

UNR9211/9212/9213/9214/9215/9216/9217/9218/9219/9210/921D/ 921E/921F/921K/921L/921M/921N/921AJ/921BJ/921CJ (UN9211/9212/9213/9214/9215/9216/9217/9218/9219/9210/921D/921E/921F/ 921K/921L/921M/921N/921AJ/921BJ/921CJ)

Silicon NPN epitaxial planer transistor
For digital circuits

Features

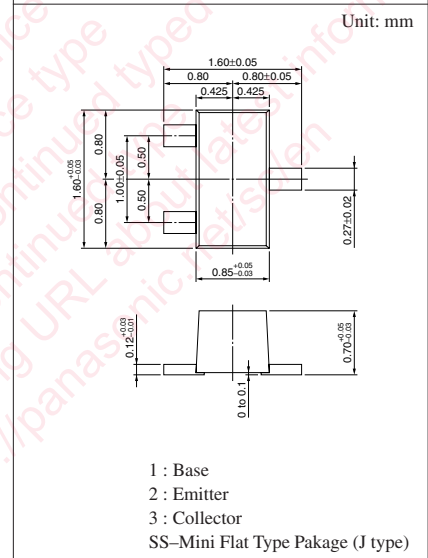
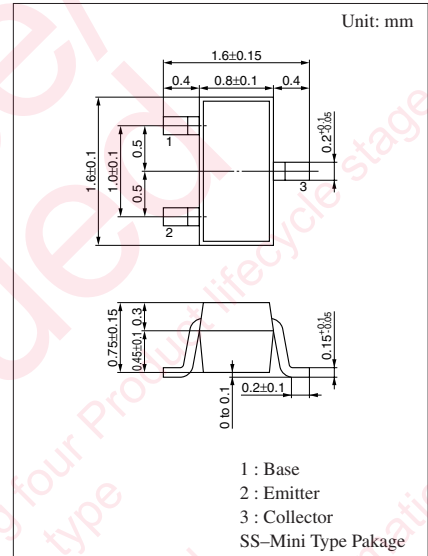
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- SS-Mini type package, allowing automatic insertion through tape packing and magazine packing.

Resistance by Part Number

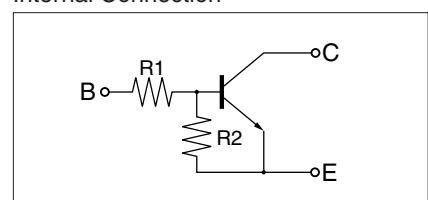
	Marking Symbol	(R ₁)	(R ₂)
• UNR9211	8A	10kΩ	10kΩ
• UNR9212	8B	22kΩ	22kΩ
• UNR9213	8C	47kΩ	47kΩ
• UNR9214	8D	10kΩ	47kΩ
• UNR9215	8E	10kΩ	—
• UNR9216	8F	4.7kΩ	—
• UNR9217	8H	22kΩ	—
• UNR9218	8I	0.51kΩ	5.1kΩ
• UNR9219	8K	1kΩ	10kΩ
• UNR9210	8L	47kΩ	—
• UNR921D	8M	47kΩ	10kΩ
• UNR921E	8N	47kΩ	22kΩ
• UNR921F	8O	4.7kΩ	10kΩ
• UNR921K	8P	10kΩ	4.7kΩ
• UNR921L	8Q	4.7kΩ	4.7kΩ
• UNR921M	EL	2.2kΩ	47kΩ
• UNR921N	EX	4.7kΩ	47kΩ
• UNR921AJ	8X	100kΩ	100kΩ
• UNR921BJ	8Y	100kΩ	—
• UNR921CJ	8Z	—	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



Internal Connection



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

■ Electrical Characteristics (T_a=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit	
Collector cutoff current		I _{CBO}	V _{CB} = 50V, I _E = 0			0.1	μA	
		I _{CEO}	V _{CE} = 50V, I _B = 0			0.5	μA	
Emitter cutoff current	UNR9211	I _{EBO}	V _{EB} = 6V, I _C = 0			0.5	mA	
	UNR9212/9214/921E/921D					0.2		
	UNR9213/UNR921M/921N/UNR921AJ					0.1		
	UNR9215/9216/9217/9210/UNR921BJ					0.01		
	UNR921F/921K					1.0		
	UNR9219					1.5		
	UNR9218/921L/UNR921CJ					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	UNR9211	h _{FE}	V _{CE} = 10V, I _C = 5mA	35				
	UNR9212/921E			60				
	UNR9213/9214/921M/UNR921AJ/921CJ			80				
	UNR9215*/9216*/9217*/9210*/UNR921BJ			160		460		
	UNR921F/921D/9219			30				
	UNR9218/921K/921L			20				
	UNR921N			80		400		
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	
			UNR9213/921K/UNR921BJ	V _{OC} = 5V, V _B = 3.5V, R _L = 1kΩ				0.2
			UNR921D	V _{CC} = 5V, V _B = 10V, R _L = 1kΩ				0.2
			UNR921E	V _{CC} = 5V, V _B = 6V, R _L = 1kΩ				0.2
			UNR921AJ	V _{CC} = 5V, V _B = 5V, R _L = 1kΩ				0.2
Transition frequency		f _T	V _{CB} = 10V, I _E = -2mA, f = 200MHz		150		MHz	
Input resistance	UNR9211/9214/9215/921K	R _i		(-30%)	10	(+30%)	kΩ	
	UNR9212/9217				22			
	UNR9213/921D/921E/9210				47			
	UNR9216/921F/921L/UNR921N				4.7			
	UNR9218				0.51			
	UNR9219/UNR921M				1			
	UNR921AJ/921BJ				100			

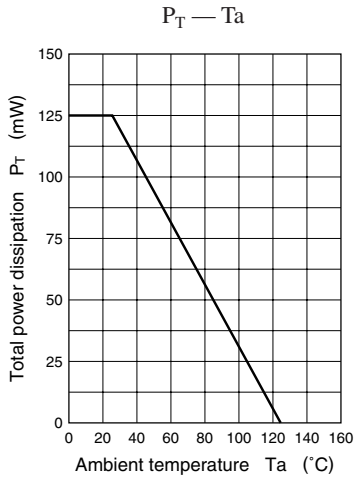
* h_{FE} rank classification (UNR9215/9216/9217/9210)

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

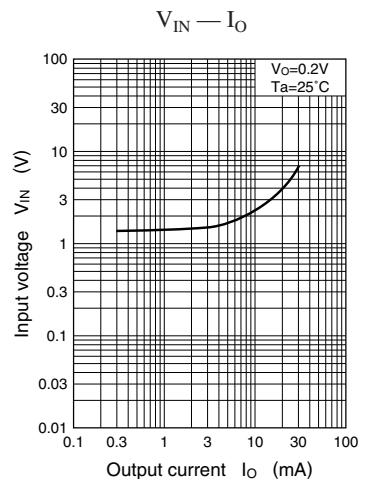
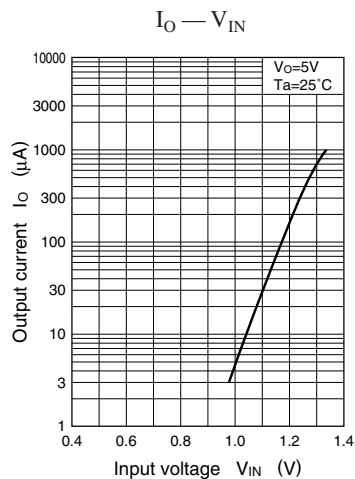
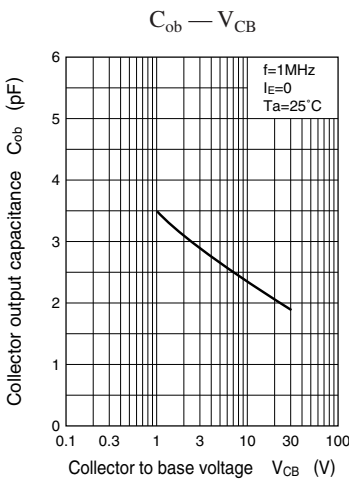
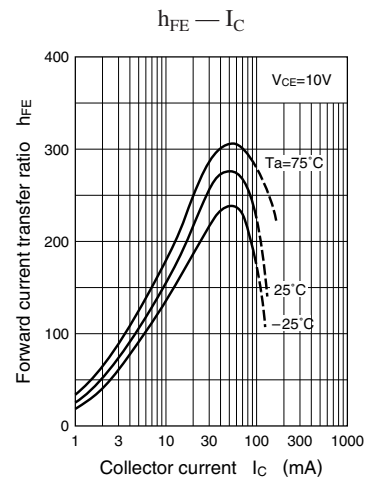
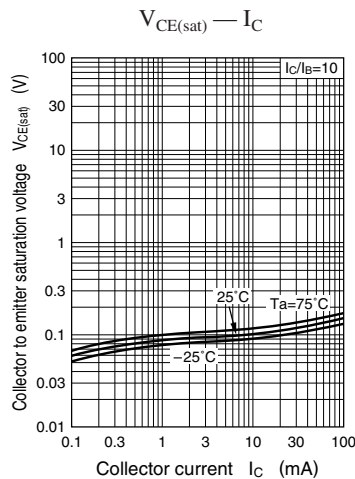
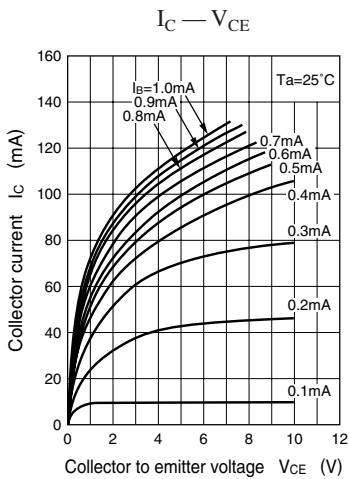
■ Electrical Characteristics (continued) (Ta=25°C)

