

UNR521x Series (UN521x Series)

Silicon NPN epitaxial planar type

For digital circuits

■ Features

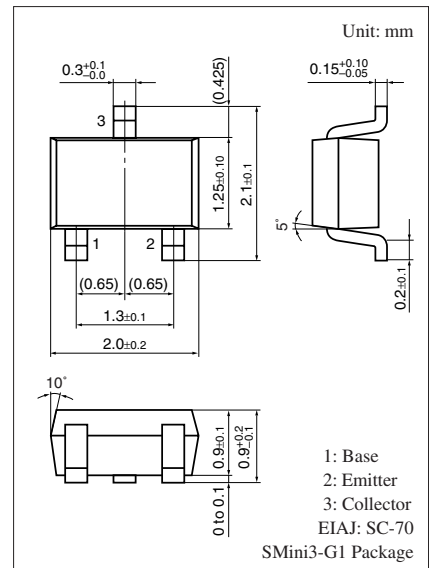
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts
- S-Mini type package, allowing automatic insertion through the tape packing and magazine packing

■ Resistance by Part Number

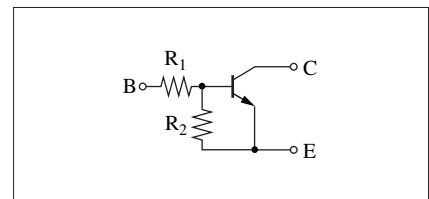
		Marking symbol (R_1)		(R_2)
• UNR5210	(UN5210)	8L	47 k Ω	—
• UNR5211	(UN5211)	8A	10 k Ω	10 k Ω
• UNR5212	(UN5212)	8B	22 k Ω	22 k Ω
• UNR5213	(UN5213)	8C	47 k Ω	47 k Ω
• UNR5214	(UN5214)	8D	10 k Ω	47 k Ω
• UNR5215	(UN5215)	8E	10 k Ω	—
• UNR5216	(UN5216)	8F	4.7 k Ω	—
• UNR5217	(UN5117)	8H	22 k Ω	—
• UNR5218	(UN5218)	8I	0.51 k Ω	5.1 k Ω
• UNR5219	(UN5219)	8K	1 k Ω	10 k Ω
• UNR521D	(UN521D)	8M	47 k Ω	10 k Ω
• UNR521E	(UN521E)	8N	47 k Ω	22 k Ω
• UNR521F	(UN521F)	8O	4.7 k Ω	10 k Ω
• UNR521K	(UN521K)	8P	10 k Ω	4.7 k Ω
• UNR521L	(UN521L)	8Q	4.7 k Ω	4.7 k Ω
• UNR521M	(UN521M)	EL	2.2 k Ω	47 k Ω
• UNR521N	(UN521N)	EX	4.7 k Ω	47 k Ω
• UNR521T	(UN521T)	EZ	22 k Ω	47 k Ω
• UNR521V	(UN521V)	FD	2.2 k Ω	2.2 k Ω
• UNR521Z	(UN521Z)	FF	4.7 k Ω	22 k Ω

■ Absolute Maximum Ratings $T_a = 25^\circ\text{C}$

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	150	mW
Junction temperature	T_j	150	$^\circ\text{C}$
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$



