

# UNR222x Series (UN222x Series)

## Silicon NPN epitaxial planar type

For digital circuits

### ■ Features

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

### ■ Resistance by Part Number

		Marking Symbol (R <sub>1</sub> )	(R <sub>2</sub> )	
• UNR2221 (UN2221)	9A	2.2 kΩ	2.2 kΩ	
• UNR2222 (UN2222)	9B	4.7 kΩ	4.7 kΩ	
• UNR2223 (UN2223)	9C	10 kΩ	10 kΩ	
• UNR2224 (UN2224)	9D	2.2 kΩ	10 kΩ	

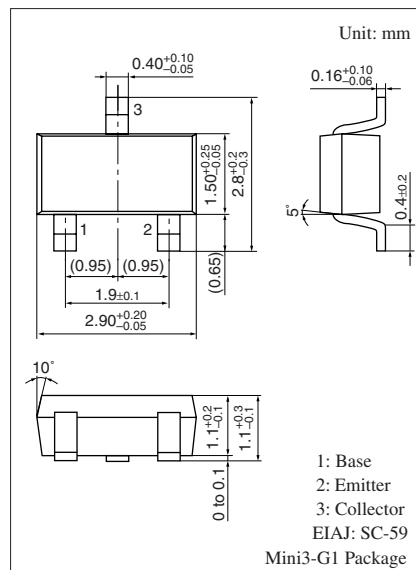
### ■ Absolute Maximum Ratings T<sub>a</sub> = 25°C

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V <sub>CBO</sub>	50	V
Collector-emitter voltage (Base open)	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

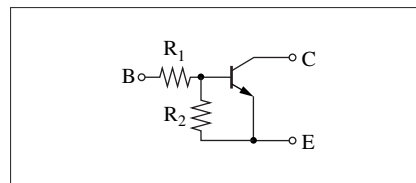
### ■ Electrical Characteristics T<sub>a</sub> = 25°C ± 3°C

Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)	V <sub>CBO</sub>	I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0	50			V
Collector-emitter voltage (Base open)	V <sub>CEO</sub>	I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0	50			V
Collector-base cutoff current (Emitter open)	I <sub>CBO</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0			1	μA
Collector-emitter cutoff current (Base open)	I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0			1	μA
Emitter-base cutoff current (Collector open)	UNR2221	I <sub>EBO</sub> V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0			5	mA
	UNR2222				2	
	UNR2223/2224				1	
Forward current transfer ratio	UNR2221	h <sub>FE</sub> V <sub>CE</sub> = 10 V, I <sub>C</sub> = 100 mA	40			—
	UNR2222		50			
	UNR2223/2224		60			
Collector-emitter saturation voltage	V <sub>CE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 5 mA			0.25	V
Output voltage high-level	V <sub>OH</sub>	V <sub>CC</sub> = 5 V, V <sub>B</sub> = 0.5 V, R <sub>L</sub> = 500 Ω	4.9			V
Output voltage low-level	V <sub>OL</sub>	V <sub>CC</sub> = 5 V, V <sub>B</sub> = 3.5 V, R <sub>L</sub> = 500 Ω			0.2	V

Note) The part numbers in the parenthesis show conventional part number.



### Internal Connection

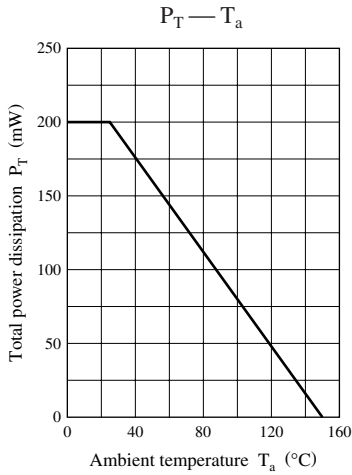


■ Electrical Characteristics (continued)  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

