

UNR2111/2112/2113/2114/2115/2116/2117/2118/2119/2110/ 211D/211E/211F/211H/211L/211M/211N/211T/211V/211Z

(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.

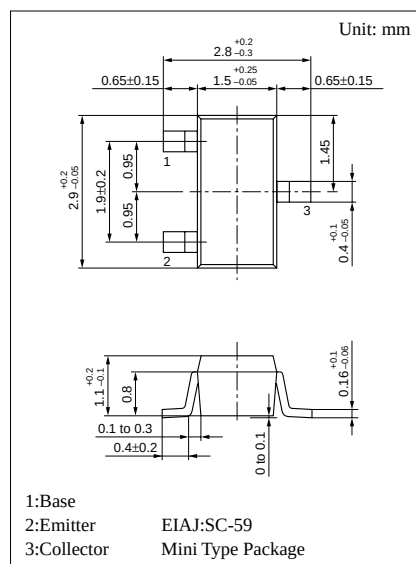
Resistance by Part Number

	Marking Symbol	(R ₁)	(R ₂)
• UNR2111	6A	10kΩ	10kΩ
• UNR2112	6B	22kΩ	22kΩ
• UNR2113	6C	47kΩ	47kΩ
• UNR2114	6D	10kΩ	47kΩ
• UNR2115	6E	10kΩ	—
• UNR2116	6F	4.7kΩ	—
• UNR2117	6H	22kΩ	—
• UNR2118	6I	0.51kΩ	5.1kΩ
• UNR2119	6K	1kΩ	10kΩ
• UNR2110	6L	47kΩ	—
• UNR211D	6M	47kΩ	10kΩ
• UNR211E	6N	47kΩ	22kΩ
• UNR211F	6O	4.7kΩ	10kΩ
• UNR211H	6P	2.2kΩ	10kΩ
• UNR211L	6Q	4.7kΩ	4.7kΩ
• UNR211M	EI	2.2kΩ	47kΩ
• UNR211N	EW	4.7kΩ	47kΩ
• UNR211T	EY	22kΩ	47kΩ
• UNR211V	FC	2.2kΩ	2.2kΩ
• UNR211Z	FE	4.7kΩ	22kΩ

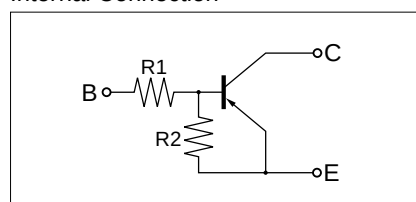
Absolute Maximum Ratings (Ta=25°C)

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	200	mW
Junction temperature	T _j	150	°C
Storage temperature	T _{stg}	-55 to +150	°C

Note) The part numbers in the parenthesis show conventional part number.



Internal Connection



UNR2111/2112/2113/2114/2115/2116/2117/2118/2119/2110/
Transistors with built-in Resistor 211D/211E/211F/211H/211L/211M/211N/211T/211V/211Z

■ Electrical Characteristics (T_a=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	UNR2111	I _{EBO}	V _{EB} = -6V, I _C = 0			- 0.5	mA	
	UNR2112/2114/211E/211D/211M/211N/211T					- 0.2		
	UNR2113					- 0.1		
	UNR2115/2116/2117/2110					- 0.01		
	UNR211F/211H					-1.0		
	UNR2119					-1.5		
	UNR2118/211L/211V					-2.0		
	UNR211Z					- 0.4		
Collector to base voltage		V _{CBO}	I _C = -10mA, I _E = 0	-50			V	
Collector to emitter voltage		V _{CEO}	I _C = -2mA, I _B = 0	-50			V	
Forward current transfer ratio	UNR2111	h _{FE}	V _{CE} = -10V, I _C = -5mA	35				
	UNR2112/211E			60				
	UNR2113/2114/211M			80				
	UNR2115*/2116*/2117*/2110*			160		460		
	UNR2119/211F/211D/211H			30				
	UNR2118/211L			20				
	UNR211N/211T			80		400		
	UNR211V			6		20		
	UNR211Z			60		200		
	Collector to emitter saturation voltage			V _{CE(sat)}	I _C = -10mA, I _B = - 0.3mA			
UNR211V			I _C = -10mA, I _B = -1.5mA			- 0.07	- 0.25	V
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	
			UNR2113	V _{CC} = -5V, V _B = -3.5V, R _L = 1kΩ				- 0.2
			UNR211D	V _{CC} = -5V, V _B = -10V, R _L = 1kΩ				- 0.2
			UNR211E	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	
Input resistance	UNR2111/2114/2115	R _i		(-30%)	10	(+30%)	kΩ	
	UNR2112/2117/211T				22			
	UNR2113/2110/211D/211E				47			
	UNR2116/211F/211L/211N/211Z				4.7			
	UNR2118				0.51			
	UNR2119				1			
	UNR211H/211M/211V				2.2			

* h_{FE} rank classification (UNR2115/2116/2117/2110)

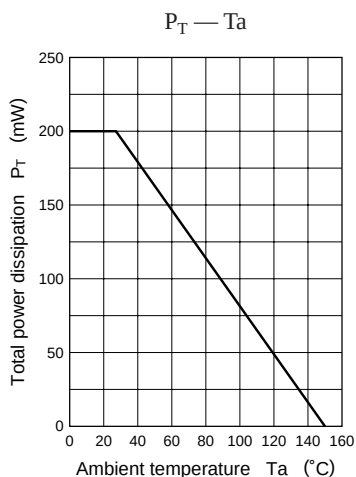
Rank	Q	R	S
h _{FE}	160 to 260	210 to 340	290 to 460

UNR2111/2112/2113/2114/2115/2116/2117/2118/2119/2110/
Transistors with built-in Resistor 211D/211E/211F/211H/211L/211M/211N/211T/211V/211Z

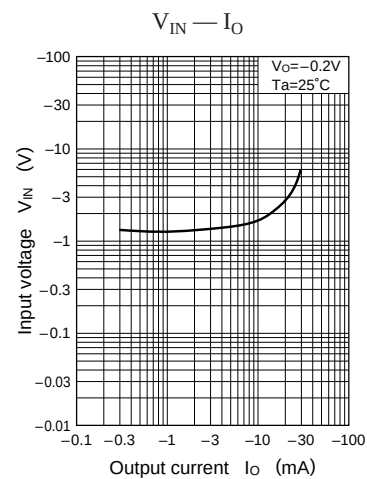
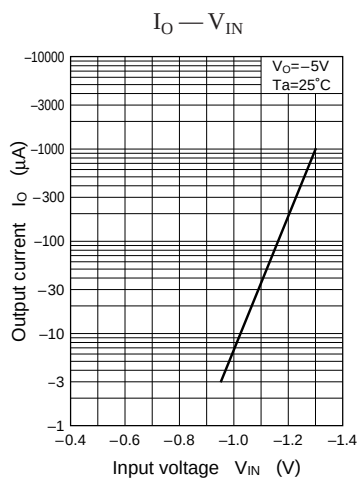
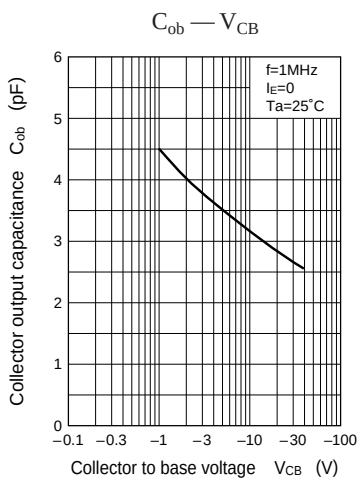
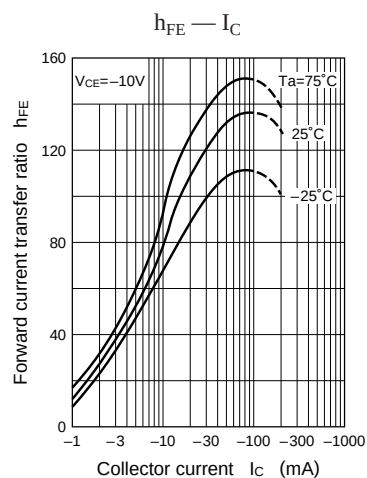
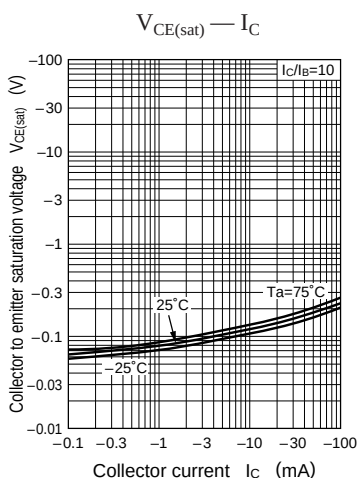
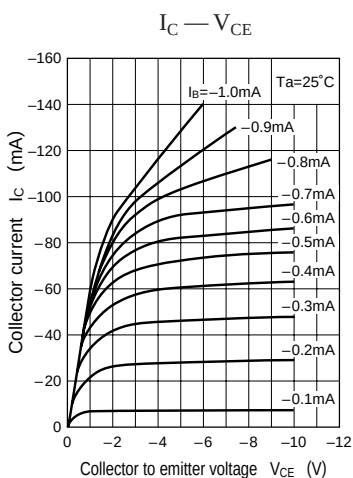
■ Electrical Characteristics (continued) (Ta=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Resis- tance ratio	UNR2111/2112/2113/211L	R_1/R_2		0.8	1.0	1.2	
	UNR2114			0.17	0.21	0.25	
	UNR2118/2119			0.08	0.1	0.12	
	UNR211D				4.7		
	UNR211E				2.14		
	UNR211F/211T				0.47		
	UNR211H			0.17	0.22	0.27	
	UNR211M				0.047		
	UNR211N				0.1		
	UNR211V				1.0		
	UNR211Z				0.21		

