

UNR2221/2222/2223/2224 (UN2221/2222/2223/2224)

Silicon NPN epitaxial planer transistor

For digital circuits

■ Features

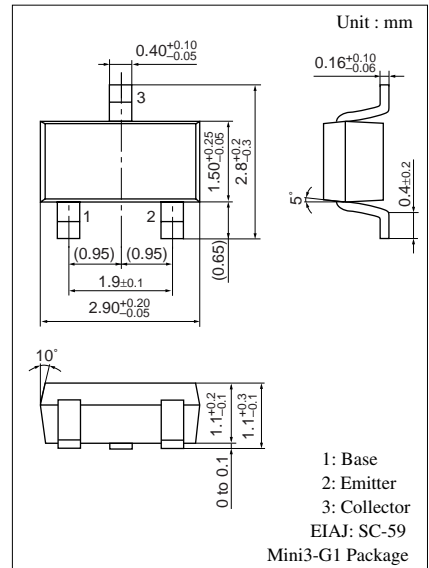
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- Mini type package, allowing downsizing of the equipment and automatic insertion through tape packing and magazine packing.

■ Resistance by Part Number

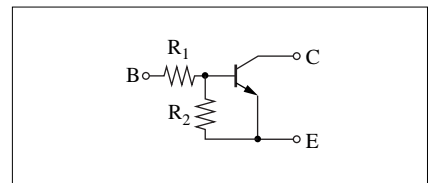
	Marking Symbol (R ₁)	(R ₂)
• UNR2221 (UN2221)	9A	2.2 kΩ 2.2 kΩ
• UNR2222 (UN2222)	9B	4.7 kΩ 4.7 kΩ
• UNR2223 (UN2223)	9C	10 kΩ 10 kΩ
• UNR2224 (UN2224)	9D	2.2 kΩ 10 kΩ

■ Absolute Maximum Ratings T_a = 25°C

Parameter	Symbol	Rating	Unit
Collector to base voltage	V _{CBO}	50	V
Collector to emitter voltage	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



Internal Connection



■ Electrical Characteristics T_a = 25°C

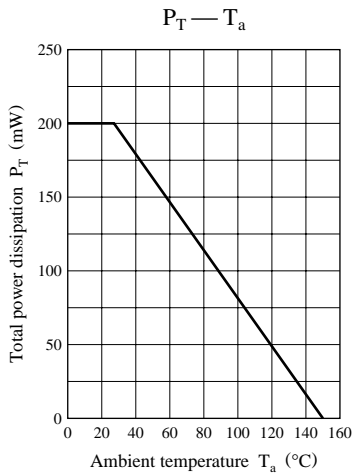
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Collector cutoff current	I _{CBO}	V _{CB} = 50 V, I _E = 0			1	μA
	I _{CEO}	V _{CE} = 50 V, I _B = 0			1	
Emitter cutoff current	UNR2221 UNR2222 UNR2223/2224	I _{EBO}	V _{EB} = 6 V, I _C = 0		5	mA
					2	
					1	
Collector to base voltage	V _{CBO}	I _C = 10 μA, I _E = 0	50			V
Collector to emitter voltage	V _{CEO}	I _C = 2 mA, I _B = 0	50			V
Forward current transfer ratio	UNR2221 UNR2222 UNR2223/2224	h _{FE}	V _{CE} = 10 V, I _C = 100 mA	40		
				50		
				60		
Collector to emitter saturation voltage	V _{CE(sat)}	I _C = 100 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.

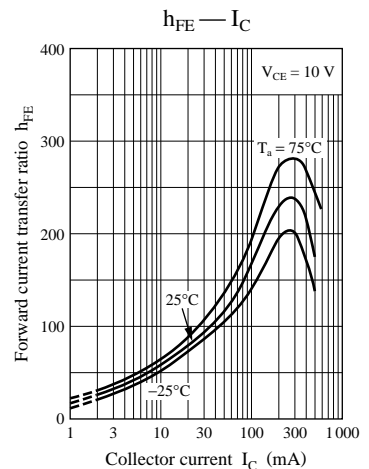
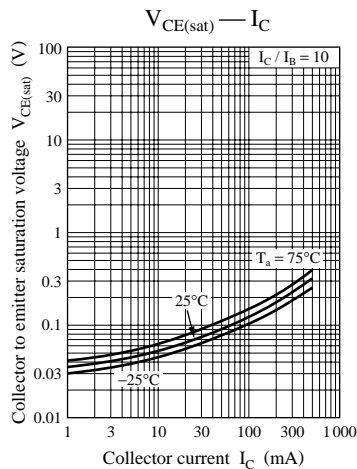
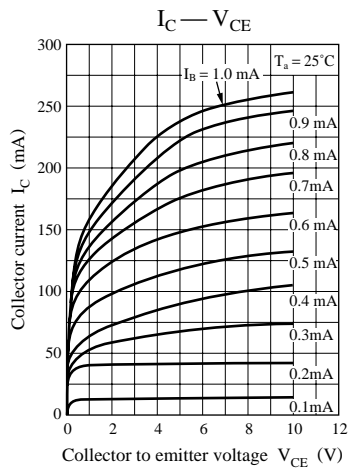
■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C}$

