

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_1)		(R_2)
• UNR2221	(UN2221)	9A	2.2 k Ω	2.2 k Ω
• UNR2222	(UN2222)	9B	4.7 k Ω	4.7 k Ω
• UNR2223	(UN2223)	9C	10 k Ω	10 k Ω
• UNR2224	(UN2224)	9D	2.2 k Ω	10 k Ω

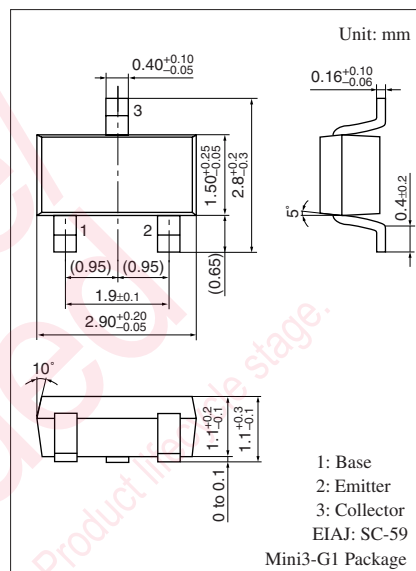
■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V_{CBO}	50	V
Collector-emitter voltage (Base open)	V_{CEO}	50	V
Collector current	I_C	500	mA
Total power dissipation	P_T	200	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$

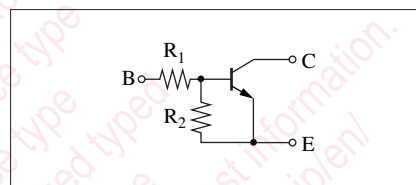
■ Electrical Characteristics $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

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}	$V_{CB} = 50 \text{ V}$, $I_E = 0$			1	μA
Collector-emitter cutoff current (Base open)		I_{CEO}	$V_{CE} = 50 \text{ V}$, $I_B = 0$			1	μA
Emitter-base cutoff current (Collector open)	UNR2221	I_{EBO}	$V_{EB} = 6 \text{ V}$, $I_C = 0$			5	mA
	UNR2222					2	
	UNR2223/2224					1	
Forward current transfer ratio	UNR2221	h_{FE}	$V_{CE} = 10 \text{ V}$, $I_C = 100 \text{ mA}$	40			—
	UNR2222			50			
	UNR2223/2224			60			
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 10 \text{ mA}$, $I_B = 5 \text{ mA}$			0.25	V
Output voltage high-level		V_{OH}	$V_{CC} = 5 \text{ V}$, $V_B = 0.5 \text{ V}$, $R_L = 500 \Omega$	4.9			V
Output voltage low-level		V_{OL}	$V_{CC} = 5 \text{ V}$, $V_B = 3.5 \text{ V}$, $R_L = 500 \Omega$			0.2	V

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



Internal Connection

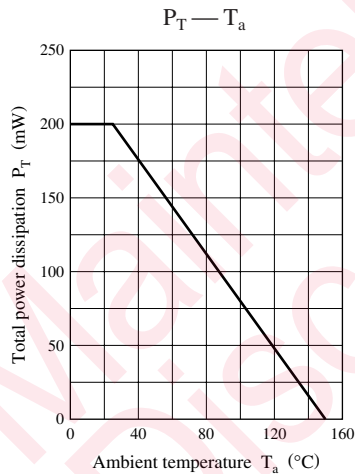


■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

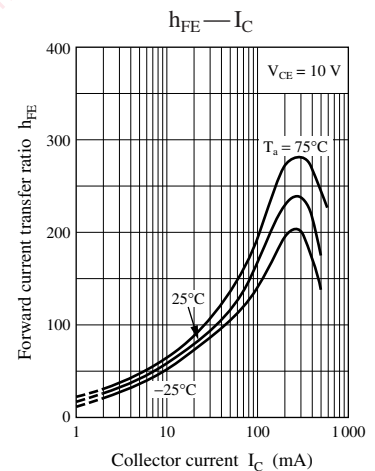
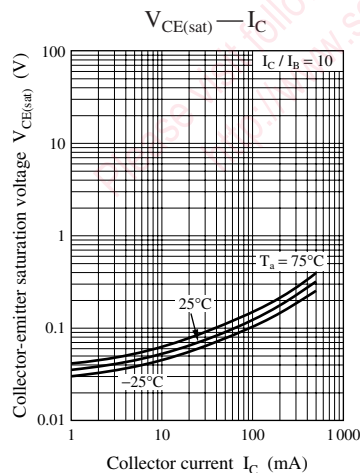
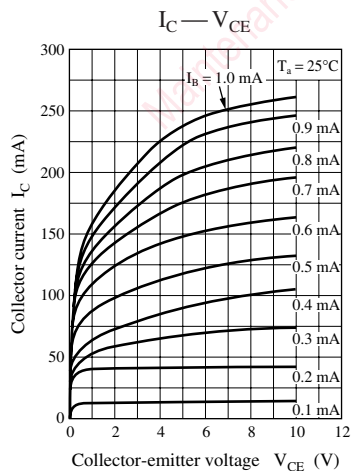
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Transition frequency		f_T	$V_{CE} = 10\text{ V}$, $I_E = -50\text{ mA}$, $f = 200\text{ MHz}$		200		MHz
Input resistance	UNR2221/2224	R_1		-30%	2.2	+30%	$\text{k}\Omega$
	UNR2222				4.7		
	UNR2223				10		
Resistance ratio		R_1/R_2		0.8	1.0	1.2	—
	UNR2224			0.17	0.22	0.27	

