

# UP04210/4211/4213/4214/4215/4216

Silicon NPN epitaxial planar transistor

For switching/digital circuits

■ Features

- Two elements incorporated into one package  
(Transistors with built-in resistor)
- Reduction of the mounting area and assembly cost by one half

■ Resistance by Part Number

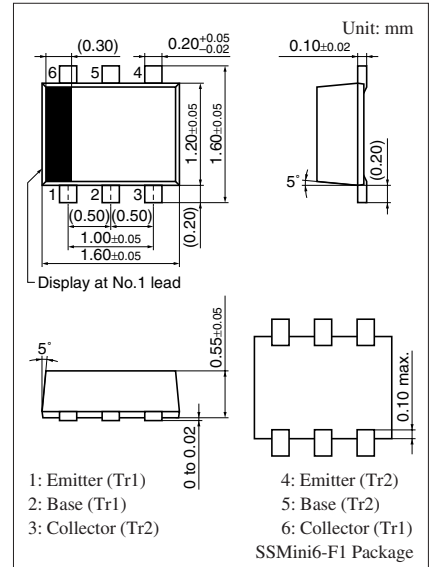
	Marking symbol	(R <sub>1</sub> )	(R <sub>2</sub> )
• UP04210	8Z	47 kΩ	—
• UP04211	9V	10 kΩ	10 kΩ
• UP04213	8S	47 kΩ	47 kΩ
• UP04214	BR	10 kΩ	47 kΩ
• UP04215	8T	10 kΩ	—
• UP04216	8U	4.7 kΩ	—

■ Absolute Maximum Ratings T<sub>a</sub> = 25°C

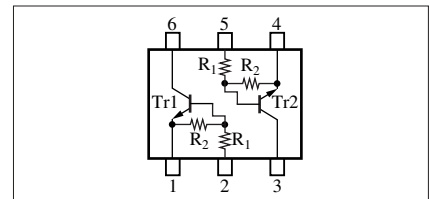
Parameter	Symbol	Rating	Unit
Collector to base voltage	V <sub>CBO</sub>	50	V
Collector to emitter voltage	V <sub>CEO</sub>	50	V
Collector current	I <sub>C</sub>	100	mA
Total power dissipation	P <sub>T</sub>	125	mW
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature	T <sub>stg</sub>	-55 to +125	°C

■ Electrical Characteristics T<sub>a</sub> = 25°C ± 3°C

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector to base voltage		V <sub>CBO</sub>	I <sub>C</sub> = 10 μA, I <sub>E</sub> = 0	50			V
Collector to emitter voltage		V <sub>CEO</sub>	I <sub>C</sub> = 2 mA, I <sub>B</sub> = 0	50			V
Collector cutoff current		I <sub>CBO</sub>	V <sub>CB</sub> = 50 V, I <sub>E</sub> = 0			0.1	μA
		I <sub>CEO</sub>	V <sub>CE</sub> = 50 V, I <sub>B</sub> = 0			0.5	
Emitter cutoff current	UP04211	I <sub>EBO</sub>	V <sub>EB</sub> = 6 V, I <sub>C</sub> = 0			0.5	mA
	UP04214					0.2	
	UP04213					0.1	
	UP04210/4215/4216					0.01	
Forward current transfer ratio	UP04211	h <sub>FE</sub>	V <sub>CE</sub> = 10 V, I <sub>C</sub> = 5 mA	35			
	UP04213/4214			80			
	UP04210/4215/4216			160	460		
Collector to emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> = 10 mA, I <sub>B</sub> = 0.3 mA			0.25	V



