

# UN2111/2112/2113/2114/2115/2116/2117/2118/2119/2110/ 211D/211E/211F/211H/211L/211M/211N/211T/211V/211Z

## Silicon PNP epitaxial planer transistor

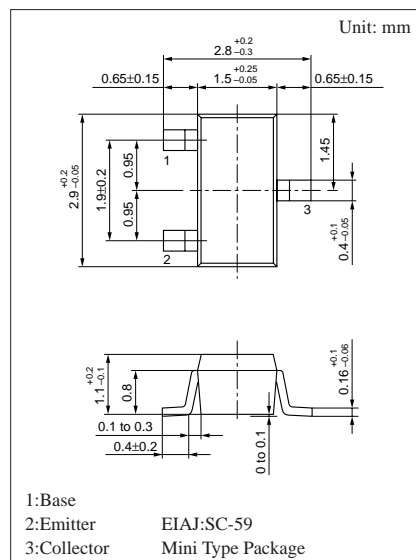
For digital circuits

### Features

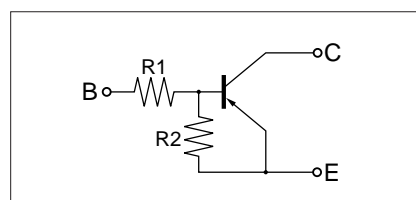
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- Mini type package, allowing downsizing of the equipment and automatic insertion through tape packing and magazine packing.

### Resistance by Part Number

	Marking Symbol	(R <sub>1</sub> )	(R <sub>2</sub> )
• UN2111	6A	10kΩ	10kΩ
• UN2112	6B	22kΩ	22kΩ
• UN2113	6C	47kΩ	47kΩ
• UN2114	6D	10kΩ	47kΩ
• UN2115	6E	10kΩ	—
• UN2116	6F	4.7kΩ	—
• UN2117	6H	22kΩ	—
• UN2118	6I	0.51kΩ	5.1kΩ
• UN2119	6K	1kΩ	10kΩ
• UN2110	6L	47kΩ	—
• UN211D	6M	47kΩ	10kΩ
• UN211E	6N	47kΩ	22kΩ
• UN211F	6O	4.7kΩ	10kΩ
• UN211H	6P	2.2kΩ	10kΩ
• UN211L	6Q	4.7kΩ	4.7kΩ
• UN211M	EI	2.2kΩ	47kΩ
• UN211N	EW	4.7kΩ	47kΩ
• UN211T	EY	22kΩ	47kΩ
• UN211V	FC	2.2kΩ	2.2kΩ
• UN211Z	FE	4.7kΩ	22kΩ



### Internal Connection



### 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>	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C

UN2111/2112/2113/2114/2115/2116/2117/2118/2119/2110/  
Transistors with built-in Resistor 211D/211E/211F/211H/211L/211M/211N/211T/211V/211Z

■ 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	UN2111	I <sub>EBO</sub>	V <sub>EB</sub> = -6V, I <sub>C</sub> = 0			- 0.5	mA
	UN2112/2114/211E/211D/211M/211N/211T					- 0.2	
	UN2113					- 0.1	
	UN2115/2116/2117/2110					- 0.01	
	UN211F/211H					-1.0	
	UN2119					-1.5	
	UN2118/211L/211V					-2.0	
	UN211Z					- 0.4	
Collector to base voltage		V <sub>CBO</sub>	I <sub>C</sub> = -10mA, 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	UN2111	h <sub>FE</sub>	V <sub>CE</sub> = -10V, I <sub>C</sub> = -5mA	35			
	UN2112/211E			60			
	UN2113/2114/211M			80			
	UN2115*/2116*/2117*/2110*			160		460	
	UN2119/211F/211D/211H			30			
	UN2118/211L			20			
	UN211N/211T			80		400	
	UN211V			6		20	
	UN211Z			60		200	
Collector to emitter saturation voltage		V <sub>CE(sat)</sub>	I <sub>C</sub> = -10mA, I <sub>B</sub> = - 0.3mA			- 0.25	V
			UN211V I <sub>C</sub> = -10mA, I <sub>B</sub> = -1.5mA		- 0.07	- 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
			UN2113 V <sub>CC</sub> = -5V, V <sub>B</sub> = -3.5V, R <sub>L</sub> = 1kΩ			- 0.2	
			UN211D V <sub>CC</sub> = -5V, V <sub>B</sub> = -10V, R <sub>L</sub> = 1kΩ			- 0.2	
			UN211E 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> = 1mA, f = 200MHz		80		MHz
Input resistance	UN2111/2114/2115	R <sub>i</sub>		(-30%)	10	(+30%)	kΩ
	UN2112/2117/211T				22		
	UN2113/2110/211D/211E				47		
	UN2116/211F/211L/211N/211Z				4.7		
	UN2118				0.51		
	UN2119				1		
	UN211H/211M/211V				2.2		

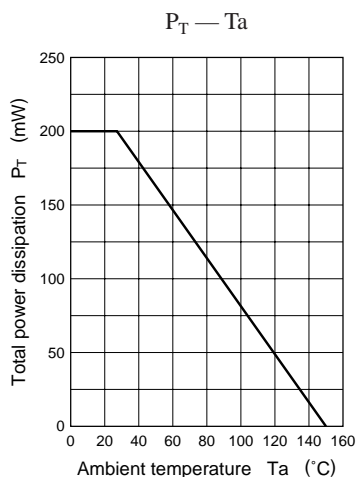
\* h<sub>FE</sub> rank classification (UN2115/2116/2117/2110)

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

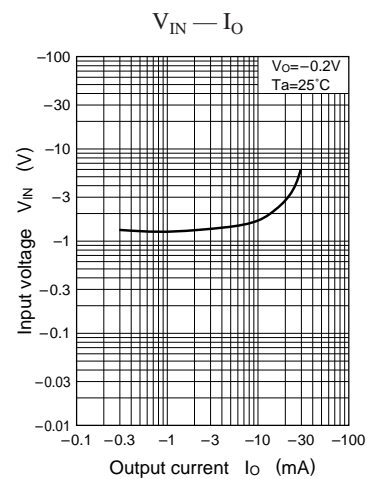
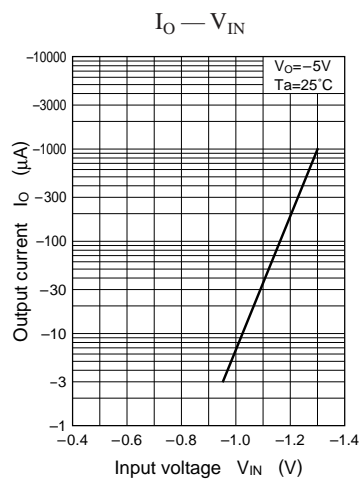
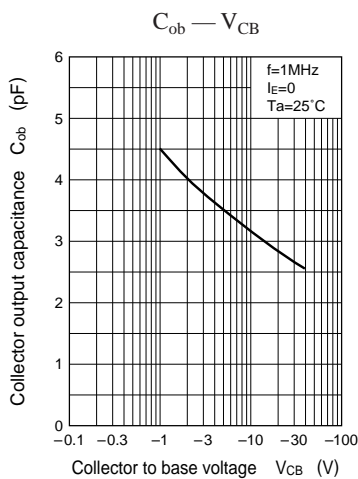
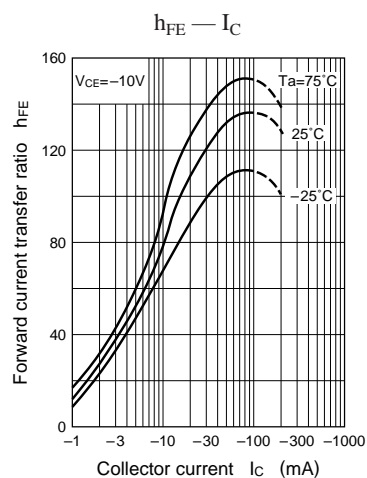
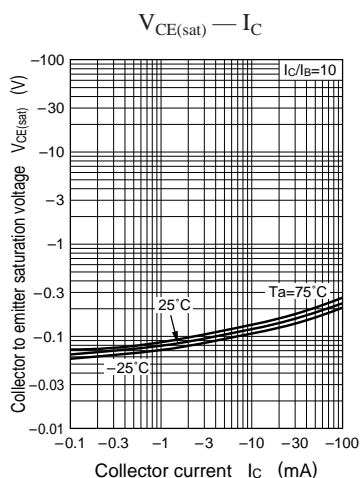
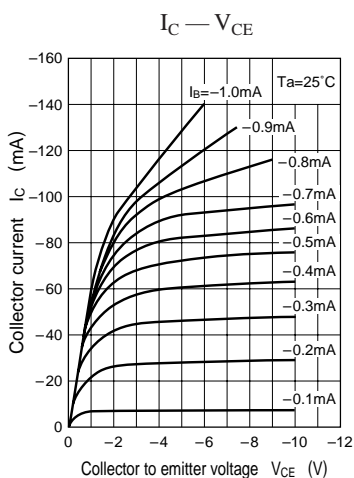
■ Electrical Characteristics (continued) (Ta=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Resis- tance ratio	UN2111/2112/2113/211L	$R_1/R_2$		0.8	1.0	1.2	
	UN2114			0.17	0.21	0.25	
	UN2118/2119			0.08	0.1	0.12	
	UN211D				4.7		
	UN211E				2.14		
	UN211F/211T				0.47		
	UN211H			0.17	0.22	0.27	
	UN211M				0.047		
	UN211N				0.1		
	UN211V				1.0		
	UN211Z				0.21		

