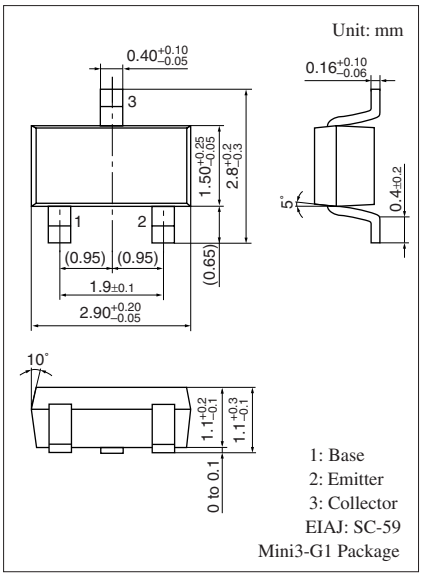
UNR211x Series (UN211x Series)

Silicon PNP epitaxial planar type

For digital circuits



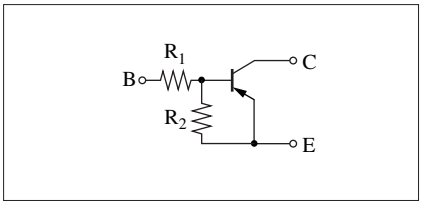
■ Features

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

■ Resistance by Part Number

		Marking Symbol	(R_1)	(R_2)
• UNR2110	(UN2110)	6L	47 kΩ	—
• UNR2111	(UN2111)	6A	10 kΩ	10 kΩ
• UNR2112	(UN2112)	6B	22 kΩ	22 kΩ
• UNR2113	(UN2113)	6C	47 kΩ	47 kΩ
• UNR2114	(UN2114)	6D	10 kΩ	47 kΩ
• UNR2115	(UN2115)	6E	10 kΩ	—
• UNR2116	(UN2116)	6F	4.7 kΩ	—
• UNR2117	(UN2117)	6H	22 kΩ	—
• UNR2118	(UN2118)	6I	0.51 kΩ	5.1 kΩ
• UNR2119	(UN2119)	6K	1 kΩ	10 kΩ
• UNR211D	(UN211D)	6M	47 kΩ	10 kΩ
• UNR211E	(UN211E)	6N	47 kΩ	22 kΩ
• UNR211F	(UN211F)	6O	4.7 kΩ	10 kΩ
• UNR211H	(UN211H)	6P	2.2 kΩ	10 kΩ
• UNR211L	(UN211L)	6Q	4.7 kΩ	4.7 kΩ
• UNR211M	(UN211M)	EI	2.2 kΩ	47 kΩ
• UNR211N	(UN211N)	EW	4.7 kΩ	47 kΩ
• UNR211T	(UN211T)	EY	22 kΩ	47 kΩ
• UNR211V	(UN211V)	FC	2.2 kΩ	2.2 kΩ
• UNR211Z	(UN211Z)	FE	4.7 kΩ	22 kΩ

Internal Connection



■ Absolute Maximum Ratings $T_a = 25°C$

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V_{CBO}	−50	V
Collector-emitter voltage (Base open)	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.

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)		V_{CBO}	$I_C = -10$ µA, $I_E = 0$	−50			V
Collector-emitter voltage (Base open)		V_{CEO}	$I_C = -2$ mA, $I_B = 0$	−50			V
Collector-base cutoff current (Emitter open)		I_{CBO}	$V_{CB} = -50$ V, $I_E = 0$			− 0.1	µA
Collector-emitter cutoff current (Base open)		I_{CEO}	$V_{CE} = -50$ V, $I_B = 0$			− 0.5	µA
Emitter-base cutoff current (Collector open)	UNR2110/2115/2116/2117	I_{EBO}	$V_{EB} = -6$ V, $I_C = 0$			− 0.01	mA
	UNR2113					− 0.1	
	UNR2112/2114/211D/211E/211M/211N/211T					− 0.2	
	UNR211Z					− 0.4	
	UNR2111					− 0.5	
	UNR211F/211H					−1.0	
	UNR2119					−1.5	
	UNR2118/211L/211V					−2.0	
Forward current transfer ratio	UNR211V	h_{FE}	$V_{CE} = -10$ V, $I_C = -5$ mA	6		20	—
	UNR2118/211L			20			
	UNR2119/211D/211F/211H			30			
	UNR2111			35			
	UNUNR2112/211E			60			
	UNR211Z			60		200	
	UNR2113/2114/211M			80			
	UNR211N/211T			80		400	
	UNR2110*/2115*/2116*/2117*			160		460	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = -10$ mA, $I_B = -0.3$ mA			− 0.25	V
	UNR211V		$I_C = -10$ mA, $I_B = -1.5$ mA				
Output voltage high-level		V_{OH}	$V_{CC} = -5$ V, $V_B = -0.5$ V, $R_L = 1$ kΩ	−4.9			V
Output voltage low-level		V_{OL}	$V_{CC} = -5$ V, $V_B = -2.5$ V, $R_L = 1$ kΩ			− 0.2	V
	UNR2113		$V_{CC} = -5$ V, $V_B = -3.5$ V, $R_L = 1$ kΩ				
	UNR211D		$V_{CC} = -5$ V, $V_B = -10$ V, $R_L = 1$ kΩ				
	UNR211E		$V_{CC} = -5$ V, $V_B = -6$ V, $R_L = 1$ kΩ				
Transition frequency		f_T	$V_{CB} = -10$ V, $I_E = 1$ mA, f = 200 MHz		80		MHz
	UNR2114/2119/211E 211F/211H		$V_{CB} = -10$ V, $I_E = 2$ mA, f = 200 MHz		150		
Input resistance	UNR2118	R_1		−30%	0.51	+30%	kΩ
	UNR2119				1.0		
	UNR211H/211M/211V				2.2		
	UNR2116/211F/211L/211N/211Z				4.7		
	UNR2111/2114/2115				10		
	UNR2112/2117/211T				22		
	UNR2110/2113/211D/211E				47		

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

2. *: Rank classification

Rank	Q	R	S	No-rank
h_{FE}	160 to 260	210 to 340	290 to 460	160 to 460

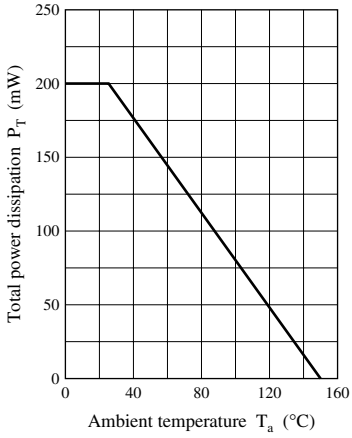
■ Electrical Characteristics (continued) $T_a = 25°C \pm 3°C$

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Resistance ratio	UNR211M	R_1/R_2			0.047		—
	UNR211N				0.1		
	UNR2118/2119			0.08	0.10	0.12	
	UNR211Z				0.21		
	UNR2114			0.17	0.21	0.25	
	UNR211H			0.17	0.22	0.27	
	UNR211T				0.47		
	UNR211F			0.37	0.47	0.57	
	UNR211V				1.0		
	UNR2111/2112/2113/211L			0.8	1.0	1.2	
	UNR211E			1.70	2.14	2.60	
	UNR211D			3.7	4.7	5.7	

Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

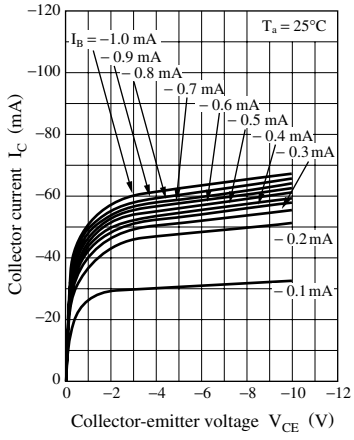
Common characteristics chart

P_T — T_a

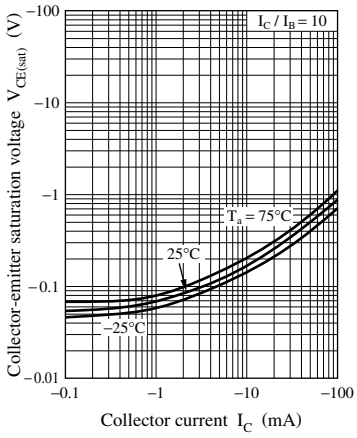


Characteristics charts of UNR2110

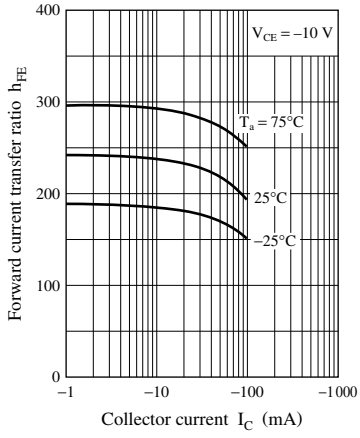
I_C — V_{CE}



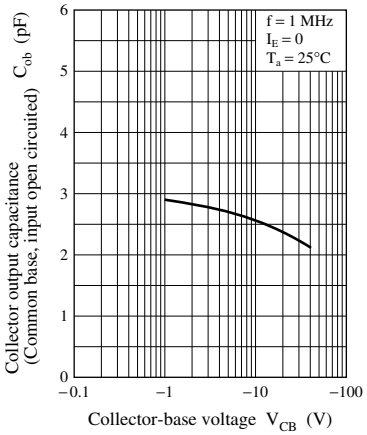
$V_{CE(sat)}$ — I_C



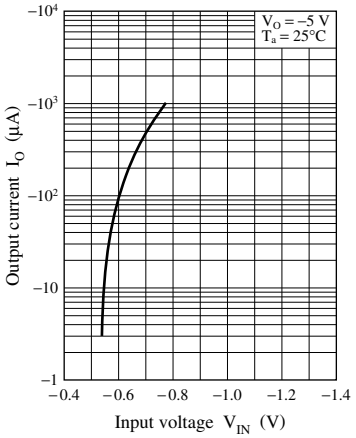
h_{FE} — I_C



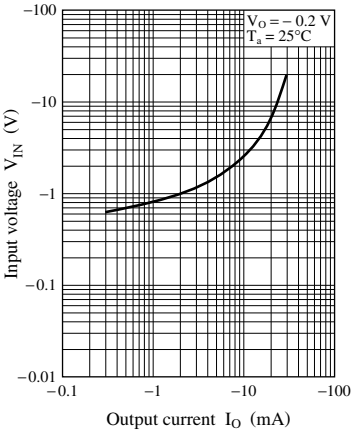
C_{ob} — V_{CB}



I_O — V_{IN}

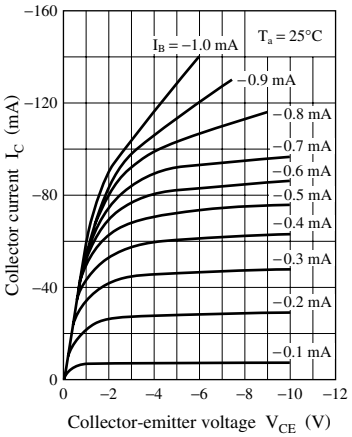


V_{IN} — I_O

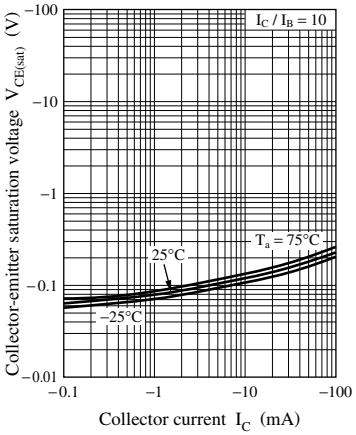


Characteristics charts of UNR2111

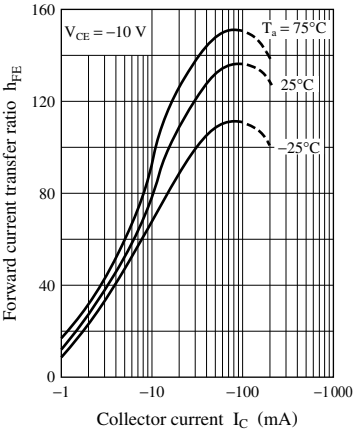
I_C — V_{CE}



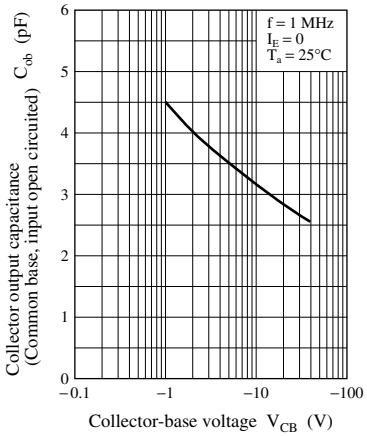
$V_{CE(sat)}$ — I_C



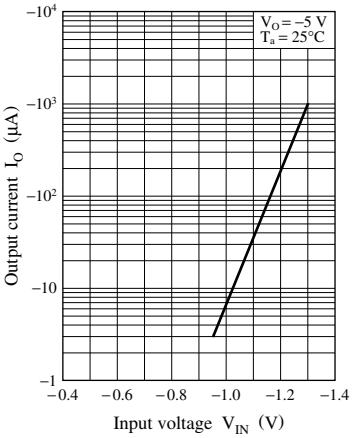
h_{FE} — I_C



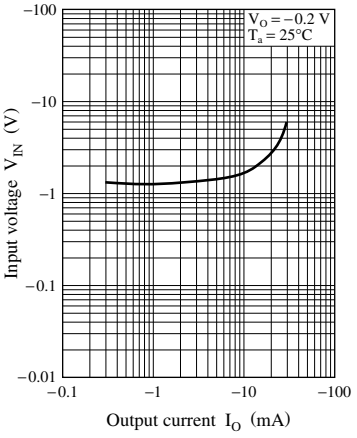
C_{ob} — V_{CB}



I_O — V_{IN}

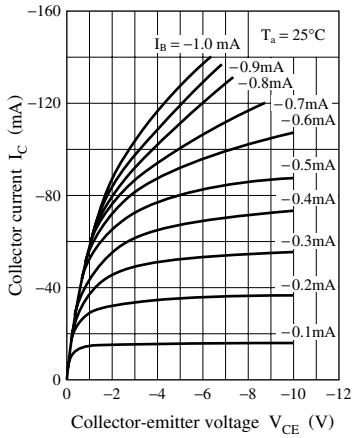


V_{IN} — I_O

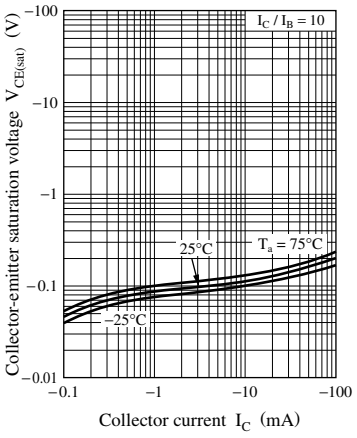


Characteristics charts of UNR2112

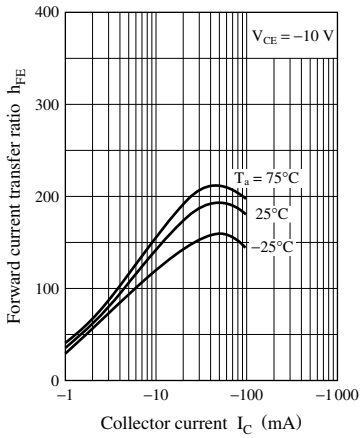
I_C — V_{CE}



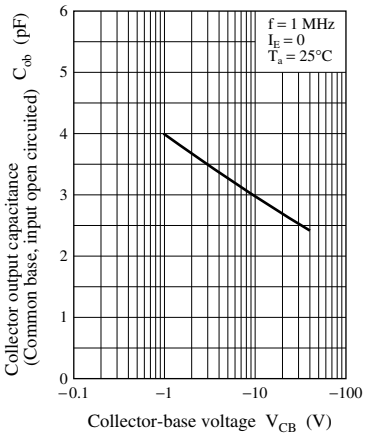