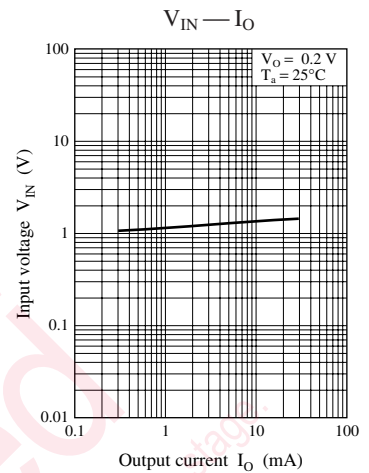
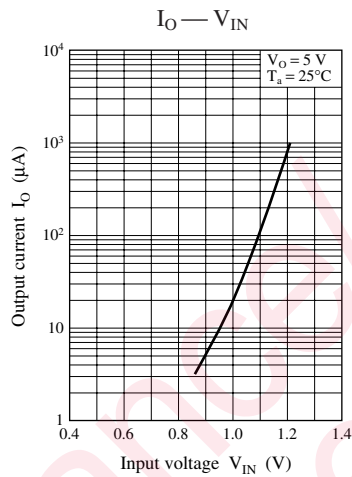
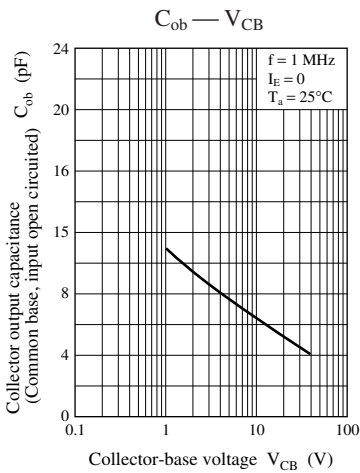
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

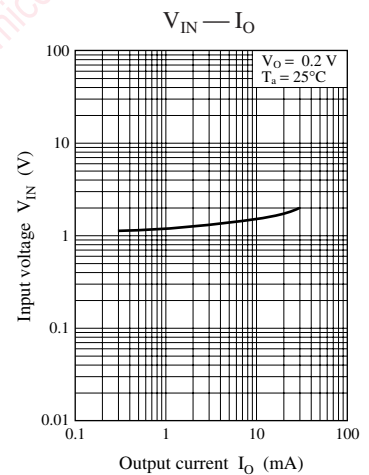
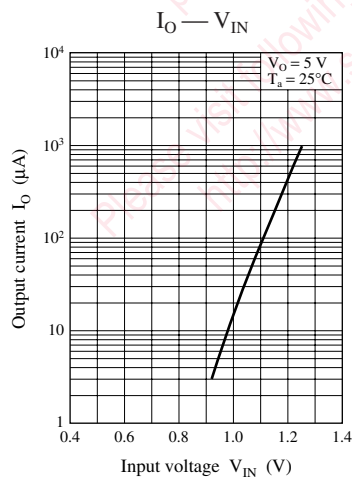
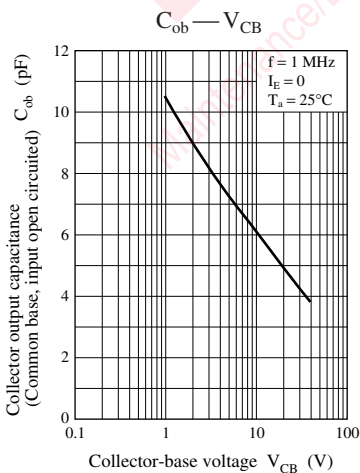
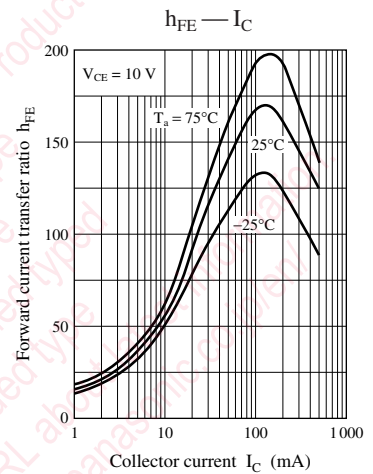
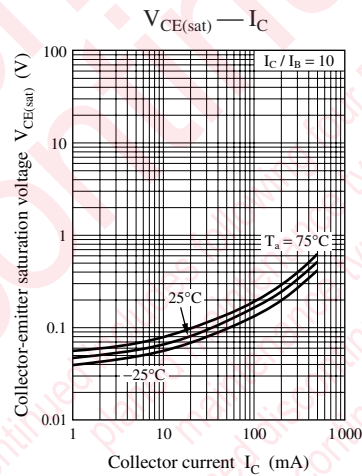
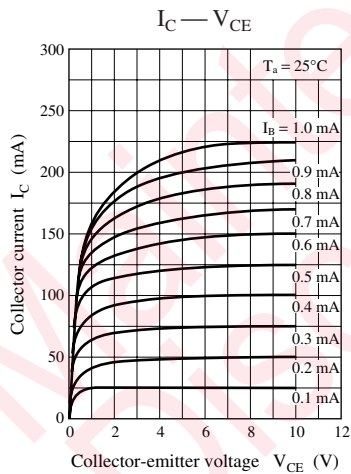


