UNR9111/9112/9113/9114/9115/9116/9117/9118/9119/9110/911D/911E/911F/911H/911L/911AJ/911BJ/911CJ (UN9111/9112/9113/9114/9115/9116/9117/9118/9119/9110/911D/911E/911F/911H/911L/911AJ/911BJ/911CJ)

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.
- SS-Mini type package, allowing automatic insertion through tape packing and magazine packing.

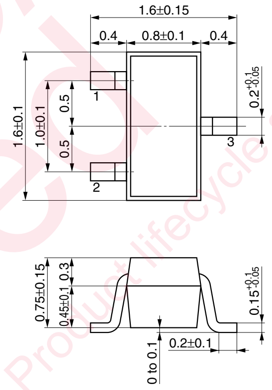
Resistance by Part Number

	Marking Symbol	(R_1)	(R_2)
UNR9111	6A	10kΩ	10kΩ
UNR9112	6B	22kΩ	22kΩ
UNR9113	6C	47kΩ	47kΩ
UNR9114	6D	10kΩ	47kΩ
UNR9115	6E	10kΩ	—
UNR9116	6F	4.7kΩ	—
UNR9117	6H	22kΩ	—
UNR9118	6I	0.51kΩ	5.1kΩ
UNR9119	6K	1kΩ	10kΩ
UNR9110	6L	47kΩ	—
UNR911D	6M	47kΩ	10kΩ
UNR911E	6N	47kΩ	22kΩ
UNR911F	6O	4.7kΩ	10kΩ
UNR911H	6P	2.2kΩ	10kΩ
UNR911L	6Q	4.7kΩ	4.7kΩ
UNR911AJ	6X	100kΩ	100kΩ
UNR911BJ	6Y	100kΩ	—
UNR911CJ	6Z	—	47kΩ

Absolute Maximum Ratings (Ta=25˚C)

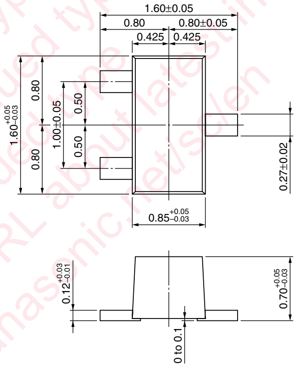
Parameter	Symbol	Ratings	Unit
Collector to base voltage	V_{CBO}	–50	V
Collector to emitter voltage	V_{CEO}	–50	V
Collector current	I_C	–100	mA
Total power dissipation	P_T	125	mW
Junction temperature	T_j	125	˚C
Storage temperature	T_{stg}	–55 to +125	˚C

Unit: mm



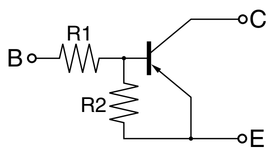
1 : Base
2 : Emitter
3 : Collector
SS–Mini Type Pakage

Unit: mm



1 : Base
2 : Emitter
3 : Collector
SS–Mini Flat Type Pakage (J type)

Internal Connection



Note.) The Part numbers in the Parenthesis show conventional part number.

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	UNR9111	I_{EBO}	V_{EB} = –6V, I_C = 0			– 0.5	mA
	UNR9112/9114/911E/911D					– 0.2	
	UNR9113/UNR911AJ					– 0.1	
	UNR9115/9116/9117/9110/UNR911BJ					– 0.01	
	UNR911F/911H					–1.0	
	UNR9119					–1.5	
	UNR9118/911L/911CJ					–2.0	
Collector to base voltage		V_{CBO}	I_C = –10μA, I_E = 0	–50			V
Collector to emitter voltage		V_{CEO}	I_C = –2mA, I_B = 0	–50			V
Forward current transfer ratio	UNR9111	h_{FE}	V_{CE} = –10V, I_C = –5mA	35			
	UNR9112/911E			60			
	UNR9113/9114/UNR911AJ/911CJ			80			
	UNR9115*/9116*/9117*/9110*UNR911BJ			160		460	
	UNR911F/911D/9119/911H			30			
	UNR9118/911L			20			
Collector to emitter saturation voltage		$V_{CE(sat)}$	I_C = –10mA, I_B = – 0.3mA			– 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
	UNR9113/UNR911BJ		V_{CC} = –5V, V_B = –3.5V, R_L = 1kΩ			– 0.2	
	UNR911D		V_{CC} = –5V, V_B = –10V, R_L = 1kΩ			– 0.2	
	UNR911E		V_{CC} = –5V, V_B = –6V, R_L = 1kΩ			– 0.2	
	UNR911AJ		V_{CC} = –5V, V_B = –5.0V, R_L = 1kΩ			– 0.2	
Transition frequency		f_T	V_{CB} = –10V, I_E = 2mA, f = 200MHz		150		MHz
	UNR911AJ				80		
Input resistance	UNR9111/9114/9115	R_1		(–30%)	10	(+30%)	kΩ
	UNR9112/9117				22		
	UNR9113/9110/911D/911E				47		
	UNR9116/911F/911L				4.7		
	UNR9118				0.51		
	UNR9119				1		
	UNR911H				2.2		
	UNR911AJ/911BJ				100		

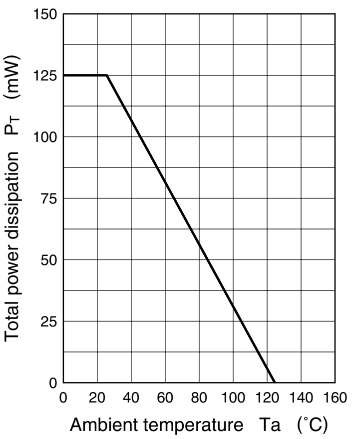
* h_{FE} rank classification (UNR9115/9116/9117/9110)

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

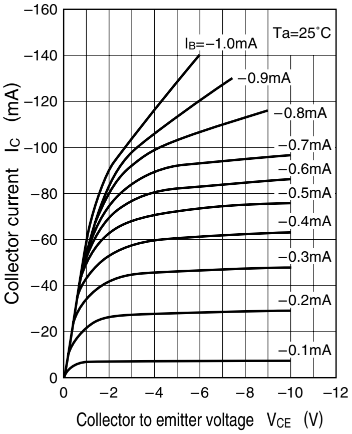
■ Electrical Characteristics (continued) (Ta=25˚C)

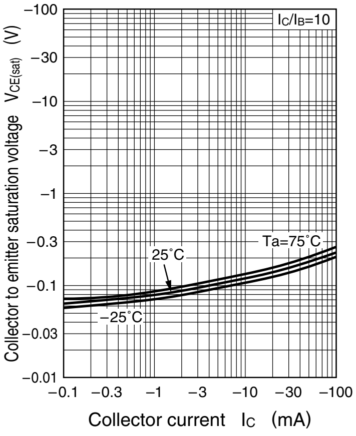
Parameter		Symbol	Conditions	min	typ	max	Unit
Resistance ratio	UNR9111/9112/9113/911L	R_1/R_2		0.8	1.0	1.2	
	UNR9114			0.17	0.21	0.25	
	UNR9118/9119			0.08	0.1	0.12	
	UNR911D				4.7		
	UNR911E				2.14		
	UNR911F				0.47		
	UNR911H			0.17	0.22	0.27	
	UNR911AJ				1.0		
Resistance between Emitter to Base	UNR911CJ	R_2		–30%	47	30%	

