

# UN9211/9212/9213/9214/9215/9216/9217/9218/9219/9210/921D/ 921E/921F/921K/921L/UNR921M/921N/921AJ/921BJ/921CJ

## Silicon NPN epitaxial planer transistor

For digital circuits

### Features

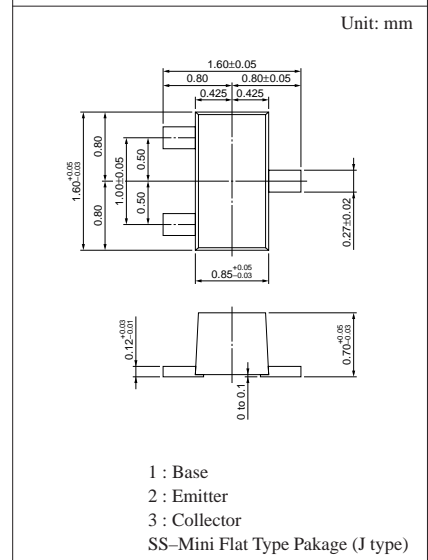
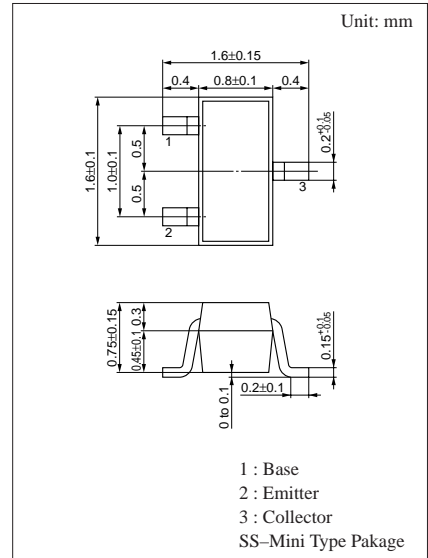
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- SS-Mini type package, allowing automatic insertion through tape packing and magazine packing.

### Resistance by Part Number

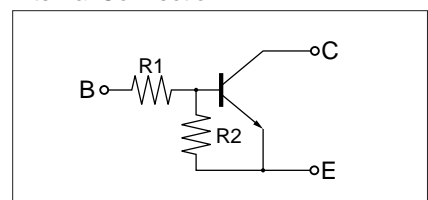
	Marking Symbol	(R <sub>1</sub> )	(R <sub>2</sub> )
• UN9211	8A	10kΩ	10kΩ
• UN9212	8B	22kΩ	22kΩ
• UN9213	8C	47kΩ	47kΩ
• UN9214	8D	10kΩ	47kΩ
• UN9215	8E	10kΩ	—
• UN9216	8F	4.7kΩ	—
• UN9217	8H	22kΩ	—
• UN9218	8I	0.51kΩ	5.1kΩ
• UN9219	8K	1kΩ	10kΩ
• UN9210	8L	47kΩ	—
• UN921D	8M	47kΩ	10kΩ
• UN921E	8N	47kΩ	22kΩ
• UN921F	8O	4.7kΩ	10kΩ
• UN921K	8P	10kΩ	4.7kΩ
• UN921L	8Q	4.7kΩ	4.7kΩ
• UNR921M	EL	2.2kΩ	47kΩ
• UNR921N	EX	4.7kΩ	47kΩ
• UNR921AJ	8X	100kΩ	100kΩ
• UNR921BJ	8Y	100kΩ	—
• UNR921CJ	8Z	—	47kΩ

### Absolute Maximum Ratings (Ta=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>	125	mW
Junction temperature	T <sub>j</sub>	125	°C
Storage temperature	T <sub>stg</sub>	-55 to +125	°C



### Internal Connection



■ 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	UN9211	I <sub>EBO</sub>	V <sub>EB</sub> = 6V, I <sub>C</sub> = 0			0.5	mA	
	UN9212/9214/921E/921D					0.2		
	UN9213/UNR921M/921N/UNR921AJ					0.1		
	UN9215/9216/9217/9210/UNR921BJ					0.01		
	UN921F/921K					1.0		
	UN9219					1.5		
	UN9218/921L/UNR921CJ					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	UN9211	h <sub>FE</sub>	V <sub>CE</sub> = 10V, I <sub>C</sub> = 5mA	35				
	UN9212/921E			60				
	UN9213/9214/921M/UNR921AJ/921CJ			80				
	UN9215*9216*/9217*/9210*/UNR921BJ			160		460		
	UN921F/921D/9219			30				
	UN9218/921K/921L			20				
	UN921N			80		400		
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>OC</sub> = 5V, V <sub>B</sub> = 3.5V, R <sub>1</sub> = 1kΩ			0.2		
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 10V, R <sub>1</sub> = 1kΩ			0.2		
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 6V, R <sub>L</sub> = 1kΩ			0.2		
			V <sub>CC</sub> = 5V, V <sub>B</sub> = 5V, 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		150		MHz	
Input resistance	UN9211/9214/9215/921K	R <sub>1</sub>		(-30%)		10	(+30%)	kΩ
	UN9212/9217				22			
	UN9213/921D/921E/9210				47			
	UN9216/921F/921L/UNR921N				4.7			
	UN9218				0.51			
	UN9219/UNR921M				1			
	UNR921AJ/921BJ				100			

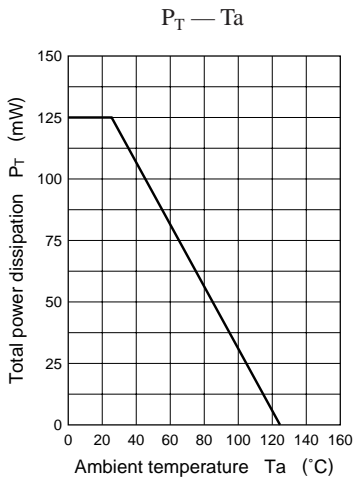
\* h<sub>FE</sub> rank classification (UN9215/9216/9217/9210)