Characteristics charts of UNR2221

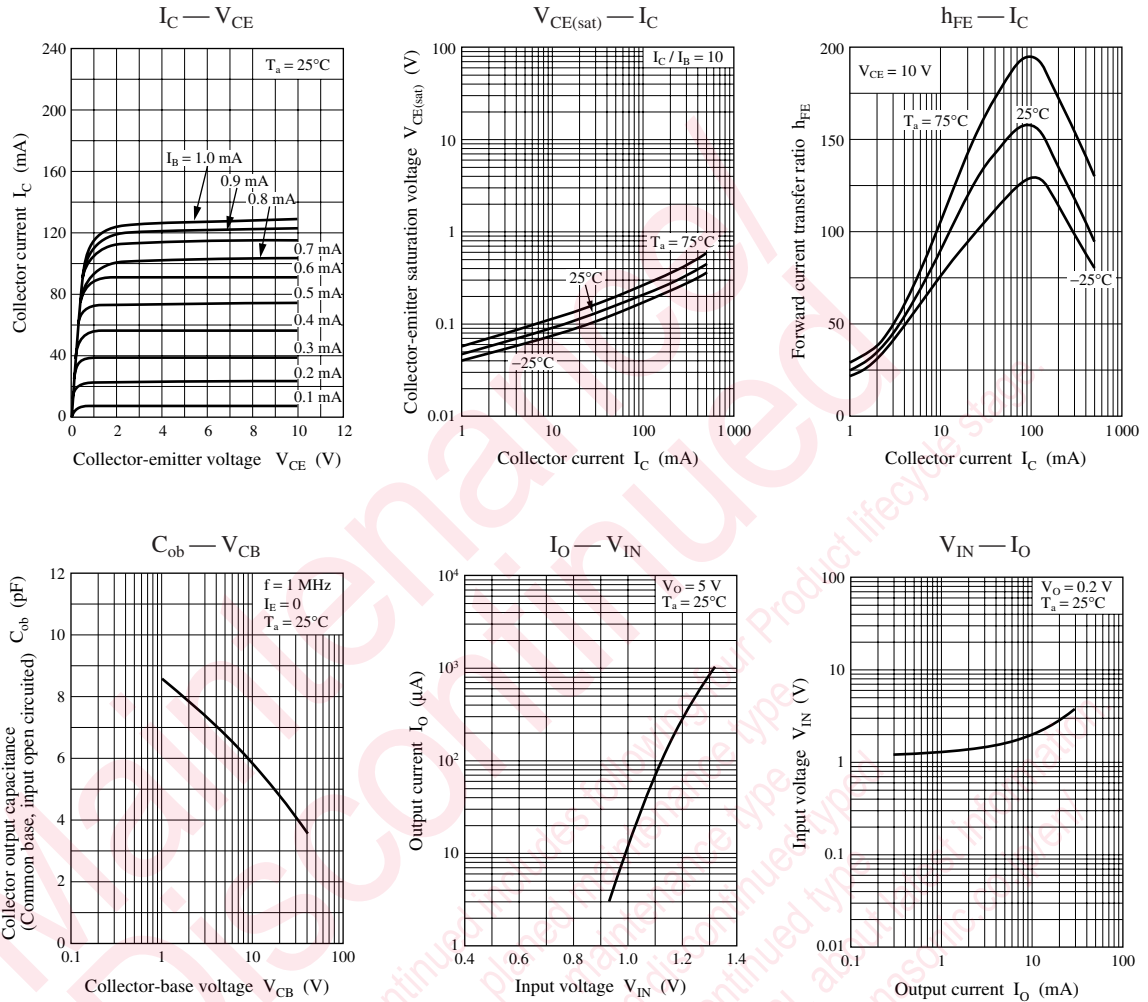




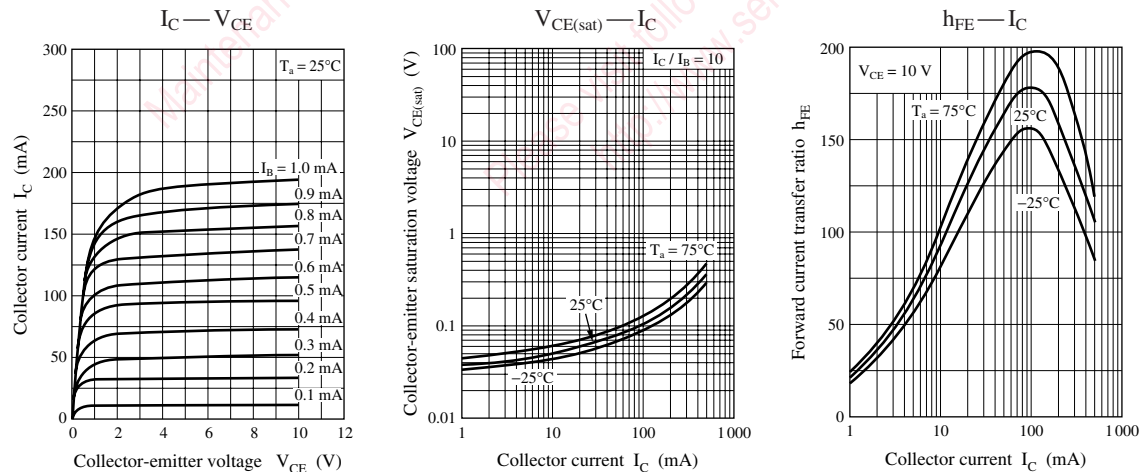
Characteristics charts of UNR2222

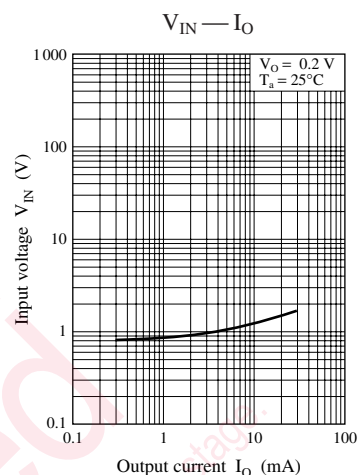
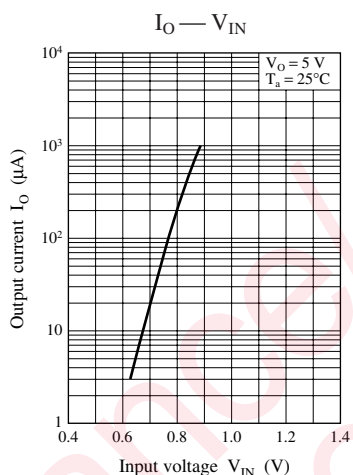
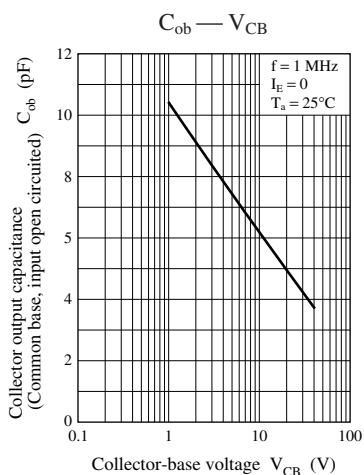


Characteristics charts of UNR2223



Characteristics charts of UNR2224





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reliability are required, or if the failure or malfunction of the prod-

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