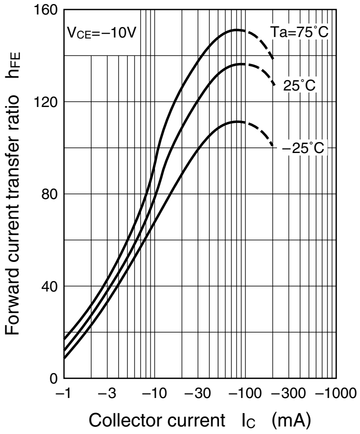
Common characteristics chart

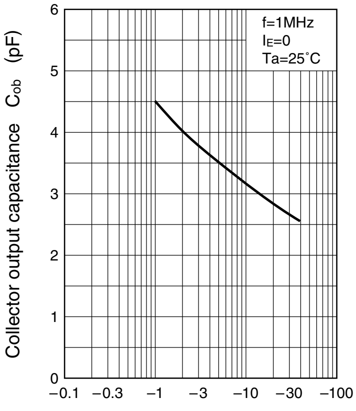

P_T — Ta

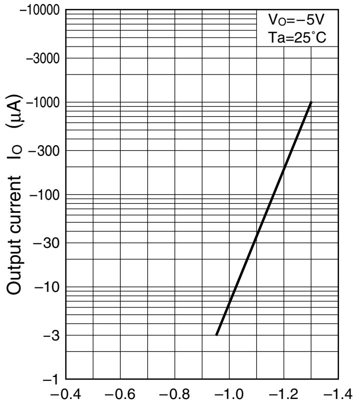
Characteristics charts of UNR9111

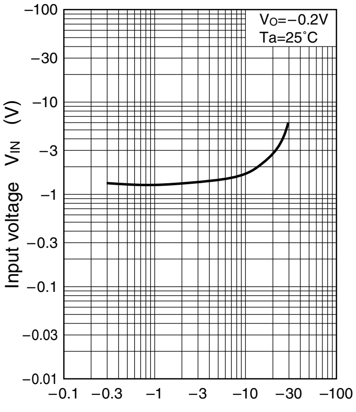

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

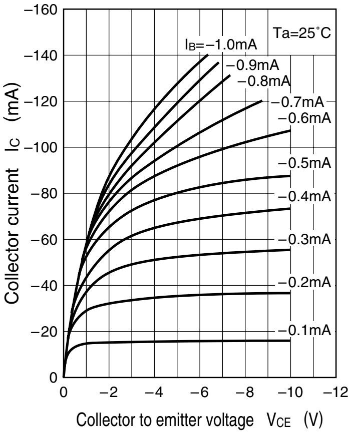

h_{FE} — I_C

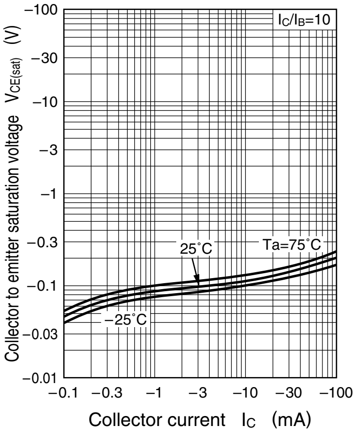

C_{ob} — V_{CB}

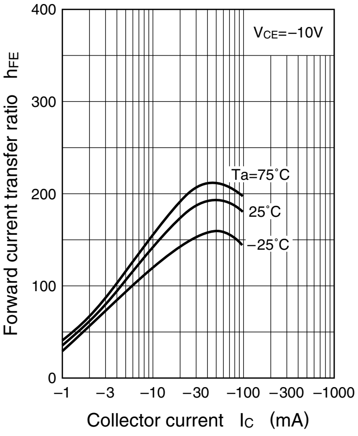

I_O — V_{IN}

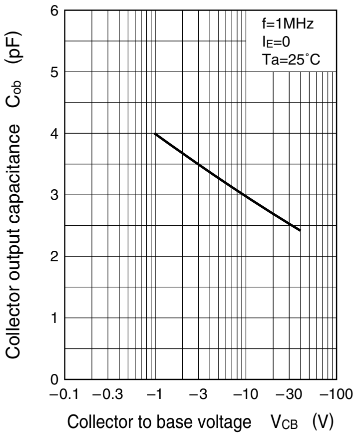

V_{IN} — I_O

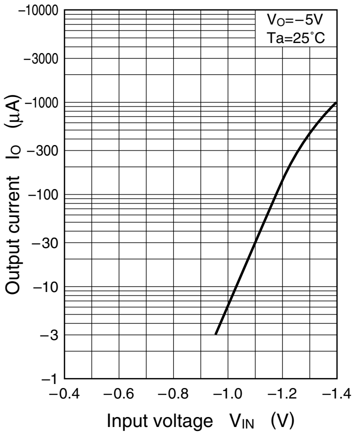
Characteristics charts of UNR9112

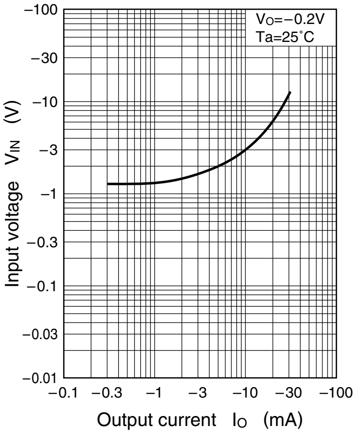

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

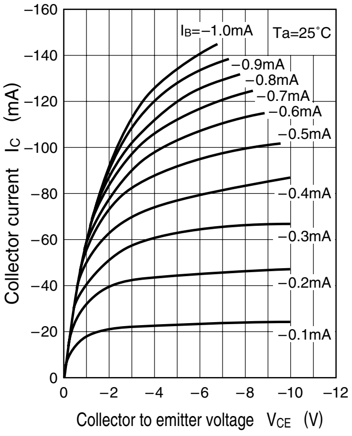

h_{FE} — I_C

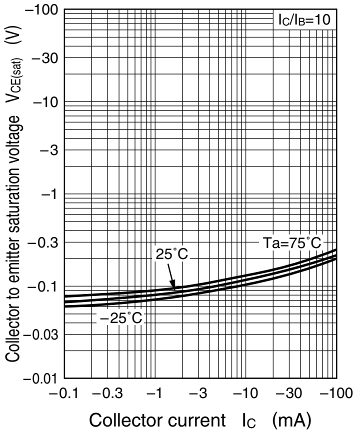

C_{ob} — V_{CB}

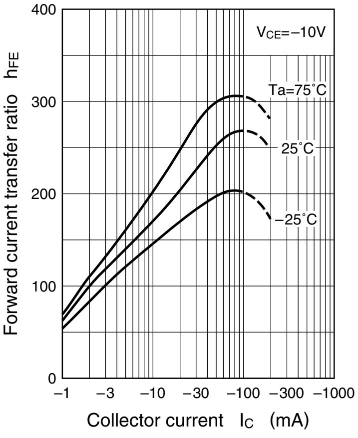

I_O — V_{IN}


V_{IN} — I_O

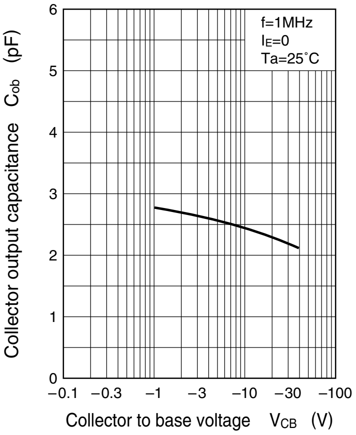