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

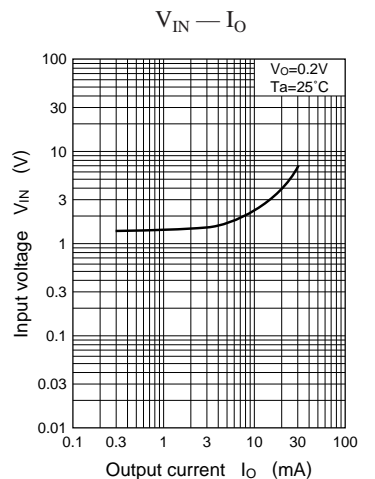
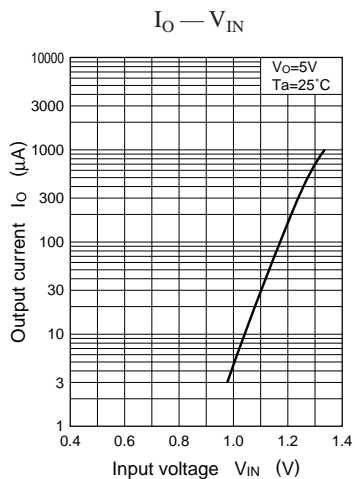
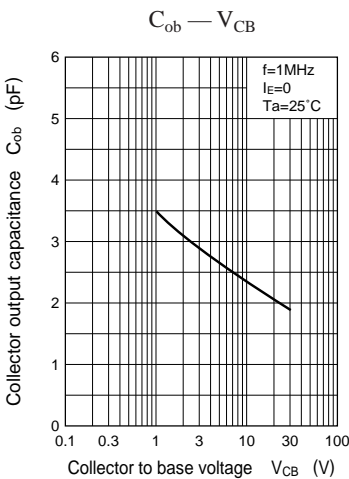
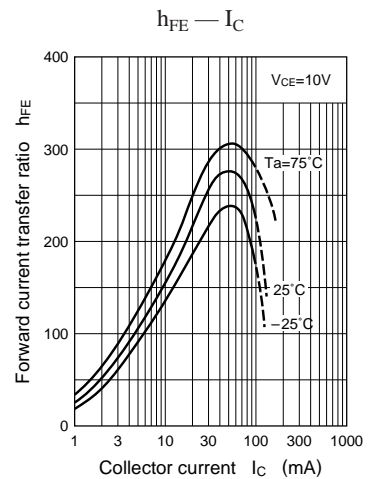
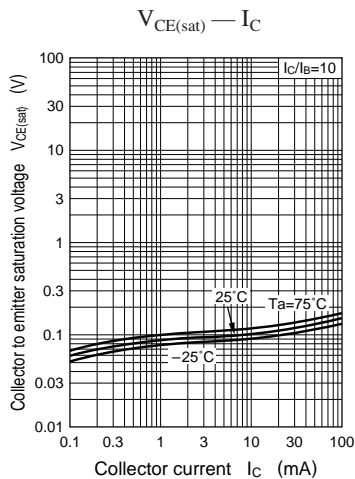
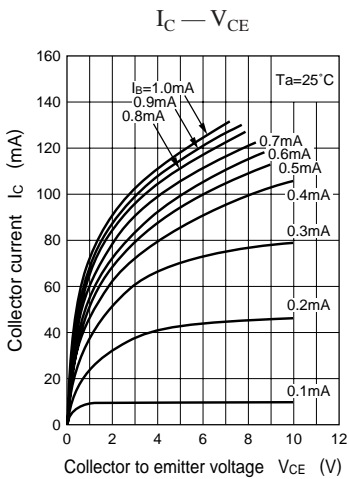
■ **Electrical Characteristics (continued)** (Ta=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Resis- tance ratio	UN9211/9212/9213/921L	$R_1/R_2$		0.8	1.0	1.2	
	UN9214			0.17	0.21	0.25	
	UN9218/9219			0.08	0.1	0.12	
	UN921D				4.7		
	UN921E				2.14		
	UN921F				0.47		
	UN921K				2.13		
	UN921M				0.047		
	UN921N				0.1		
	UNR921AJ				1.0		
Resistance between Emitter to Base	UNR921CJ	$R_2$		-30%	47	30%	kΩ

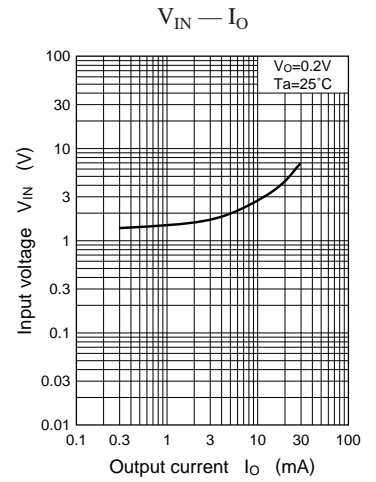
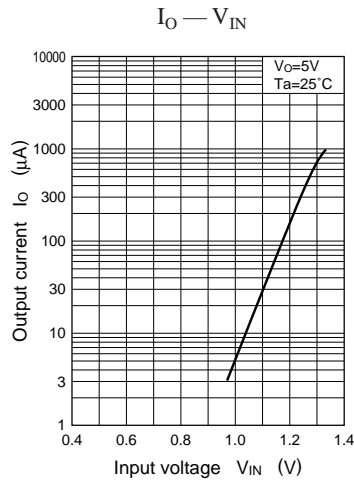
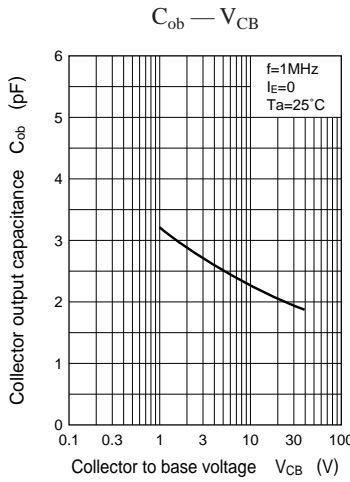
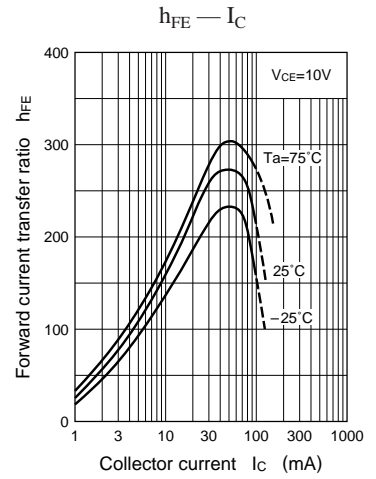
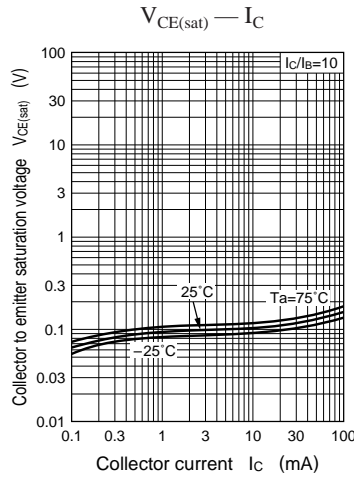
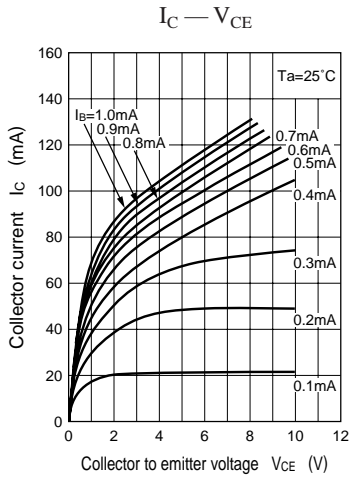
Common characteristics chart



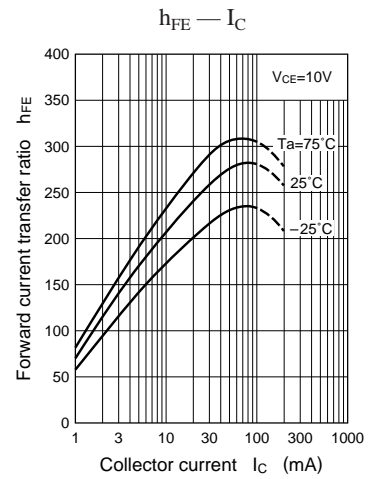
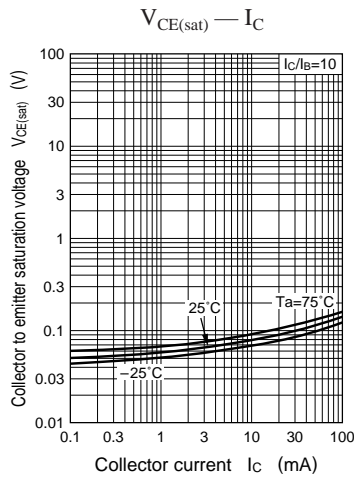
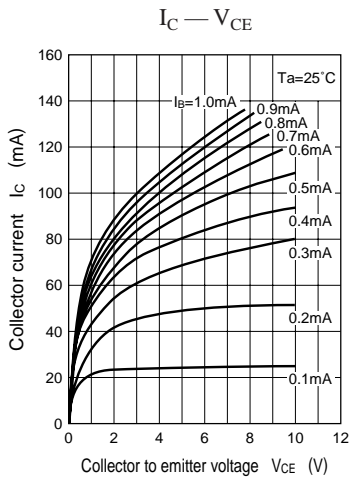
Characteristics charts of UN9211



