

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

## Silicon NPN epitaxial planer transistor

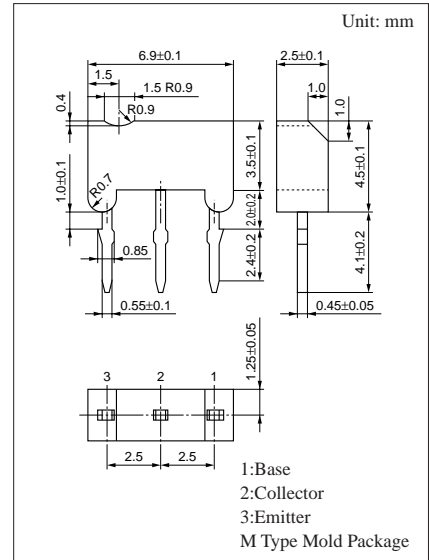
For digital circuits

### Features

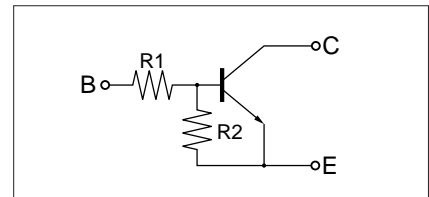
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- M type package allowing easy automatic and manual insertion as well as stand-alone fixing to the printed circuit board.

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

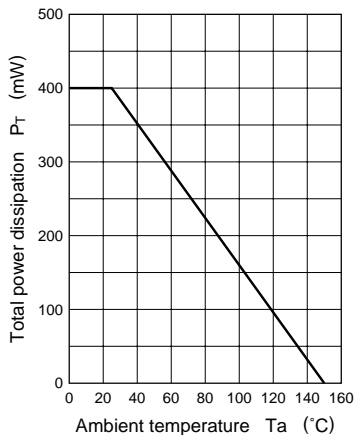
Parameter		Symbol	Conditions	min	typ	max	Unit	
Collector cutoff current		I <sub>CBO</sub>	V <sub>CB</sub> = 50V, I <sub>E</sub> = 0			0.1	μA	
		I <sub>CEO</sub>	V <sub>CE</sub> = 50V, I <sub>B</sub> = 0			0.5	μA	
Emitter cutoff current	UN1211	I <sub>EBO</sub>	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0			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			V	
	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>1</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

