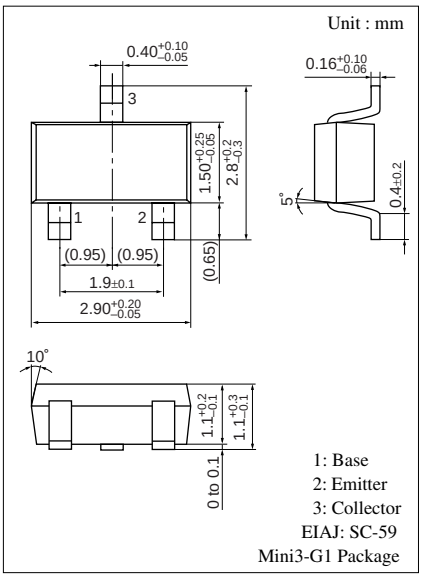
UNR2221/2222/2223/2224

(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.

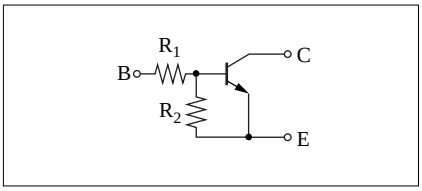
■ Resistance by Part Number

		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	I_{EBO}	V_{EB} = 6 V, I_C = 0			5	mA
	UNR2222					2	
	UNR2223/2224					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	h_{FE}	V_{CE} = 10 V, I_C = 100 mA	40			
	UNR2222			50			
	UNR2223/2224			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

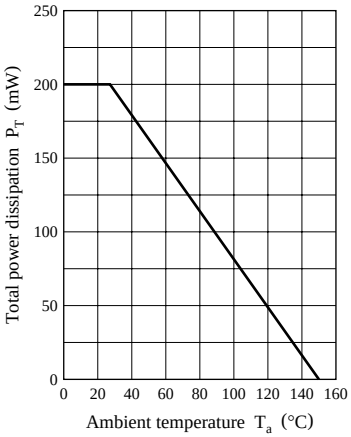
Note) The part numbers in the parenthesis show conventional part number.

