

Transistors with built-in Resistor



# UN1211/1212/1213/1214/1215/1216/1217/1218/1219/1210/ 121D/121E/121F/121K/121L

## Silicon NPN epitaxial planer transistor

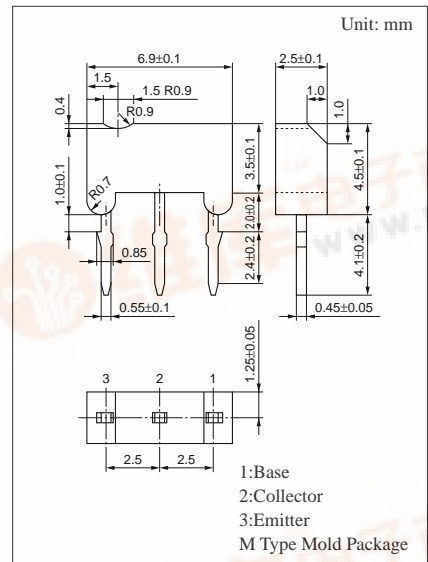
For digital circuits

### Features

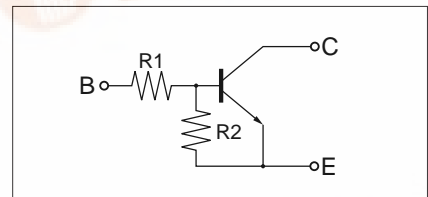
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- M type package allowing easy automatic and manual insertion as well as stand-alone fixing to the printed circuit board.

### Resistance by Part Number

	(R <sub>1</sub> )	(R <sub>2</sub> )
• UN1211	10kΩ	10kΩ
• UN1212	22kΩ	22kΩ
• UN1213	47kΩ	47kΩ
• UN1214	10kΩ	47kΩ
• UN1215	10kΩ	—
• UN1216	4.7kΩ	—
• UN1217	22kΩ	—
• UN1218	0.51kΩ	5.1kΩ
• UN1219	1kΩ	10kΩ
• UN1210	47kΩ	—
• UN121D	47kΩ	10kΩ
• UN121E	47kΩ	22kΩ
• UN121F	4.7kΩ	10kΩ
• UN121K	10kΩ	4.7kΩ
• UN121L	4.7kΩ	4.7kΩ



### Internal Connection



### Absolute Maximum Ratings (T<sub>a</sub>=25°C)

Parameter	Symbol	Rated	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>	400	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>sig</sub>	-55 to +150	°C



**UN1211/1212/1213/1214/1215/1216/1217/1218/  
Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L**

**Electrical Characteristics (Ta=25°C)**

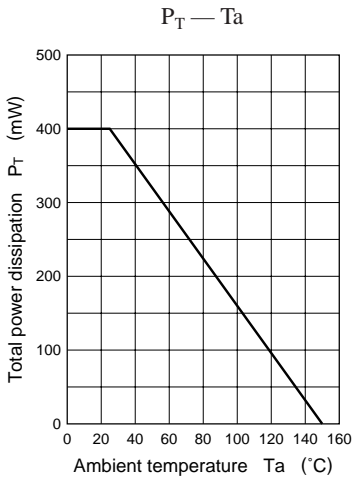
Parameter		Symbol	Conditions	min	typ	max	Unit	
Collector cutoff current		I <sub>CBO</sub>	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0			0.1	μA	
		I <sub>CEO</sub>	V <sub>CE</sub> = 50V, I <sub>B</sub> = 0			0.5	μA	
Emitter cutoff current	UN1211	I <sub>EBO</sub>	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0			0.5	mA	
	UN1212/1214/121E/121D					0.2		
	UN1213					0.1		
	UN1215/1216/1217/1210					0.01		
	UN121F/121K					1.0		
	UN1219					1.5		
	UN1218/121L					2.0		
Collector to base voltage		V <sub>CBO</sub>	I <sub>C</sub> = 10μA, I <sub>E</sub> = 0	50			V	
Collector to emitter voltage		V <sub>CEO</sub>	I <sub>C</sub> = 2mA, I <sub>B</sub> = 0	50			V	
Forward current transfer ratio	UN1211	h <sub>FE</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA	35				
	UN1212/121E			60				
	UN1213/1214			80				
	UN1215*/1216*/1217*/1210*			160		460		
	UN121F/121D/1219			30				
	UN1218/121K/121L			20				
Collector to emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> = 10mA, I <sub>B</sub> = 0.3mA			0.25	V	
Output voltage high level		V <sub>OH</sub>	V <sub>CC</sub> = 5V, V <sub>B</sub> = 0.5V, R <sub>L</sub> = 1kΩ	4.9			V	
Output voltage low level		V <sub>OL</sub>	V <sub>CC</sub> = 5V, V <sub>B</sub> = 2.5V, R <sub>L</sub> = 1kΩ			0.2	V	
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 3.5V, R <sub>L</sub> = 1kΩ			0.2		
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 10V, R <sub>L</sub> = 1kΩ			0.2		
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 6V, R <sub>L</sub> = 1kΩ			0.2		
Transition frequency		f <sub>T</sub>	V <sub>CB</sub> = 10V, I <sub>E</sub> = -2mA, f = 200MHz		80		MHz	
Input resistance	UN1211/1214/1215/121K	R <sub>I</sub>		(-30%)		10	(+30%)	kΩ
	UN1212/1217					22		
	UN1213/121D/121E/1210					47		
	UN1216/121F/121L					4.7		
	UN1218					0.51		
	UN1219					1		
Resistance ratio	UN1211/1212/1213/121L	R <sub>I</sub> /R <sub>2</sub>				0.8	1.0	1.2
	UN1214					0.17	0.21	0.25
	UN1218/1219					0.08	0.1	0.12
	UN121D						4.7	
	UN121E						2.14	
	UN121F						0.47	
	UN121K						2.13	

\* h<sub>FE</sub> rank classification (UN1215/1216/1217/1210)

