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Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China



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 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

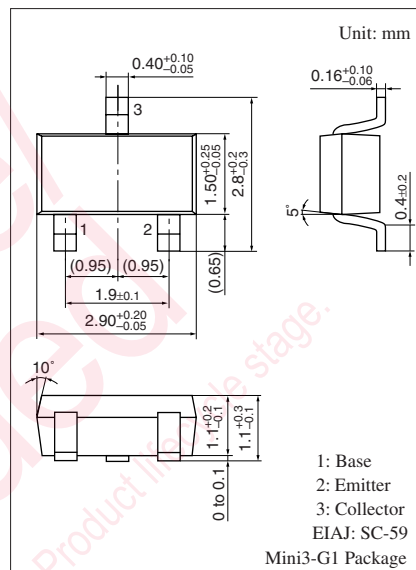
■ Absolute Maximum Ratings T_a = 25°C

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	°C
Storage temperature	T _{stg}	-55 to +150	°C

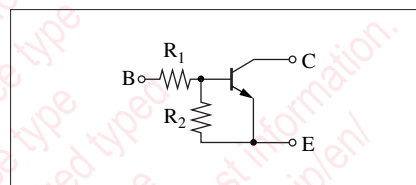
■ Electrical Characteristics T_a = 25°C ± 3°C

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			1	μA
Collector-emitter cutoff current (Base open)	I _{CEO}	V _{CE} = 50 V, I _B = 0			1	μA
Emitter-base cutoff current (Collector open)	UNR2221	V _{EB} = 6 V, I _C = 0			5	mA
	UNR2222				2	
	UNR2223/2224				1	
Forward current transfer ratio	UNR2221	h _{FE} V _{CE} = 10 V, I _C = 100 mA	40			—
	UNR2222		50			
	UNR2223/2224		60			
Collector-emitter saturation voltage	V _{CE(sat)}	I _C = 10 mA, I _B = 5 mA			0.25	V
Output voltage high-level	V _{OH}	V _{CC} = 5 V, V _B = 0.5 V, R _L = 500 Ω	4.9			V
Output voltage low-level	V _{OL}	V _{CC} = 5 V, V _B = 3.5 V, R _L = 500 Ω			0.2	V

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



Internal Connection

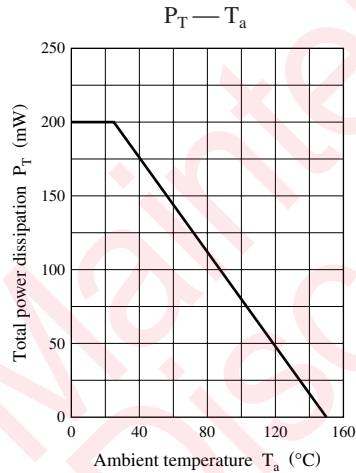


■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

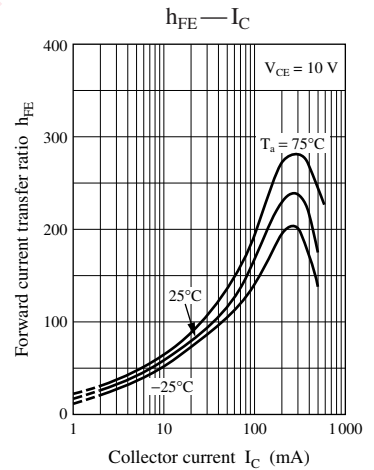
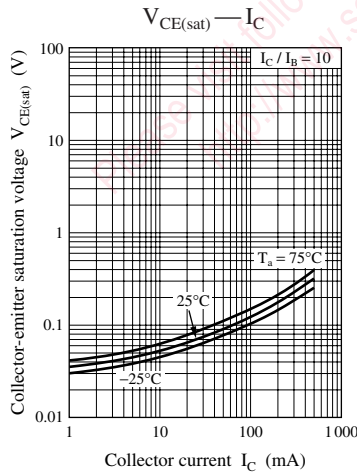
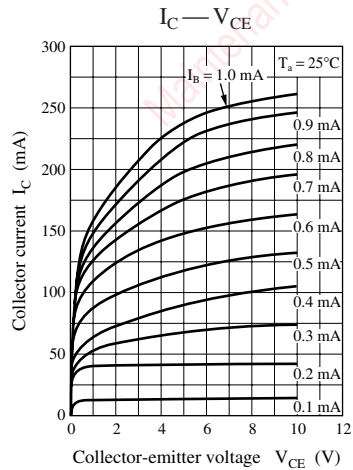
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Transition frequency	f_T	$V_{CB} = 10\text{ V}, I_E = -50\text{ mA}, f = 200\text{ MHz}$		200		MHz
Input resistance	UNR2221/2224 R_1		-30%	2.2	+30%	k Ω
				4.7		
				10		
Resistance ratio	R_1/R_2		0.8	1.0	1.2	—
			0.17	0.22	0.27	

