

# UNR211x Series (UN211x Series)

## Silicon PNP epitaxial planar type

For digital circuits

### ■ Features

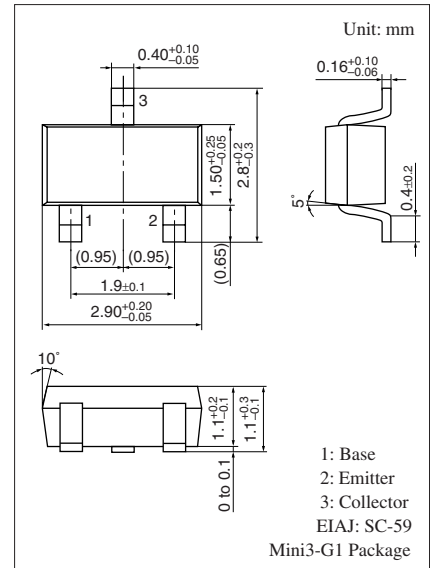
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts
- Mini type package allowing easy automatic insertion through tape packing and magazine packing

### ■ Resistance by Part Number

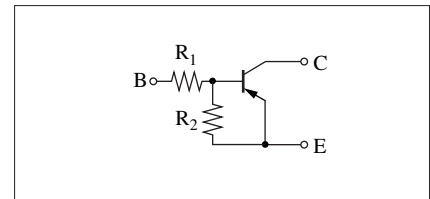
	Marking Symbol (R <sub>1</sub> )	(R <sub>2</sub> )
• UNR2110 (UN2110)	6L	47 kΩ —
• UNR2111 (UN2111)	6A	10 kΩ 10 kΩ
• UNR2112 (UN2112)	6B	22 kΩ 22 kΩ
• UNR2113 (UN2113)	6C	47 kΩ 47 kΩ
• UNR2114 (UN2114)	6D	10 kΩ 47 kΩ
• UNR2115 (UN2115)	6E	10 kΩ —
• UNR2116 (UN2116)	6F	4.7 kΩ —
• UNR2117 (UN2117)	6H	22 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

### ■ Absolute Maximum Ratings T<sub>a</sub> = 25°C

Parameter	Symbol	Rating	Unit
Collector-base voltage (Emitter open)	V <sub>CBO</sub>	-50	V
Collector-emitter voltage (Base open)	V <sub>CEO</sub>	-50	V
Collector current	I <sub>C</sub>	-100	mA
Total power dissipation	P <sub>T</sub>	200	mW
Junction temperature	T <sub>j</sub>	150	°C
Storage temperature	T <sub>stg</sub>	-55 to +150	°C



### Internal Connection



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

■ Electrical Characteristics  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$ 

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)		$V_{CBO}$	$I_C = -10 \mu\text{A}, I_E = 0$	-50			V
Collector-emitter voltage (Base open)		$V_{CEO}$	$I_C = -2 \text{mA}, I_B = 0$	-50			V
Collector-base cutoff current (Emitter open)		$I_{CBO}$	$V_{CB} = -50 \text{V}, I_E = 0$			-0.1	$\mu\text{A}$
Collector-emitter cutoff current (Base open)		$I_{CEO}$	$V_{CE} = -50 \text{V}, I_B = 0$			-0.5	$\mu\text{A}$
Emitter-base cutoff current (Collector open)	UNR2110/2115/2116/2117	$I_{EBO}$	$V_{EB} = -6 \text{V}, I_C = 0$			-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	$h_{FE}$	$V_{CE} = -10 \text{V}, I_C = -5 \text{mA}$	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		$V_{CE(sat)}$	$I_C = -10 \text{mA}, I_B = -0.3 \text{mA}$			-0.25	V
	UNR211V		$I_C = -10 \text{mA}, I_B = -1.5 \text{mA}$				
Output voltage high-level		$V_{OH}$	$V_{CC} = -5 \text{V}, V_B = -0.5 \text{V}, R_L = 1 \text{k}\Omega$	-4.9			V
Output voltage low-level		$V_{OL}$	$V_{CC} = -5 \text{V}, V_B = -2.5 \text{V}, R_L = 1 \text{k}\Omega$			-0.2	V
			$V_{CC} = -5 \text{V}, V_B = -3.5 \text{V}, R_L = 1 \text{k}\Omega$				
			$V_{CC} = -5 \text{V}, V_B = -10 \text{V}, R_L = 1 \text{k}\Omega$				
			$V_{CC} = -5 \text{V}, V_B = -6 \text{V}, R_L = 1 \text{k}\Omega$				
Transition frequency		$f_T$	$V_{CB} = -10 \text{V}, I_E = 1 \text{mA}, f = 200 \text{MHz}$		80		MHz
			$V_{CB} = -10 \text{V}, I_E = 2 \text{mA}, f = 200 \text{MHz}$		150		
Input resistance	UNR2118	$R_i$		-30%	0.51	+30%	k $\Omega$
	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

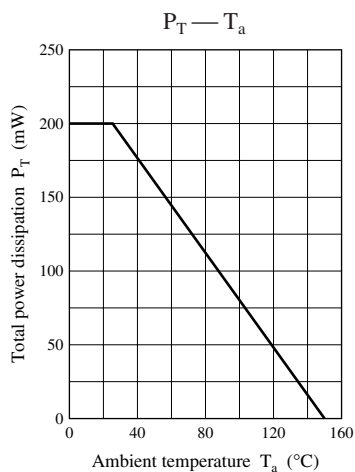
Rank	Q	R	S	No-rank
$h_{FE}$	160 to 260	210 to 340	290 to 460	160 to 460

■ Electrical Characteristics (continued)  $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

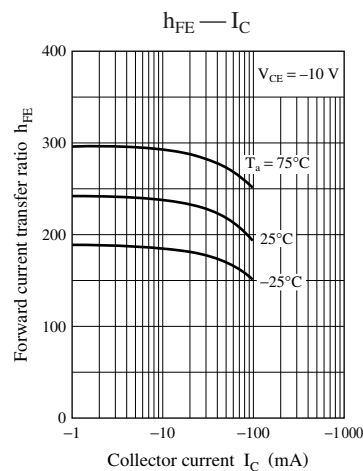
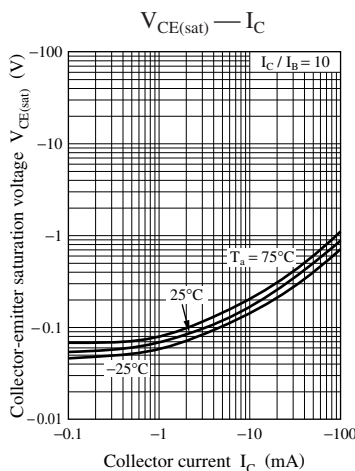
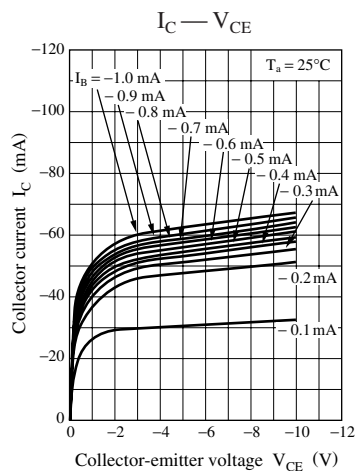
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Resistance ratio	UNR211M	$R_1/R_2$		0.047		—
	UNR211N			0.1		
	UNR2118/2119		0.08	0.10	0.12	
	UNR211Z			0.21		
	UNR2114		0.17	0.21	0.25	
	UNR211H		0.17	0.22	0.27	
	UNR211T			0.47		
	UNR211F		0.37	0.47	0.57	
	UNR211V			1.0		
	UNR2111/2112/2113/211L		0.8	1.0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

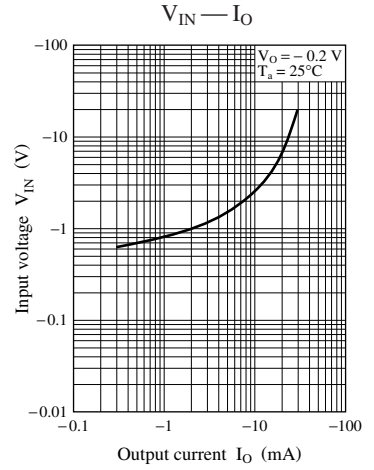
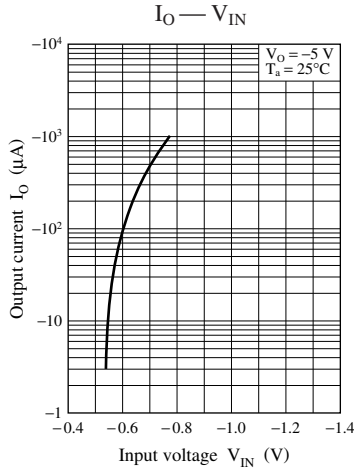
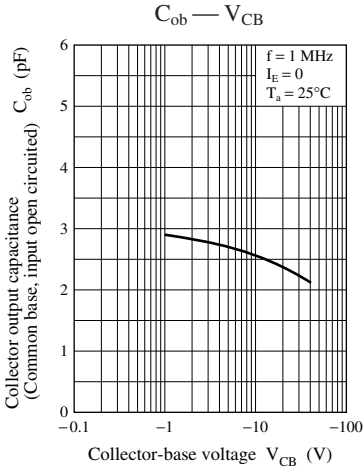
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

