

# UN2221/2222/2223/2224

## Silicon NPN epitaxial planer transistor

For digital circuits

### Features

- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- Mini type package, allowing downsizing of the equipment and automatic insertion through tape packing and magazine packing.

### Resistance by Part Number

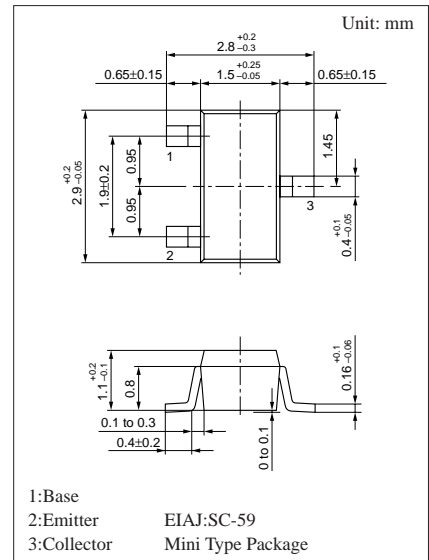
	Marking Symbol	(R <sub>1</sub> )	(R <sub>2</sub> )
• UN2221	9A	2.2kΩ	2.2kΩ
• UN2222	9B	4.7kΩ	4.7kΩ
• UN2223	9C	10kΩ	10kΩ
• UN2224	9D	2.2kΩ	10kΩ

### Absolute Maximum Ratings (T<sub>a</sub>=25°C)

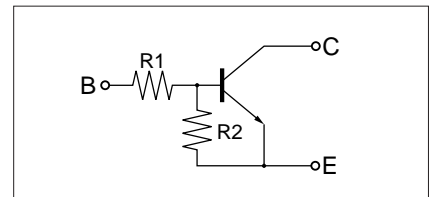
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V <sub>CBO</sub>	50	V
Collector to emitter voltage	V <sub>CEO</sub>	50	V
Collector current	I <sub>C</sub>	500	mA
Total power dissipation	P <sub>T</sub>	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

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

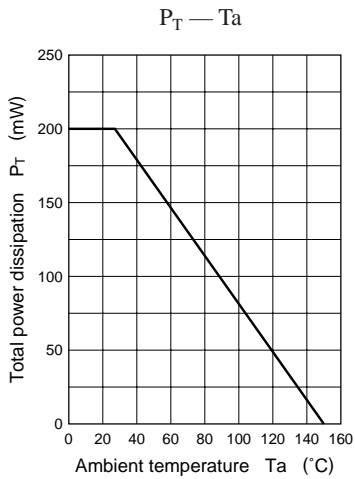
Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current		I <sub>CBO</sub>	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0			1	μA
		I <sub>CEO</sub>	V <sub>CE</sub> = 50V, I <sub>B</sub> = 0			1	μA
Emitter cutoff current	UN2221	I <sub>EBO</sub>	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0			5	mA
	UN2222					2	
	UN2223/2224					1	
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
Forward current transfer ratio	UN2221	h <sub>FE</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 100mA	40			
	UN2222			50			
	UN2223/2224			60			
Collector to emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> = 100mA, I <sub>B</sub> = 5mA			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> = 500Ω	4.9			V
Output voltage low level		V <sub>OL</sub>	V <sub>CC</sub> = 5V, V <sub>B</sub> = 3.5V, R <sub>L</sub> = 500Ω			0.2	V
Transition frequency		f <sub>T</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = -50mA, f = 200MHz		200		MHz
Input resistance	UN2221/2224	R <sub>1</sub>			2.2		kΩ
	UN2222			(-30%)	4.7	(+30%)	
	UN2223				10		
Resistance ratio		R <sub>1</sub> /R <sub>2</sub>		0.8	1.0	1.2	
				UN2224		0.22	



