

# 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

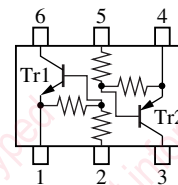
**■ Absolute Maximum Ratings**  $T_a = 25^\circ\text{C}$ 

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	$^\circ\text{C}$
	Storage temperature	$T_{stg}$	-55 to +150	$^\circ\text{C}$

**■ 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)	$I_{CBO}$	$V_{CB} = 50\ \text{V}$ , $I_E = 0$			0.1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)	$I_{CEO}$	$V_{CE} = 50\ \text{V}$ , $I_B = 0$			0.5	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{EBO}$	$V_{EB} = 6\ \text{V}$ , $I_C = 0$			0.5	mA
Forward current transfer ratio	$h_{FE}$	$V_{CE} = 10\ \text{V}$ , $I_C = 5\ \text{mA}$	35			—
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%	10	+30%	$\text{k}\Omega$
Resistance ratio	$R_1 / R_2$		0.8	1.0	1.2	—
Transition frequency	$f_T$	$V_{CB} = 10\ \text{V}$ , $I_E = -2\ \text{mA}$ , $f = 200\ \text{MHz}$		150		MHz

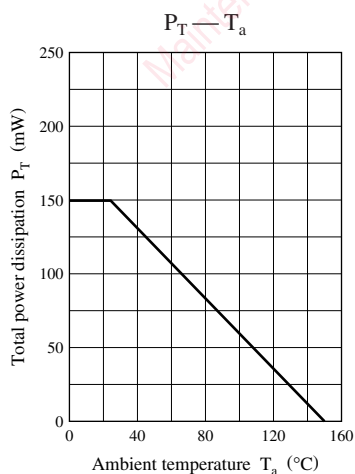
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

## • Tr2

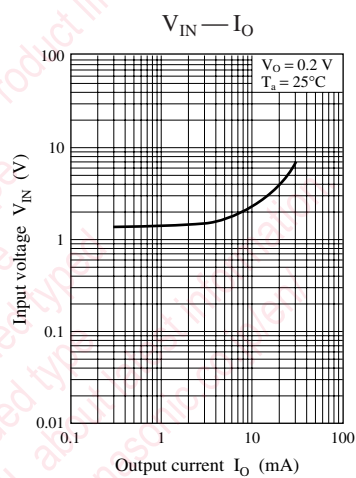
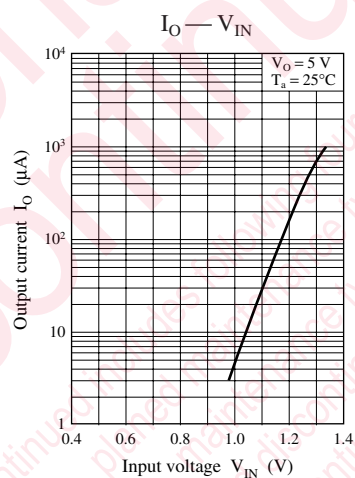
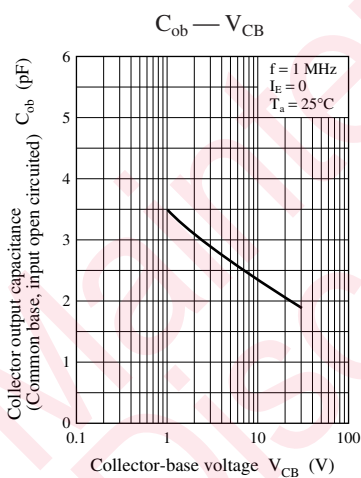
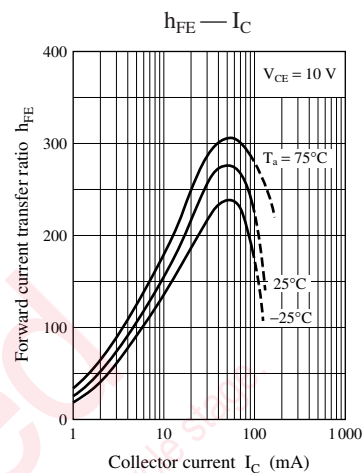
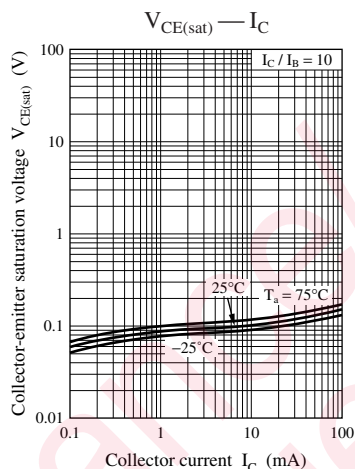
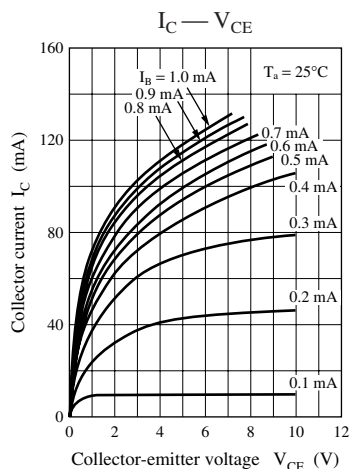
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	$V_{CBO}$	$I_C = -10\ \mu\text{A}$ , $I_E = 0$	-50			V
Collector-emitter voltage (Base open)	$V_{CEO}$	$I_C = -2\ \text{mA}$ , $I_B = 0$	-50			V
Collector-base cutoff current (Emitter open)	$I_{CBO}$	$V_{CB} = -50\ \text{V}$ , $I_E = 0$			-0.1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)	$I_{CEO}$	$V_{CE} = -50\ \text{V}$ , $I_B = 0$			-0.5	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	$I_{EBO}$	$V_{EB} = -6\ \text{V}$ , $I_C = 0$			-0.5	mA
Forward current transfer ratio	$h_{FE}$	$V_{CE} = -10\ \text{V}$ , $I_C = -5\ \text{mA}$	35			—
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%	10	+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.