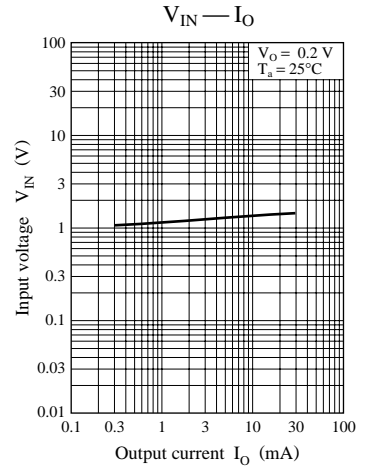
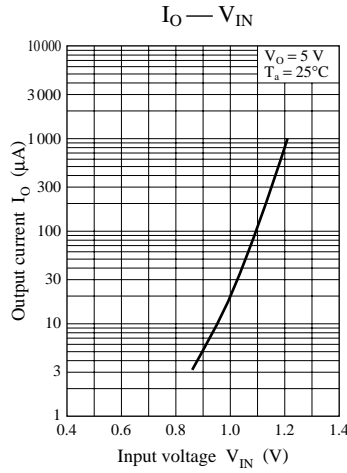
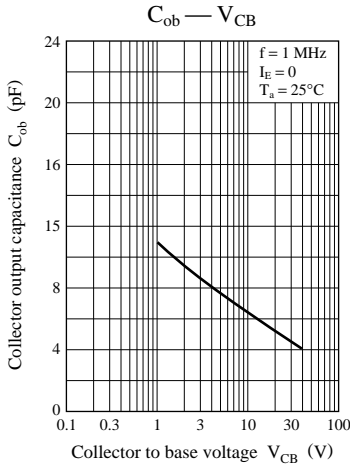
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Transition frequency		f_T	$V_{CE} = 10\text{ V}, I_E = -50\text{ mA}, f = 200\text{ MHz}$		200		MHz
Input resistance	UNR2221/2224	R_1		-30%	2.2	+30%	k Ω
	UNR2222				4.7		
	UNR2223				10		
Resistance ratio		R_1/R_2		0.8	1.0	1.2	
UNR2224					0.22		