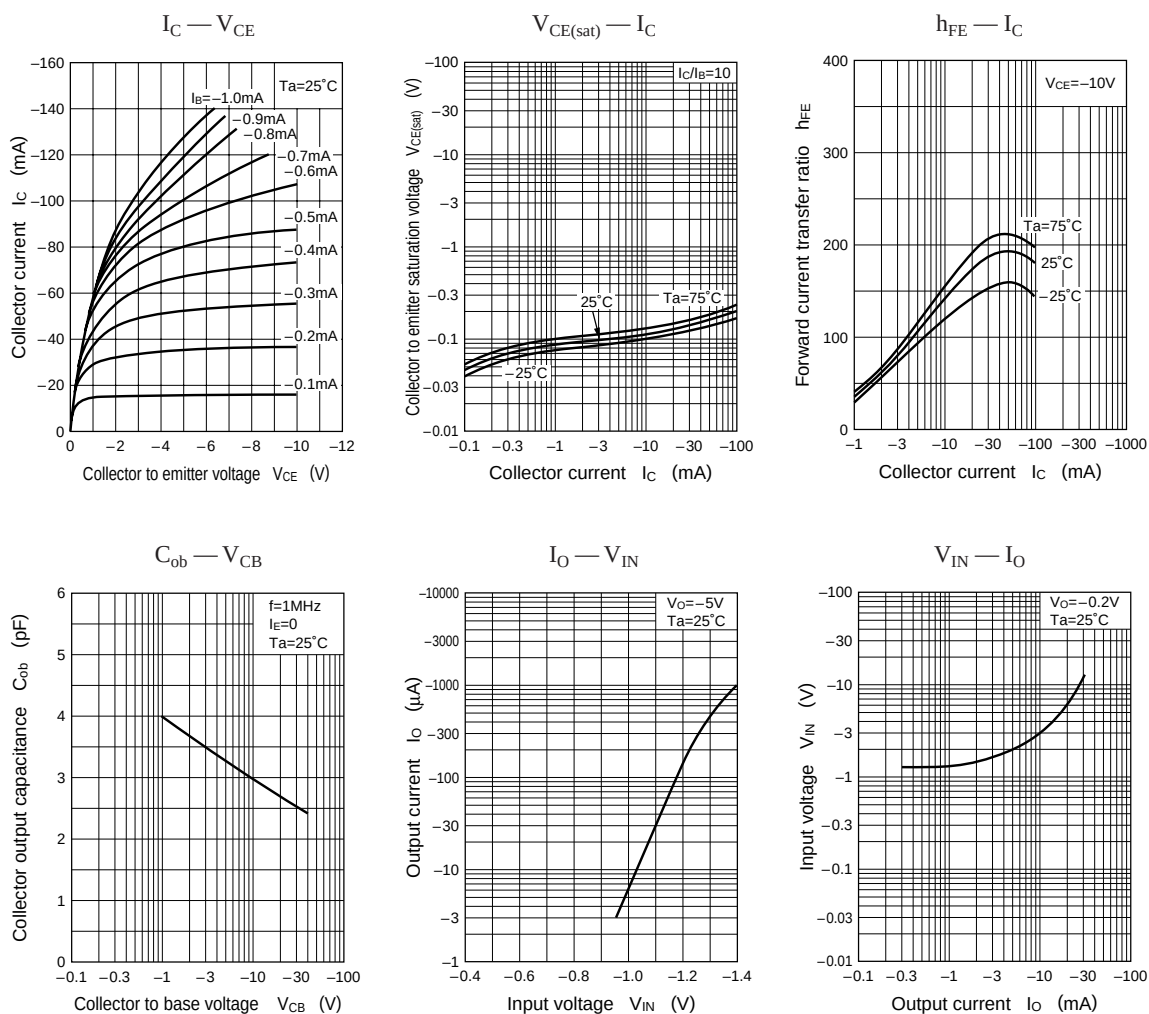
Common characteristics chart



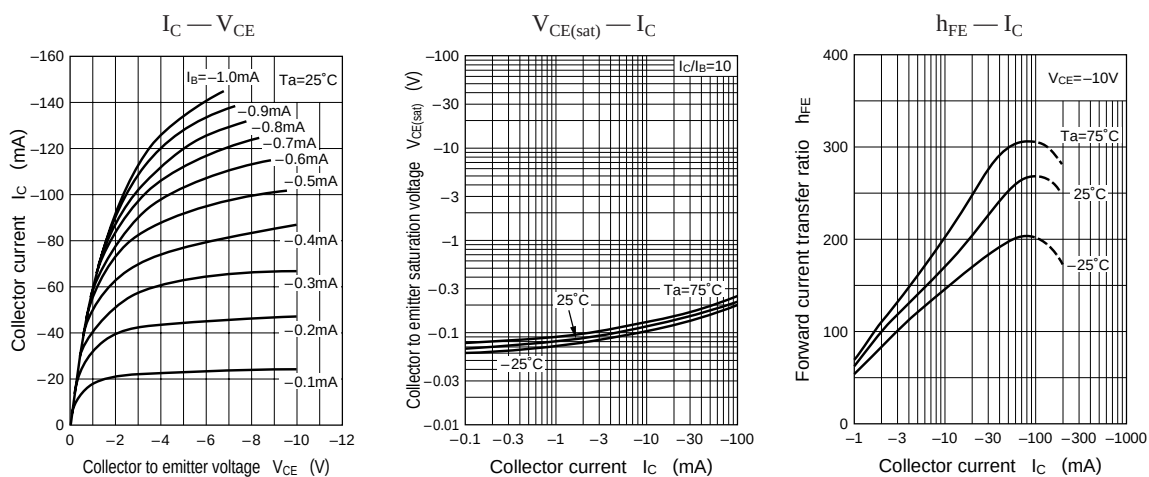
Characteristics charts of UNR2111

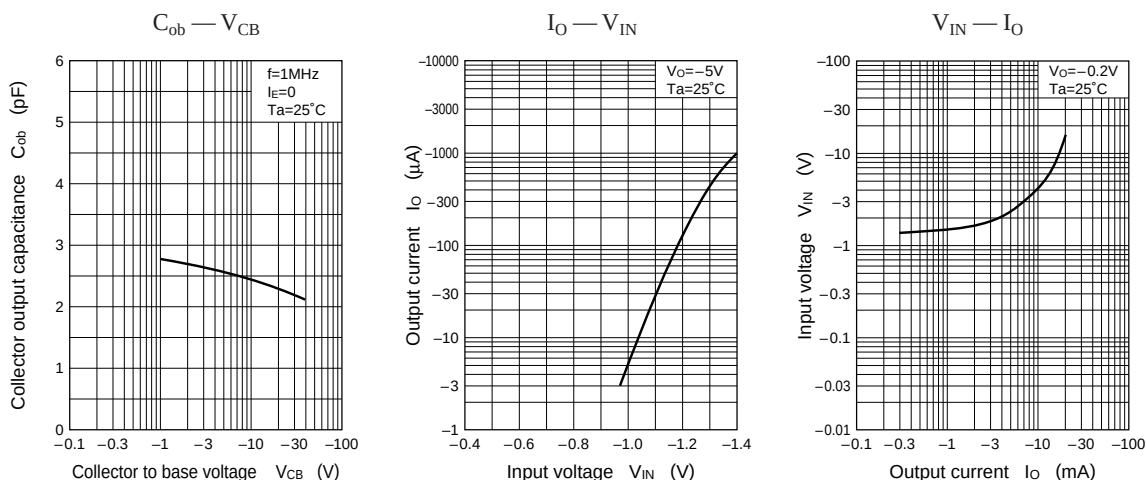


Characteristics charts of UNR2112

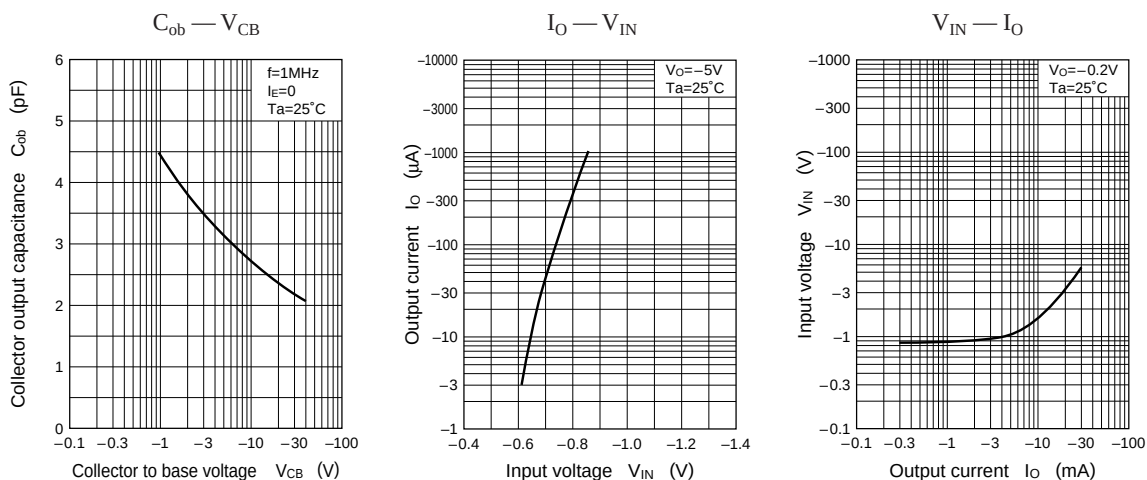
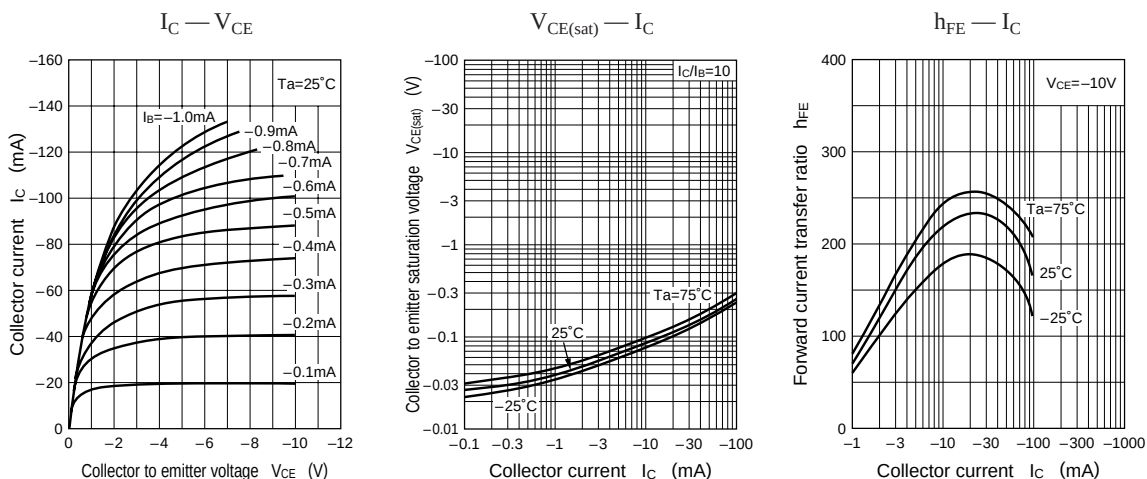