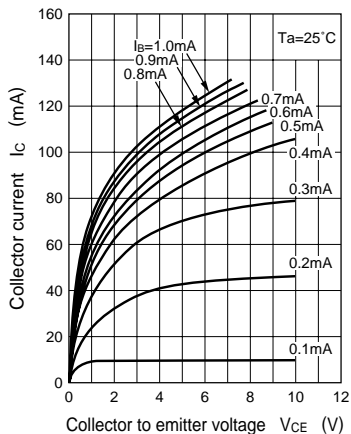
Common characteristics chart

$P_T - T_a$

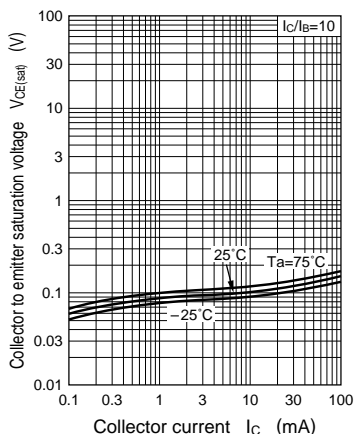


Characteristics charts of UN1211

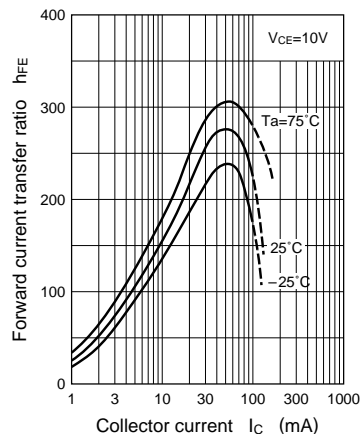
$I_C - V_{CE}$



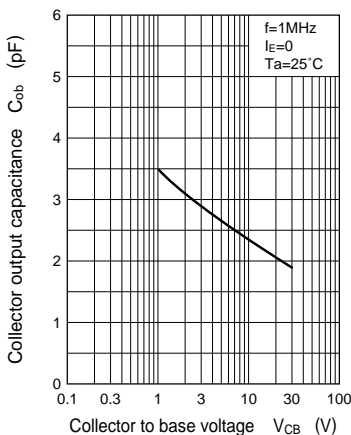
$V_{CE(sat)} - I_C$



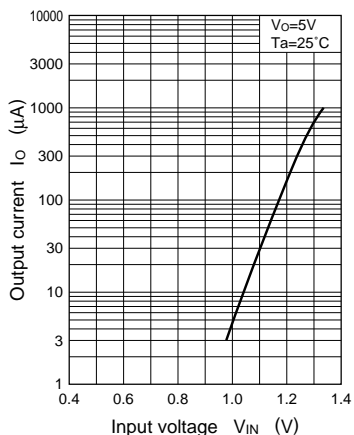
$h_{FE} - I_C$



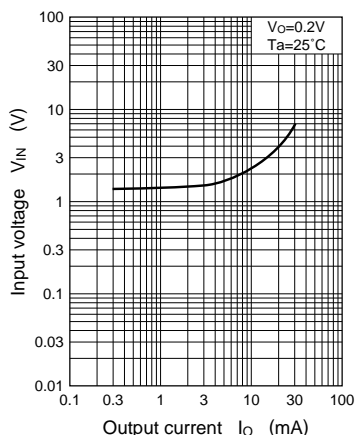
$C_{ob} - V_{CB}$



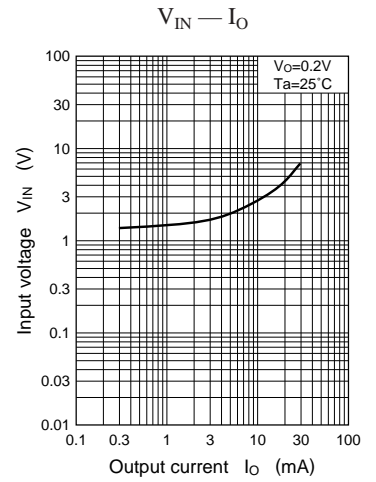
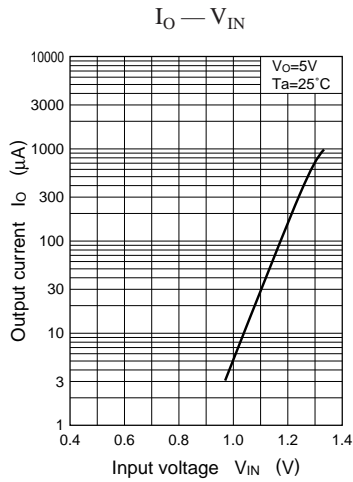
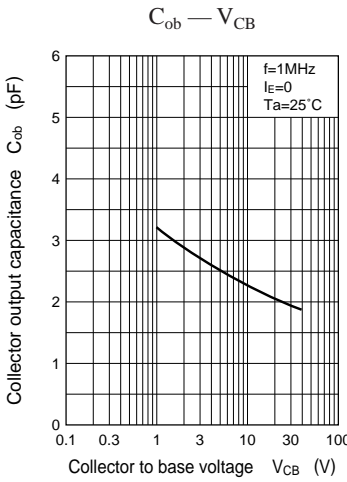
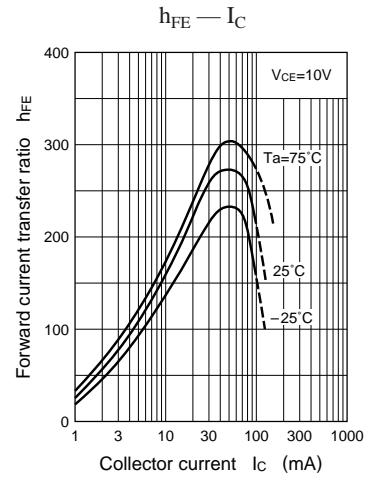
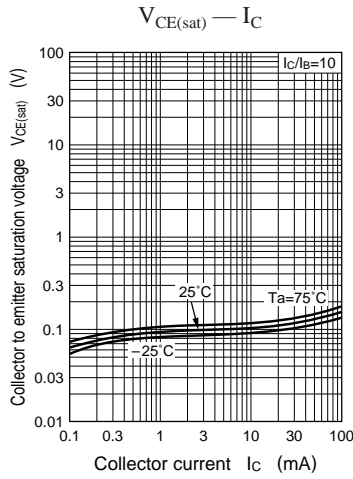
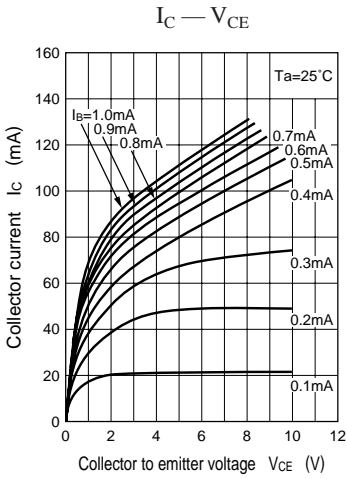
$I_O - V_{IN}$



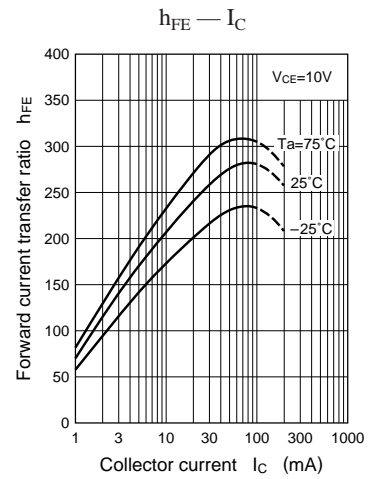
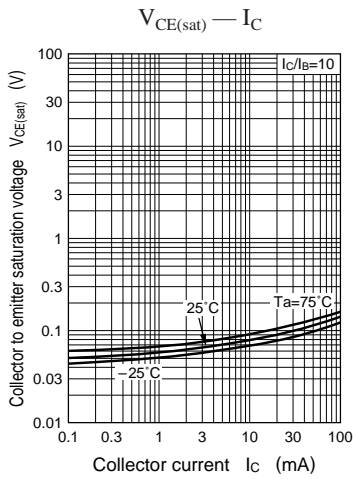
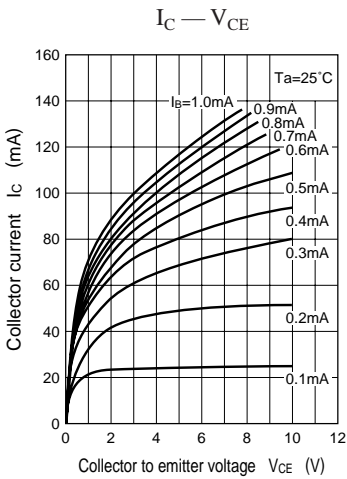
$V_{IN} - I_O$



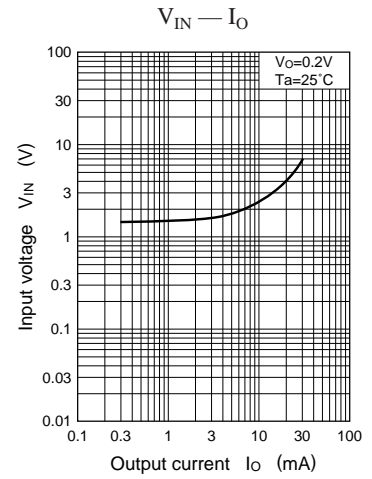
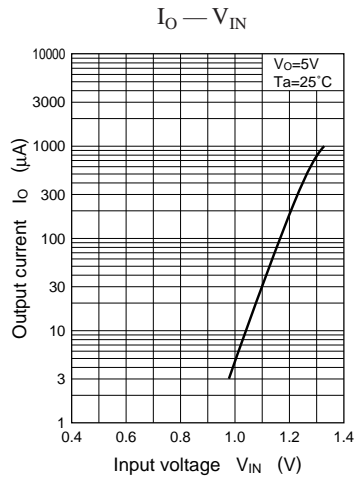
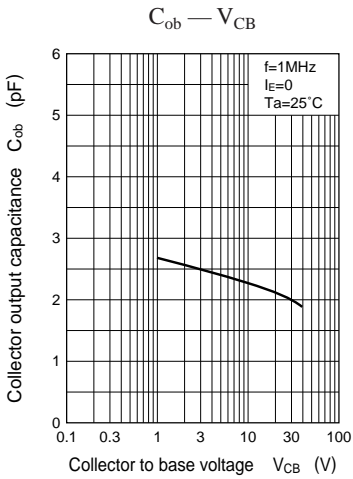
Characteristics charts of UN1212