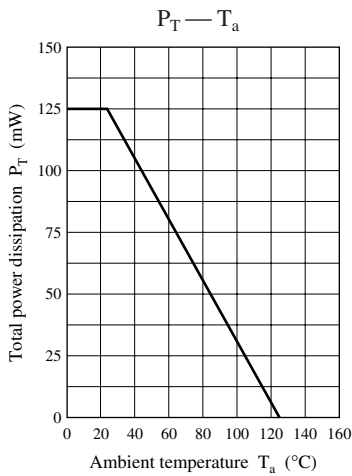
Internal Connection



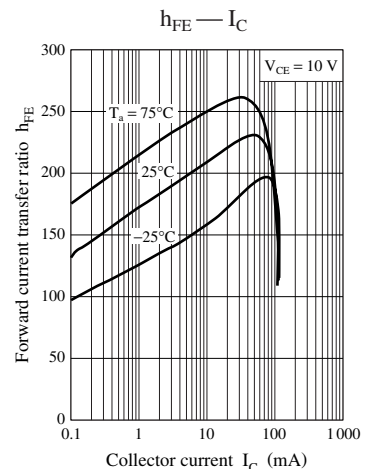
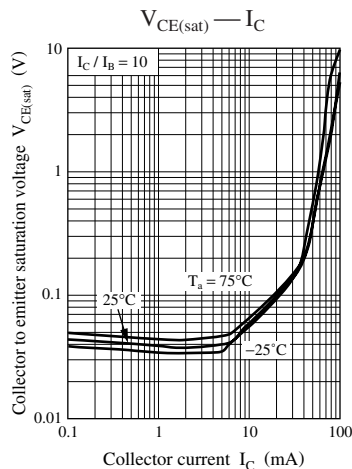
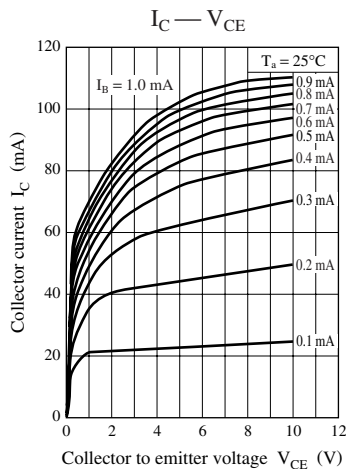
■ Electrical Characteristics (continued)  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

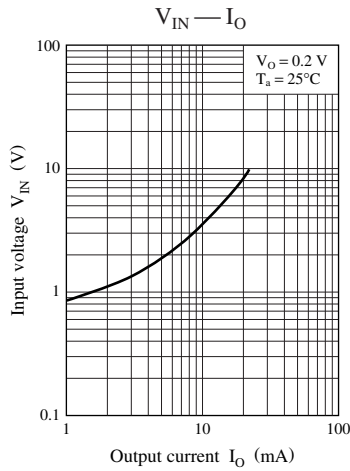
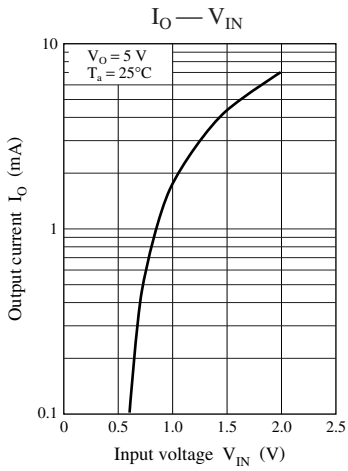
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
High-level output voltage	$V_{OH}$	$V_{CC} = 5\text{ V}, V_B = 0.5\text{ V}, R_L = 1\text{ k}\Omega$	4.9			V
Low-level output voltage	$V_{OL}$	$V_{CC} = 5\text{ V}, V_B = 2.5\text{ V}, R_L = 1\text{ k}\Omega$			0.2	V
		$V_{CC} = 5\text{ V}, V_B = 3.5\text{ V}, R_L = 1\text{ k}\Omega$				
Input resistance	$R_1$		-30%	4.7	+30%	k $\Omega$
				10		
				47		
Resistance ratio	$R_1 / R_2$		0.8	1.0	1.2	
			0.17	0.21	0.25	
Gain bandwidth product	$f_T$	$V_{CB} = 10\text{ V}, I_E = -2\text{ mA}, f = 200\text{ MHz}$		150		MHz