Characteristics charts of UNR2113

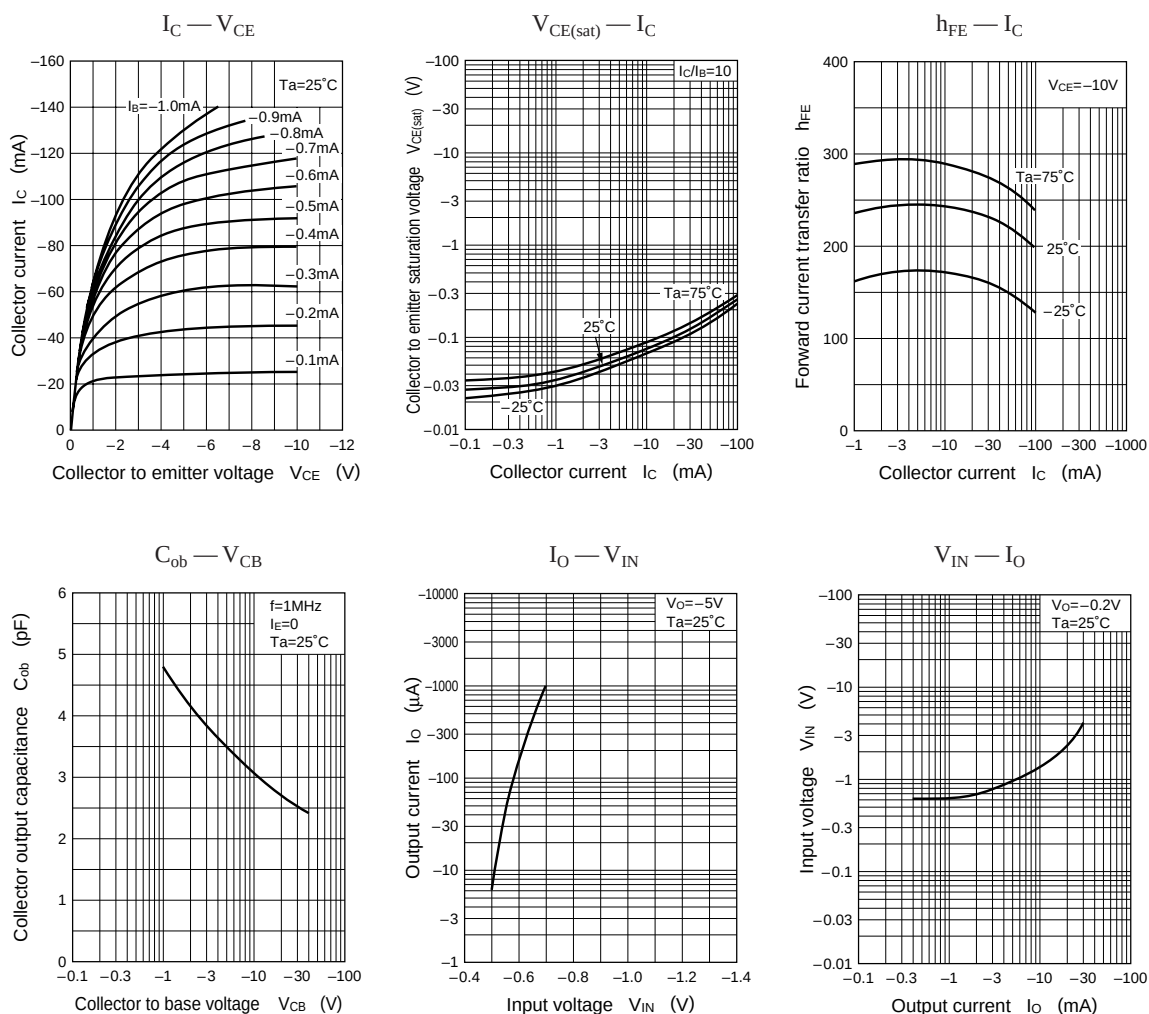




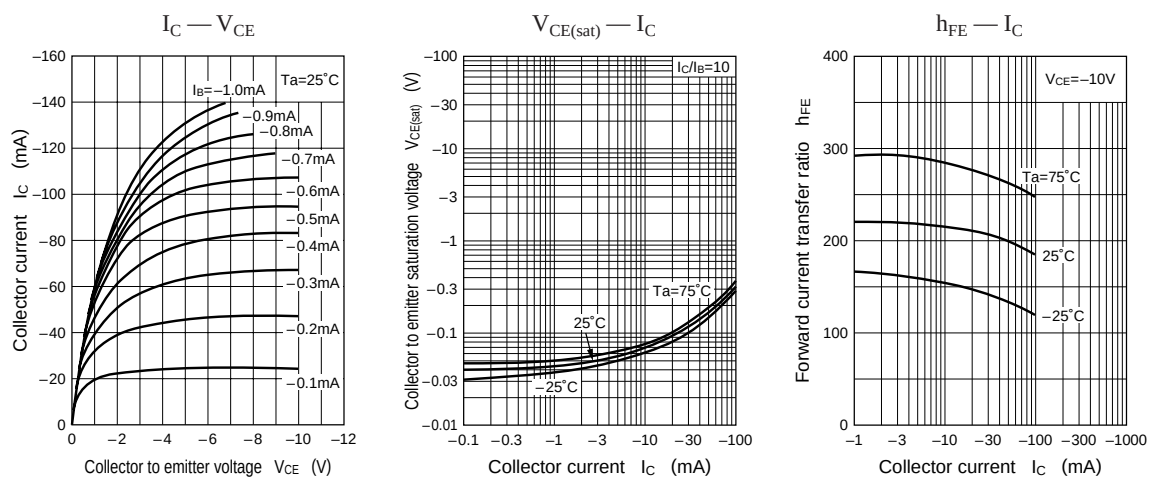
Characteristics charts of UNR2114

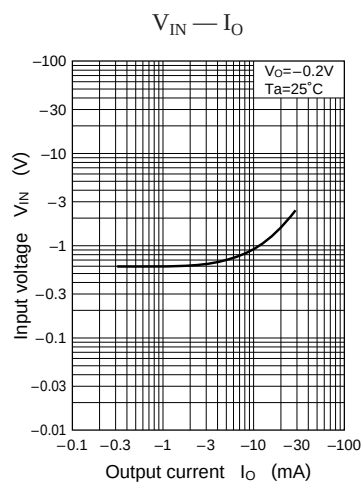
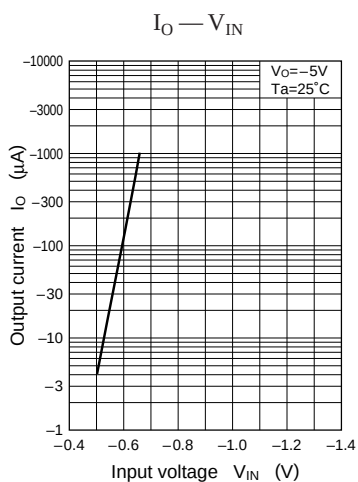
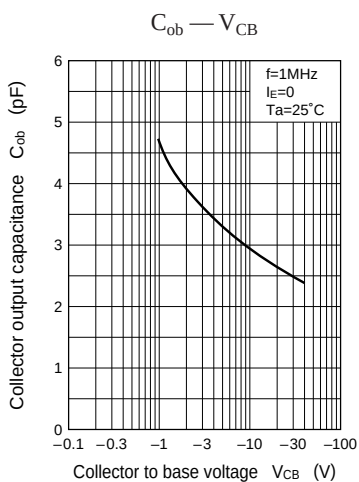


