

UP04312

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

- UNR2212 + UNR2112

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

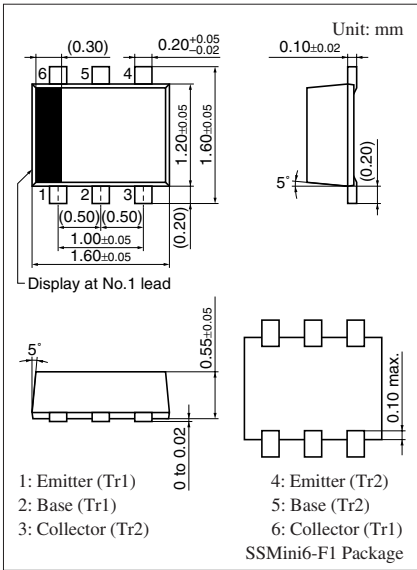
Parameter	Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	50 V
	Collector-emitter voltage (Base open)	V_{CEO}	50 V
	Collector current	I_C	100 mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	-50 V
	Collector-emitter voltage (Base open)	V_{CEO}	-50 V
	Collector current	I_C	-100 mA
Overall	Total power dissipation	P_T	125 mW
	Junction temperature	T_j	125 $^\circ\text{C}$
	Storage temperature	T_{stg}	-55 to +125 $^\circ\text{C}$

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

- Tr1

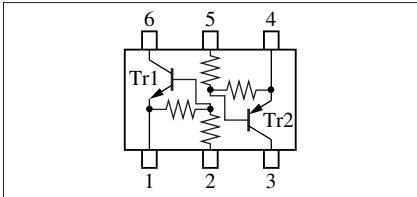
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10 \mu\text{A}, I_E = 0$	50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 2 \text{ mA}, I_B = 0$	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = 50 \text{ V}, I_E = 0$			0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = 50 \text{ V}, I_B = 0$			0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = 6 \text{ V}, I_C = 0$			0.2	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = 10 \text{ V}, I_C = 5 \text{ mA}$	60			—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = 10 \text{ mA}, I_B = 0.3 \text{ mA}$			0.25	V
Output voltage high level	V_{OH}	$V_{CC} = 5 \text{ V}, V_B = 0.5 \text{ V}, R_L = 1 \text{ k}\Omega$	4.9			V
Output voltage low level	V_{OL}	$V_{CC} = 5 \text{ V}, V_B = 2.5 \text{ V}, R_L = 1 \text{ k}\Omega$			0.2	V
Input resistance	R_1		-30%	22	+30%	k Ω
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = 10 \text{ V}, I_E = -1 \text{ mA}, f = 200 \text{ MHz}$		150		MHz

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



Marking Symbol: 7T

Internal Connection



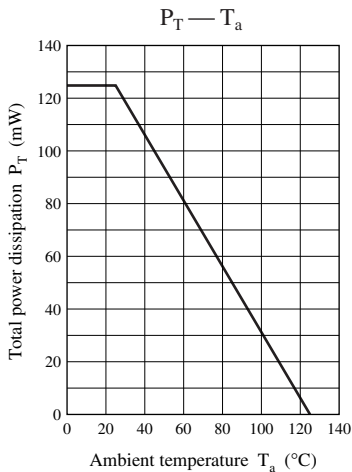
■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

• Tr2

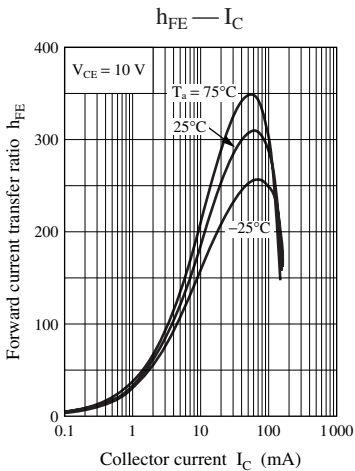
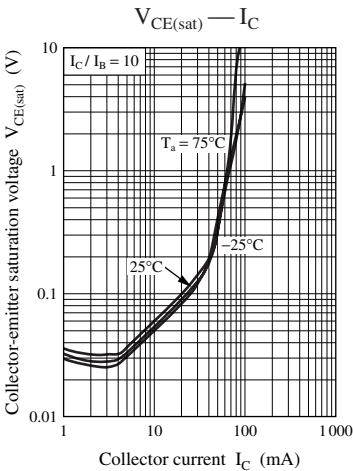
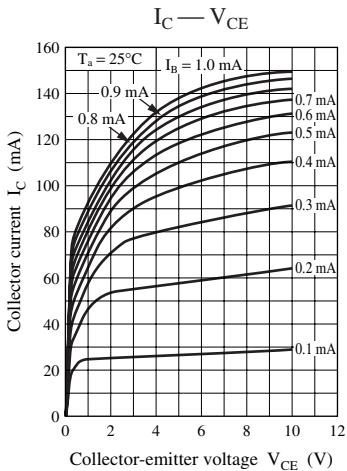
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10\text{ }\mu\text{A}$, $I_E = 0$	-50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = -2\text{ mA}$, $I_B = 0$	-50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{CB} = -50\text{ V}$, $I_E = 0$			-0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{CE} = -50\text{ V}$, $I_B = 0$			-0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{EB} = -6\text{ V}$, $I_C = 0$			-0.2	mA
Forward current transfer ratio	h_{FE}	$V_{CE} = -10\text{ V}$, $I_C = -5\text{ mA}$	60			—
Collector-emitter saturation voltage	$V_{CE(sat)}$	$I_C = -10\text{ mA}$, $I_B = -0.3\text{ mA}$			-0.25	V
Output voltage high level	V_{OH}	$V_{CC} = -5\text{ V}$, $V_B = -0.5\text{ V}$, $R_L = 1\text{ k}\Omega$	-4.9			V
Output voltage low level	V_{OL}	$V_{CC} = -5\text{ V}$, $V_B = -2.5\text{ V}$, $R_L = 1\text{ k}\Omega$			-0.2	V
Input resistance	R_i		-30%	22	+30%	$\text{k}\Omega$
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{CB} = -10\text{ V}$, $I_E = 1\text{ mA}$, $f = 200\text{ MHz}$		80		MHz

