

Transistors with built-in Resistor

Panasonic

**UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z
(UN5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/511D/511E/511F/
511H/511L/511M/511N/511T/511V/511Z)**

Silicon PNP epitaxial planer transistor

For digital circuits

Features

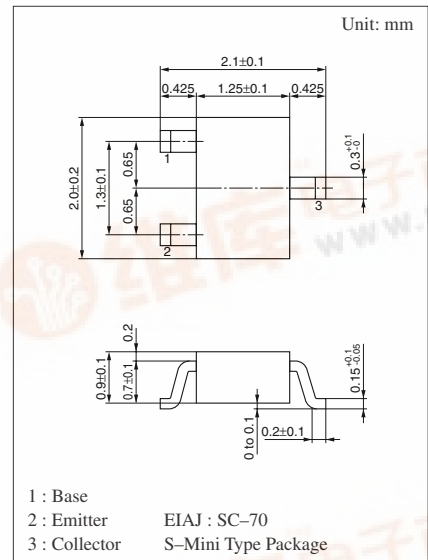
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- S-Mini type package, allowing automatic insertion through tape packing and magazine packing.

Resistance by Part Number

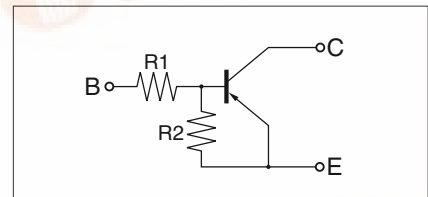
	Marking Symbol	(R ₁)	(R ₂)
• UNR5111	6A	10kΩ	10kΩ
• UNR5112	6B	22kΩ	22kΩ
• UNR5113	6C	47kΩ	47kΩ
• UNR5114	6D	10kΩ	47kΩ
• UNR5115	6E	10kΩ	—
• UNR5116	6F	4.7kΩ	—
• UNR5117	6H	22kΩ	—
• UNR5118	6I	0.51Ω	5.1kΩ
• UNR5119	6K	1kΩ	10kΩ
• UNR5110	6L	47kΩ	—
• UNR511D	6M	47kΩ	10kΩ
• UNR511E	6N	47kΩ	22kΩ
• UNR511F	6O	4.7kΩ	10kΩ
• UNR511H	6P	2.2kΩ	10kΩ
• UNR511L	6Q	4.7kΩ	4.7kΩ
• UNR511M	EI	2.2kΩ	47kΩ
• UNR511N	EW	4.7kΩ	47kΩ
• UNR511T	EY	22kΩ	47kΩ
• UNR511V	FC	2.2kΩ	2.2kΩ
• UNR511Z	FE	4.7kΩ	22kΩ

Absolute Maximum Ratings (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Collector to base voltage	V _{CBO}	-50	V
Collector to emitter voltage	V _{CEO}	-50	V
Collector current	I _C	-100	mA
Total power dissipation	P _T	150	mW
Junction temperature	T _j	150	°C
Storage temperature	T _{stg}	-55 to +150	°C



Internal Connection



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

■ Electrical Characteristics (Ta=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Collector cutoff current		I _{CBO}	V _{CB} = −50V, I _E = 0			− 0.1	μA
		I _{CEO}	V _{CE} = −50V, I _B = 0			− 0.5	μA
Emitter cutoff current	UNR5111	I _{EBO}	V _{EB} = −6V, I _C = 0			− 0.5	mA
	UNR5112/5114/511E/511D/511M/511N/511T					− 0.2	
	UNR5113					− 0.1	
	UNR5115/5116/5117/5110					− 0.01	
	UNR511F/511H					− 1.0	
	UNR5119					− 1.5	
	UNR5118/511L/511V					− 2.0	
	UNR511Z					− 0.4	
Collector to base voltage		V _{CBO}	I _C = −10μA, I _E = 0	−50			V
UNR511N/511T/511V/511Z				−50			
Collector to emitter voltage		V _{CEO}	I _C = −2mA, I _B = 0	−50			V
UNR511N/511T				−50			
Forward current transfer ratio	UNR5111	h _{FE}	V _{CE} = −10V, I _C = −5mA	35			
	UNR5112/511E			60			
	UNR5113/5114/511M			80			
	UNR5115*/5116*/5117*/5110*			160		460	
	UNR511F/511D/5119/511H			30			
	UNR5118/511L			20			
	UNR511N/511T			80		400	
	UNR511V			6		20	
	UNR511Z			0		200	
Collector to emitter saturation voltage		V _{CE(sat)}	I _C = −10mA, I _B = − 0.3mA			− 0.25	V
UNR511V			I _C = −10mA, I _B = −1.5mA			− 0.25	
Output voltage high level		V _{OH}	V _{CC} = −5V, V _B = − 0.5V, R _L = 1kΩ	−4.9			V
Output voltage low level		V _{OL}	V _{CC} = −5V, V _B = −2.5V, R _L = 1kΩ			− 0.2	V
			V _{CC} = −5V, V _B = −3.5V, R _L = 1kΩ			− 0.2	
			V _{CC} = −5V, V _B = −10V, R _L = 1kΩ			− 0.2	
			V _{CC} = −5V, V _B = −6V, R _L = 1kΩ			− 0.2	
Transition frequency		f _T	V _{CB} = −10V, I _E = 1mA, f = 200MHz		80		MHz
UNR511Z			V _{CB} = −10V, I _E = 1mA, f = 200MHz		150		
Input resistance	UNR5111/5114/5115	R _i		(−30%)	10	(+30%)	kΩ
	UNR5112/5117/511T				22		
	UNR5113/5110/511D/511E				47		
	UNR5116/511F/511L/511N/511Z				4.7		
	UNR5118				0.51		
	UNR5119				1		
	UNR511H/511M/511V				2.2		

* h_{FE} rank classification (UNR5115/5116/5117/5110)

Rank	Q	R	S
h_{FE}	160 to 260	210 to 340	290 to 460

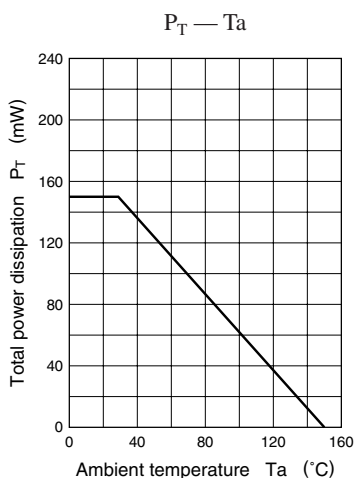
UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

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

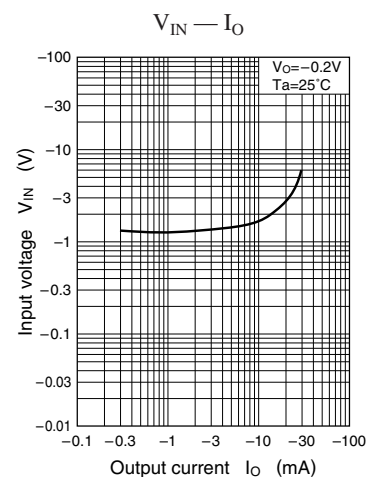
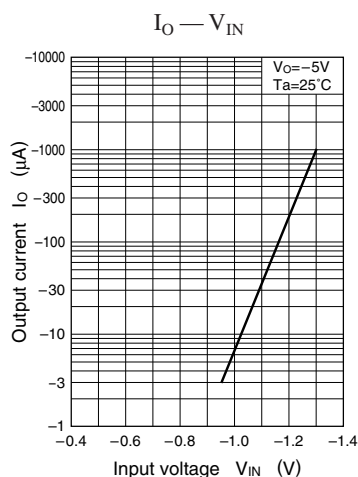
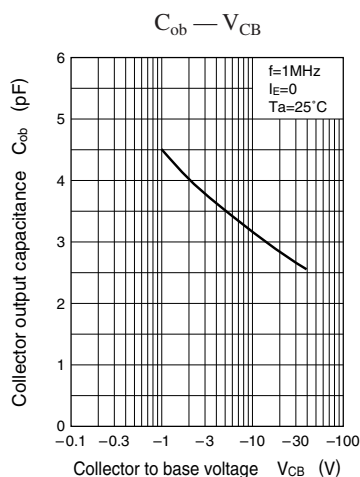
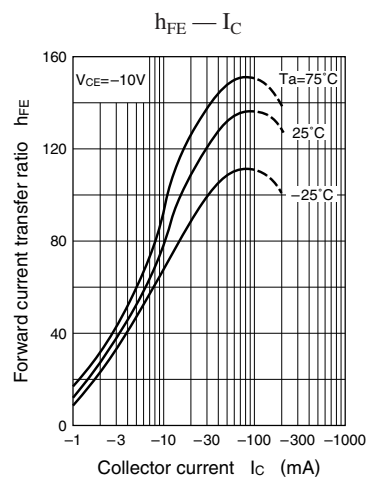
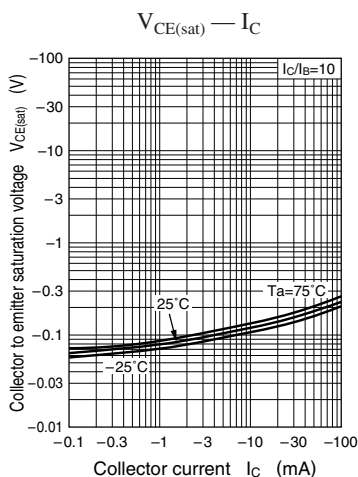
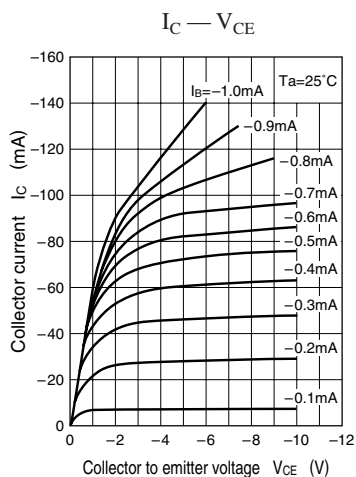
Parameter		Symbol	Conditions	min	typ	max	Unit
Resis- tance ratio	UNR5111/5112/5113/511L	R_1/R_2		0.8	1.0	1.2	
	UNR5114			0.17	0.21	0.25	
	UNR5118/5119			0.08	0.1	0.12	
	UNR511D				4.7		
	UNR511E				2.14		
	UNR511F/511T				0.47		
	UNR511H			0.17	0.22	0.27	
	UNR511M				0.047		
	UNR511N				0.1		
	UNR511V				1.0		
	UNR511Z				0.21		