■ Electrical Characteristics (continued) $T_a = 25°C$

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

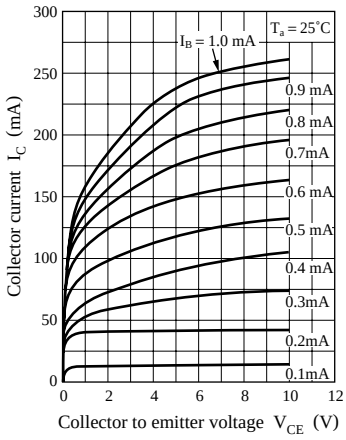
Common characteristics chart

P_T — T_a

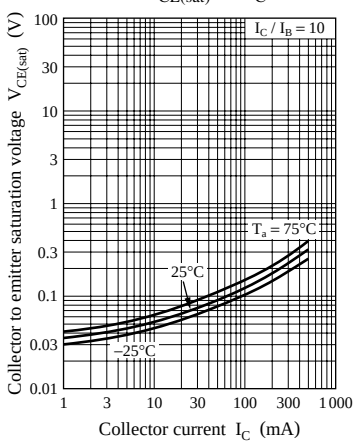


Characteristics charts of UNR2221

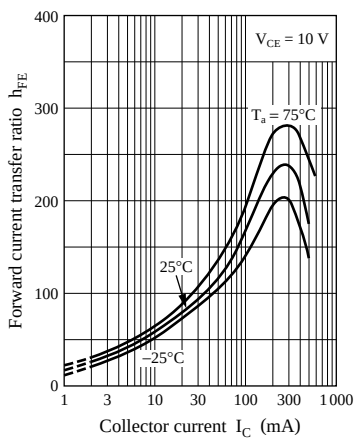
I_C — V_{CE}



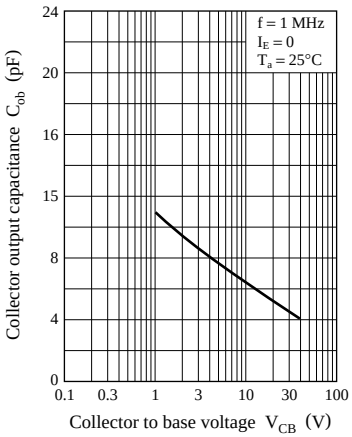
$V_{CE(sat)}$ — I_C



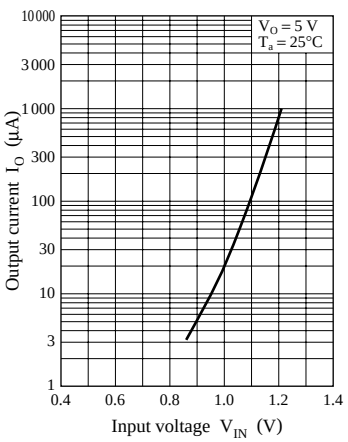
h_{FE} — I_C



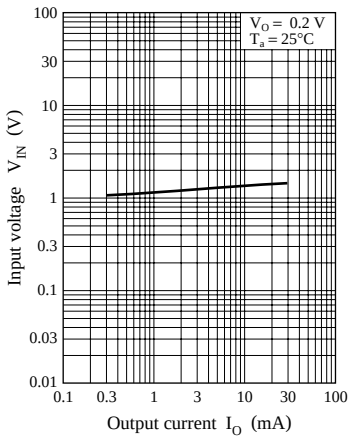
C_{ob} — V_{CB}



I_O — V_{IN}

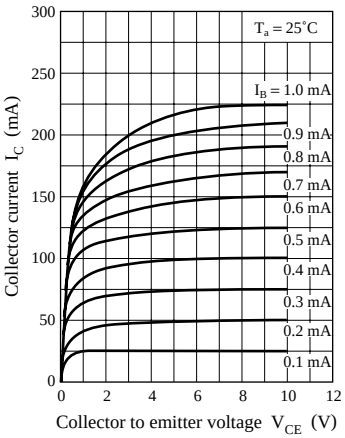


V_{IN} — I_O