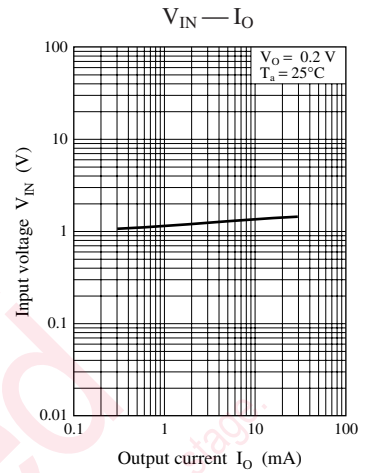
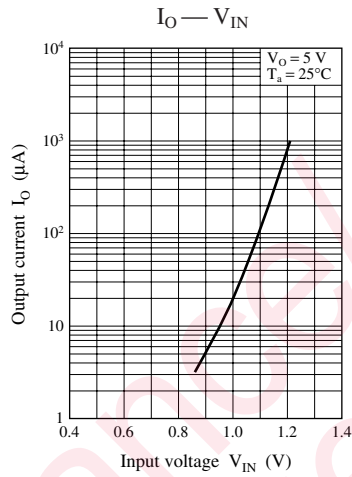
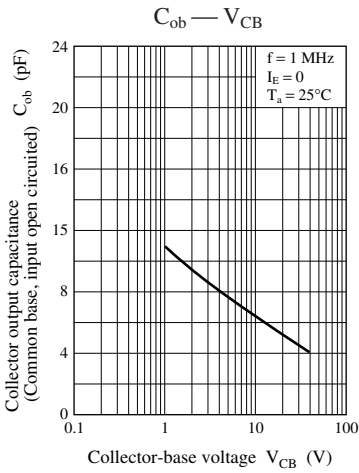
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

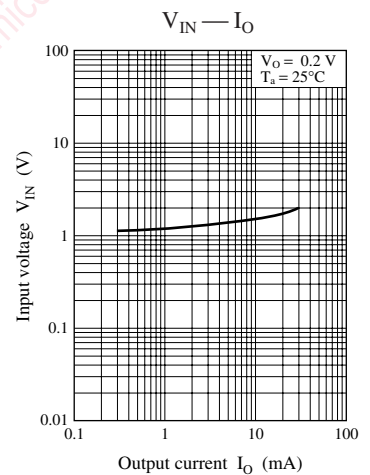
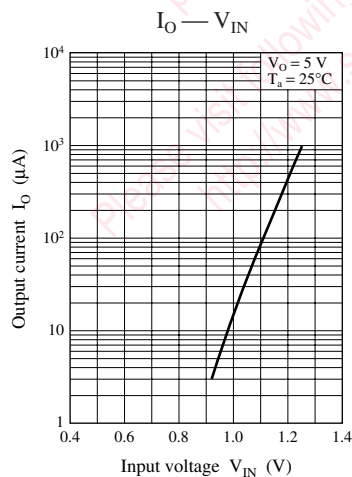
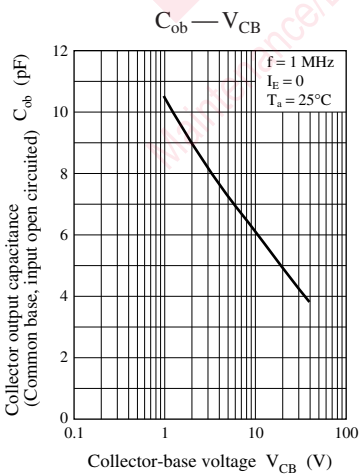
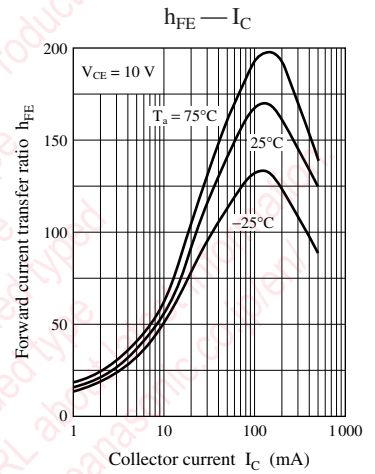
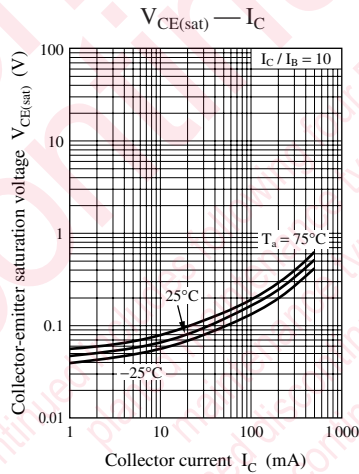
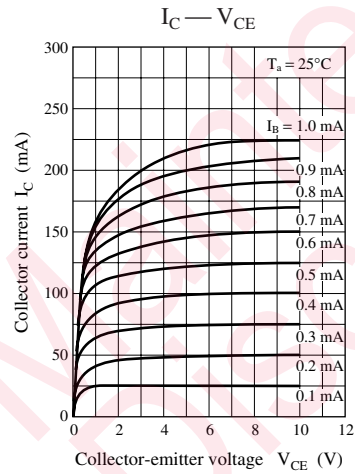