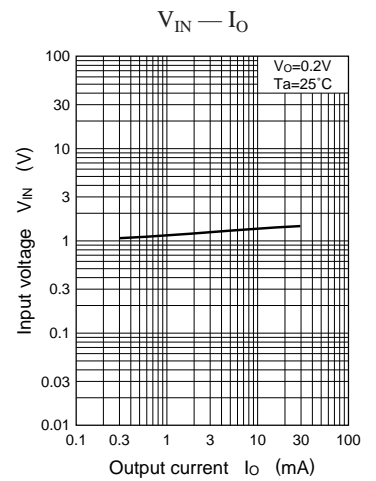
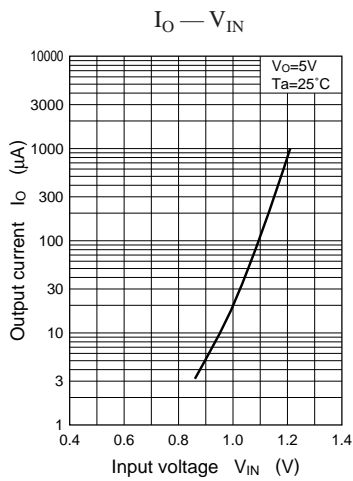
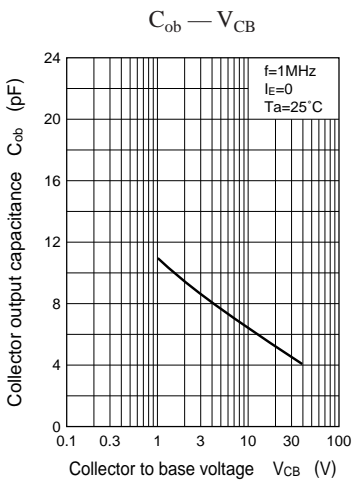
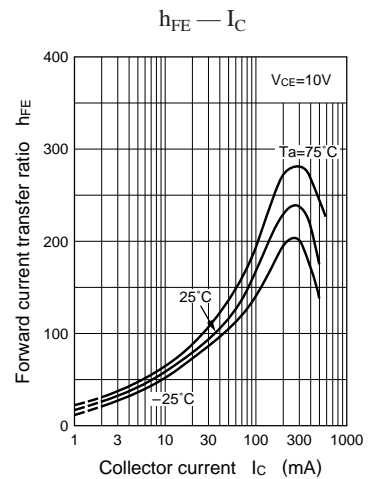
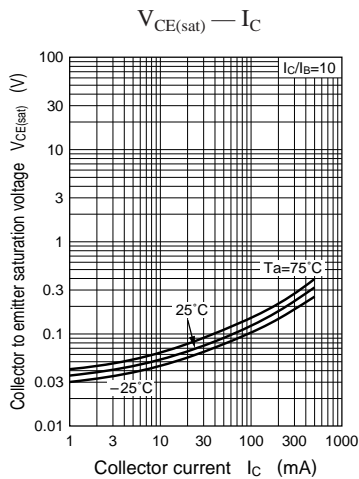
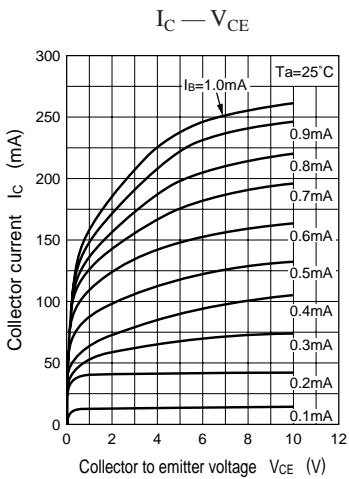
### Internal Connection



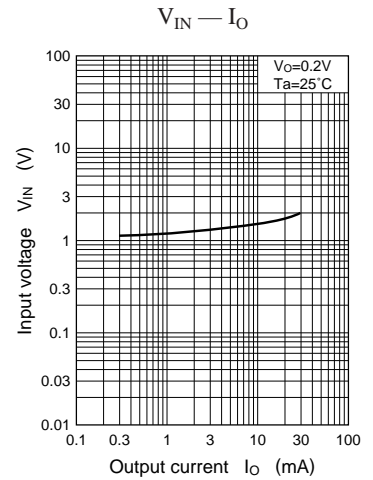
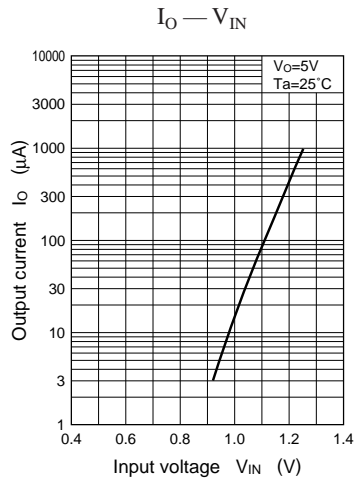
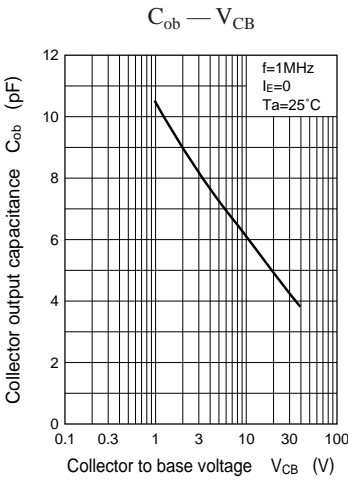
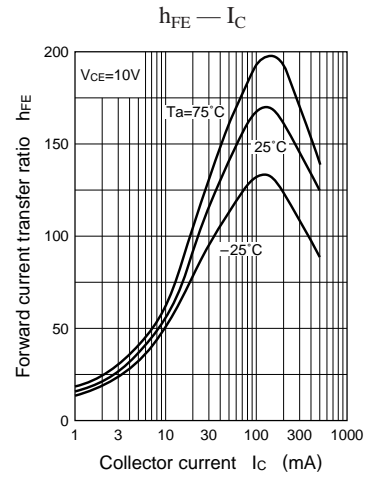
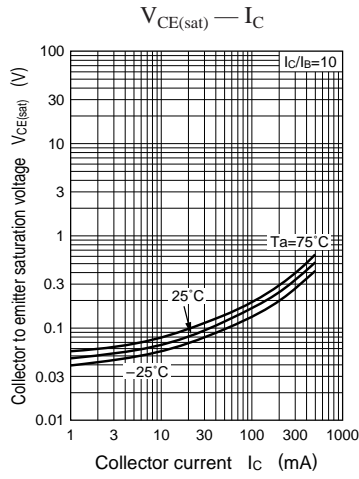
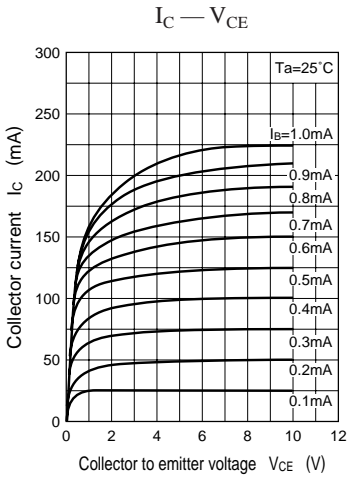
Common characteristics chart