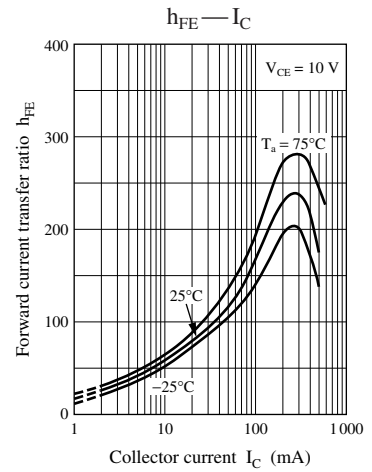
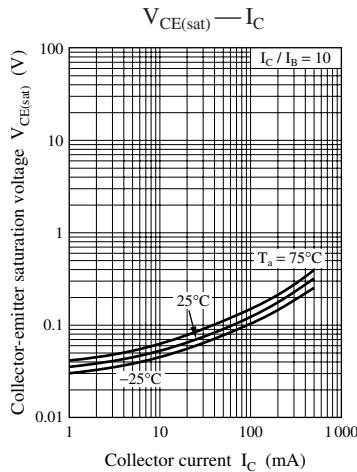
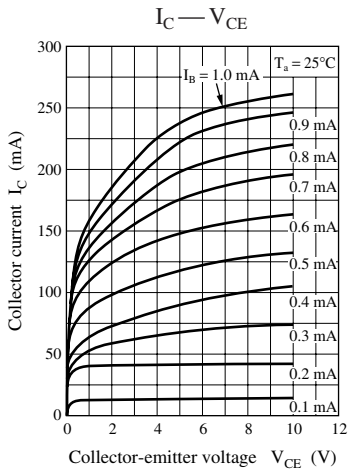
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transition frequency	$f_T$	$V_{CB} = 10\text{ V}$ , $I_E = -50\text{ mA}$ , $f = 200\text{ MHz}$		200		MHz
Input resistance	UNR2221/2224 $R_1$		-30%	2.2	+30%	k $\Omega$
				4.7		
				10		
Resistance ratio	$R_1/R_2$		0.8	1.0	1.2	—
			0.17	0.22	0.27	

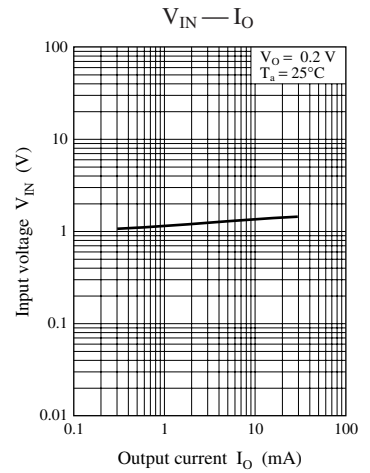
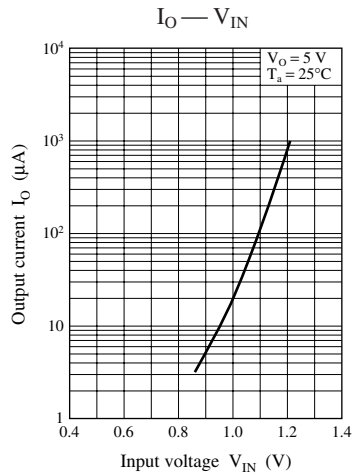
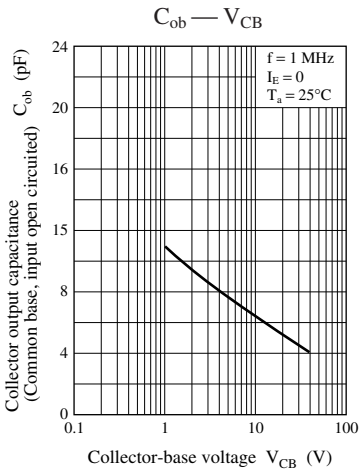
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