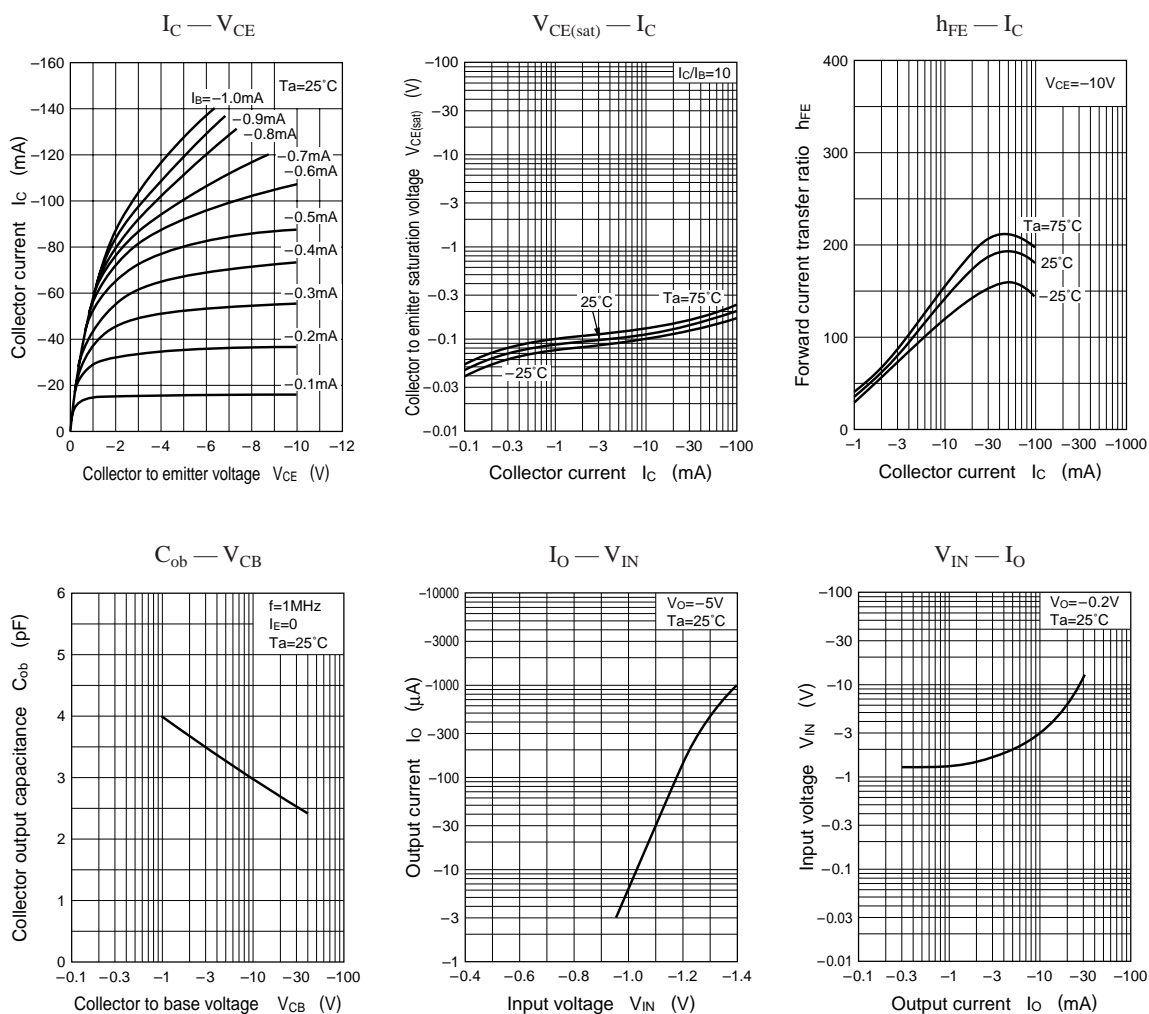
Common characteristics chart



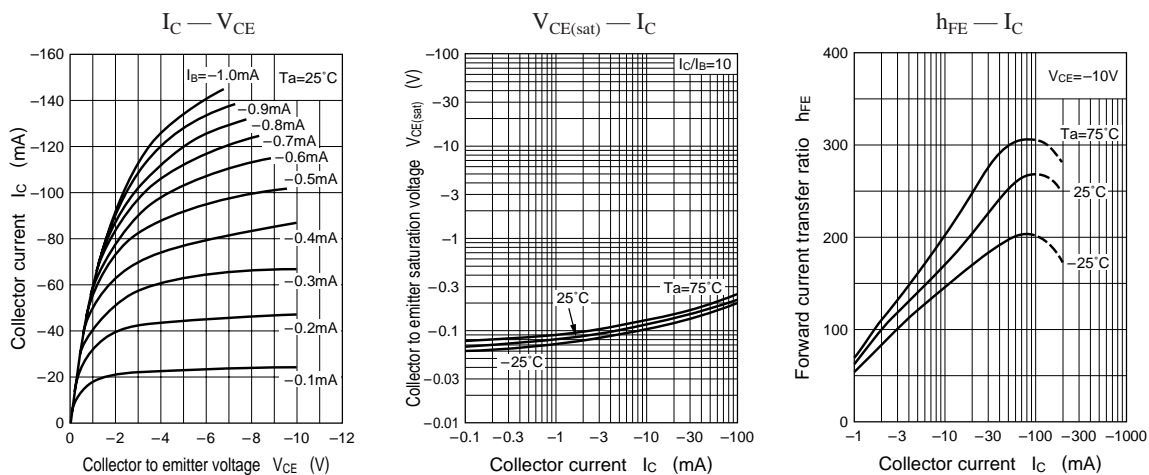
Characteristics charts of UN2111

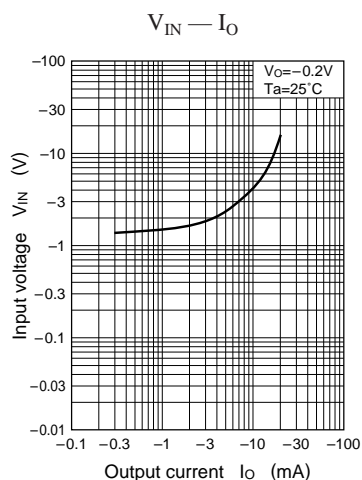
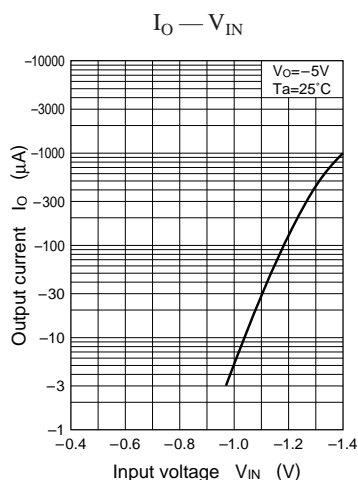
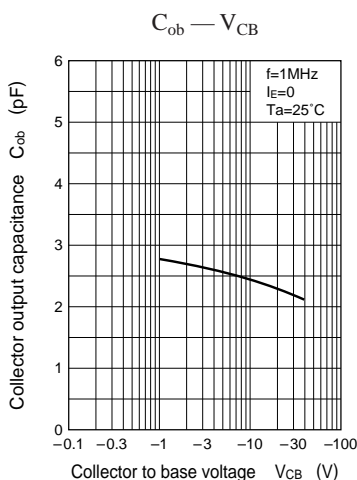


