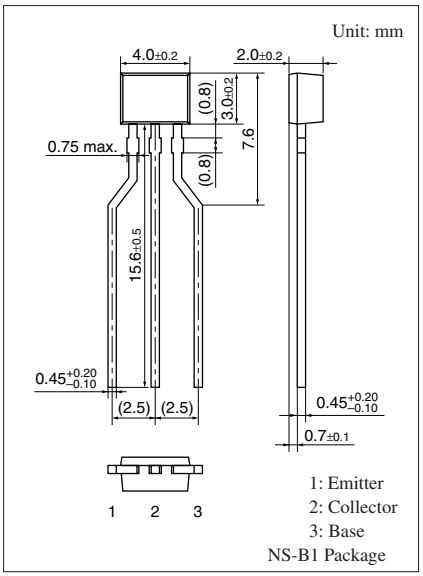
UNR4221/4222/4223/4224

(UN4221/4222/4223/4224)

Silicon NPN epitaxial planar type

For digital circuits



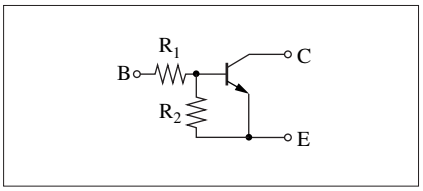
■ Features

- Costs can be reduced through downsizing of the equipment and reduction of the number of parts
- New S type package, allowing supply with the radial taping

■ Resistance by Part Number

	(R_1)	(R_2)
• UNR4221 (UN4221)	2.2 kΩ	2.2 kΩ
• UNR4222 (UN4222)	4.7 kΩ	4.7 kΩ
• UNR4223 (UN4223)	10 kΩ	10 kΩ
• UNR4224 (UN4224)	2.2 kΩ	10 kΩ

Internal Connection



■ 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	300	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

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			1.0	µA
Collector-emitter cutoff current (Base open)		I_{CEO}	V_{CE} = 50 V, I_B = 0			1.0	µA
Emitter-base cutoff current (Collector open)	UNR4221	I_{EBO}	V_{EB} = 6 V, I_C = 0			5.0	mA
	UNR4222					2.0	
	UNR4223/4224					1.0	
Forward current transfer ratio	UNR4221	h_{FE}	V_{CE} = 10 V, I_C = 100 mA	40			—
	UNR4222			50			
	UNR4223/4224			60			
Collector-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.

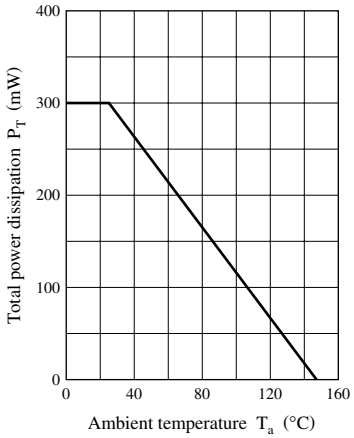
■ Electrical Characteristics (continued) $T_a = 25°C \pm 3°C$

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	UNR4221/4224	R_1		−30%	2.2	+30%	kΩ
	UNR4222				4.7		
	UNR4223				10		
Resistance ratio		R_1/R_2		0.8	1.0	1.2	
	UNR4224			0.17	0.22	0.27	