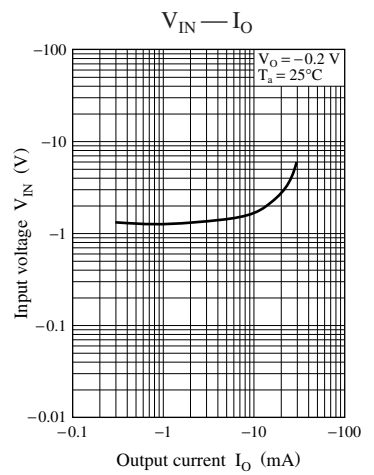
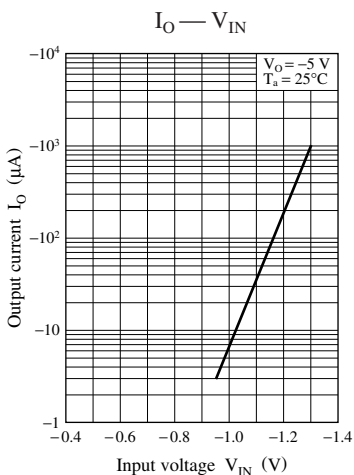
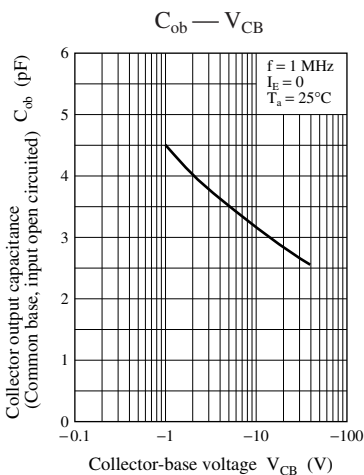
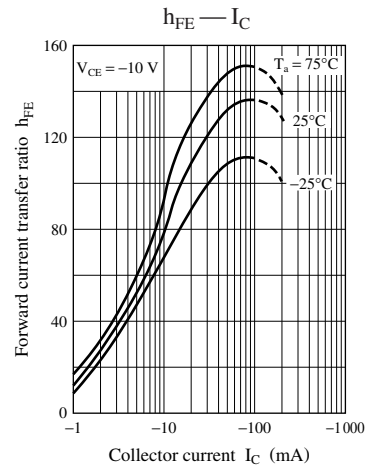
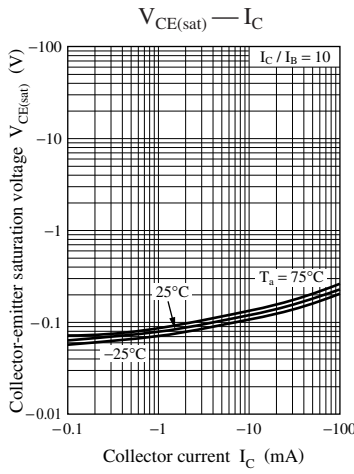
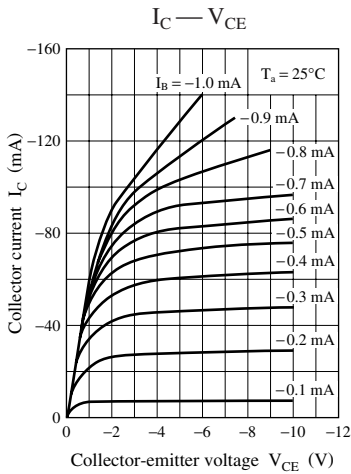