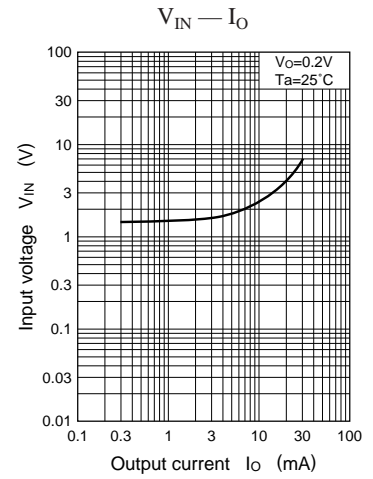
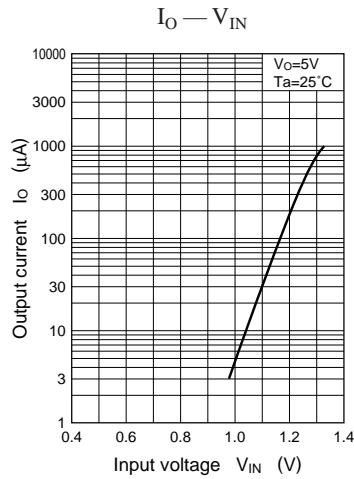
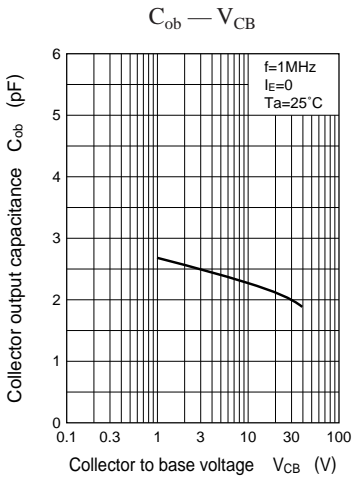
Characteristics charts of UN9212



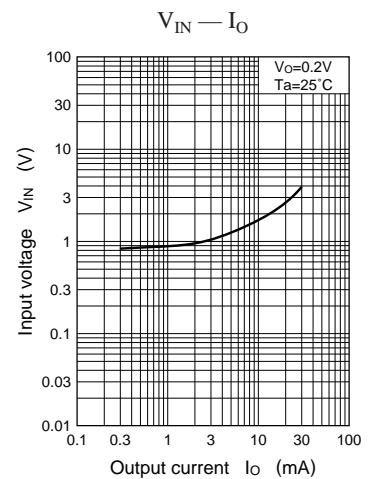
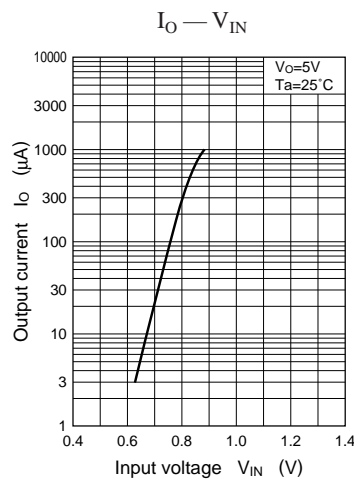
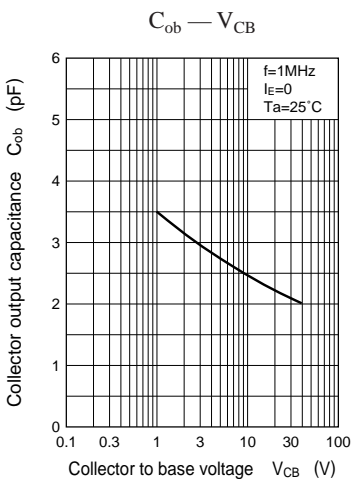
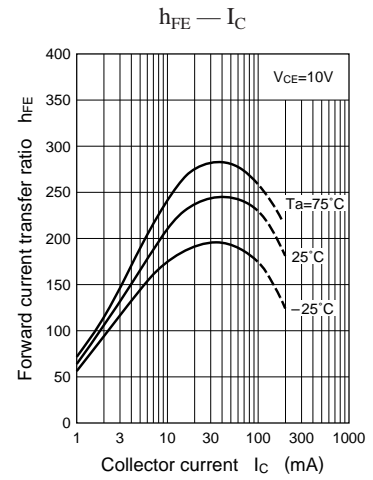
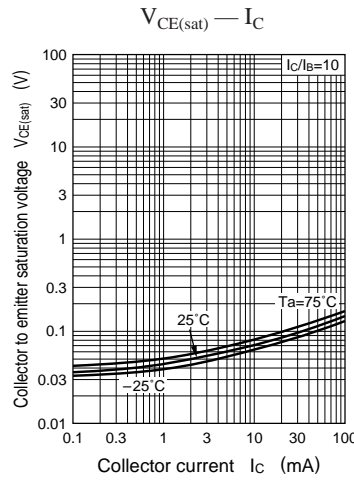
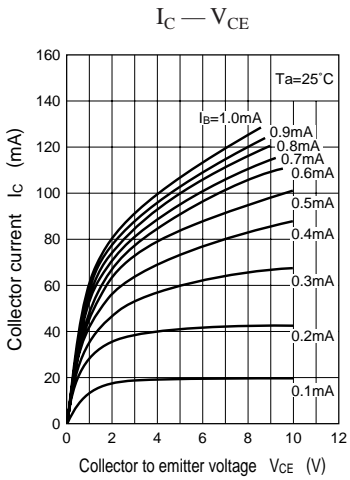
Characteristics charts of UN9213



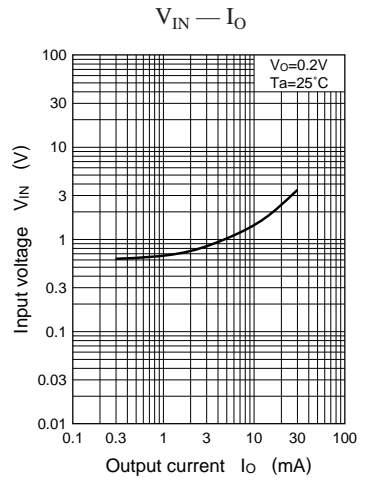
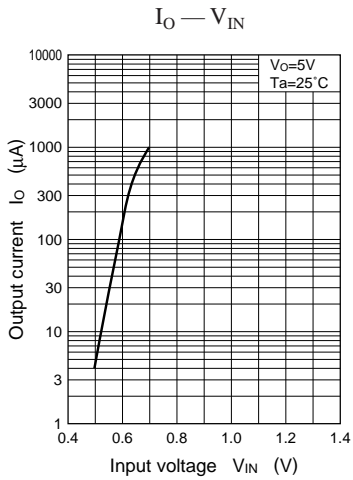
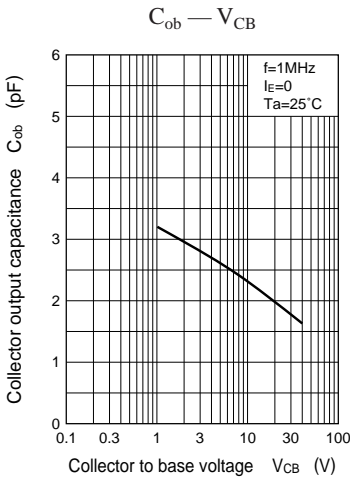
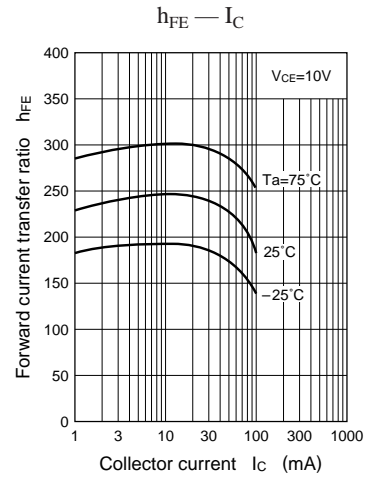
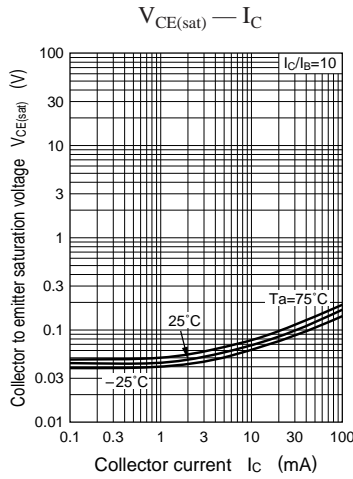
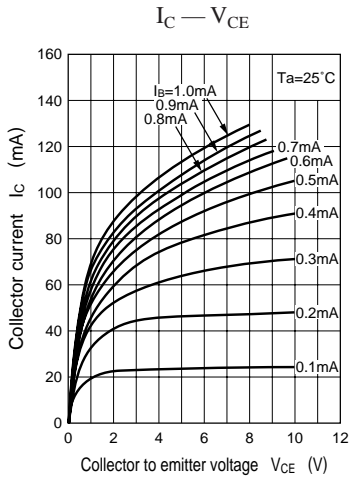
UN1211/1212/1213/1214/1215/1216/1217/1218/  
 Transistors with built-in Resistor 1219/1210/121D/121E/121F/121K/121L