Characteristics charts of UNR2115

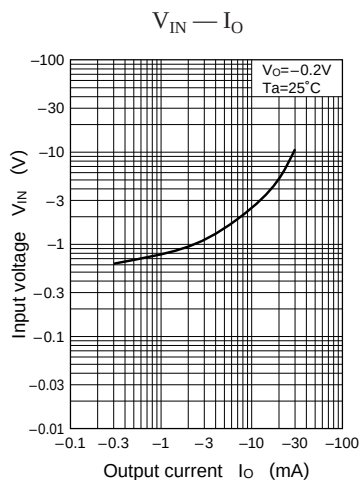
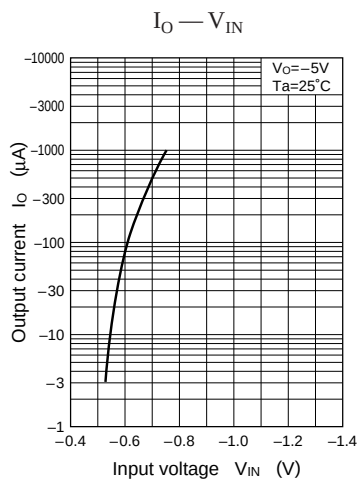
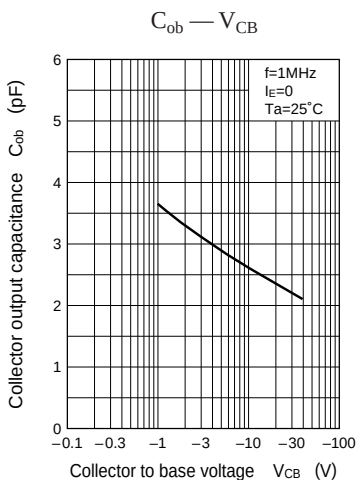
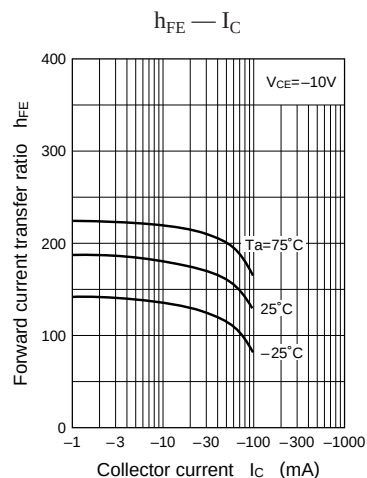
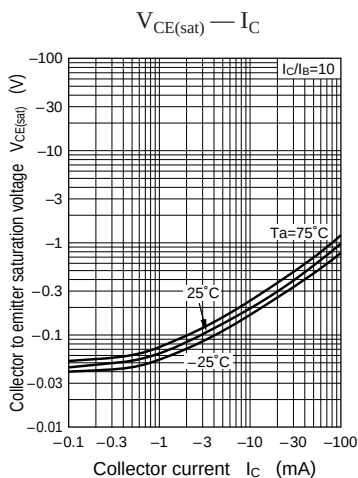
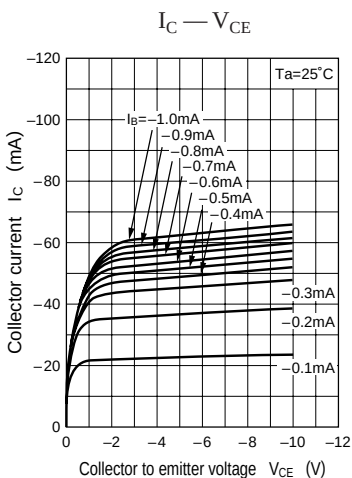