$V_{CE(sat)}$ — I_C



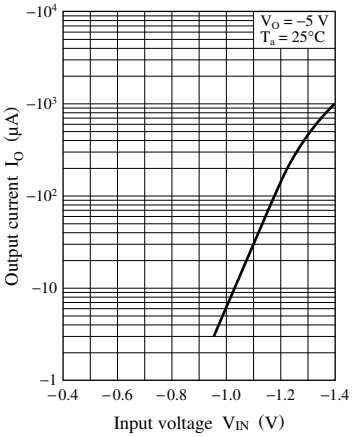
h_{FE} — I_C



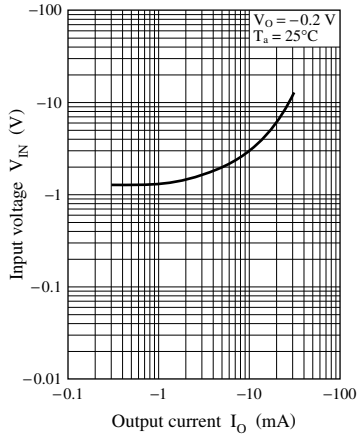
C_{ob} — V_{CB}



I_O — V_{IN}

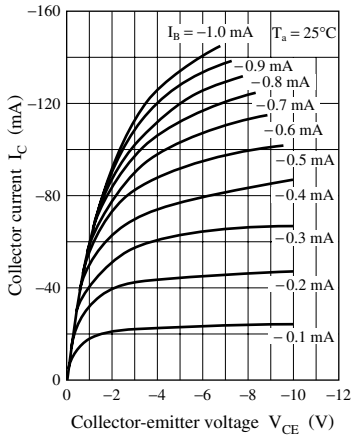


V_{IN} — I_O

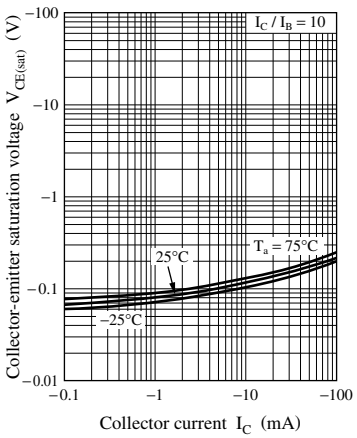


Characteristics charts of UNR2113

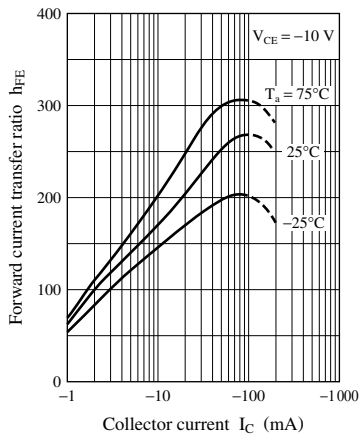
I_C — V_{CE}



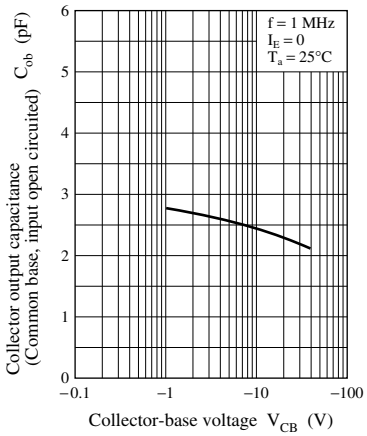
$V_{CE(sat)}$ — I_C



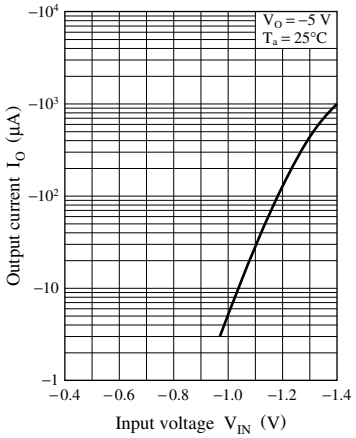
h_{FE} — I_C



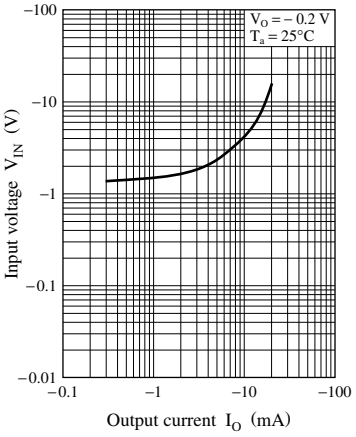
C_{ob} — V_{CB}



I_O — V_{IN}

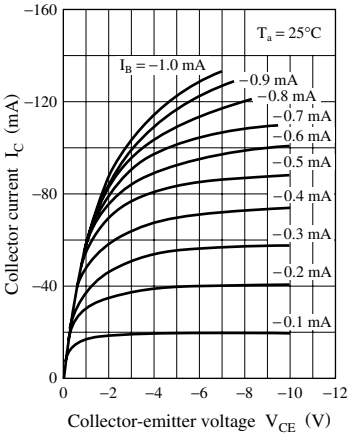


V_{IN} — I_O

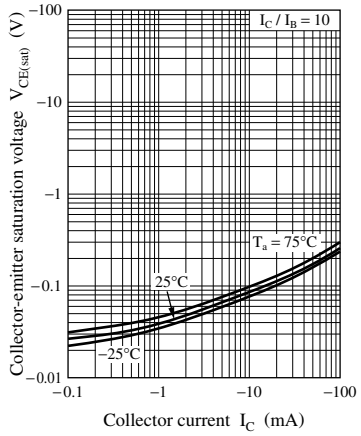


Characteristics charts of UNR2114

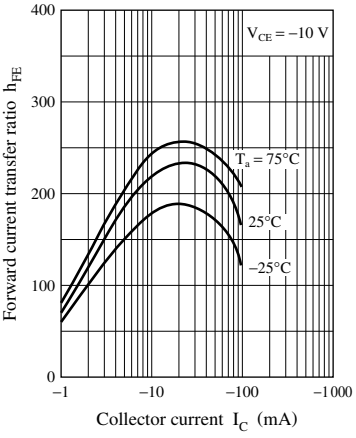
I_C — V_{CE}



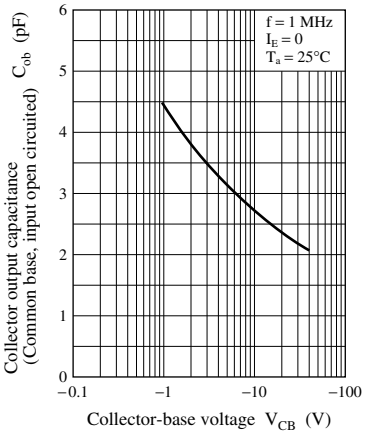
$V_{CE(sat)}$ — I_C



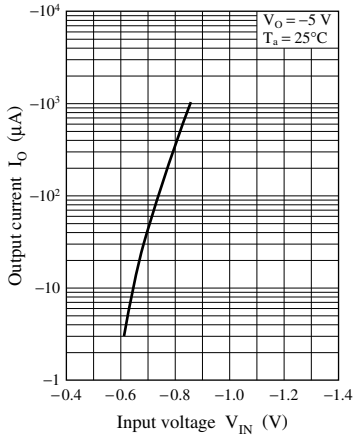
h_{FE} — I_C



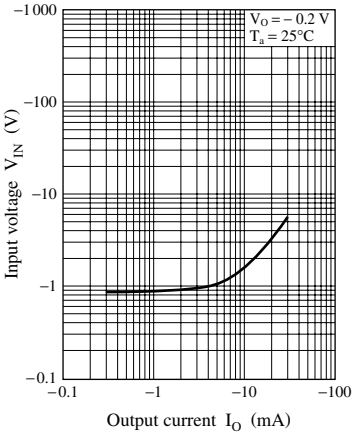
C_{ob} — V_{CB}



I_O — V_{IN}

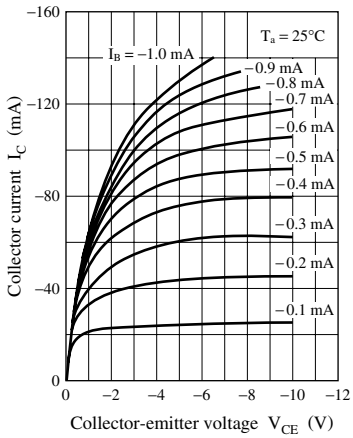


V_{IN} — I_O

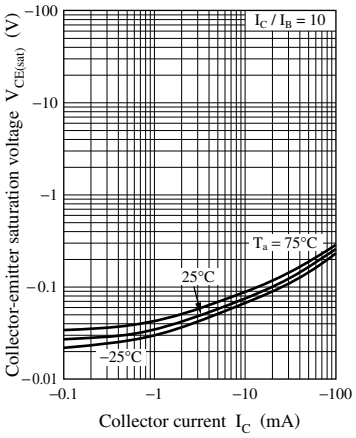


Characteristics charts of UNR2115

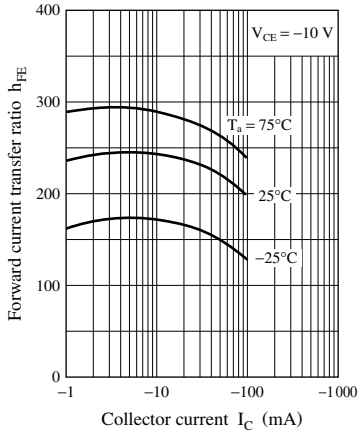