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}	$I_{\text{C}} = 10\ \mu\text{A}$, $I_{\text{E}} = 0$	50			V
Collector-emitter voltage (Base open)		V_{CEO}	$I_{\text{C}} = 2\ \text{mA}$, $I_{\text{B}} = 0$	50			V
Collector-base cutoff current (Emitter open)		I_{CBO}	$V_{\text{CB}} = 50\ \text{V}$, $I_{\text{E}} = 0$			0.1	μA
Collector-emitter cutoff current (Base open)		I_{CEO}	$V_{\text{CE}} = 50\ \text{V}$, $I_{\text{B}} = 0$			0.5	
Emitter-base cutoff current (Collector open)	UNR5210/5215/5216/5217	I_{EBO}	$V_{\text{EB}} = 6\ \text{V}$, $I_{\text{C}} = 0$			0.01	mA
	UNR5213					0.1	
	UNR5212/5214/521D/ 521E/521M/521N/521T					0.2	
	UNR521Z					0.4	
	UNR5211					0.5	
	UNR521F/521K					1.0	
	UNR5219					1.5	
	UNR5218/521L/521V					2.0	
Forward current transfer ratio	UNR521V	h_{FE}	$V_{\text{CE}} = 10\ \text{V}$, $I_{\text{C}} = 5\ \text{mA}$	6		20	—
	UNR5218/521K/521L			20			
	UNR5219/521D/521F			30			
	UNR5211			35			
	UNR5212/521E			60			
	UNR521Z			60		200	
	UNR5213/5214/521M			80			
	UNR521N/521T			80		400	
	UNR5210*/5215*/5216*/5217*			160		460	
Collector-emitter saturation voltage		$V_{\text{CE(sat)}}$	$I_{\text{C}} = 10\ \text{mA}$, $I_{\text{B}} = 0.3\ \text{mA}$			0.25	V
UNR521V			$I_{\text{C}} = 10\ \text{mA}$, $I_{\text{B}} = 1.5\ \text{mA}$				
Output voltage high-level		V_{OH}	$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 0.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$	4.9			V
Output voltage low-level		V_{OL}	$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 2.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$			0.2	V
UNR5213/521K			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 3.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
UNR521D			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 10\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
UNR521E			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 6.0\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
Transition frequency		f_{T}	$V_{\text{CB}} = 10\ \text{V}$, $I_{\text{E}} = -2\ \text{mA}$, $f = 200\ \text{MHz}$		150		MHz
Input resistance	UNR5218	R_{I}		-30%	0.51	+30%	$\text{k}\Omega$
	UNR5219				1.0		
	UNR521M/521V				2.2		
	UNR5216/521F/521L/521N UNR521Z				4.7		
	UNR5211/5214/5215/521K				10		
	UNR5212/5217/521T				22		
	UNR5210/5213/521D/521E				47		

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

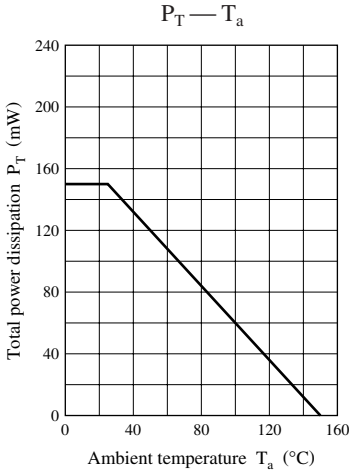
2. *: Rank classification

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

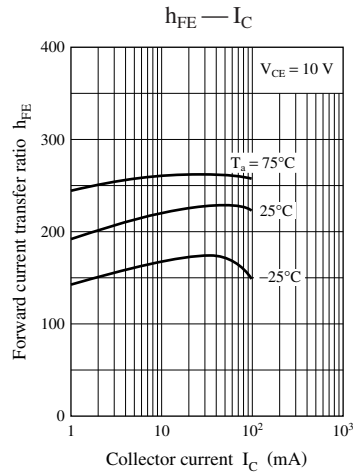
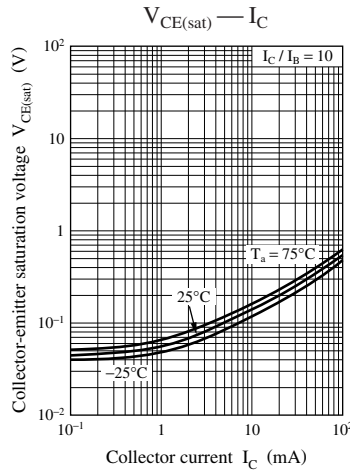
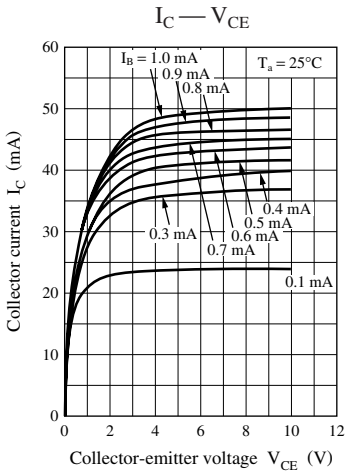
■ Electrical Characteristics (continued) $T_a = 25^\circ\text{C} \pm 3^\circ\text{C}$