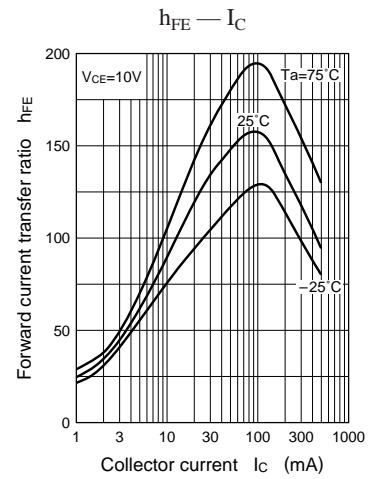
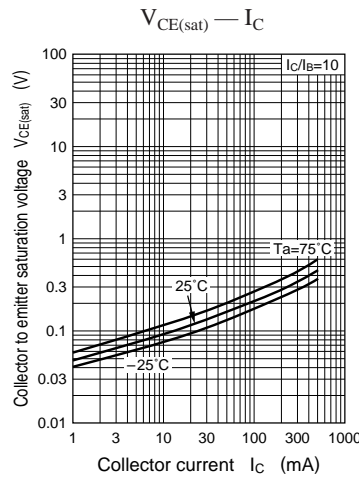
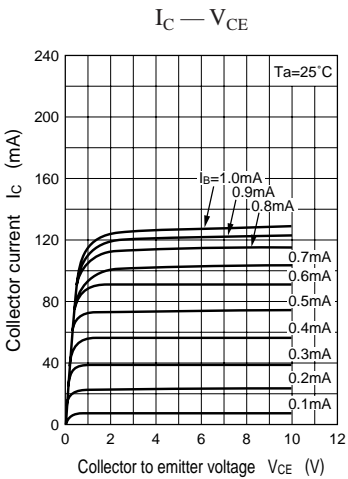
Characteristics charts of UN2221

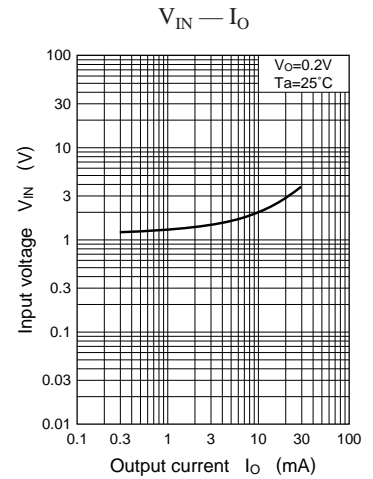
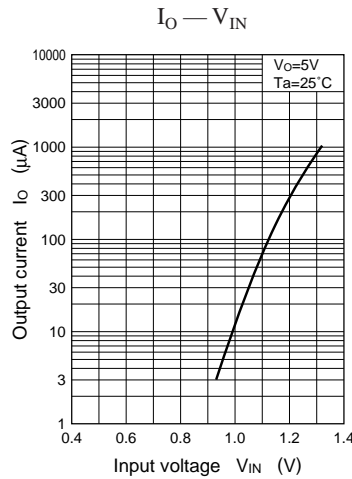
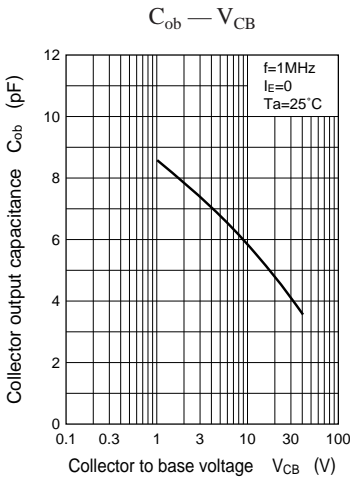


Characteristics charts of UN2222



Characteristics charts of UN2223





Characteristics charts of UN2224