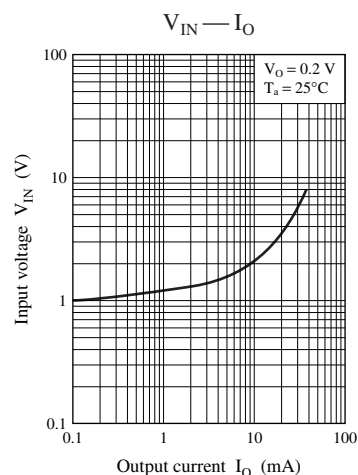
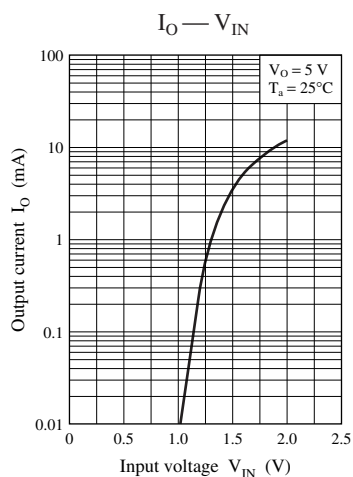
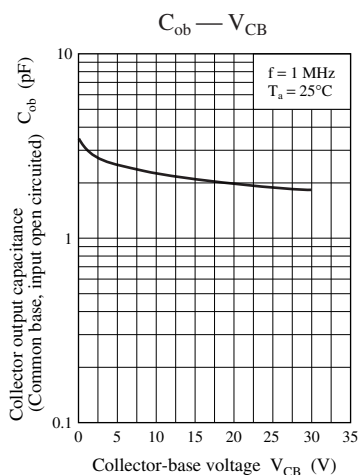
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

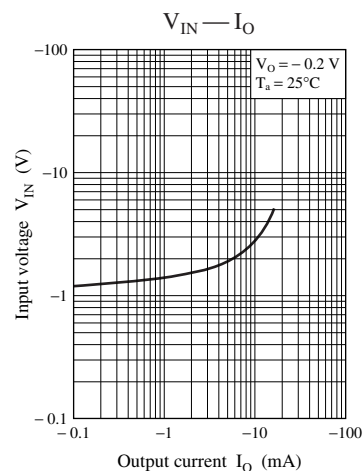
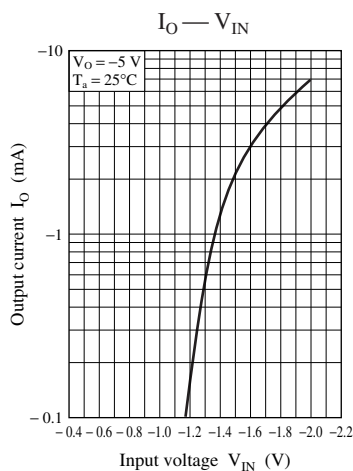
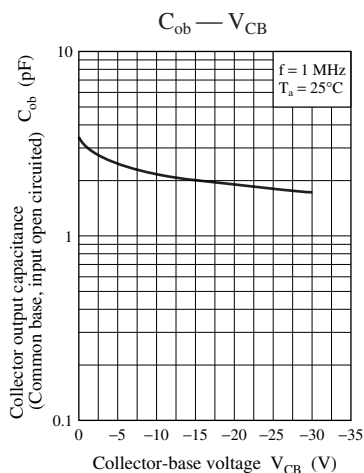
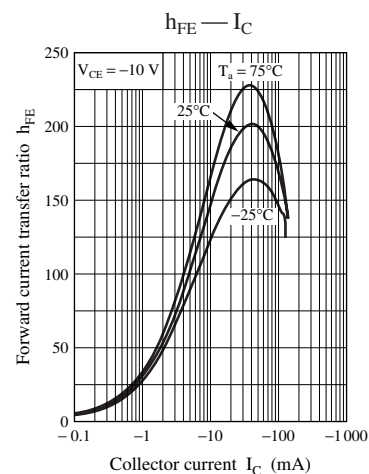
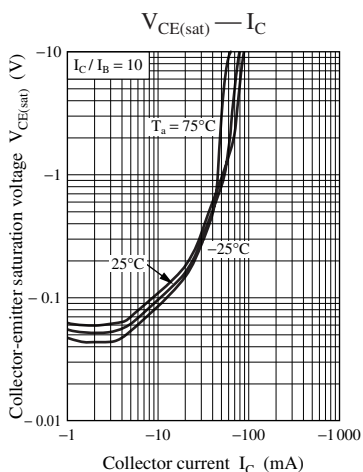
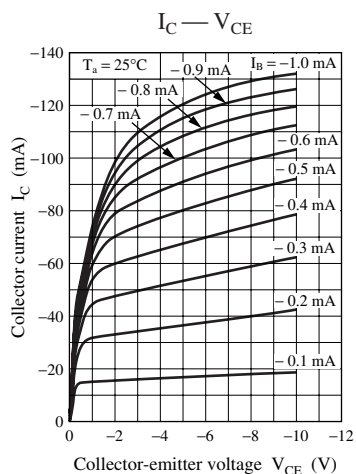


Characteristics charts of Tr1





Characteristics charts of Tr2



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