Characteristics charts of UNR9113


I_C — V_{CE}

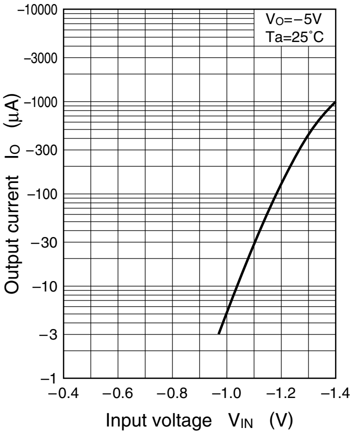

$V_{CE(sat)}$ — I_C


h_{FE} — I_C

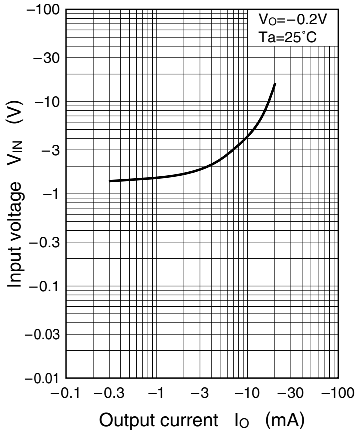
C_{ob} — V_{CB}



I_O — V_{IN}

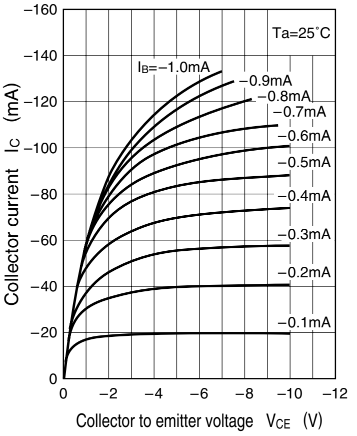


V_{IN} — I_O

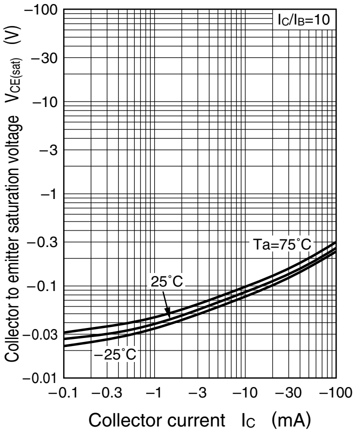


Characteristics charts of UNR9114

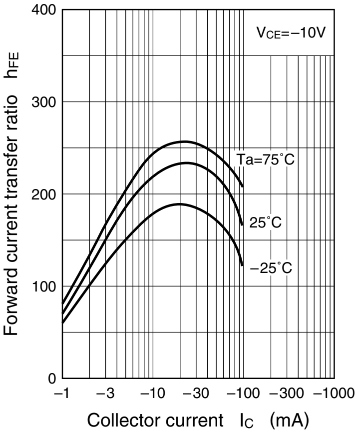
I_C — V_{CE}



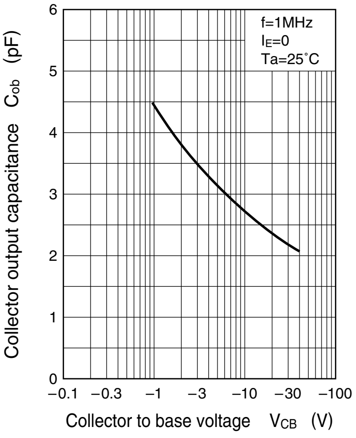
$V_{CE(sat)}$ — I_C



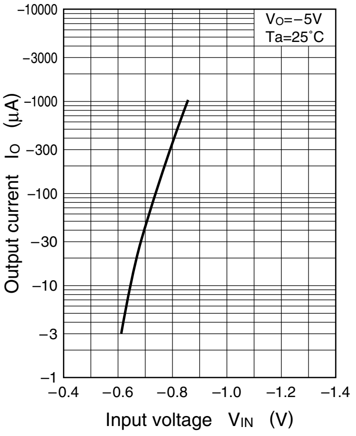
h_{FE} — I_C



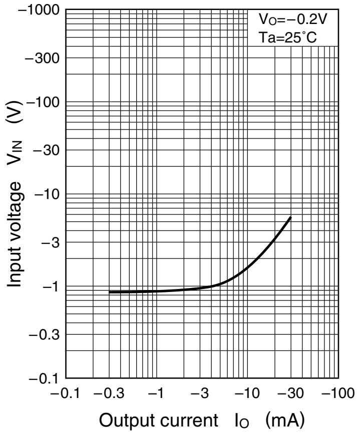
C_{ob} — V_{CB}



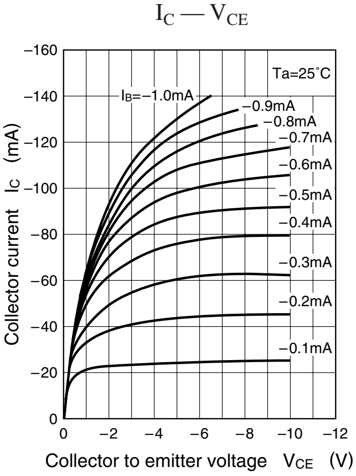
I_O — V_{IN}



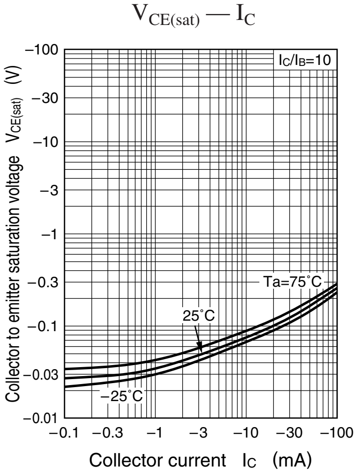
V_{IN} — I_O



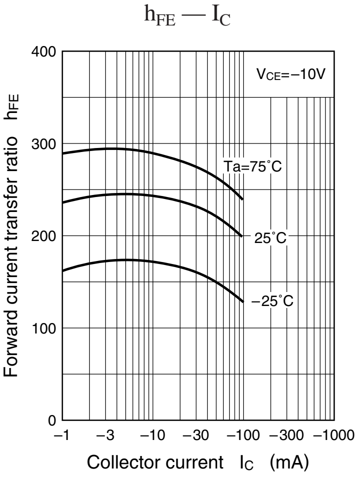
Characteristics charts of UNR9115



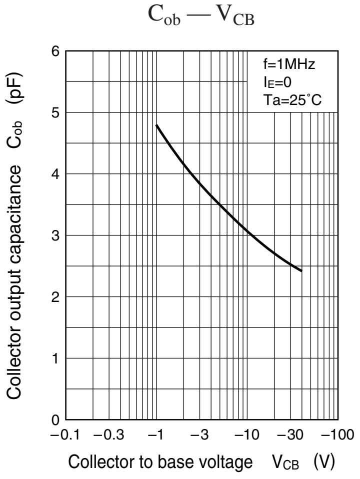
I_C — V_{CE}



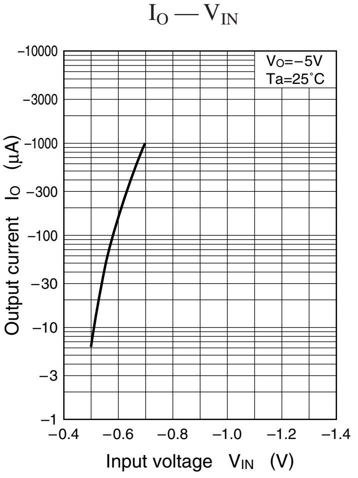
$V_{CE(sat)}$ — I_C