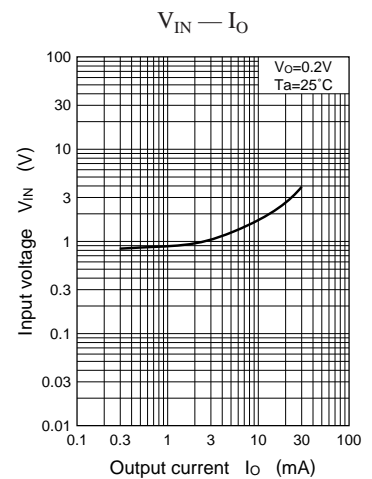
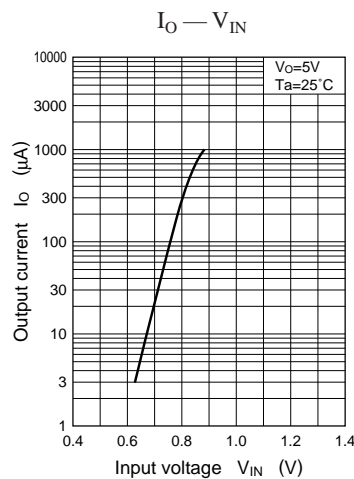
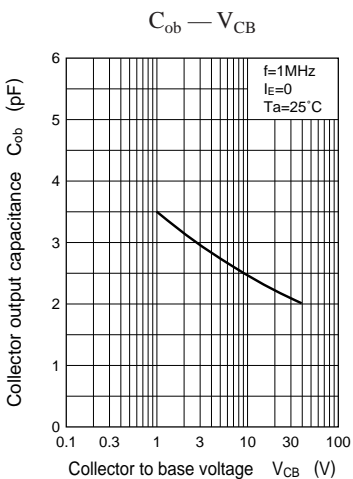
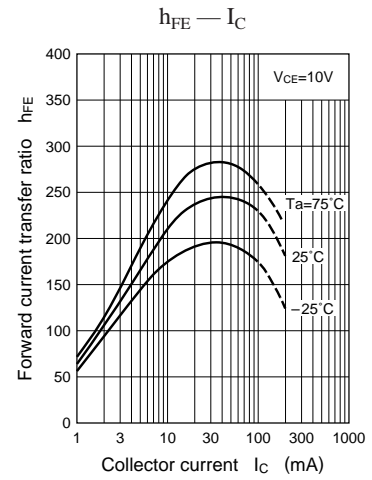
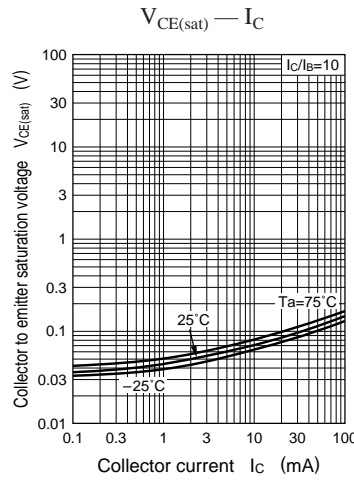
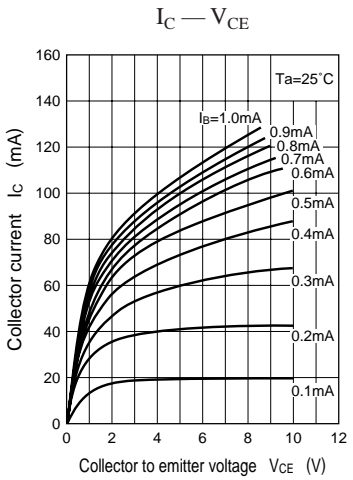
Characteristics charts of UN1213



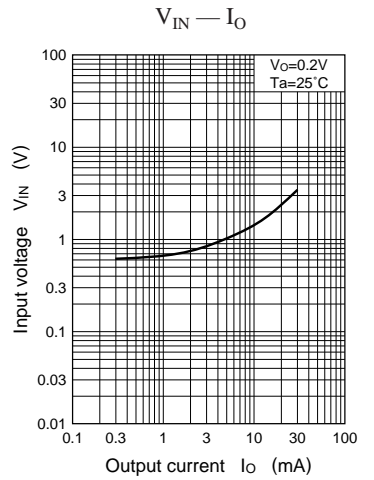
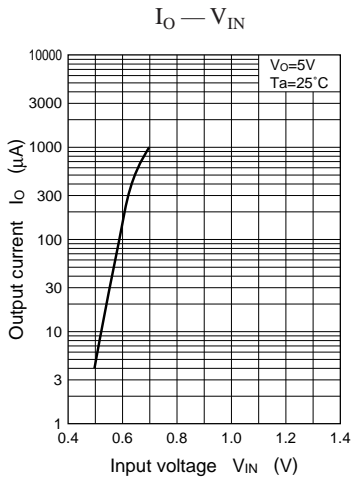
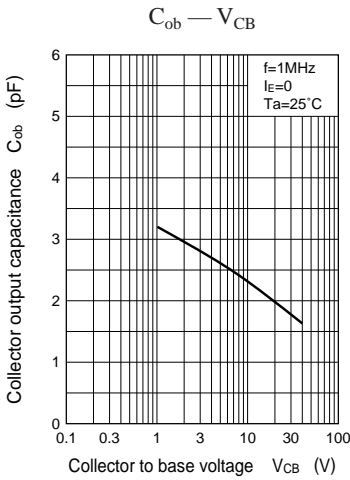
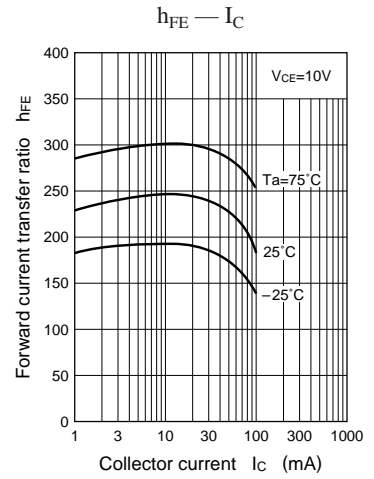
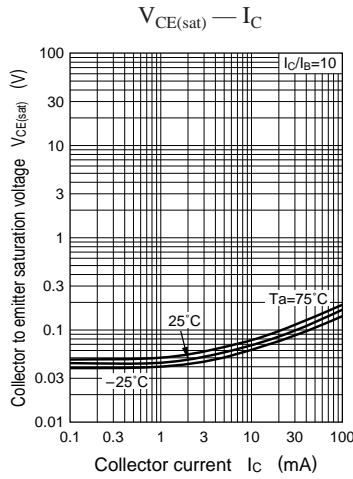
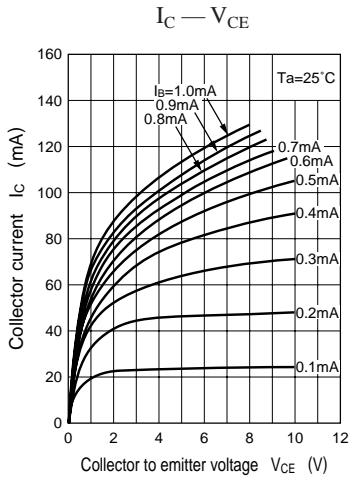
UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L