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Common characteristics chart

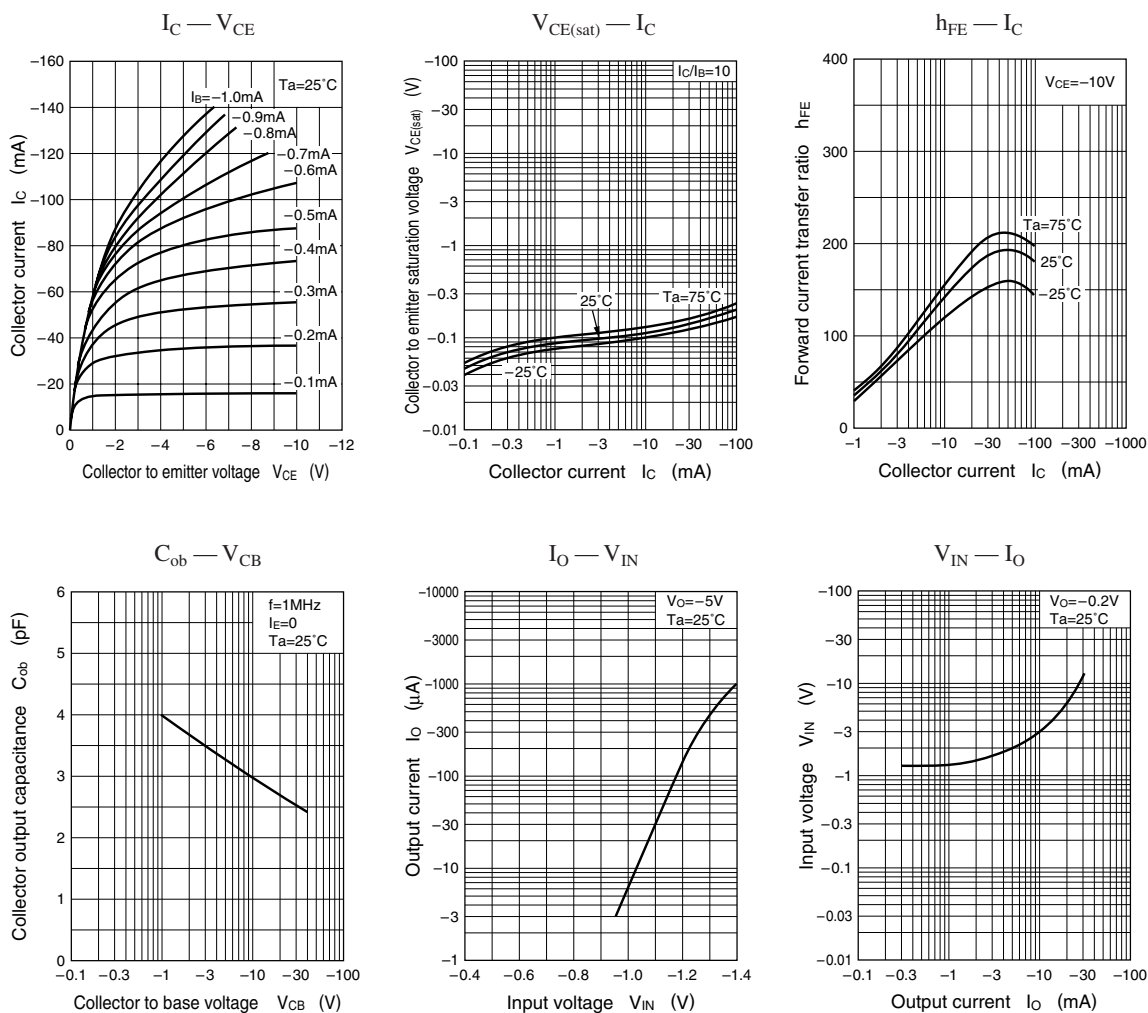


Characteristics charts of UNR5111

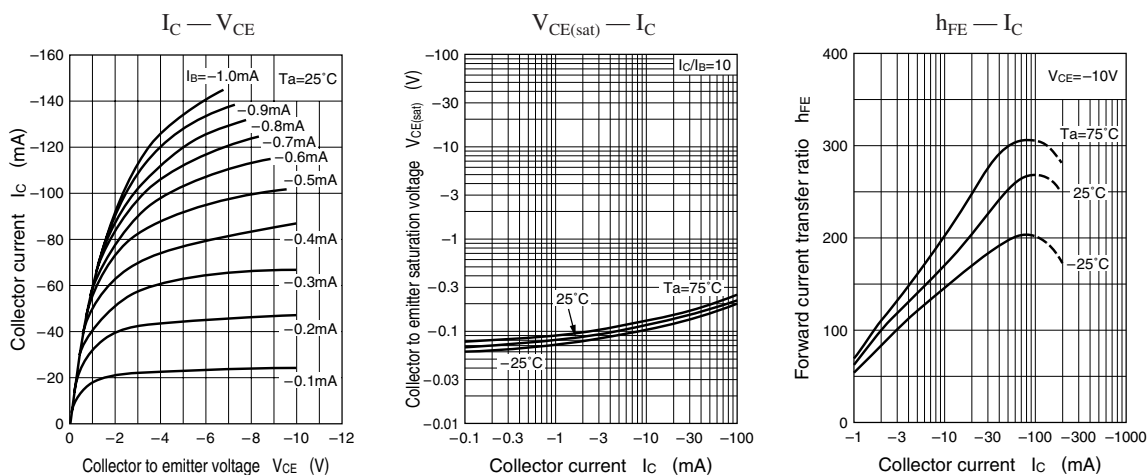


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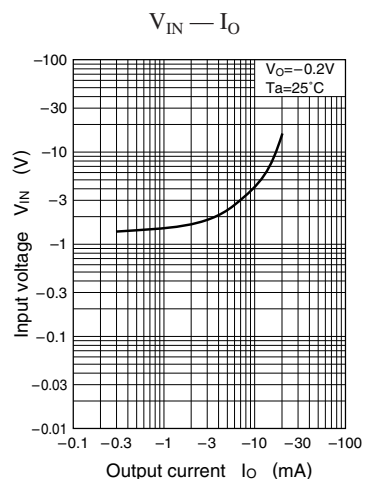
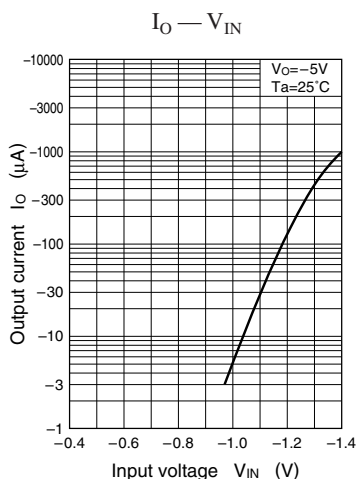
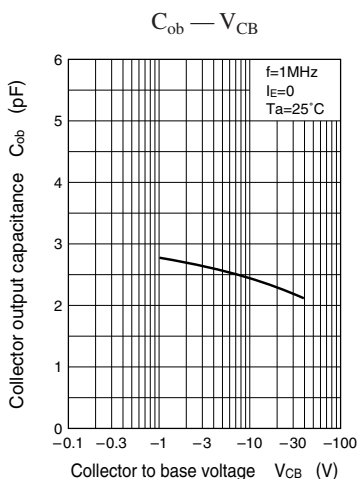
Characteristics charts of UNR5112