Common characteristics chart

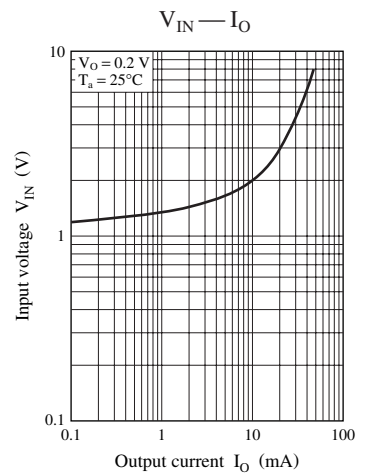
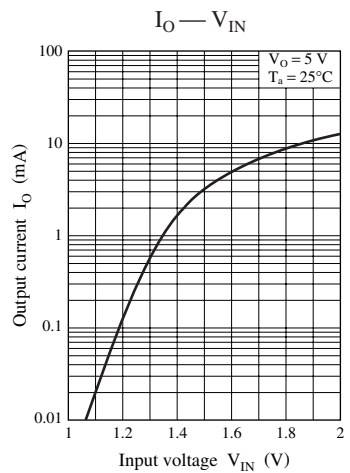
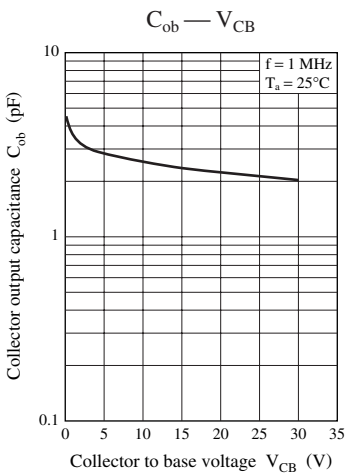
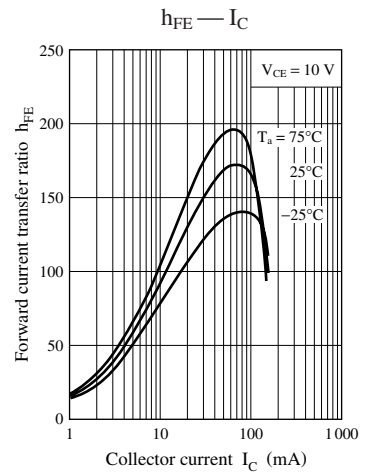
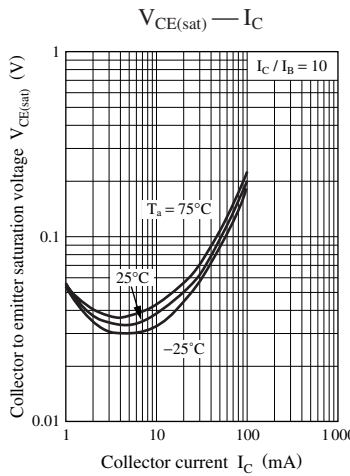
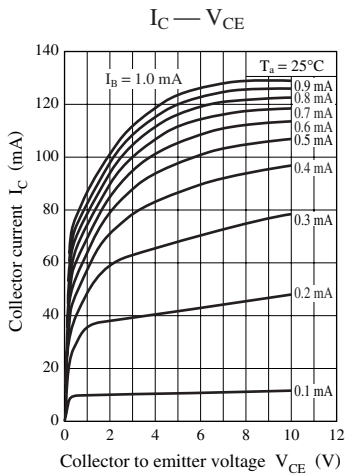