Characteristics charts of UN2112

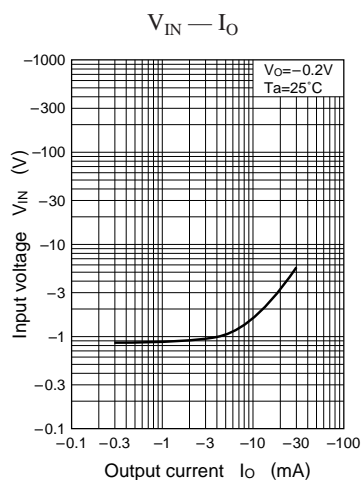
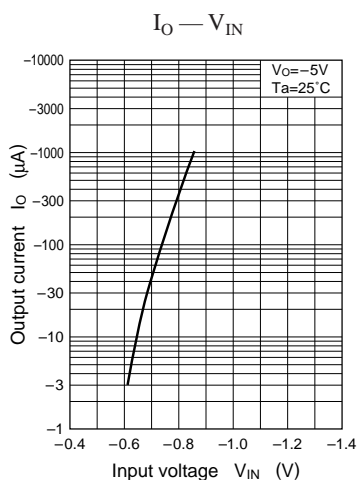
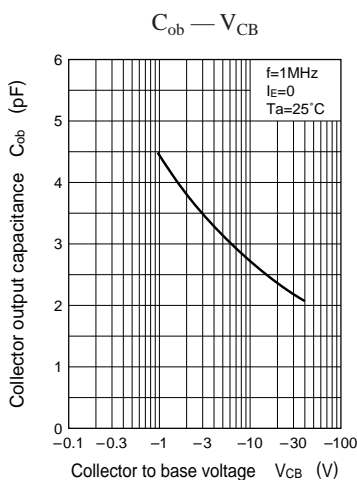
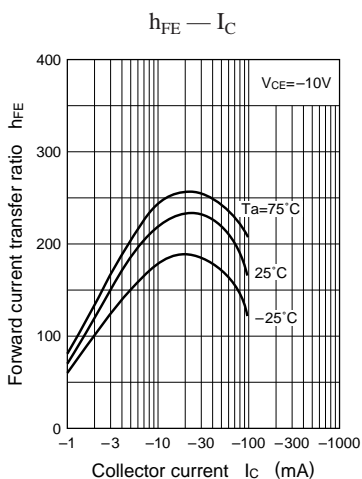
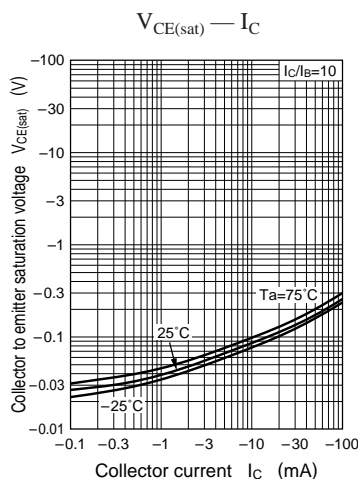
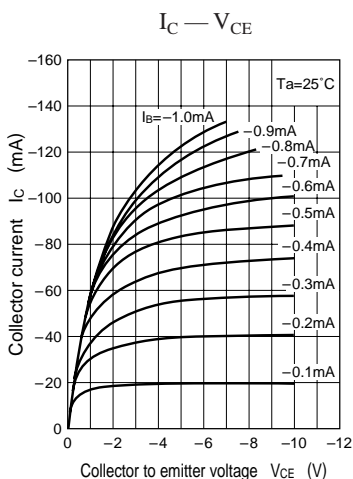


Characteristics charts of UN2113

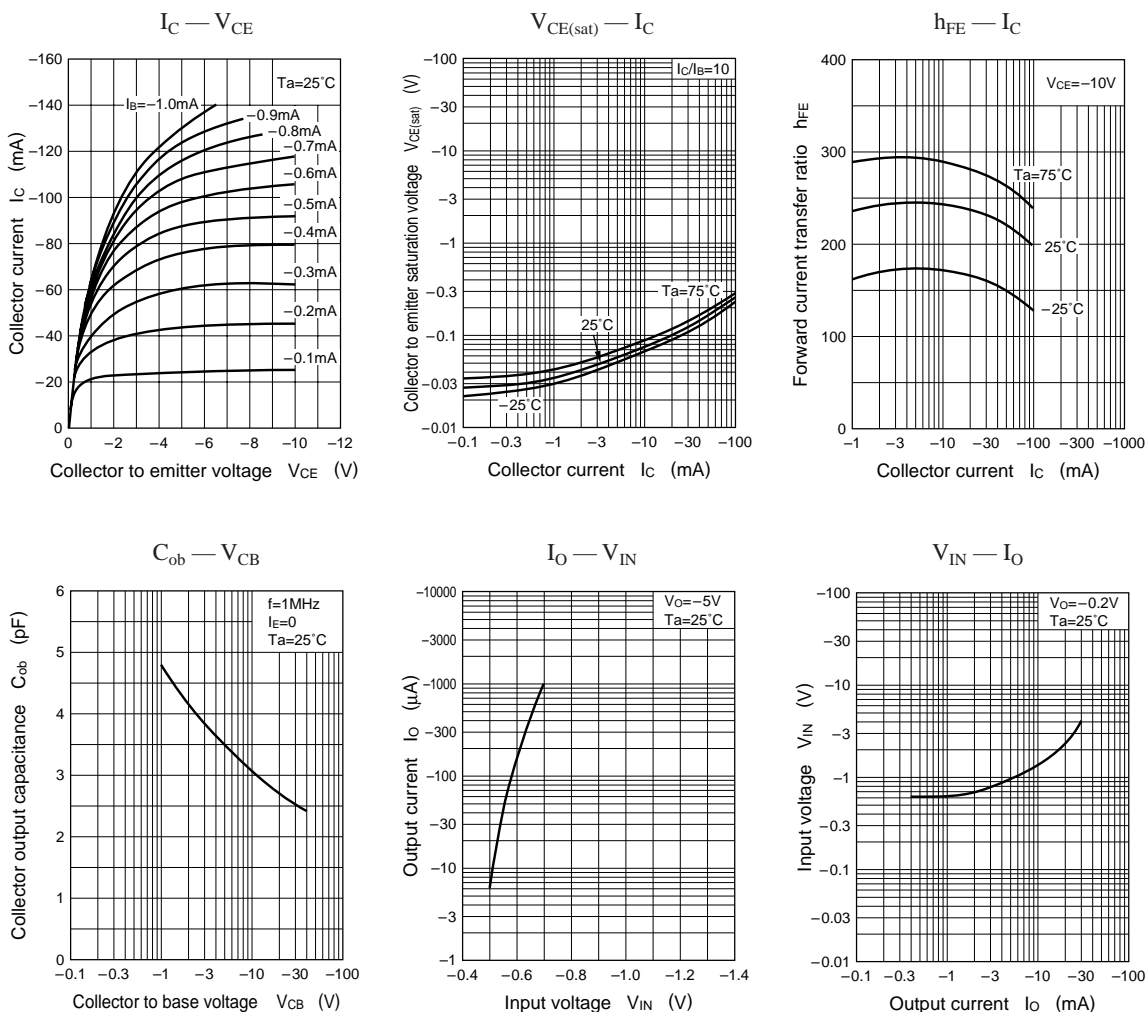




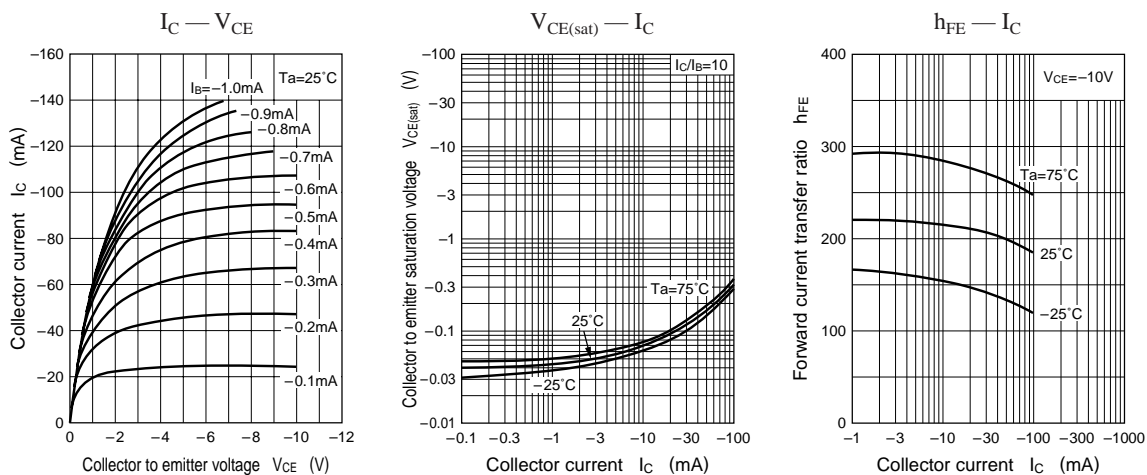
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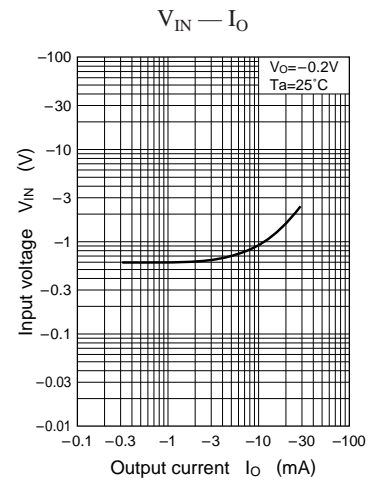
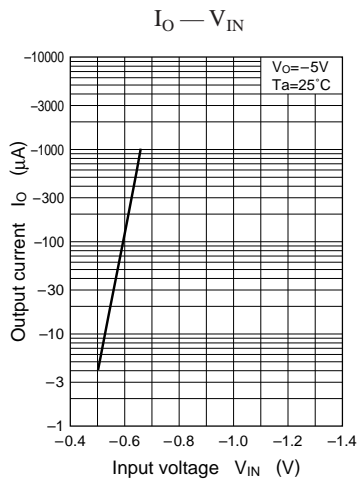
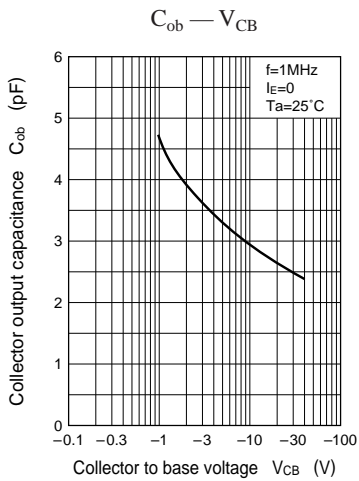


