

XP04311

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

- UNR2211 + UNR2111

■ 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	°C
	Storage temperature	T_{stg}	-55 to +150	°C

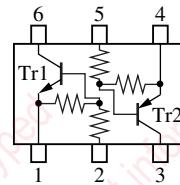
■ Package

- Code
 SMini6-G1
- Pin Name

1: Emitter (Tr1)	4: Emitter (Tr2)
2: Base (Tr1)	5: Base (Tr2)
3: Collector (Tr2)	6: Collector (Tr1)

■ Marking Symbol: 7X

■ Internal Connection



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

• Tr1

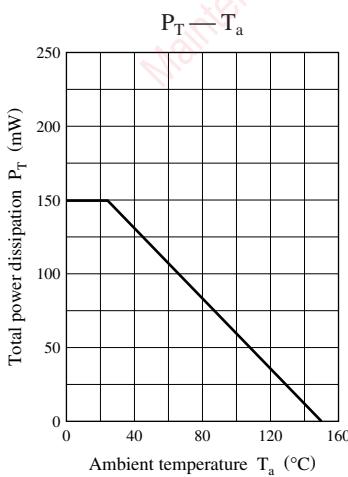
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = 10 \mu\text{A}, I_E = 0$	50			V
Collector-emitter voltage (Base open)	V_{CEO}	$I_C = 2 \text{ mA}, I_B = 0$	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	$V_{\text{CB}} = 50 \text{ V}, I_E = 0$			0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = 50 \text{ V}, I_B = 0$			0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = 6 \text{ V}, I_C = 0$			0.5	mA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = 10 \text{ V}, I_C = 5 \text{ mA}$	35			—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_C = 10 \text{ mA}, I_B = 0.3 \text{ mA}$			0.25	V
Output voltage high-level	V_{OH}	$V_{\text{CC}} = 5 \text{ V}, V_B = 0.5 \text{ V}, R_L = 1 \text{ k}\Omega$	4.9			V
Output voltage low-level	V_{OL}	$V_{\text{CC}} = 5 \text{ V}, V_B = 2.5 \text{ V}, R_L = 1 \text{ k}\Omega$			0.2	V
Input resistance	R_1		-30%	10	+30%	$\text{k}\Omega$
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{\text{CB}} = 10 \text{ V}, I_E = -2 \text{ mA}, f = 200 \text{ MHz}$		150		MHz

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

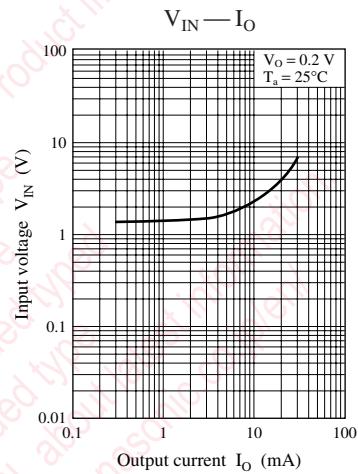
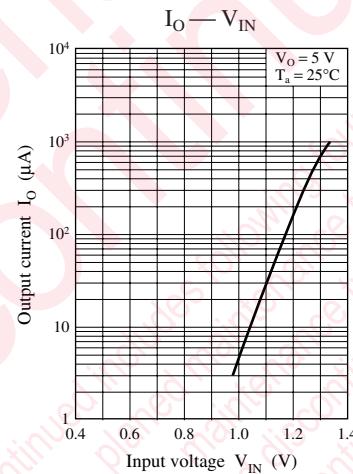
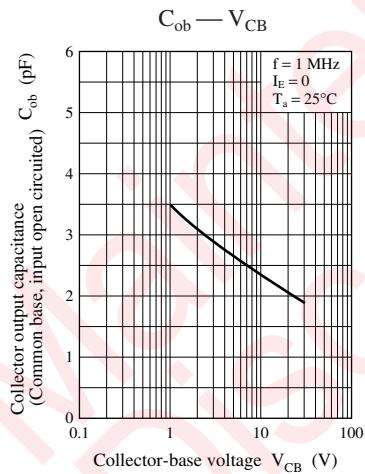
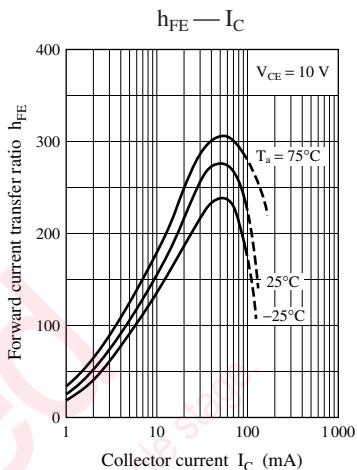
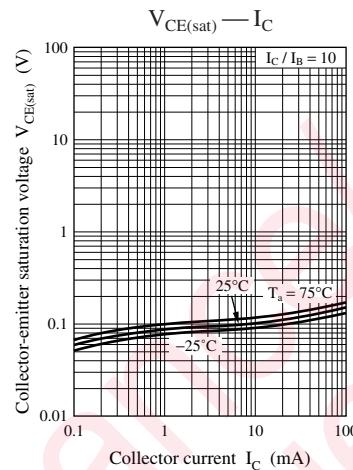
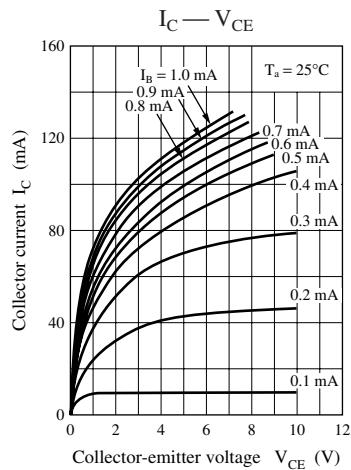
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	$I_C = -10 \mu\text{A}, I_E = 0$	-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}	$V_{\text{CB}} = -50 \text{ V}, I_E = 0$			-0.1	μA
Collector-emitter cutoff current (Base open)	I_{CEO}	$V_{\text{CE}} = -50 \text{ V}, I_B = 0$			-0.5	μA
Emitter-base cutoff current (Collector open)	I_{EBO}	$V_{\text{EB}} = -6 \text{ V}, I_C = 0$			-0.5	mA
Forward current transfer ratio	h_{FE}	$V_{\text{CE}} = -10 \text{ V}, I_C = -5 \text{ mA}$	35			—
Collector-emitter saturation voltage	$V_{\text{CE(sat)}}$	$I_C = -10 \text{ mA}, I_B = -0.3 \text{ mA}$			-0.25	V
Output voltage high-level	V_{OH}	$V_{\text{CC}} = -5 \text{ V}, V_B = -0.5 \text{ V}, R_L = 1 \text{ k}\Omega$	-4.9			V
Output voltage low-level	V_{OL}	$V_{\text{CC}} = -5 \text{ V}, V_B = -2.5 \text{ V}, R_L = 1 \text{ k}\Omega$			-0.2	V
Input resistance	R_1		-30%	10	+30%	$\text{k}\Omega$
Resistance ratio	R_1 / R_2		0.8	1.0	1.2	—
Transition frequency	f_T	$V_{\text{CB}} = -10 \text{ V}, I_E = 1 \text{ mA}, f = 200 \text{ MHz}$		80		MHz