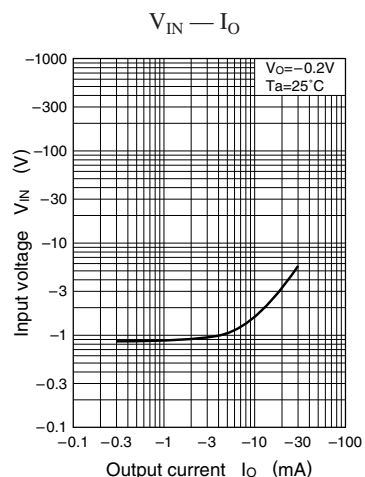
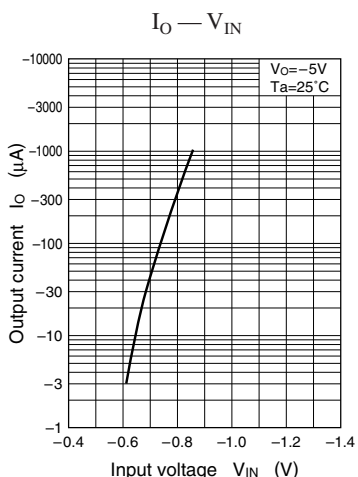
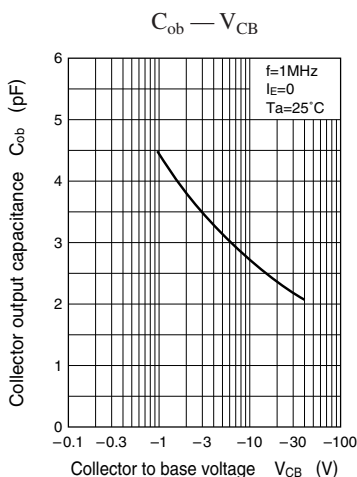
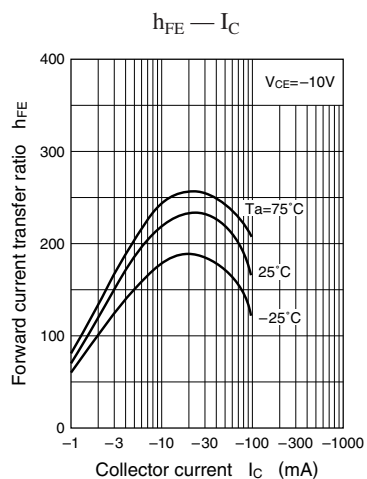
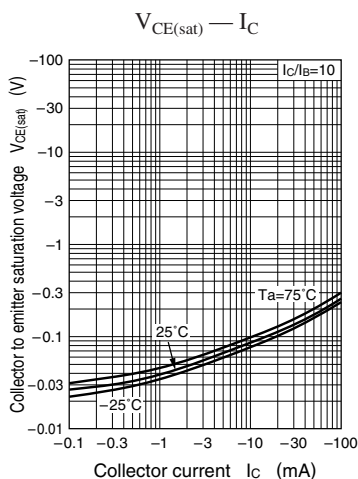
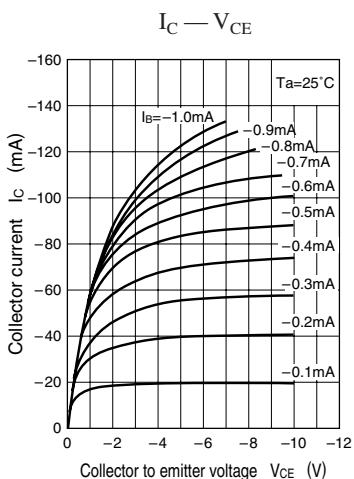
Characteristics charts of UNR5113



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
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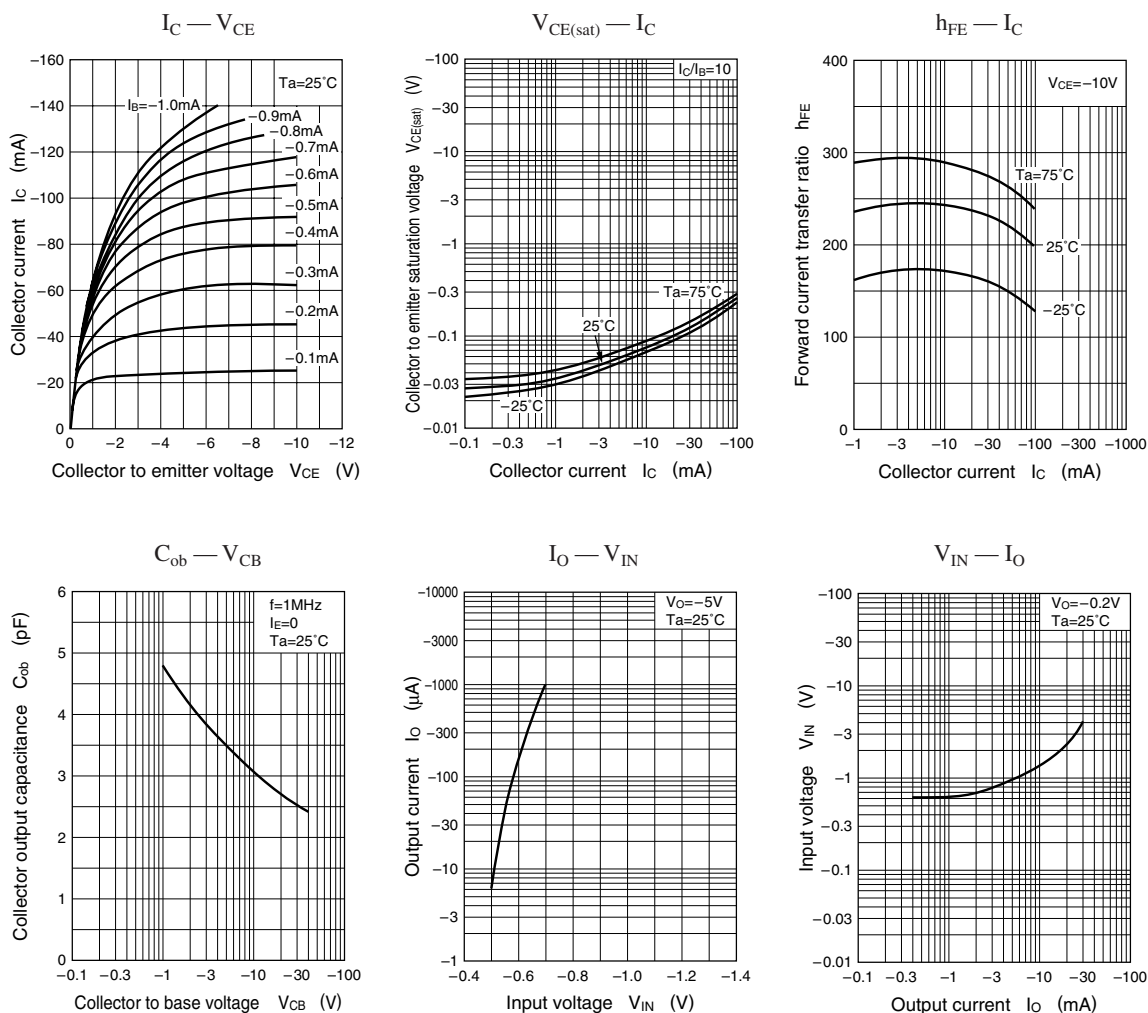


Characteristics charts of UNR5114

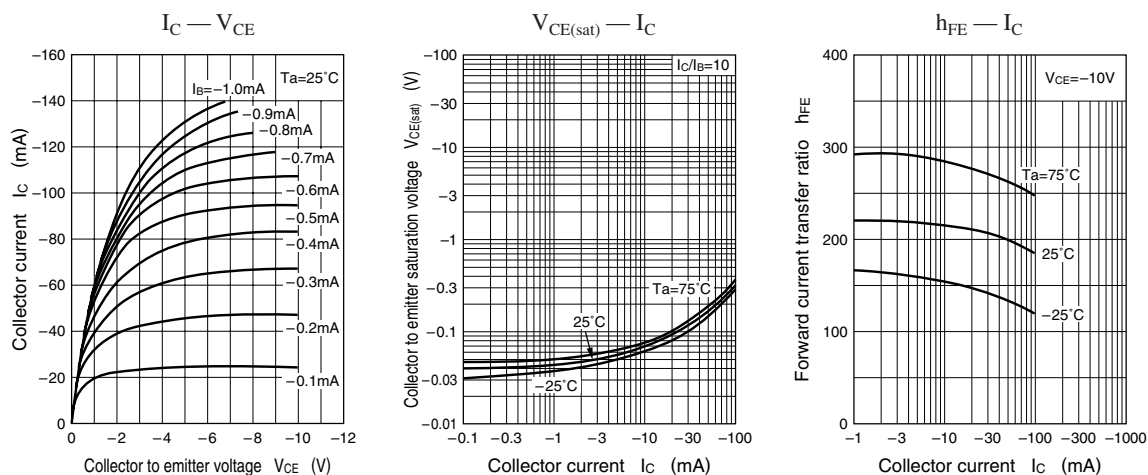


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Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