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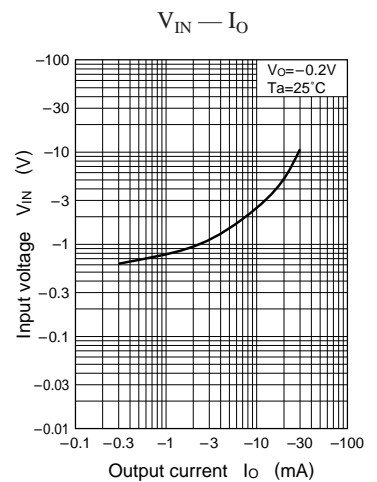
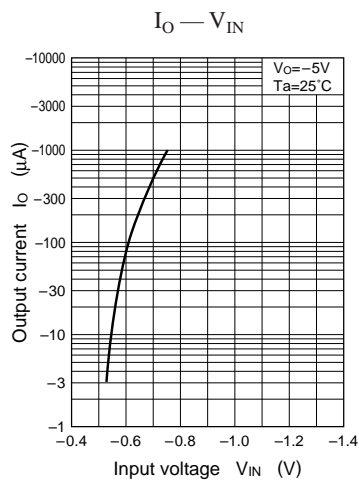
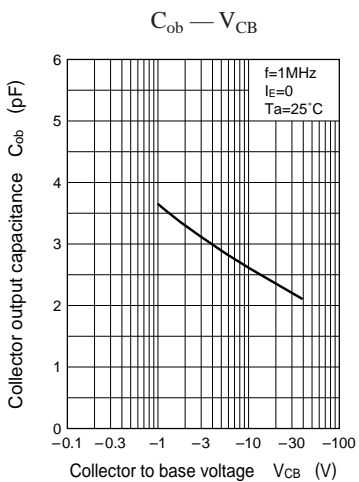
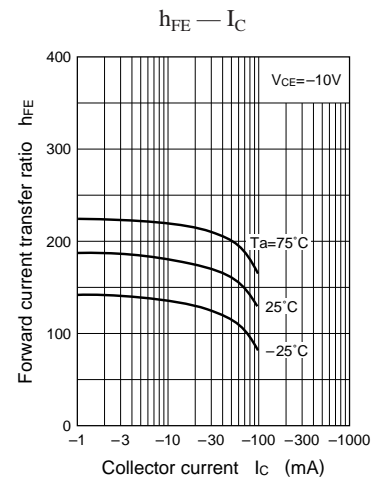
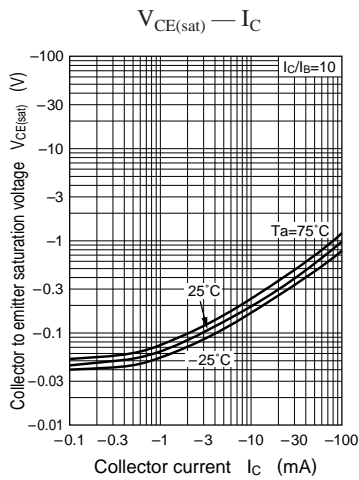
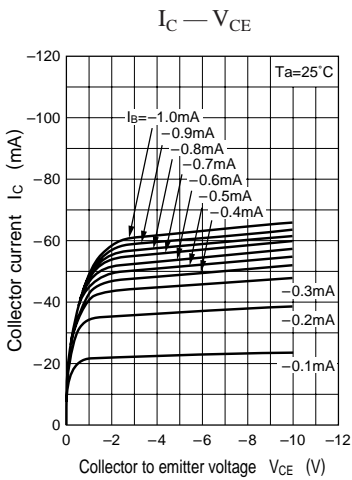


