

# XP0311

Silicon NPN epitaxial planer transistor (Tr1)

Silicon PNP epitaxial planer transistor (Tr2)

For switching/digital circuits

## Features

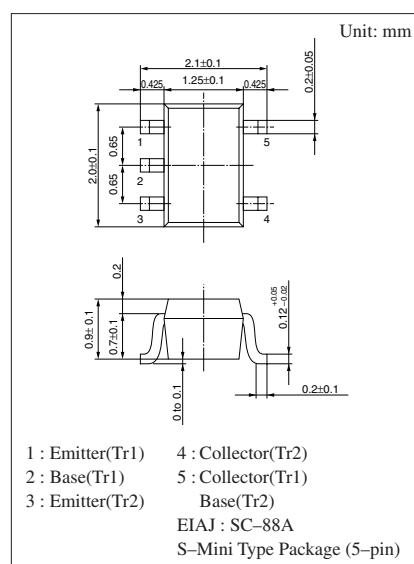
- Two elements incorporated into one package.  
(Transistors with built-in resistor, Tr1 collector is connected to Tr2 base.)
- Reduction of the mounting area and assembly cost by one half.

## Basic Part Number of Element

- UNR1211(UN1211)+UNR1111(UN1111)

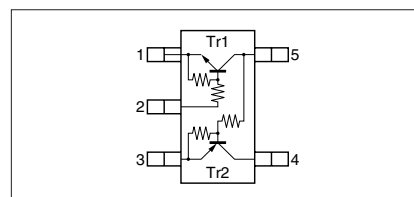
## Absolute Maximum Ratings (Ta=25°C)

	Parameter	Symbol	Ratings	Unit
Tr1	Collector to base voltage	$V_{CBO}$	50	V
	Collector to emitter voltage	$V_{CEO}$	50	V
	Collector current	$I_C$	100	mA
Tr2	Collector to base voltage	$V_{CBO}$	-50	V
	Collector to emitter voltage	$V_{CEO}$	-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



Marking Symbol: DU

Internal Connection



Note.) The Part number in the Parenthesis shows conventional part number.

# ■ Electrical Characteristics (T<sub>a</sub>=25°C)

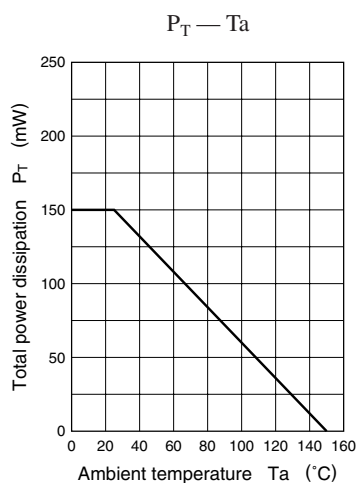
## • Tr1

Parameter	Symbol	Conditions	min	typ	max	Unit
Collector to base voltage	V <sub>CBO</sub>	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0	50			V
Collector to emitter voltage	V <sub>CEO</sub>	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0	50			V
Collector cutoff current	I <sub>CBO</sub>	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0			0.1	μA
	I <sub>CEO</sub>	V <sub>CE</sub> = 50V, I <sub>B</sub> = 0			0.5	μA
Emitter cutoff current	I <sub>EBO</sub>	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0			0.5	mA
Forward current transfer ratio	h <sub>FE</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA	35			
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.3mA			0.25	V
Output voltage high level	V <sub>OH</sub>	V <sub>CC</sub> = 5V, V <sub>B</sub> = 0.5V, R <sub>L</sub> = 1kΩ	4.9			V
Output voltage low level	V <sub>OL</sub>	V <sub>CC</sub> = 5V, V <sub>B</sub> = 2.5V, R <sub>L</sub> = 1kΩ			0.2	V
Input resistance	R <sub>I</sub>		-30%	10	+30%	kΩ
Resistance ratio	R <sub>I</sub> /R <sub>2</sub>		0.8	1.0	1.2	
Transition frequency	f <sub>T</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = -1mA, f = 200MHz		150		MHz