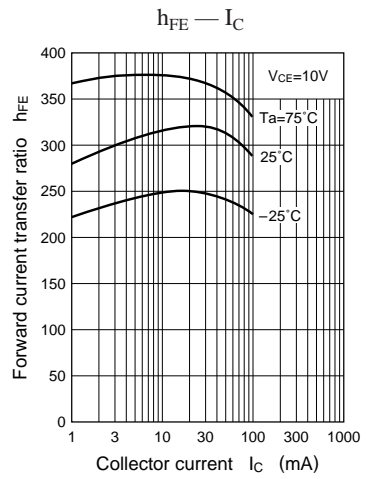
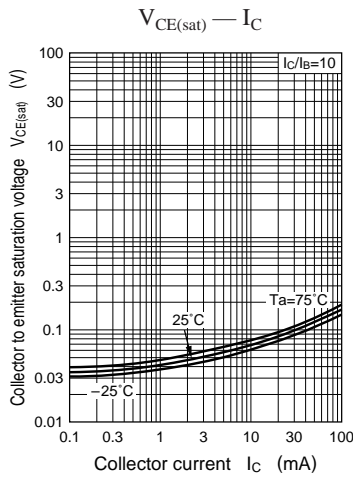
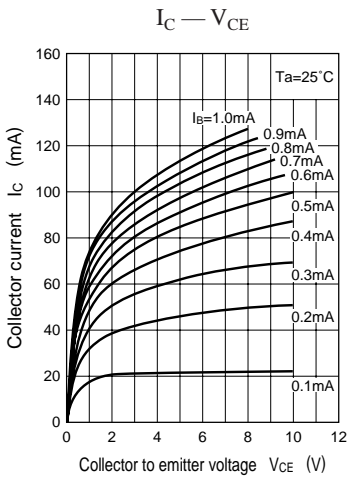
Characteristics charts of UN9214

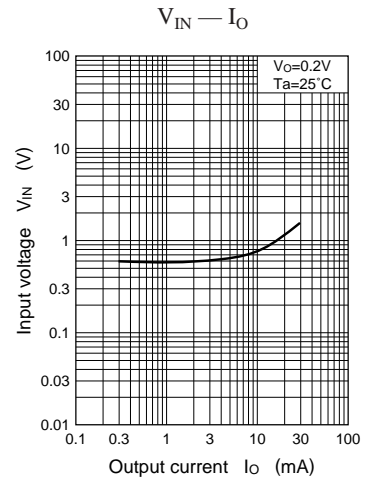
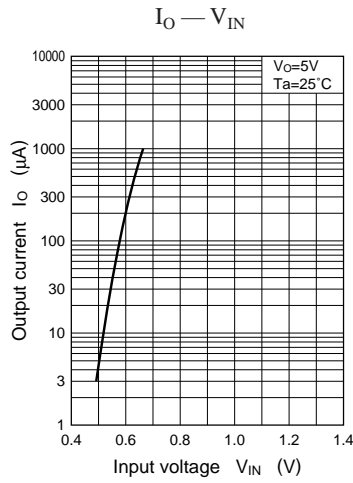
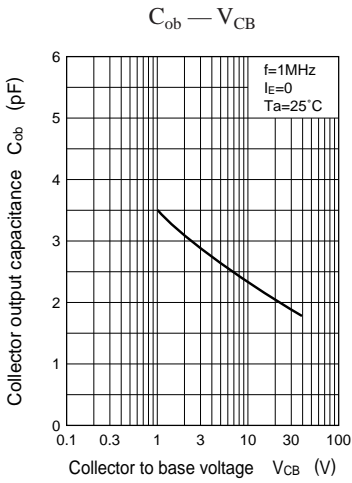


Characteristics charts of UN9215

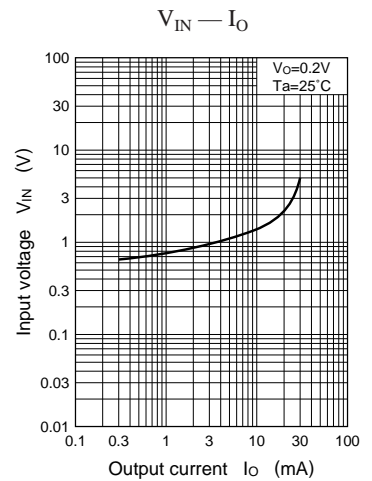
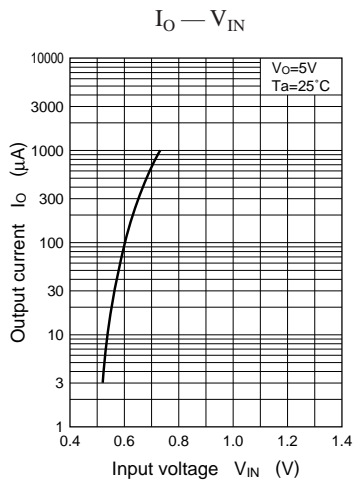
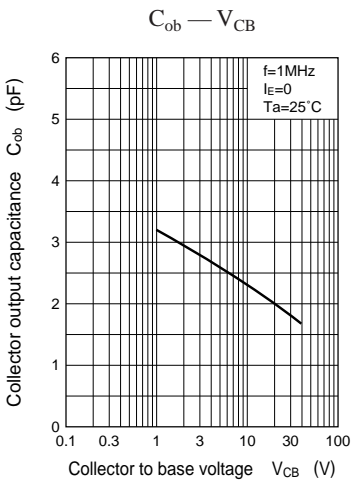
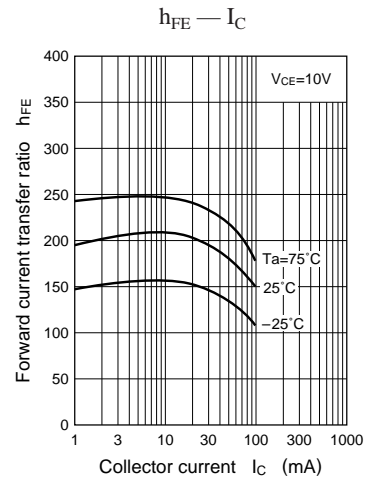
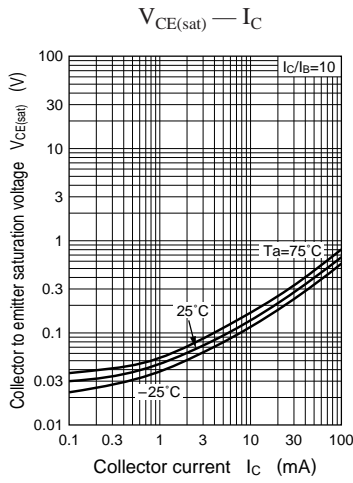
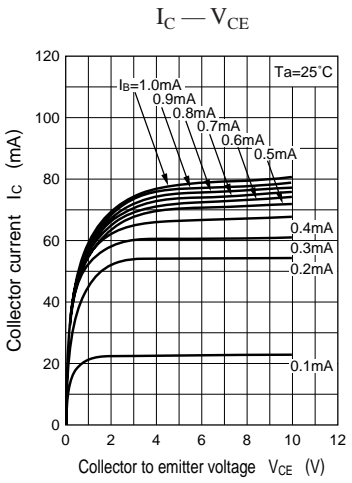