Characteristics charts of UP04210

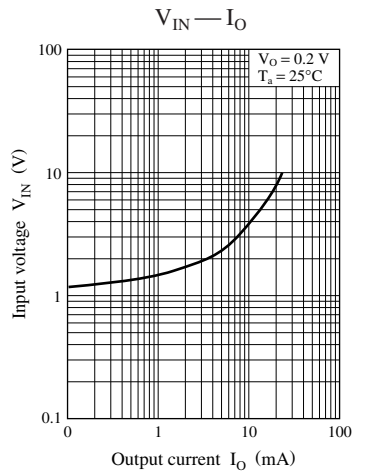
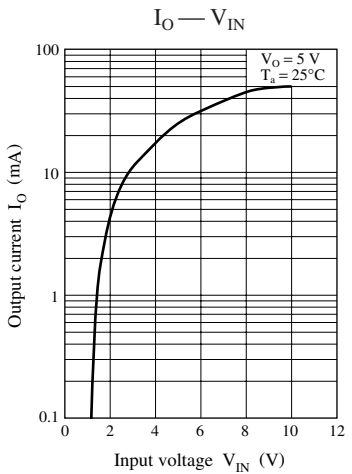
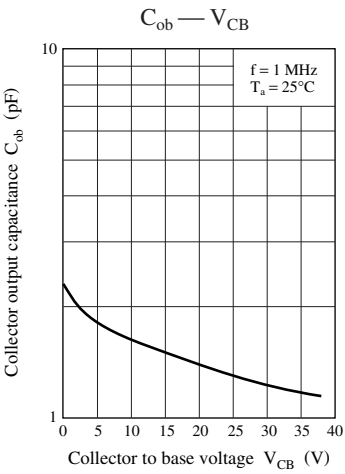
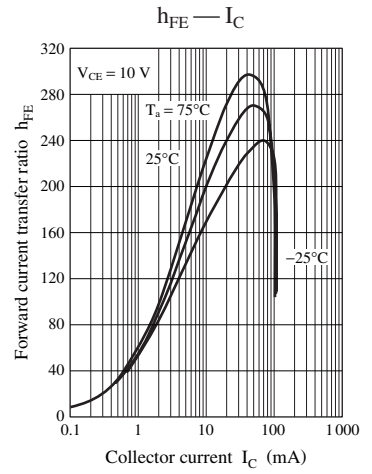
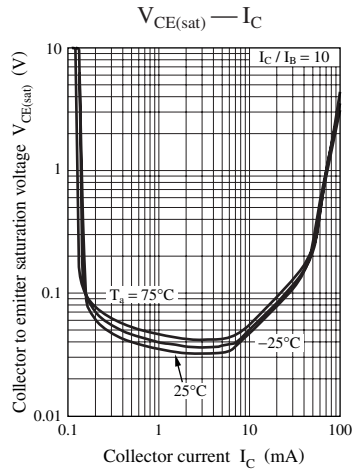
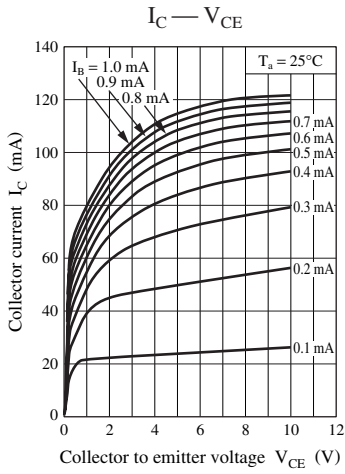




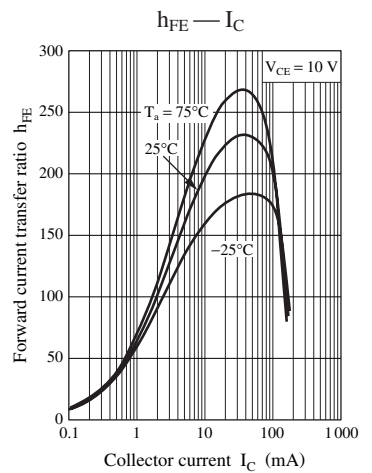
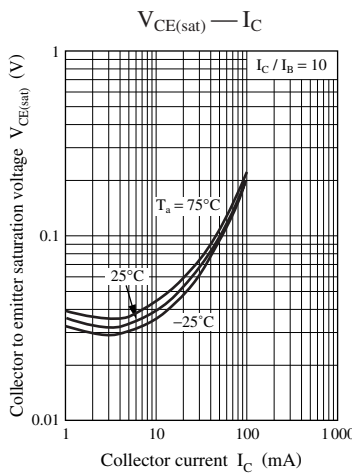
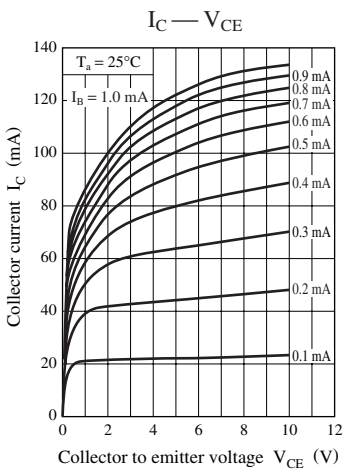
Characteristics charts of UP04211