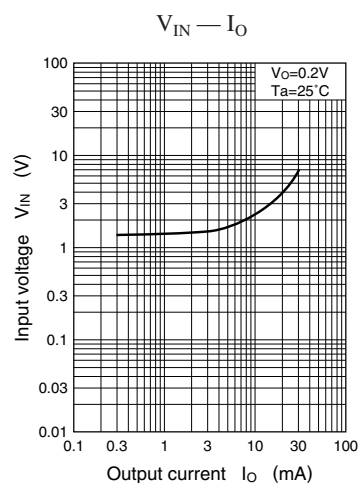
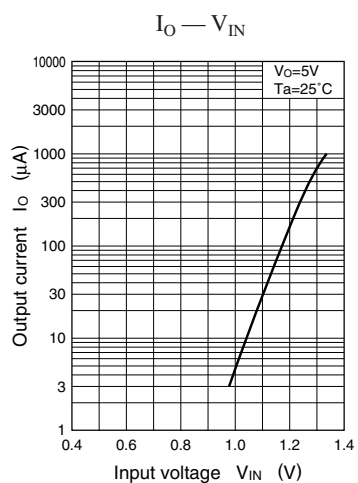
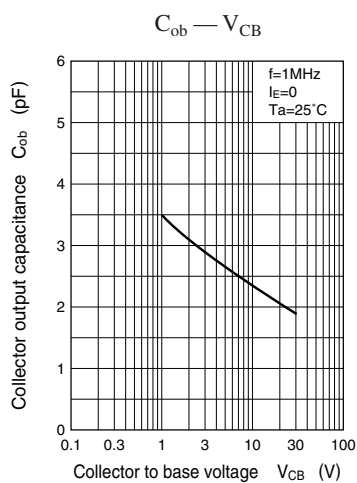
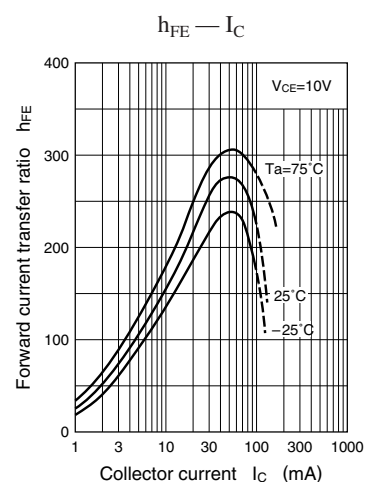
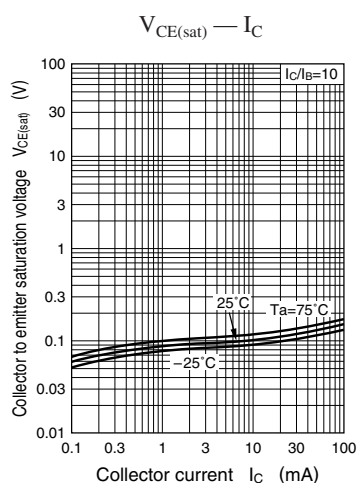
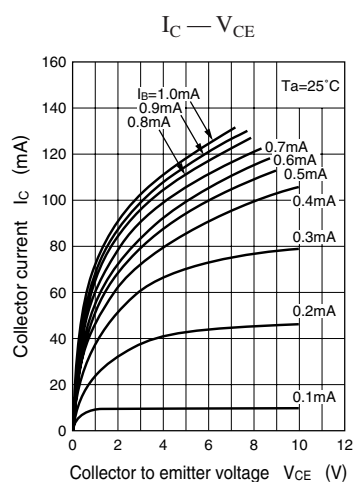
## • Tr2

Parameter	Symbol	Conditions	min	typ	max	Unit
Collector to base voltage	V <sub>CBO</sub>	I <sub>C</sub> = -10μA, I <sub>E</sub> = 0	-50			V
Collector to emitter voltage	V <sub>CEO</sub>	I <sub>C</sub> = -2mA, I <sub>B</sub> = 0	-50			V
Collector cutoff current	I <sub>CBO</sub>	V <sub>CB</sub> = -50V, I <sub>E</sub> = 0			- 0.1	μA
	I <sub>CEO</sub>	V <sub>CE</sub> = -50V, I <sub>B</sub> = 0			- 0.5	μA
Emitter cutoff current	I <sub>EBO</sub>	V <sub>EB</sub> = -6V, I <sub>C</sub> = 0			- 0.5	mA
Forward current transfer ratio	h <sub>FE</sub>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -5mA	35			
Collector to emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = -10mA, I <sub>B</sub> = - 0.3mA			- 0.25	V
Output voltage high level	V <sub>OH</sub>	V <sub>CC</sub> = -5V, V <sub>B</sub> = - 0.5V, R <sub>L</sub> = 1kΩ	-4.9			V
Output voltage low level	V <sub>OL</sub>	V <sub>CC</sub> = -5V, V <sub>B</sub> = -2.5V, R <sub>L</sub> = 1kΩ			- 0.2	V
Input resistance	R <sub>I</sub>		-30%	10	+30%	kΩ
Resistance ratio	R <sub>I</sub> /R <sub>2</sub>		0.8	1.0	1.2	
Transition frequency	f <sub>T</sub>	V <sub>CB</sub> = -10V, I <sub>E</sub> = 1mA, f = 200MHz		80		MHz