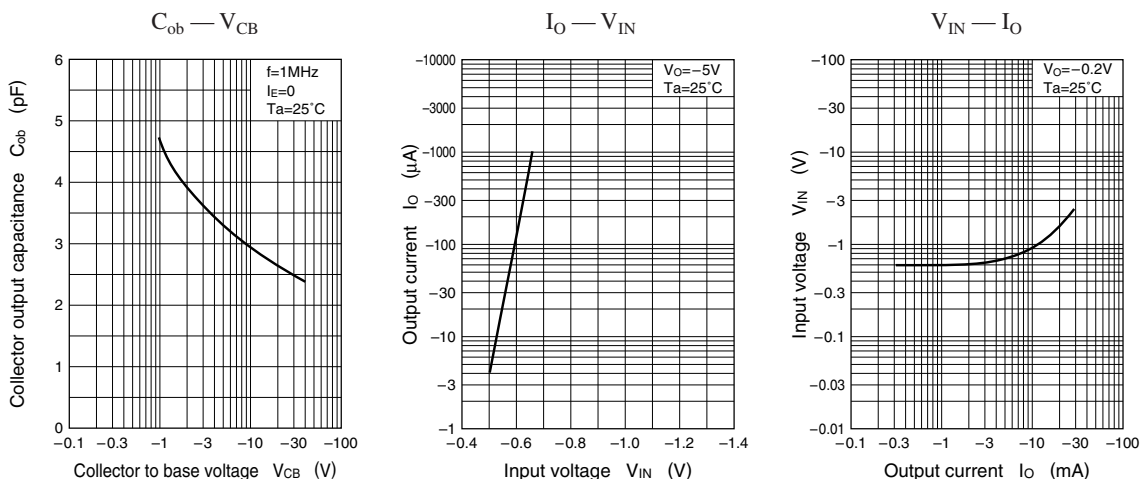
Characteristics charts of UNR5115



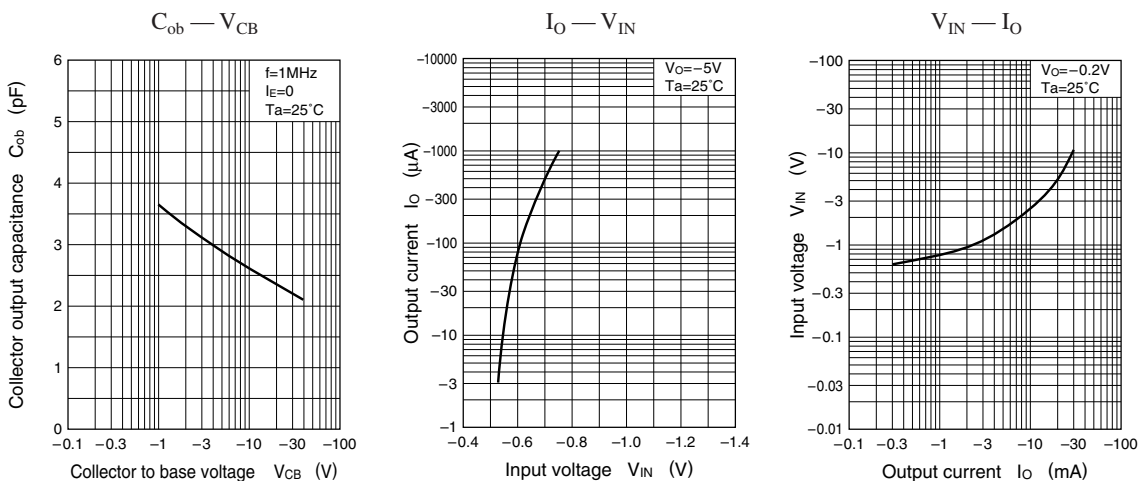
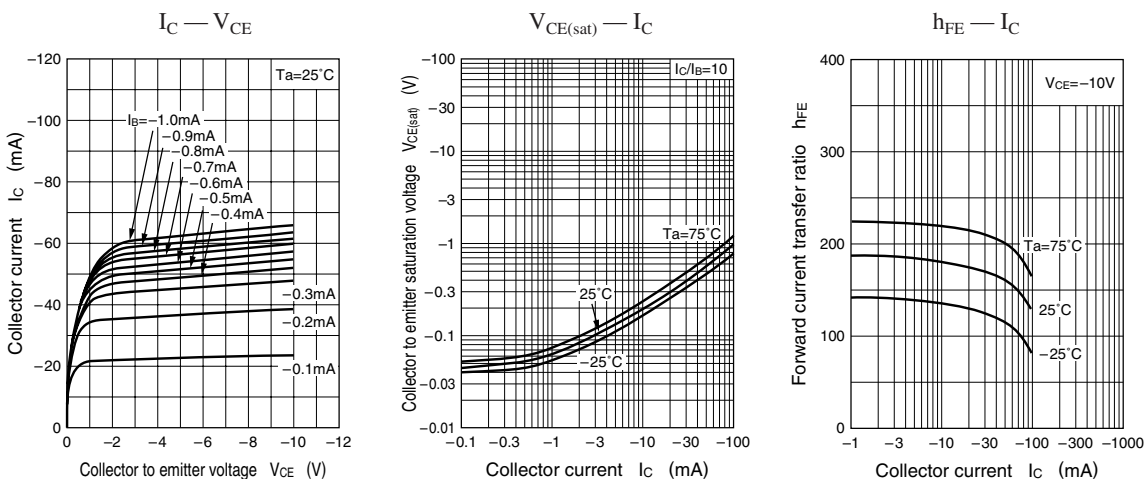
Characteristics charts of UNR5116



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
 Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

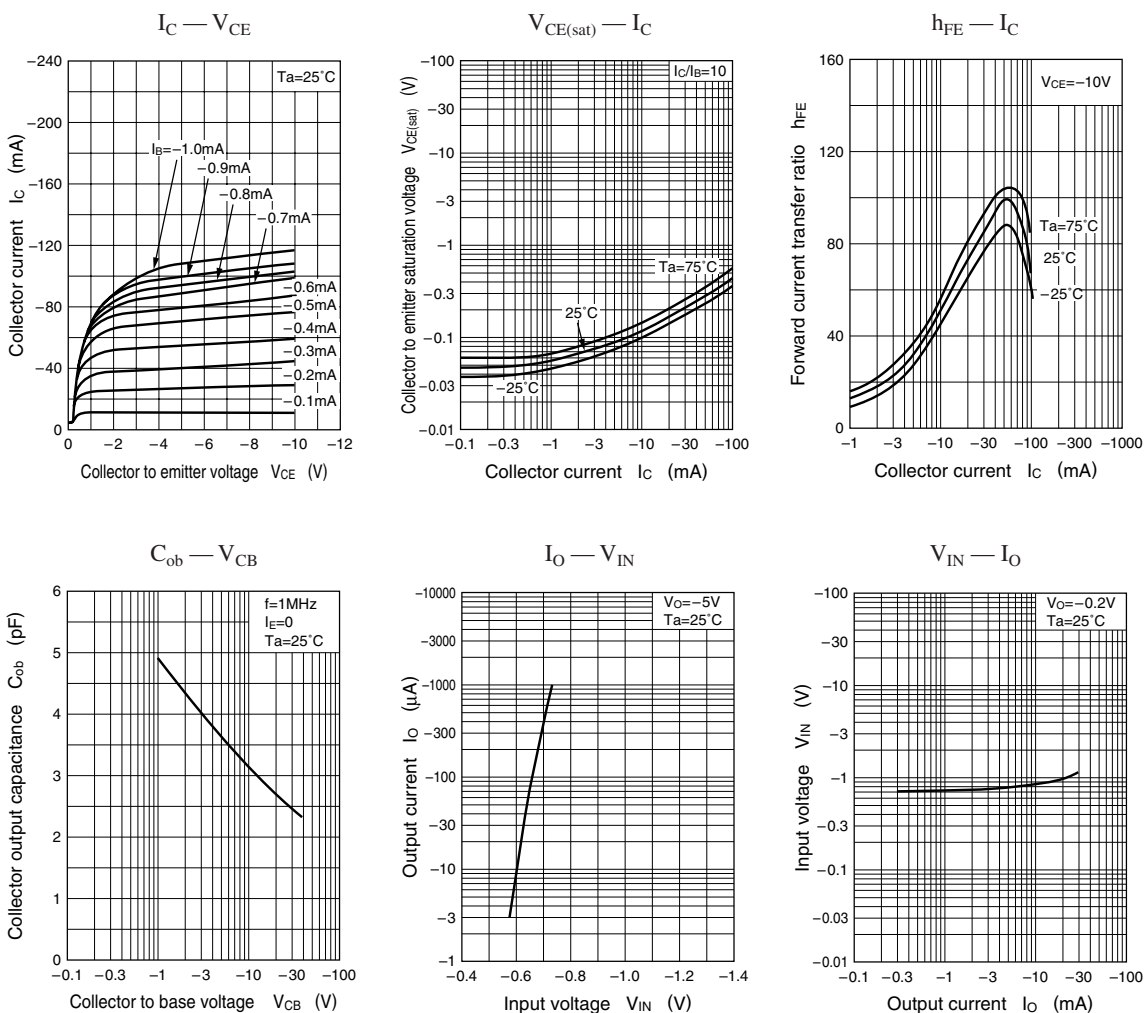


Characteristics charts of UNR5117

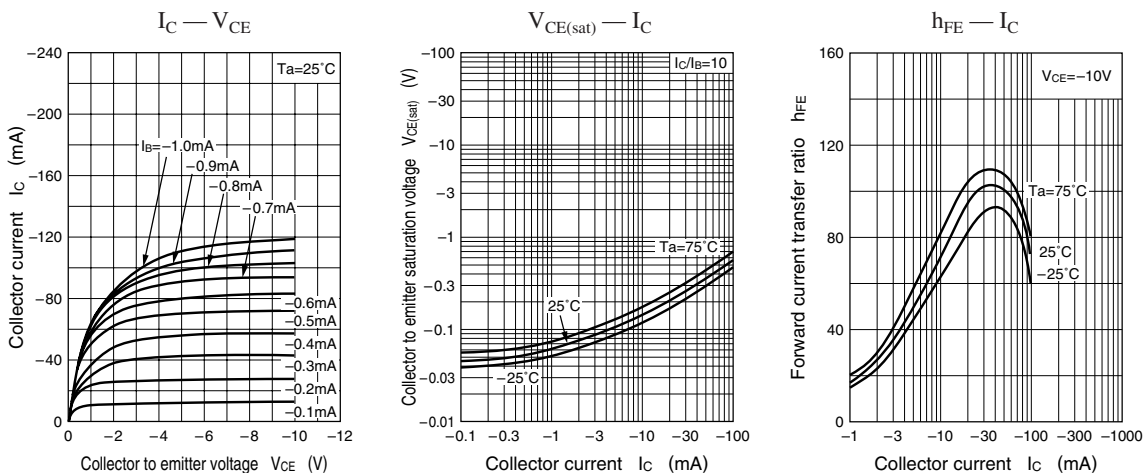


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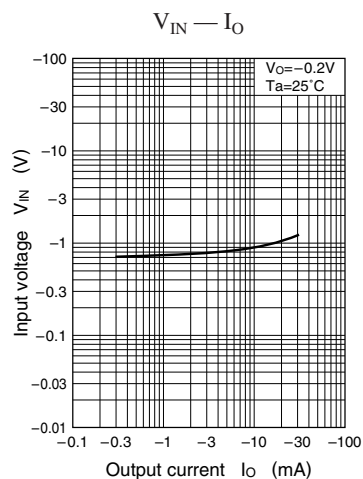
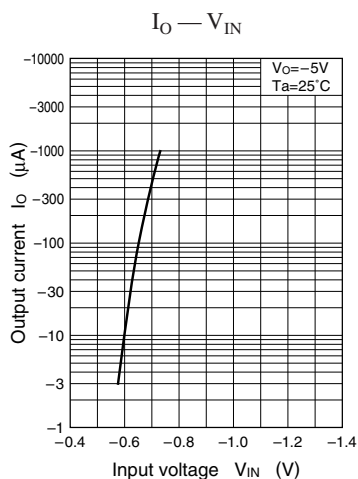
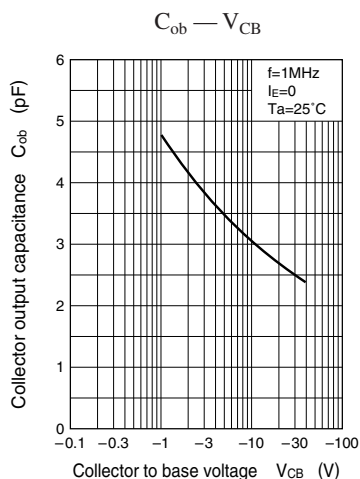
Characteristics charts of UNR5118