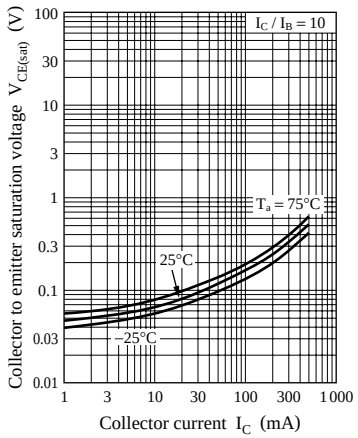


Characteristics charts of UNR2222

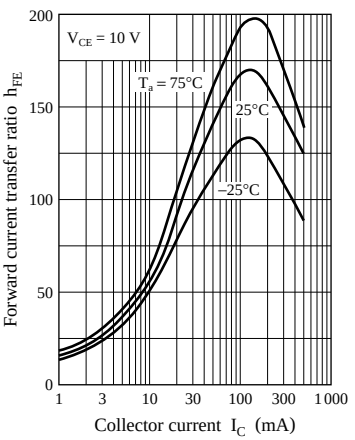
I_C — V_{CE}



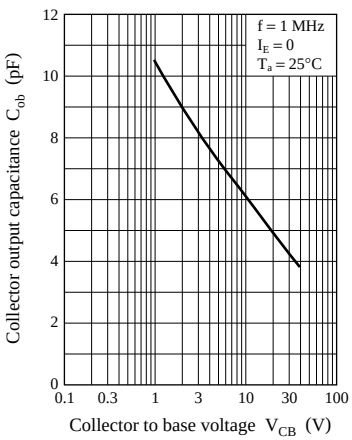
$V_{CE(sat)}$ — I_C



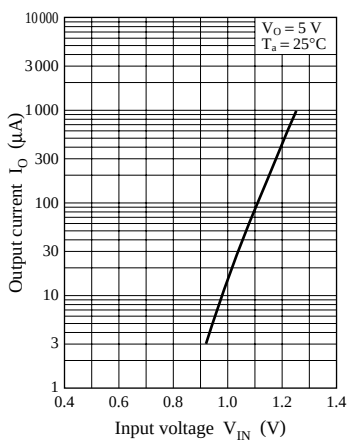
h_{FE} — I_C



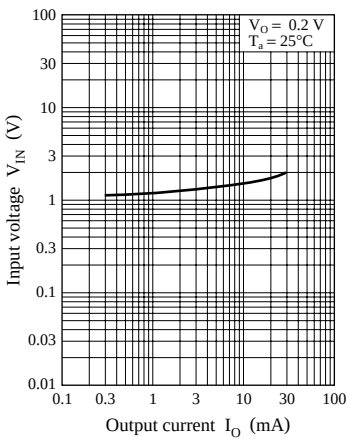
C_{ob} — V_{CB}



I_O — V_{IN}

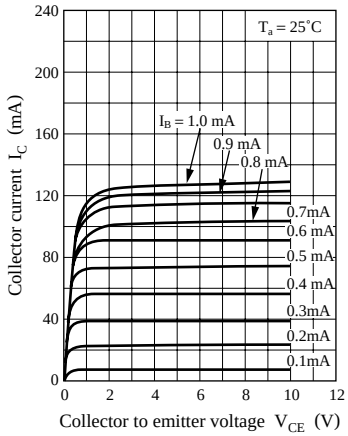


V_{IN} — I_O

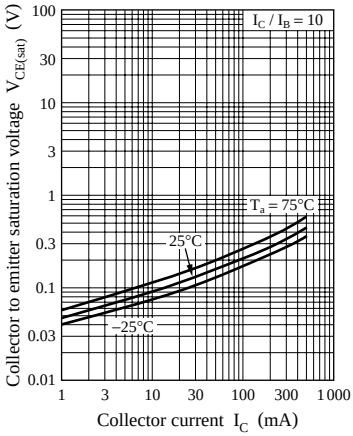


Characteristics charts of UNR2223

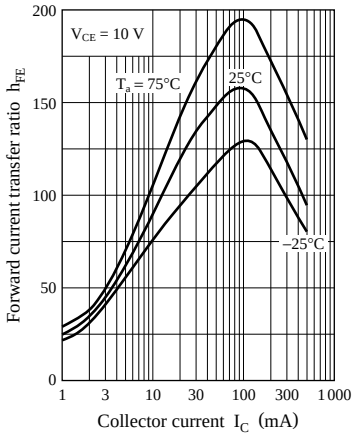
I_C — V_{CE}



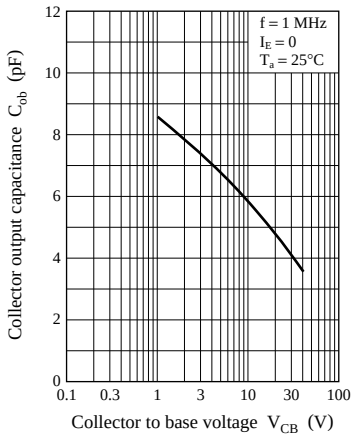
$V_{CE(sat)}$ — I_C