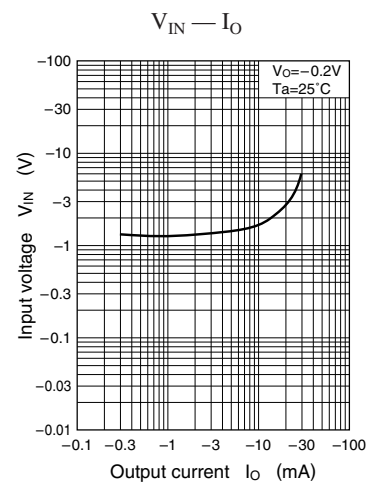
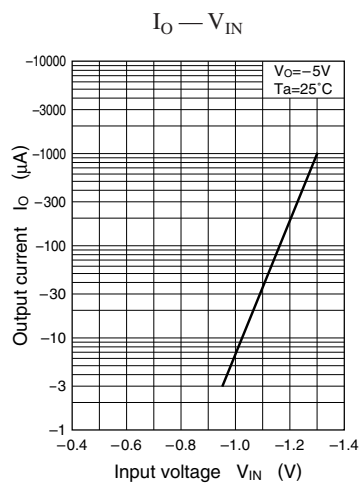
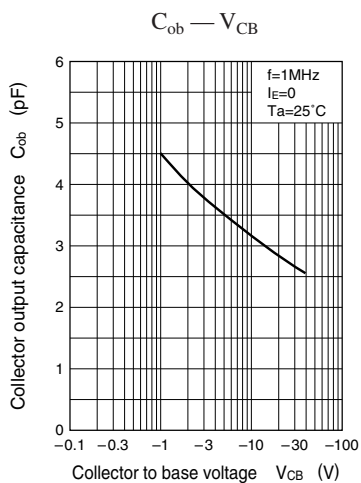
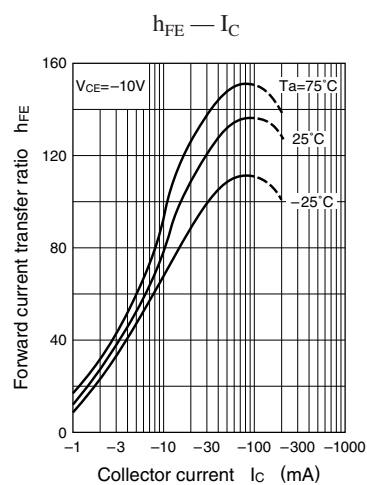
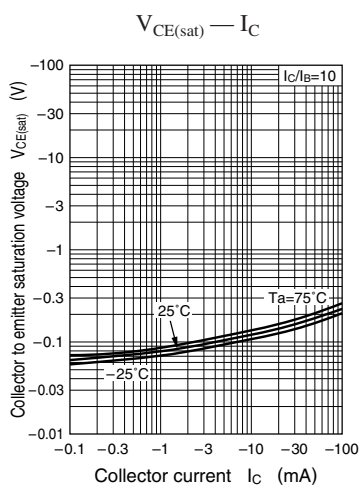
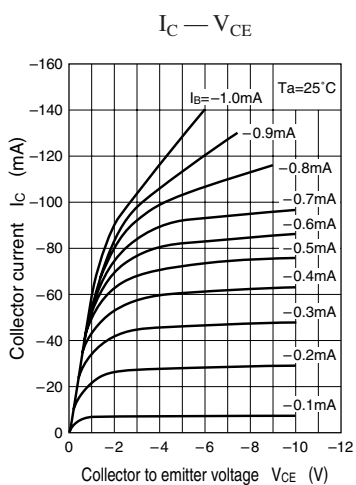
Common characteristics chart



Characteristics charts of Tr1



## Characteristics charts of Tr2



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