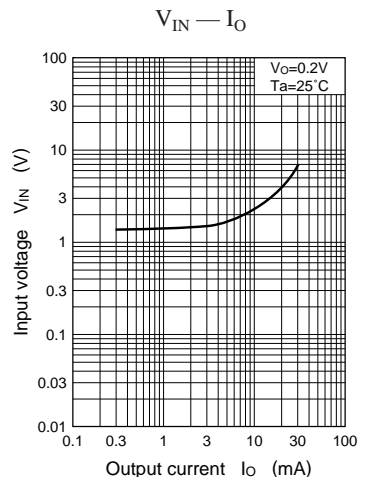
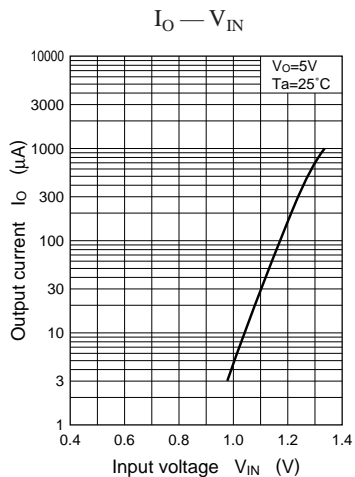
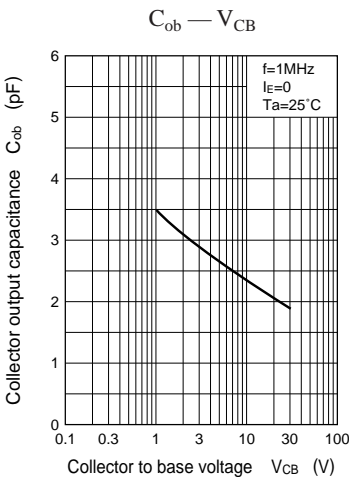
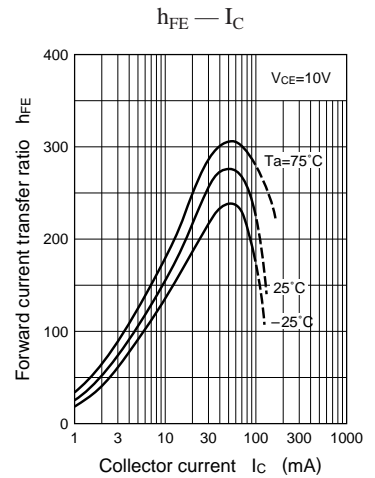
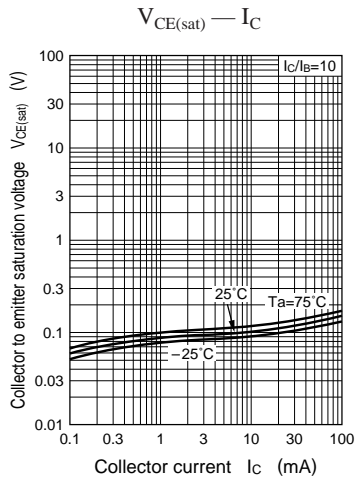
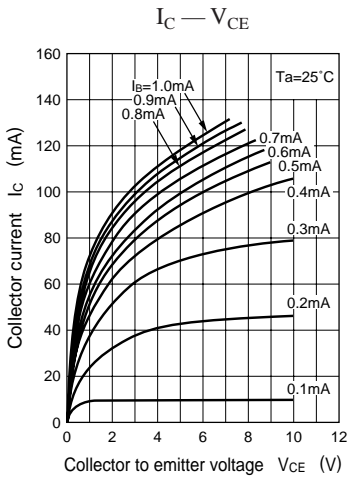
Rank	Q	R	S
h <sub>FE</sub>	160 to 260	210 to 340	290 to 460

UN1211/1212/1213/1214/1215/1216/1217/1218/  
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Common characteristics chart

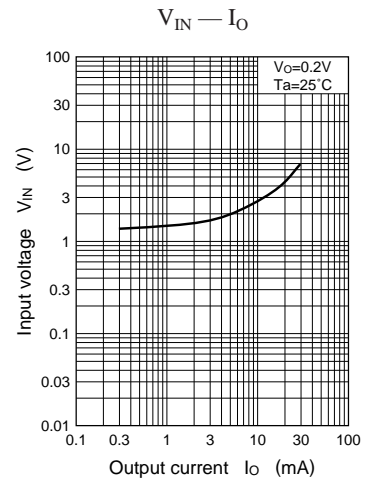
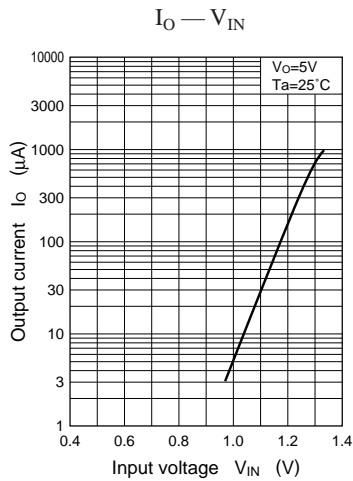
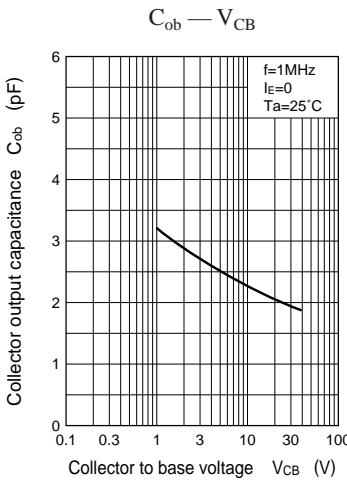
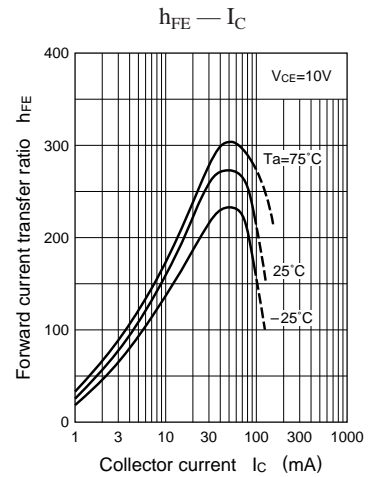
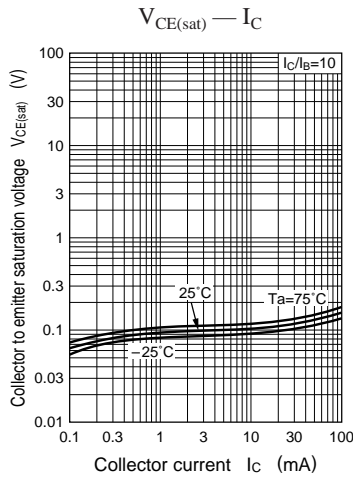
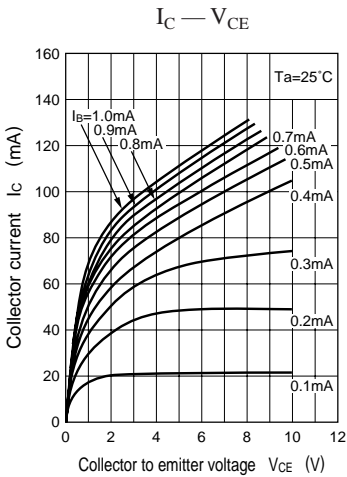


Characteristics charts of UN1211

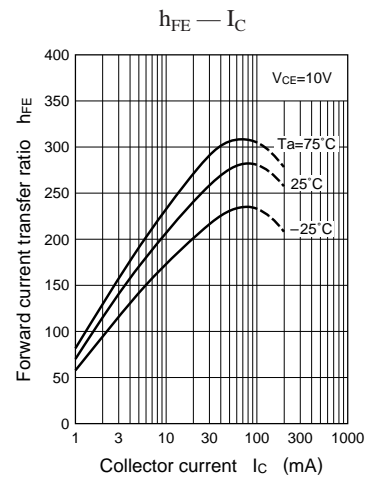
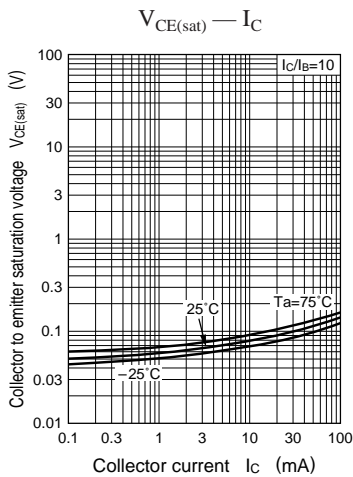
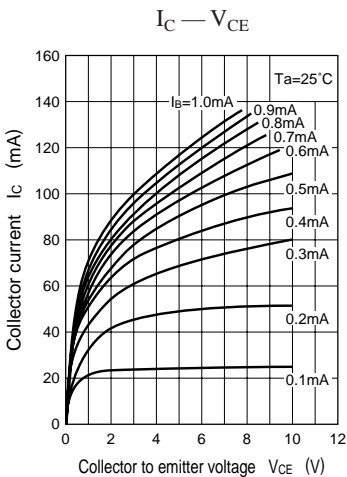