Parameter		Symbol	Conditions	min	typ	max	Unit
Resis- tance ratio	UNR9211/9212/9213/921L	R_1/R_2		0.8	1.0	1.2	
	UNR9214			0.17	0.21	0.25	
	UNR9218/9219			0.08	0.1	0.12	
	UNR921D				4.7		
	UNR921E				2.14		
	UNR921F				0.47		
	UNR921K				2.13		
	UNR921M				0.047		
	UNR921N				0.1		
	UNR921AJ				1.0		
Resistance between Emitter to Base	UNR921CJ	R_2		-30%	47	30%	kΩ

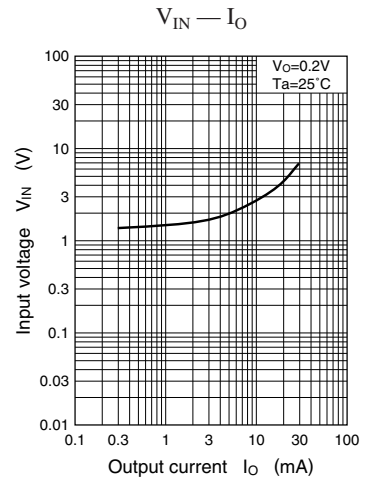
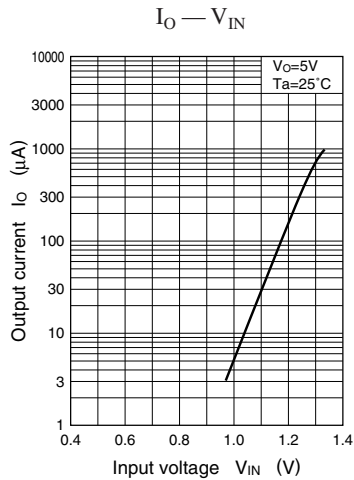
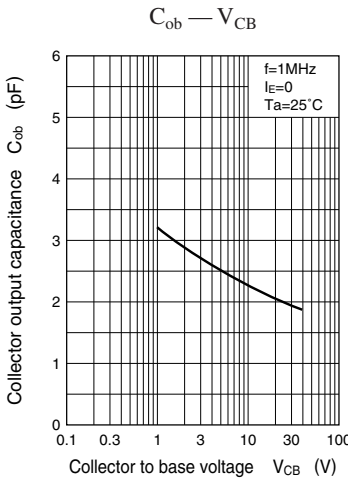
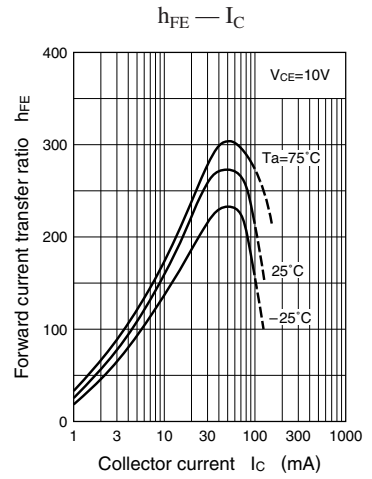
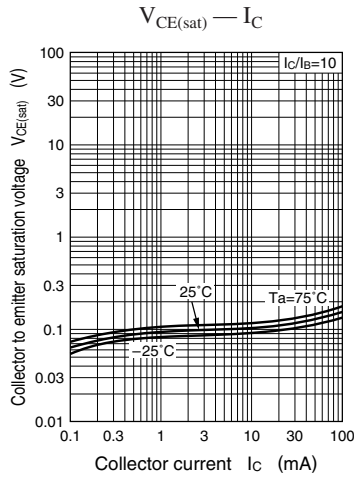
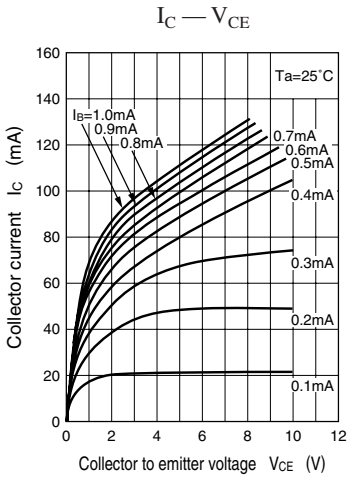
Common characteristics chart



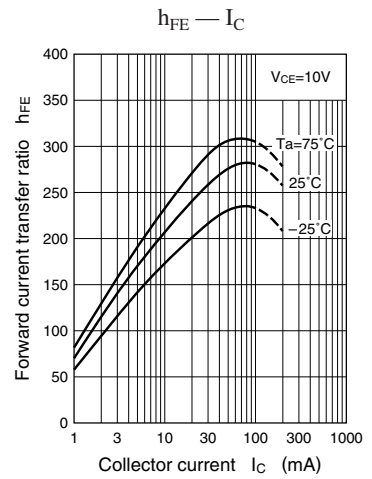
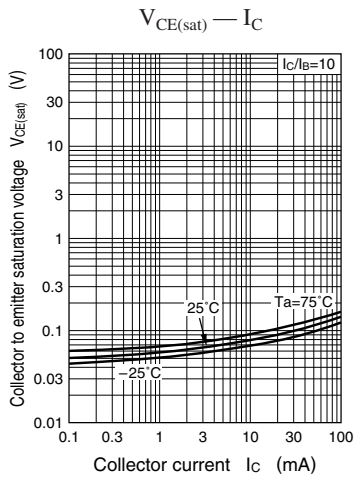
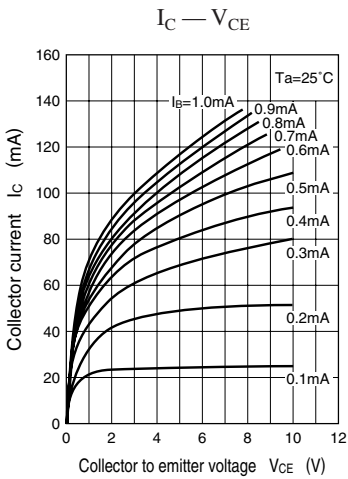
Characteristics charts of UNR9211