I_C — V_{CE}



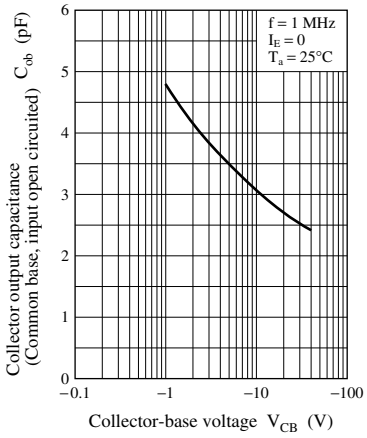
$V_{CE(sat)}$ — I_C



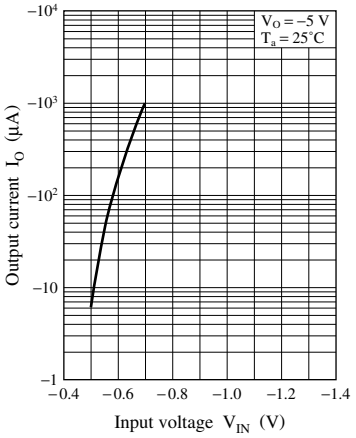
h_{FE} — I_C



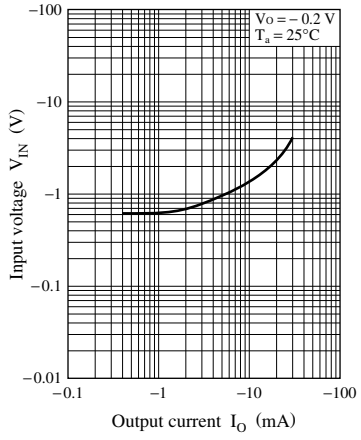
C_{ob} — V_{CB}



I_O — V_{IN}

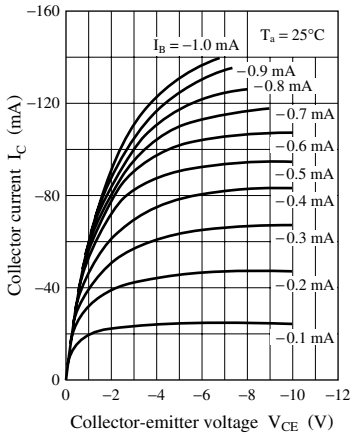


V_{IN} — I_O

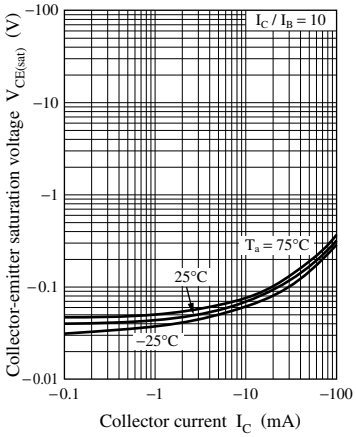


Characteristics charts of UNR2116

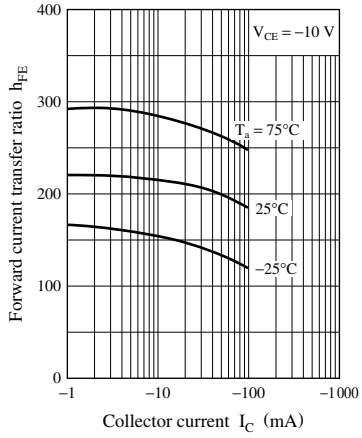
I_C — V_{CE}



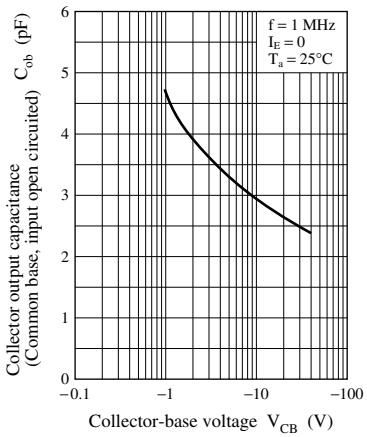
$V_{CE(sat)}$ — I_C



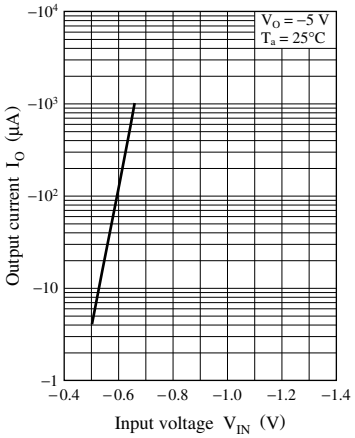
h_{FE} — I_C



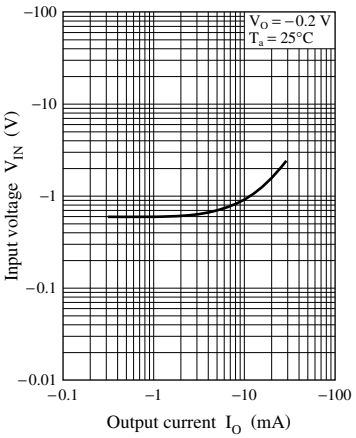
C_{ob} — V_{CB}



I_O — V_{IN}

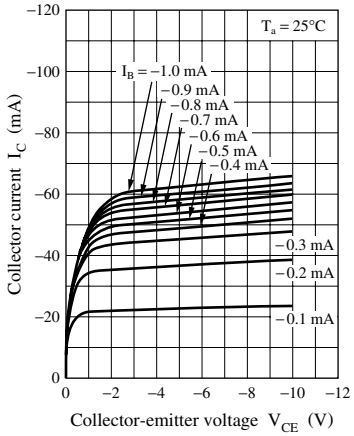


V_{IN} — I_O

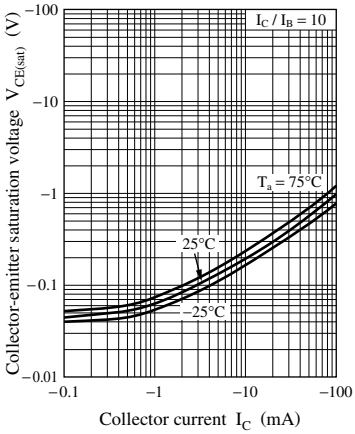


Characteristics charts of UNR2117

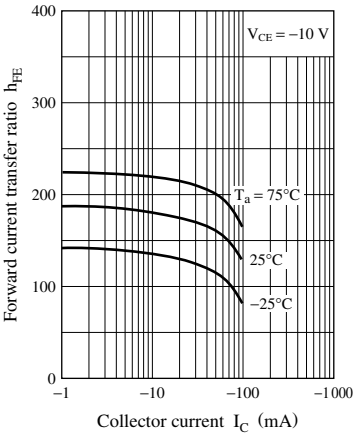
I_C — V_{CE}



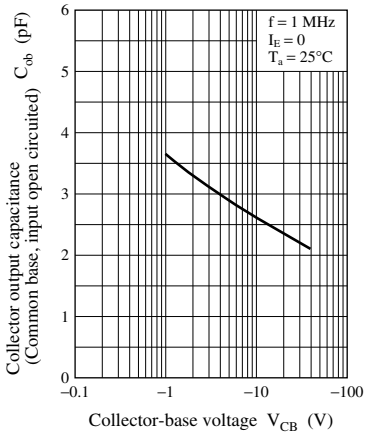
$V_{CE(sat)}$ — I_C



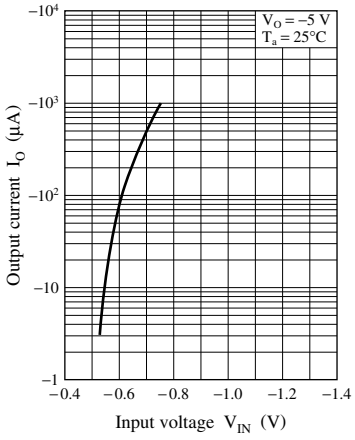
h_{FE} — I_C



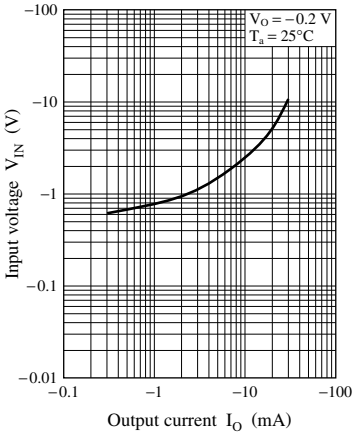
C_{ob} — V_{CB}



I_O — V_{IN}

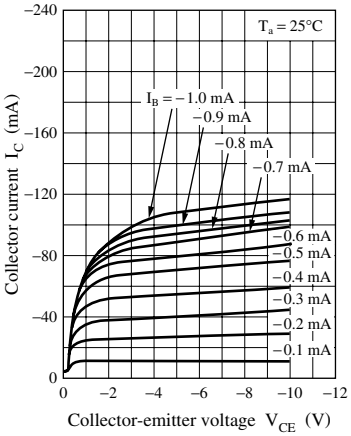


V_{IN} — I_O

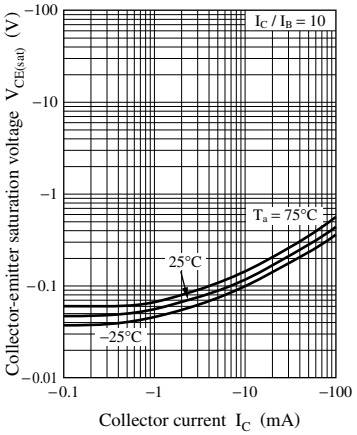


