

XP03390

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

For digital circuits

■ Features

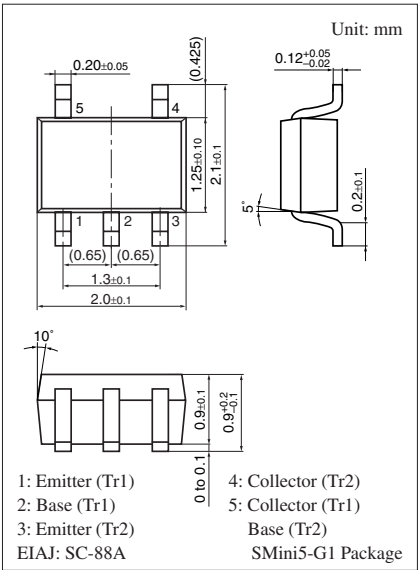
- Two elements incorporated into one package
 (Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

■ Basic Part Number

- UNR2213 + UNR2114

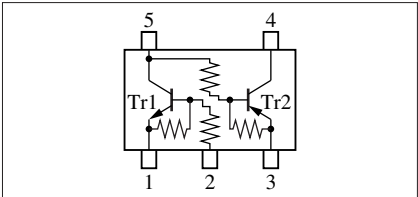
■ Absolute Maximum Ratings $T_a = 25^{\circ}\text{C}$

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	100	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	-50	V
	Collector-emitter voltage (Base open)	V_{CEO}	-50	V
	Collector current	I_C	-100	mA
Overall	Total power dissipation	P_T	150	mW
	Junction temperature	T_j	150	$^{\circ}\text{C}$
	Storage temperature	T_{stg}	-55 to +150	$^{\circ}\text{C}$



Marking Symbol: EX

Internal Connection



■ 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}	$I_{\text{C}} = 10\ \mu\text{A}$, $I_{\text{E}} = 0$	50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_{\text{C}} = 2\ \text{mA}$, $I_{\text{B}} = 0$	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = 50\ \text{V}$, $I_{\text{E}} = 0$			0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = 50\ \text{V}$, $I_{\text{B}} = 0$			0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = 6\ \text{V}$, $I_{\text{C}} = 0$			0.1	mA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = 10\ \text{V}$, $I_{\text{C}} = 5\ \text{mA}$	80			—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = 10\ \text{mA}$, $I_{\text{B}} = 0.3\ \text{mA}$			0.25	V
Output voltage high-level	V_{OH}	$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 0.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$	4.9			V
Output voltage low-level	V_{OL}	$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 3.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$			0.2	V
Input resistance	R_{I}		-30%	47	+30%	$\text{k}\Omega$
Resistance ratio	$R_{\text{I}} / R_{\text{2}}$		0.8	1.0	1.2	—
Transition frequency	f_{T}	$V_{\text{CB}} = 10\ \text{V}$, $I_{\text{E}} = -2\ \text{mA}$, $f = 200\ \text{MHz}$		150		MHz

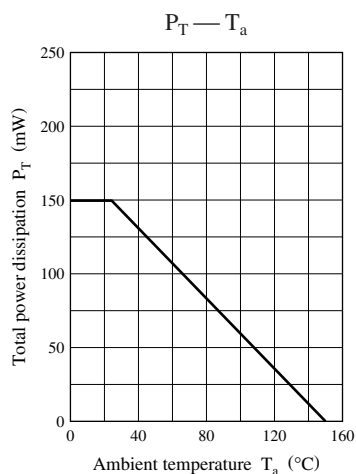
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