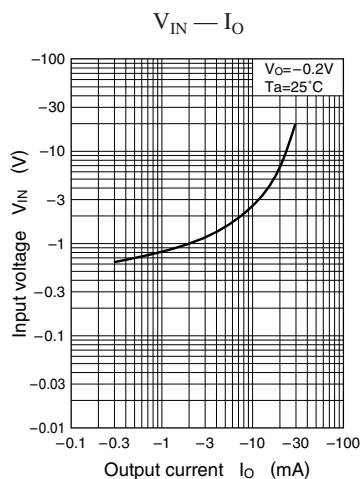
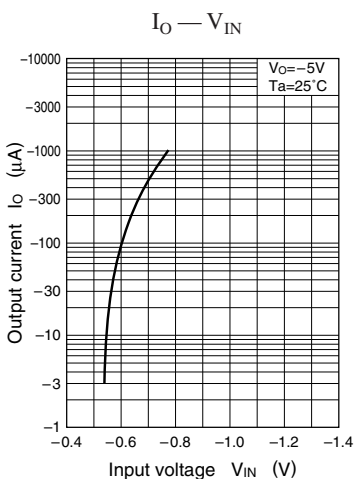
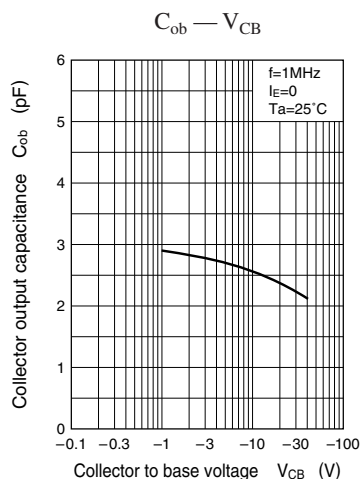
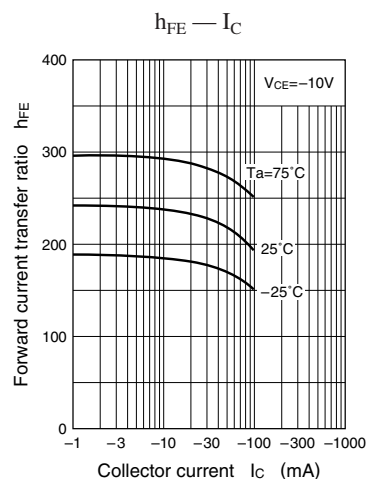
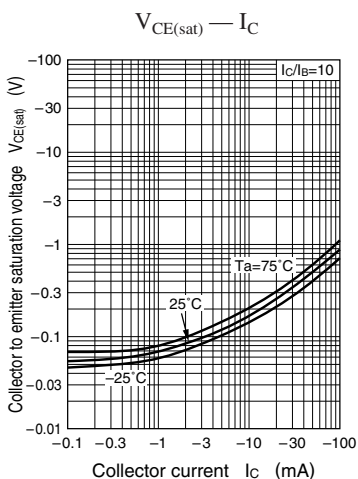
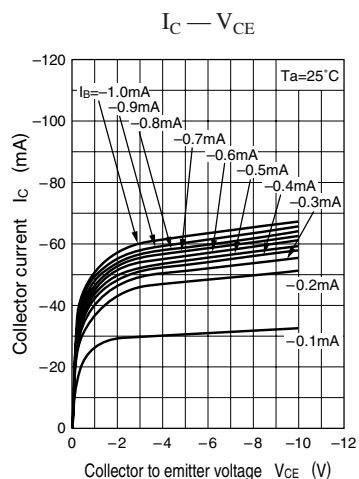
Characteristics charts of UNR5119



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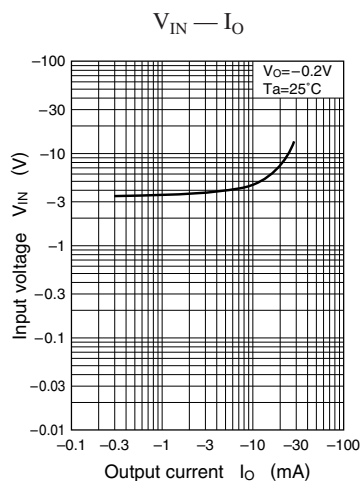
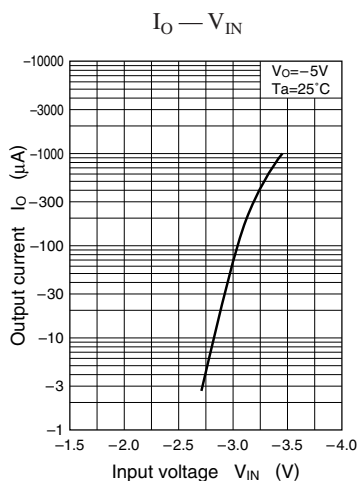
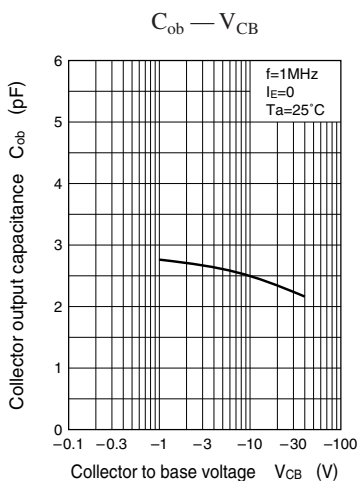
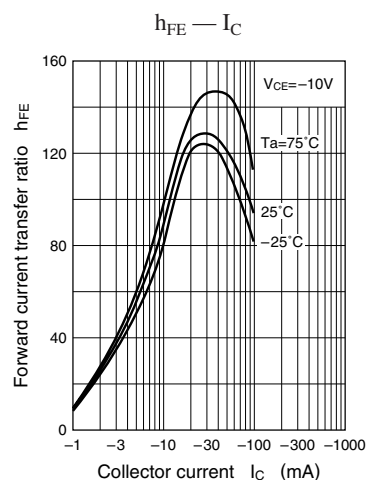
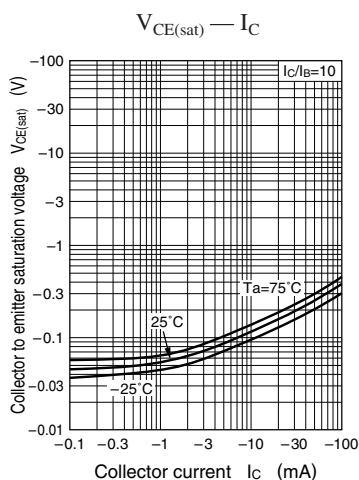
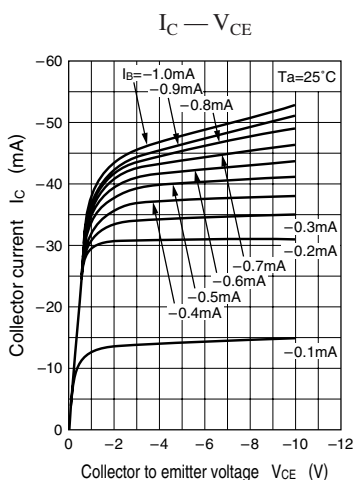


Characteristics charts of UNR5110

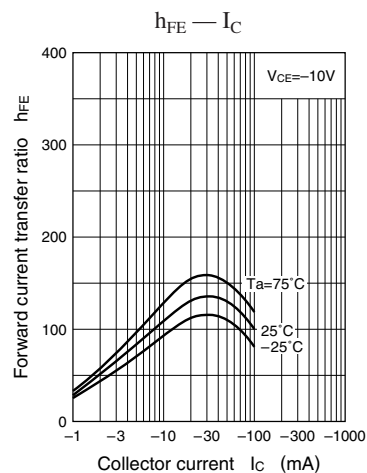
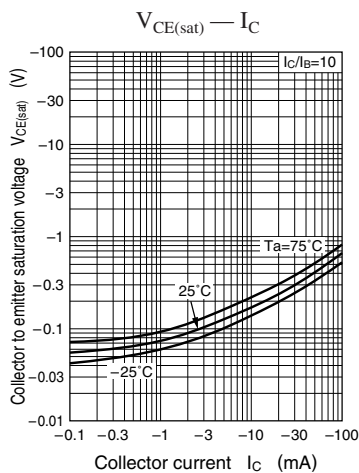
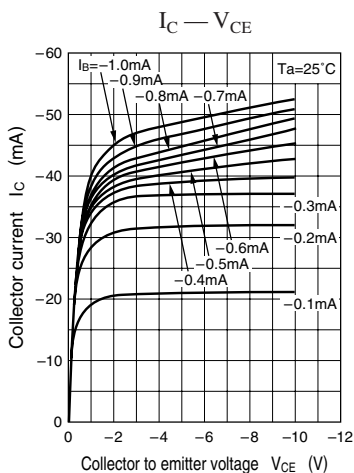