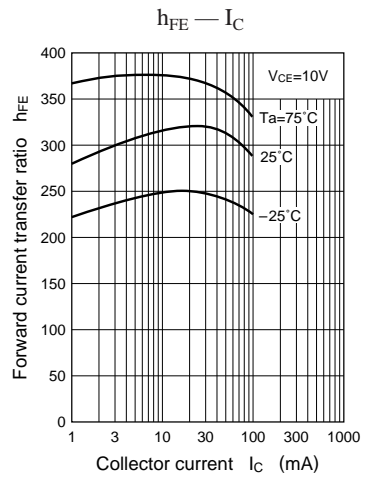
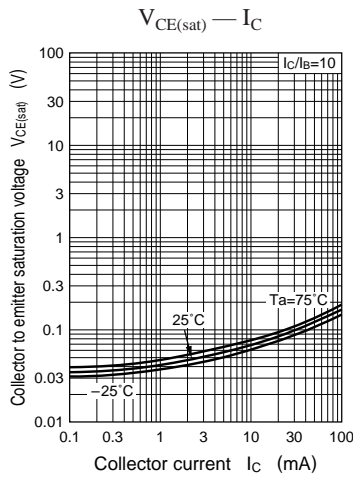
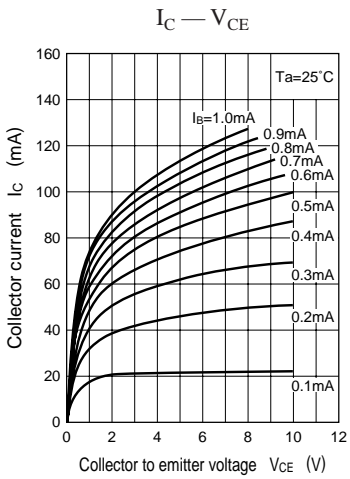
Characteristics charts of UN1214

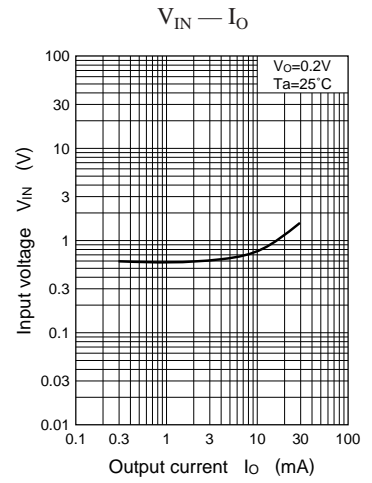
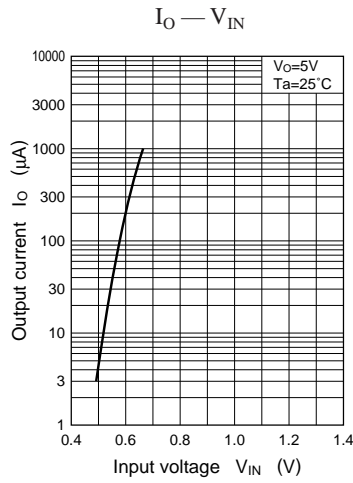
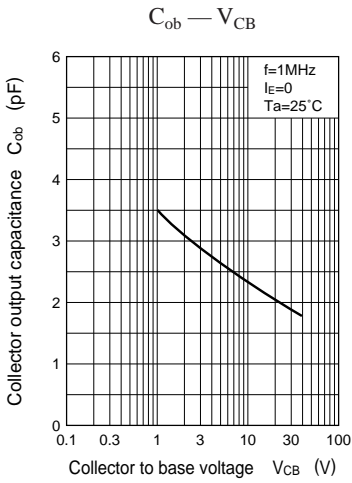


Characteristics charts of UN1215

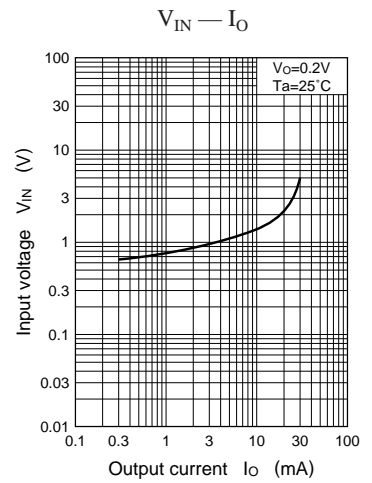
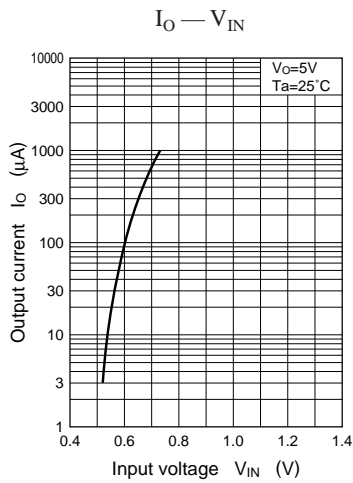
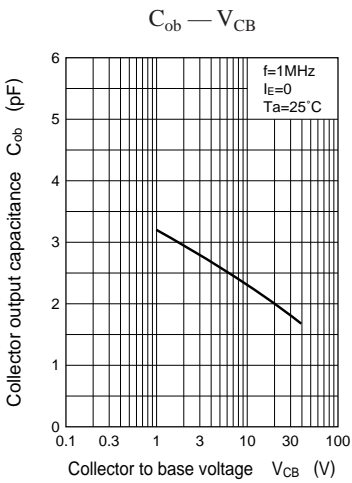
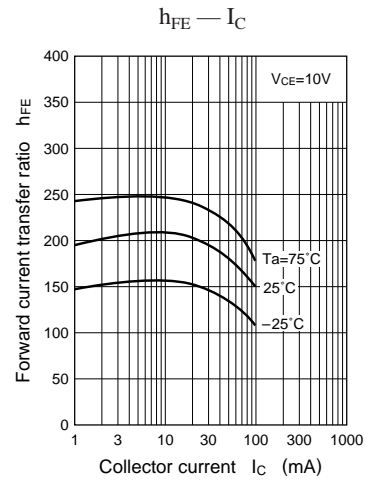
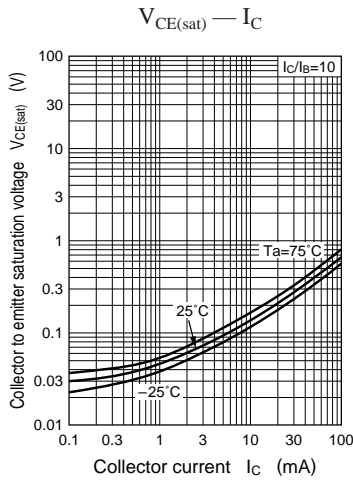
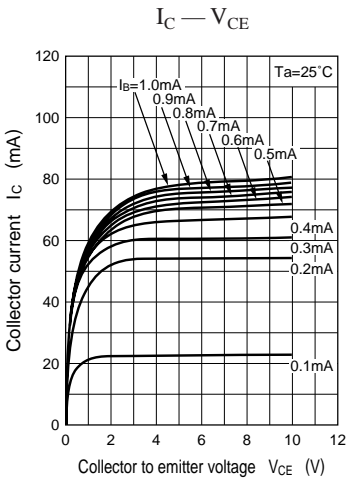