Characteristics charts of UNR2118

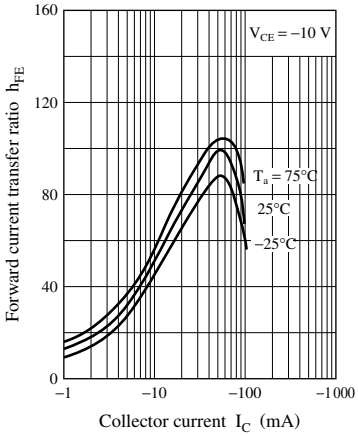
I_C — V_{CE}



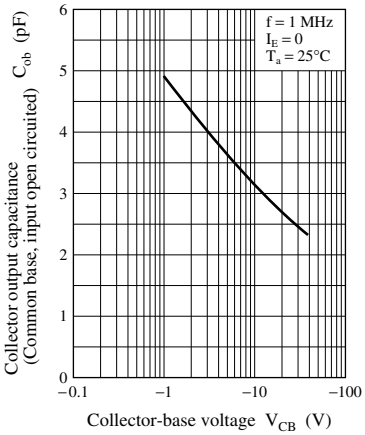
$V_{CE(sat)}$ — I_C



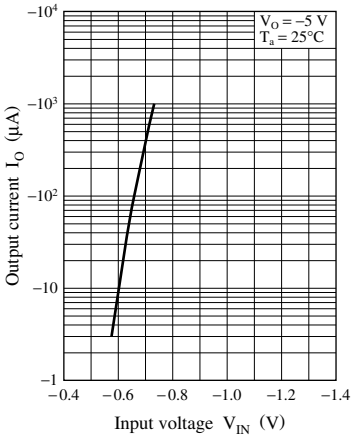
h_{FE} — I_C



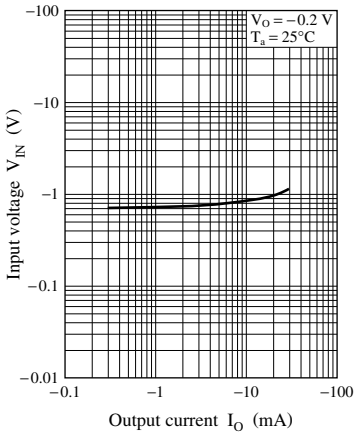
C_{ob} — V_{CB}



I_O — V_{IN}

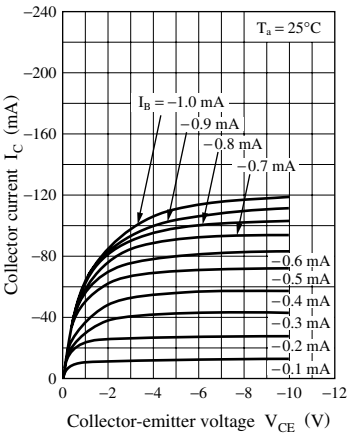


V_{IN} — I_O

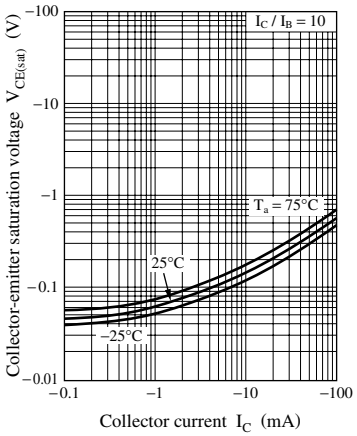


Characteristics charts of UNR2119

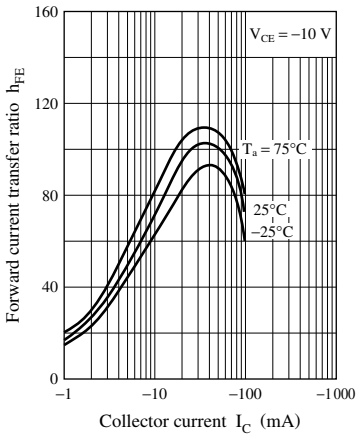
I_C — V_{CE}



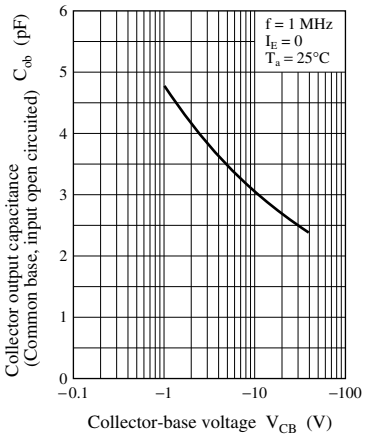
$V_{CE(sat)}$ — I_C



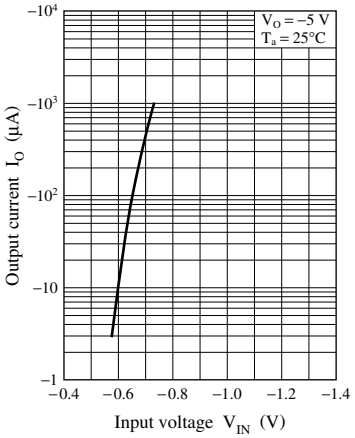
h_{FE} — I_C



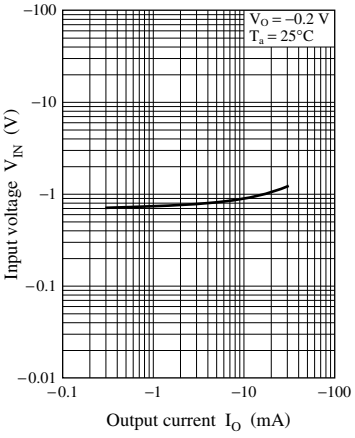
C_{ob} — V_{CB}



I_O — V_{IN}

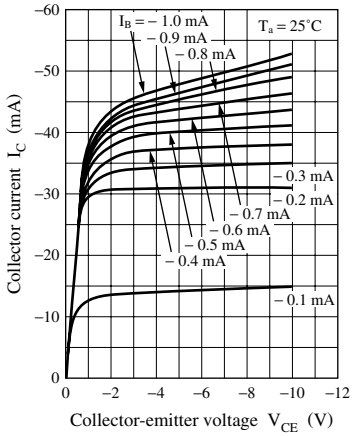


V_{IN} — I_O

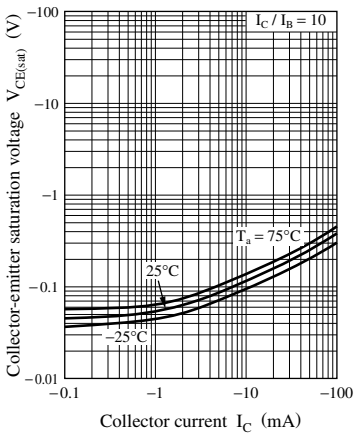


Characteristics charts of UNR211D

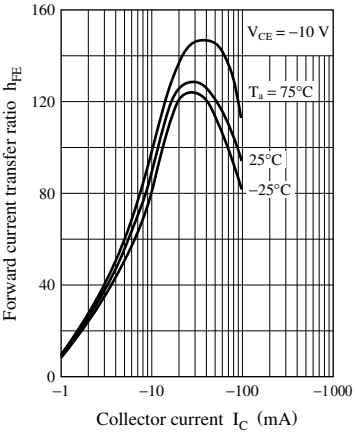
I_C — V_{CE}



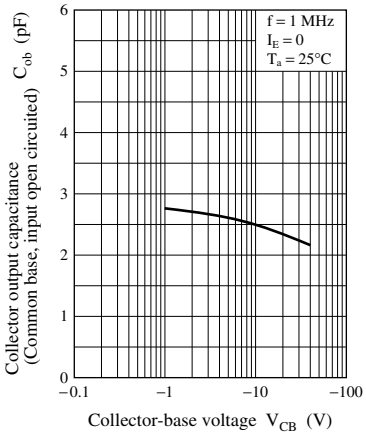
$V_{CE(sat)}$ — I_C



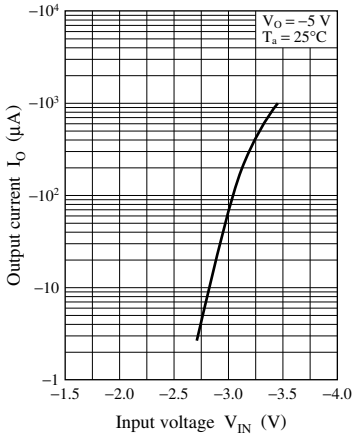
h_{FE} — I_C



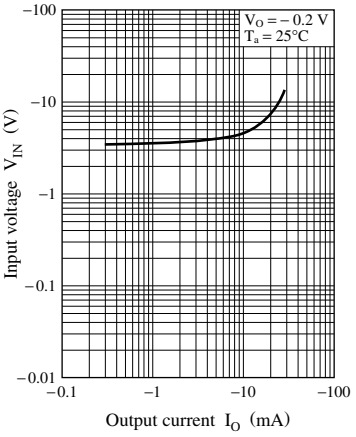
C_{ob} — V_{CB}



I_O — V_{IN}

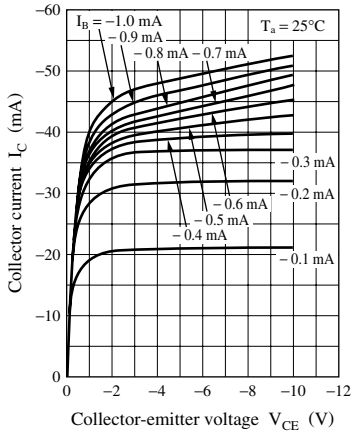