Characteristics charts of UNR2116

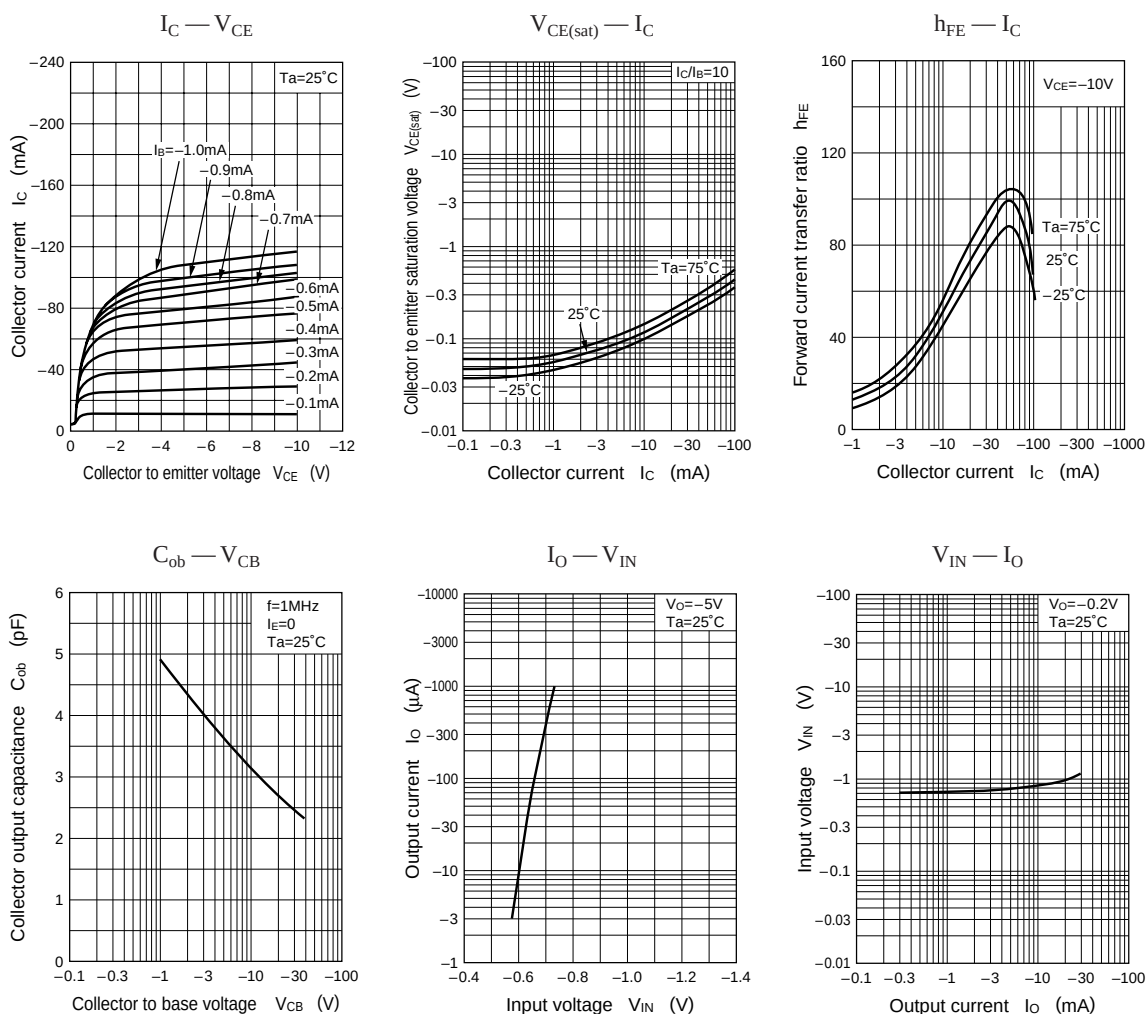




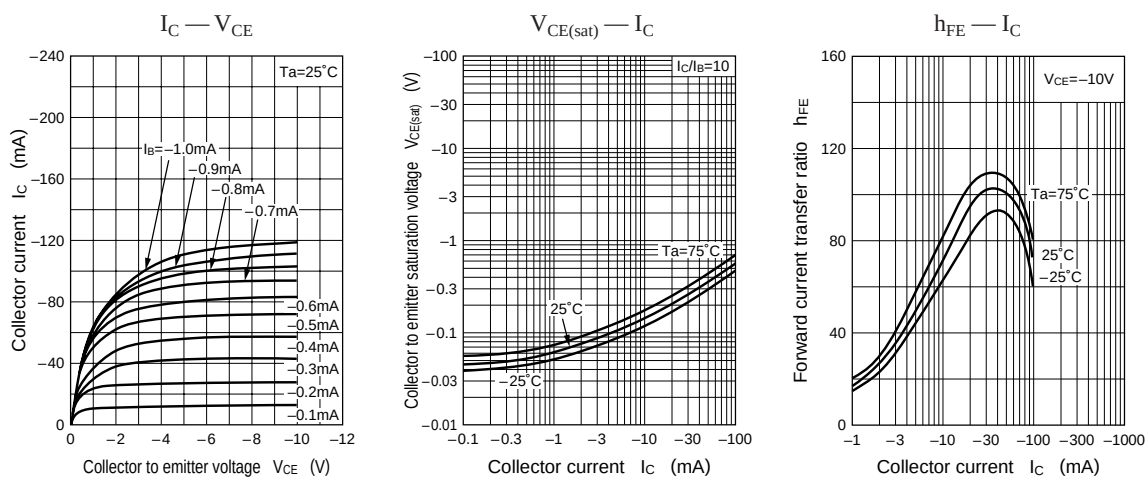
Characteristics charts of UNR2117

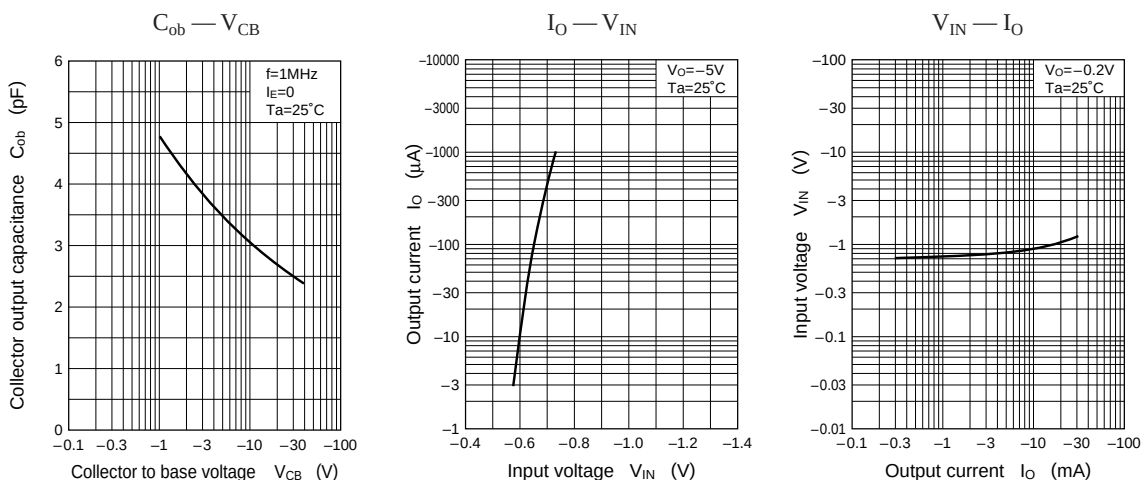


Characteristics charts of UNR2118

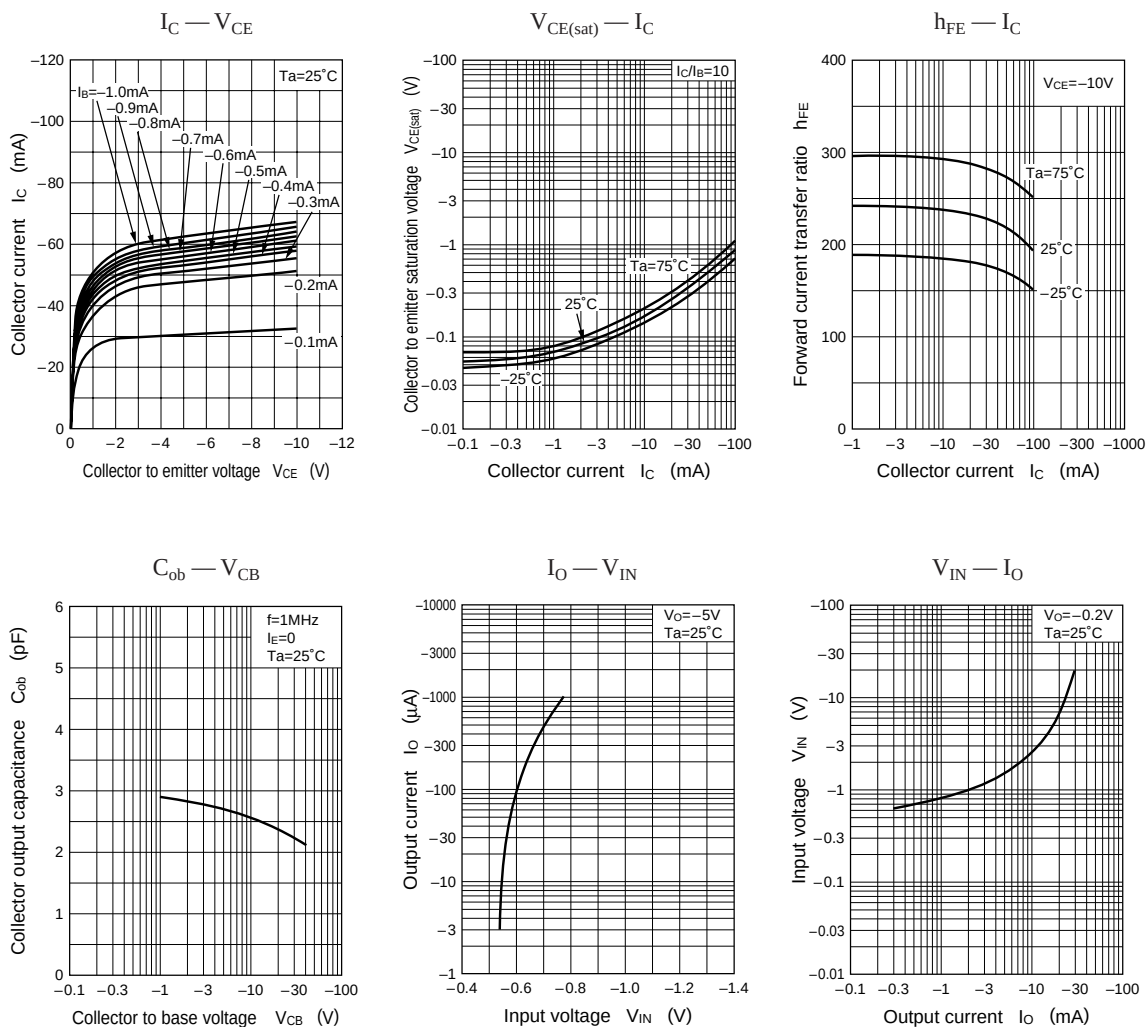


Characteristics charts of UNR2119

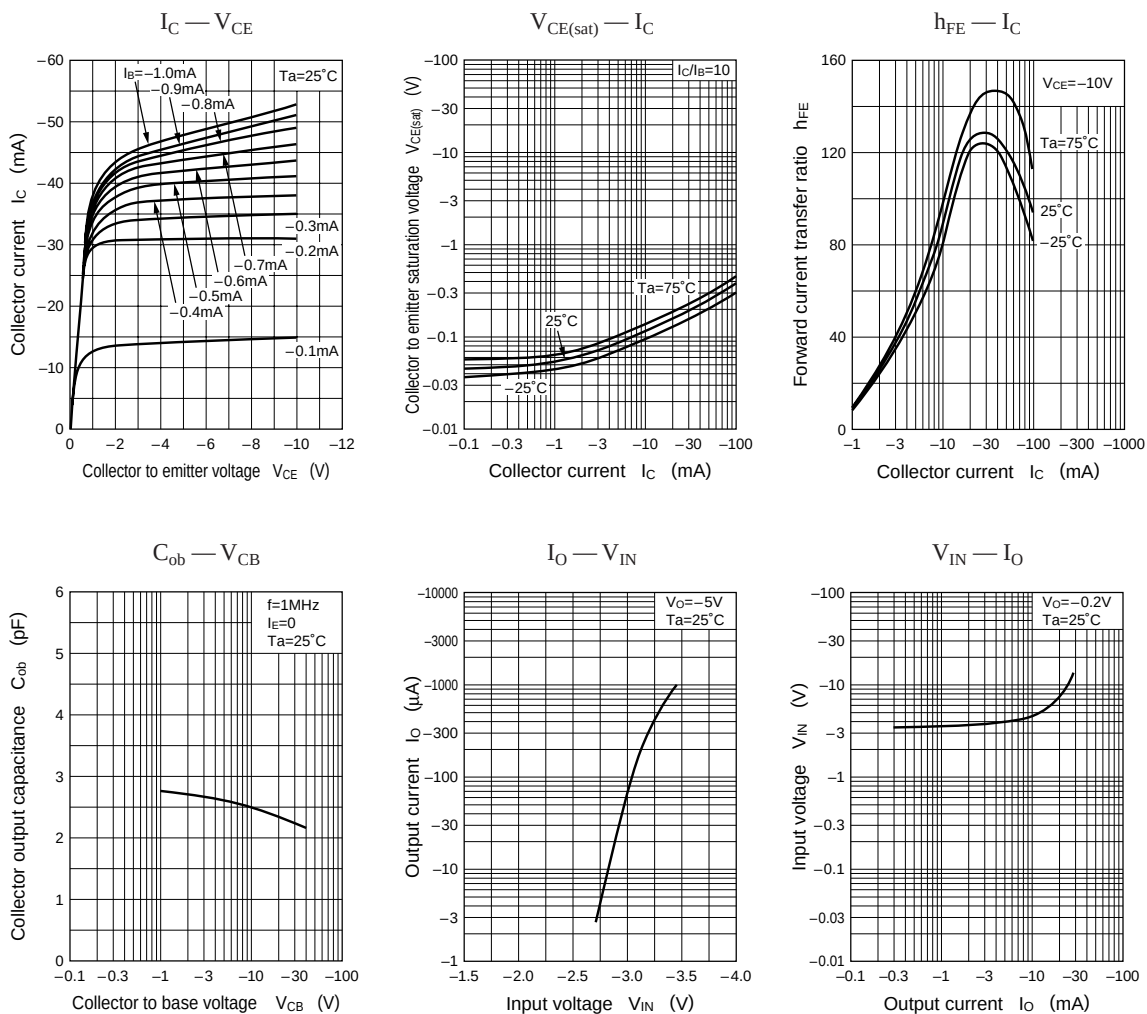




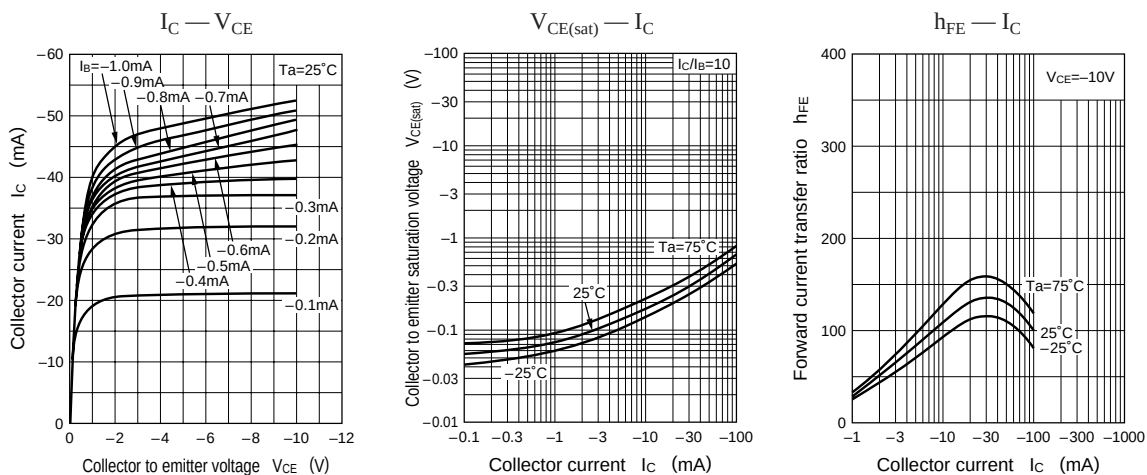
Characteristics charts of UNR2110

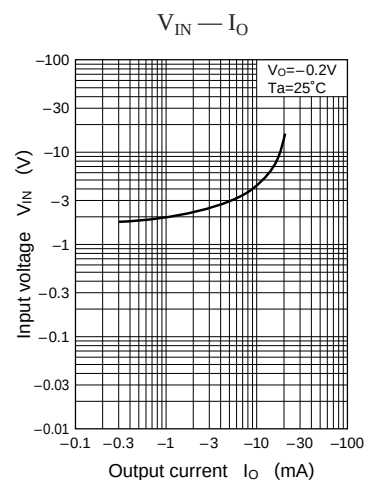
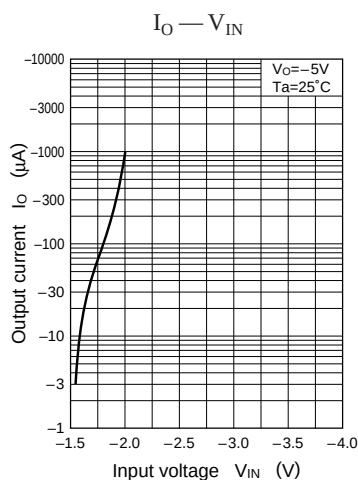
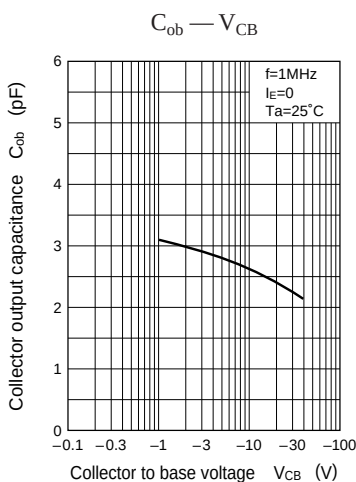