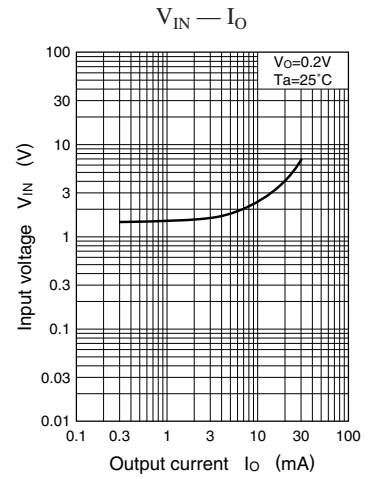
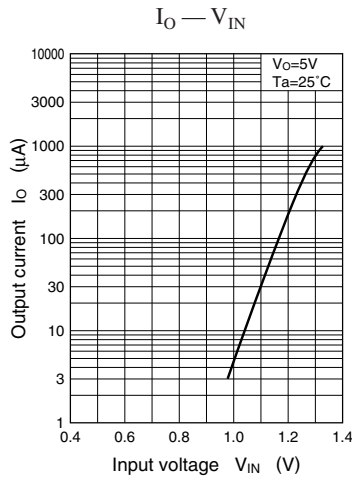
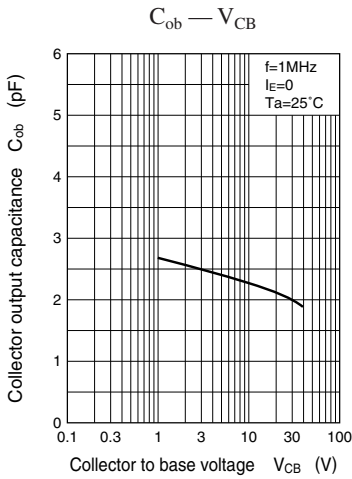


Characteristics charts of UNR9212

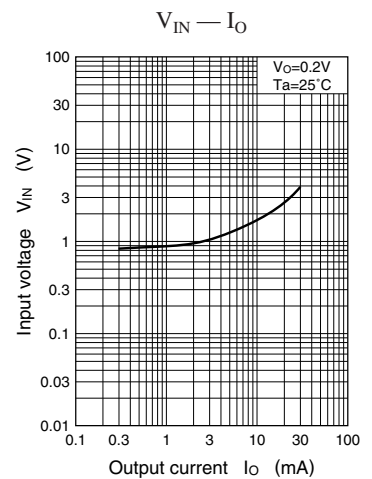
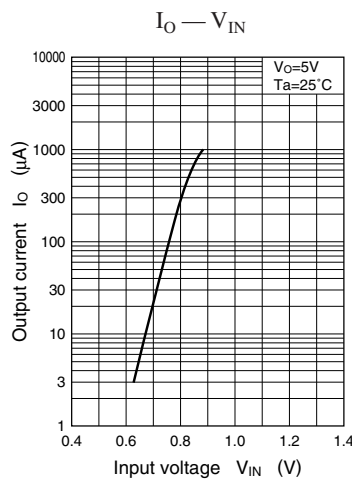
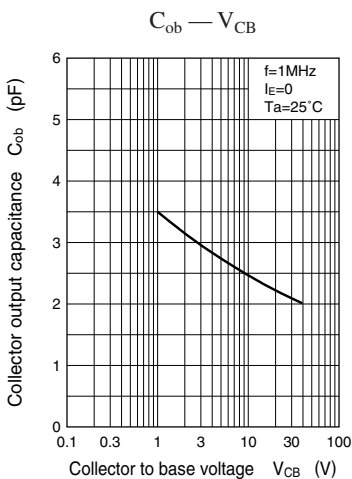
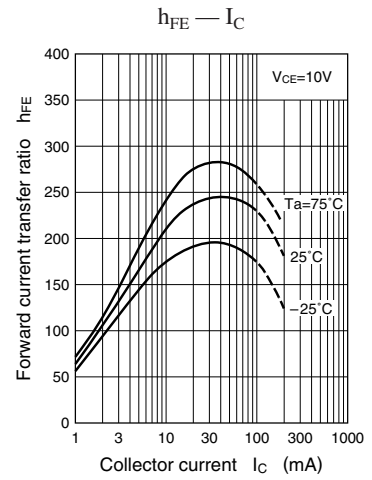
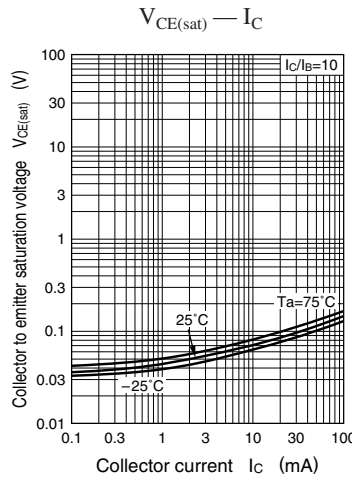
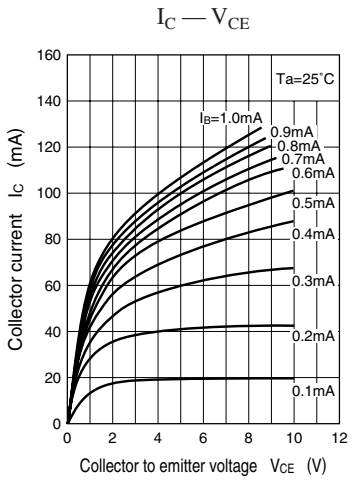


Characteristics charts of UNR9213

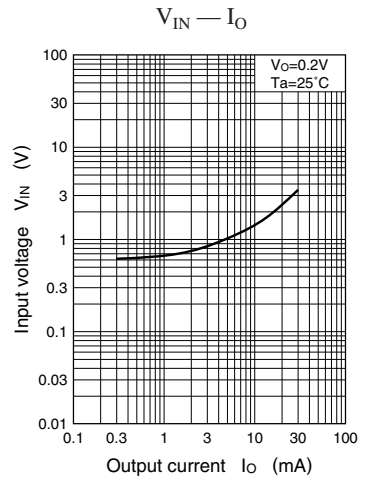
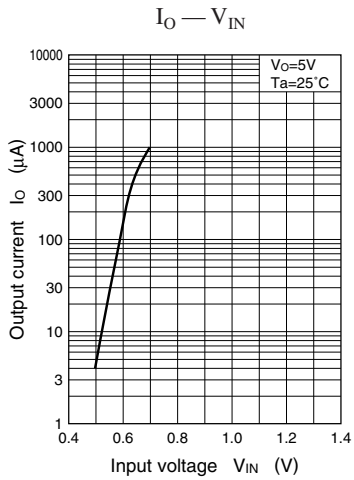
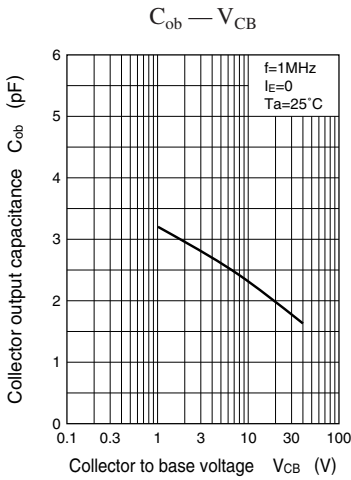
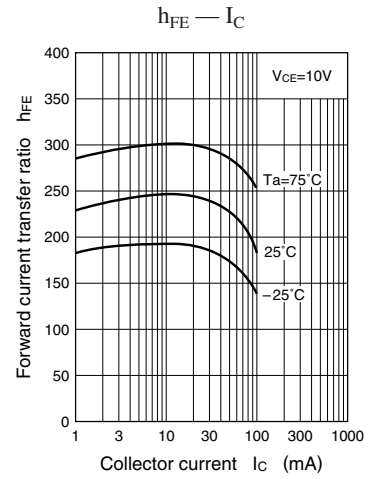
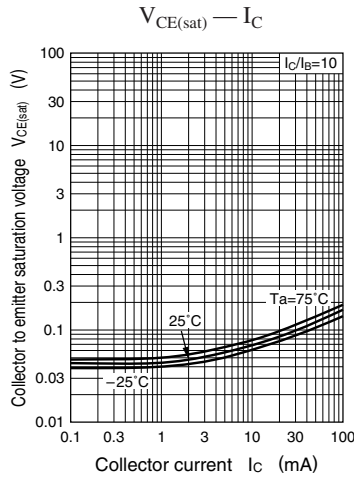
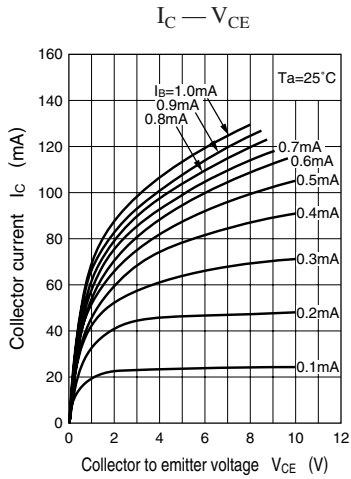