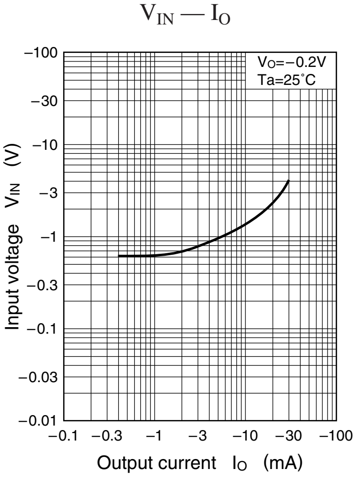
h_{FE} — I_C



C_{ob} — V_{CB}

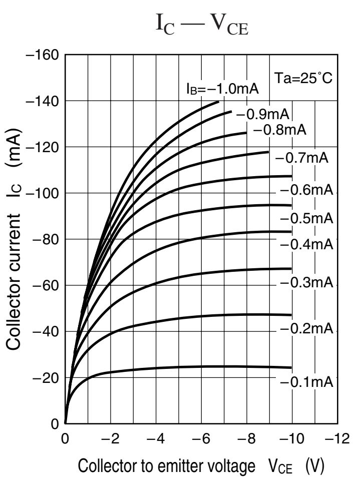


I_O — V_{IN}

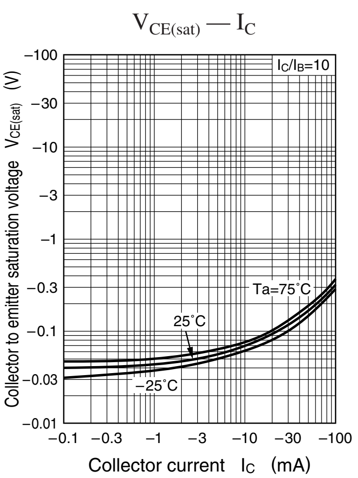


V_{IN} — I_O

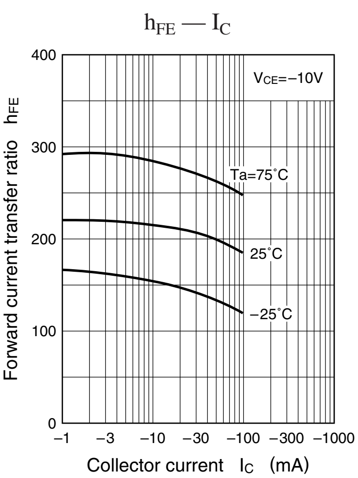
Characteristics charts of UNR9116



I_C — V_{CE}

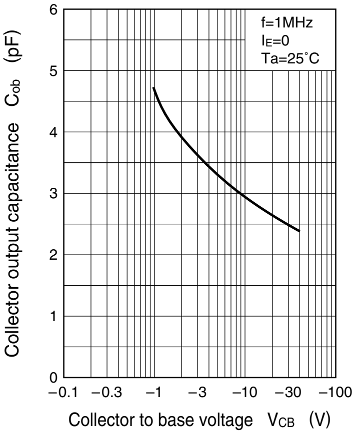


$V_{CE(sat)}$ — I_C

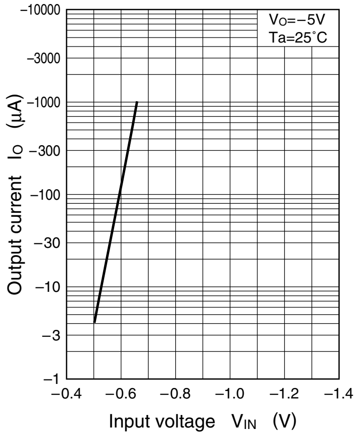


h_{FE} — I_C

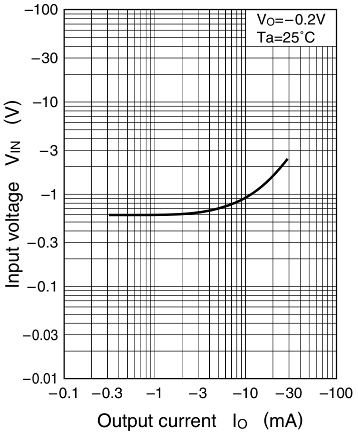
C_{ob} — V_{CB}



I_O — V_{IN}

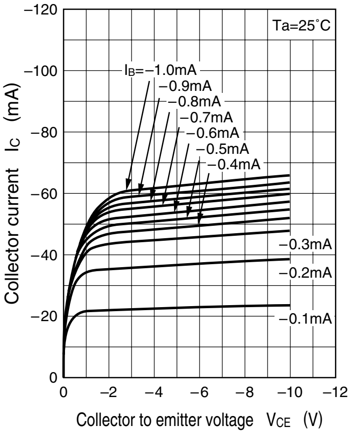


V_{IN} — I_O

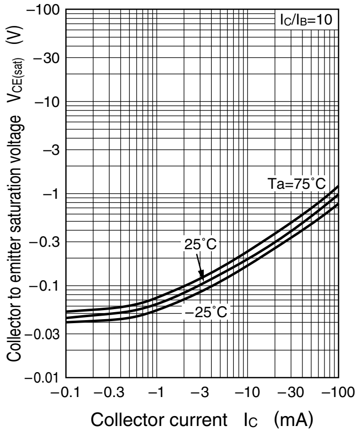


Characteristics charts of UNR9117

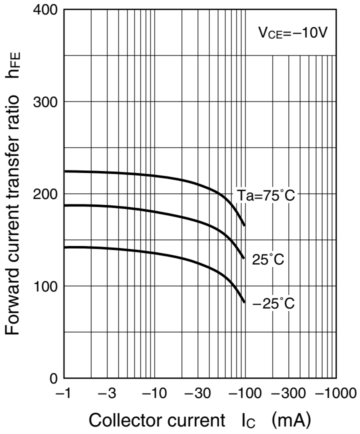
I_C — V_{CE}



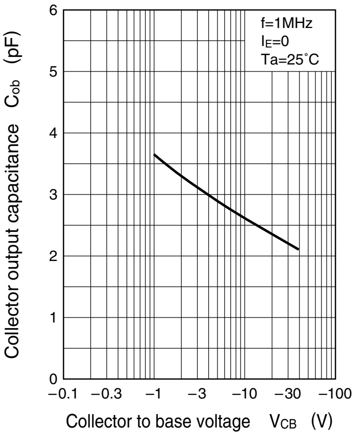
$V_{CE(sat)}$ — I_C



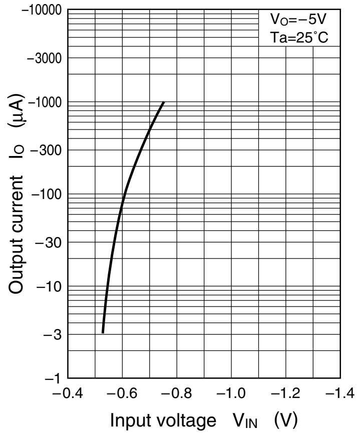
h_{FE} — I_C



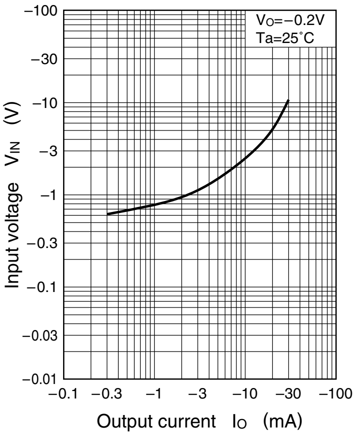
C_{ob} — V_{CB}



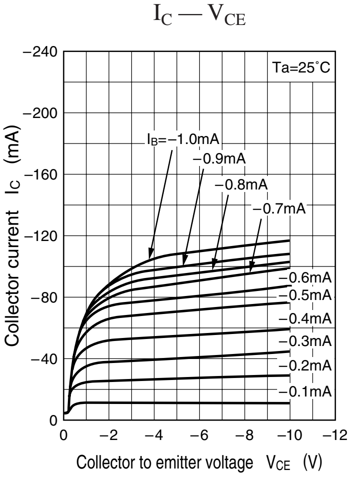
I_O — V_{IN}