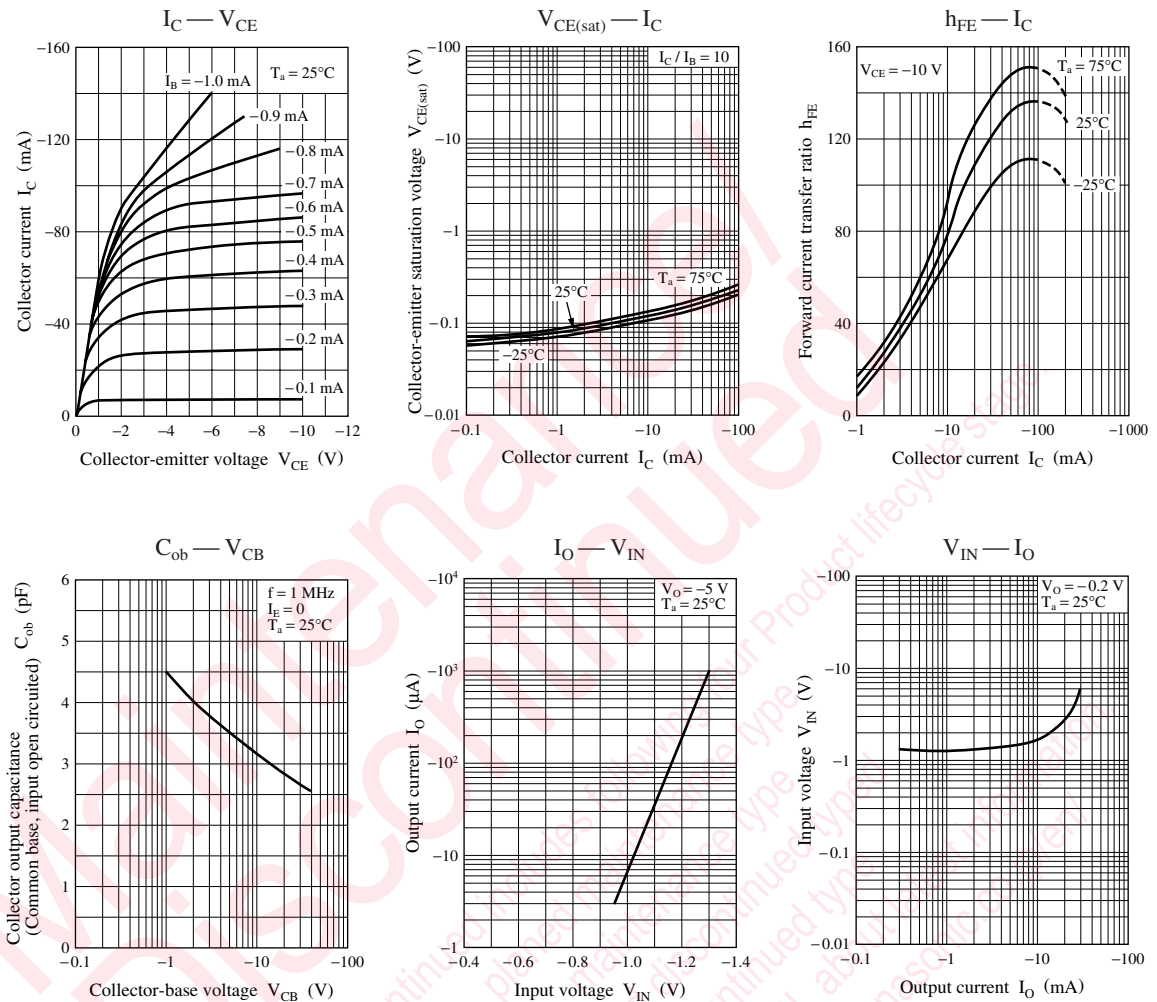
## Common characteristics chart



## Characteristics charts of Tr1

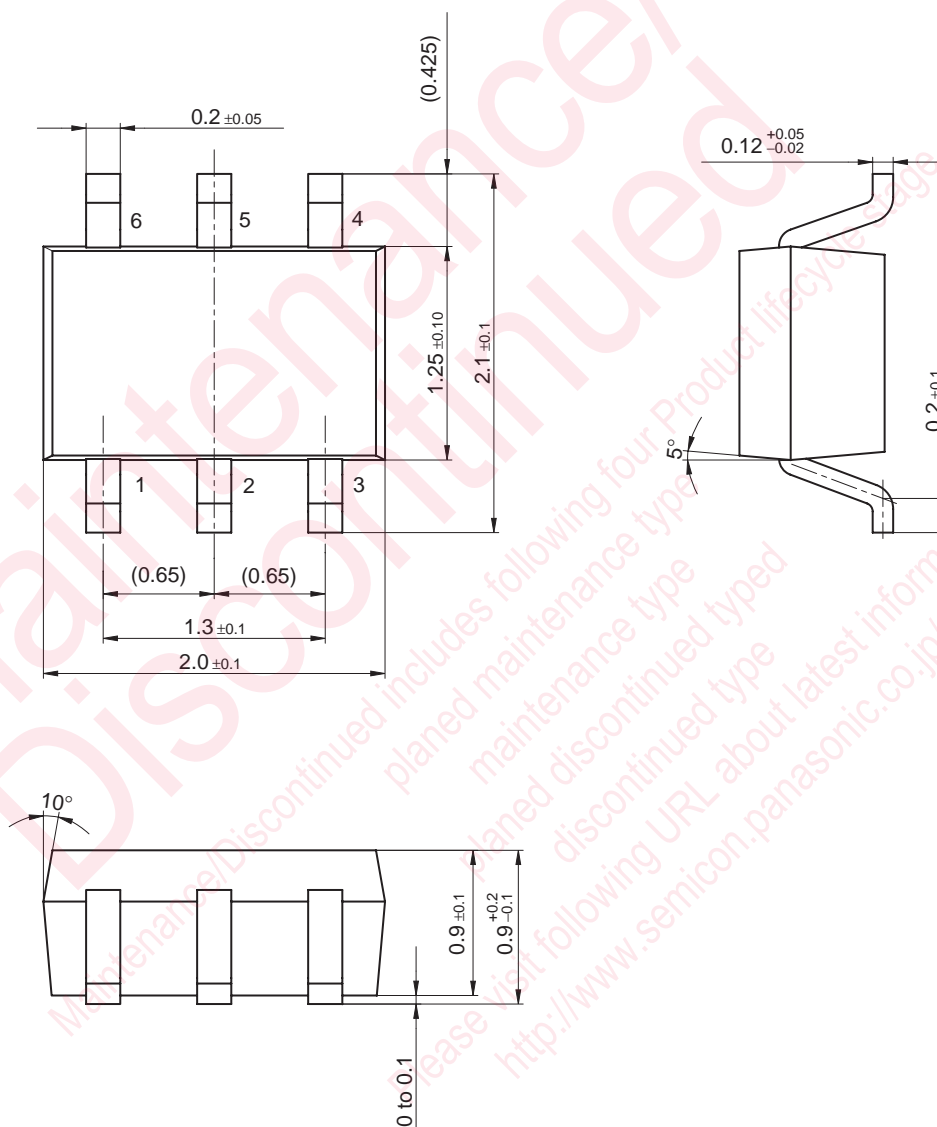


## Characteristics charts of Tr2



## SMini6-G1

Unit: mm



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