Characteristics charts of UN1216

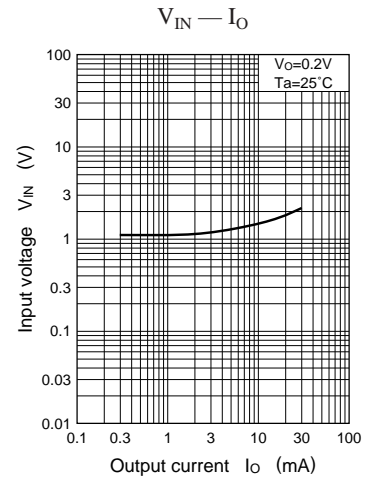
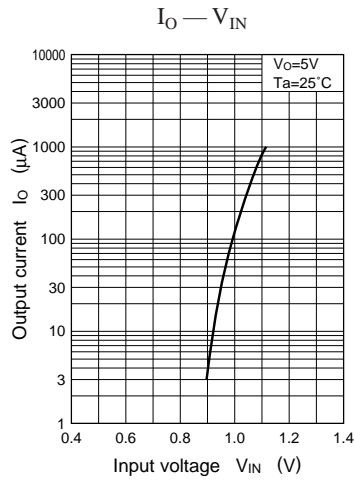
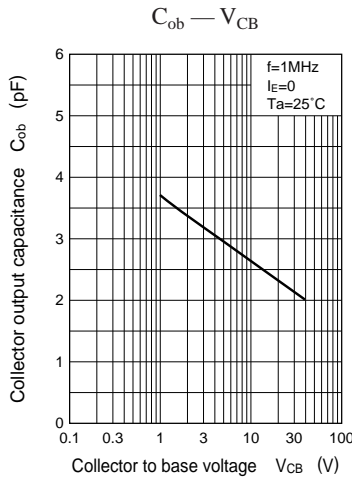
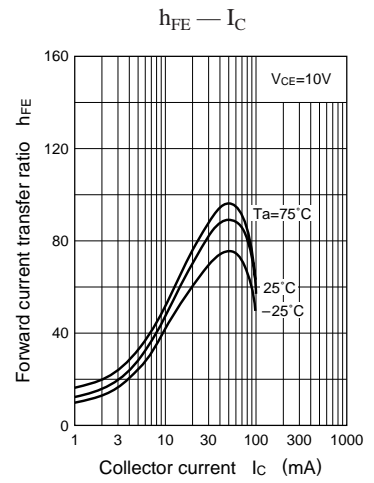
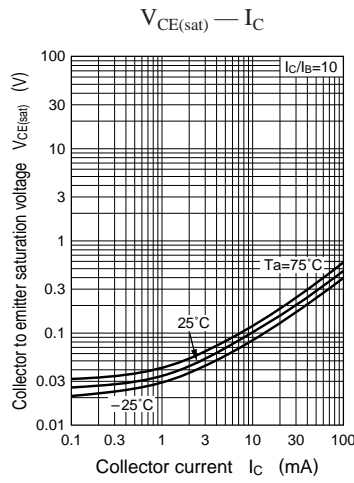
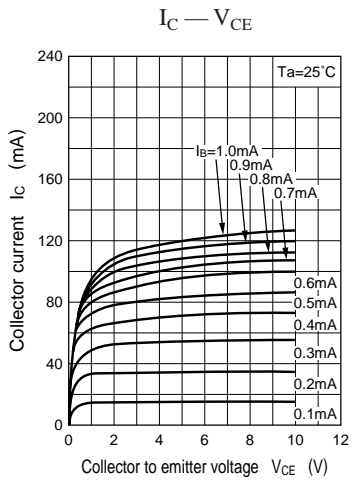




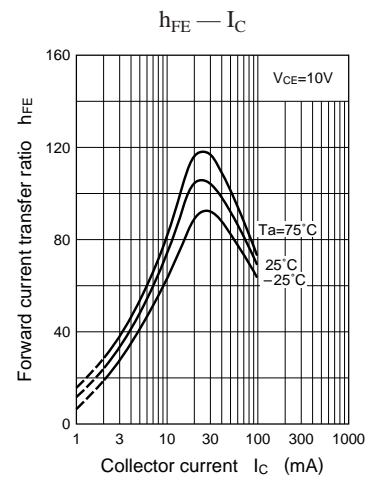
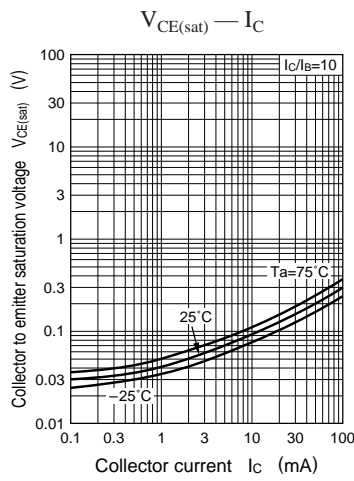
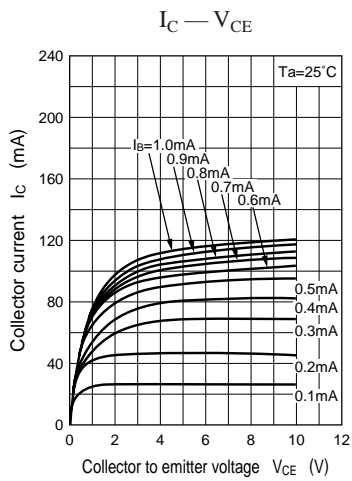
Characteristics charts of UN1217