Characteristics charts of UNR2110

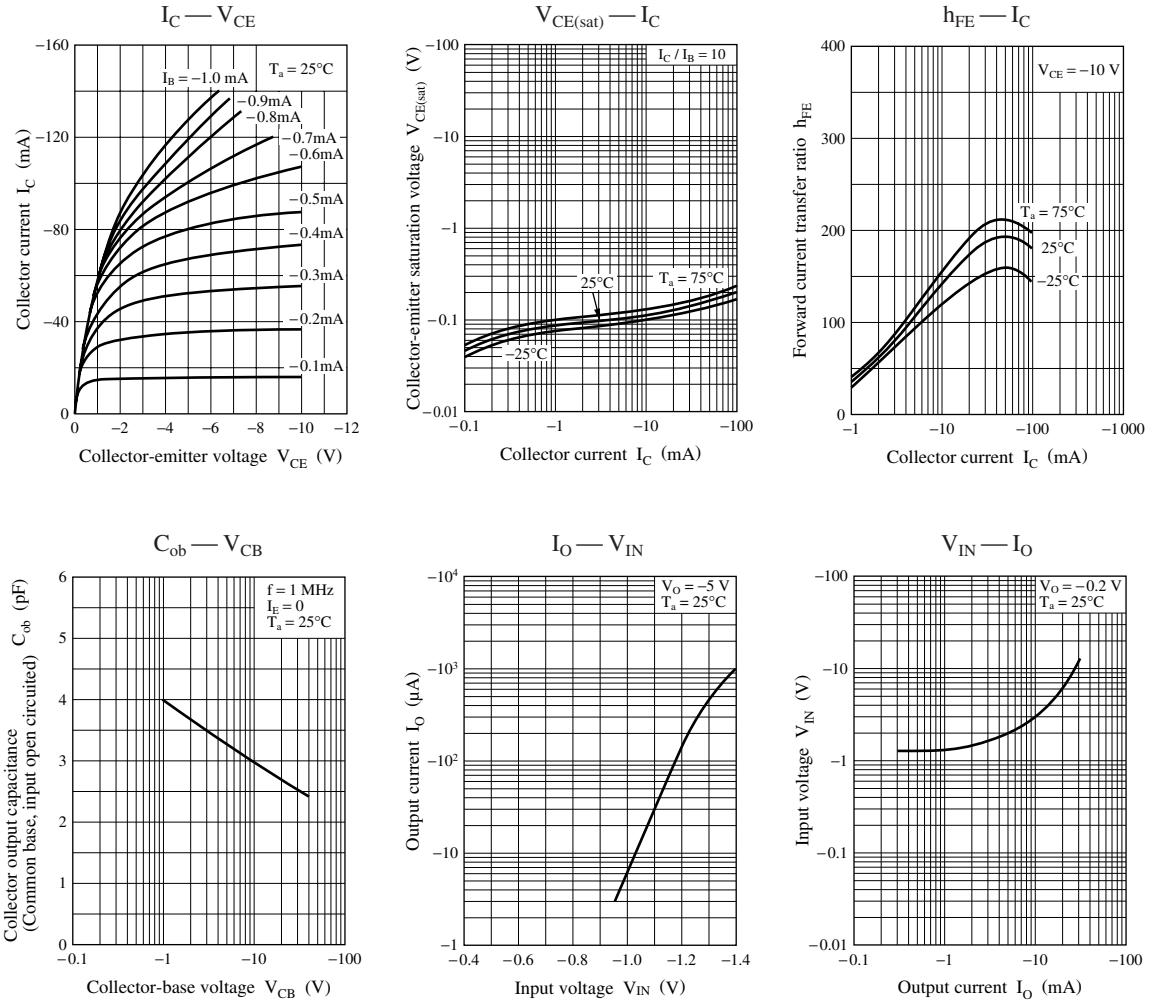




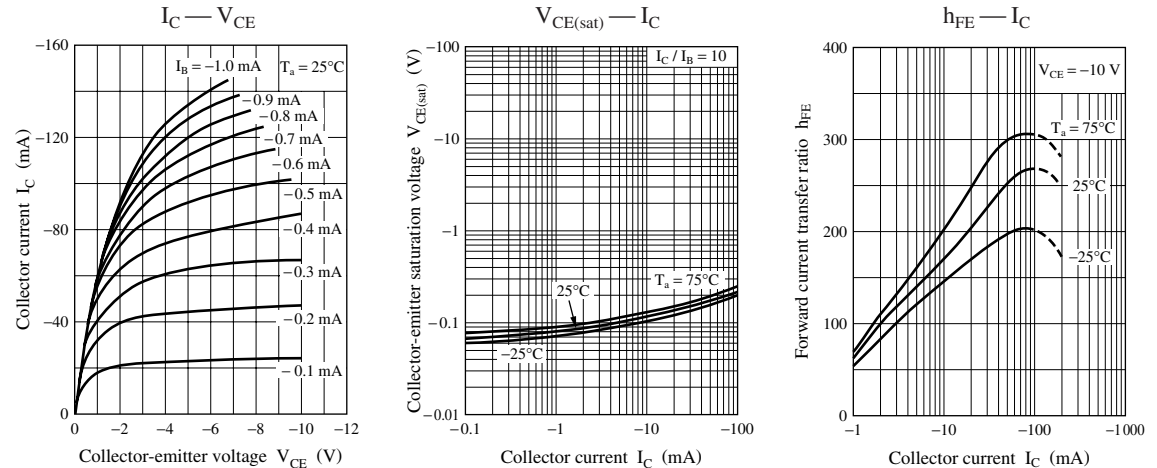
Characteristics charts of UNR2111

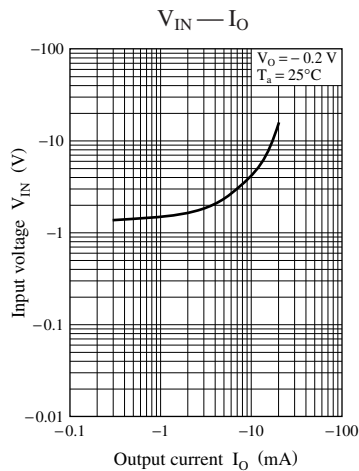
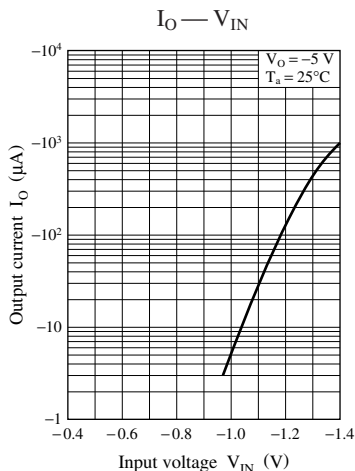
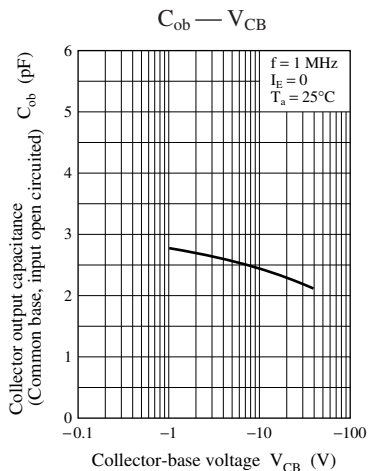


Characteristics charts of UNR2112

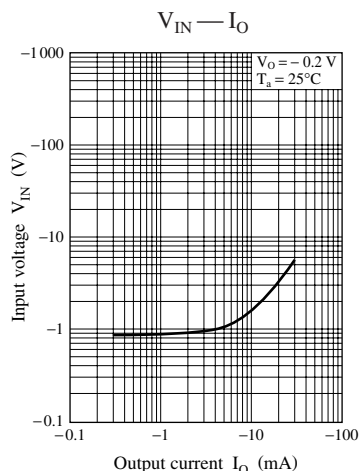
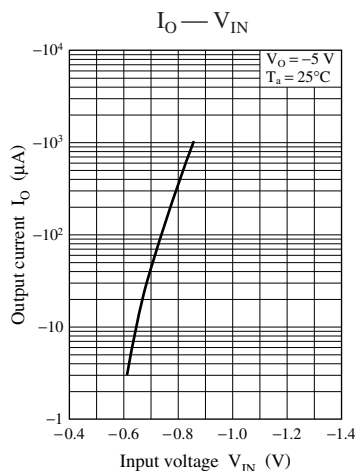
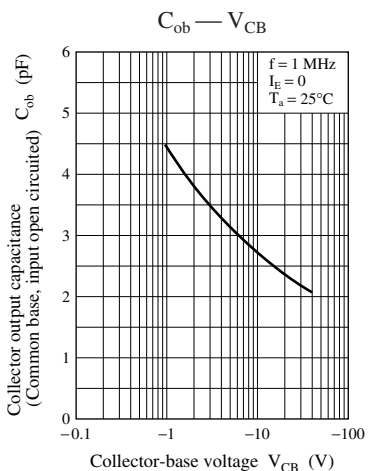
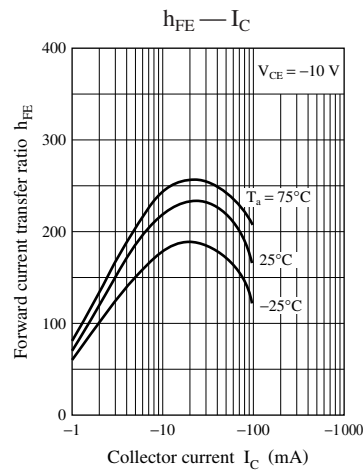
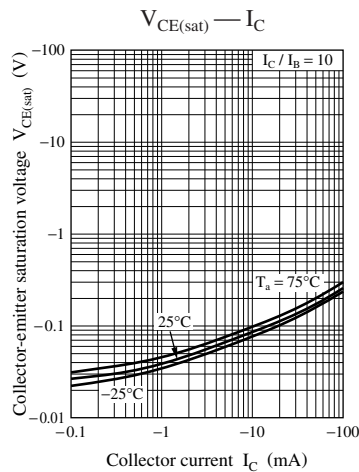
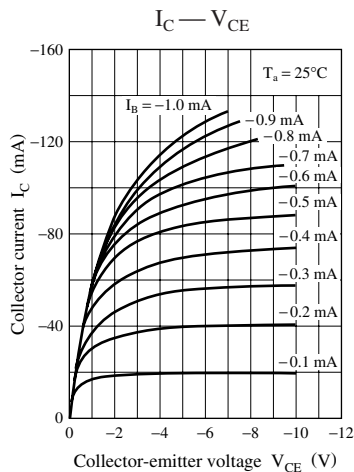


Characteristics charts of UNR2113

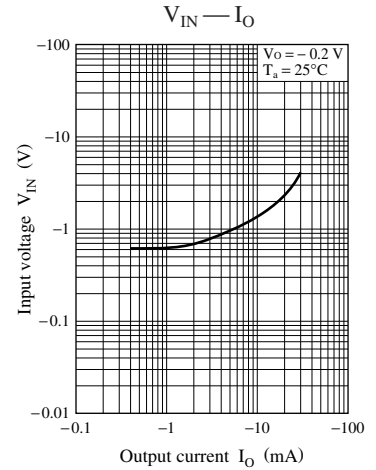
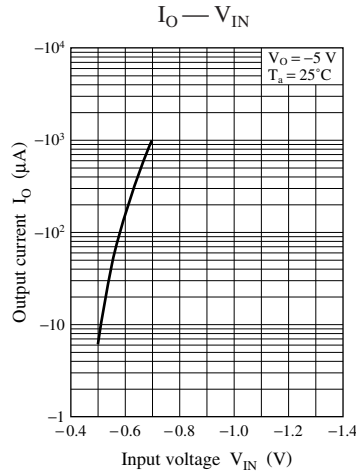
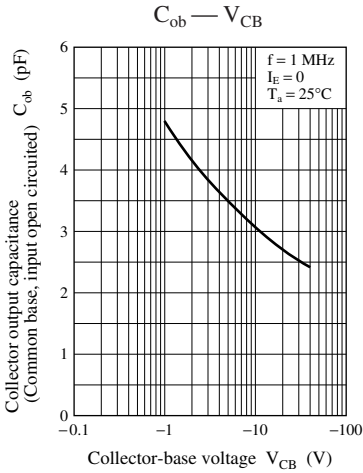
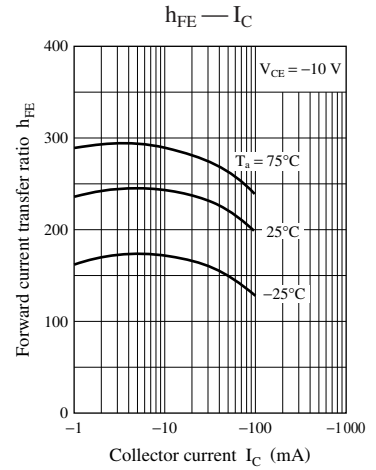
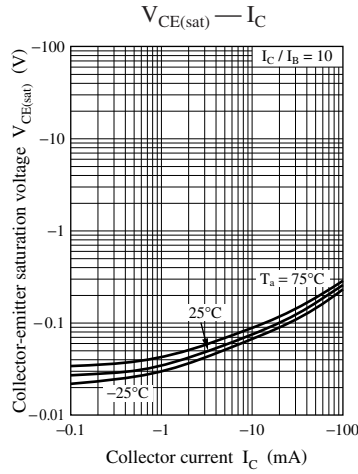
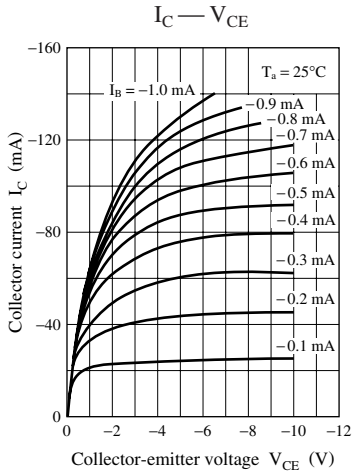