Characteristics charts of UN2116



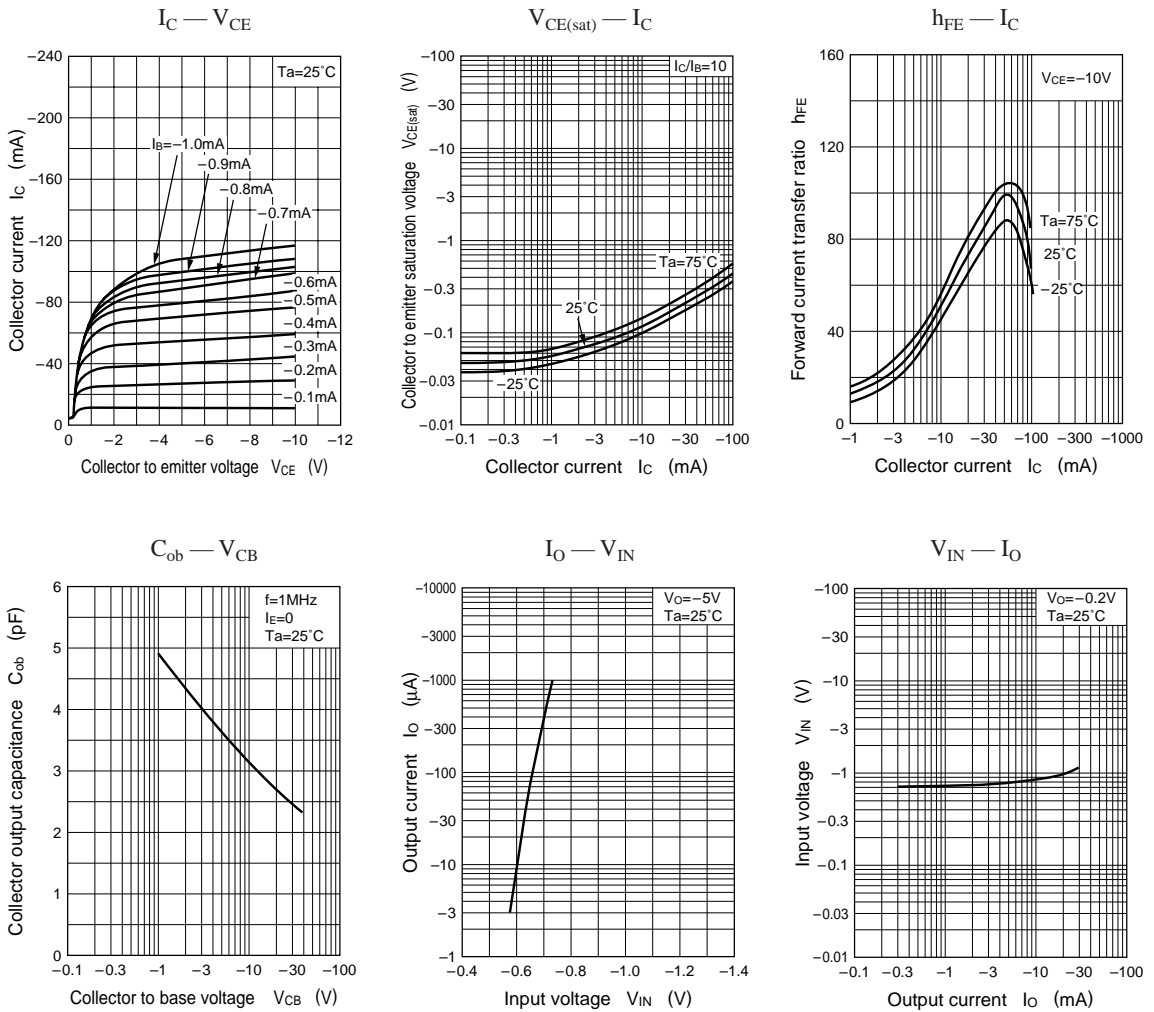


Characteristics charts of UN2117

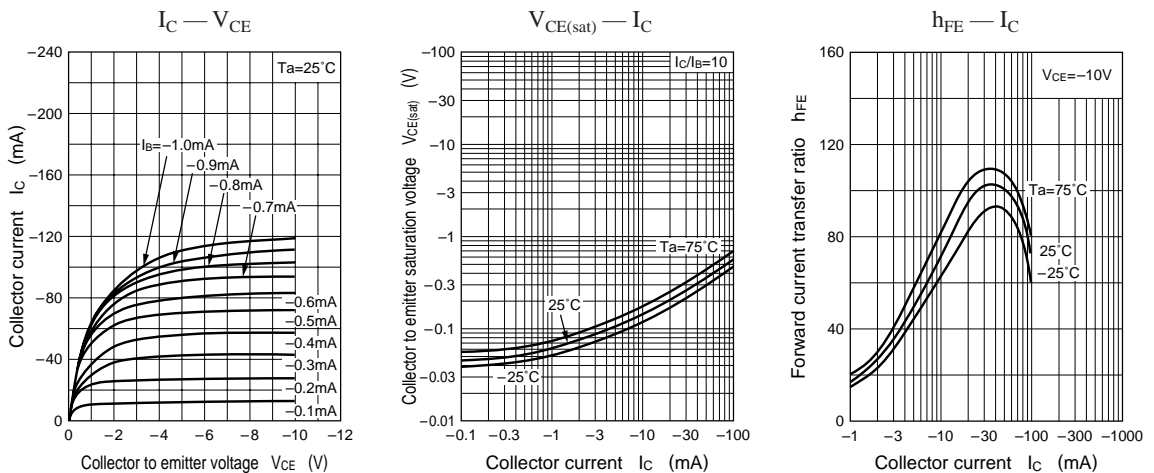


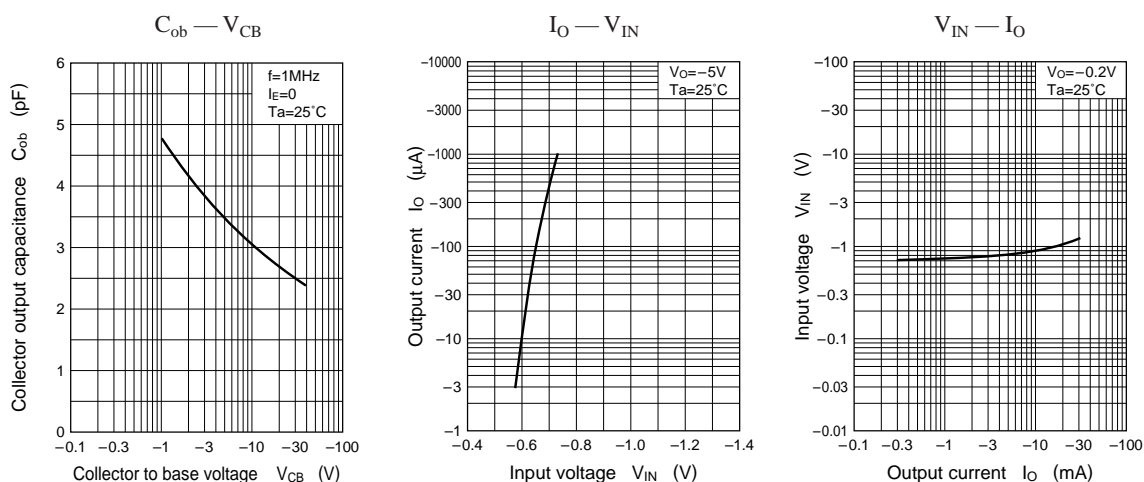


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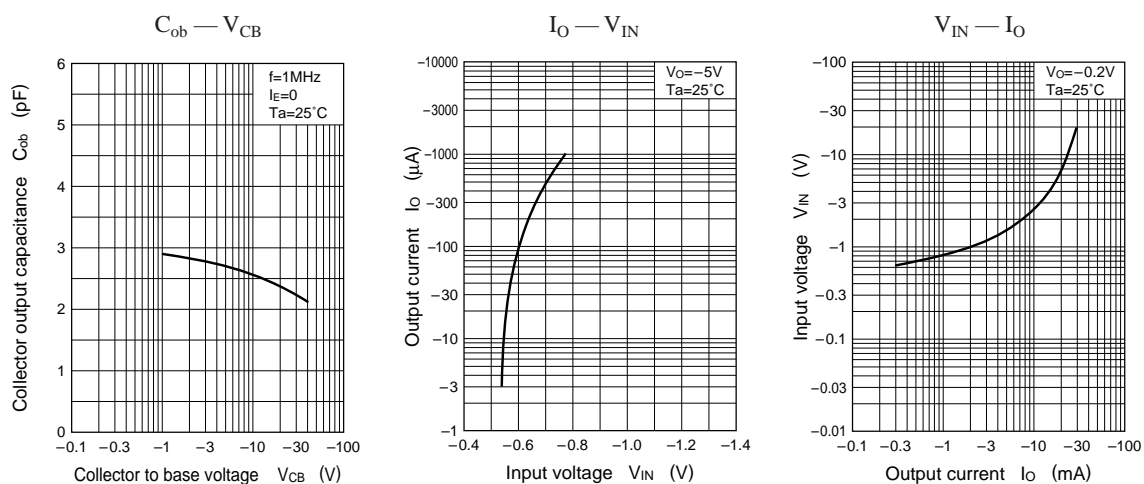
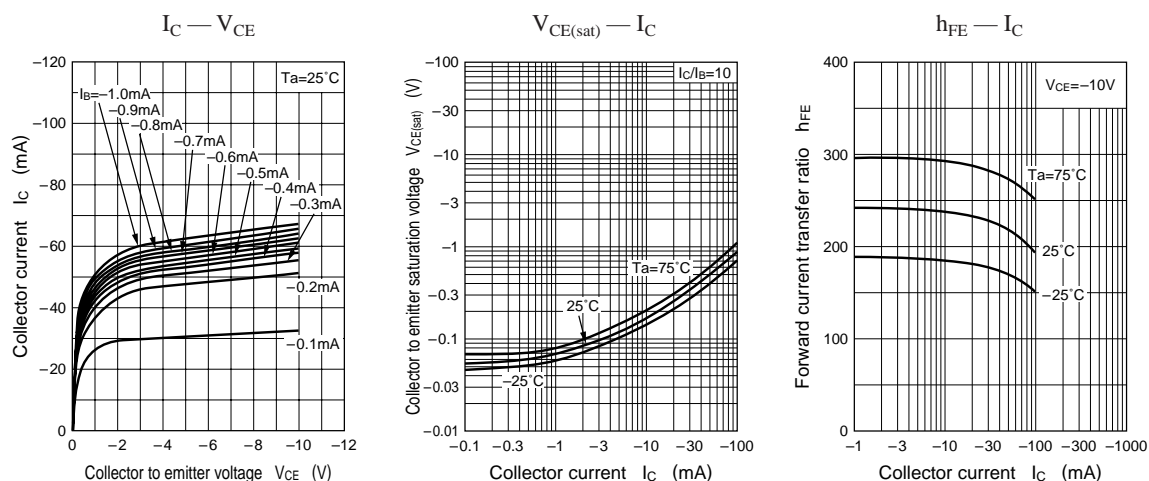


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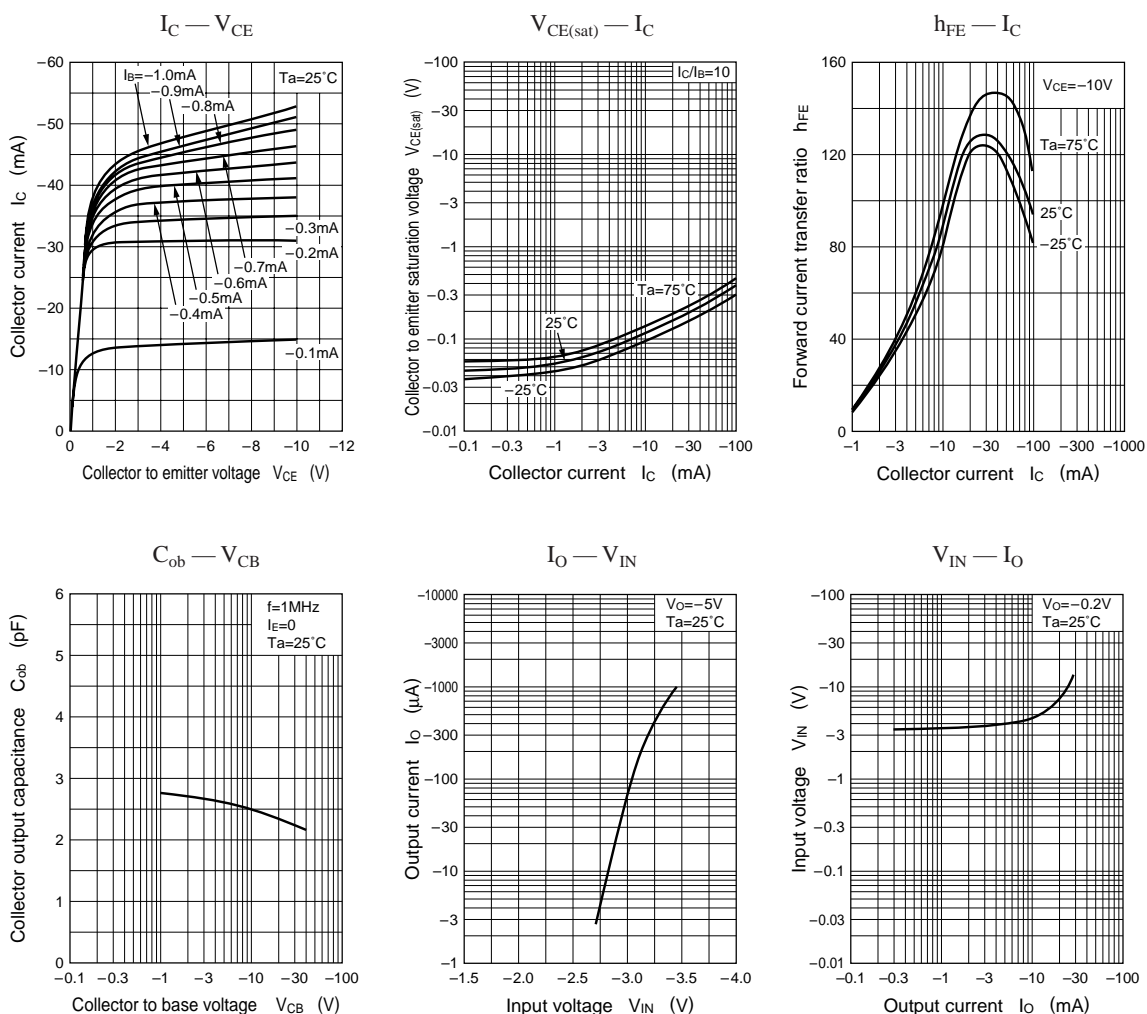