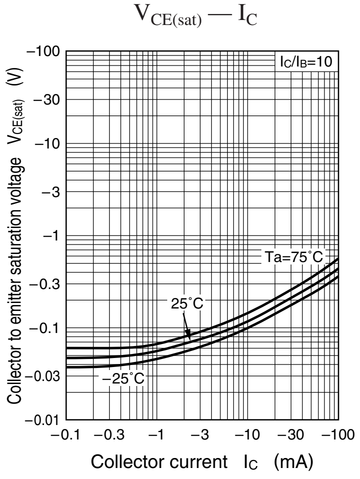


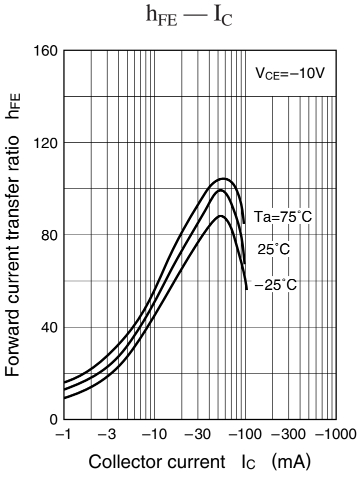
V_{IN} — I_O

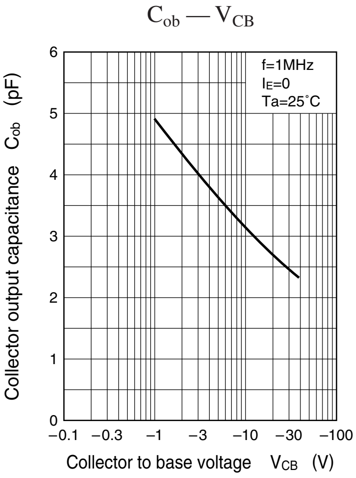


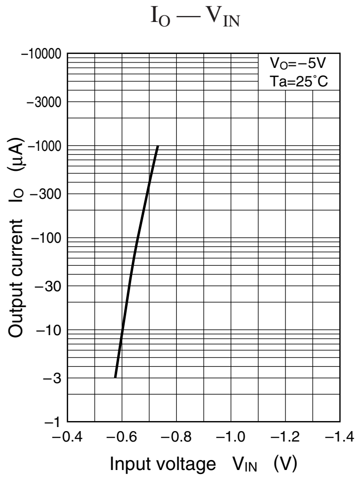
Characteristics charts of UNR9118

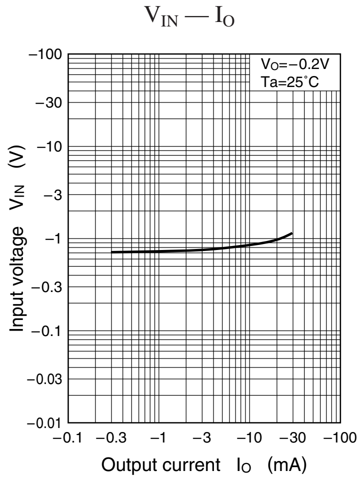

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

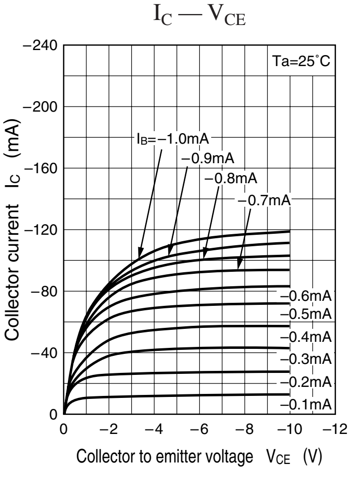

h_{FE} — I_C

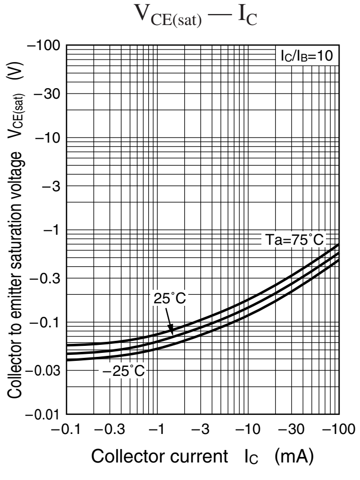

C_{ob} — V_{CB}

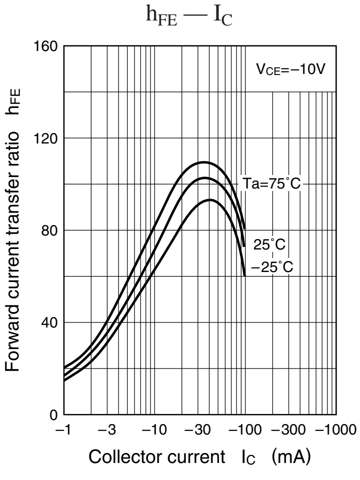

I_O — V_{IN}


V_{IN} — I_O

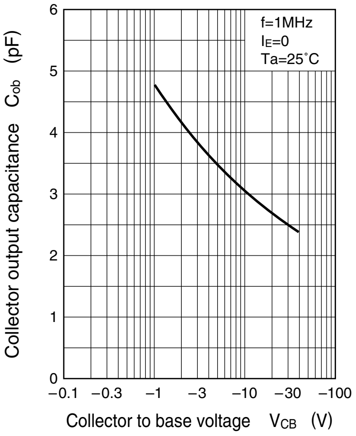
Characteristics charts of UNR9119


I_C — V_{CE}

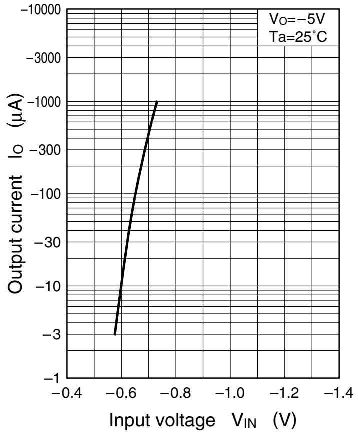

$V_{CE(sat)}$ — I_C


h_{FE} — I_C

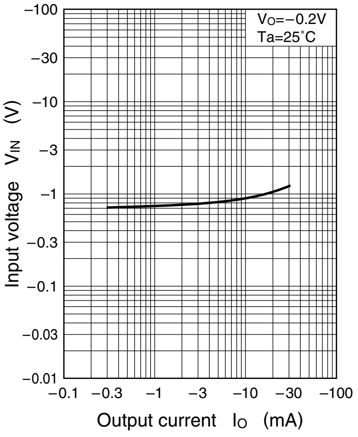
C_{ob} — V_{CB}



I_O — V_{IN}

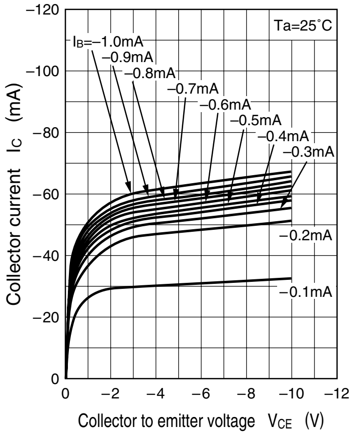


V_{IN} — I_O

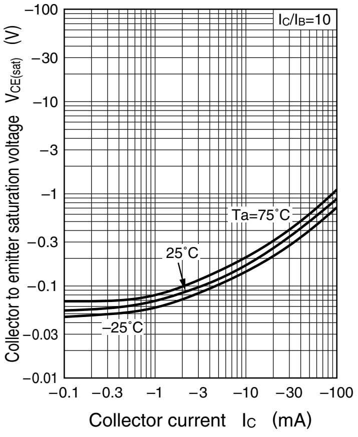


Characteristics charts of UNR9110

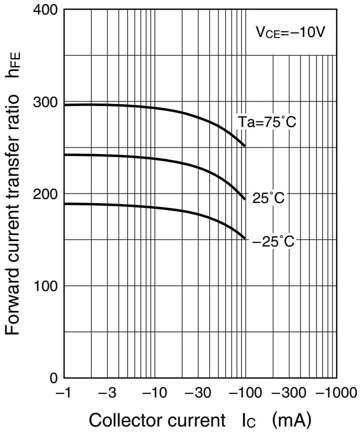