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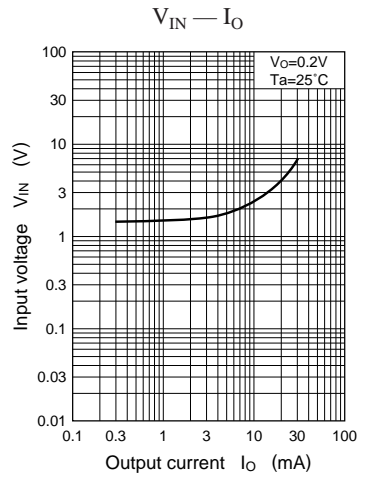
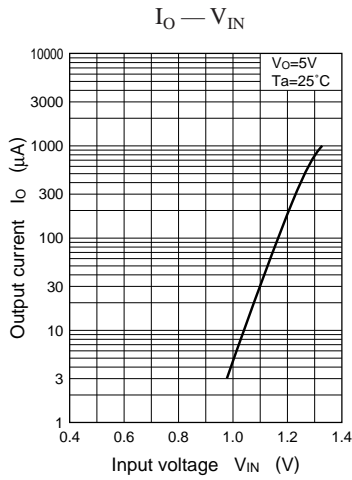
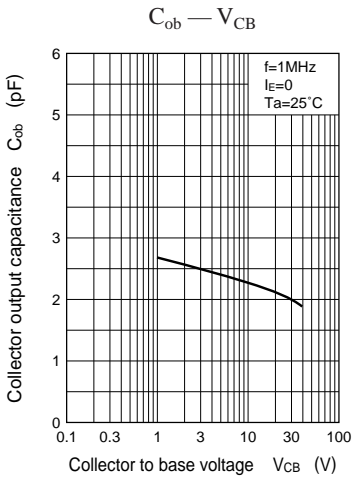
Characteristics charts of UN1212



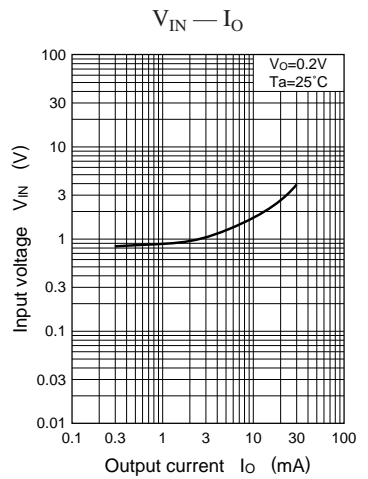
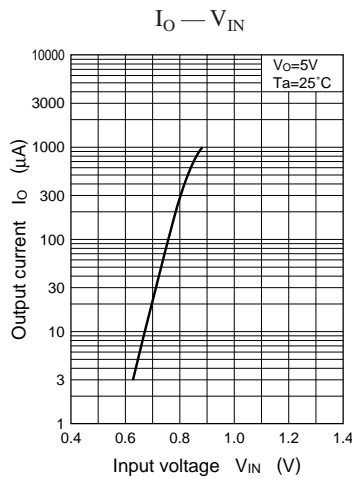
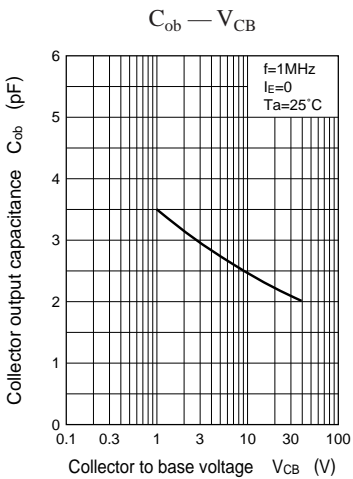
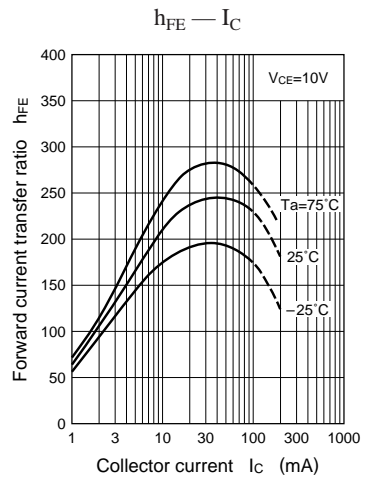
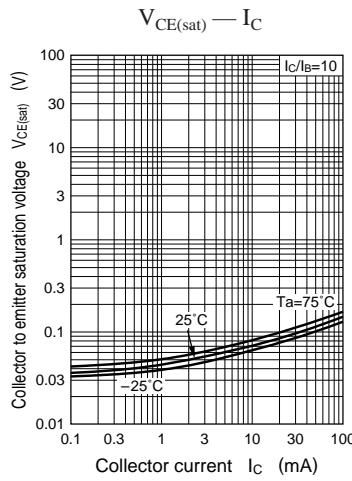
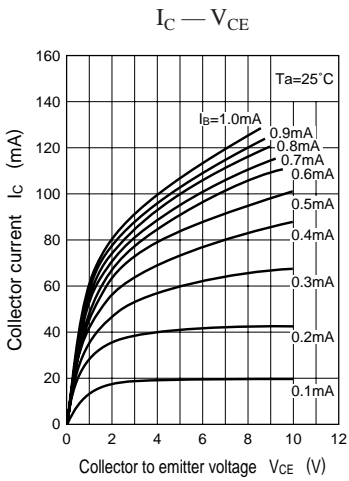
Characteristics charts of UN1213



UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

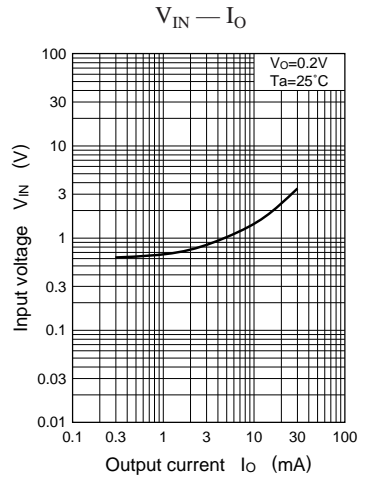
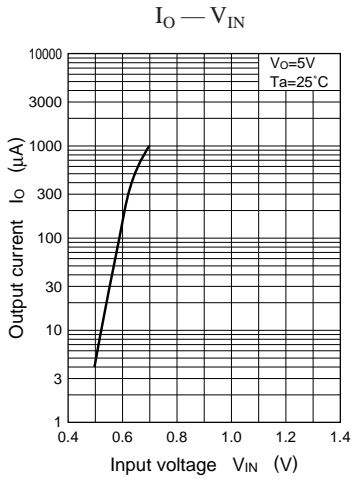
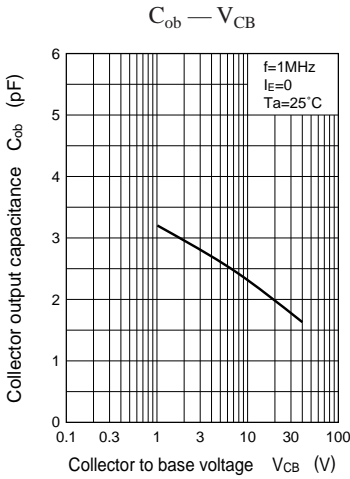
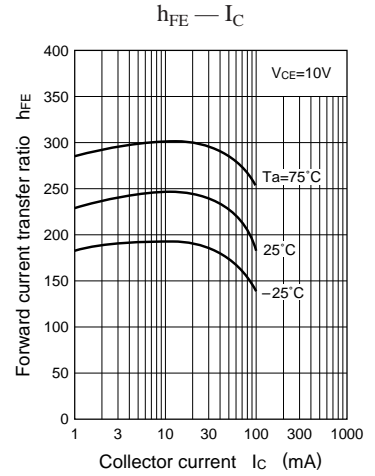
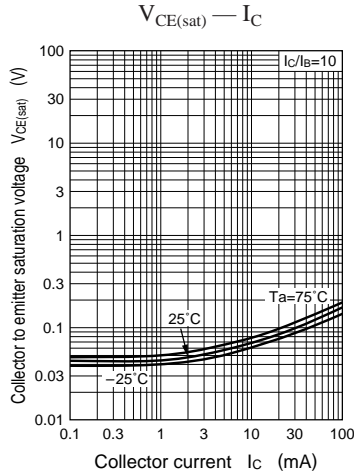
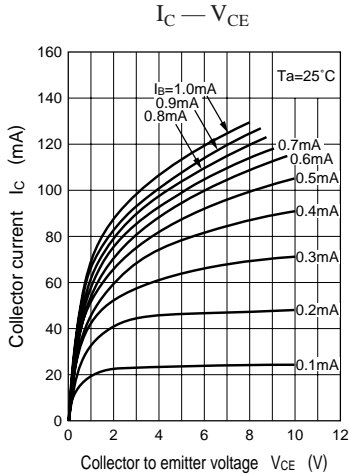


Characteristics charts of UN1214

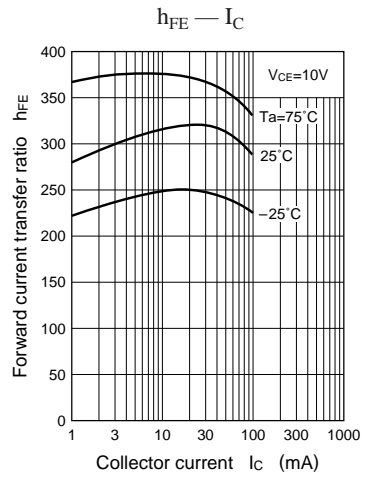
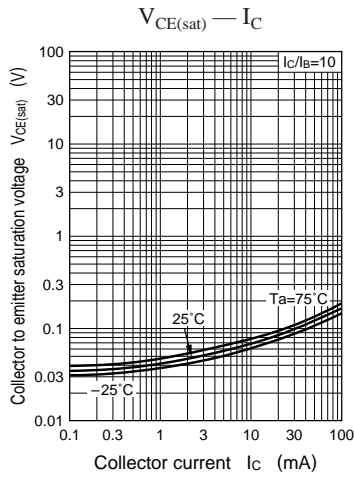
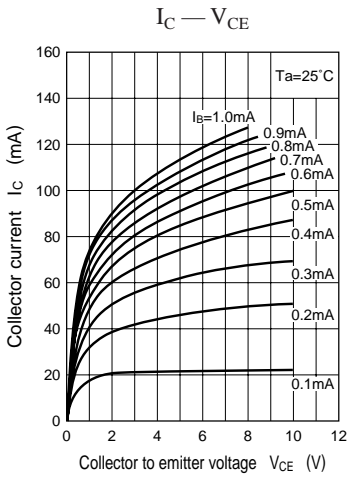


UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

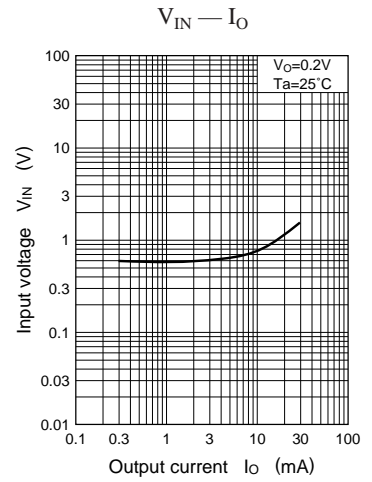
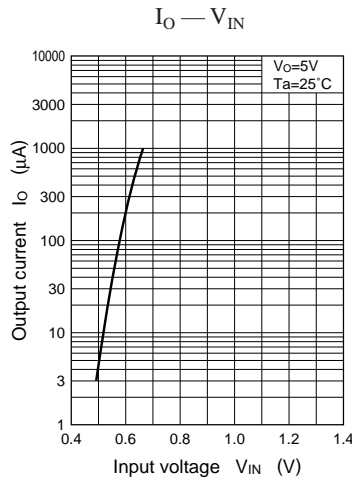
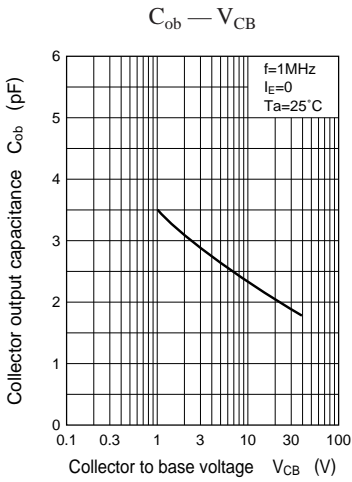
Characteristics charts of UN1215