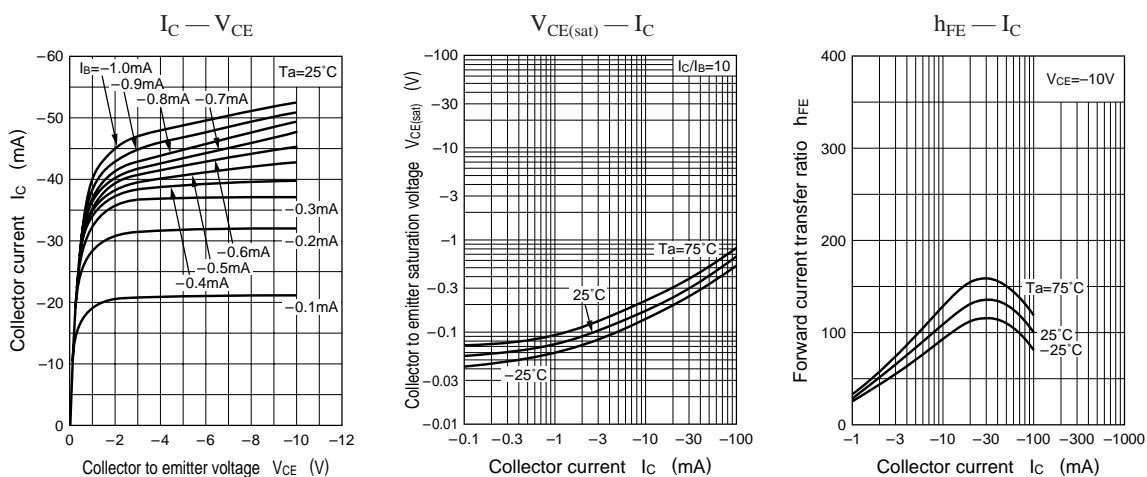
Characteristics charts of UN2110

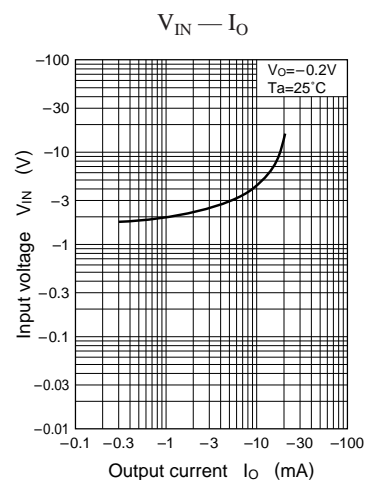
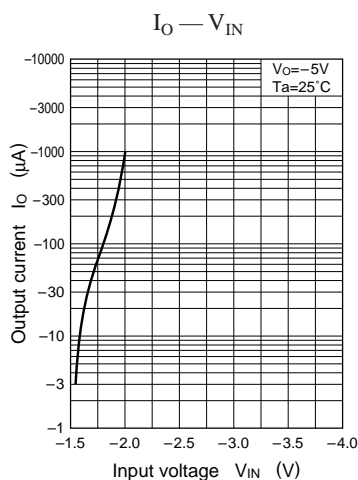
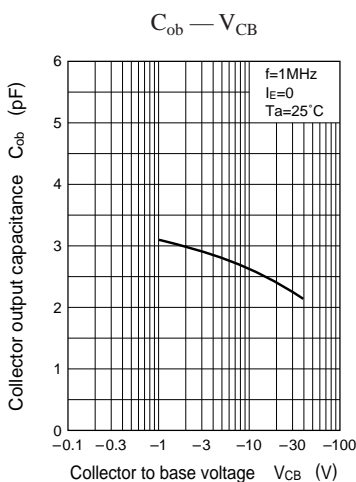


Characteristics charts of UN211D

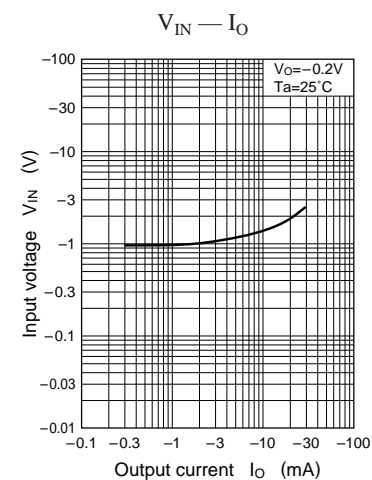
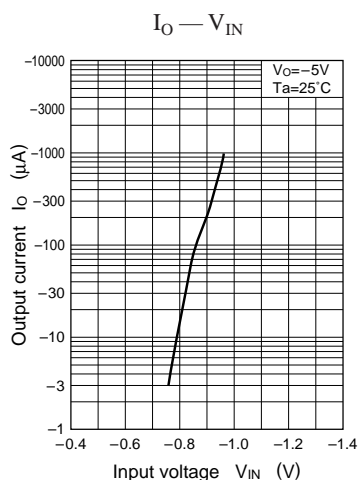
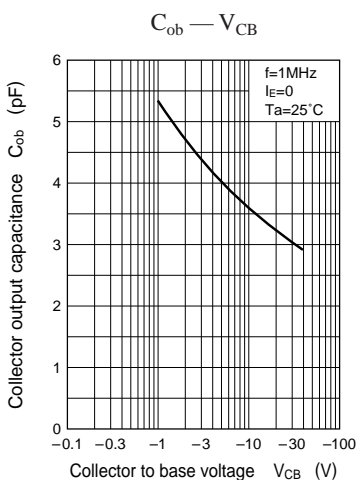
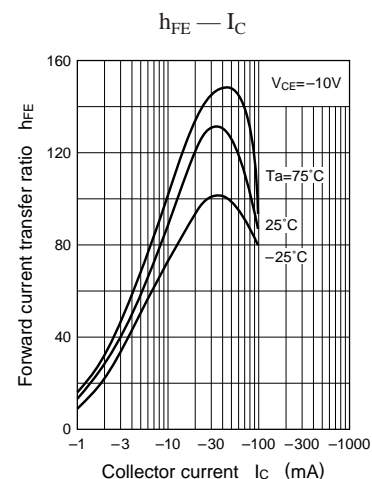
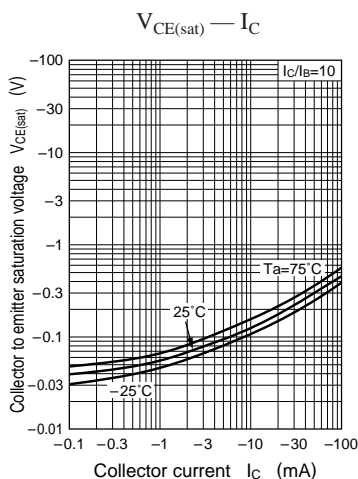
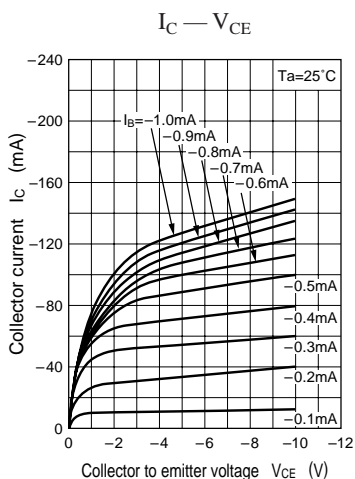