I_C — V_{CE}



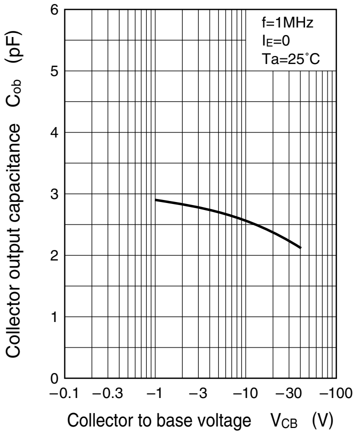
$V_{CE(sat)}$ — I_C



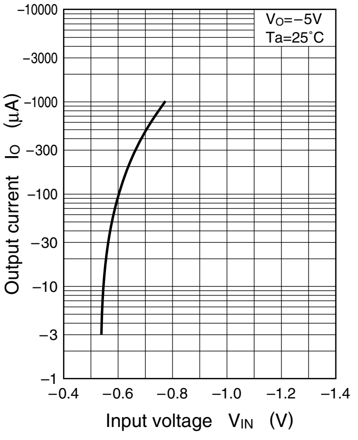
h_{FE} — I_C



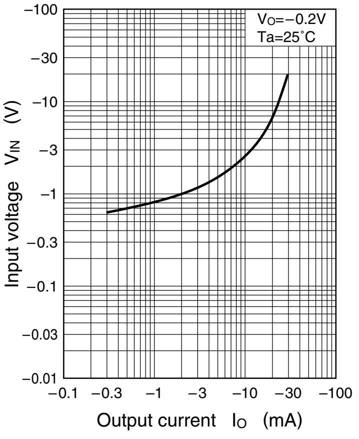
C_{ob} — V_{CB}



I_O — V_{IN}

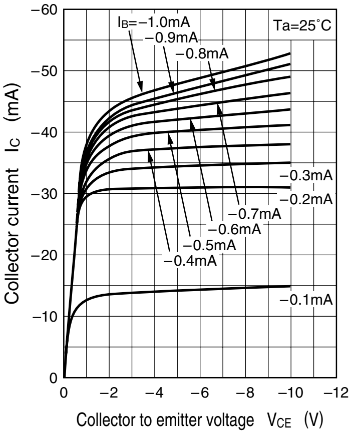


V_{IN} — I_O

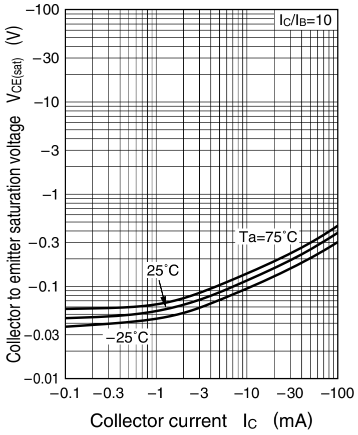


Characteristics charts of UNR911D

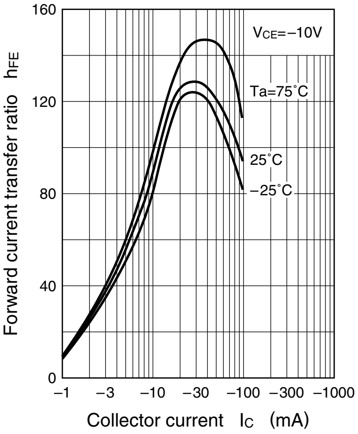
I_C — V_{CE}



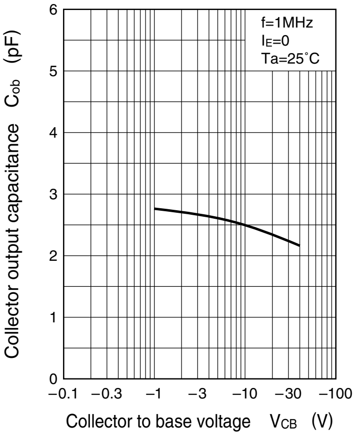
$V_{CE(sat)}$ — I_C



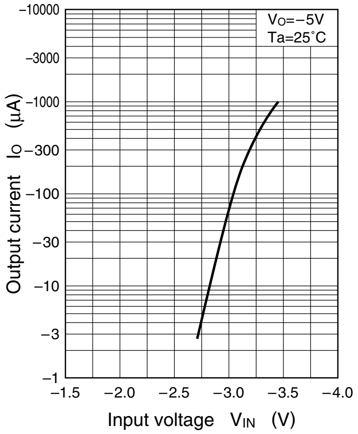
h_{FE} — I_C



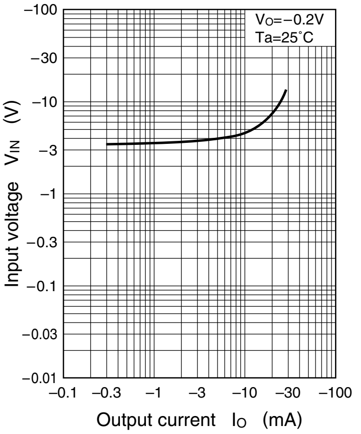
C_{ob} — V_{CB}



I_O — V_{IN}

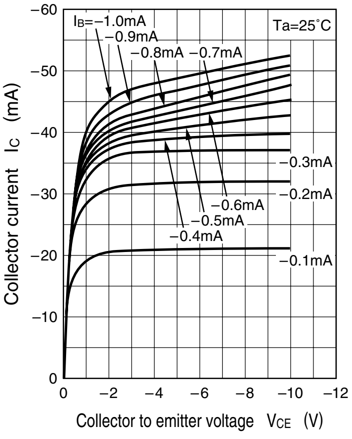


V_{IN} — I_O

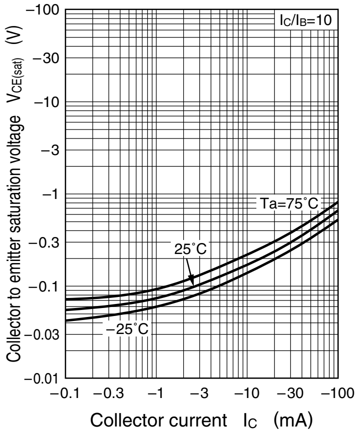


Characteristics charts of UNR911E

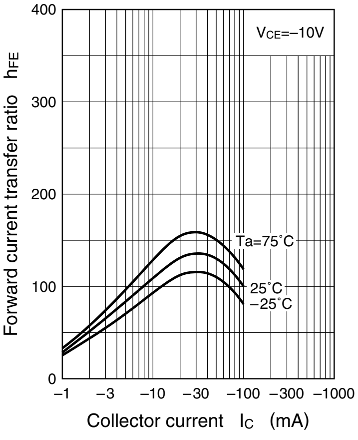
I_C — V_{CE}

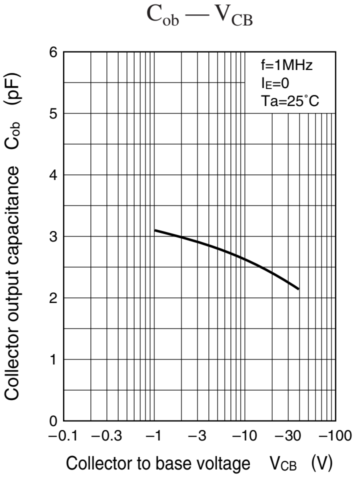


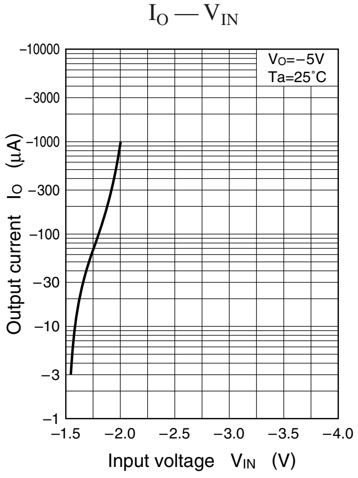
$V_{CE(sat)}$ — I_C