V_{IN} — I_O

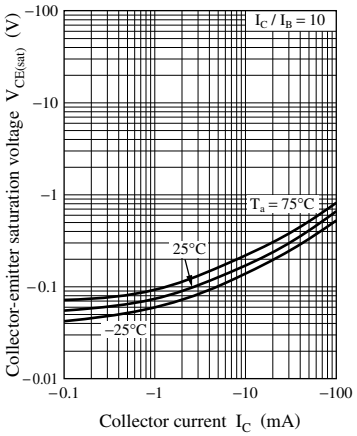


Characteristics charts of UNR211E

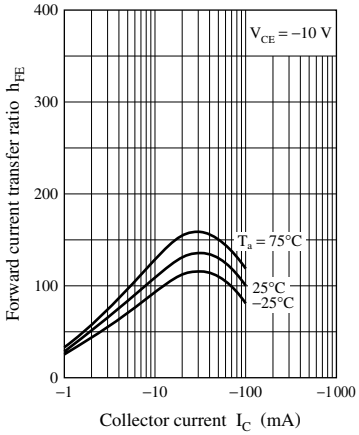
I_C — V_{CE}



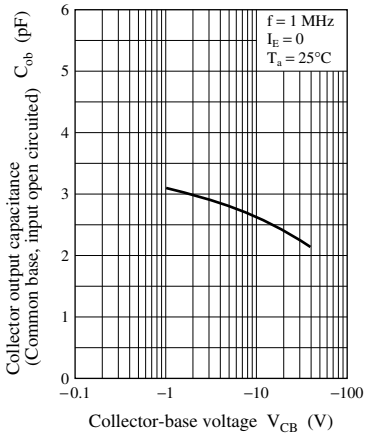
$V_{CE(sat)}$ — I_C



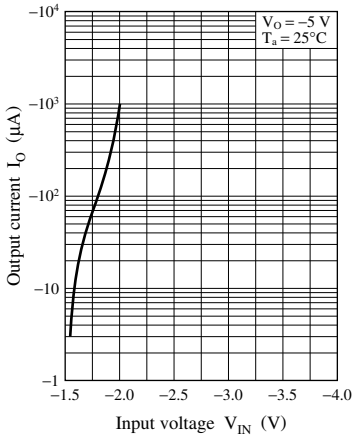
h_{FE} — I_C



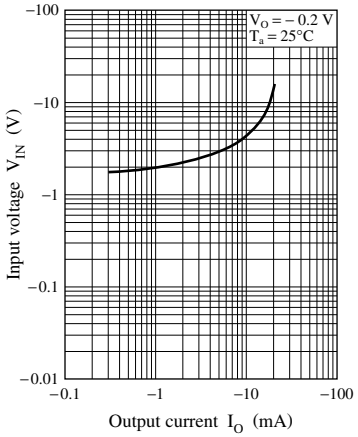
C_{ob} — V_{CB}



I_O — V_{IN}

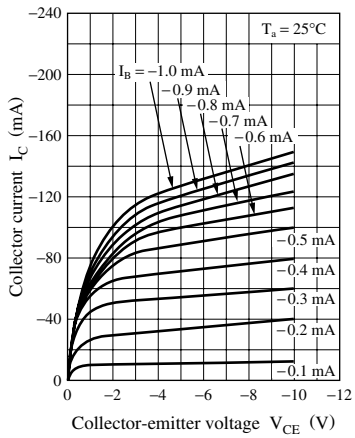


V_{IN} — I_O

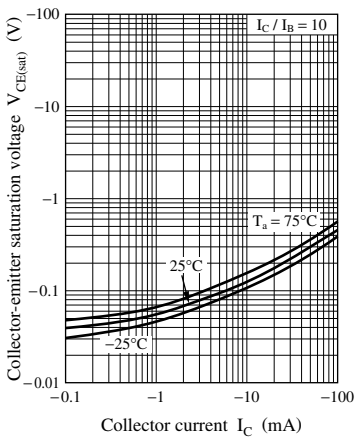


Characteristics charts of UNR211F

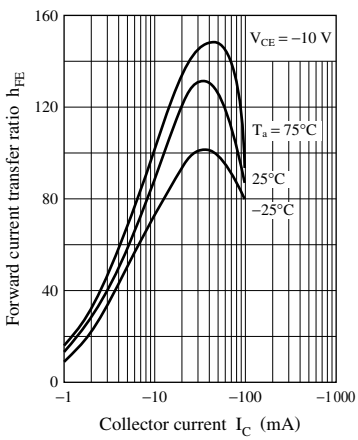
I_C — V_{CE}



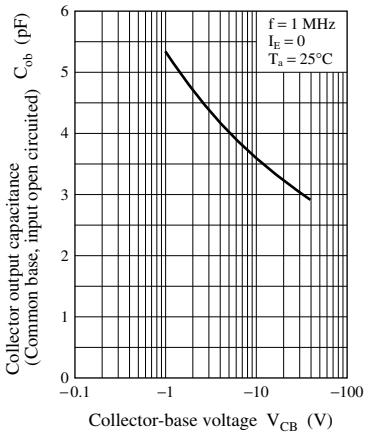
$V_{CE(sat)}$ — I_C



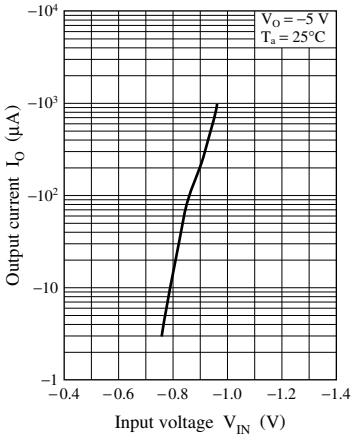
h_{FE} — I_C



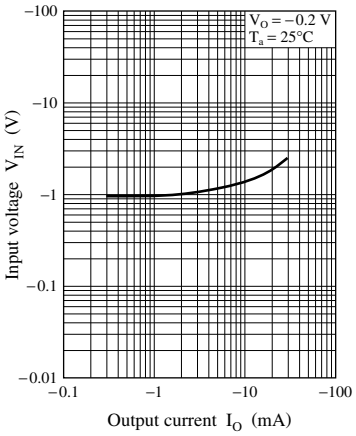
C_{ob} — V_{CB}



I_O — V_{IN}

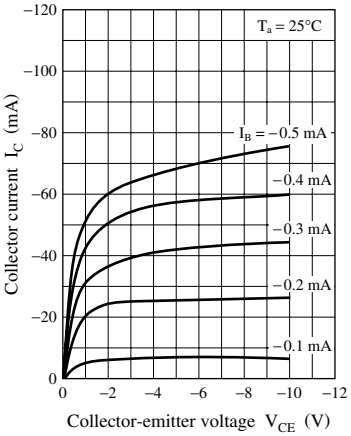


V_{IN} — I_O

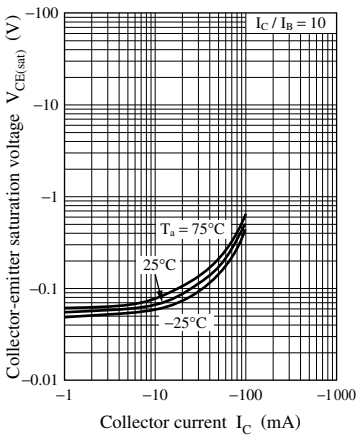


Characteristics charts of UNR211H

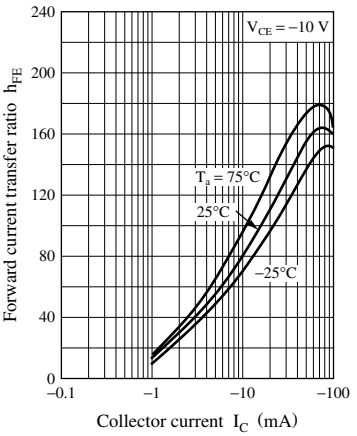
I_C — V_{CE}



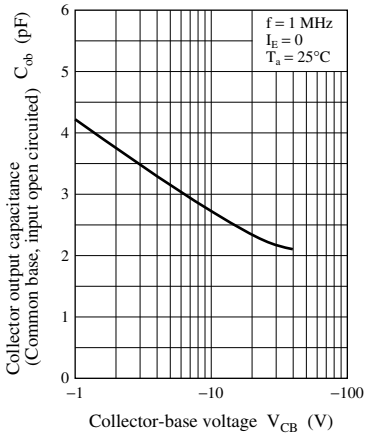
$V_{CE(sat)}$ — I_C



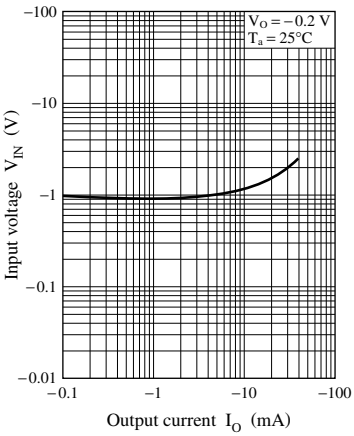
h_{FE} — I_C



C_{ob} — V_{CB}

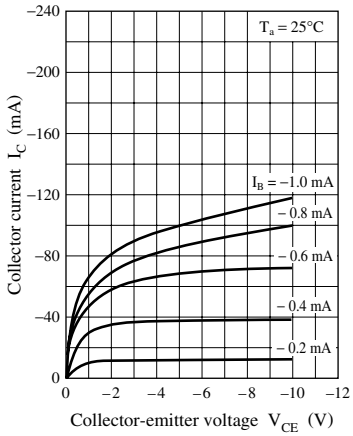