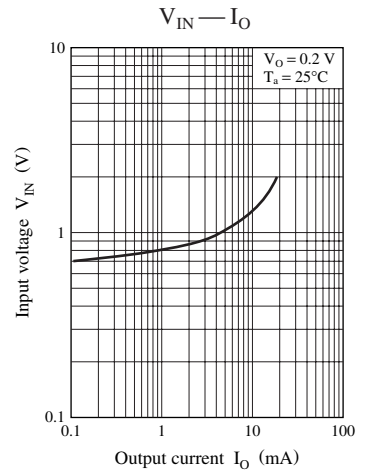
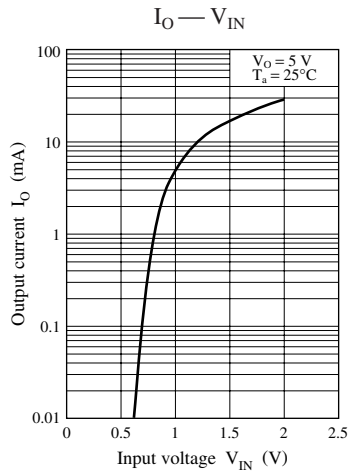
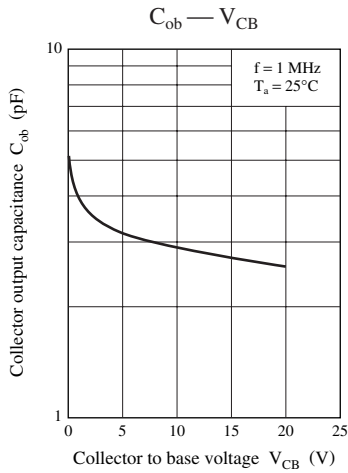


Characteristics charts of UP04213

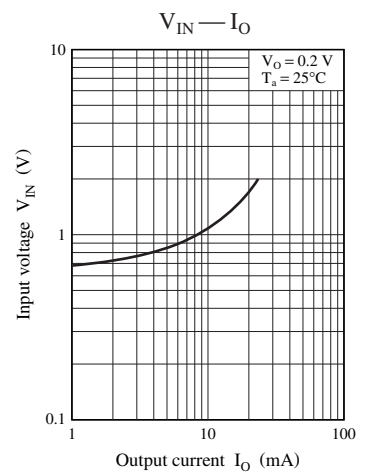
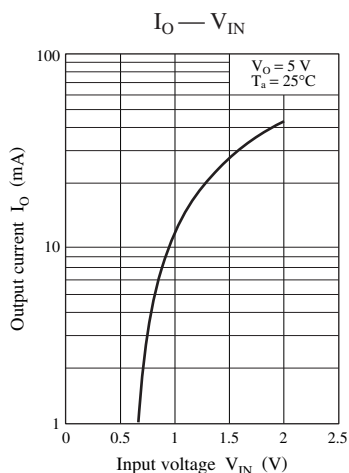
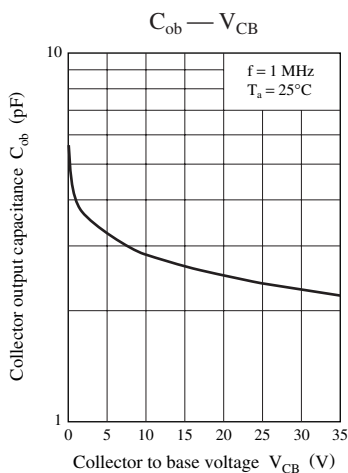
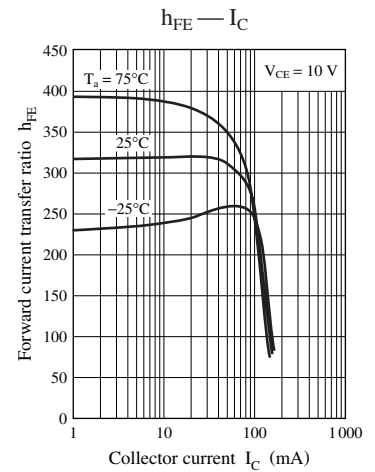
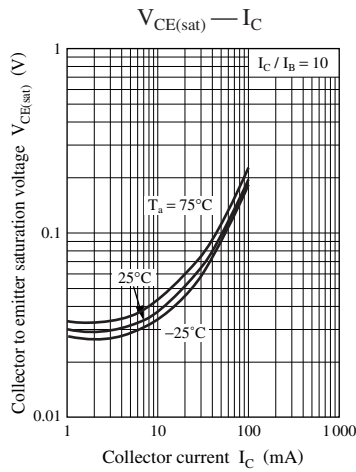
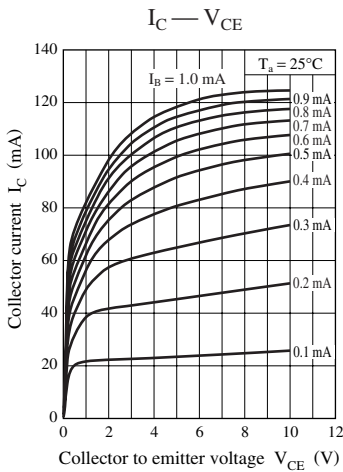


