XP0431N

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

- UNR221N + UNR211N

■ Absolute Maximum Ratings $T_a = 25°C$

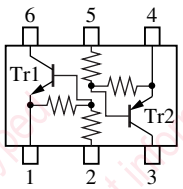
Parameter		Symbol	Rating	Unit
Tr1	Collector-base voltage (Emitter open)	V_{CBO}	50	V
	Collector-emitter voltage (Base open)	V_{CEO}	50	V
	Collector current	I_C	100	mA
Tr2	Collector-base voltage (Emitter open)	V_{CBO}	−50	V
	Collector-emitter voltage (Base open)	V_{CEO}	−50	V
	Collector current	I_C	−100	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: HC

■ Internal Connection



Maintenance/Discontinued
Discontinued includes following four Product lifecycle stage.
planed discontinued type
discontinued type
Please visit following URL about latest information.
http://www.semicon.panasonic.co.jp/en/

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

• Tr1

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	I_C = 10 µA, I_E = 0	50			V
Collector-emitter voltage (Base open)	V_{CEO}	I_C = 2 mA, I_B = 0	50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = 50 V, I_E = 0			0.1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = 50 V, I_B = 0			0.5	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = 6 V, I_C = 0			0.2	mA
Forward current transfer ratio	h_{FE}	V_{CE} = 10 V, I_C = 5 mA	80		400	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = 10 mA, I_B = 0.3 mA			0.25	V
Output voltage high-level	V_{OH}	V_{CC} = 5 V, V_B = 0.5 V, R_L = 1 kΩ	4.9			V
Output voltage low-level	V_{OL}	V_{CC} = 5 V, V_B = 2.5 V, R_L = 1 kΩ			0.2	V
Input resistance	R_1		−30%	4.7	+30%	kΩ
Resistance ratio	R_1 / R_2			0.1		—
Transition frequency	f_T	V_{CB} = 10 V, I_E = −2 mA, f = 200 MHz		150		MHz

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

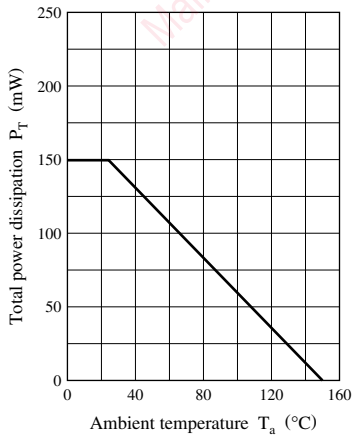
• Tr2

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V_{CBO}	I_C = −10 µA, I_E = 0	−50			V
Collector-emitter voltage (Base open)	V_{CEO}	I_C = −2 mA, I_B = 0	−50			V
Collector-base cutoff current (Emitter open)	I_{CBO}	V_{CB} = −50 V, I_E = 0			− 0.1	µA
Collector-emitter cutoff current (Base open)	I_{CEO}	V_{CE} = −50 V, I_B = 0			− 0.5	µA
Emitter-base cutoff current (Collector open)	I_{EBO}	V_{EB} = −6 V, I_C = 0			− 0.2	mA
Forward current transfer ratio	h_{FE}	V_{CE} = −10 V, I_C = −5 mA	80		400	—
Collector-emitter saturation voltage	$V_{CE(sat)}$	I_C = −10 mA, I_B = − 0.3 mA			− 0.25	V
Output voltage high-level	V_{OH}	V_{CC} = −5 V, V_B = − 0.5 V, R_L = 1 kΩ	−4.9			V
Output voltage low-level	V_{OL}	V_{CC} = −5 V, V_B = −2.5 V, R_L = 1 kΩ			− 0.2	V
Input resistance	R_1		−30%	4.7	+30%	kΩ
Resistance ratio	R_1/R_2			0.1		—
Transition frequency	f_T	V_{CB} = −10 V, I_E = 1 mA, f = 200MHz		80		MHz

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

Common characteristics chart

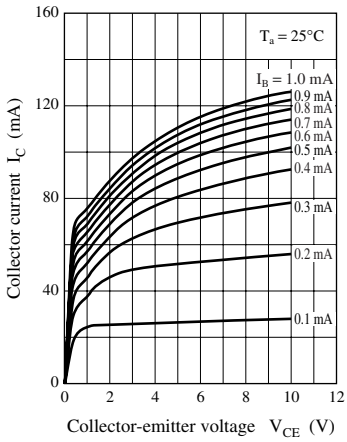
P_T — T_a



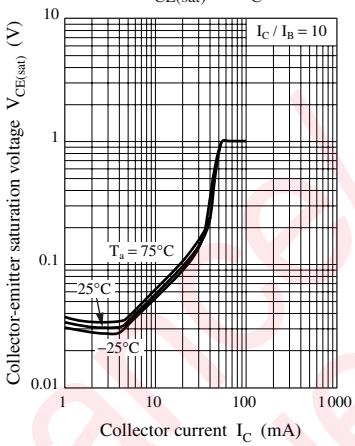
Maintenance/Discontinued
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Characteristics charts of Tr1