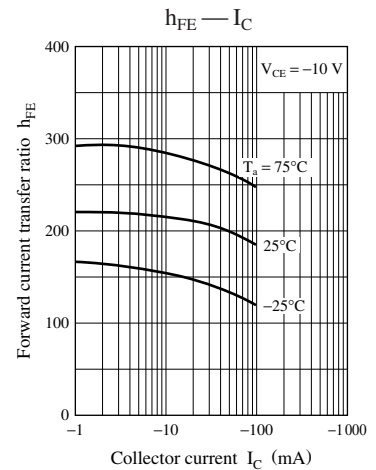
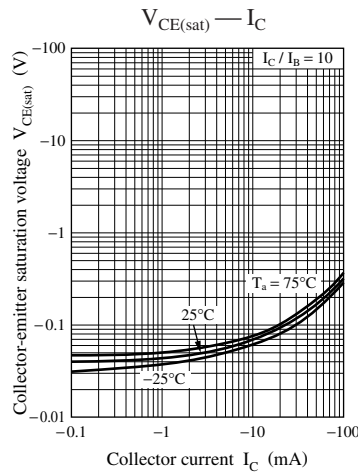
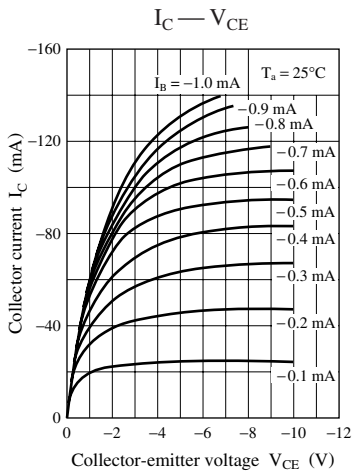
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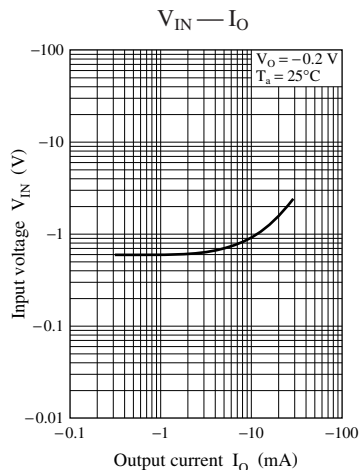
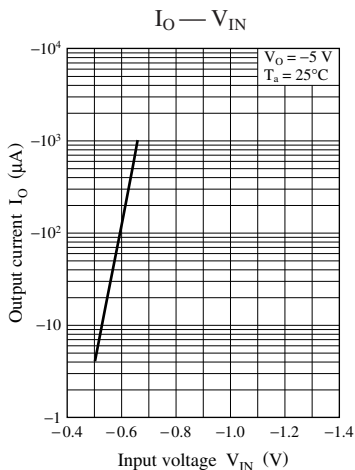
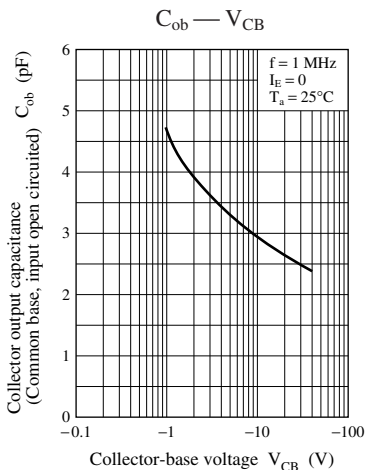


**Characteristics charts of UNR2115**

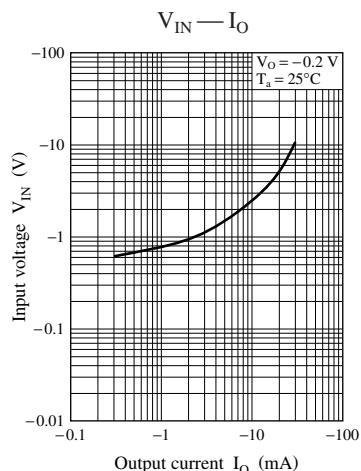
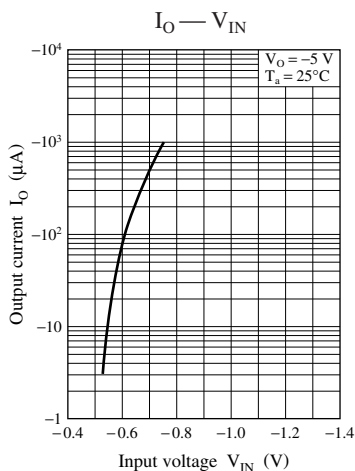
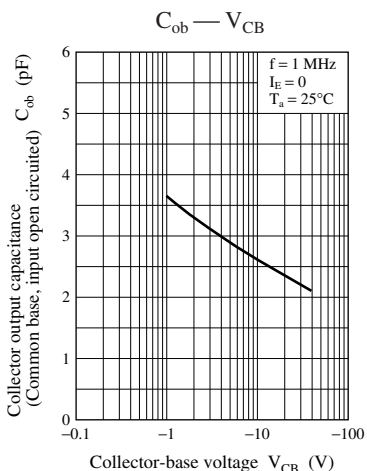
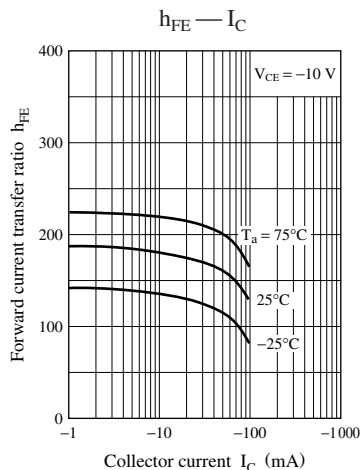
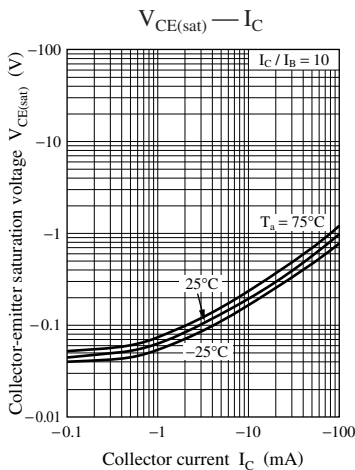
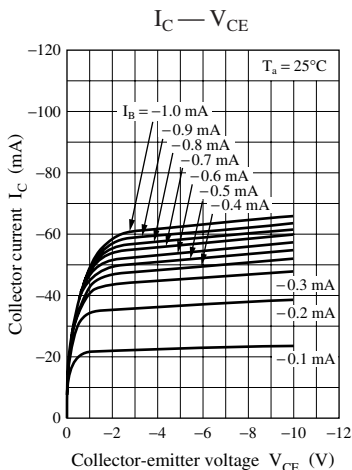


**Characteristics charts of UNR2116**



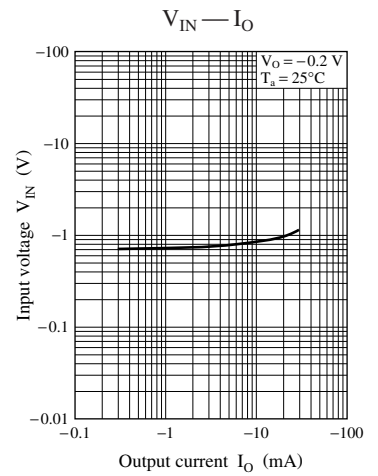
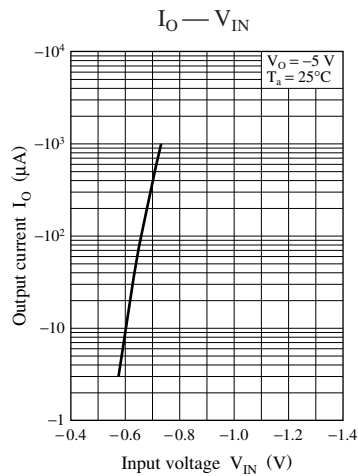
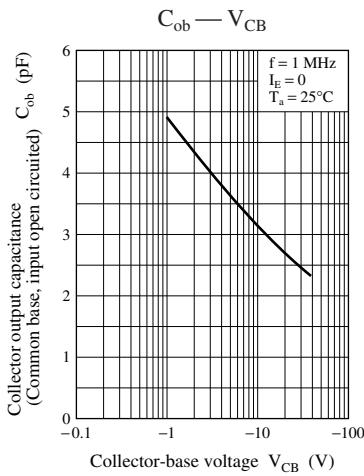
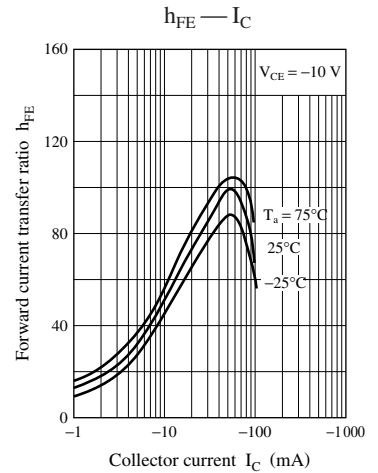
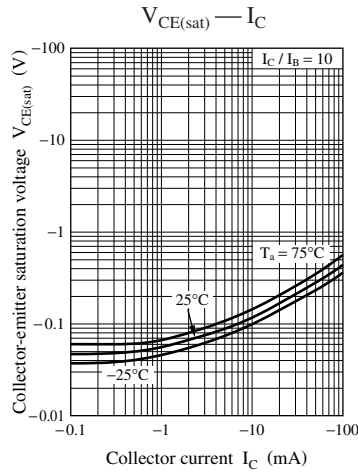
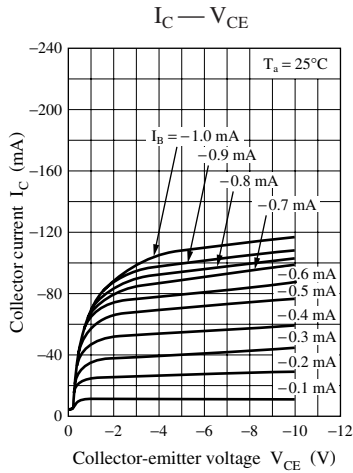