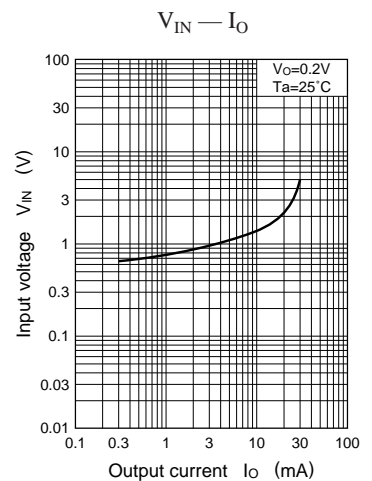
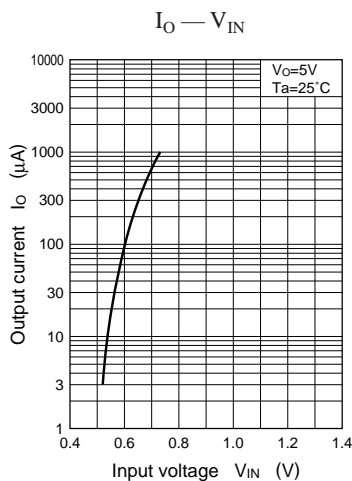
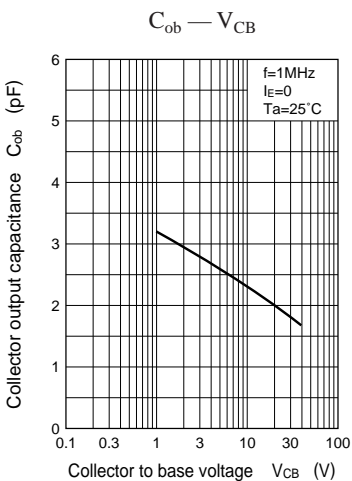
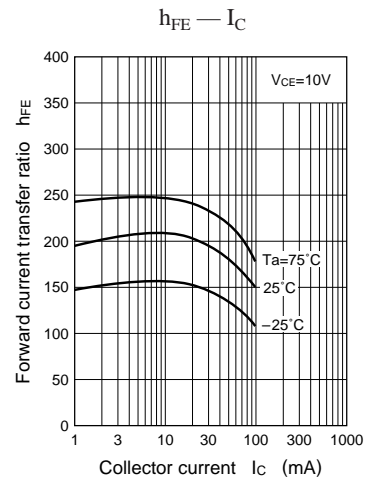
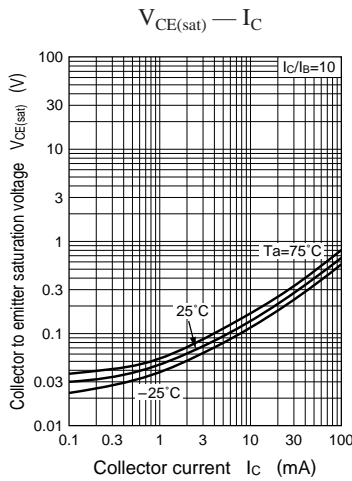
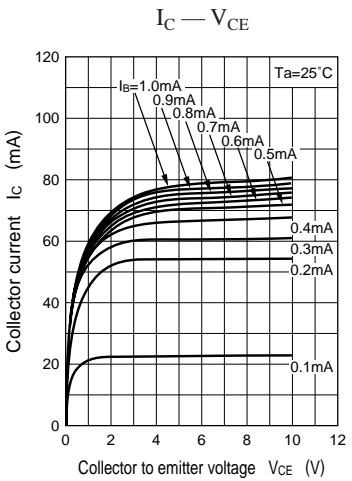
Characteristics charts of UN1216



UN1211/1212/1213/1214/1215/1216/1217/1218/  
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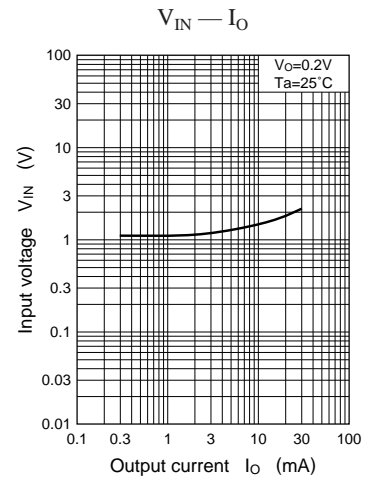
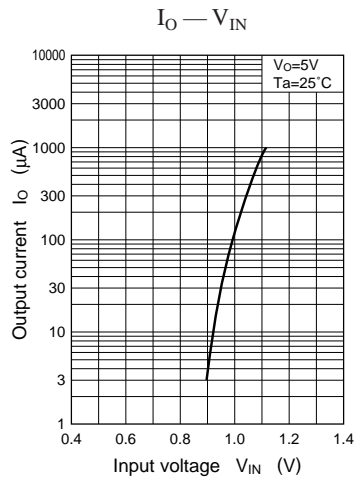
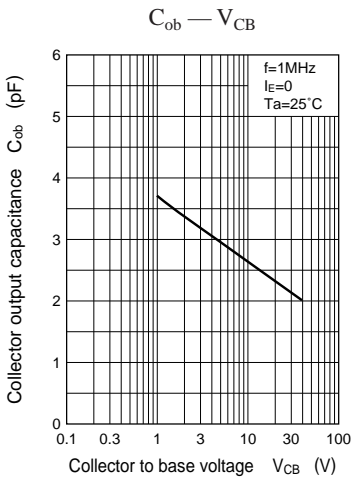
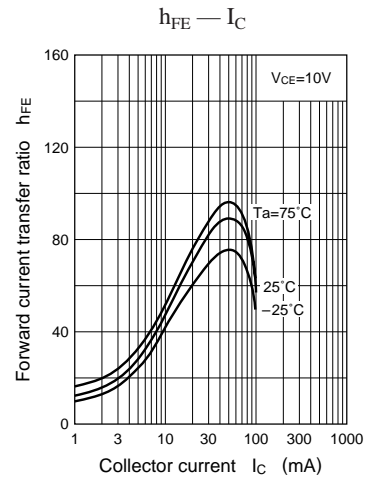
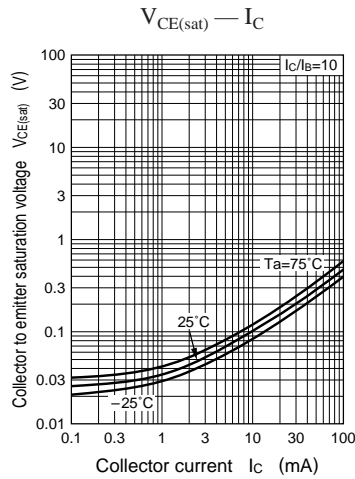
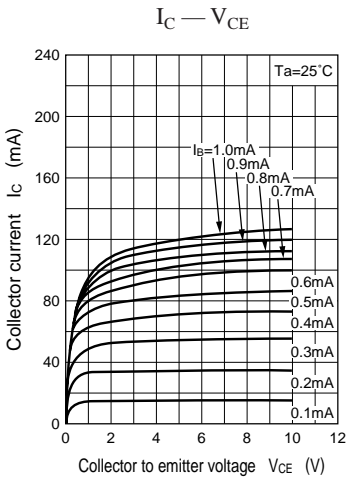


Characteristics charts of UN1217

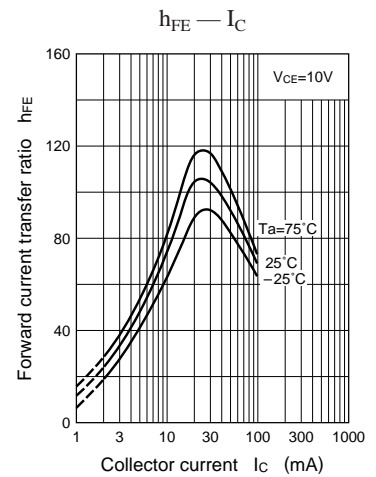
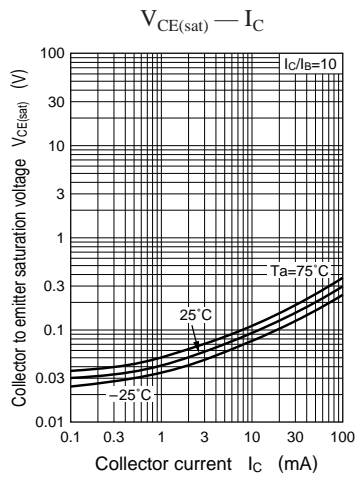
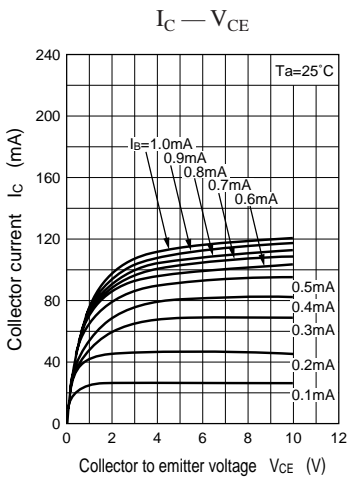


UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

Characteristics charts of UN1218

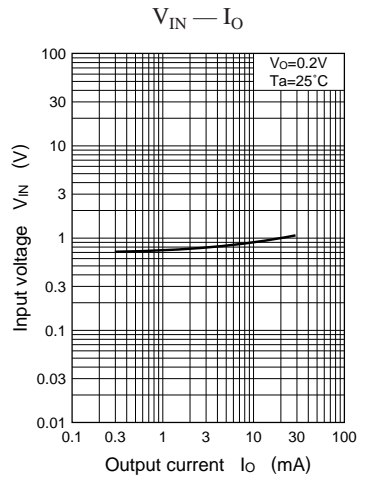
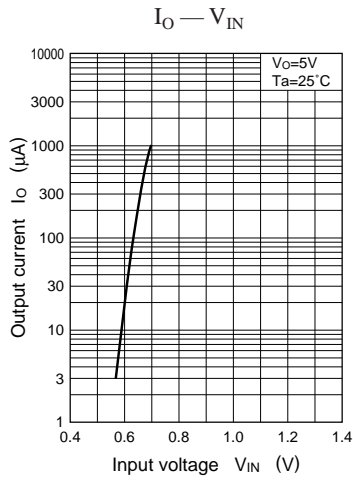
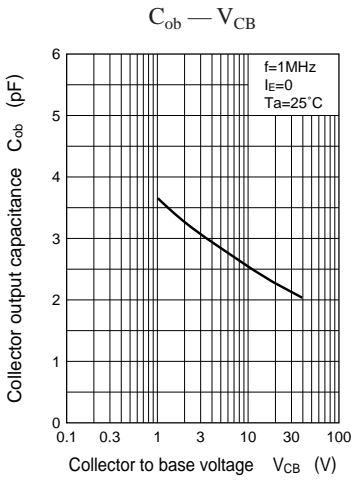


Characteristics charts of UN1219

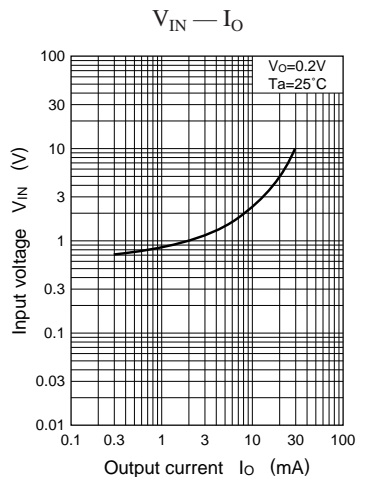
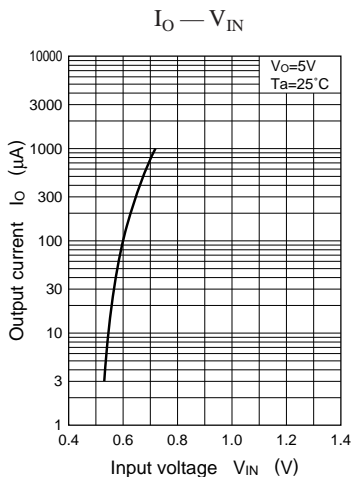
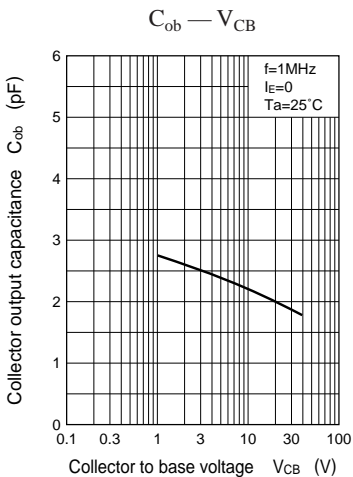
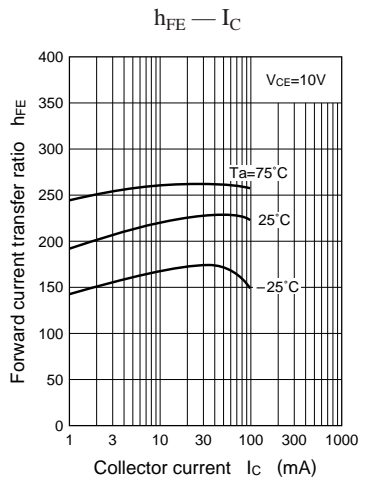
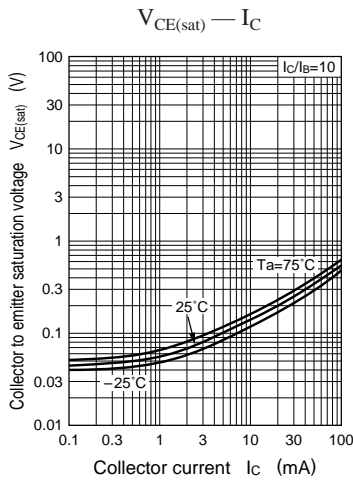
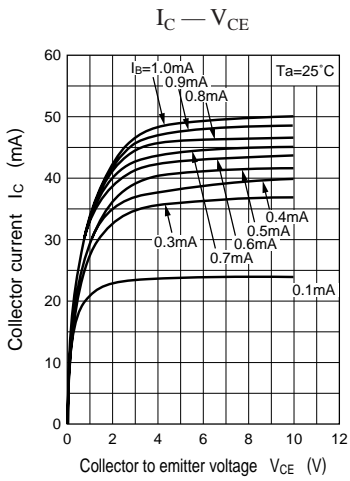




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 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