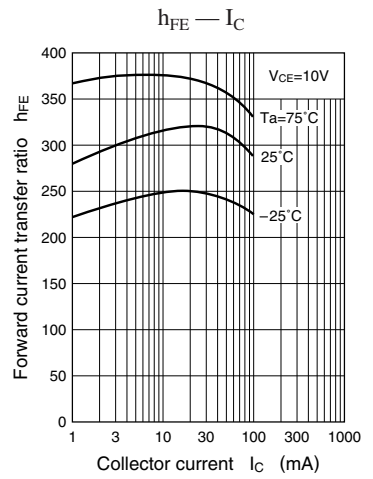
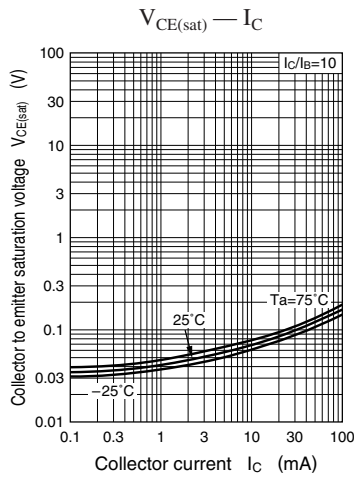
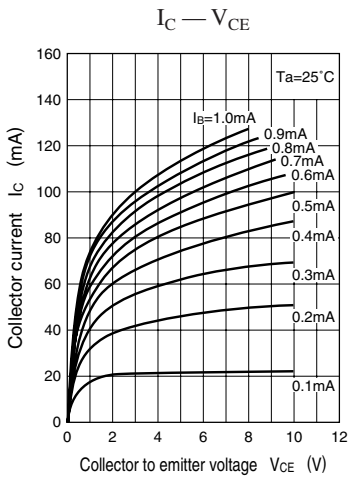
Characteristics charts of UNR9214

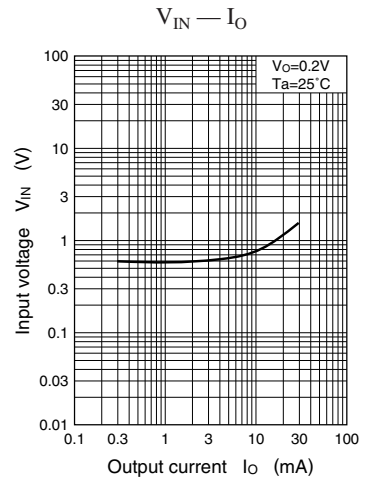
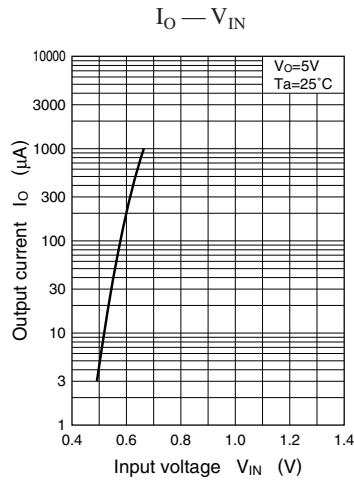
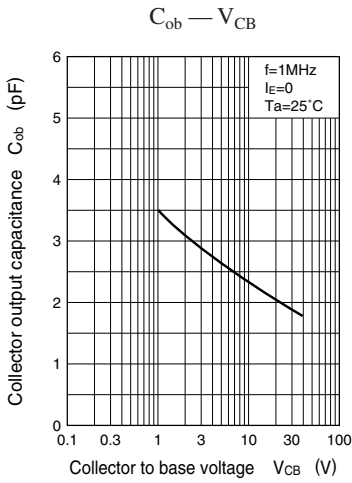


Characteristics charts of UNR9215

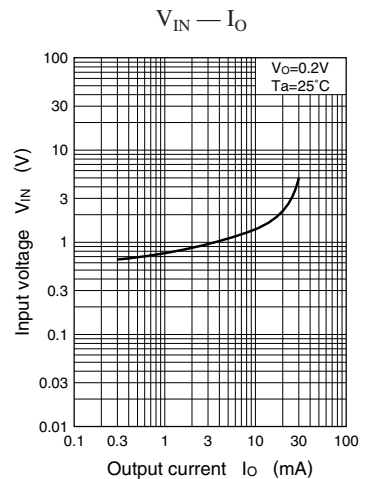
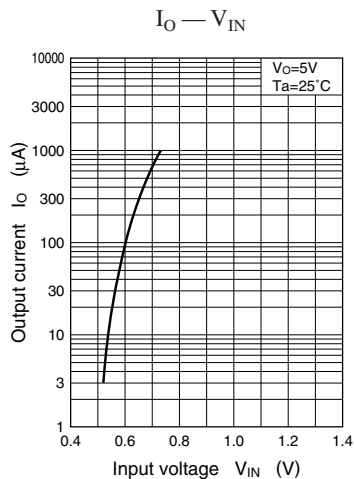
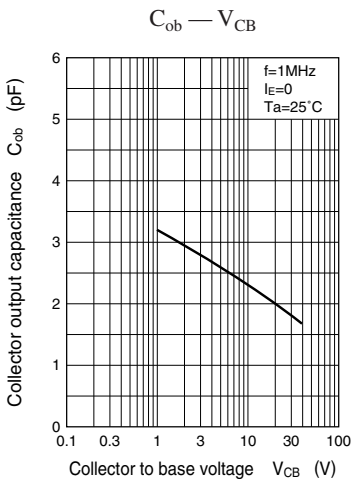
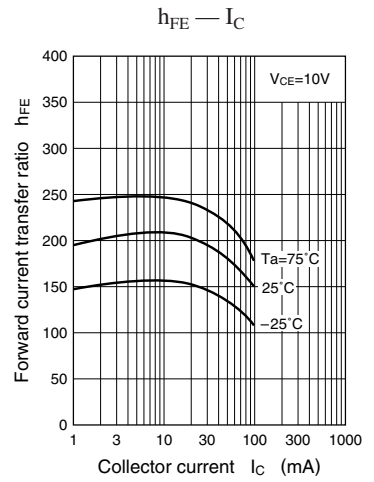
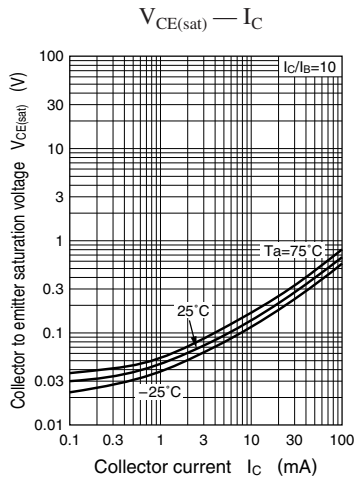
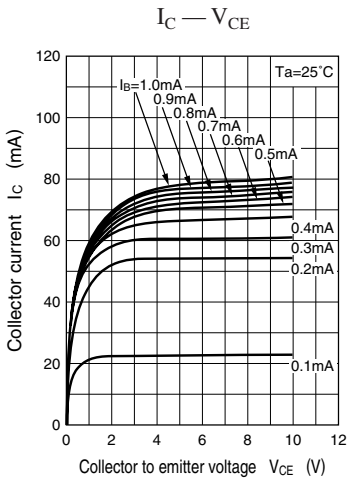