Characteristics charts of UP04214

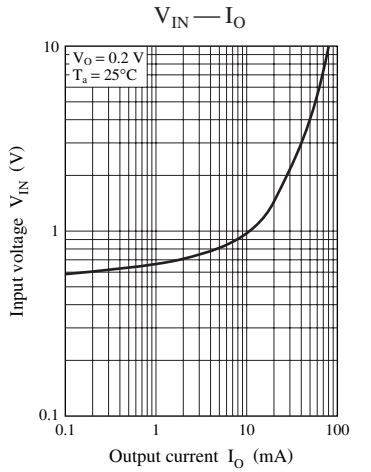
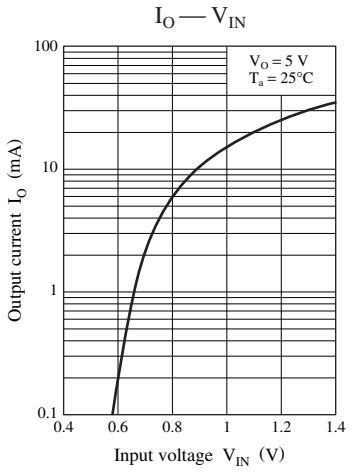
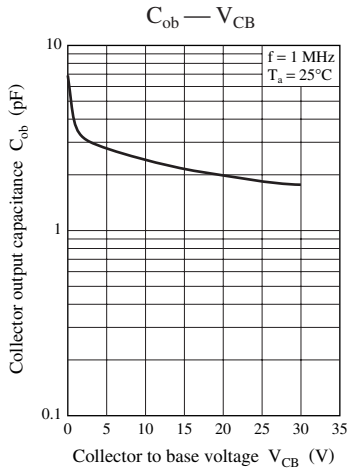
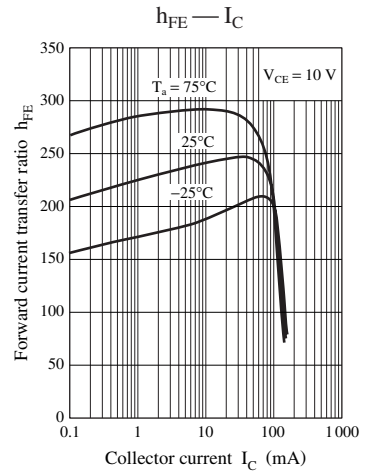
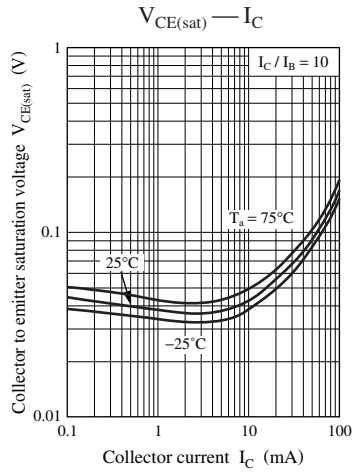
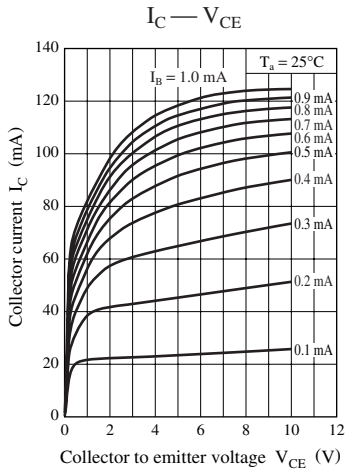




**Characteristics charts of UP04215**



Characteristics charts of UP04216



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