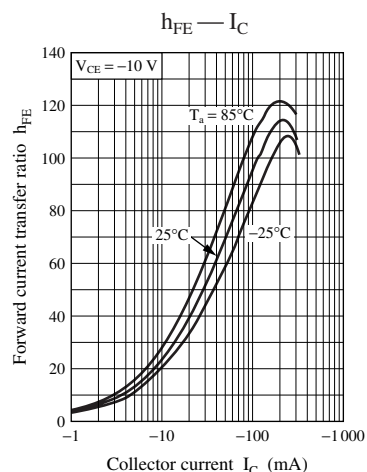
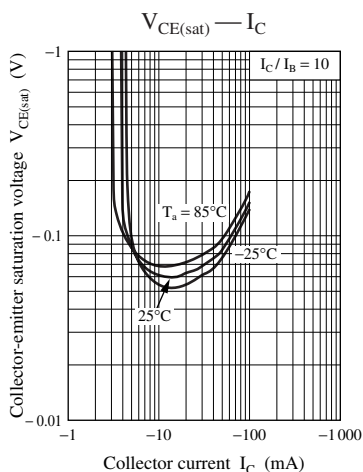
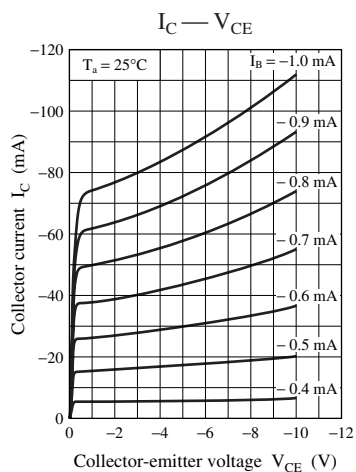


Characteristics charts of Tr1





Characteristics charts of Tr2



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