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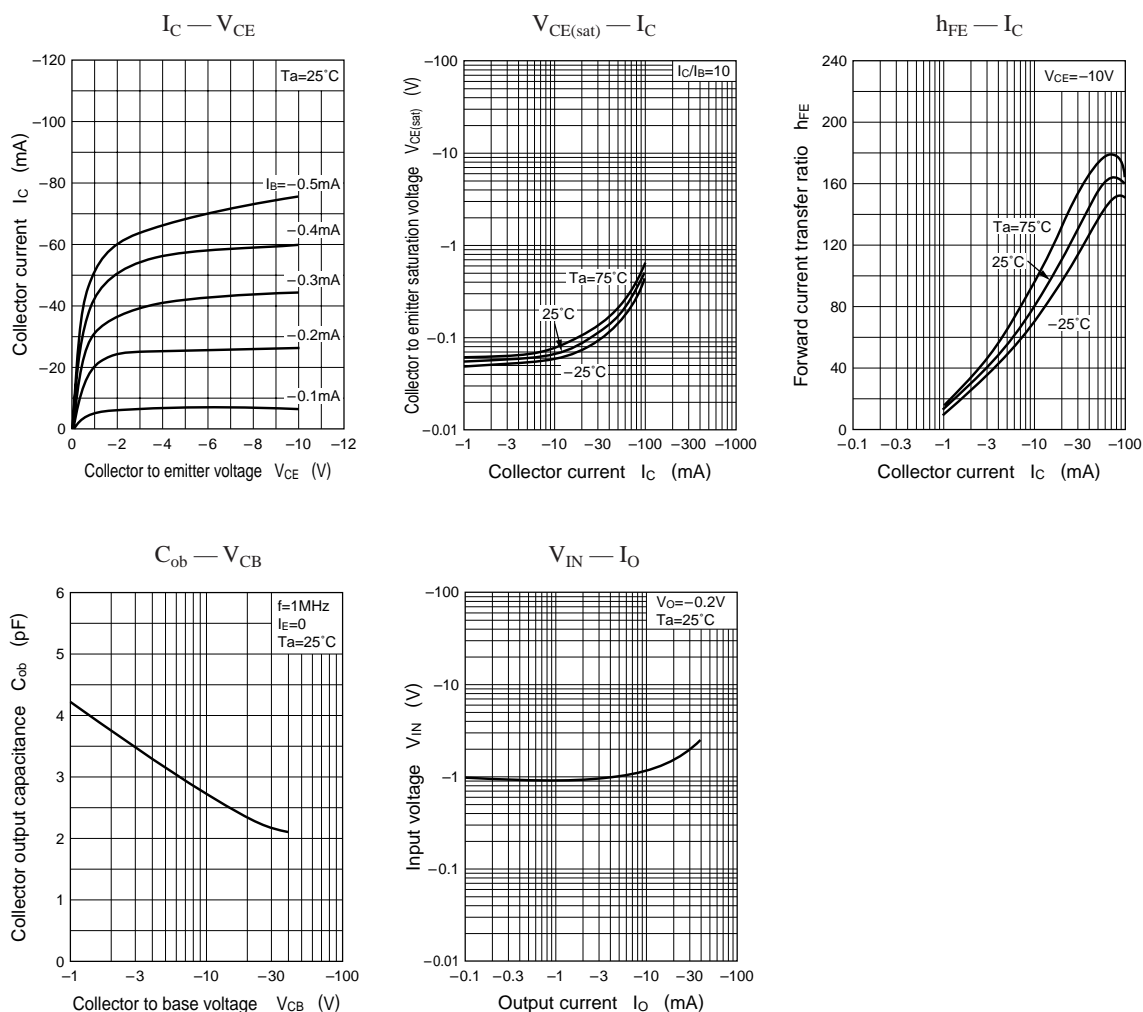




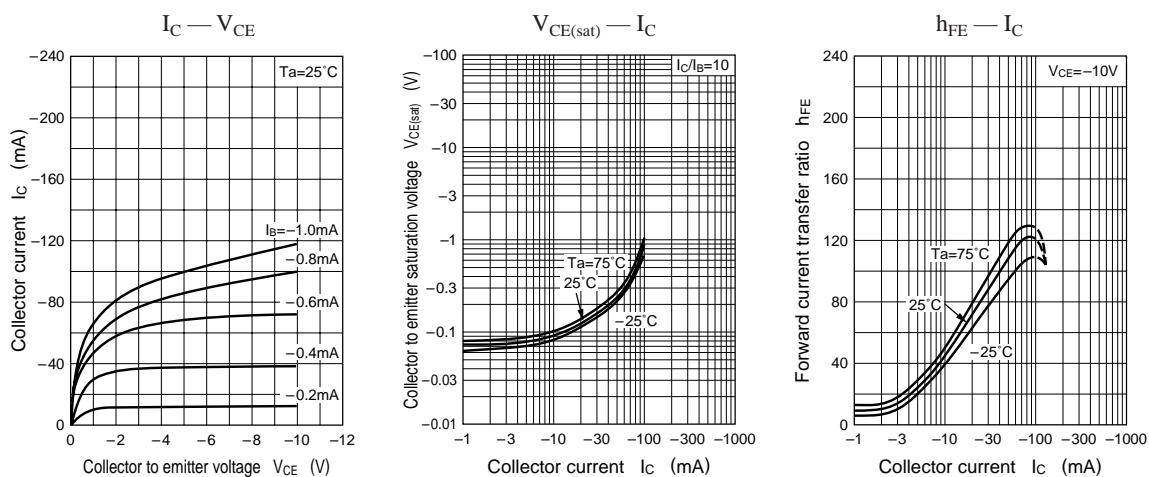
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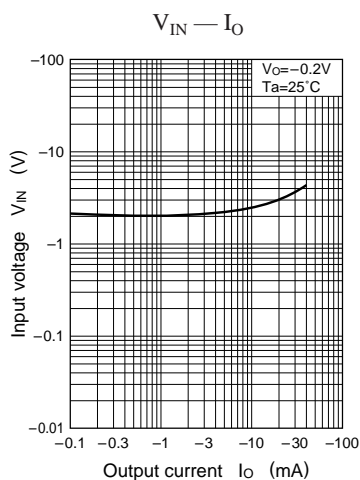
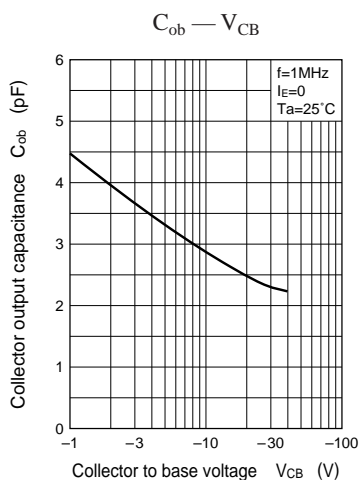


Characteristics charts of UN211H

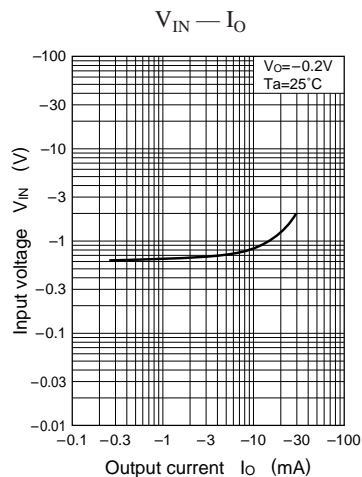
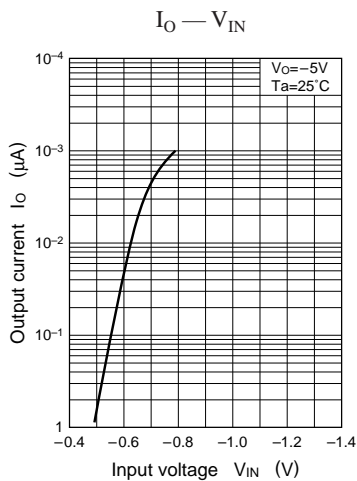
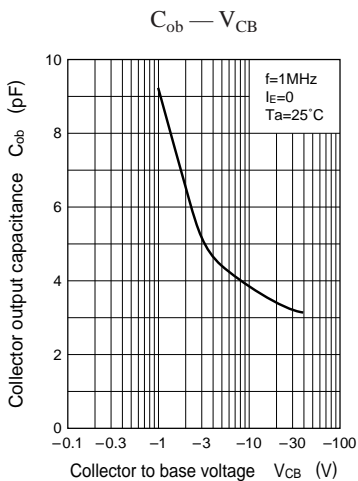
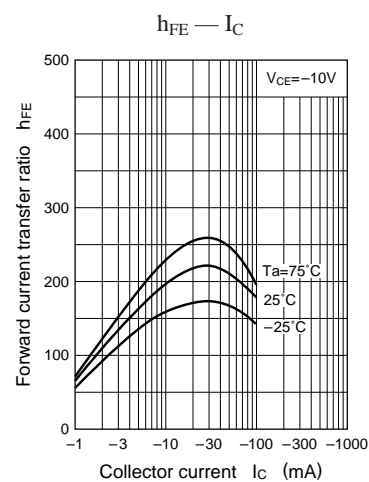
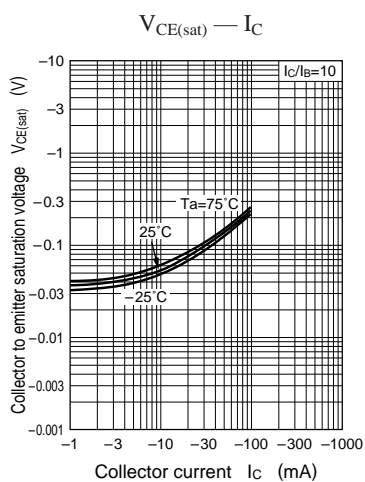
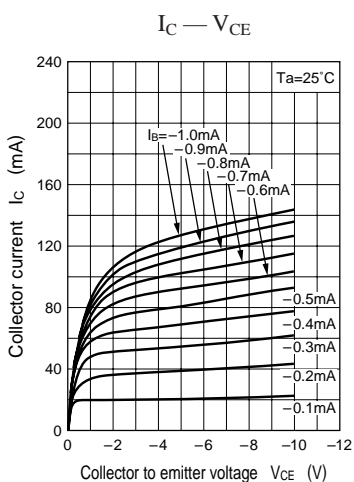