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

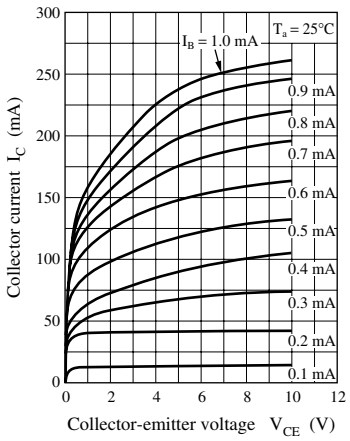
Common characteristics chart

P_T — T_a

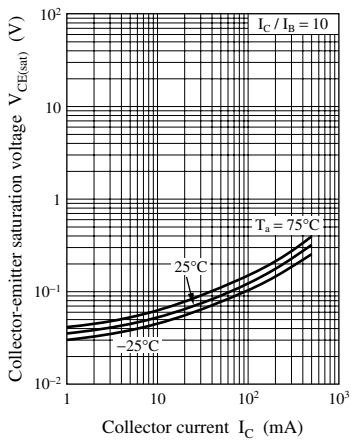


Characteristics charts of UNR4221

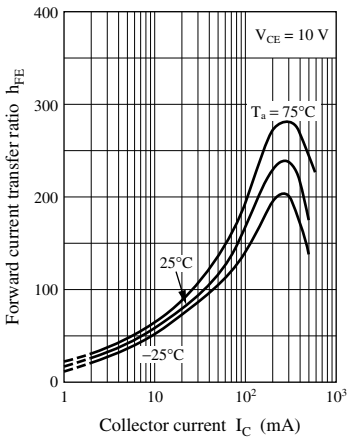
I_C — V_{CE}



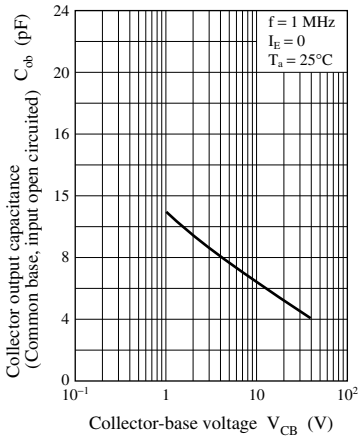
$V_{CE(sat)}$ — I_C



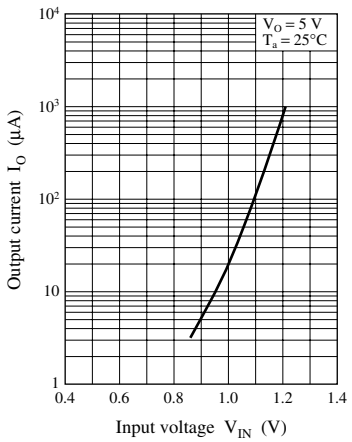
h_{FE} — I_C



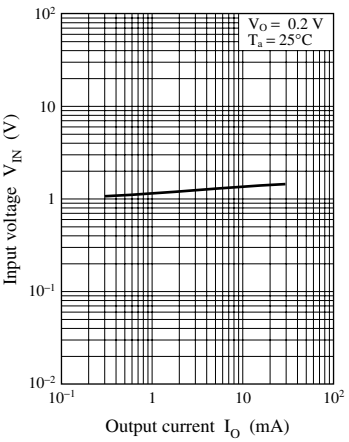
C_{ob} — V_{CB}



I_O — V_{IN}

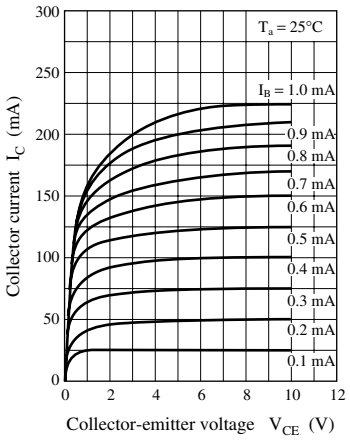


V_{IN} — I_O

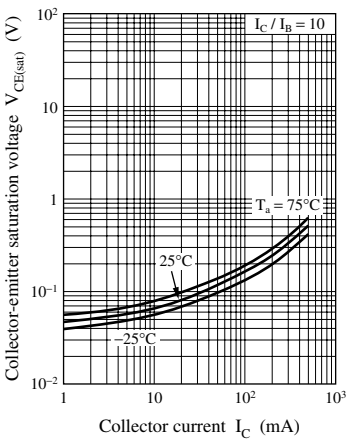