Characteristics charts of UN9216



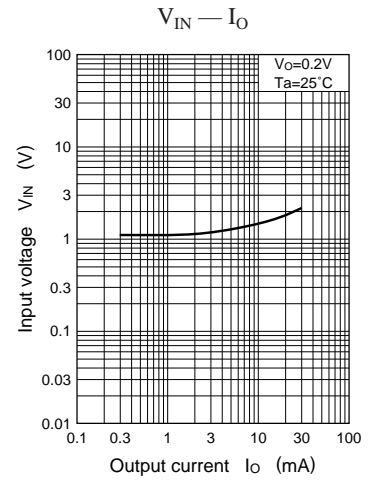
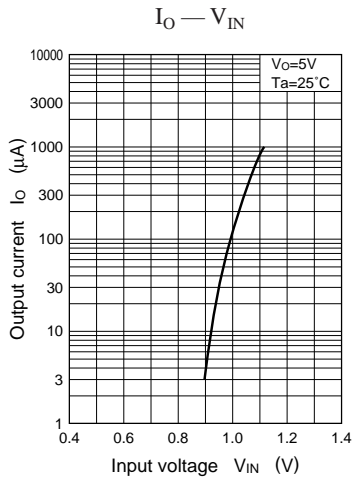
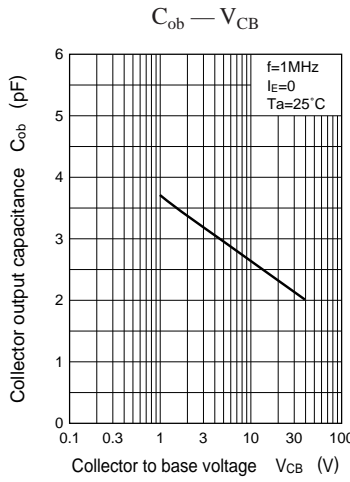
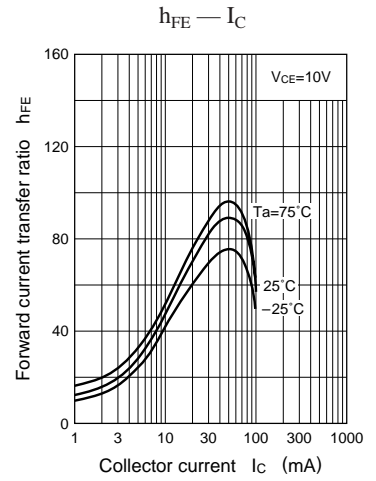
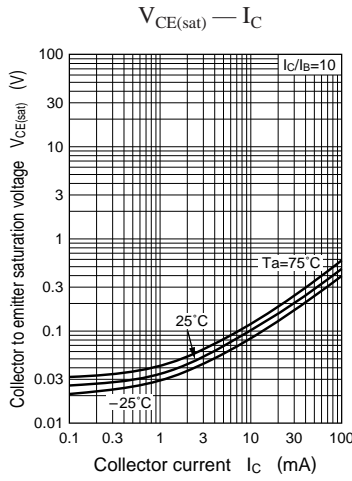
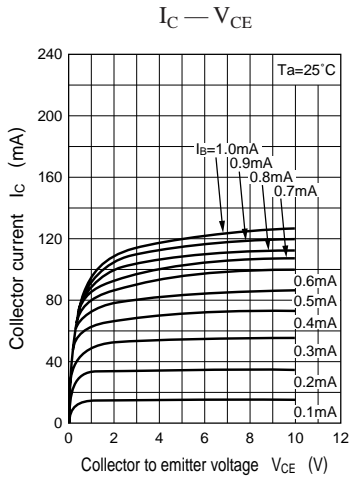


Characteristics charts of UN9217

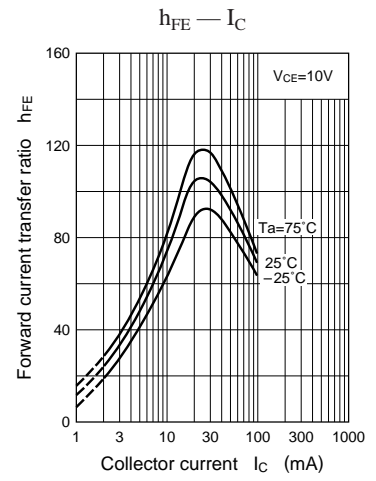
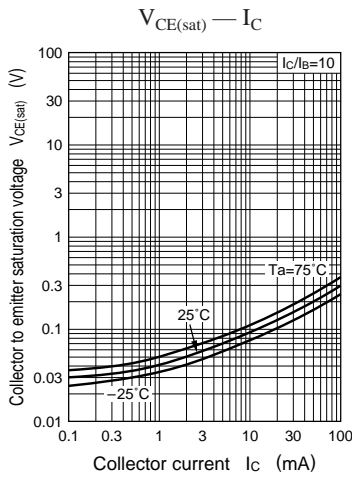
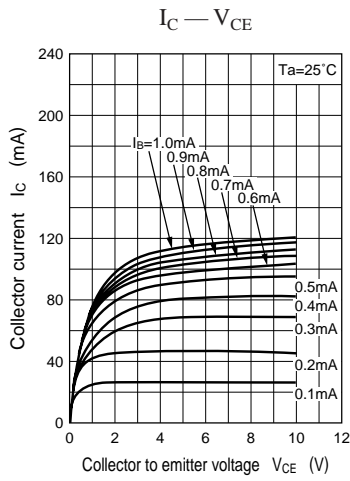


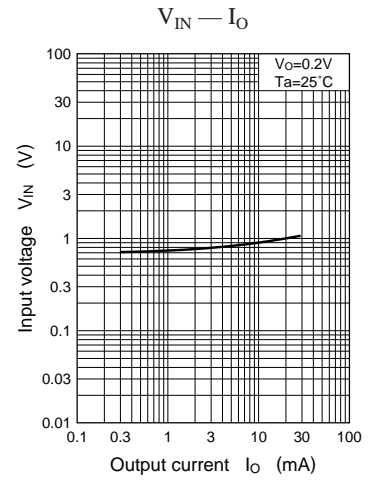
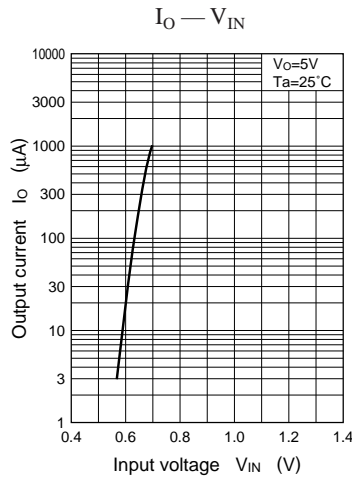
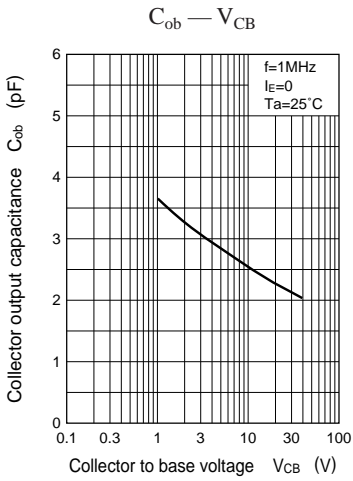