Characteristics charts of UNR2117

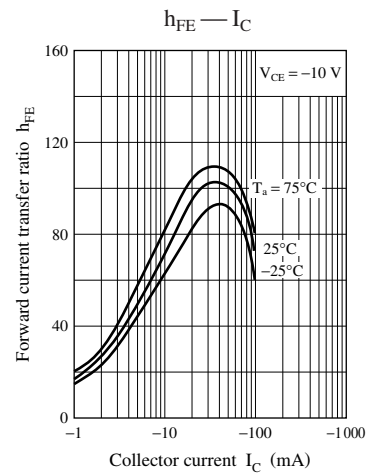
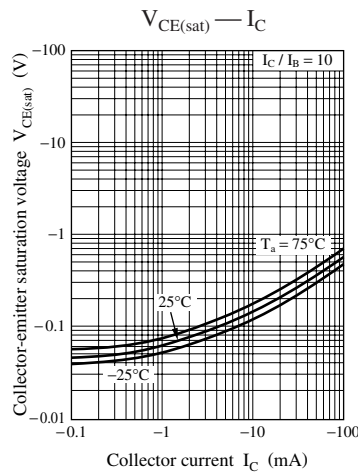
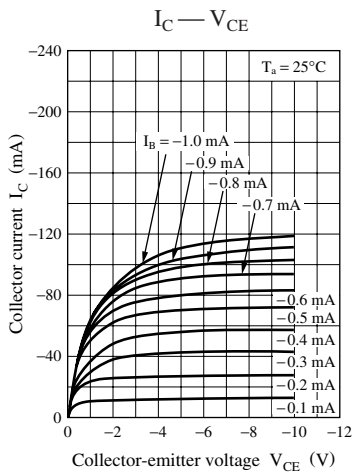


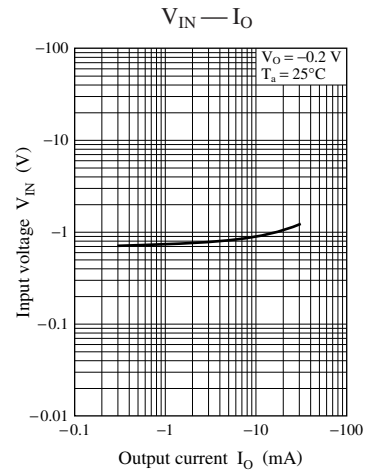
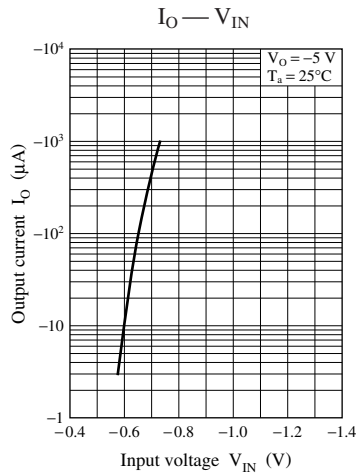
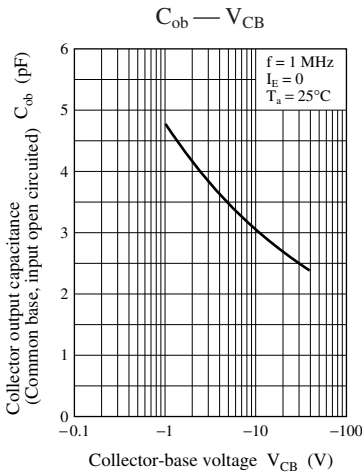


Characteristics charts of UNR2118

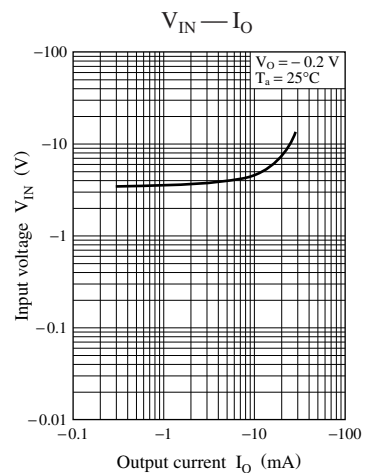
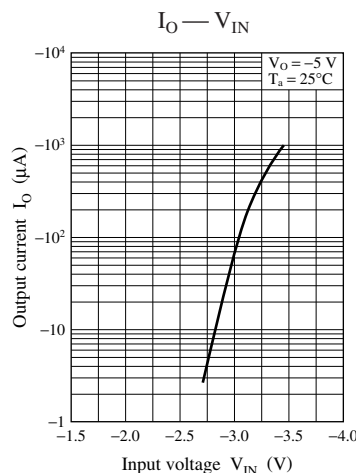
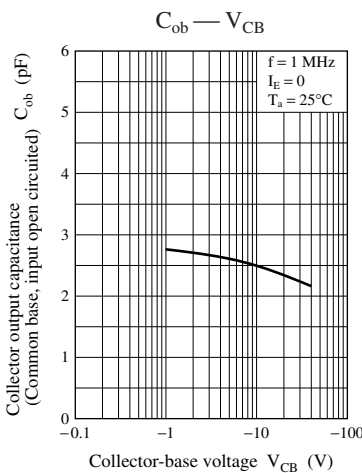
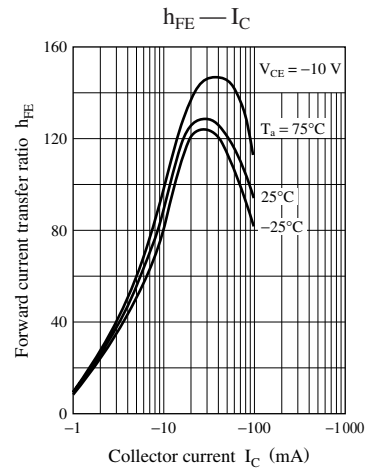
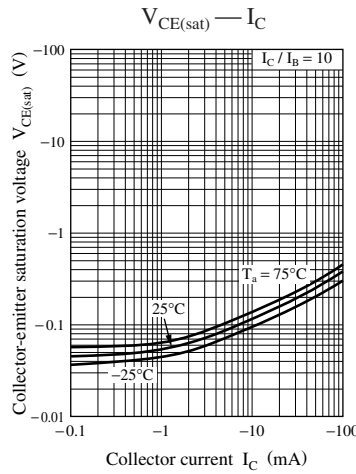
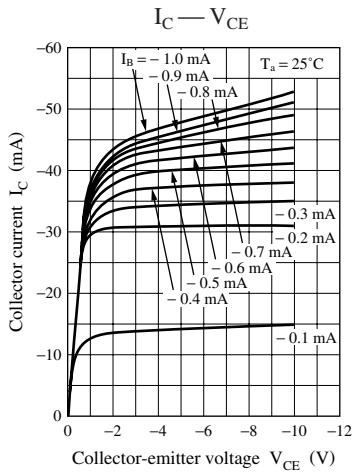


Characteristics charts of UNR2119

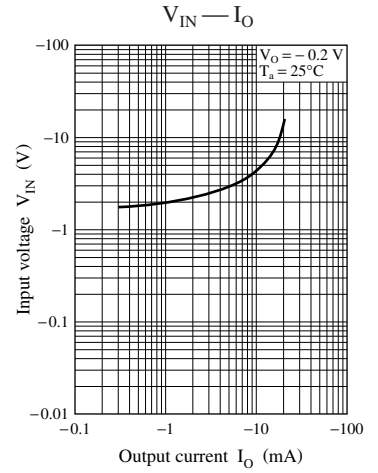
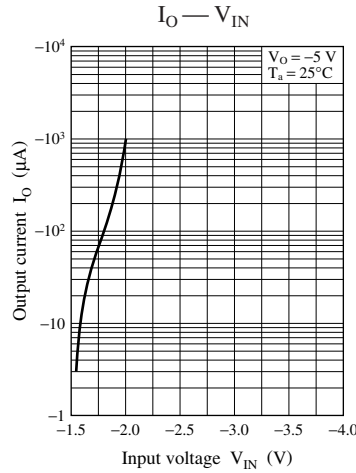
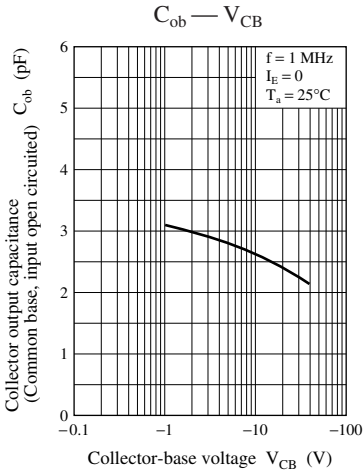
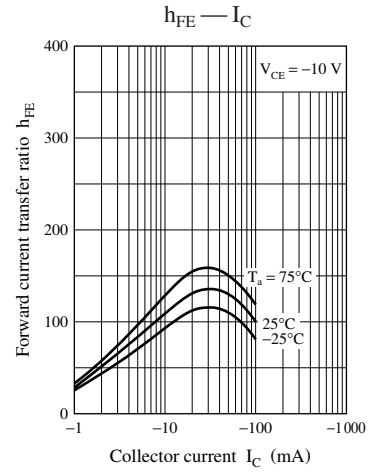
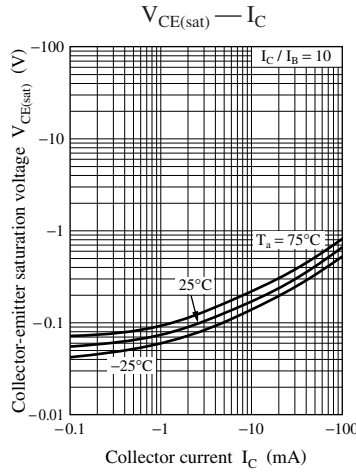
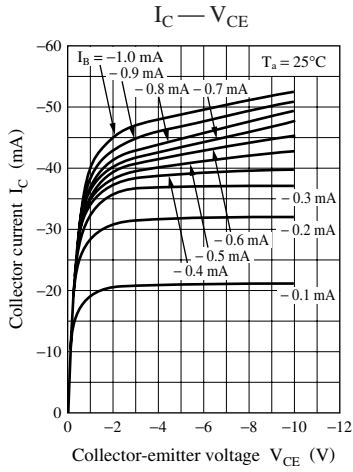