Common characteristics chart

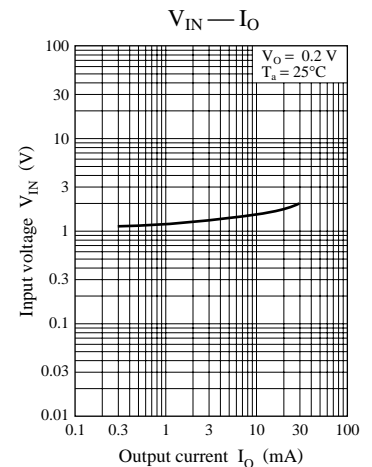
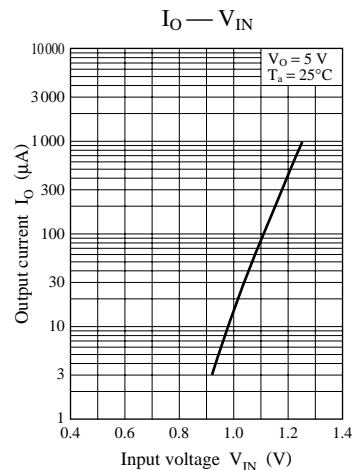
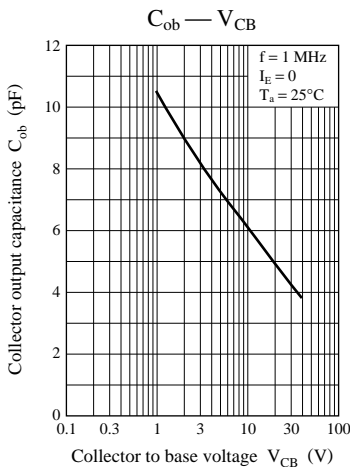
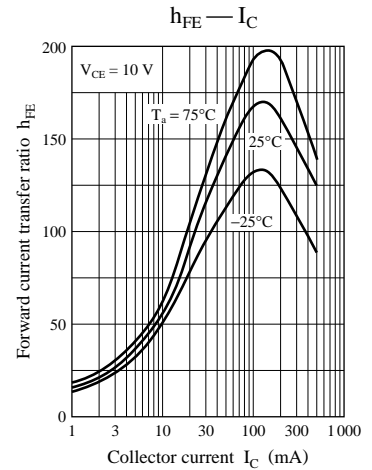
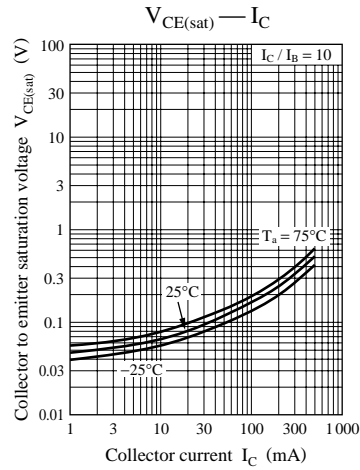
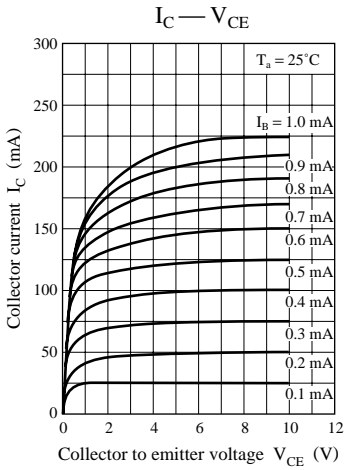


Characteristics charts of UNR2221

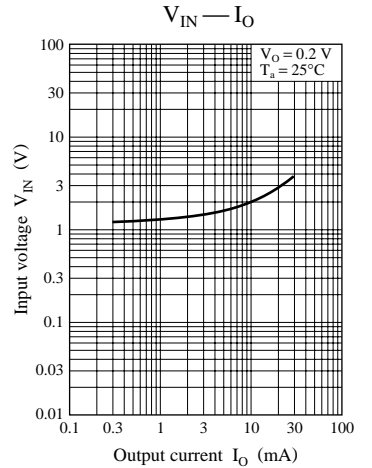
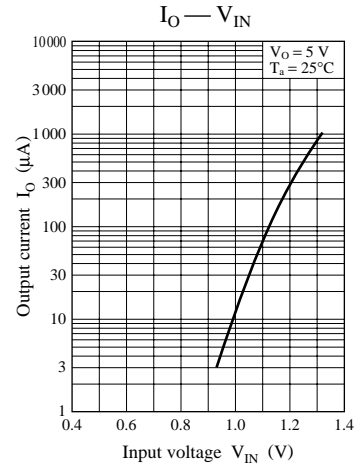
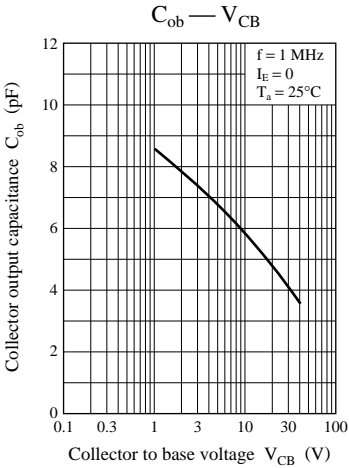
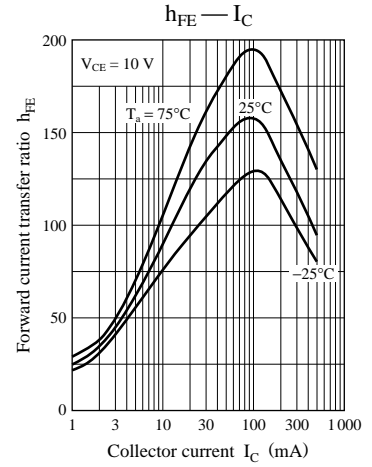
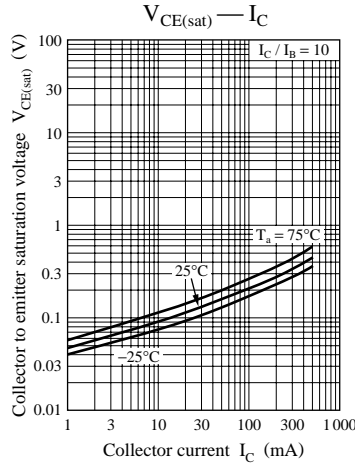
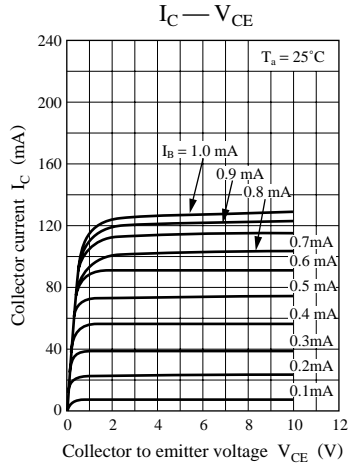