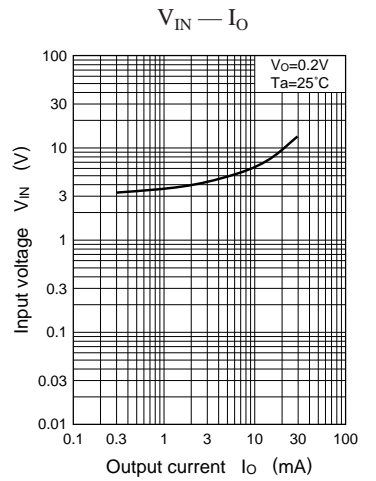
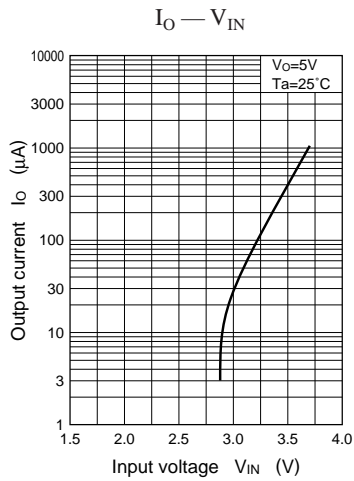
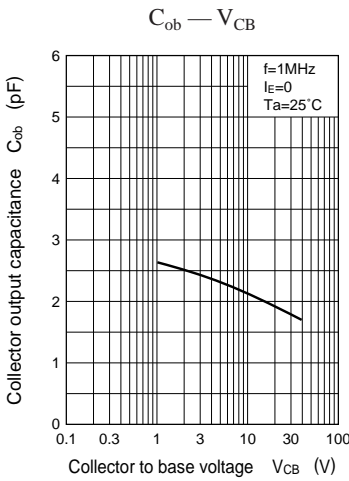
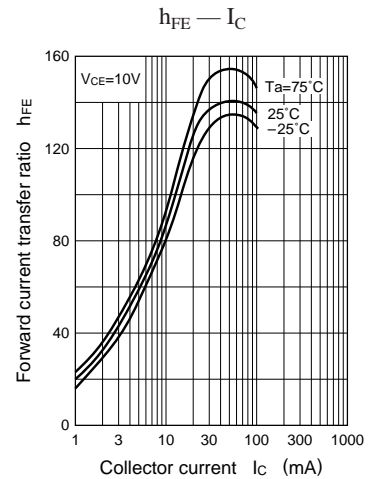
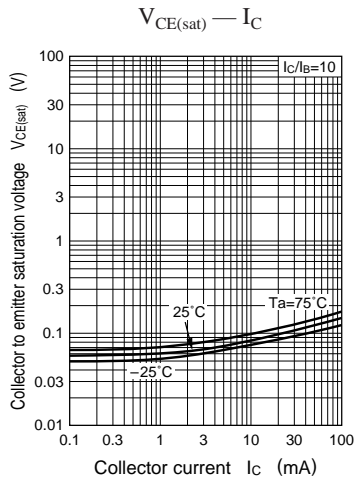
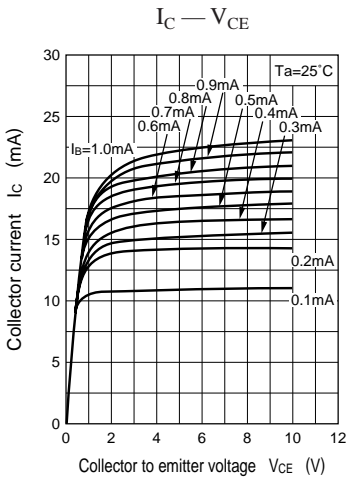


Characteristics charts of UN1210

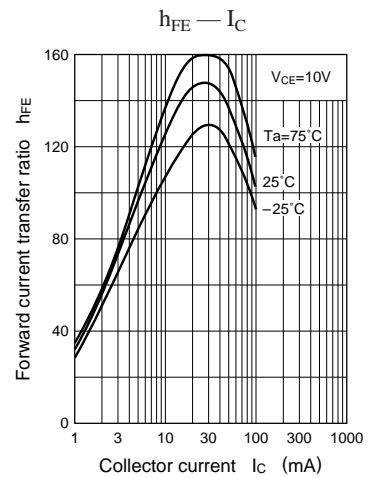
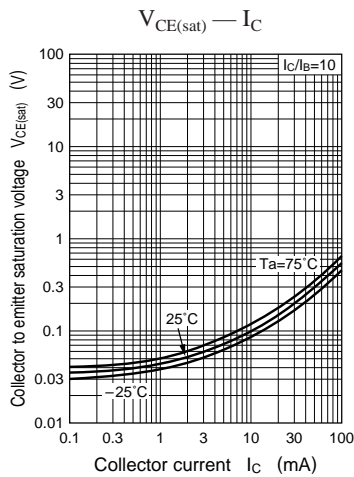
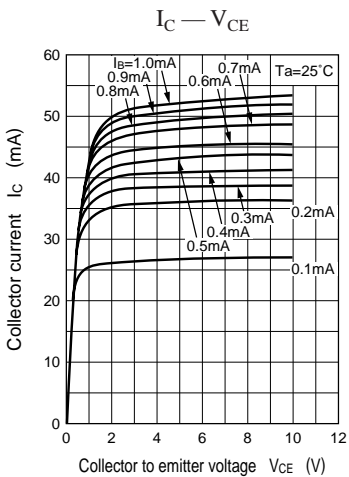


UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

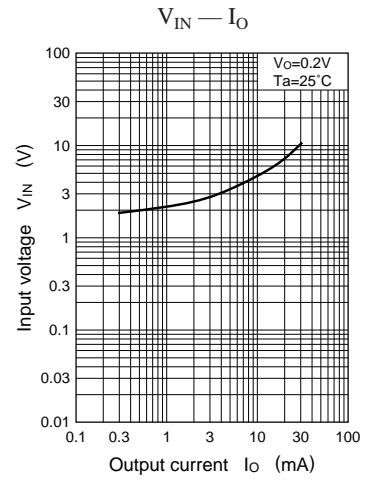
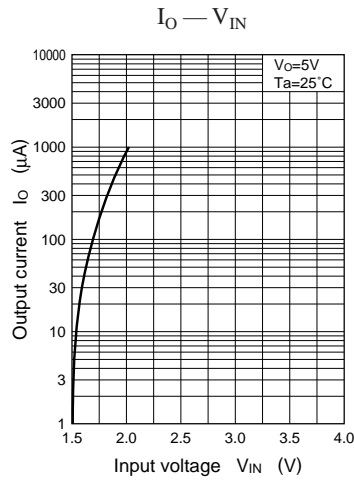
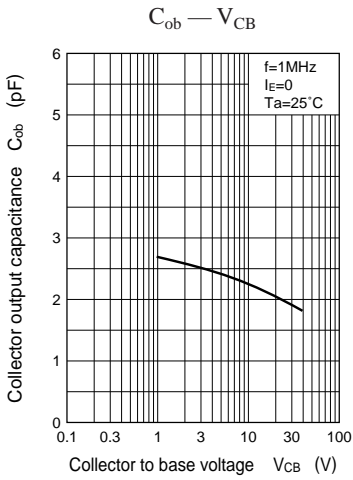
Characteristics charts of UN121D