Characteristics charts of UNR9216

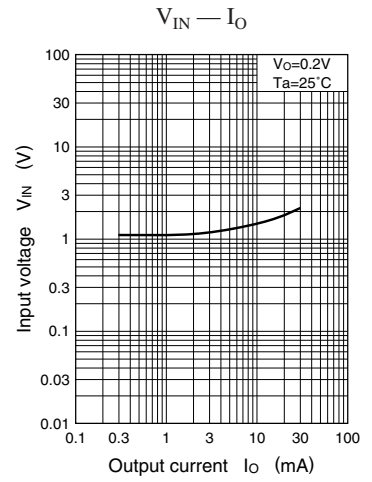
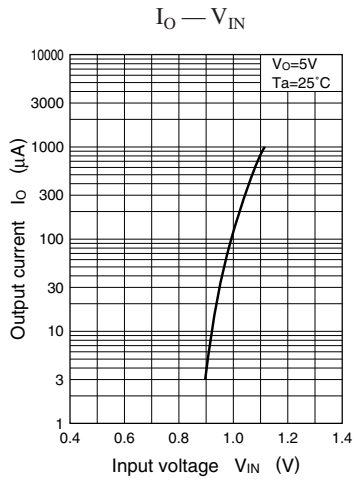
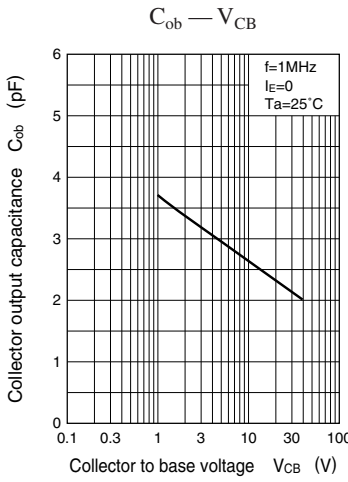
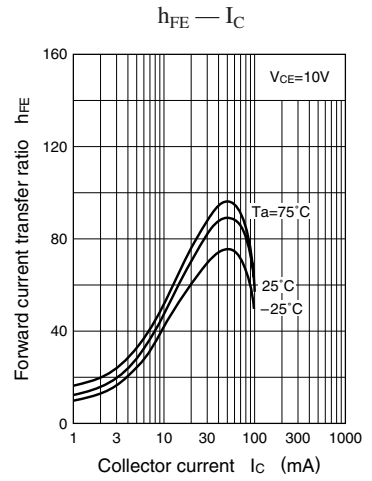
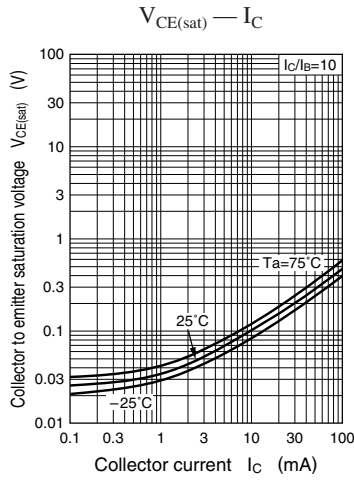
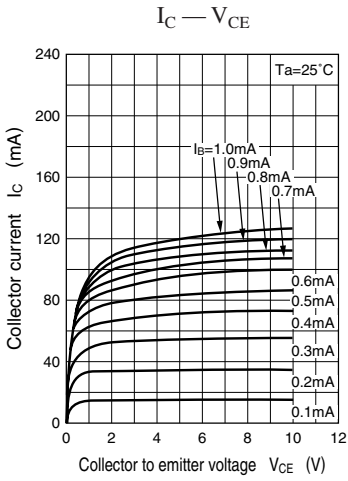




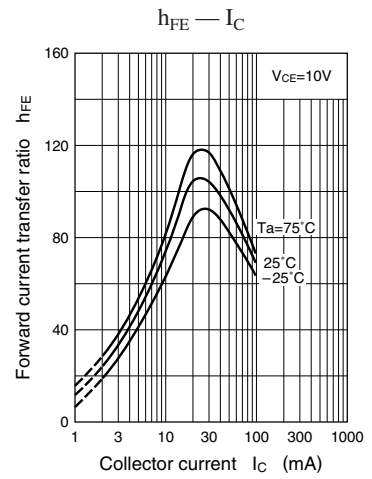
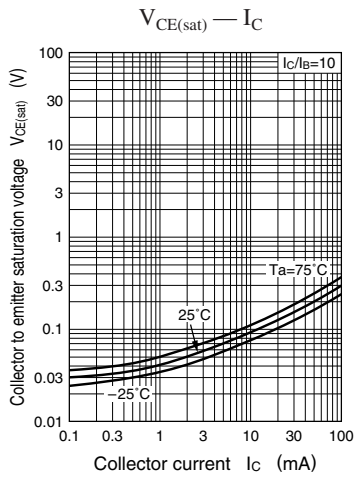
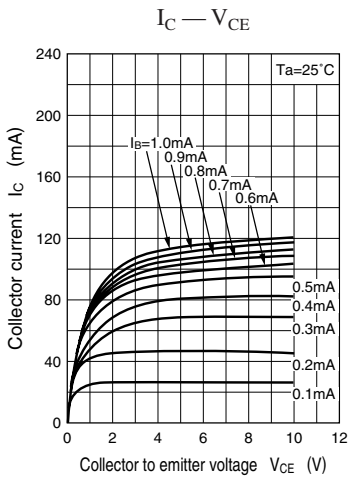
Characteristics charts of UNR9217

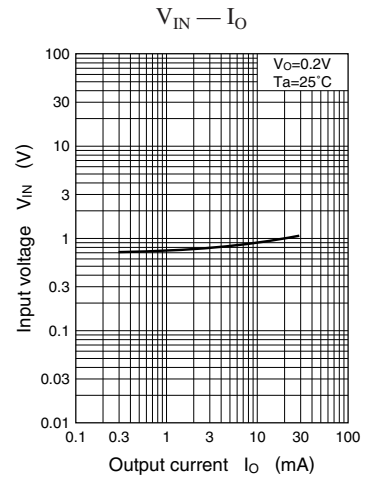
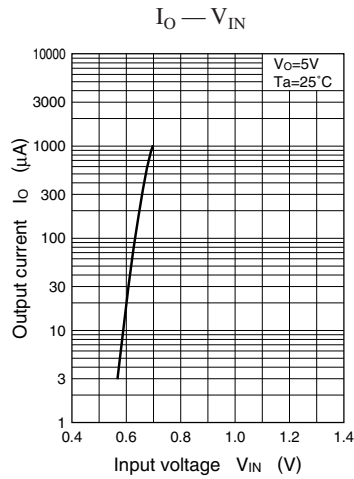
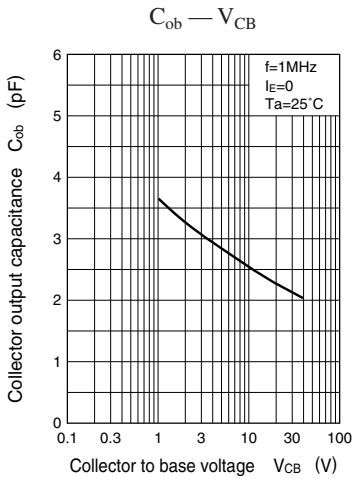


Characteristics charts of UNR9218

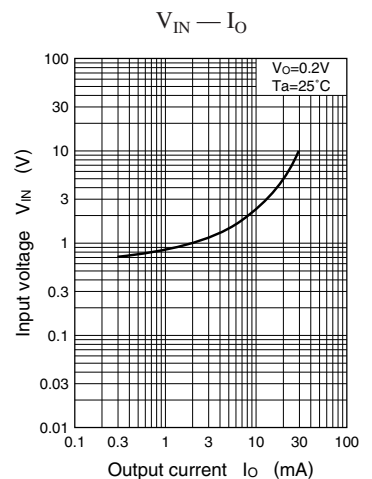
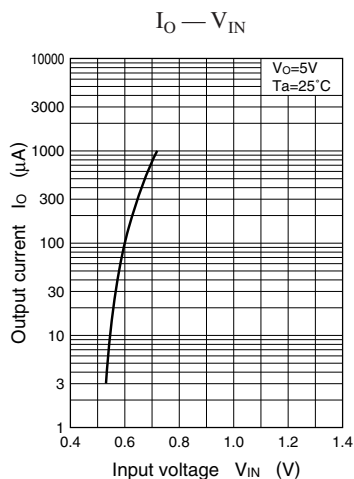
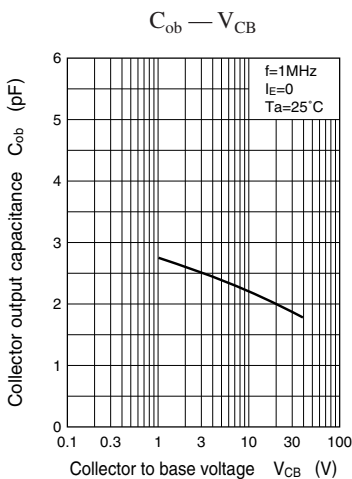
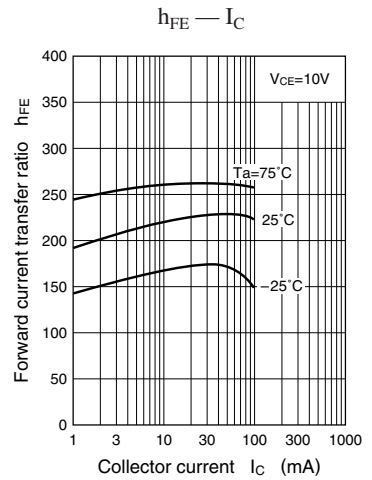
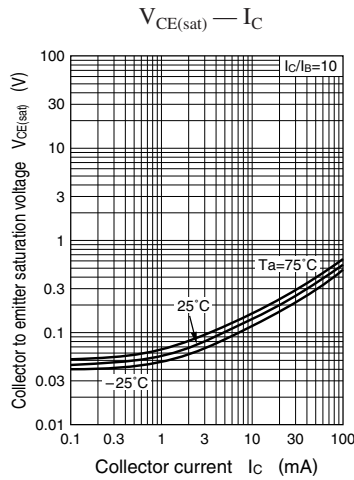
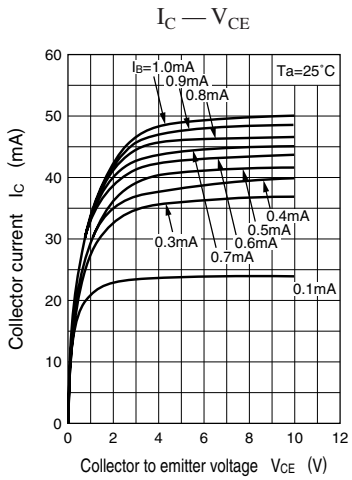