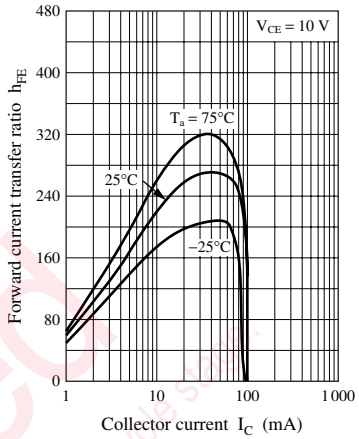
I_C — V_{CE}



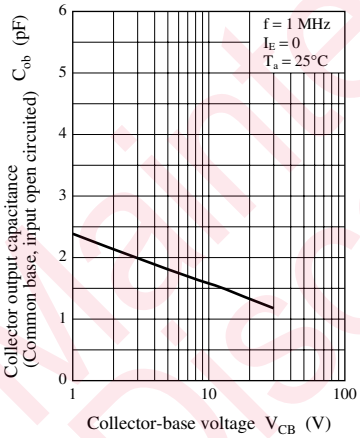
$V_{CE(sat)}$ — I_C



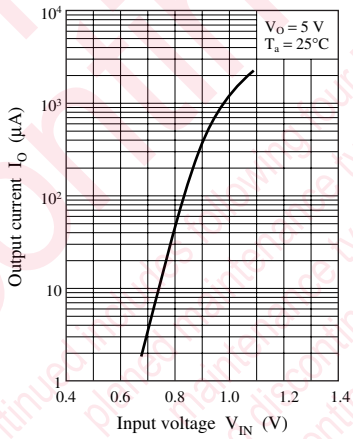
h_{FE} — I_C



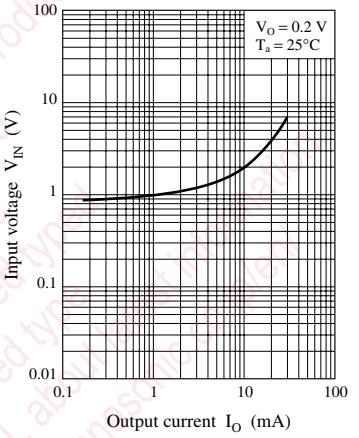
C_{ob} — V_{CB}



I_O — V_{IN}



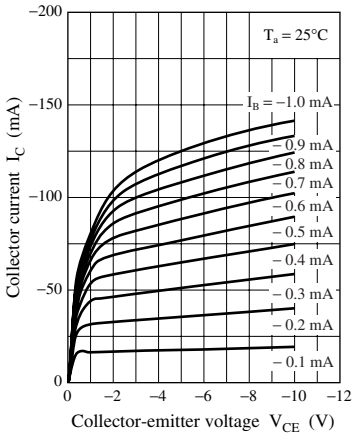
V_{IN} — I_O



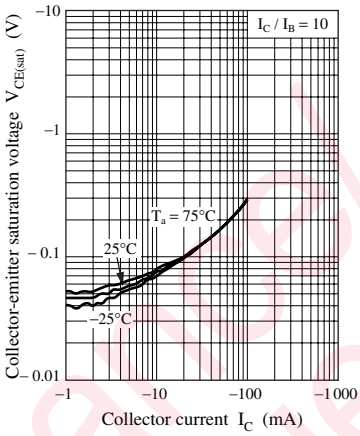
Maintenance/Discontinued
Please visit following URL about the successor model.
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Characteristics charts of Tr2