Characteristics charts of UN9218

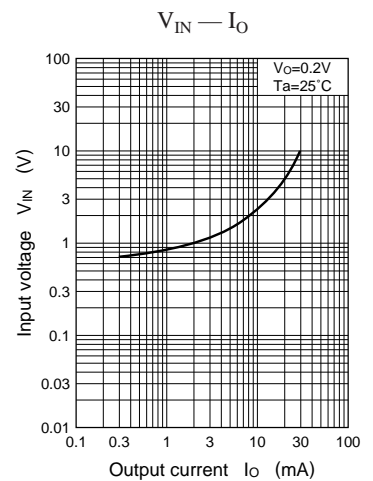
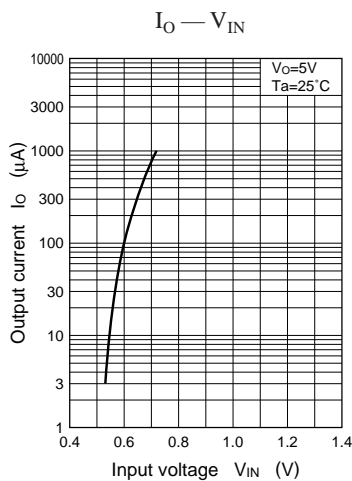
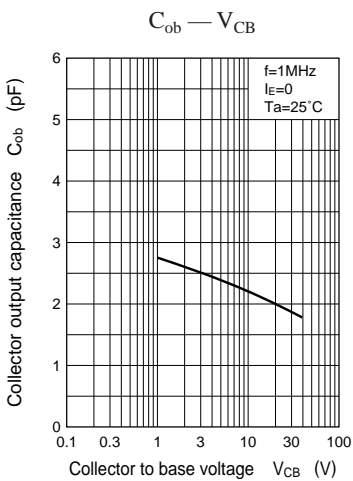
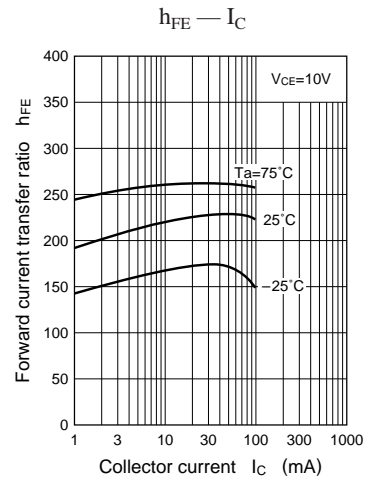
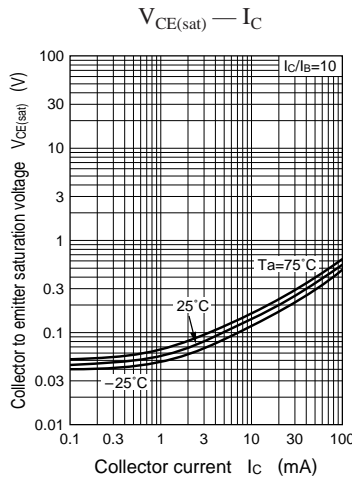
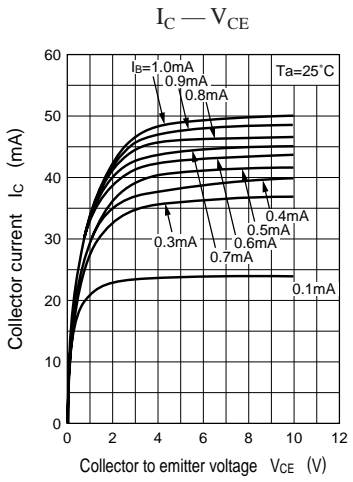


Characteristics charts of UN9219

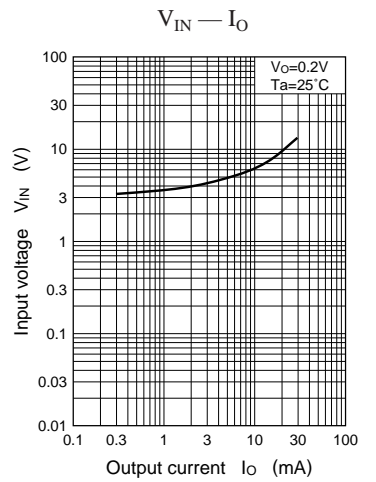
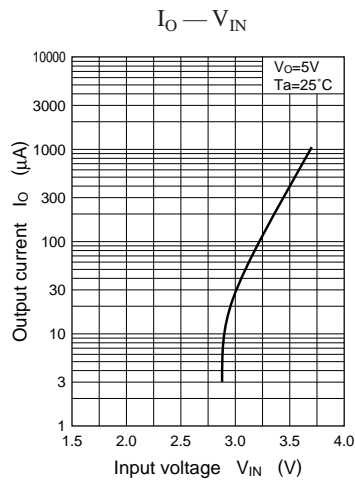
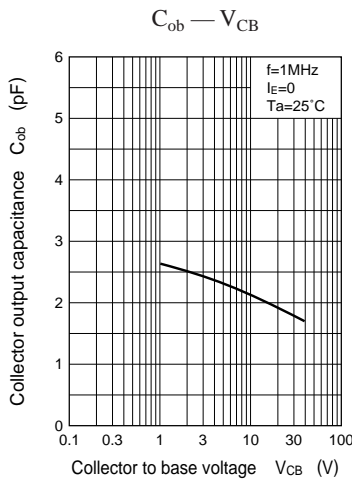
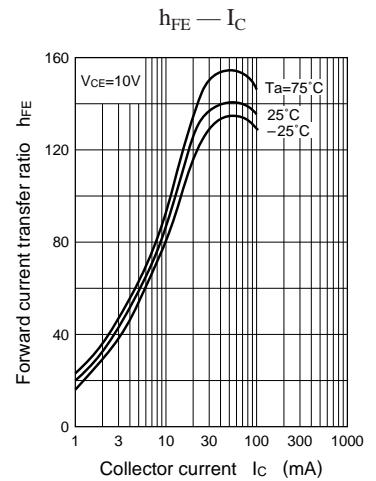
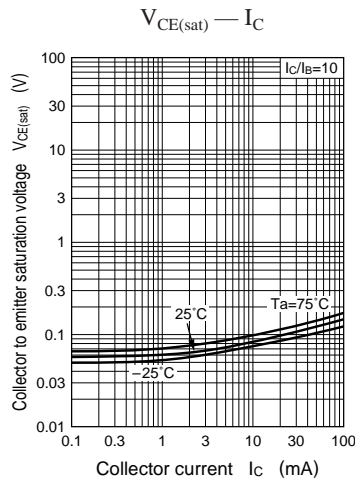
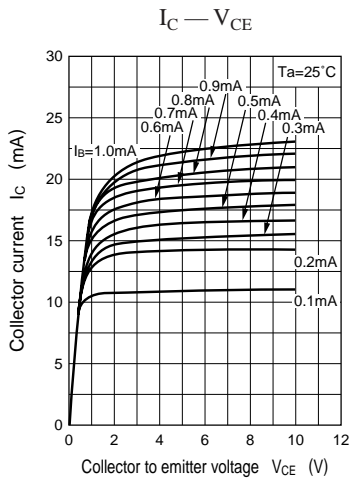




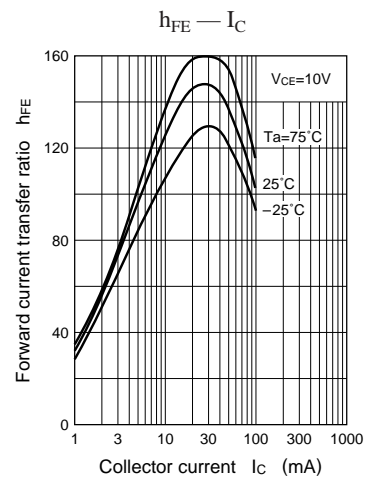
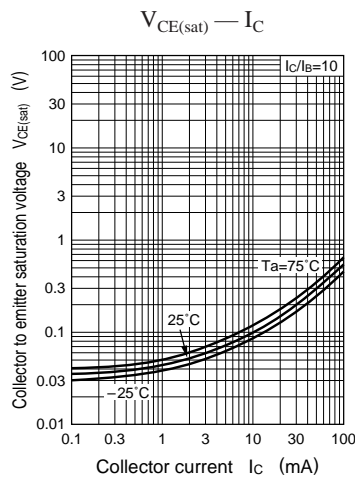
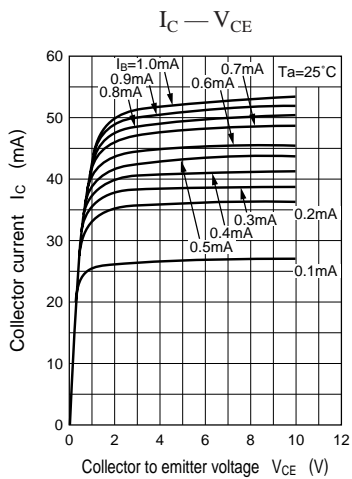
Characteristics charts of UN9210