Characteristics charts of UN211L

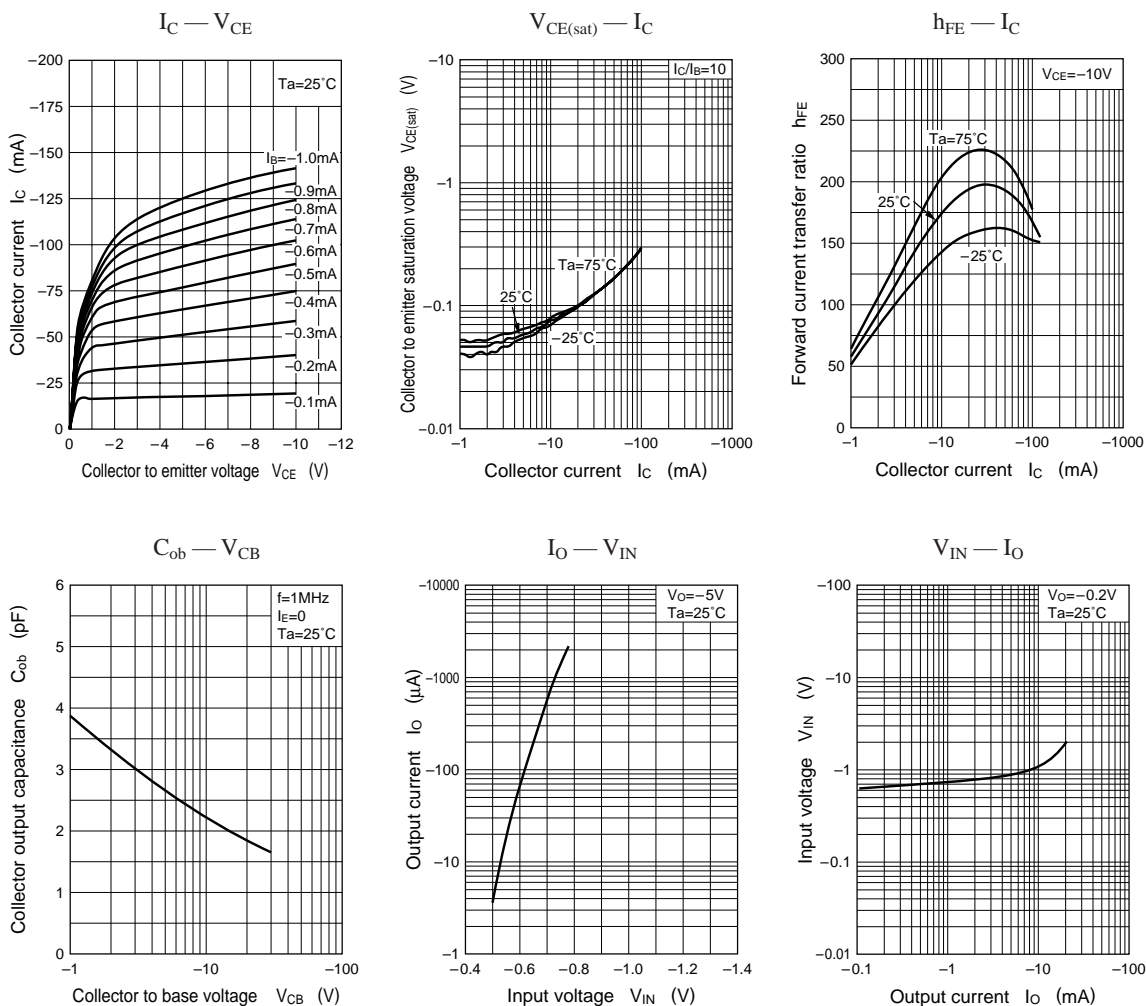




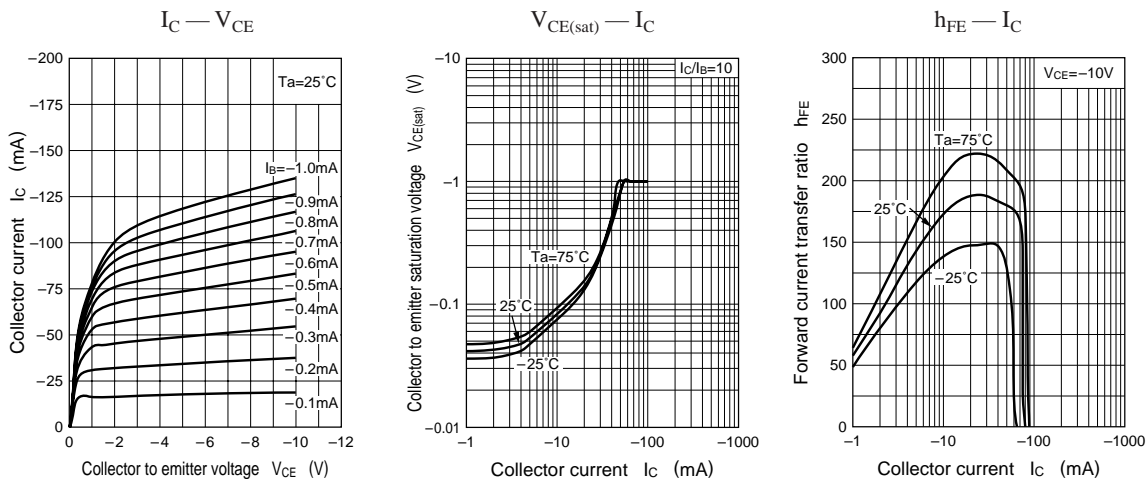
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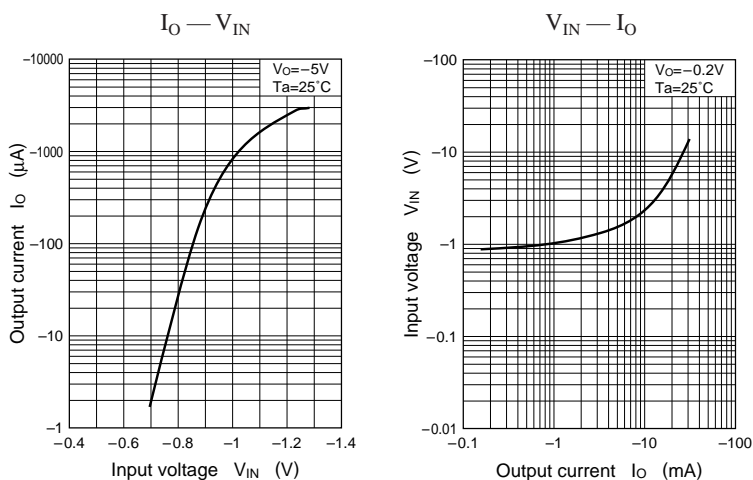


Characteristics charts of UN211N

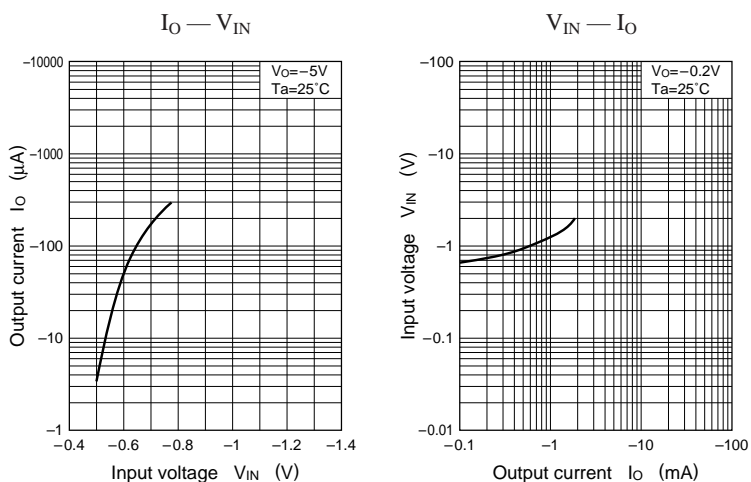
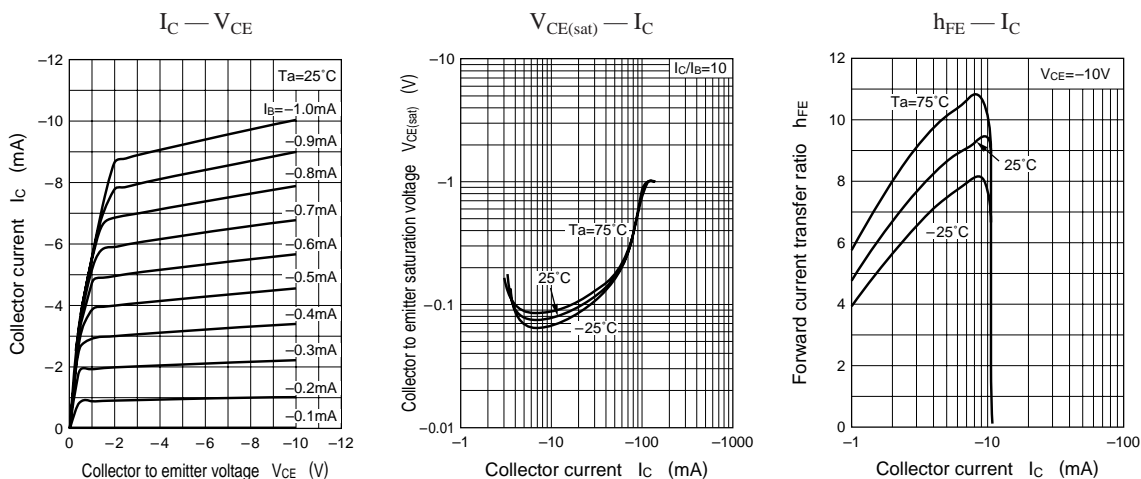


Characteristics charts of UN211T





Characteristics charts of UN211V





Characteristics charts of UN211Z