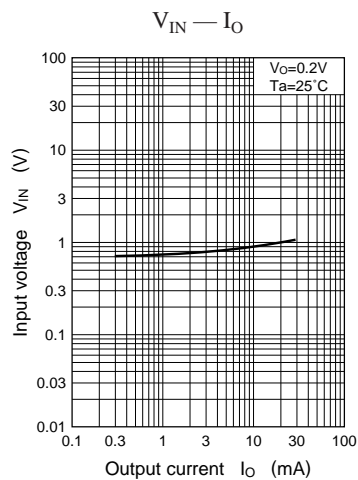
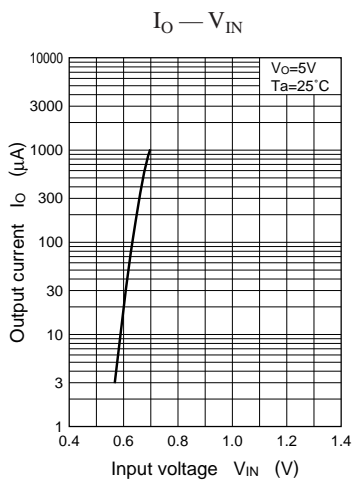
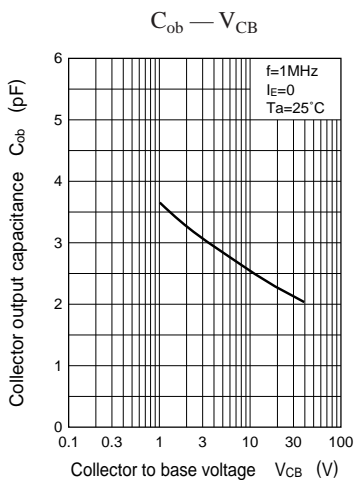
Characteristics charts of UN1218



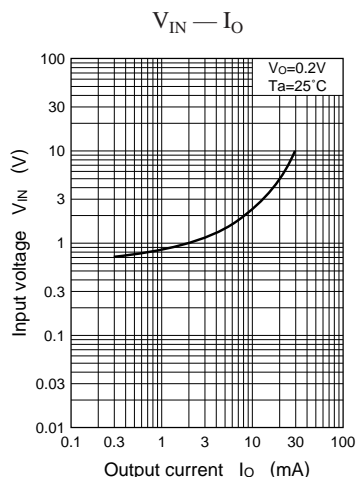
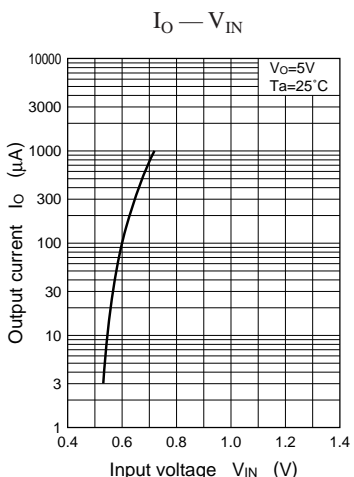
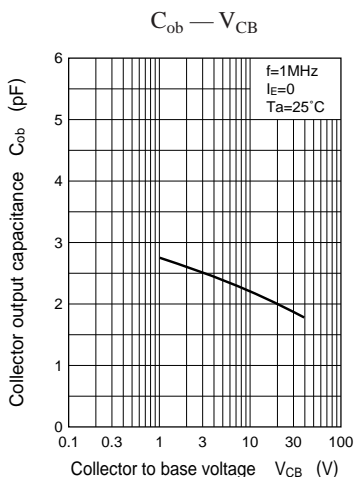
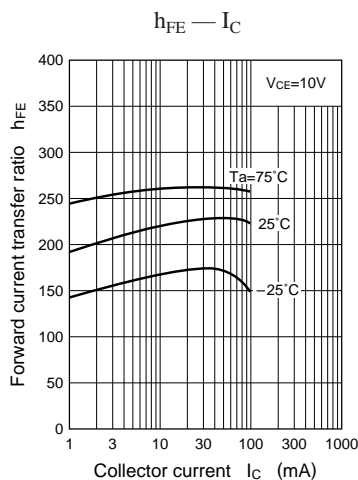
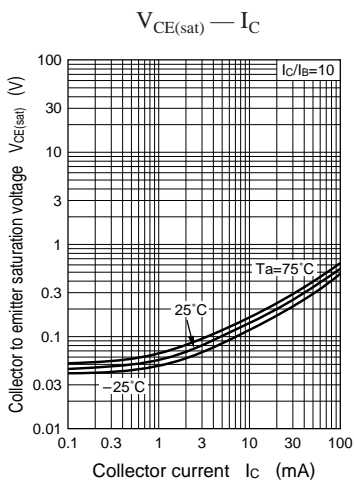
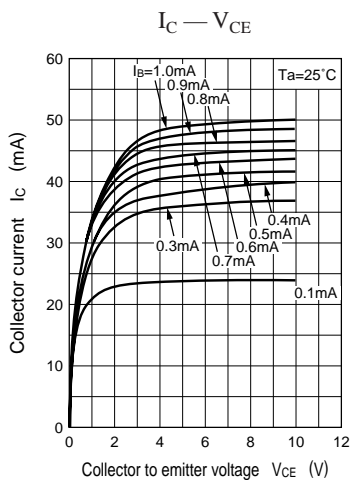
Characteristics charts of UN1219