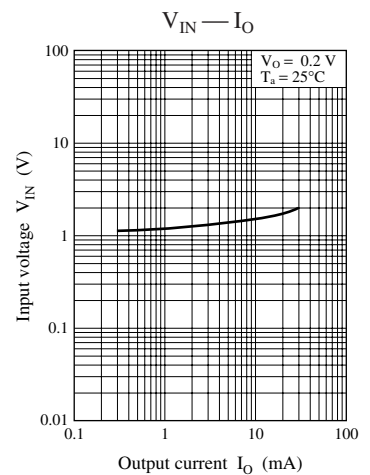
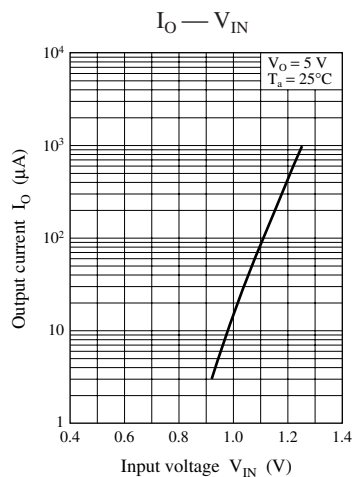
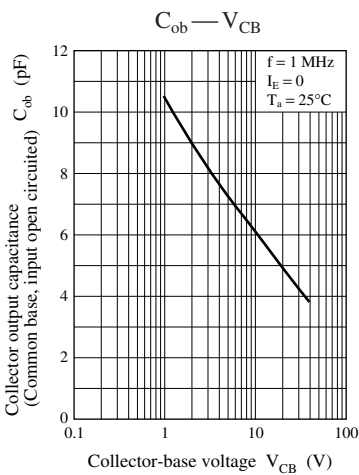
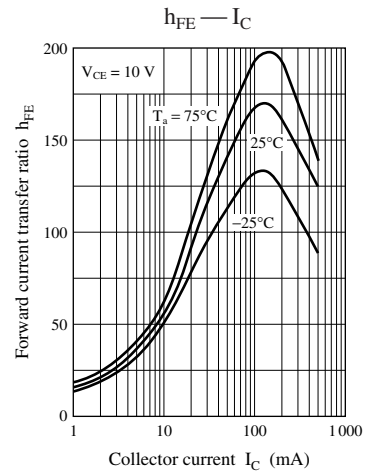
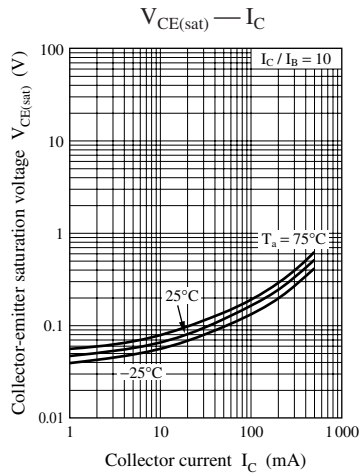
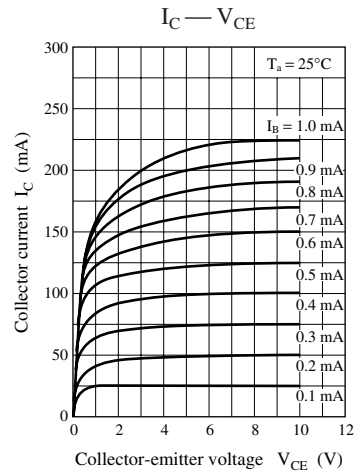


Characteristics charts of UNR2221

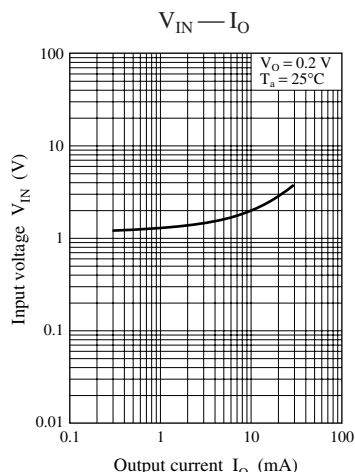
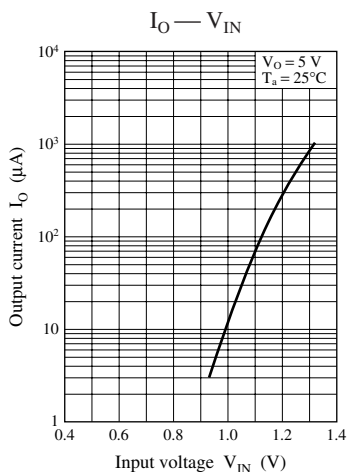
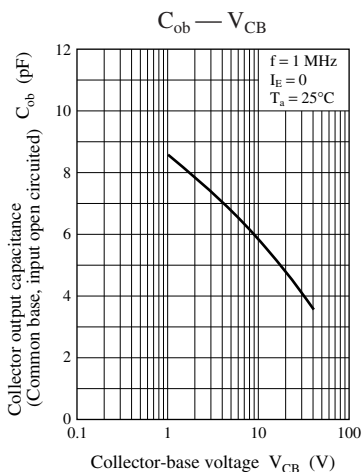
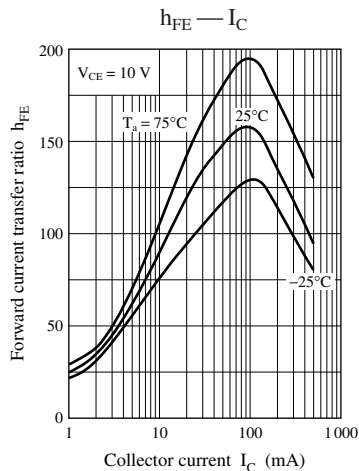
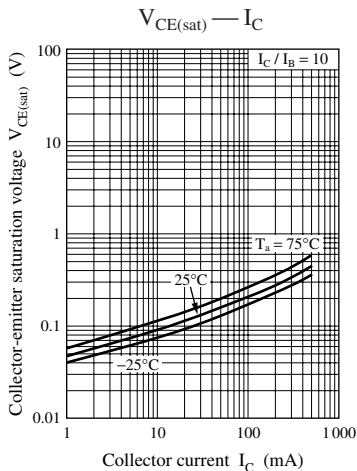
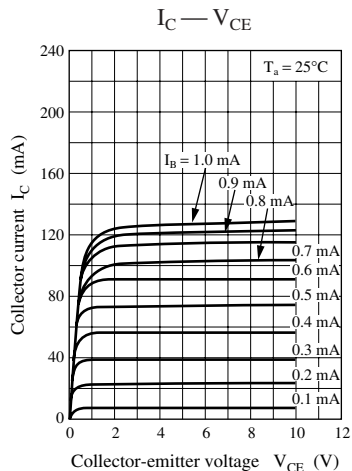