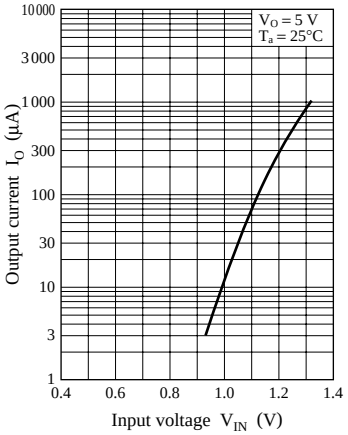
h_{FE} — I_C



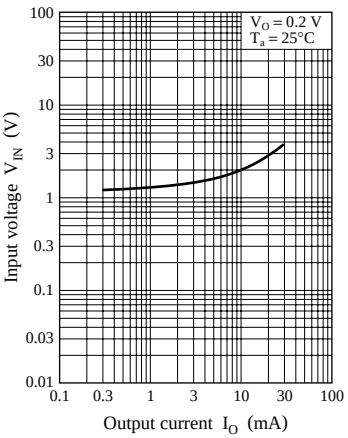
C_{ob} — V_{CB}



I_O — V_{IN}

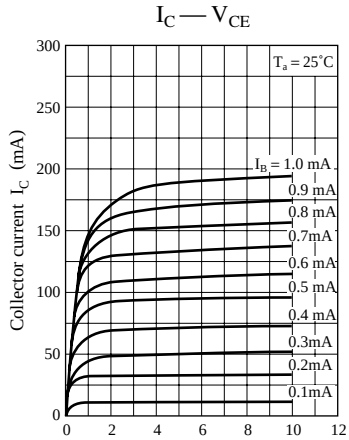


V_{IN} — I_O

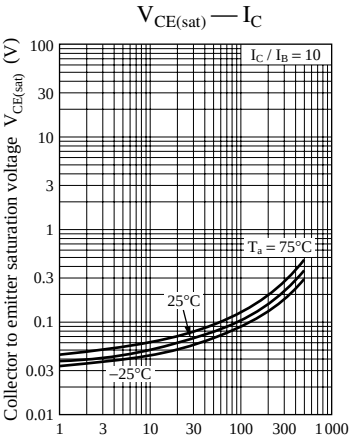


Characteristics charts of UNR2224

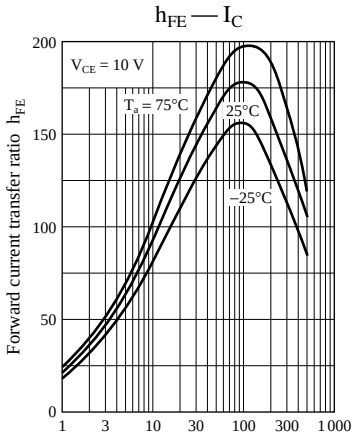
I_C — V_{CE}



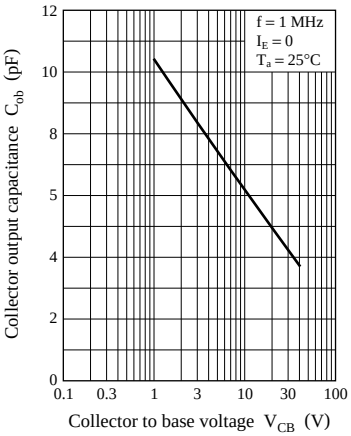
$V_{CE(sat)}$ — I_C



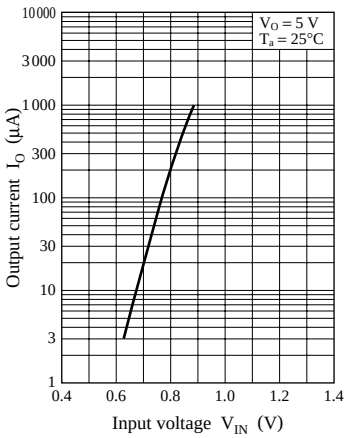
h_{FE} — I_C



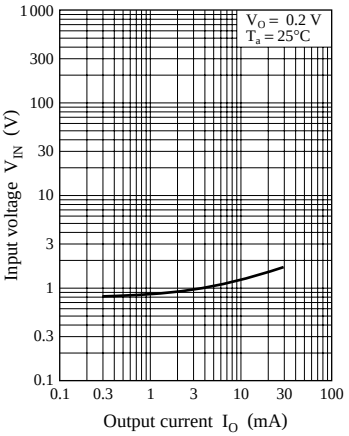
C_{ob} — V_{CB}



I_O — V_{IN}



V_{IN} — I_O



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