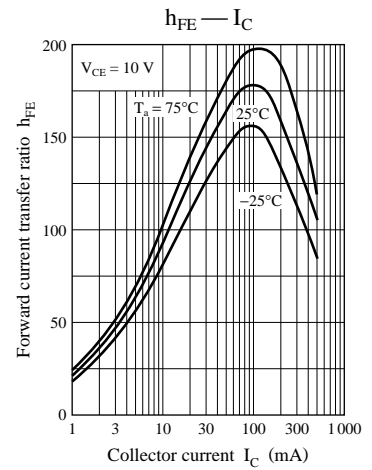
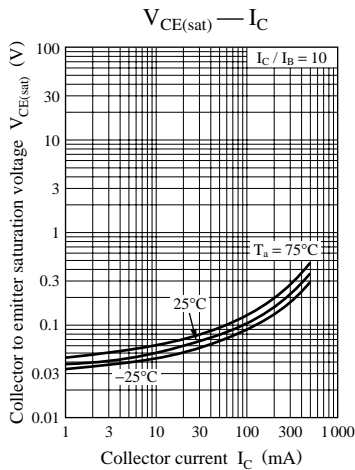
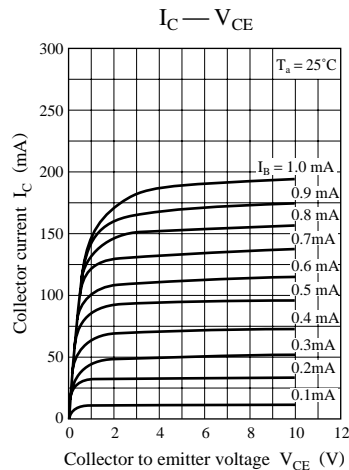
Characteristics charts of UNR2222

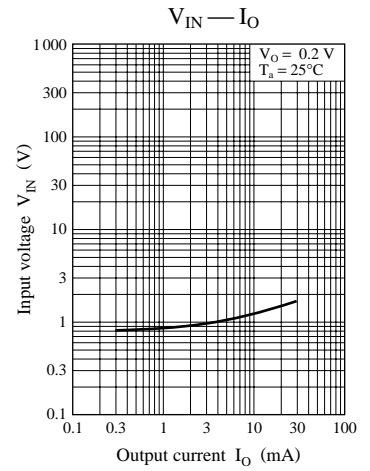
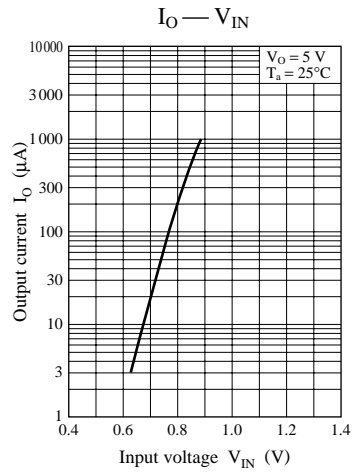
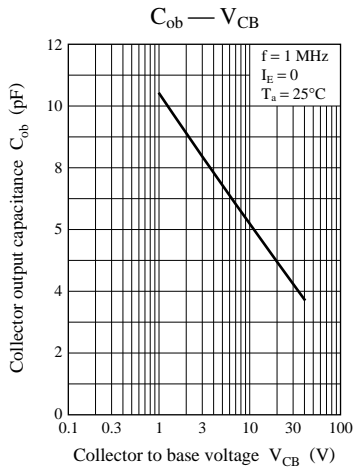


Characteristics charts of UNR2223



Characteristics charts of UNR2224





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