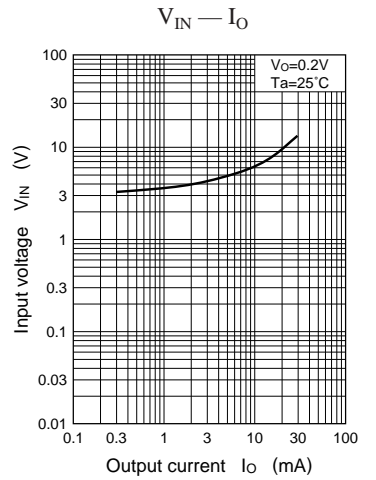
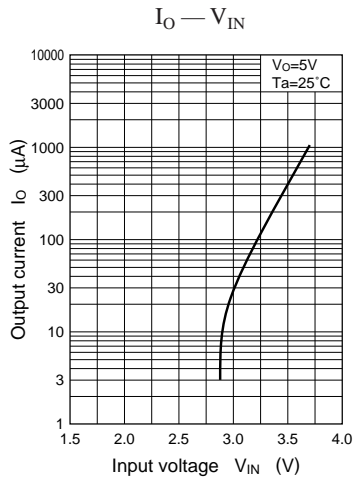
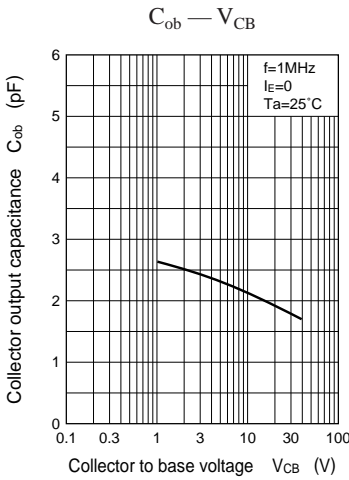
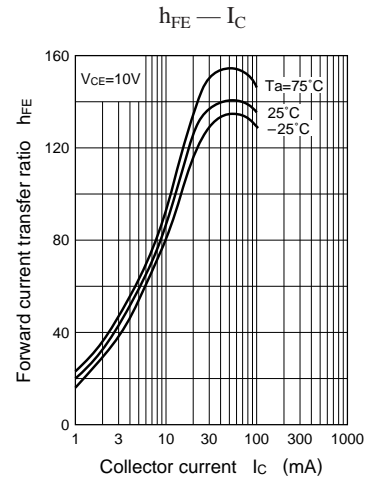
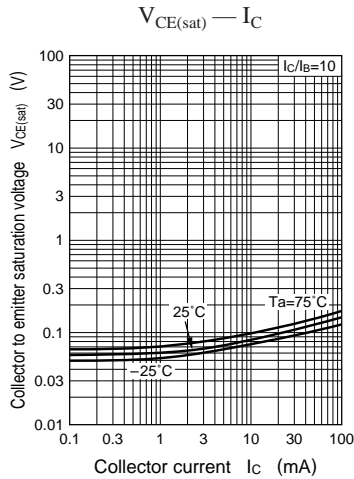
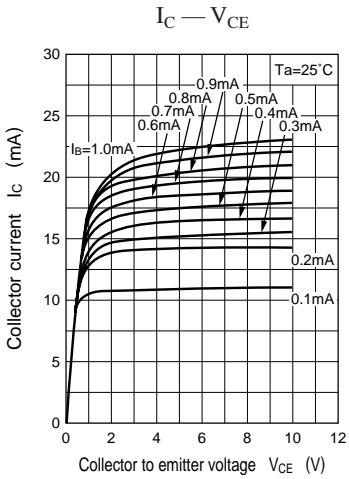




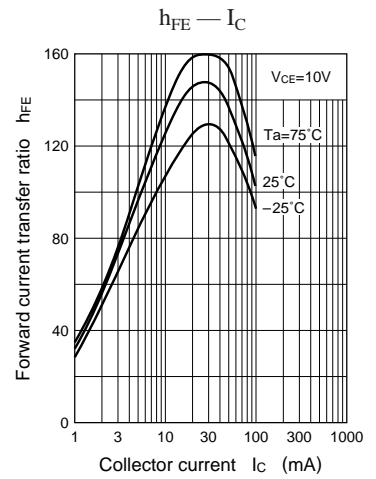
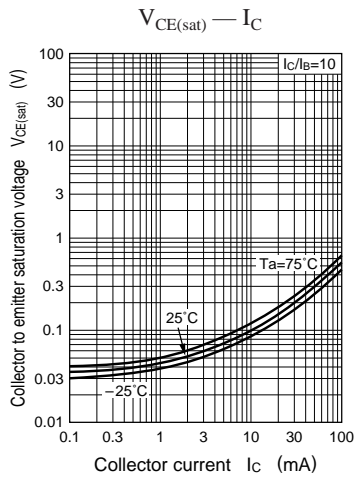
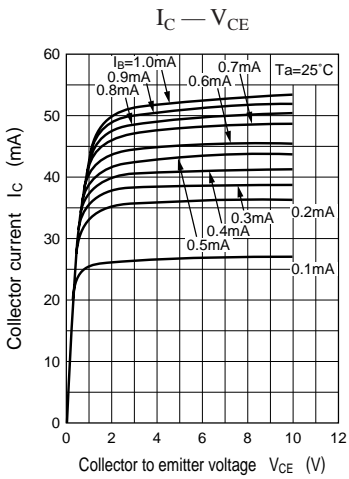
Characteristics charts of UN1210



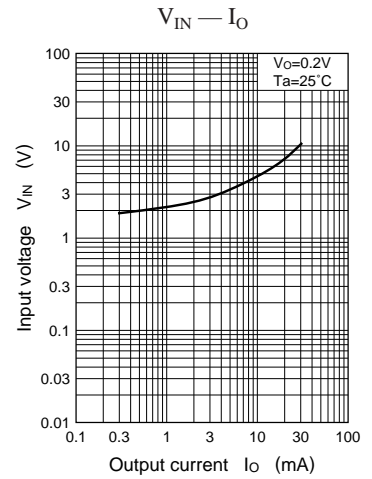
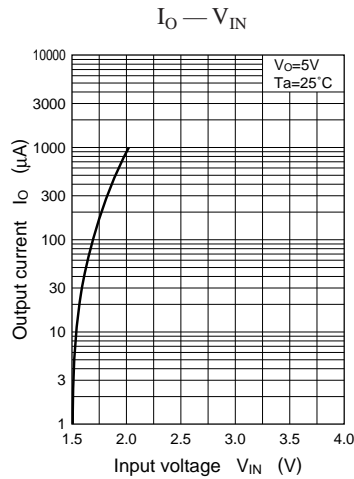
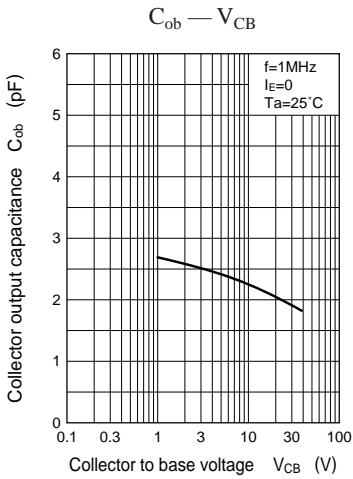
Characteristics charts of UN121D