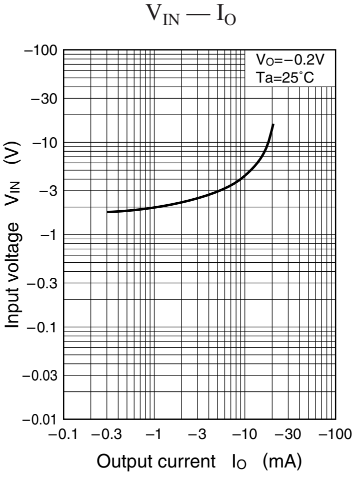


h_{FE} — I_C

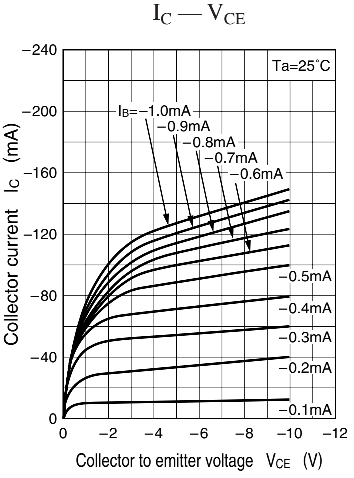


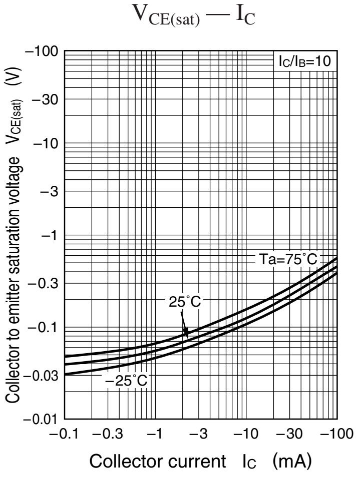

C_{ob} — V_{CB}

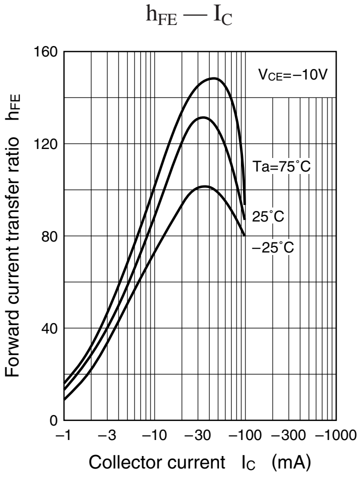

I_O — V_{IN}

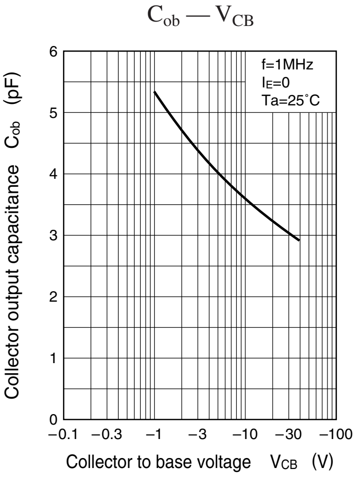

V_{IN} — I_O

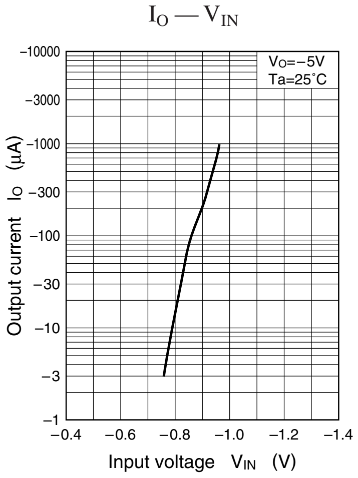
Characteristics charts of UNR911F

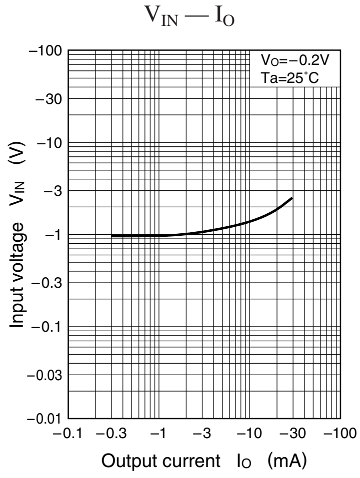

I_C — V_{CE}


$V_{CE(sat)}$ — I_C


h_{FE} — I_C

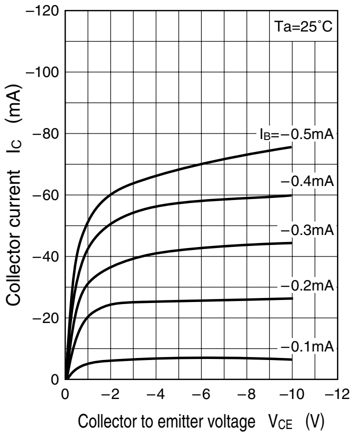

C_{ob} — V_{CB}


I_O — V_{IN}

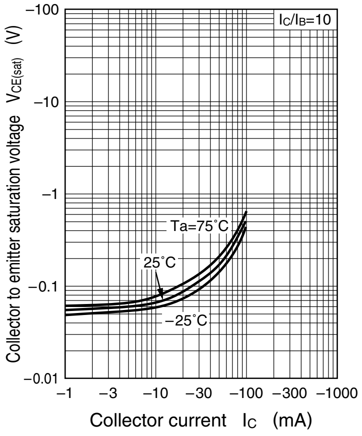

V_{IN} — I_O

Characteristics charts of UNR911H

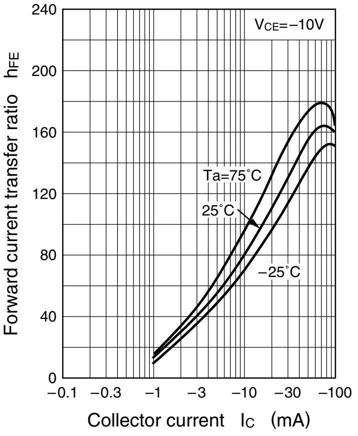
I_C — V_{CE}



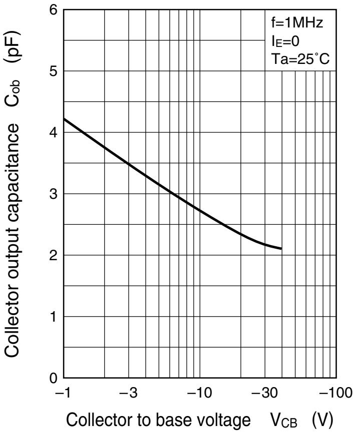
$V_{CE(sat)}$ — I_C



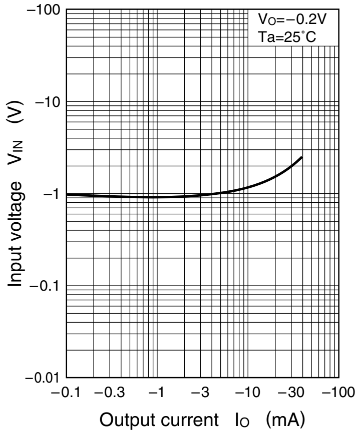
h_{FE} — I_C



C_{ob} — V_{CB}

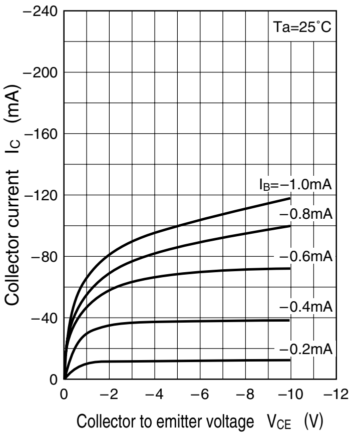


V_{IN} — I_O

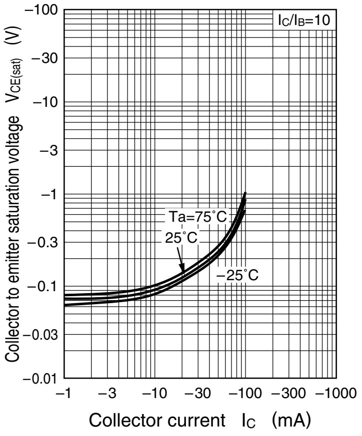