• Tr2

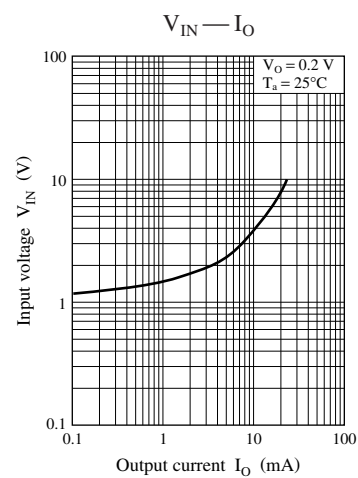
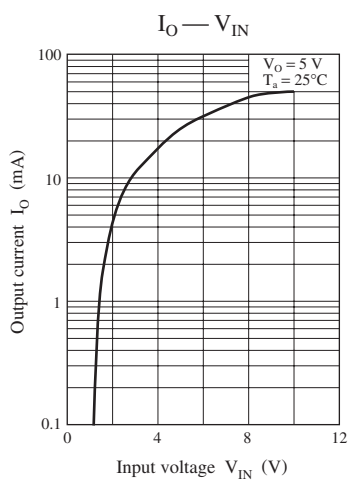
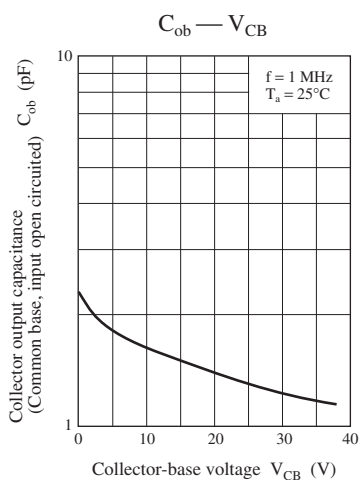
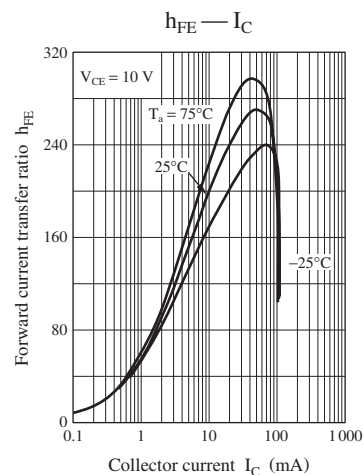
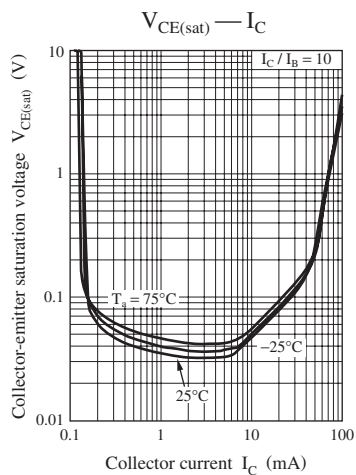
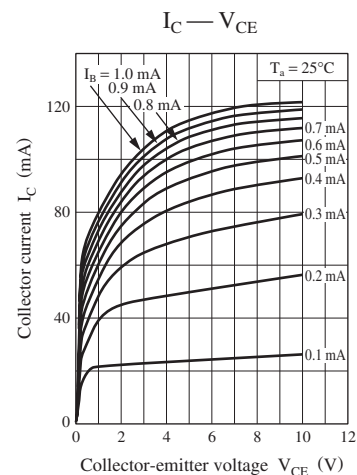
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_{\text{C}} = -10\ \mu\text{A}$, $I_{\text{E}} = 0$	-50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_{\text{C}} = -2\ \text{mA}$, $I_{\text{B}} = 0$	-50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = -50\ \text{V}$, $I_{\text{E}} = 0$			-0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = -50\ \text{V}$, $I_{\text{B}} = 0$			-0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = -6\ \text{V}$, $I_{\text{C}} = 0$			-0.2	mA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = -10\ \text{V}$, $I_{\text{C}} = -5\ \text{mA}$	80			—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_{\text{C}} = -10\ \text{mA}$, $I_{\text{B}} = -0.3\ \text{mA}$			-0.25	V
Output voltage high-level	V_{OH}	$V_{\text{CC}} = -5\ \text{V}$, $V_{\text{B}} = -0.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$	-4.9			V
Output voltage low-level	V_{OL}	$V_{\text{CC}} = -5\ \text{V}$, $V_{\text{B}} = -2.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$			-0.2	V
Input resistance	R_{I}		-30%	10	+30%	$\text{k}\Omega$
Resistance ratio	$R_{\text{I}} / R_{\text{2}}$		0.17	0.21	0.25	—
Transition frequency	f_{T}	$V_{\text{CB}} = -10\ \text{V}$, $I_{\text{E}} = 1\ \text{mA}$, $f = 200\ \text{MHz}$		80		MHz