Characteristics charts of UNR2221

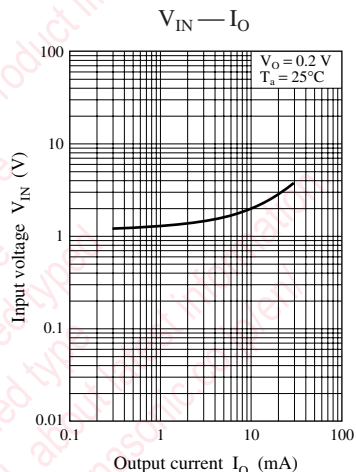
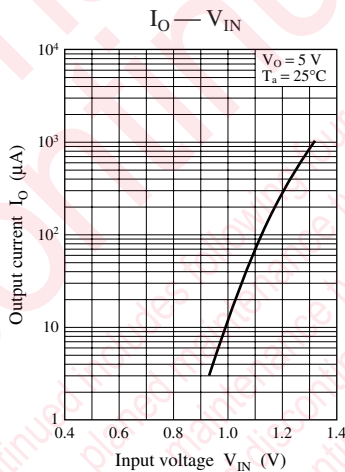
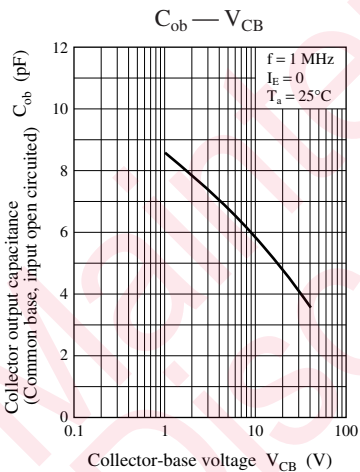
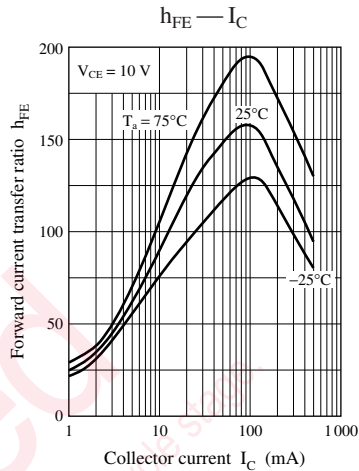
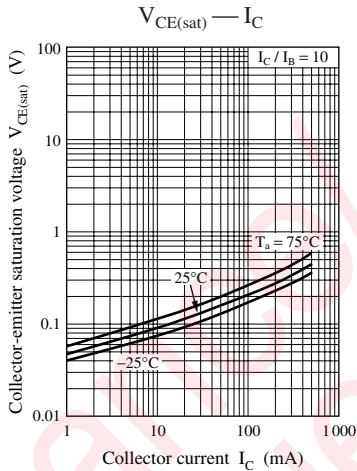
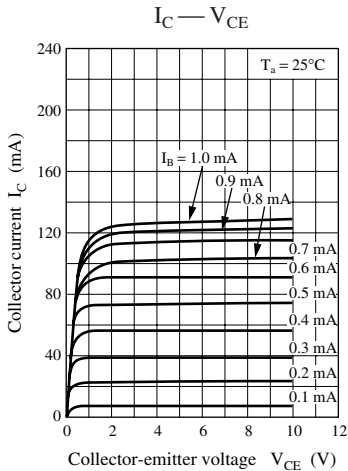