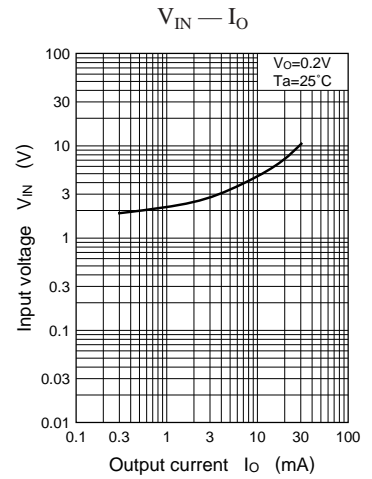
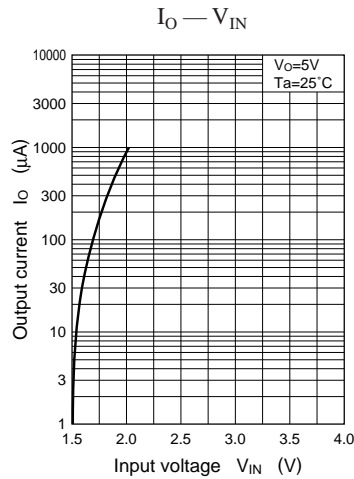
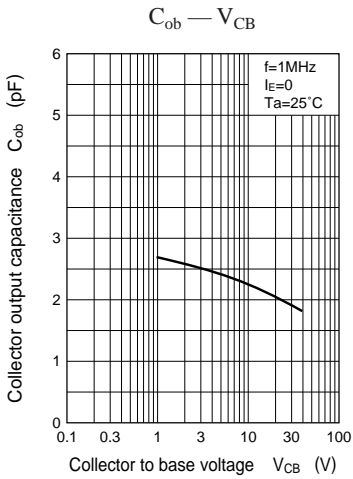


Characteristics charts of UN921D

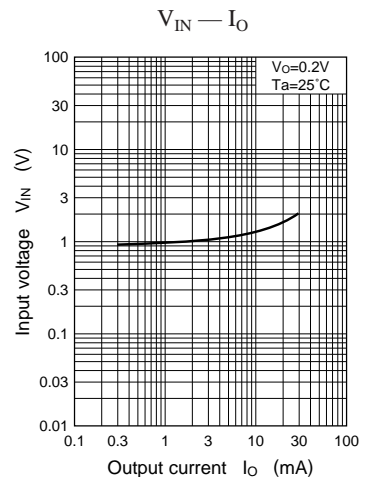
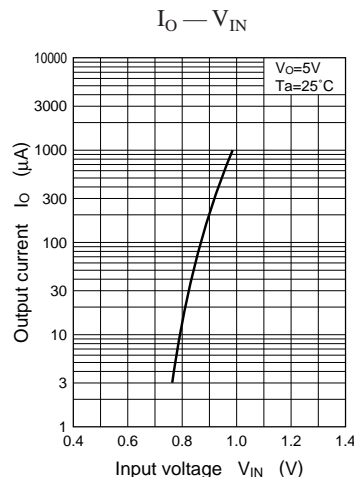
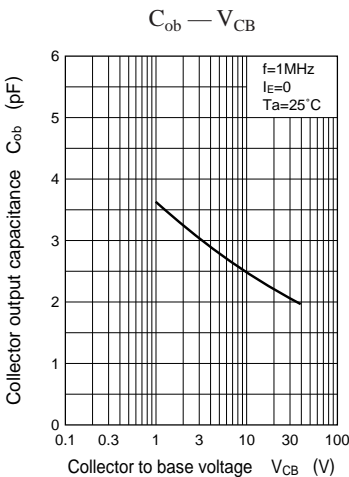
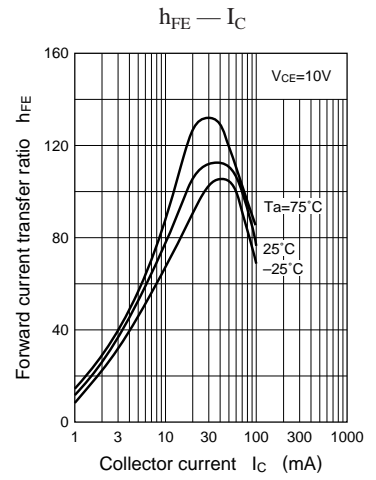
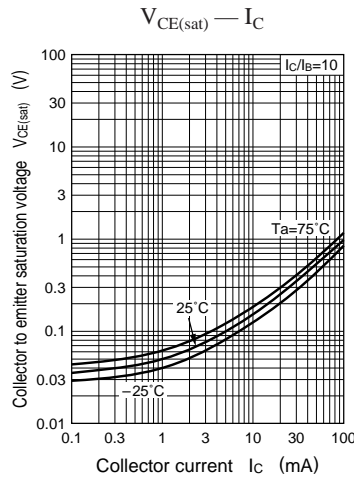
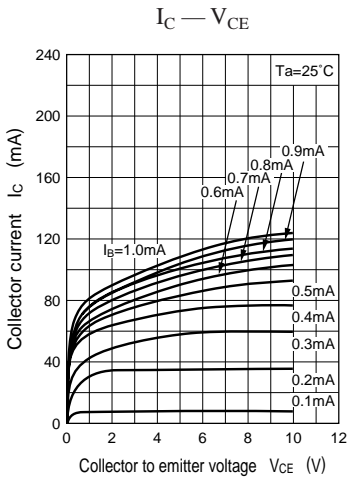


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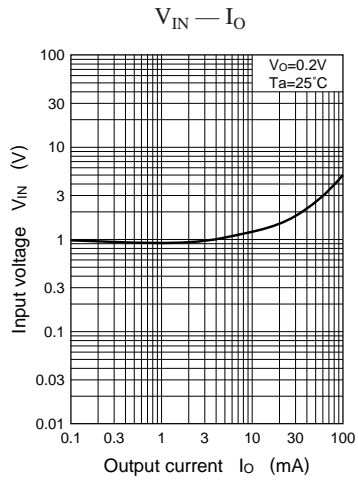
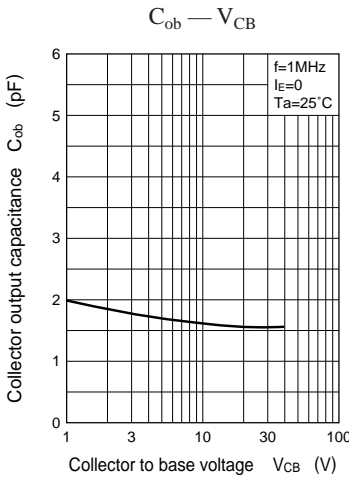
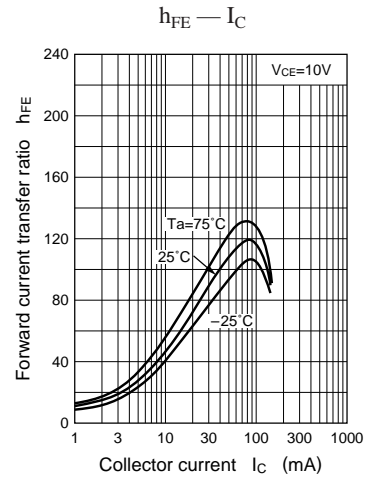
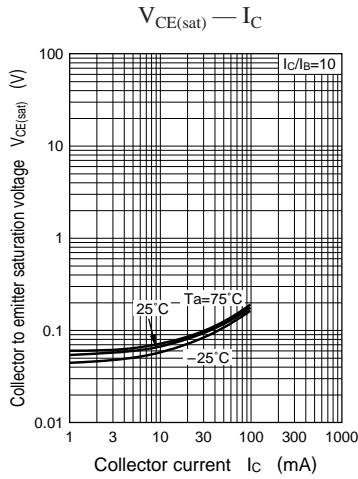
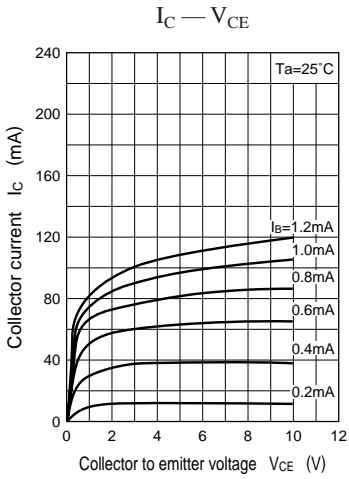