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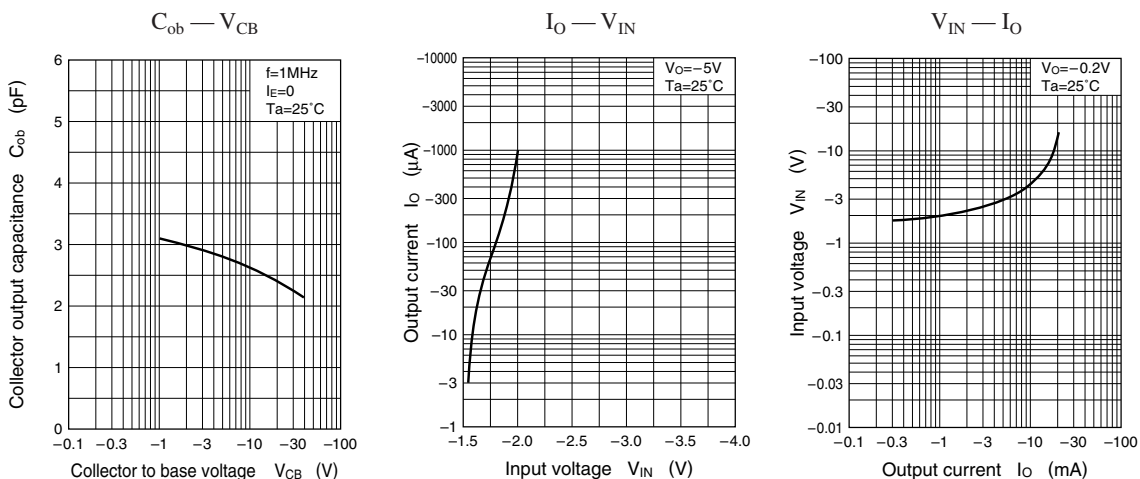
Characteristics charts of UNR511D



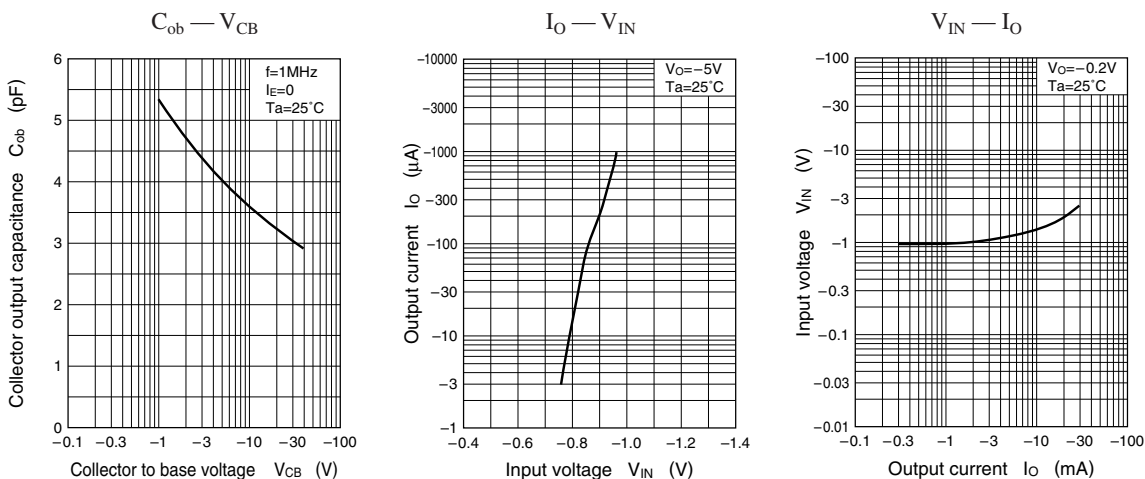
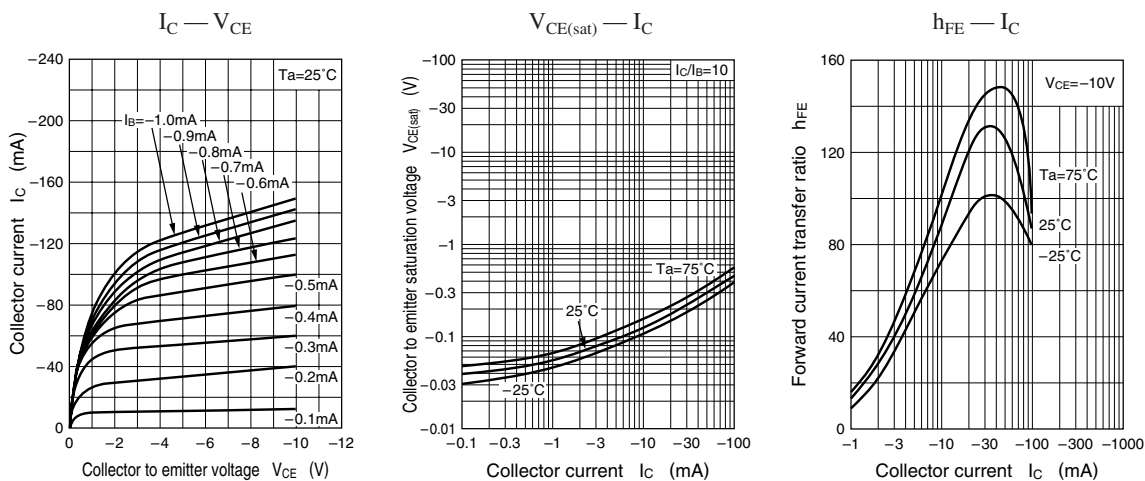
Characteristics charts of UNR511E



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
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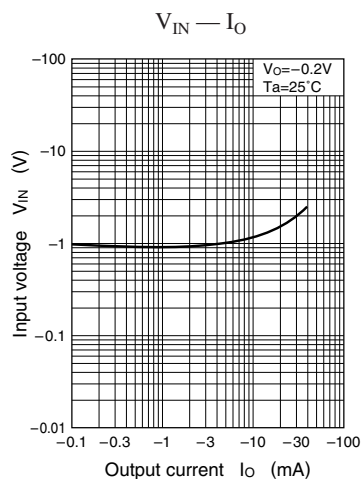
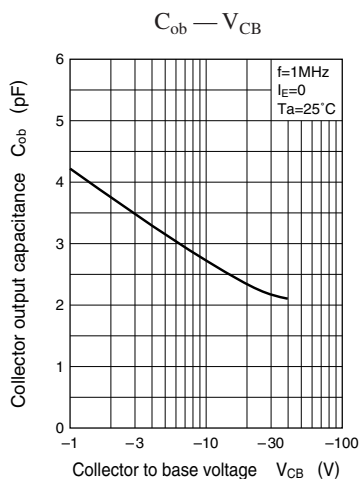
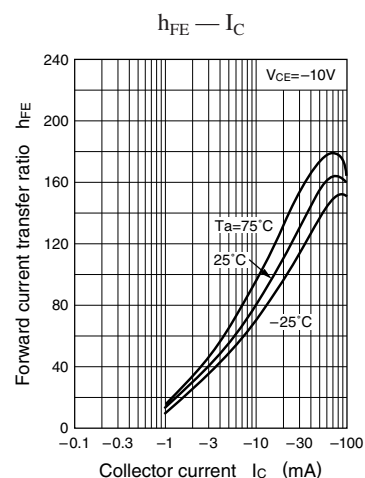
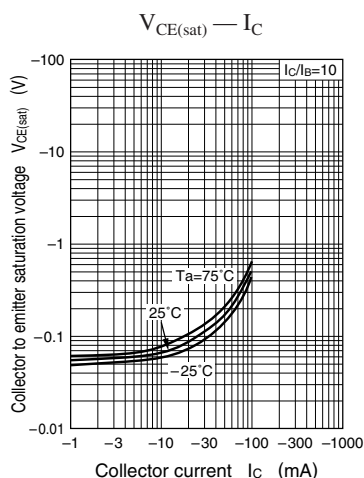
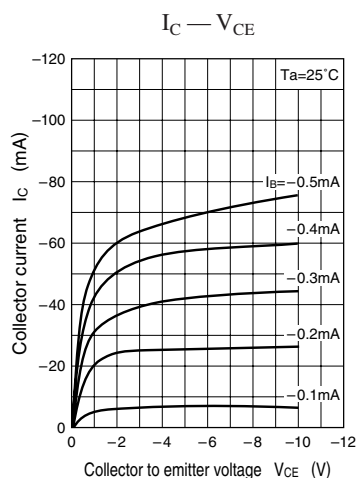