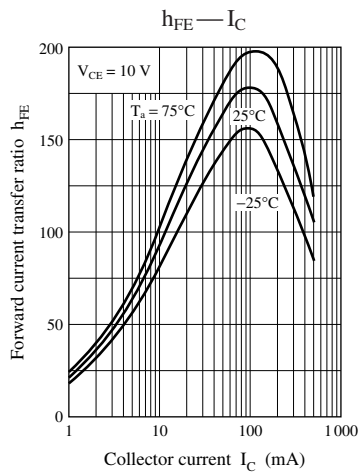
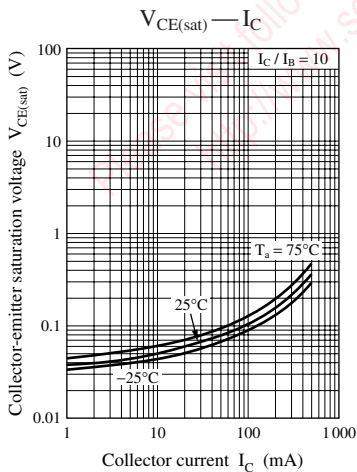
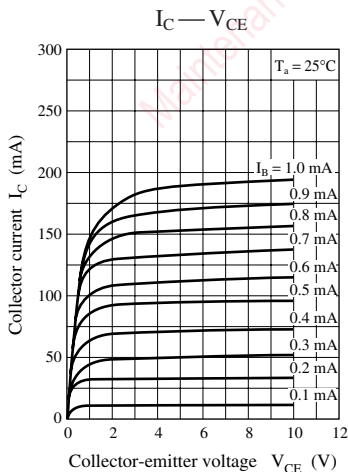
Characteristics charts of UNR2222

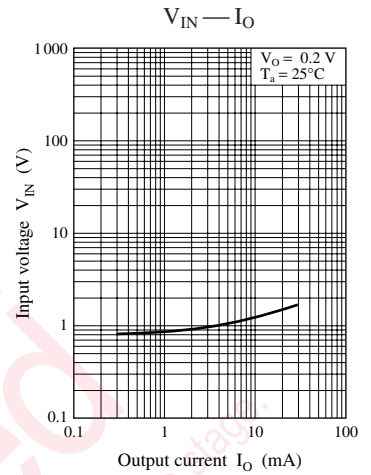
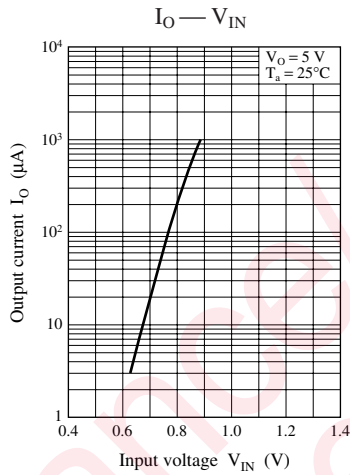
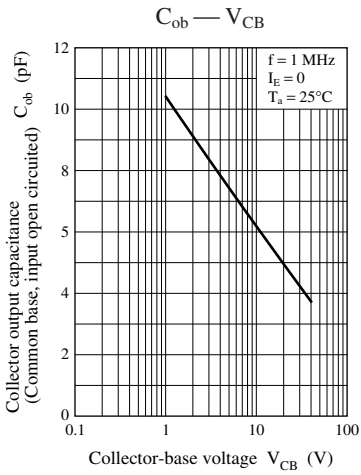


Characteristics charts of UNR2223



Characteristics charts of UNR2224





Maintenance/Discontinued includes following four Product lifecycle stages:
 planned maintenance type
 maintenance type
 planned discontinued type
 discontinued type
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