Characteristics charts of UNR9219

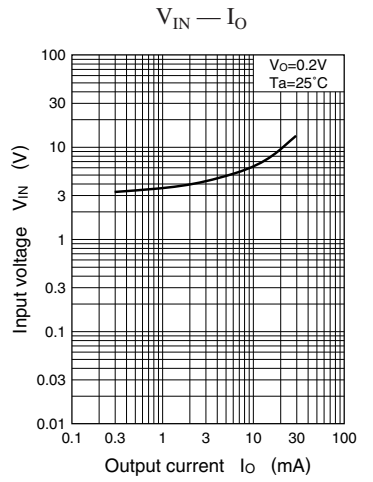
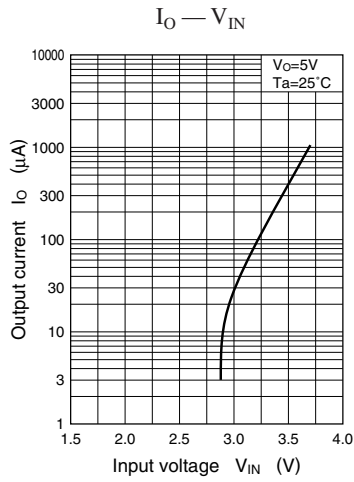
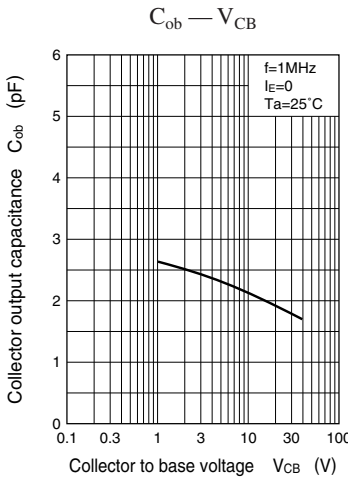
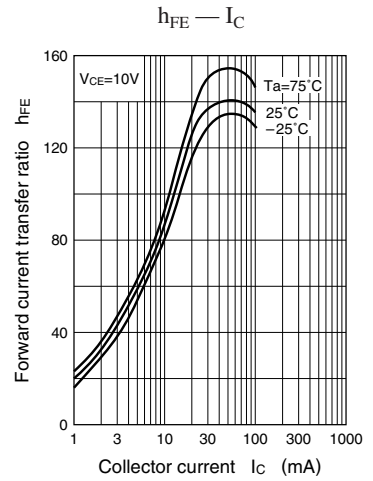
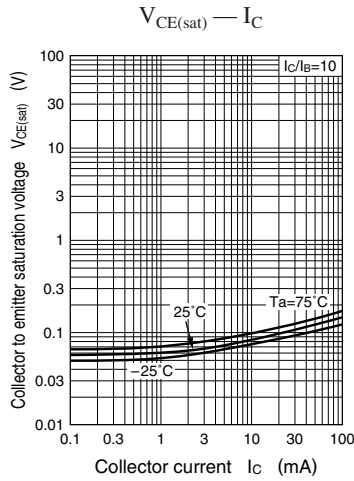
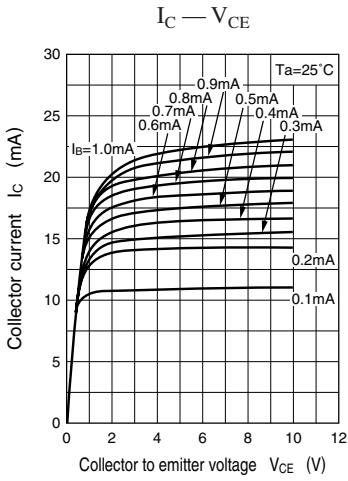




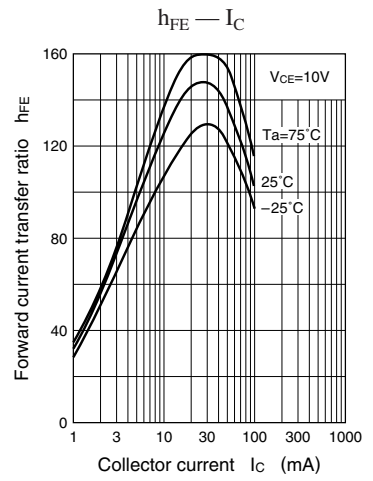
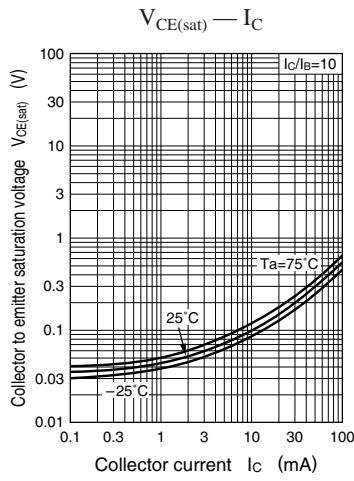
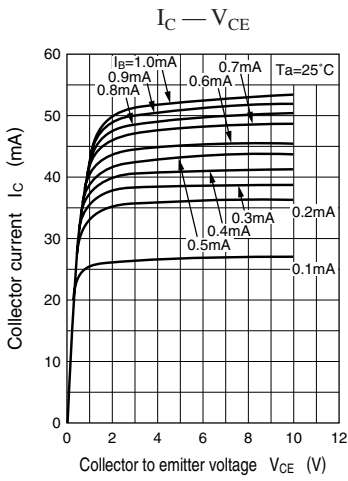
Characteristics charts of UNR9210

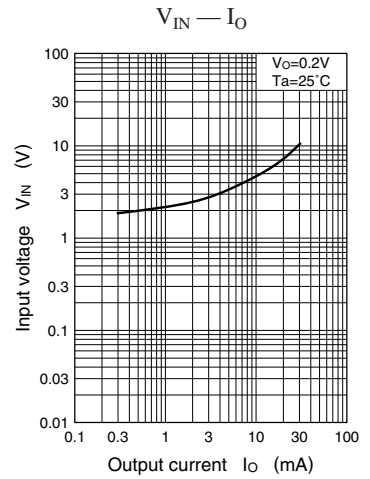
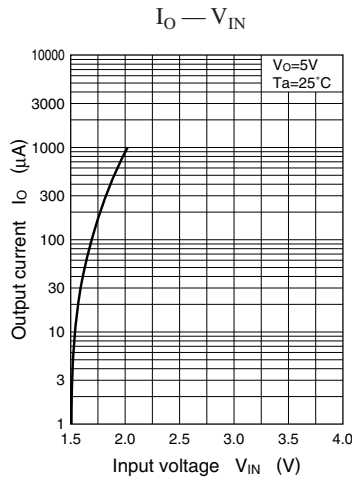
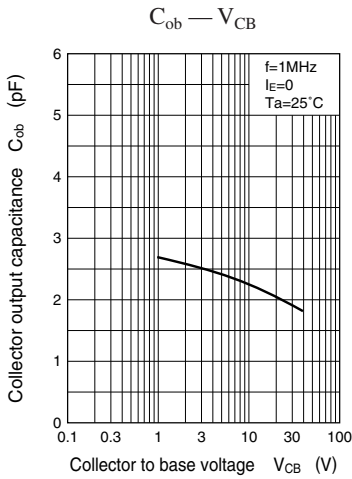