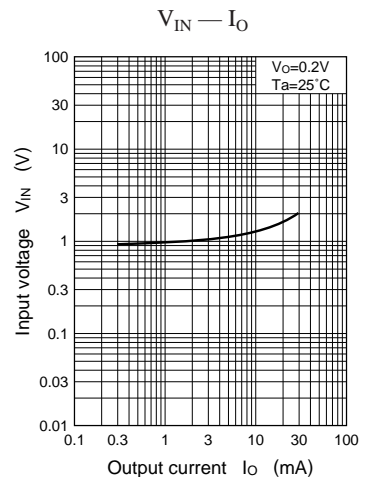
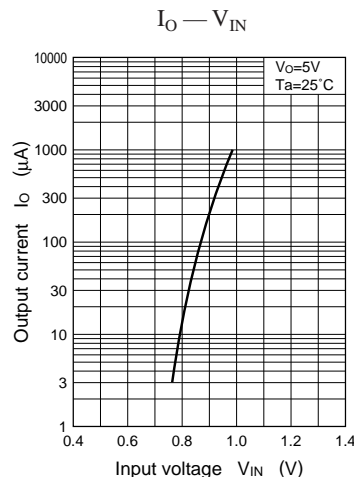
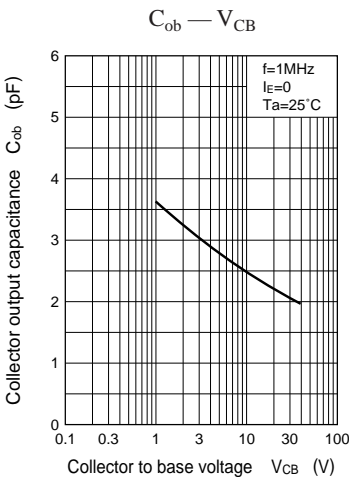
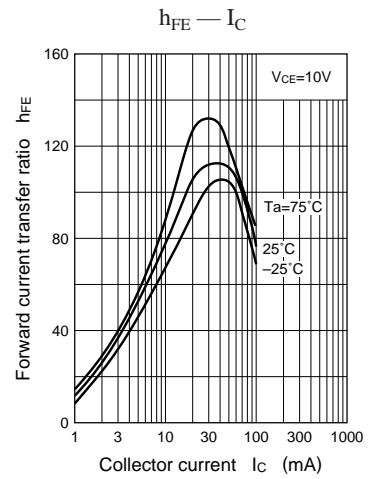
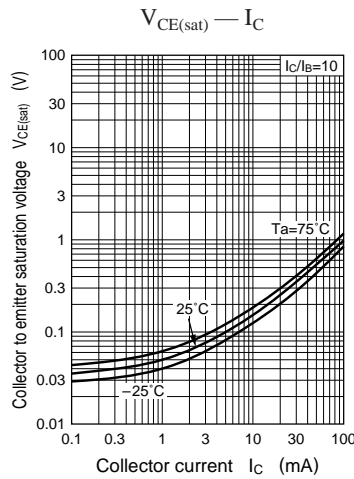
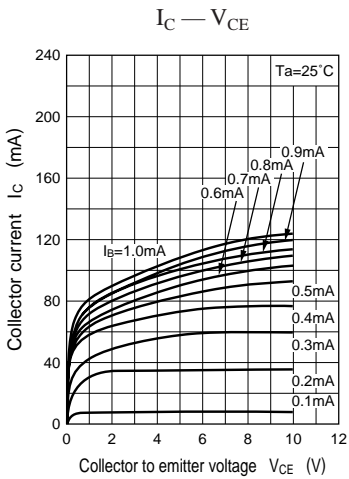
Characteristics charts of UN121E



UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

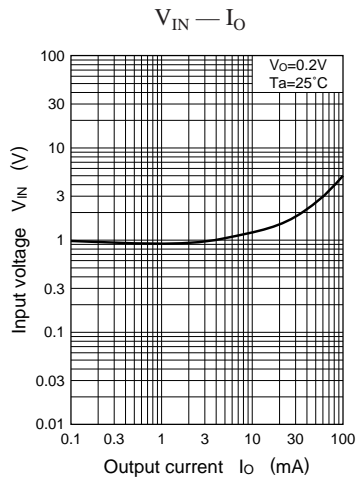
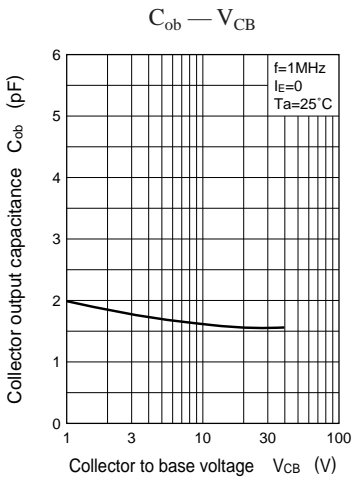
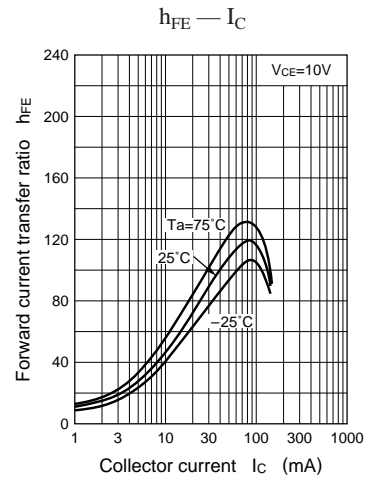
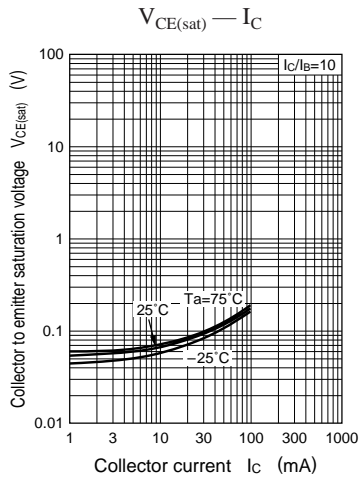
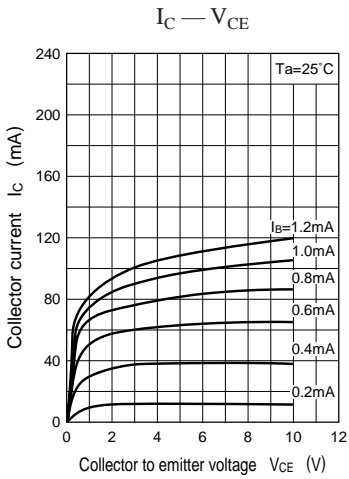


Characteristics charts of UN121F

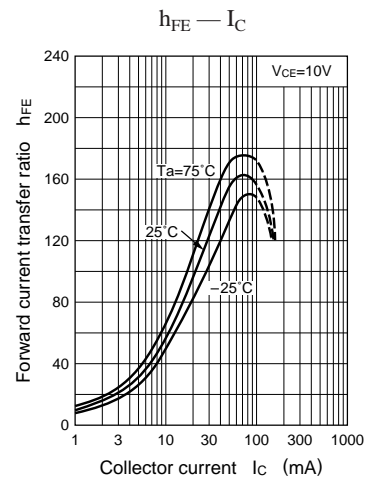
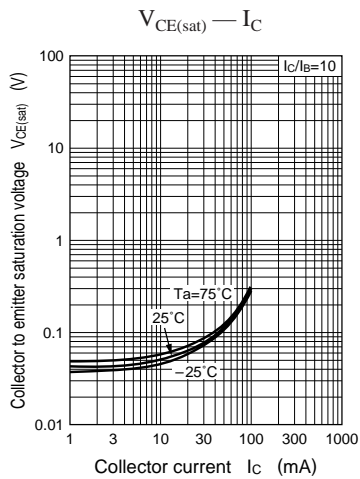
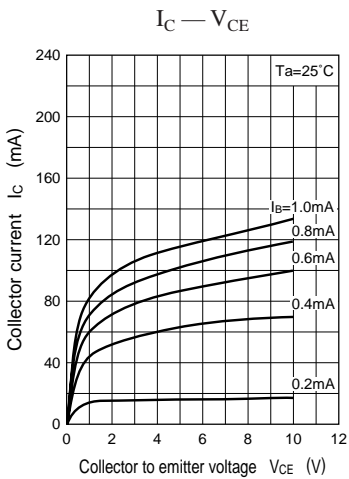


UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

Characteristics charts of UN121K



Characteristics charts of UN121L



UN1211/1212/1213/1214/1215/1216/1217/1218/  
Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L