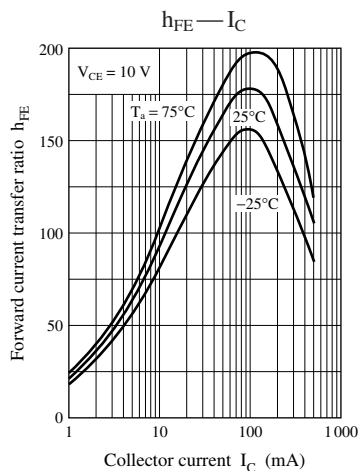
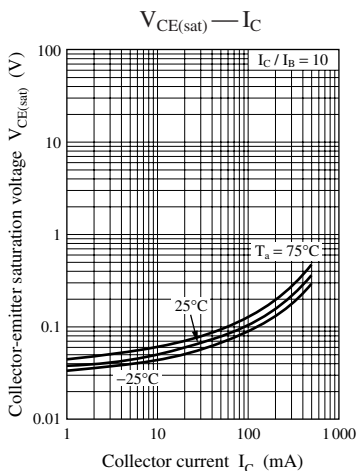
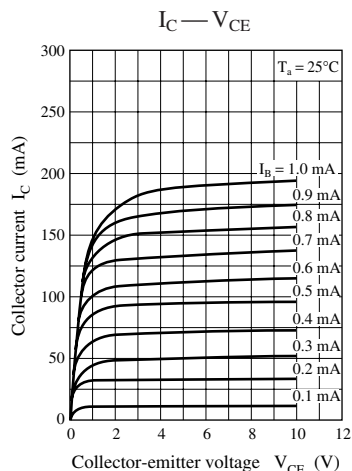
### Characteristics charts of UNR2222

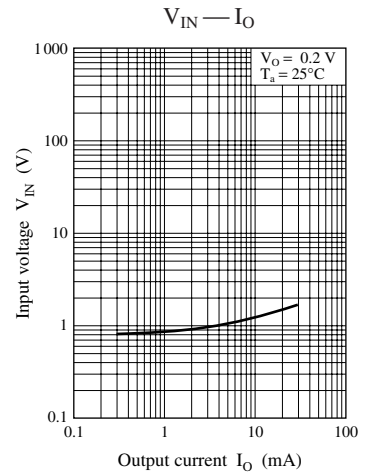
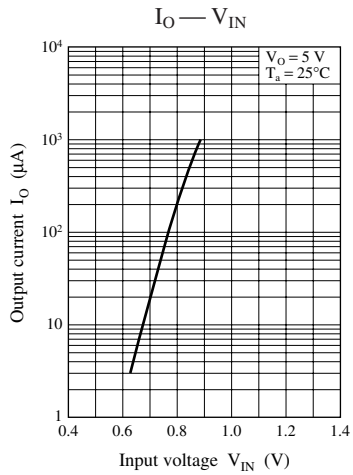
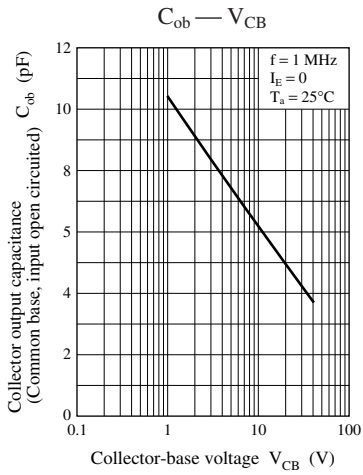


Characteristics charts of UNR2223



Characteristics charts of UNR2224





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