Characteristics charts of UNR211D

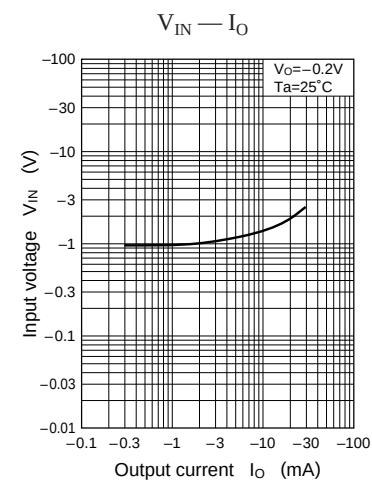
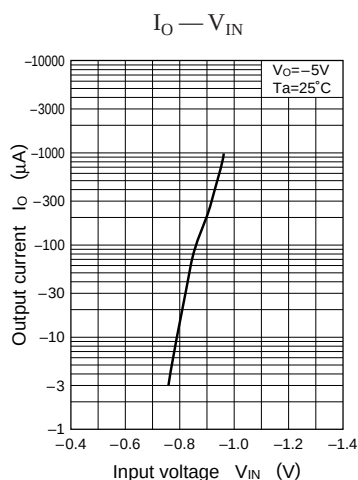
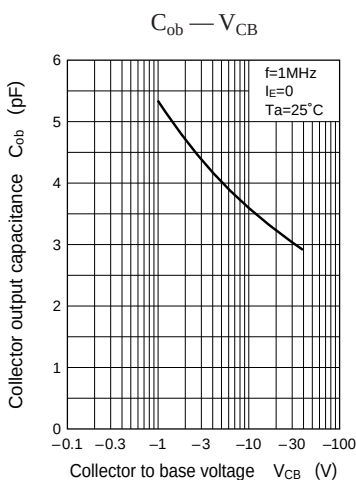
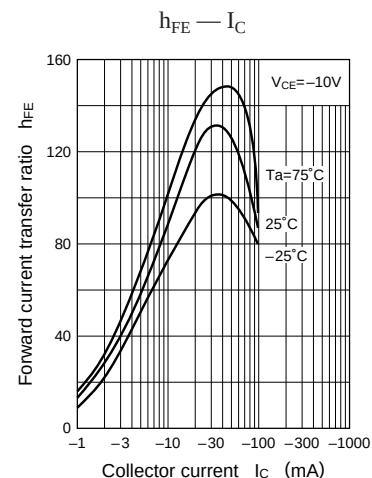
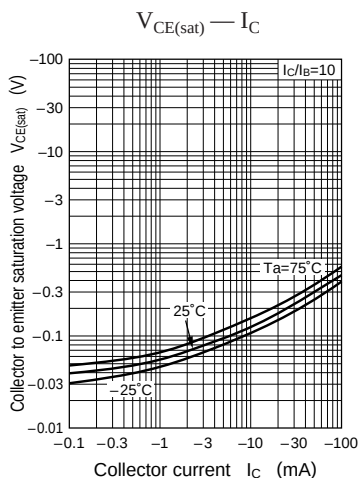
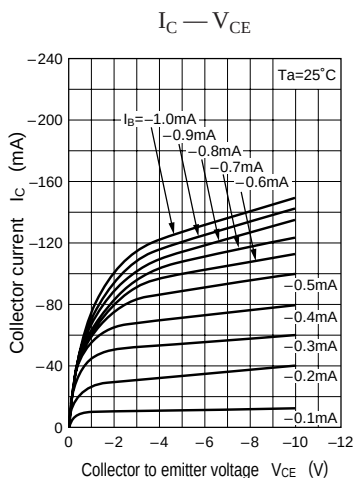


Characteristics charts of UNR211E

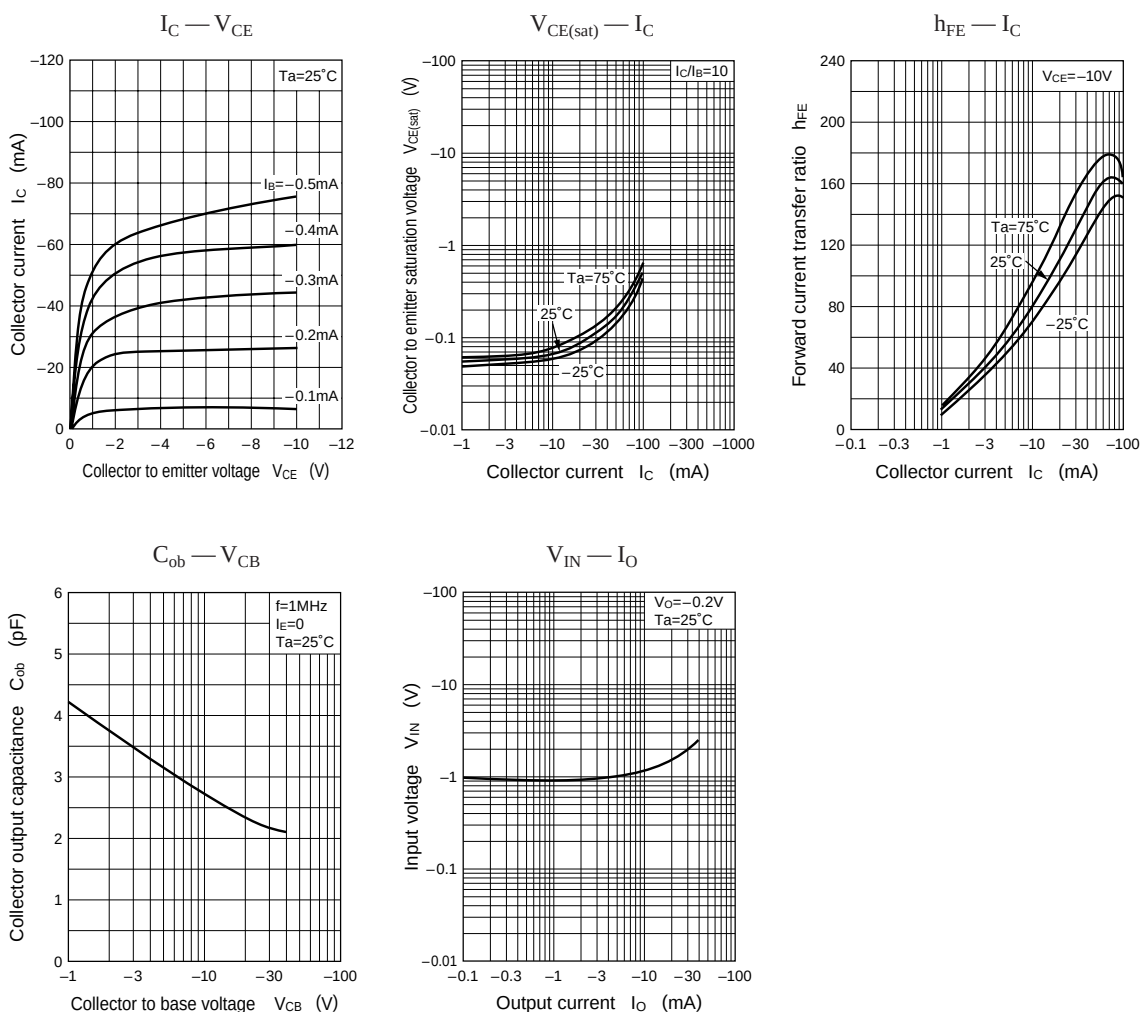




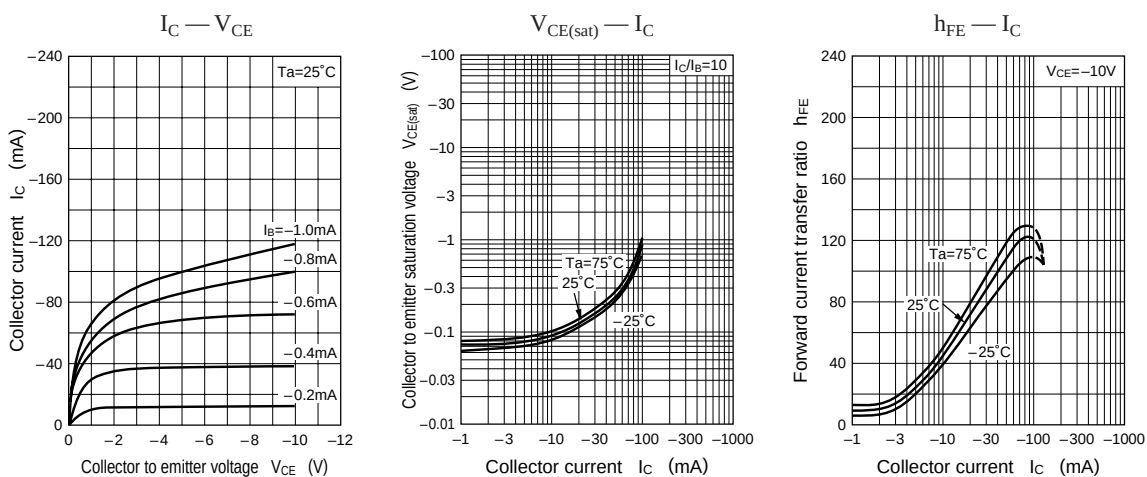
Characteristics charts of UNR211F

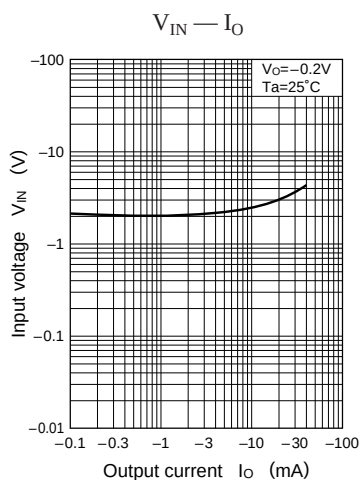
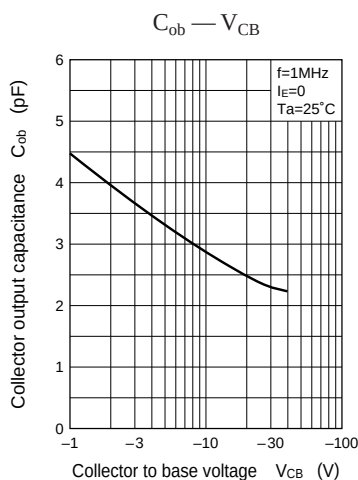