Characteristics charts of UNR4222

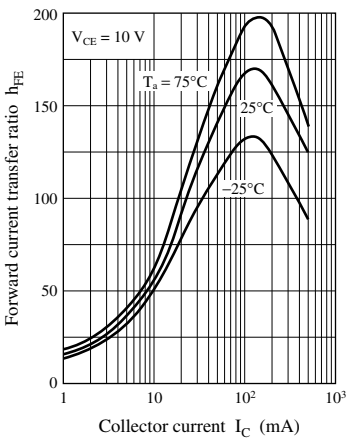
I_C — V_{CE}



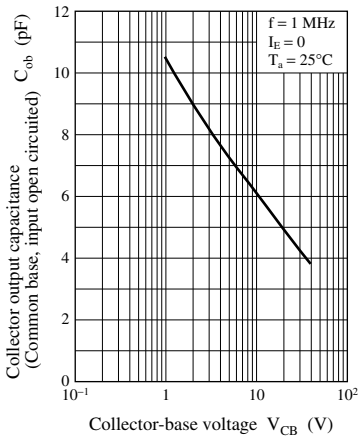
$V_{CE(sat)}$ — I_C



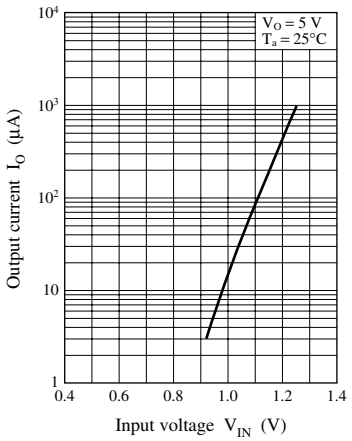
h_{FE} — I_C



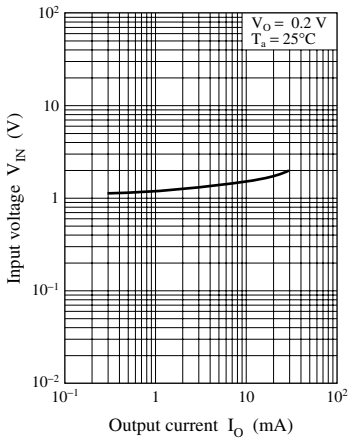
C_{ob} — V_{CB}



I_O — V_{IN}

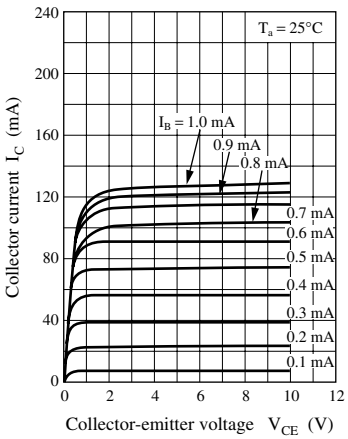


V_{IN} — I_O

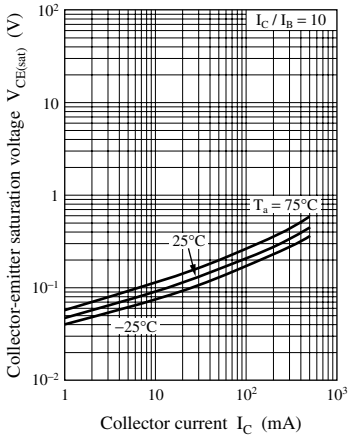


Characteristics charts of UNR4223

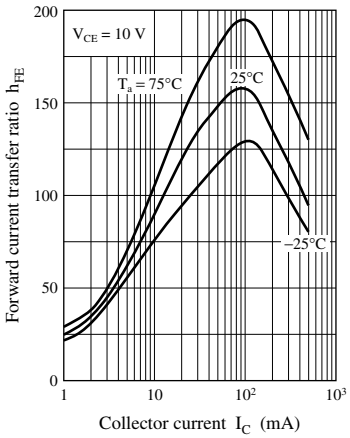
I_C — V_{CE}



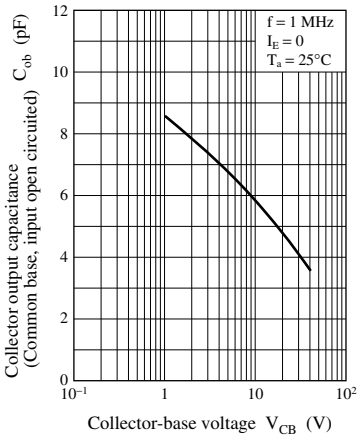
$V_{CE(sat)}$ — I_C



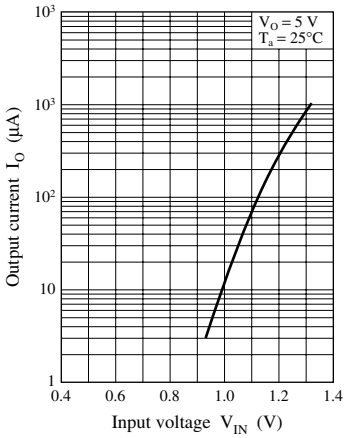