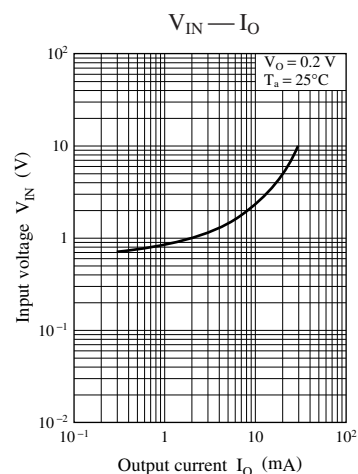
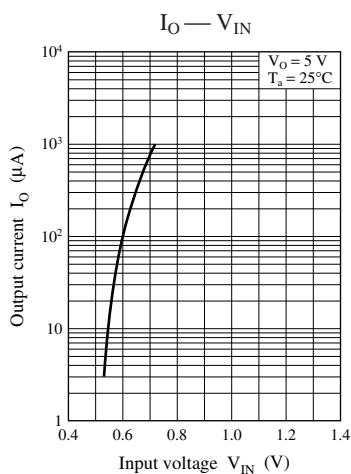
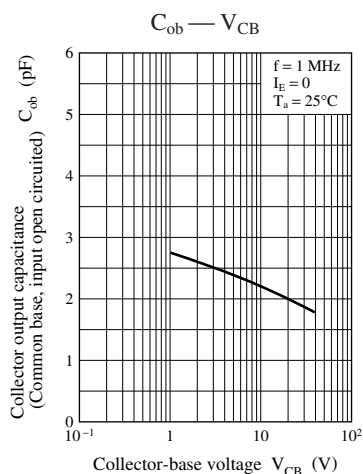
	Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Resistance ratio	UNR521M	R_1/R_2			0.047		—
	UNR521N				0.1		
	UNR5218/5219			0.08	0.10	0.12	
	UNR521Z				0.21		
	UNR5214			0.17	0.21	0.25	
	UNR521T				0.47		
	UNR521F			0.37	0.47	0.57	
	UNR521V				1.0		
	UNR5211/5212/5213/521L			0.8	1.0	1.2	
	UNR521K			1.70	2.13	2.60	
	UNR521E			1.70	2.14	2.60	
	UNR521D			3.7	4.7	5.7	