Characteristics charts of UNR211H

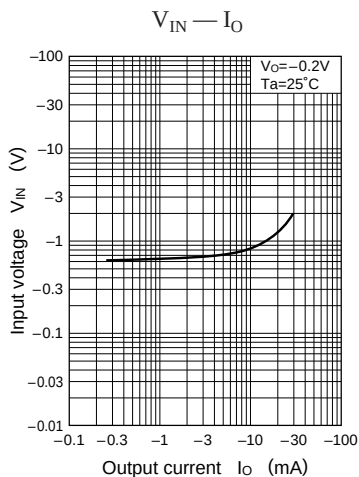
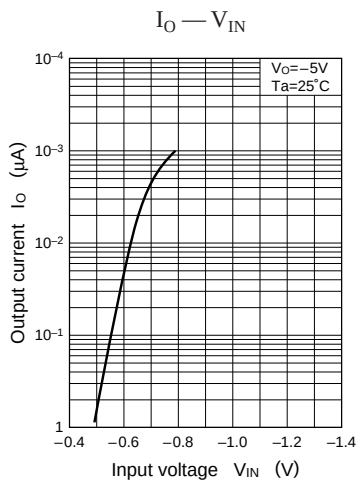
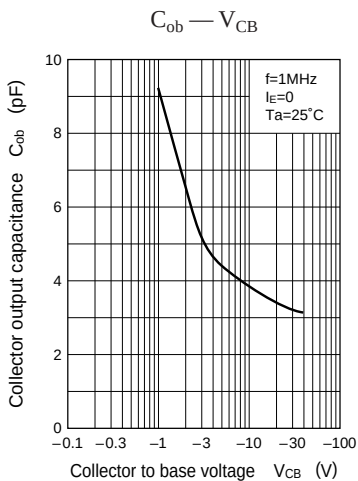
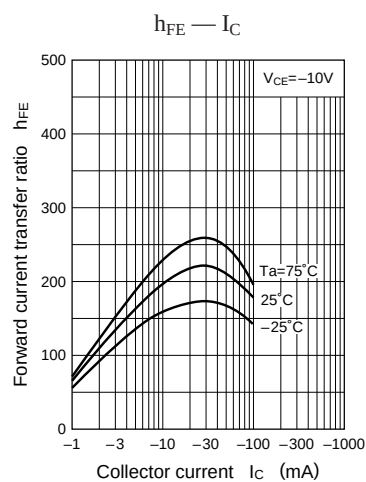
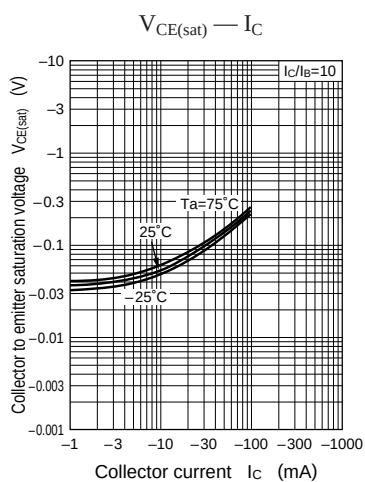
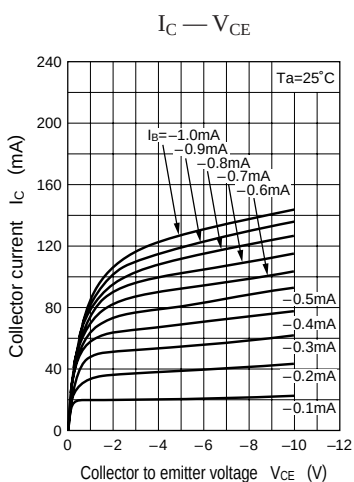