V_{IN} — I_O

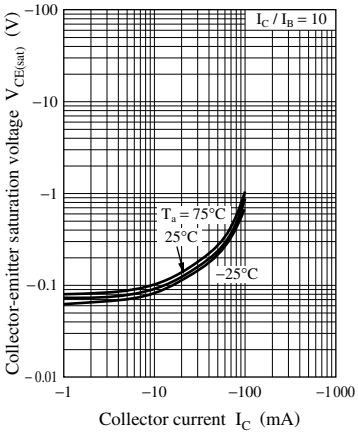


Characteristics charts of UNR211L

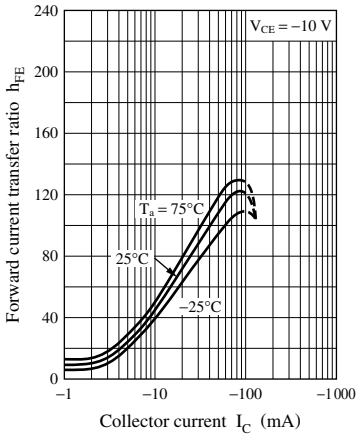
I_C — V_{CE}



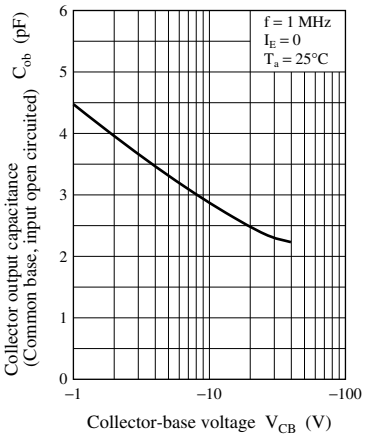
$V_{CE(sat)}$ — I_C



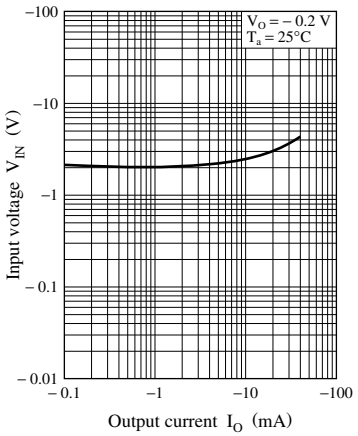
h_{FE} — I_C



C_{ob} — V_{CB}

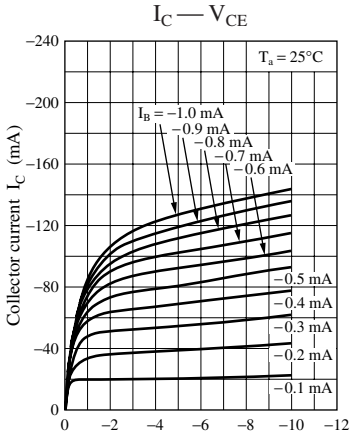


V_{IN} — I_O

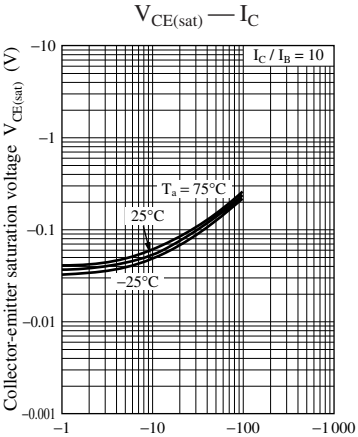


Characteristics charts of UNR211M

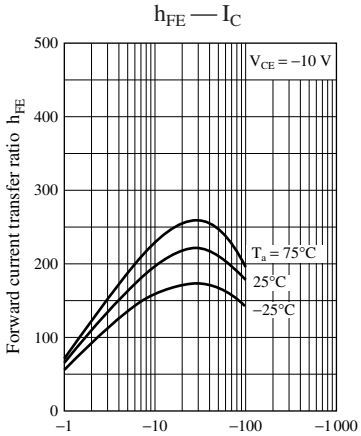
I_C — V_{CE}



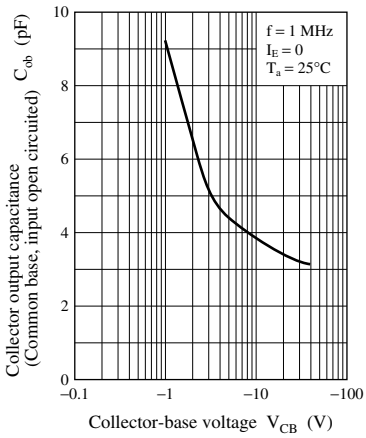
$V_{CE(sat)}$ — I_C



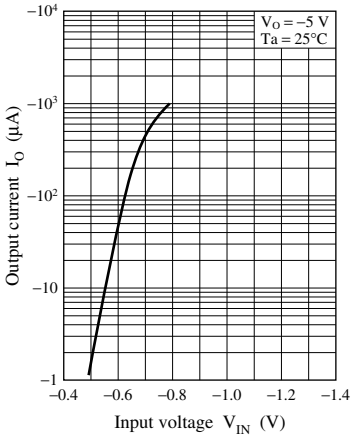
h_{FE} — I_C



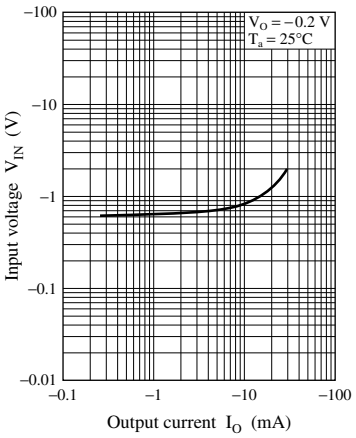
C_{ob} — V_{CB}



I_O — V_{IN}

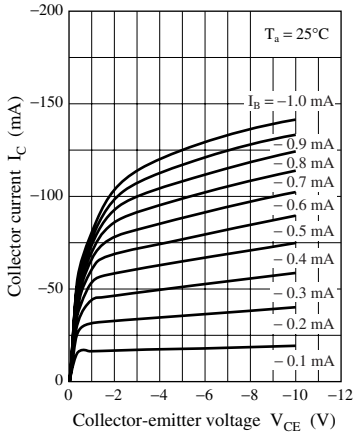


V_{IN} — I_O

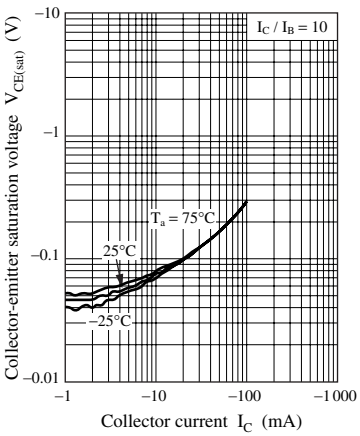


Characteristics charts of UNR211N

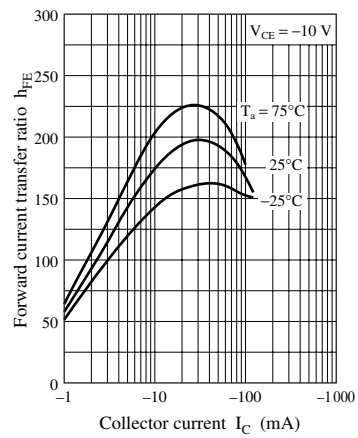
I_C — V_{CE}



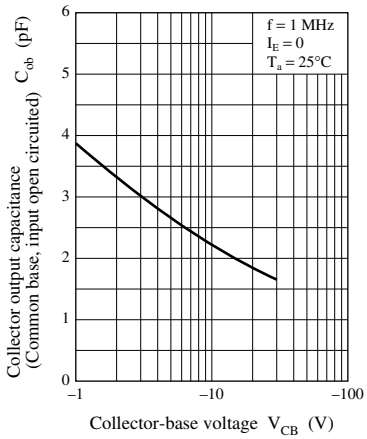
$V_{CE(sat)}$ — I_C



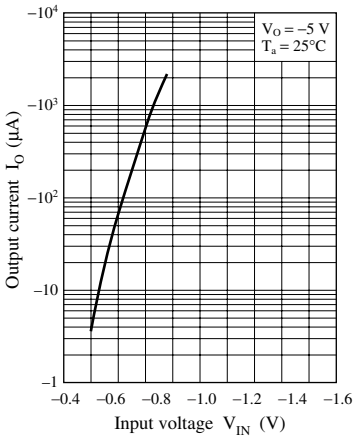
h_{FE} — I_C



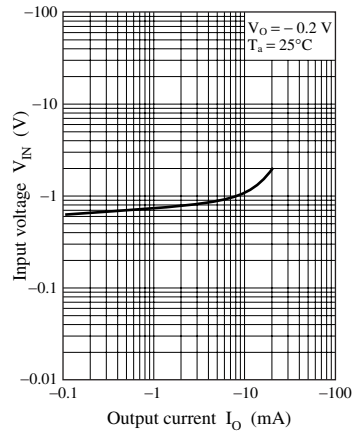
C_{ob} — V_{CB}



I_O — V_{IN}