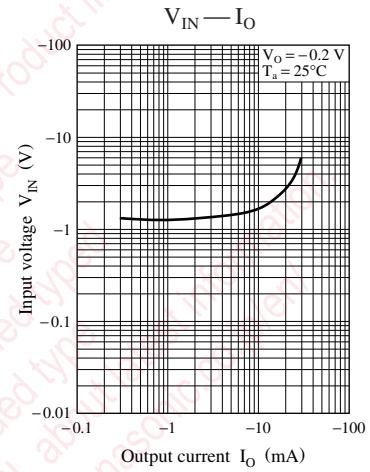
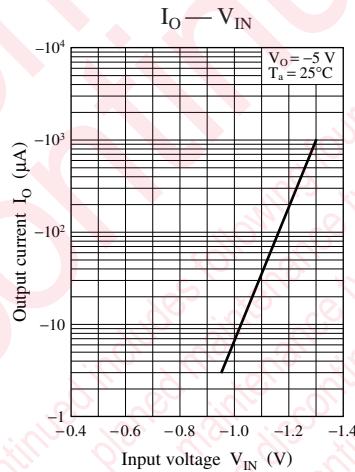
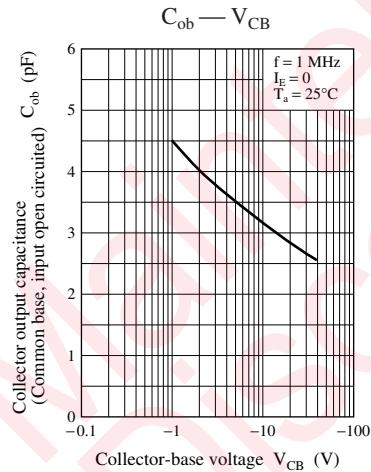
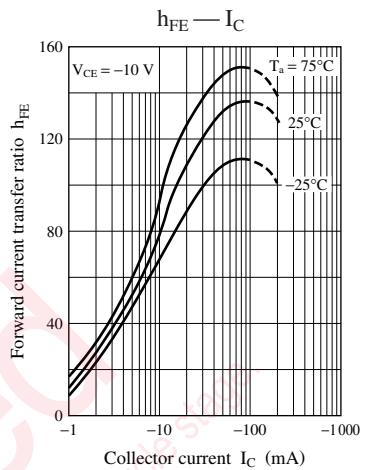
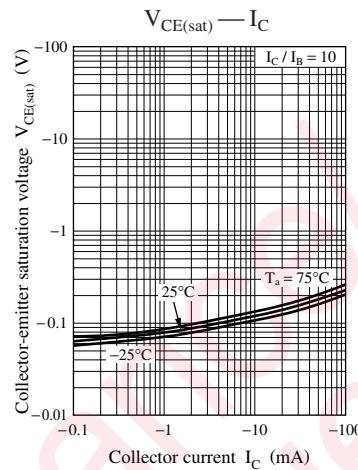
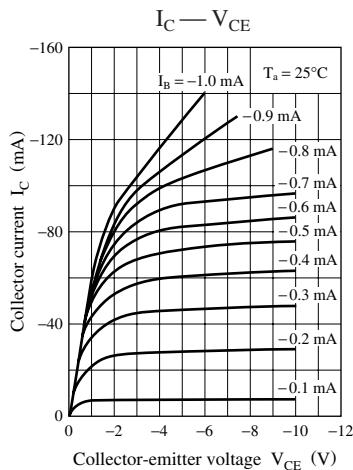
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