Common characteristics chart

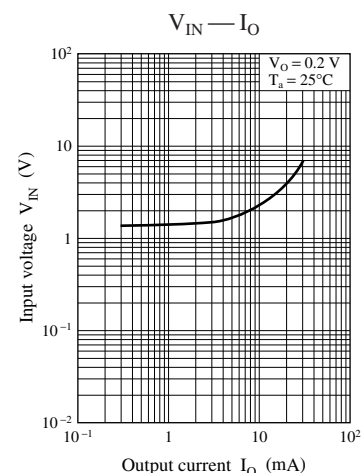
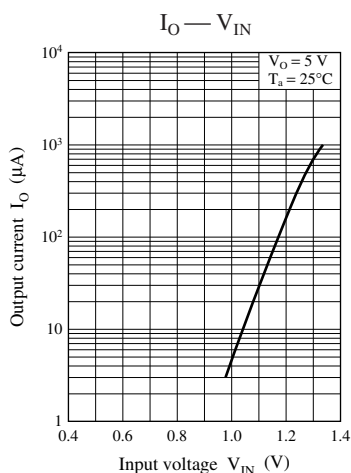
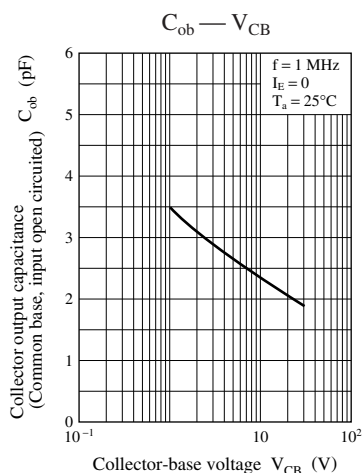
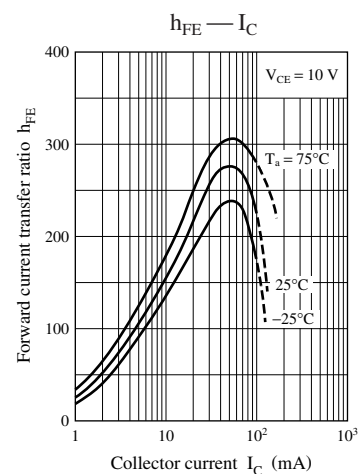
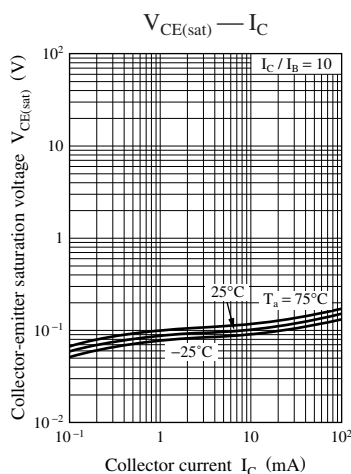
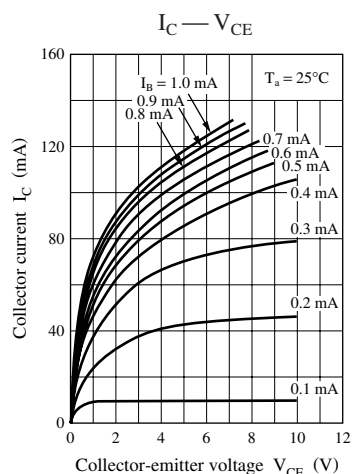


Characteristics charts of UNR5210

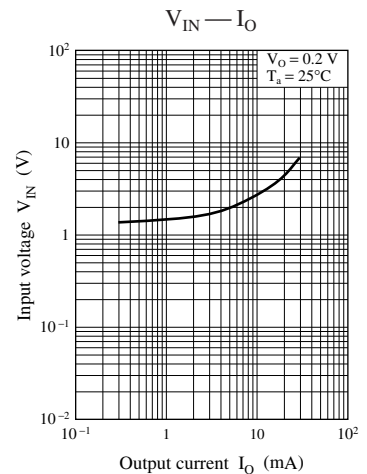
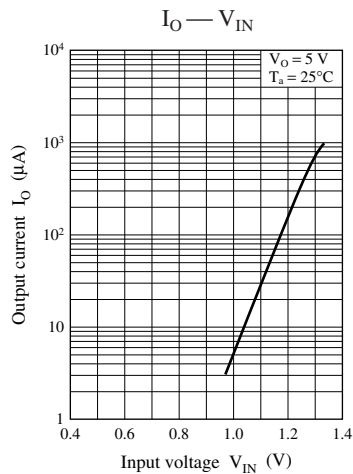
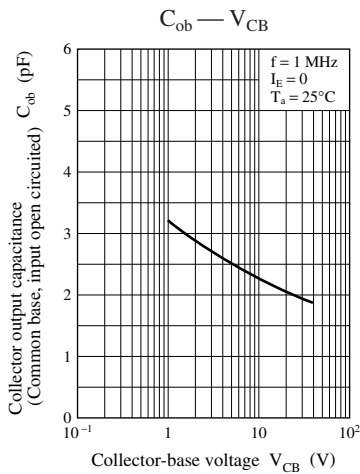
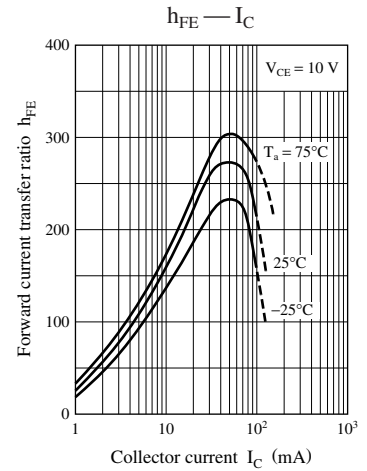
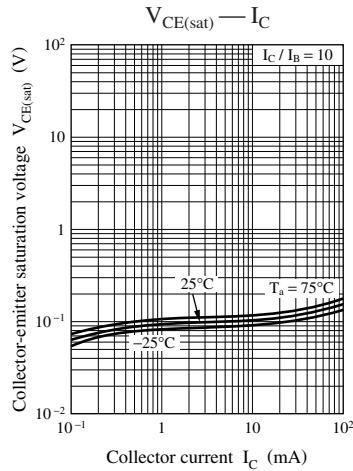
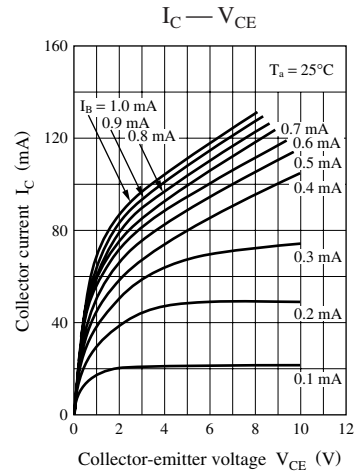