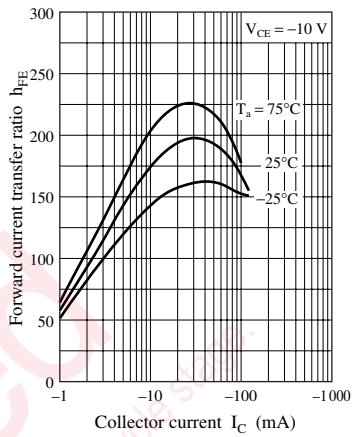
I_C — V_{CE}



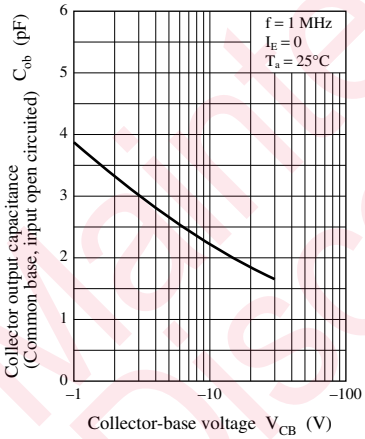
$V_{CE(sat)}$ — I_C



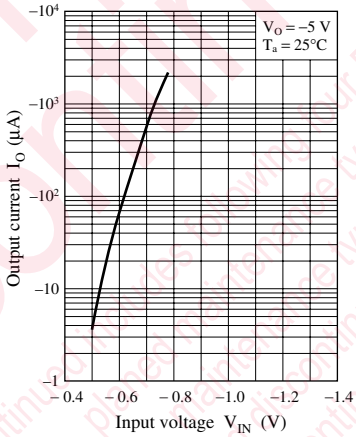
h_{FE} — I_C



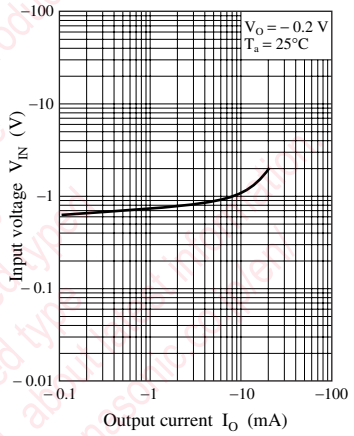
C_{ob} — V_{CB}



I_O — V_{IN}



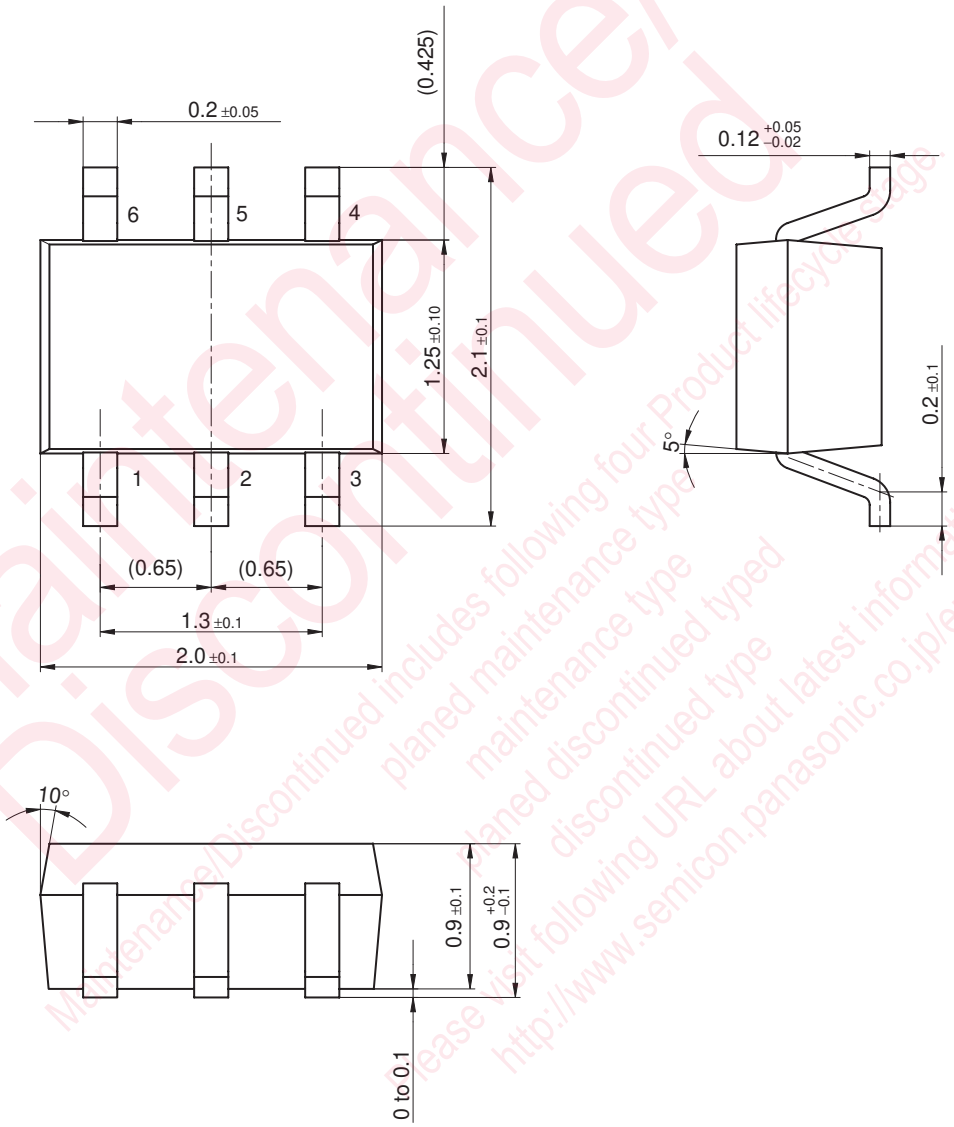
V_{IN} — I_O



Maintenance/Discontinued
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SMini6-G1

Unit: mm



Maintenance/Discontinued includes following four Product lifecycle stage
planed maintenance type
maintenance type
planed discontinued type
discontinued type
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