h_{FE} — I_C



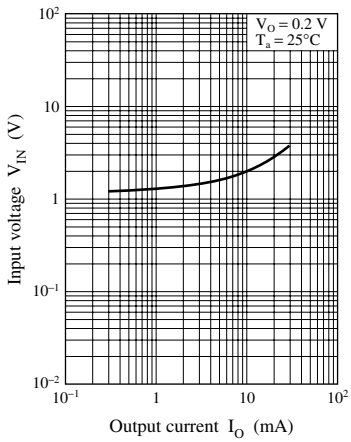
C_{ob} — V_{CB}



I_O — V_{IN}

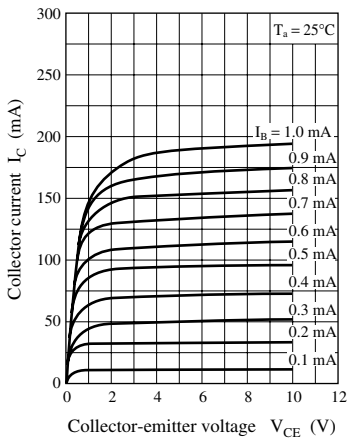


V_{IN} — I_O

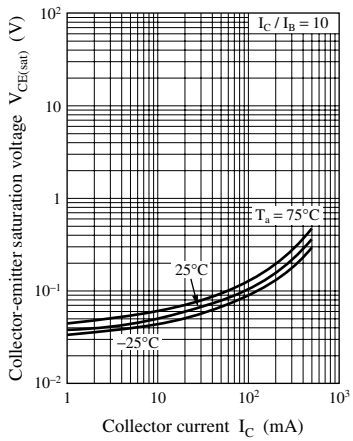


Characteristics charts of UNR4224

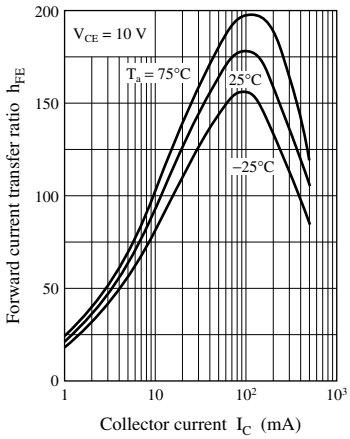
I_C — V_{CE}



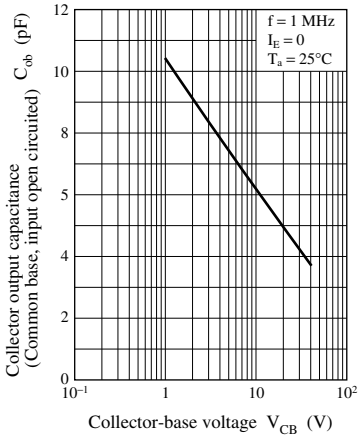
$V_{CE(sat)}$ — I_C



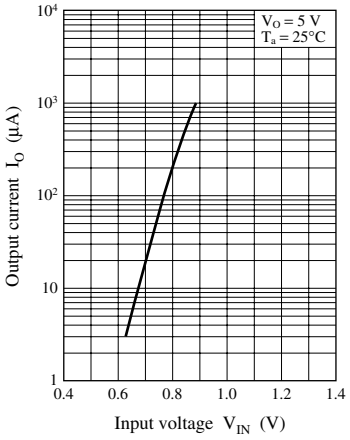
h_{FE} — I_C



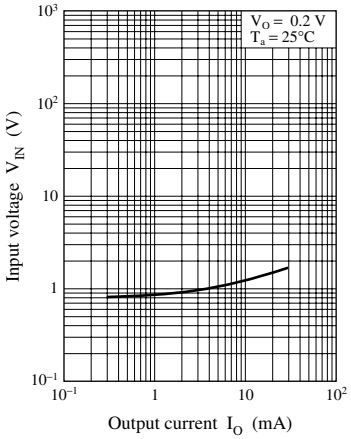
C_{ob} — V_{CB}



I_O — V_{IN}



V_{IN} — I_O



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