Characteristics charts of UNR511F

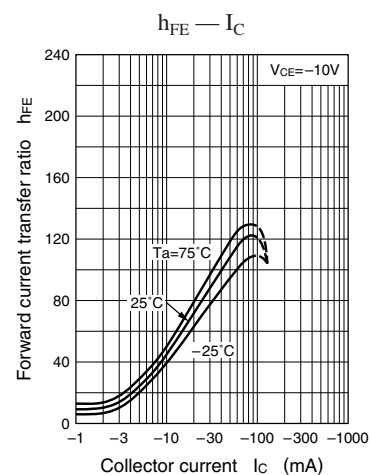
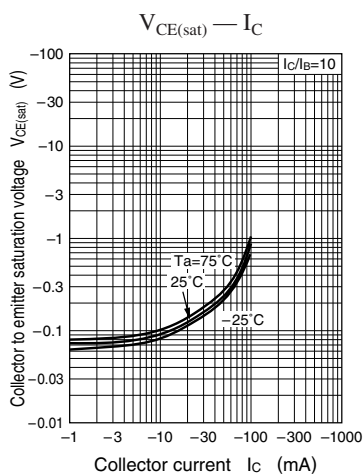
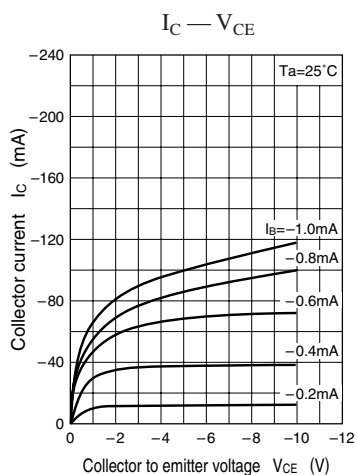


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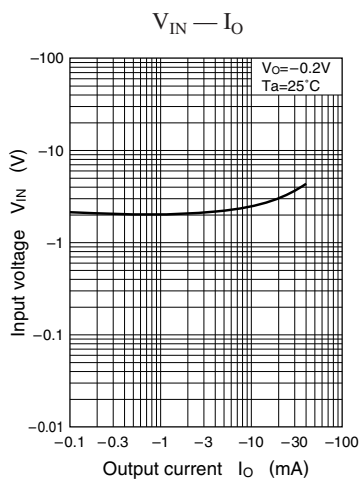
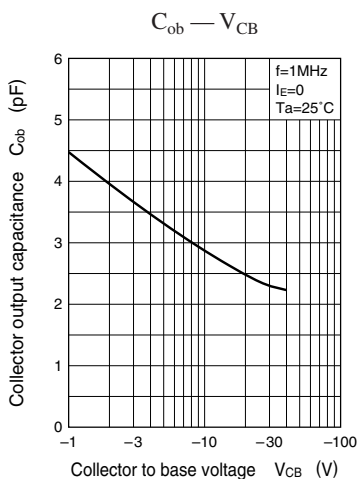
Characteristics charts of UNR511H



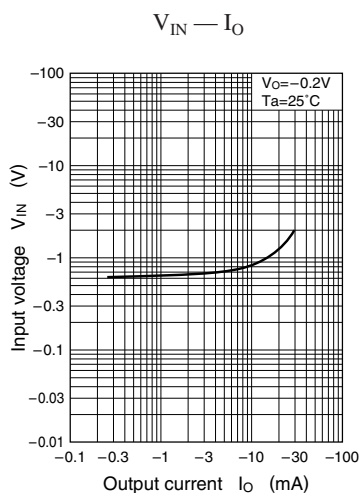
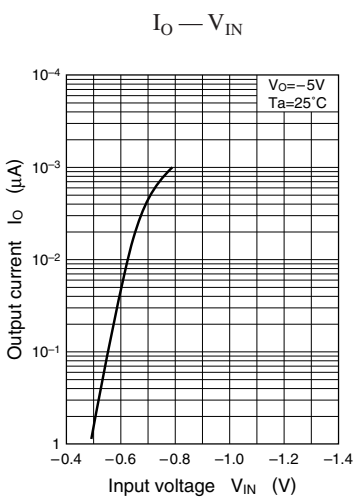
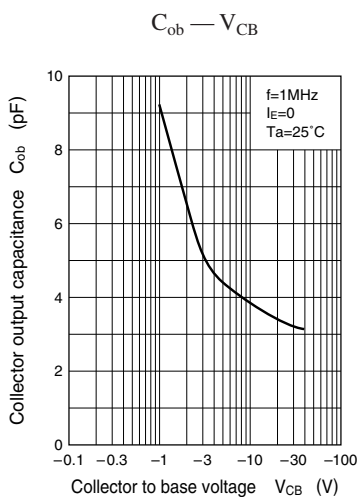
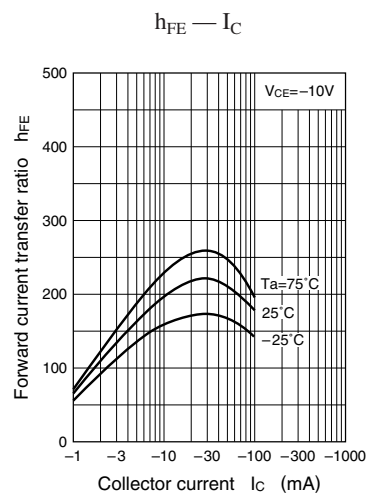
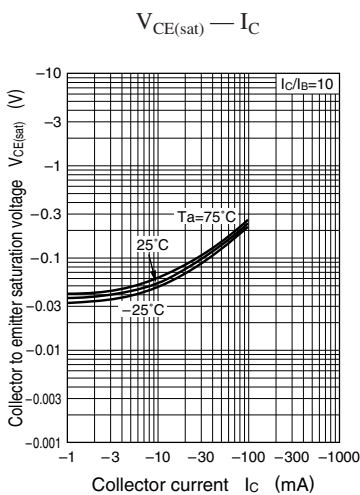
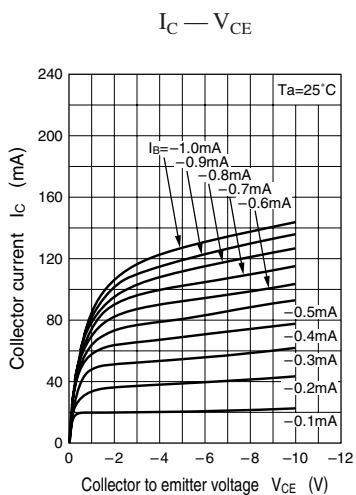
Characteristics charts of UNR511L