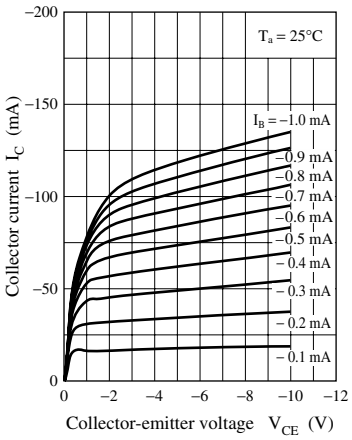


V_{IN} — I_O

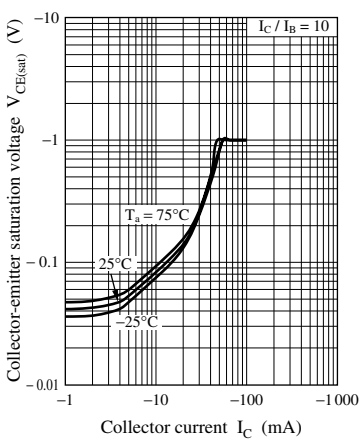


Characteristics charts of UNR211T

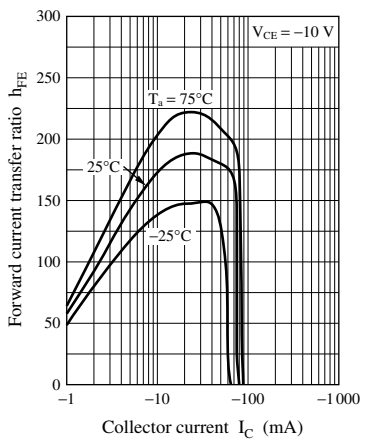
I_C — V_{CE}



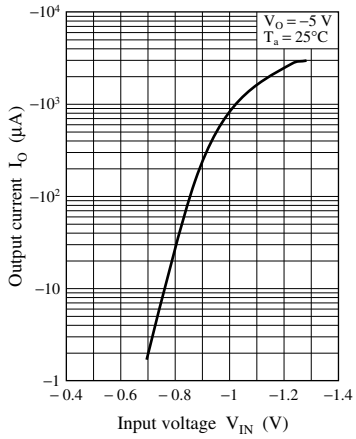
$V_{CE(sat)}$ — I_C



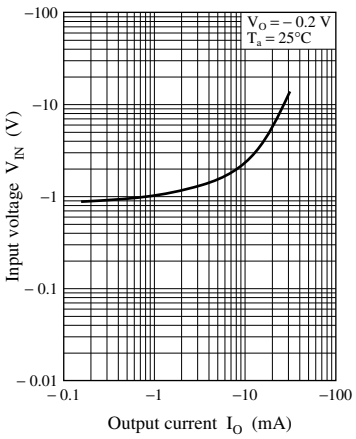
h_{FE} — I_C



I_O — V_{IN}

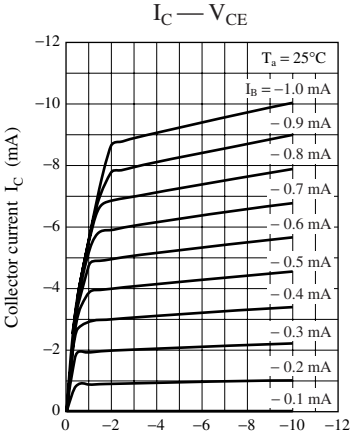


V_{IN} — I_O

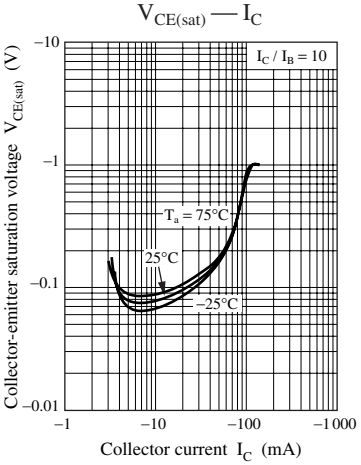


Characteristics charts of UNR211V

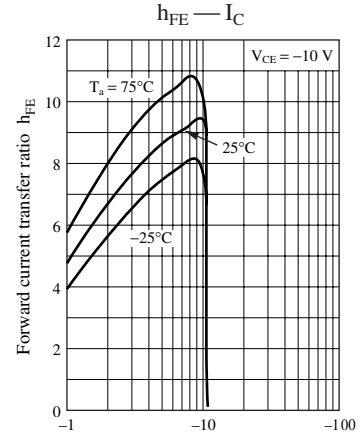
I_C — V_{CE}



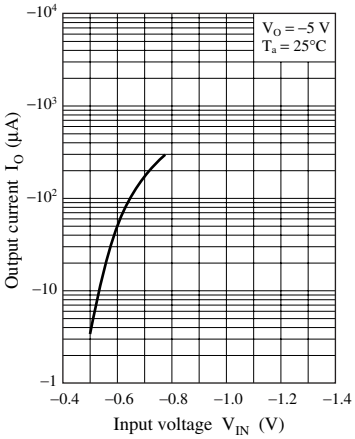
$V_{CE(sat)}$ — I_C



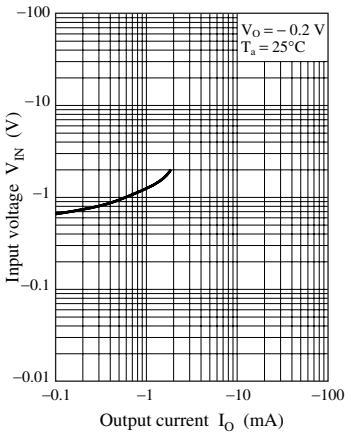
h_{FE} — I_C



I_O — V_{IN}

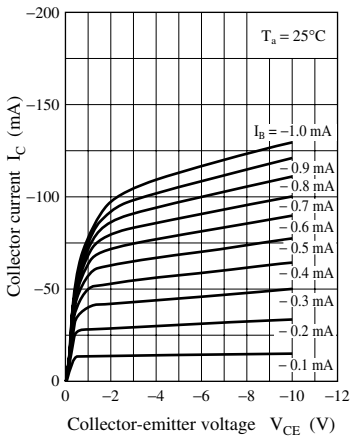


V_{IN} — I_O

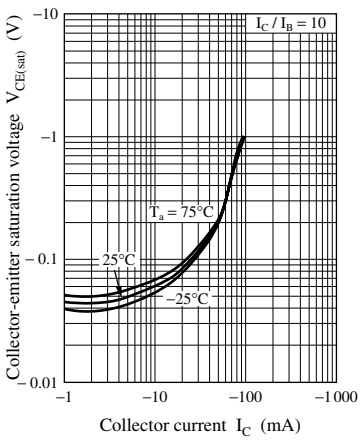


Characteristics charts of UNR211Z

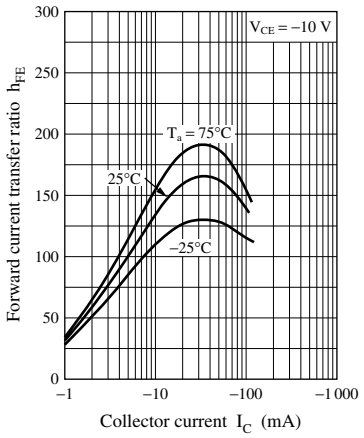
I_C — V_{CE}



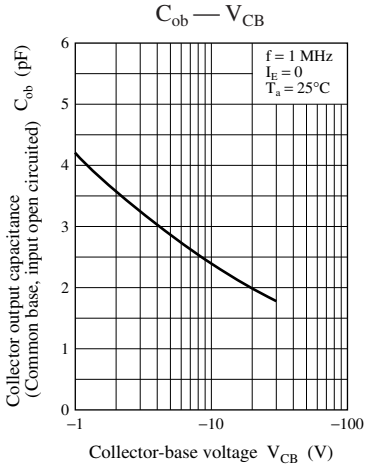
$V_{CE(sat)}$ — I_C



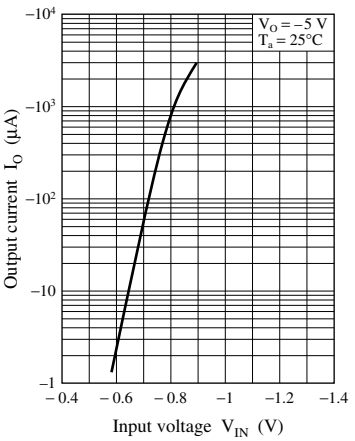
h_{FE} — I_C



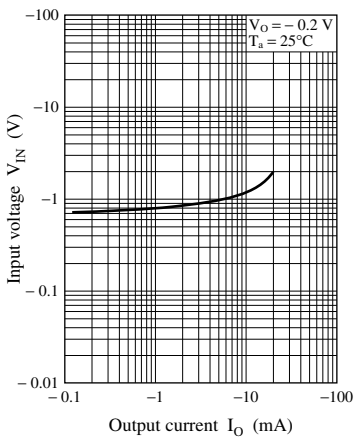
C_{ob} — V_{CB}



I_O — V_{IN}



V_{IN} — I_O



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