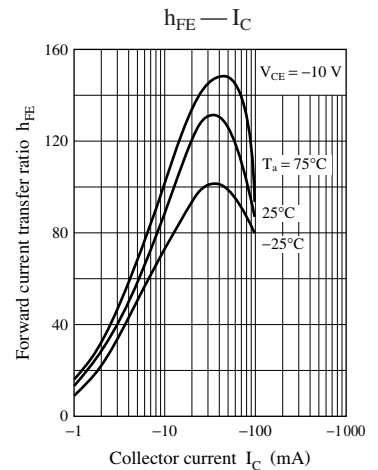
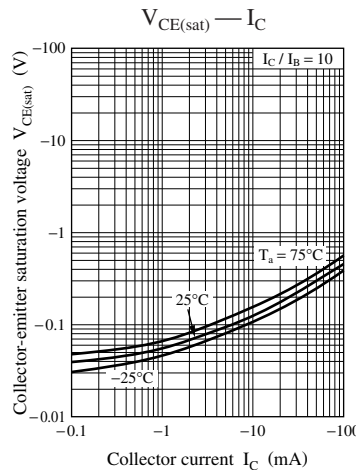
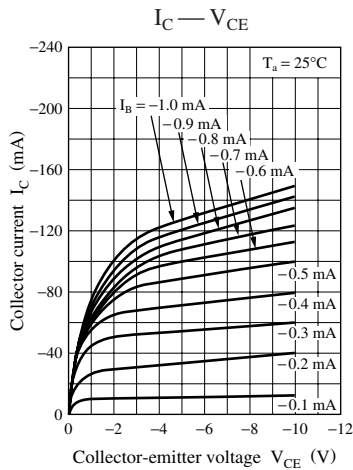
**Characteristics charts of UNR211D**

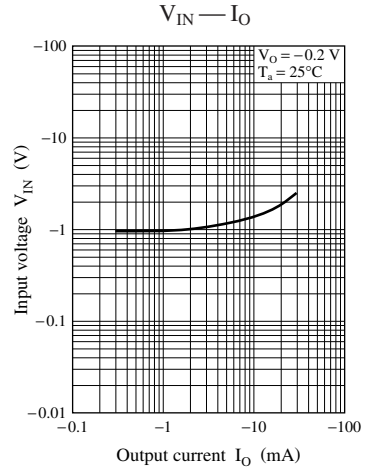
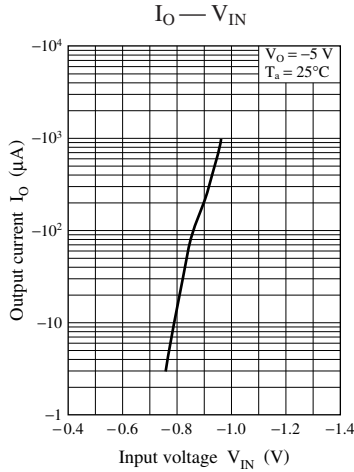
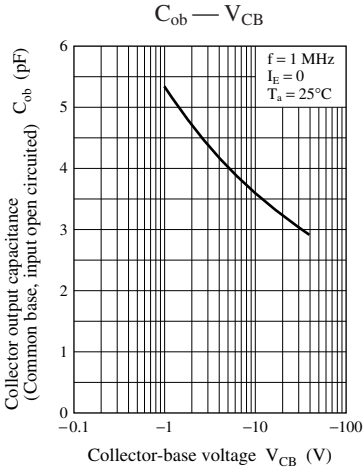


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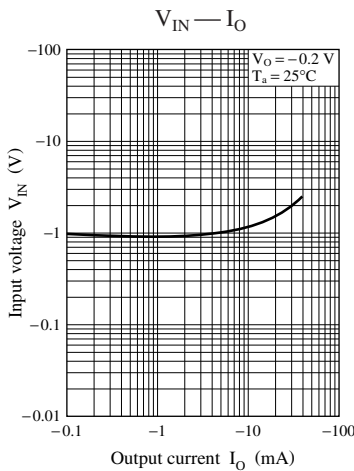
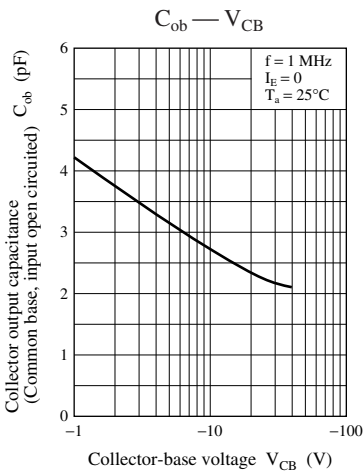
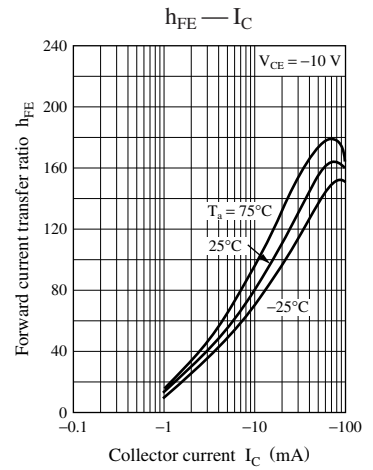
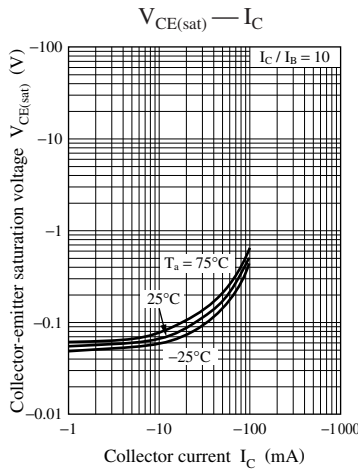
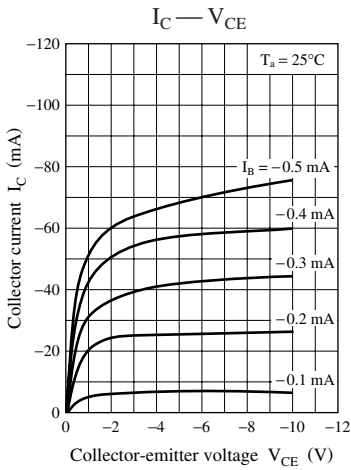