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

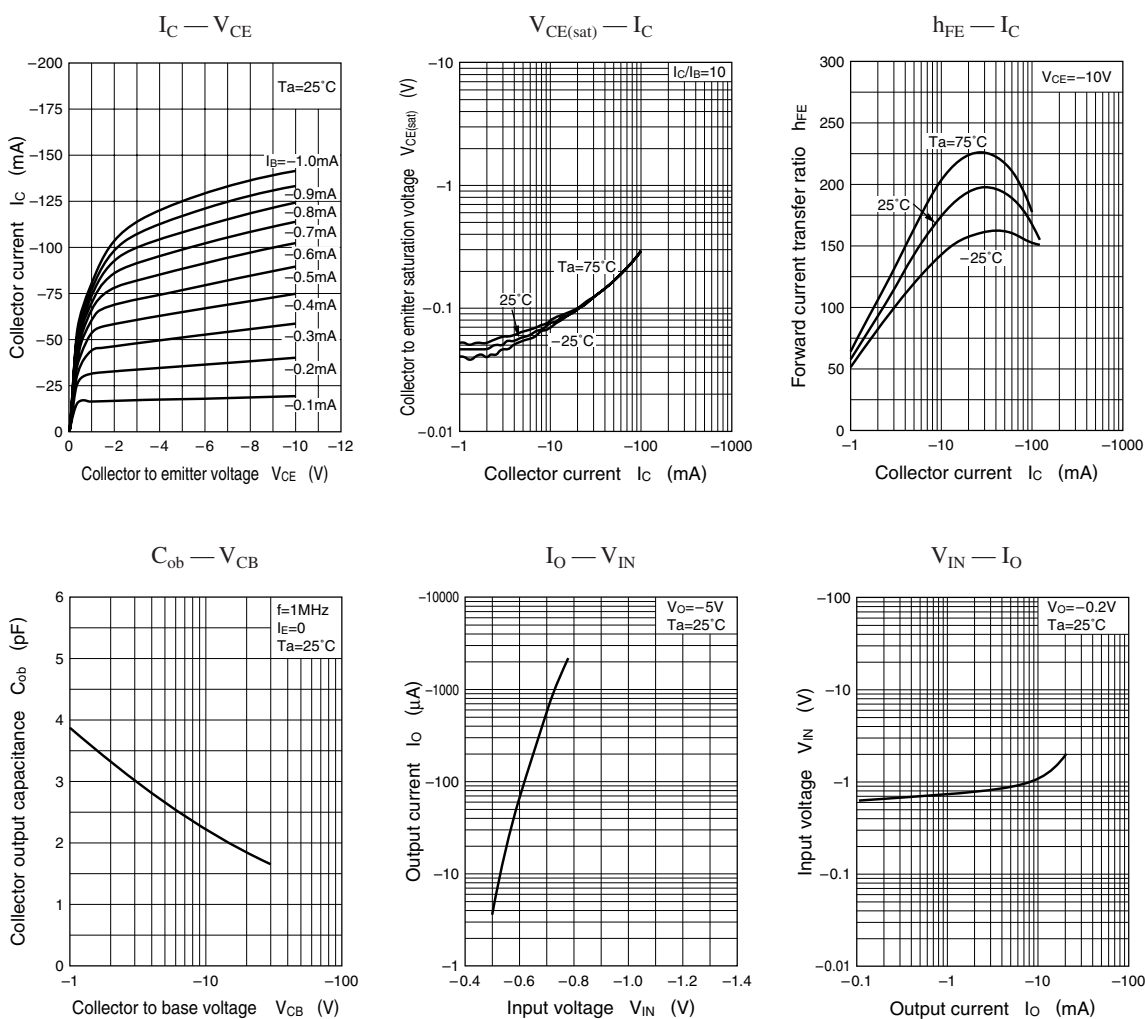


Characteristics charts of UNR511M

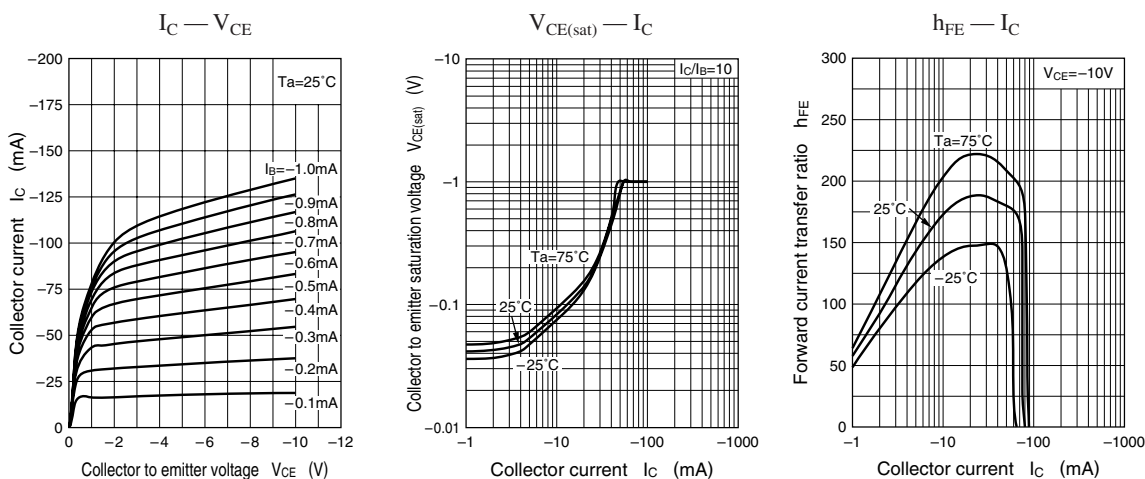


UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/ Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

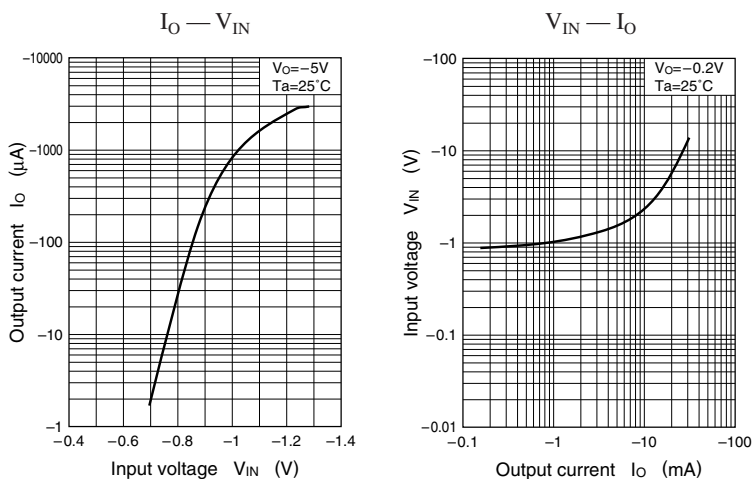
Characteristics charts of UNR511N



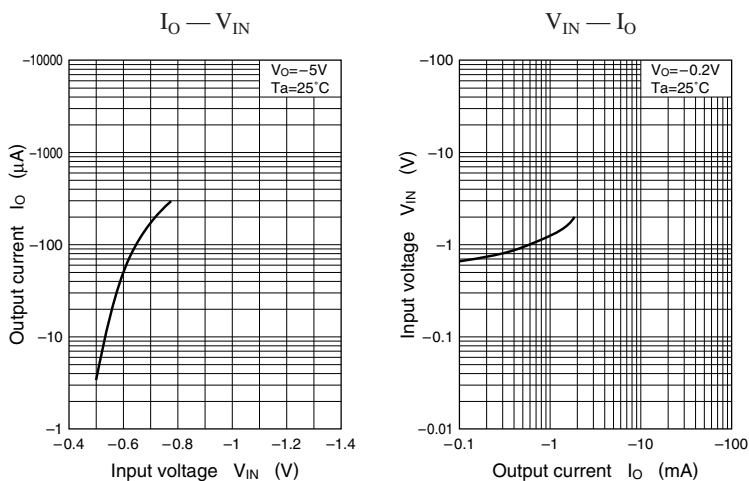
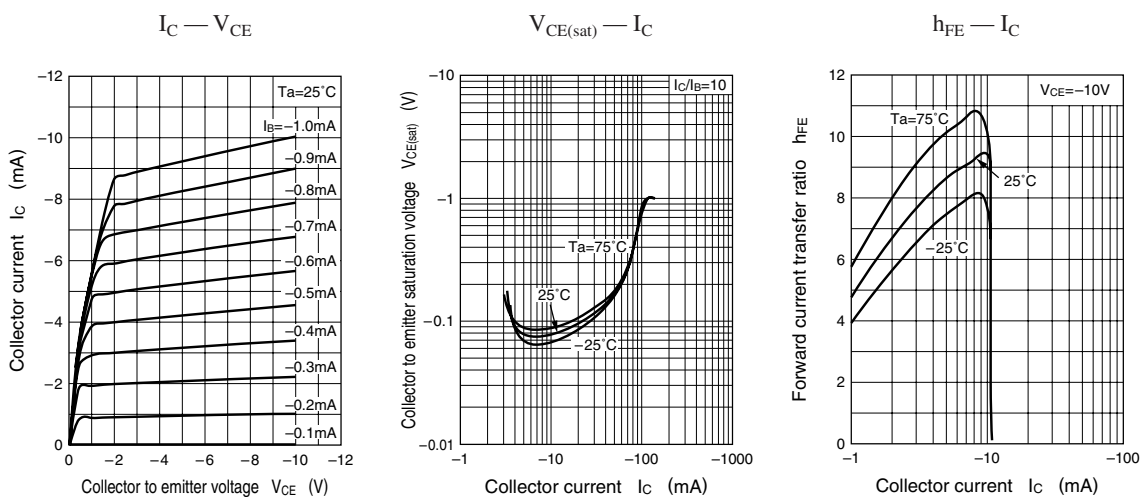
Characteristics charts of UNR511T



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
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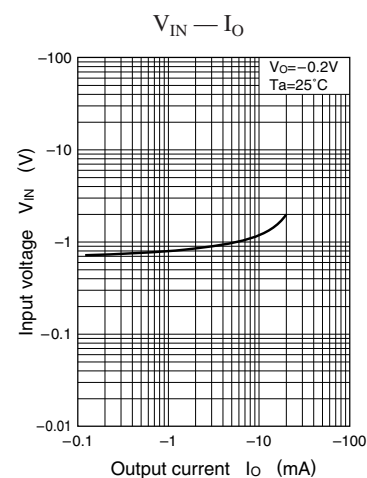
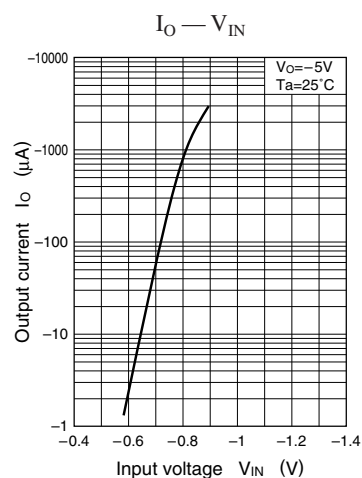
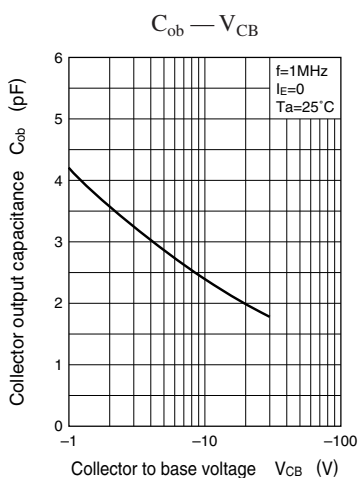
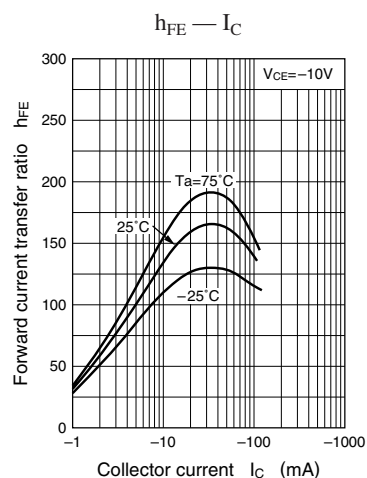
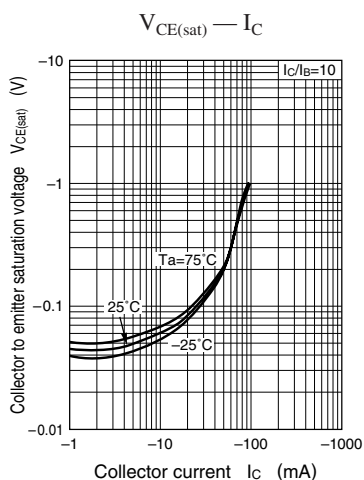
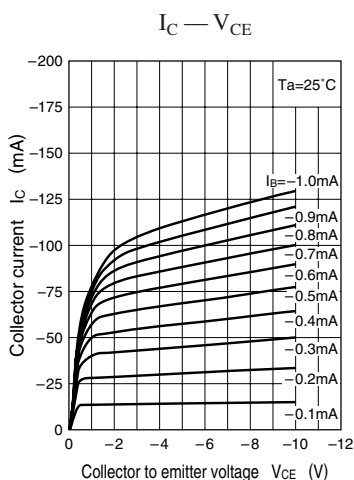


Characteristics charts of UNR511V



UNR5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/
Transistors with built-in Resistor 511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

Characteristics charts of UNR511Z



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