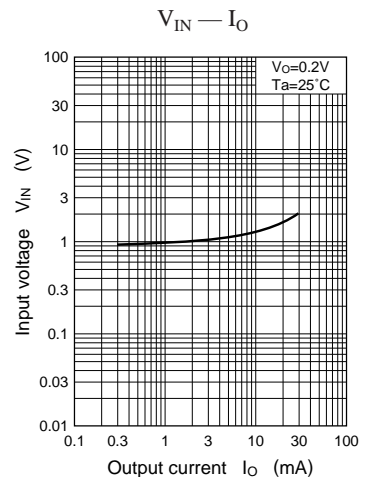
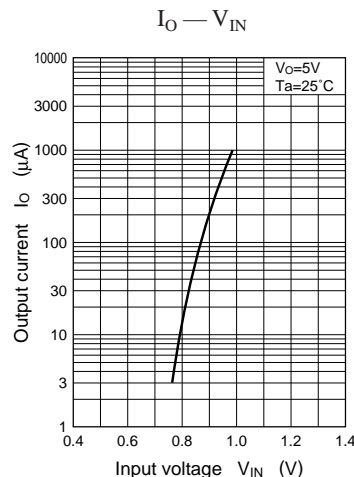
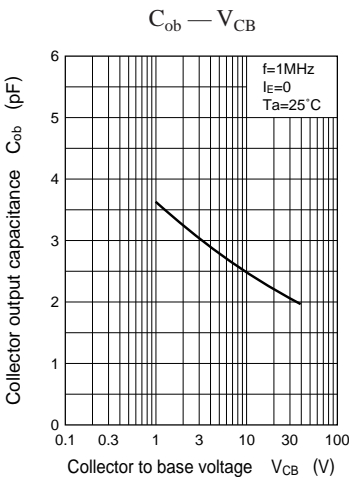
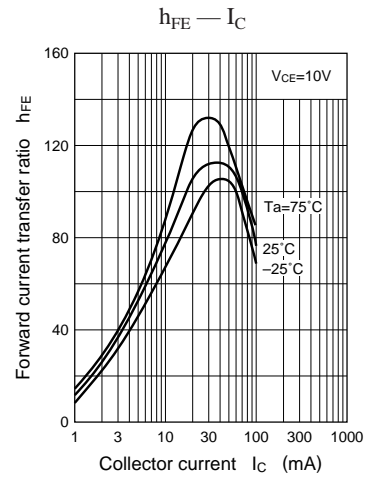
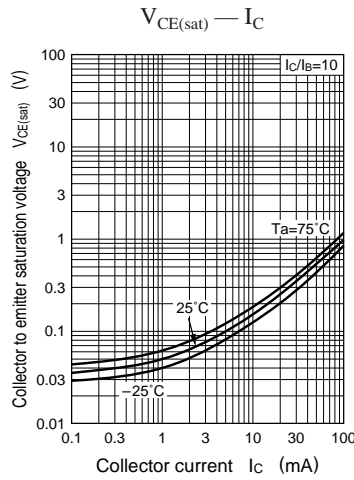
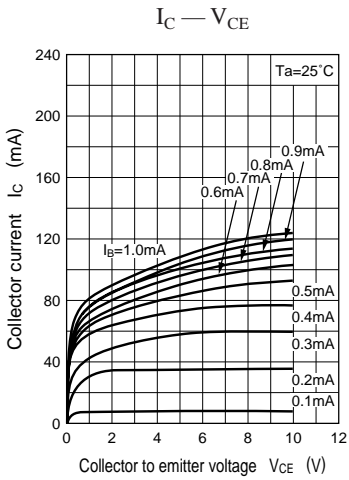
Characteristics charts of UN121E



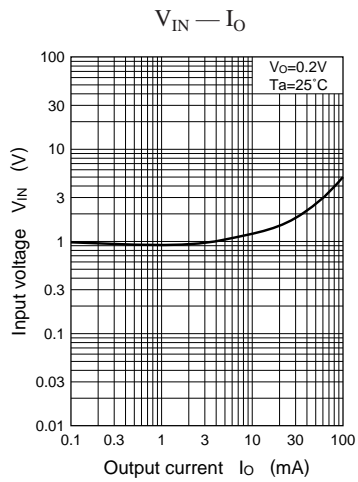
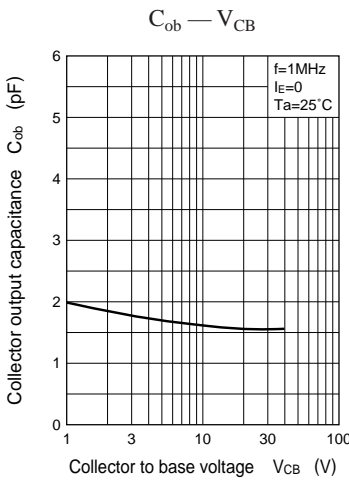
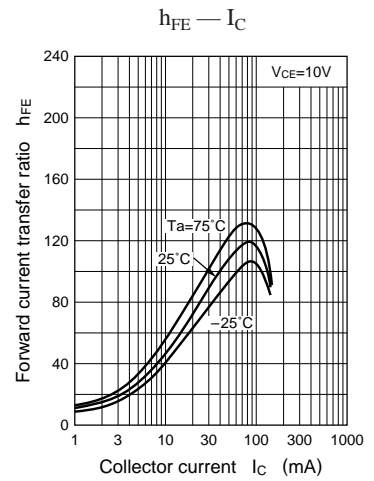
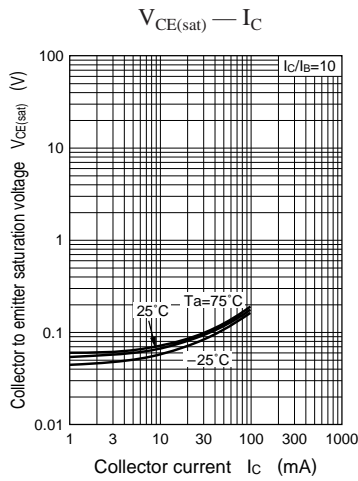
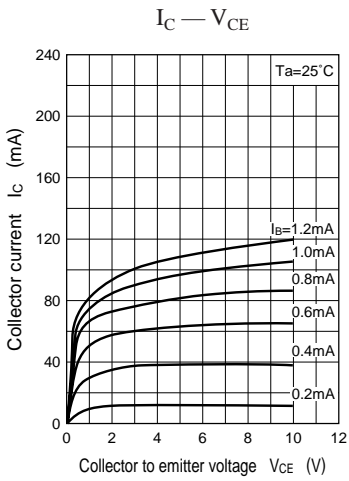
UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L



Characteristics charts of UN121F



Characteristics charts of UN121K



Characteristics charts of UN121L