Characteristics charts of UNR921D

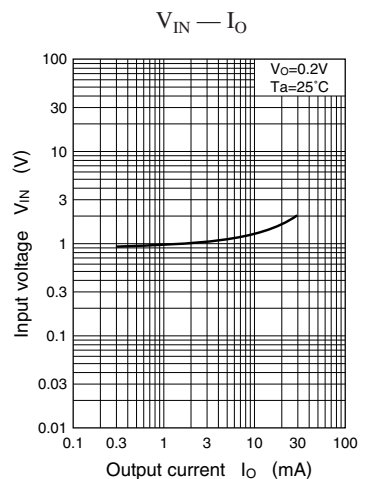
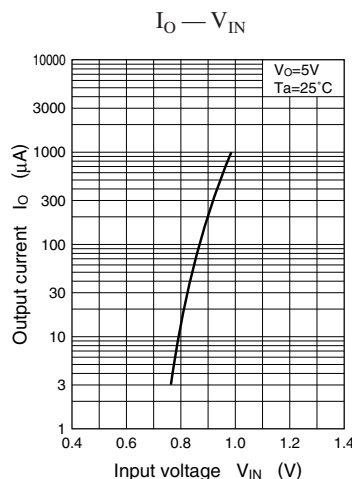
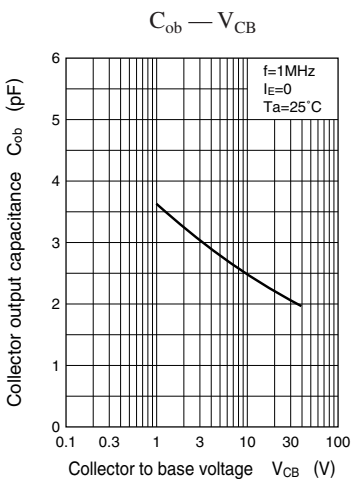
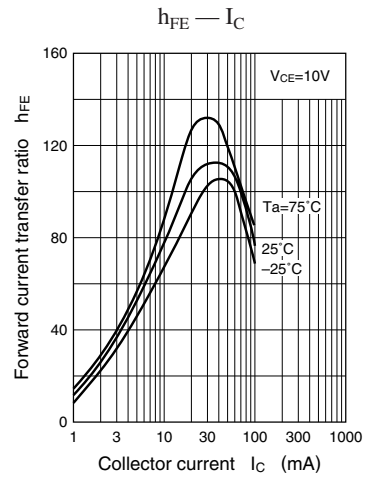
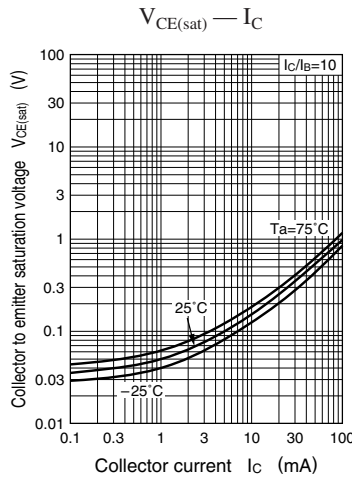
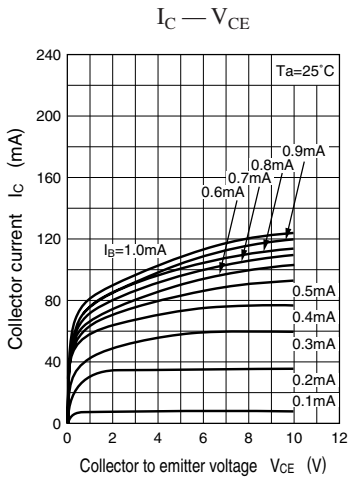


Characteristics charts of UNR921E

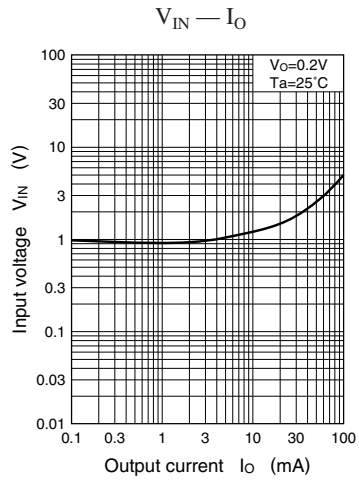
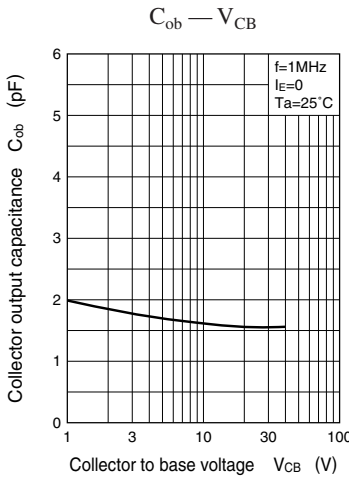
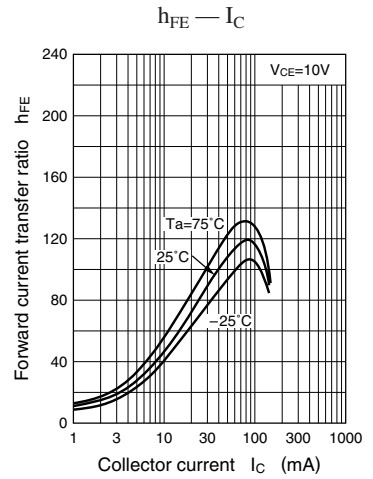
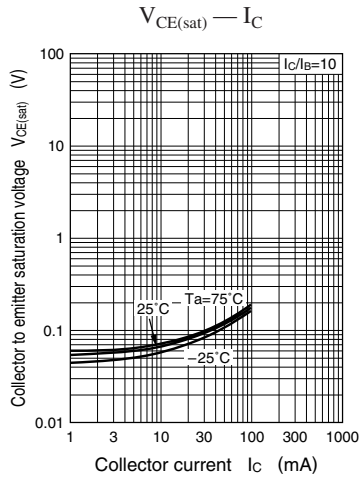
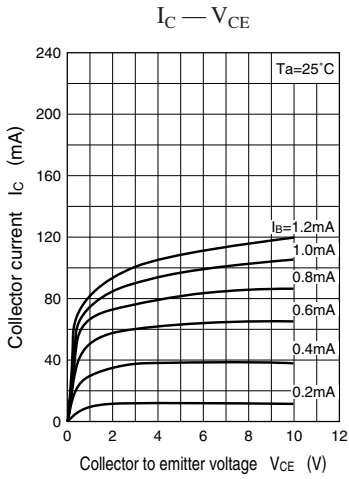




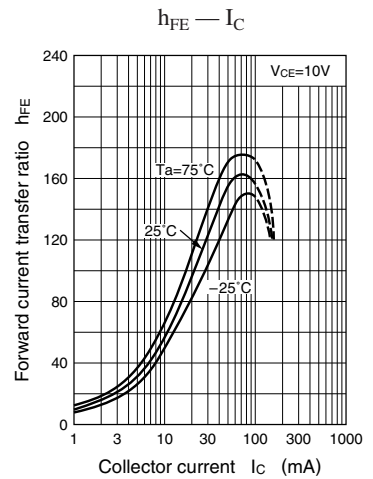
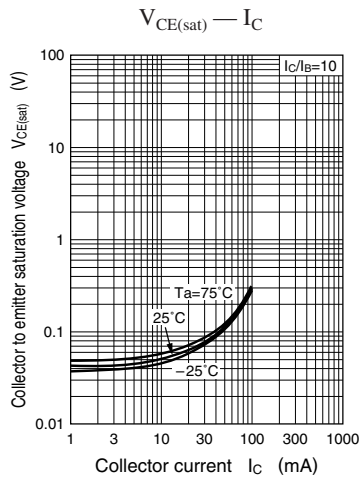
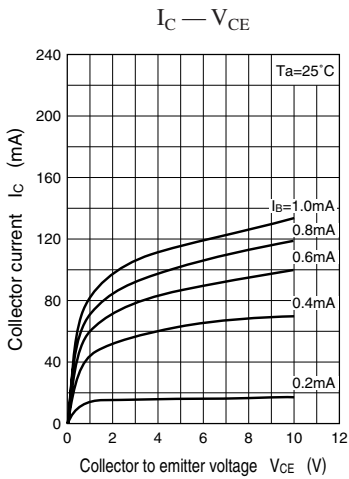
Characteristics charts of UNR921F