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

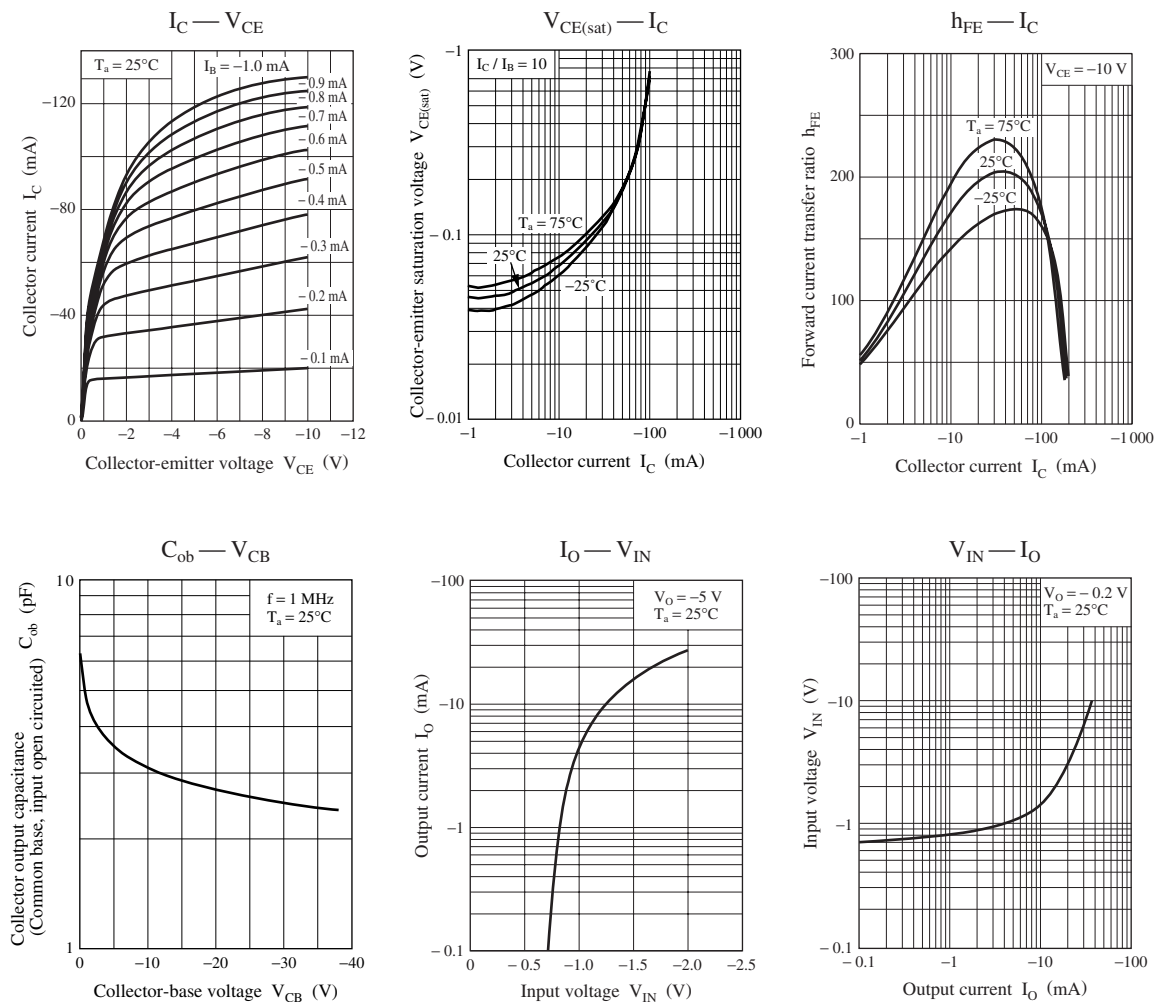
Common characteristics chart



Characteristics charts of Tr1



Characteristics charts of Tr2



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