Characteristics charts of UNR911L

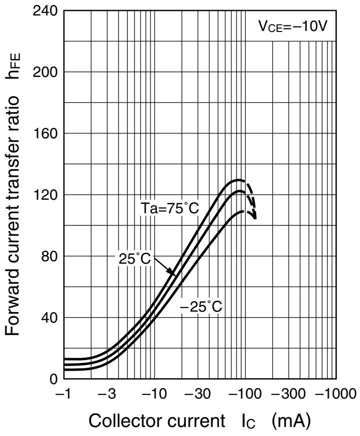
I_C — V_{CE}



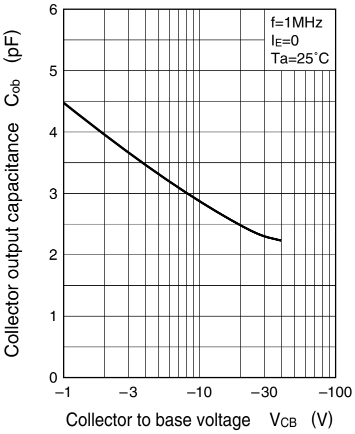
$V_{CE(sat)}$ — I_C



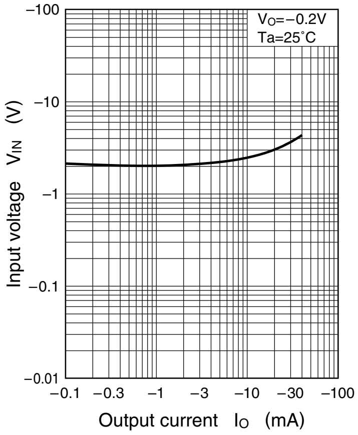
h_{FE} — I_C



C_{ob} — V_{CB}



V_{IN} — I_O



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

(1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.

(2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.

(3) The products described in this book 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 book are subject to change without notice for 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 range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. 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, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.

(6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.

(7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.