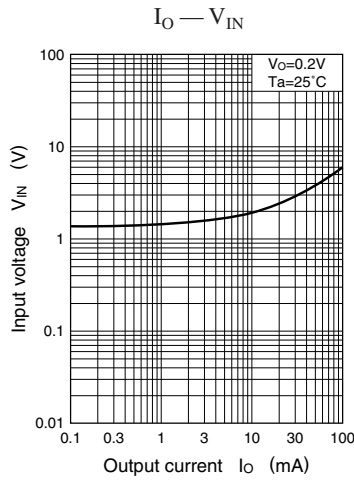
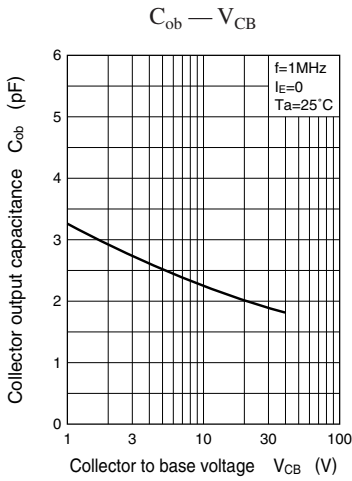


Characteristics charts of UNR921K

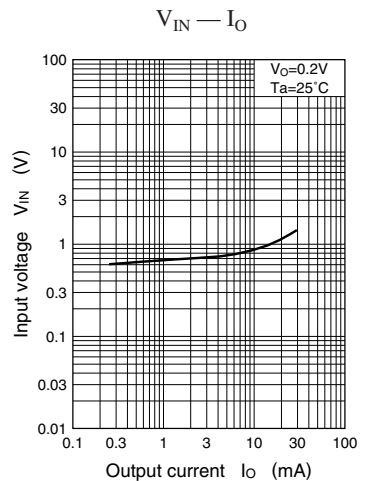
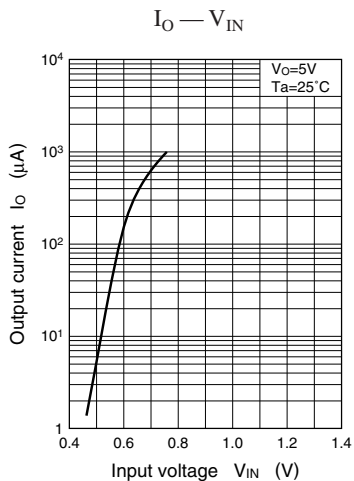
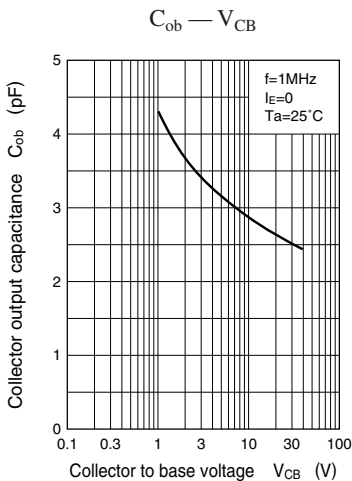
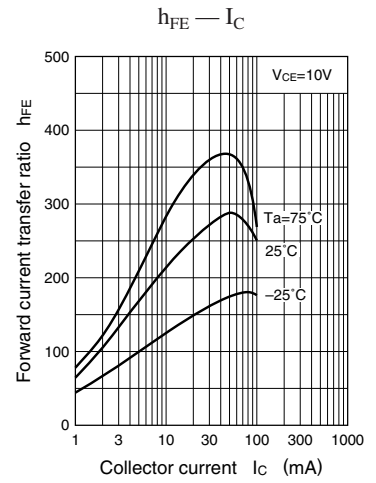
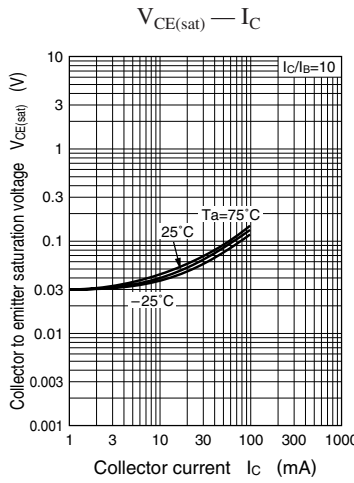
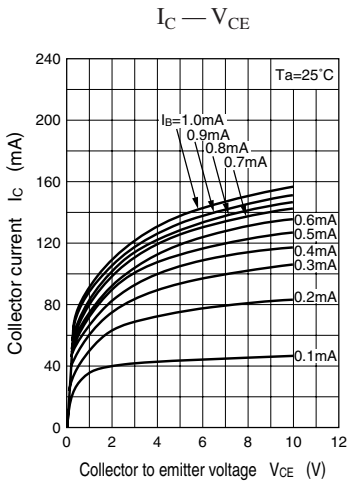


Characteristics charts of UNR921L



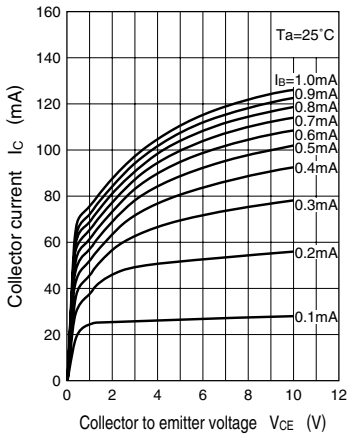


Characteristics charts of UNR921M

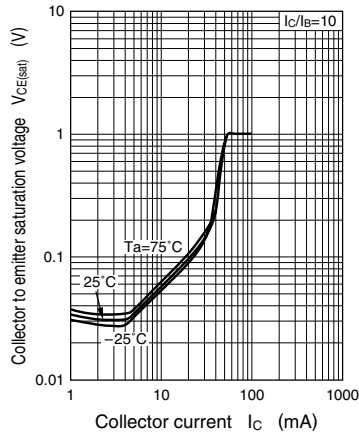


Characteristics charts of UNR921N

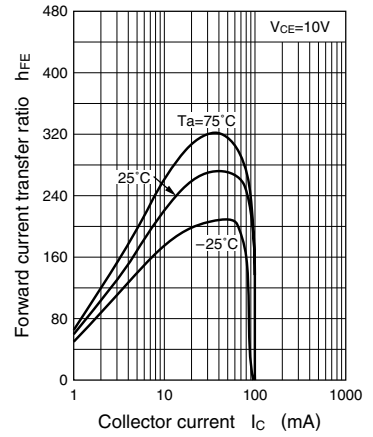
$I_C - V_{CE}$



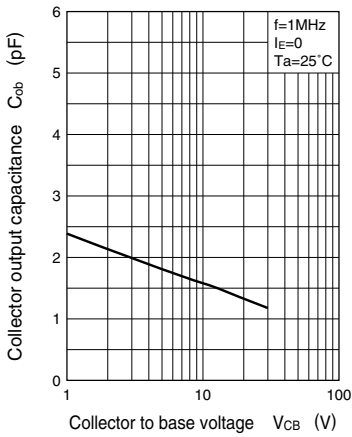
$V_{CE(sat)} - I_C$



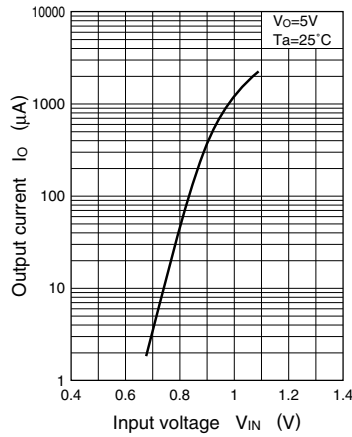
$h_{FE} - I_C$



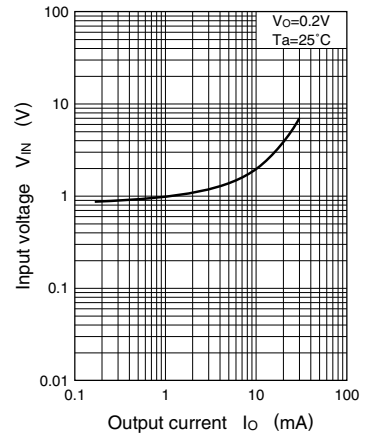
$C_{ob} - V_{CB}$



$I_O - V_{IN}$



$V_{IN} - I_O$



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