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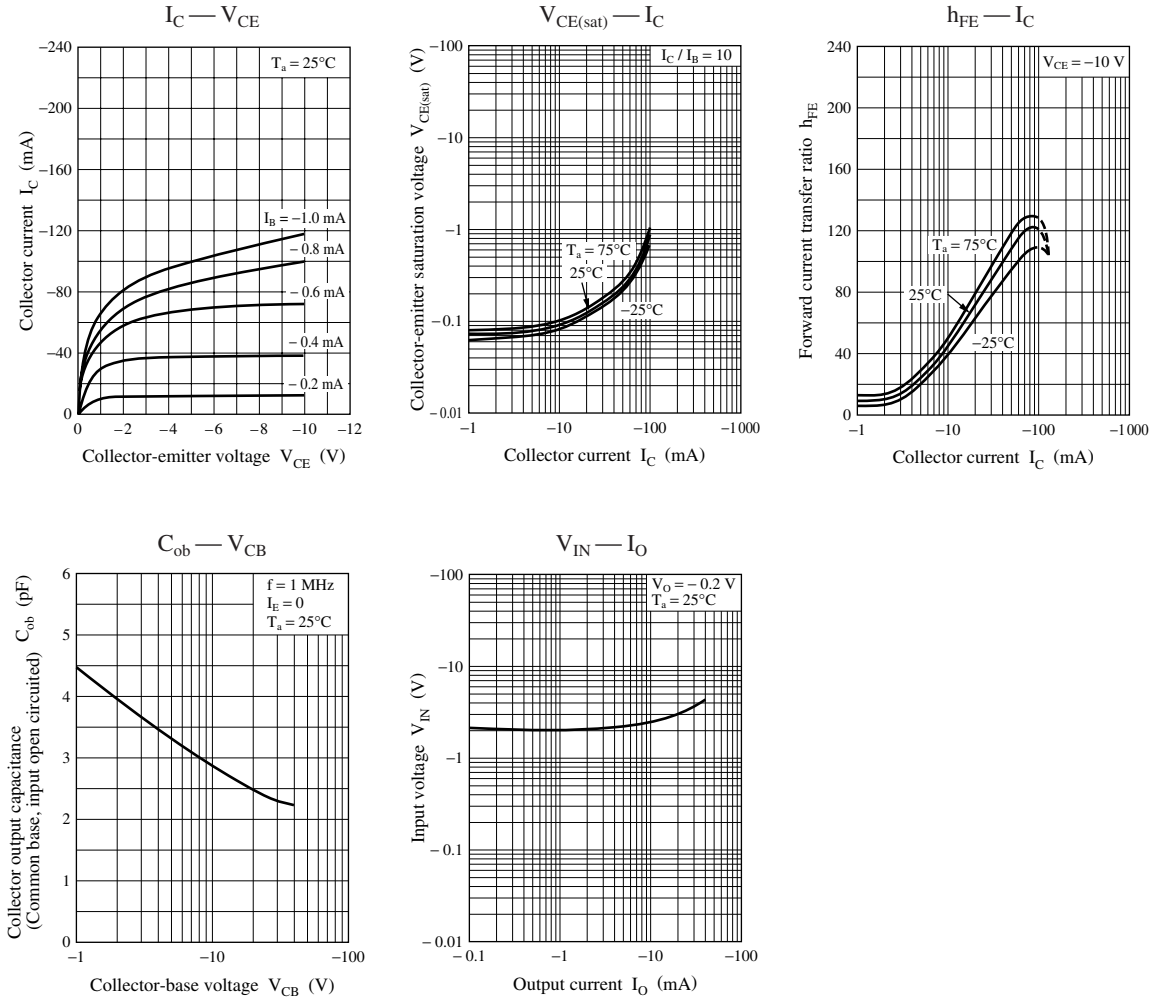




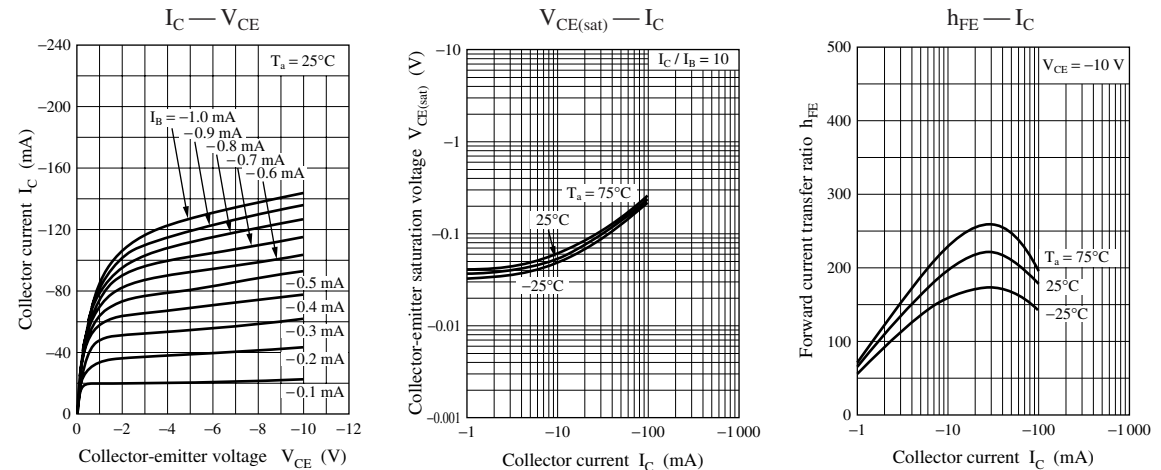
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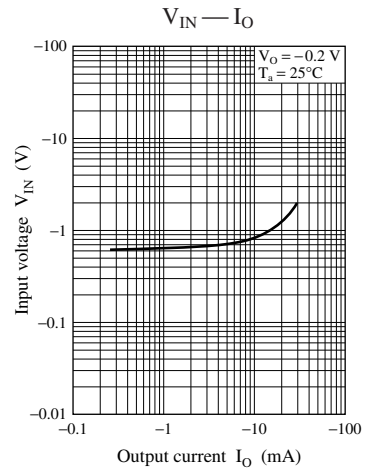
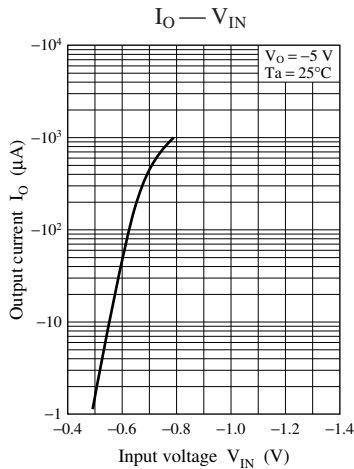
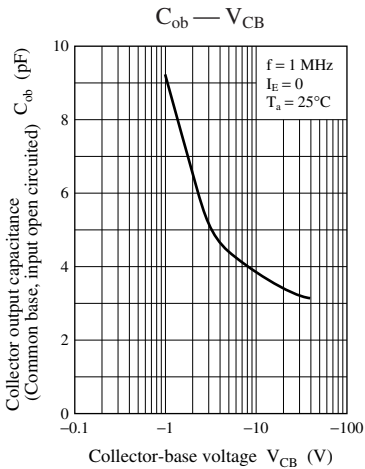


Characteristics charts of UNR211L

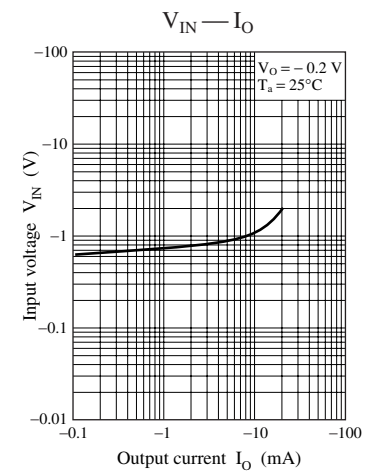
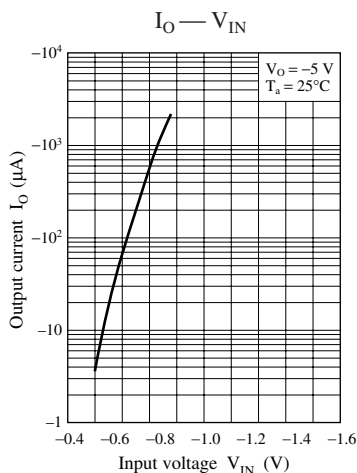
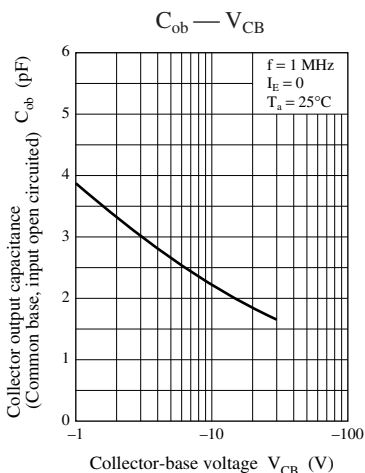
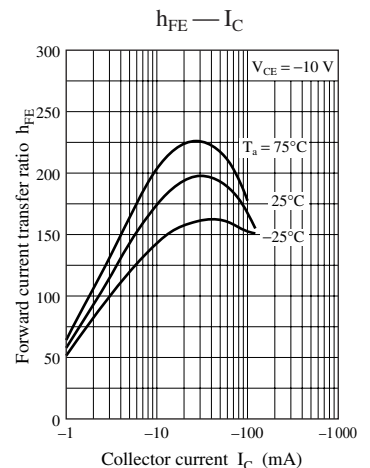
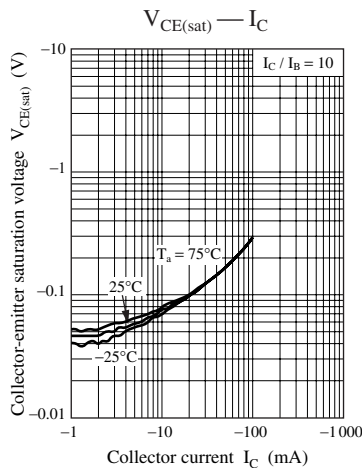
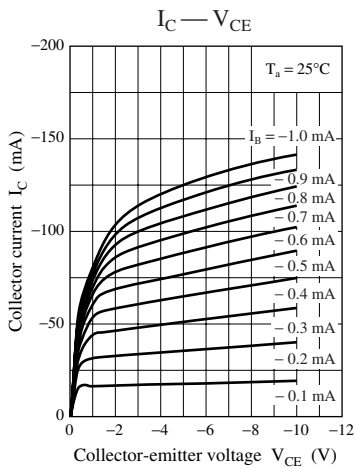