Characteristics charts of Tr1

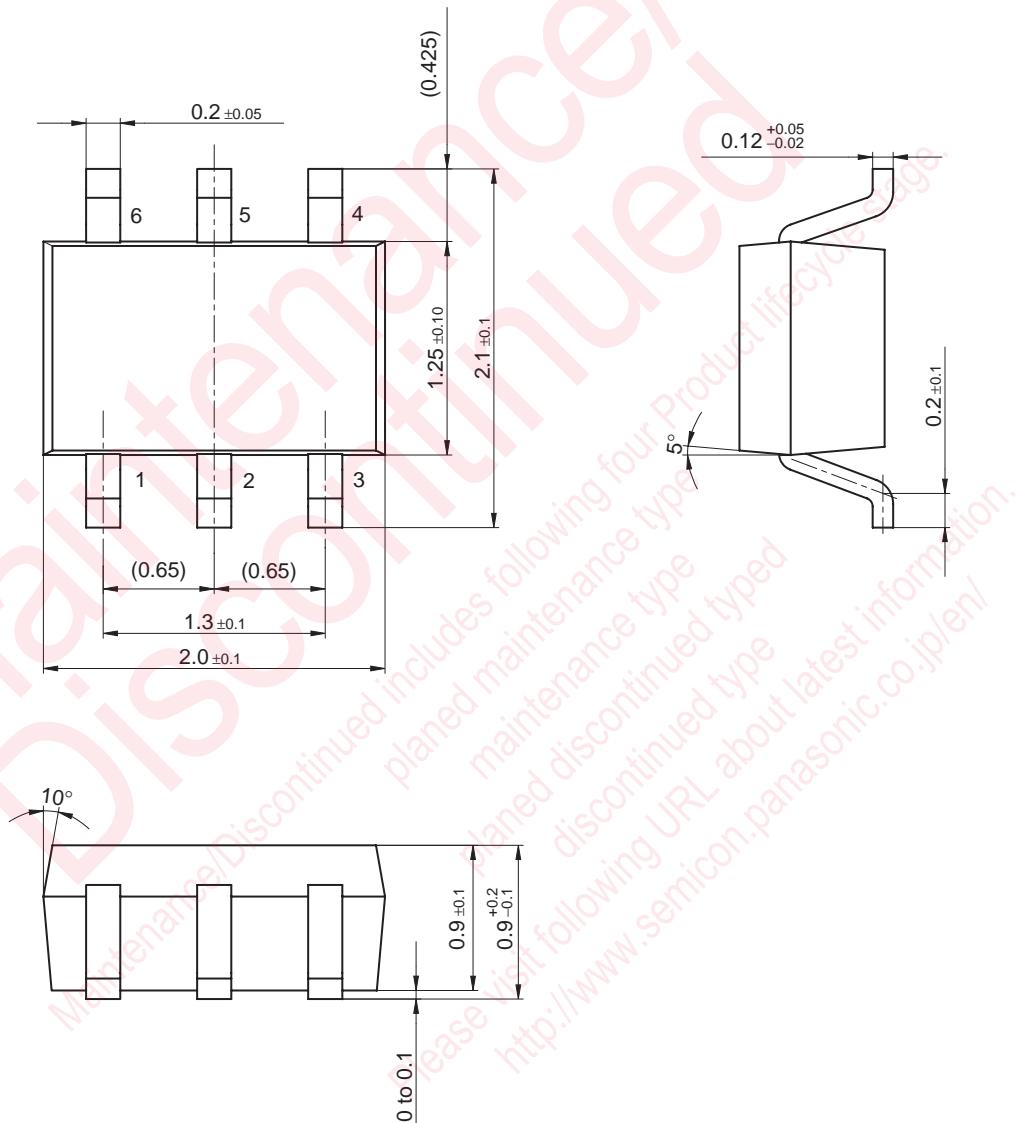


Characteristics charts of Tr2



SMini6-G1

Unit: mm



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