Characteristics charts of UNR211L

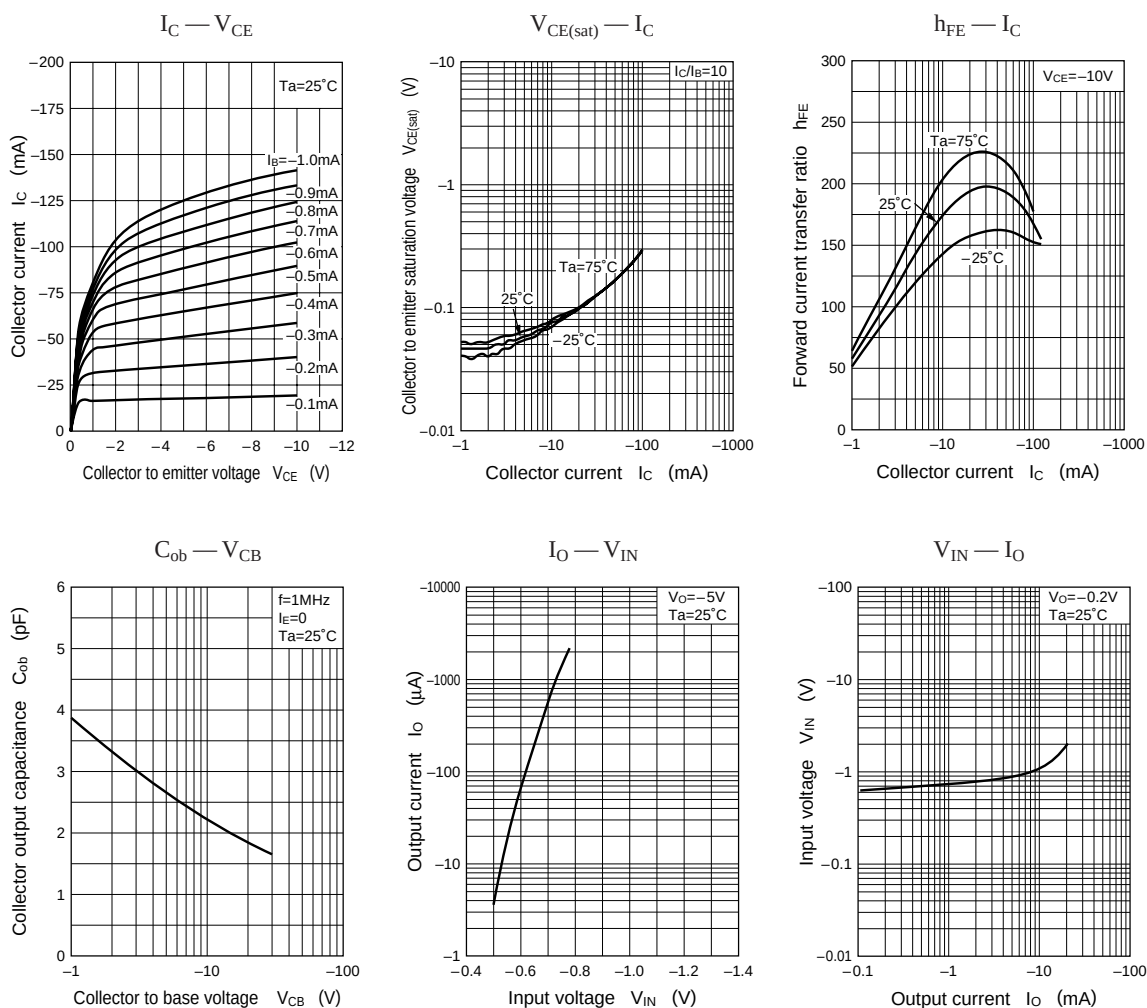




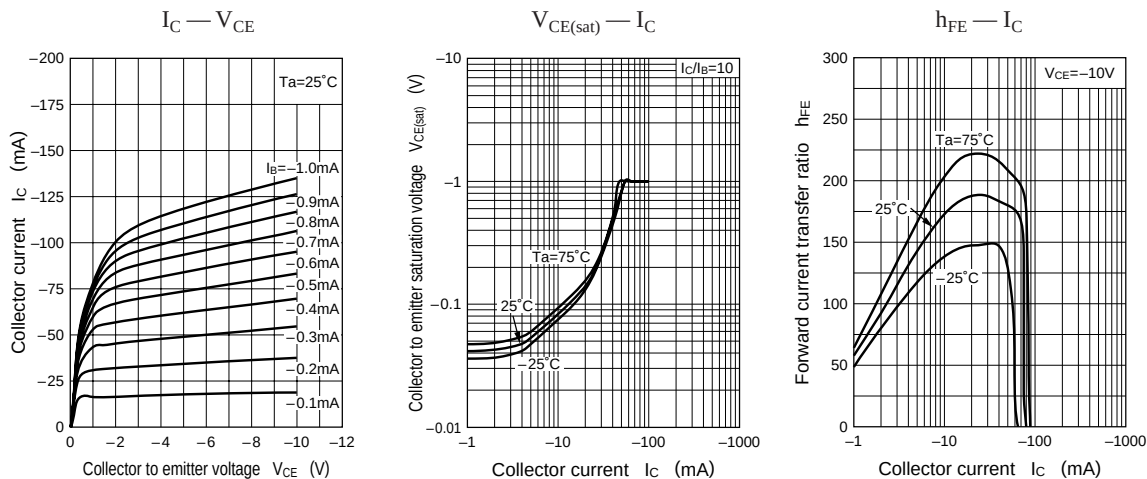
Characteristics charts of UNR211M

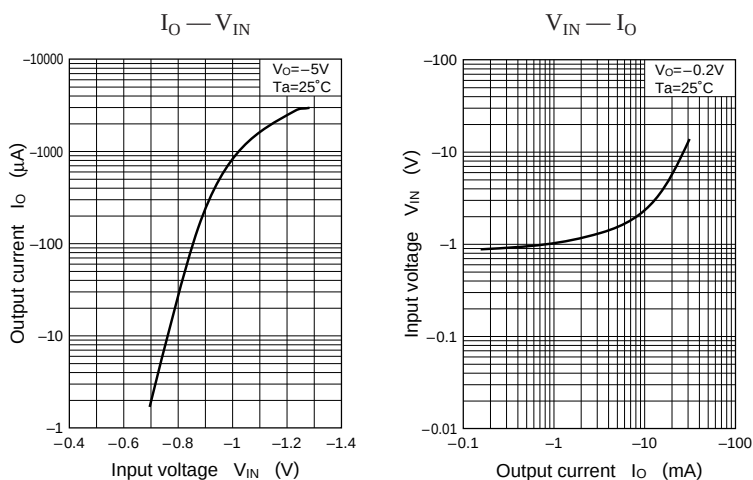


Characteristics charts of UNR211N

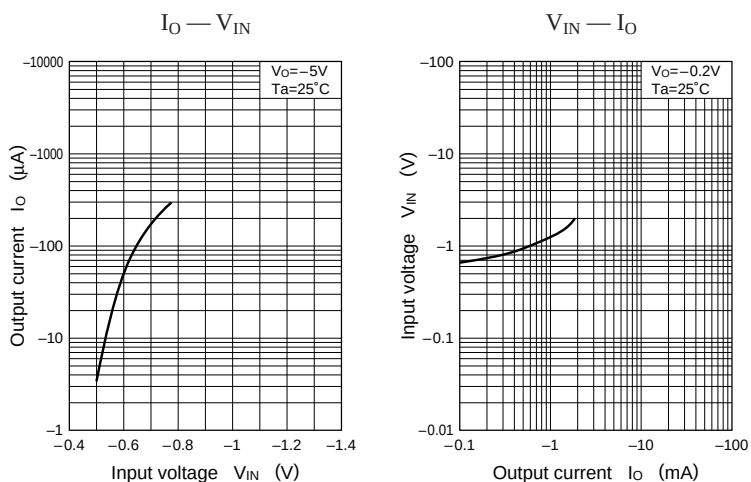
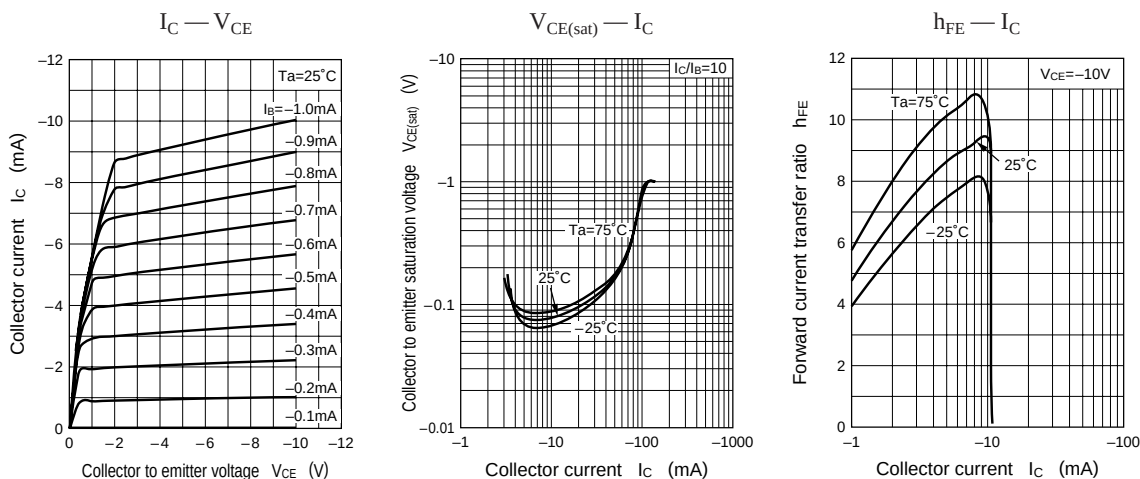


Characteristics charts of UNR211T

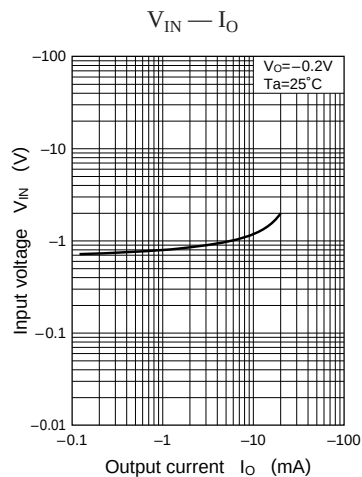
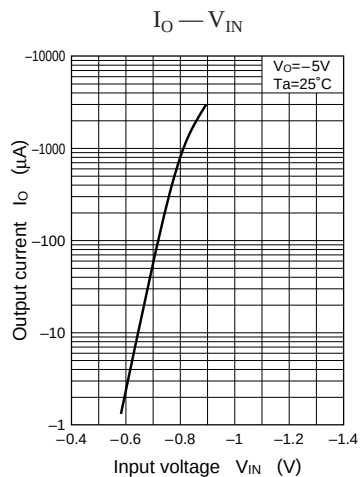
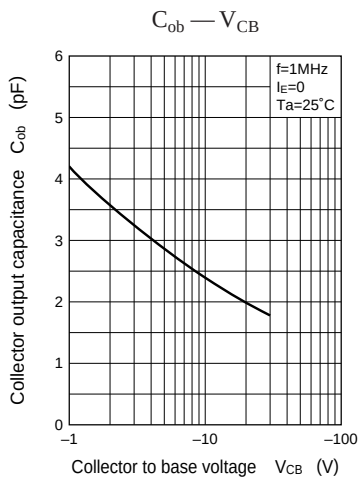
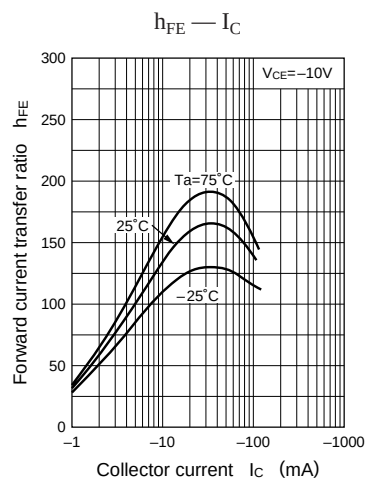
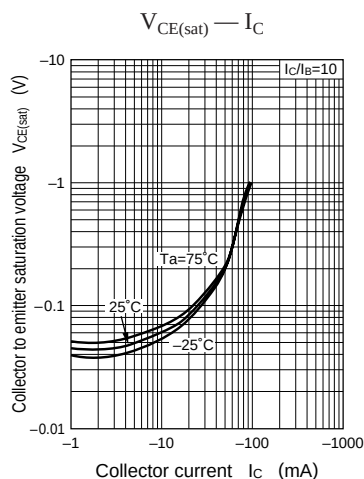
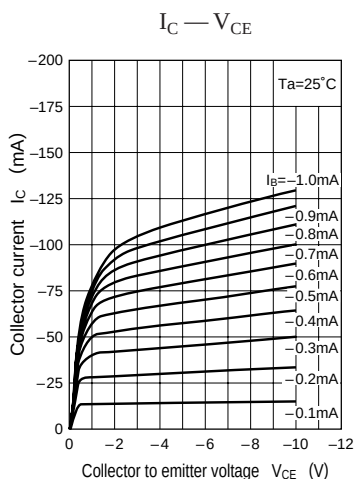




Characteristics charts of UNR211V



Characteristics charts of UNR211Z



Request for your special attention and precautions in using the technical information and semiconductors described in this material

- (1) An export permit needs to be obtained from the competent authorities of the Japanese Government if any of the products or technologies described in this material and controlled under the "Foreign Exchange and Foreign Trade Law" is to be exported or taken out of Japan.
- (2) The technical information described in this material is limited to showing representative characteristics and applied circuit examples of the products. It does not constitute the warranting of industrial property, the granting of relative rights, or the granting of any license.
- (3) The products described in this material are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
 - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
 - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this material are subject to change without notice for reasons of modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the guaranteed values, in particular those of maximum rating, the range of operating power supply voltage and heat radiation characteristics. Otherwise, we will not be liable for any defect which may arise later in your equipment.
Even when the products are used within the guaranteed values, redundant design is recommended, so that such equipment may not violate relevant laws or regulations because of the function of our products.
- (6) When using products for which dry packing is required, observe the conditions (including shelf life and after-unpacking standby time) agreed upon when specification sheets are individually exchanged.
- (7) No part of this material may be reprinted or reproduced by any means without written permission from our company.

Please read the following notes before using the datasheets

- A. These materials are intended as a reference to assist customers with the selection of Panasonic semiconductor products best suited to their applications.
Due to modification or other reasons, any information contained in this material, such as available product types, technical data, and so on, is subject to change without notice.
Customers are advised to contact our semiconductor sales office and obtain the latest information before starting precise technical research and/or purchasing activities.
- B. Panasonic is endeavoring to continually improve the quality and reliability of these materials but there is always the possibility that further rectifications will be required in the future. Therefore, Panasonic will not assume any liability for any damages arising from any errors etc. that may appear in this material.
- C. These materials are solely intended for a customer's individual use.
Therefore, without the prior written approval of Panasonic, any other use such as reproducing, selling, or distributing this material to a third party, via the Internet or in any other way, is prohibited.