Characteristics charts of UNR211M

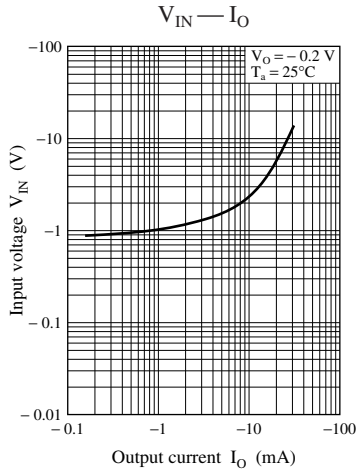
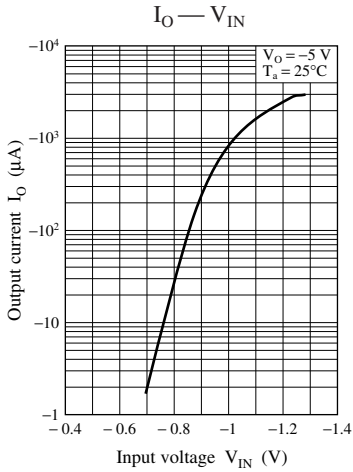
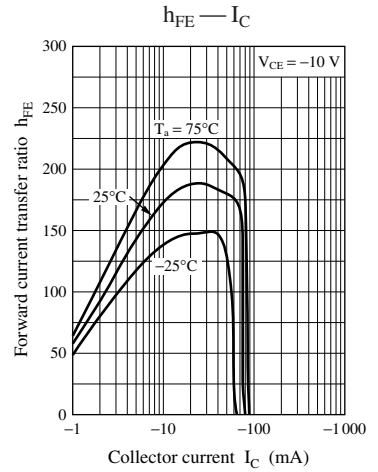
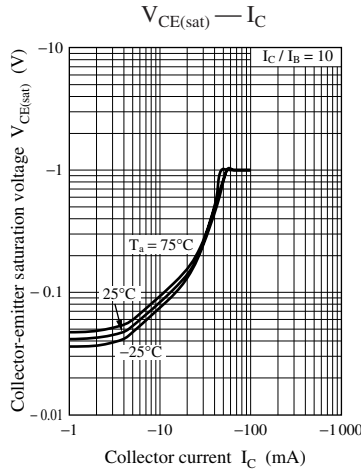
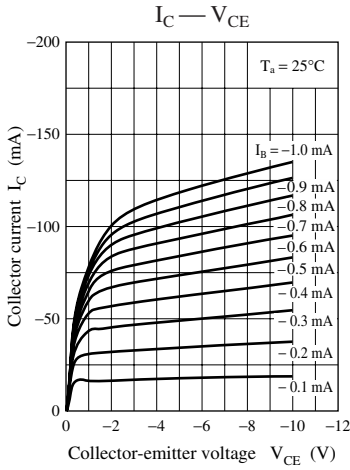




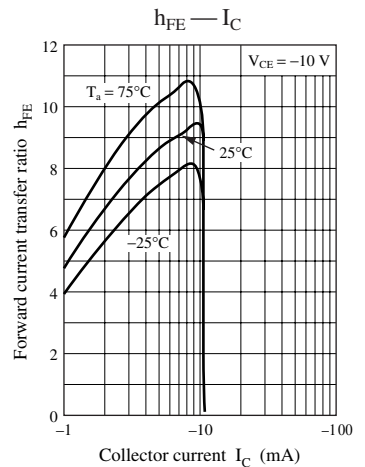
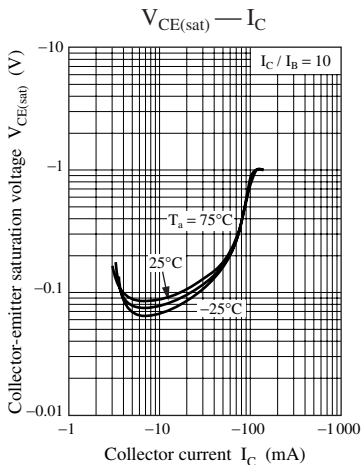
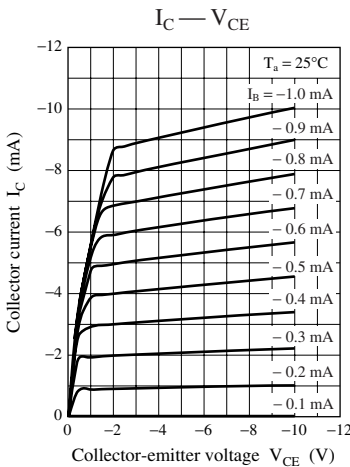
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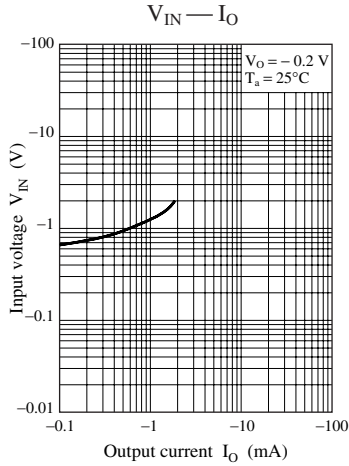
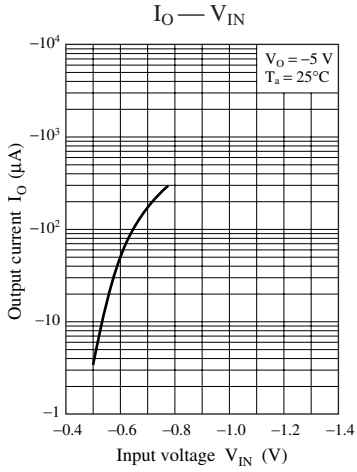


Characteristics charts of UNR211T

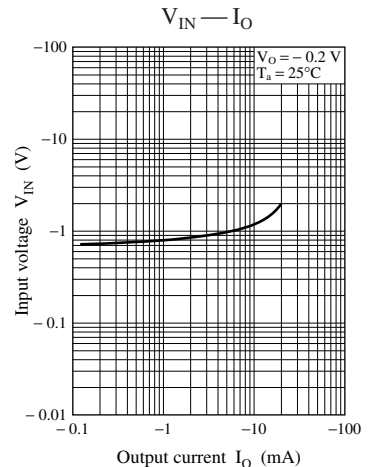
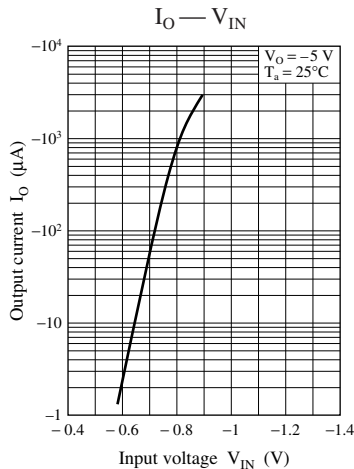
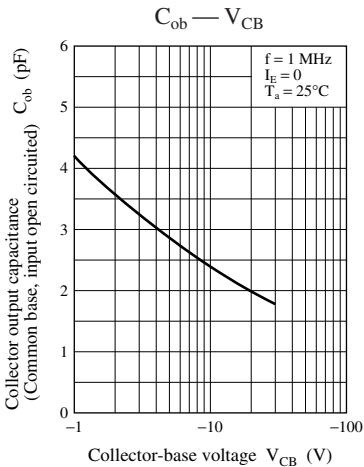
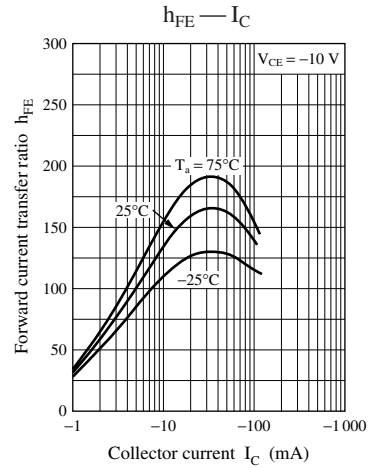
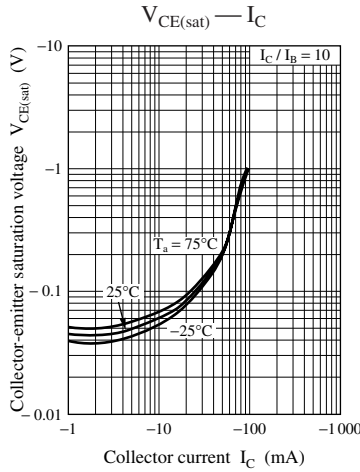
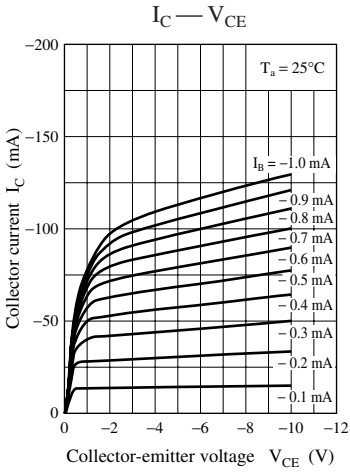


Characteristics charts of UNR211V





**Characteristics charts of UNR211Z**





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