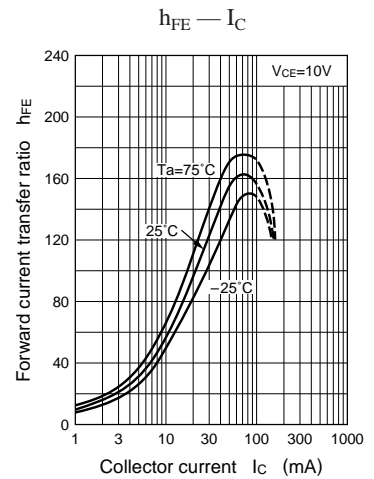
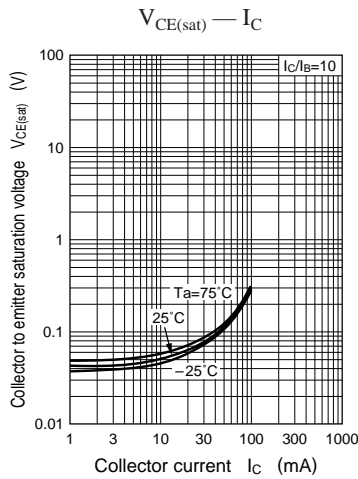
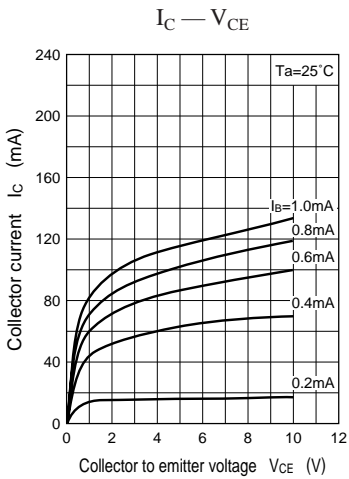
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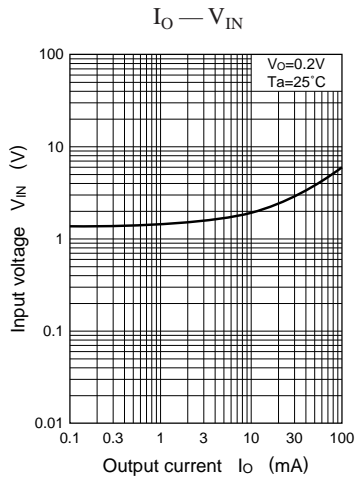
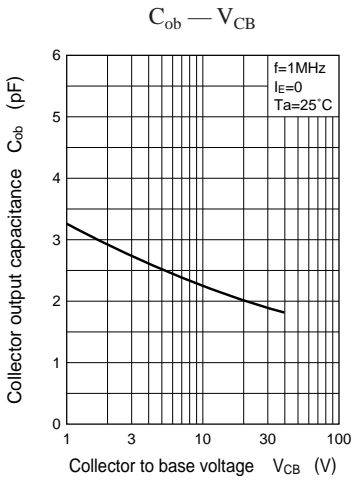


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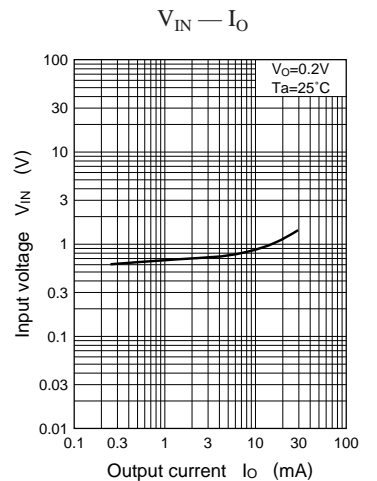
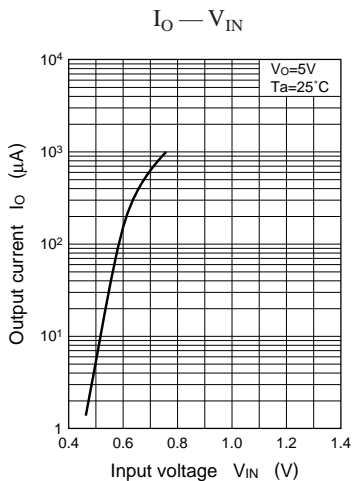
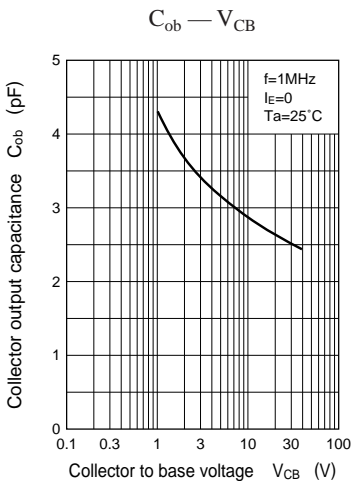
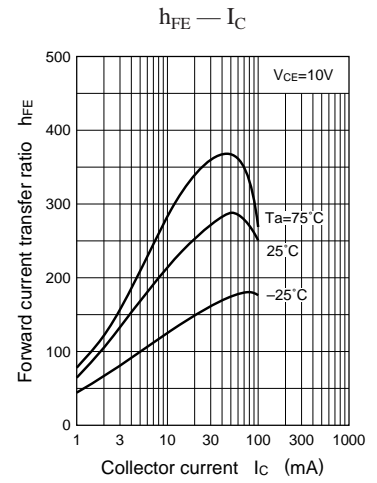
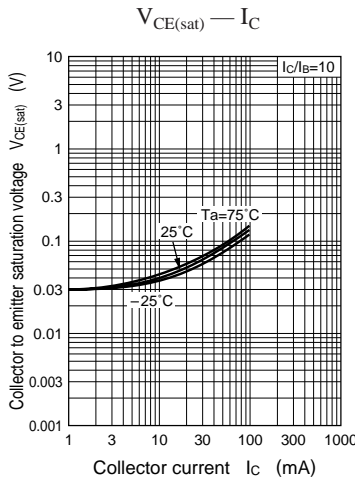
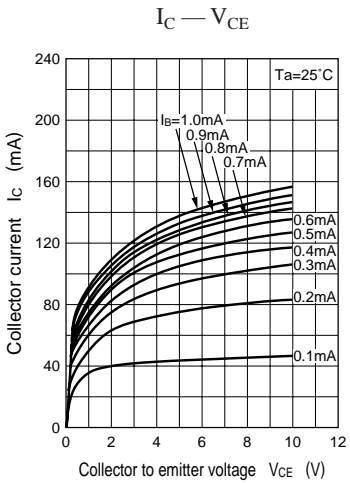


Characteristics charts of UN921L





Characteristics charts of UN921M



Characteristics charts of UN921N