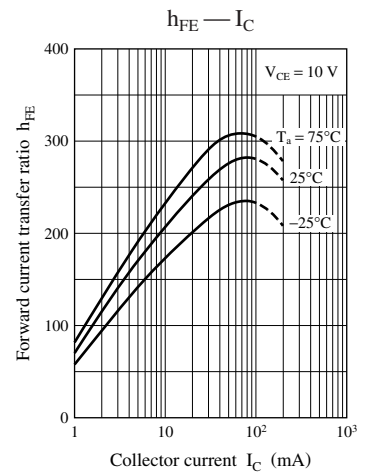
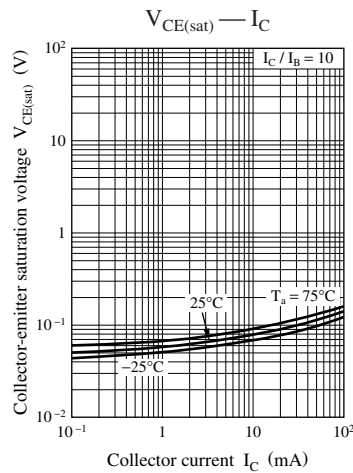
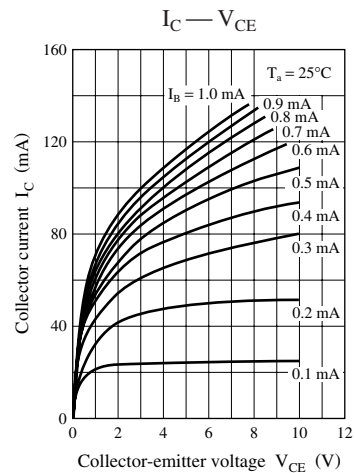
Characteristics charts of UNR5211

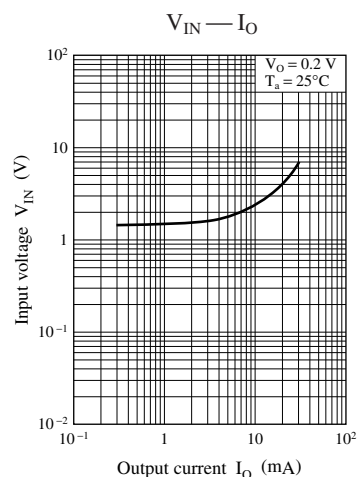
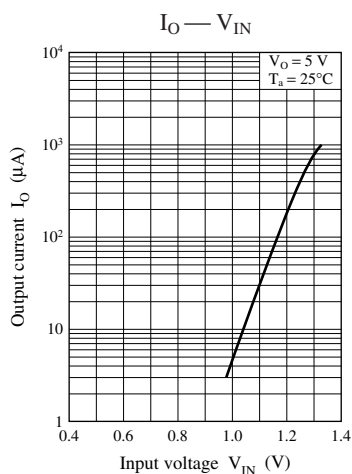
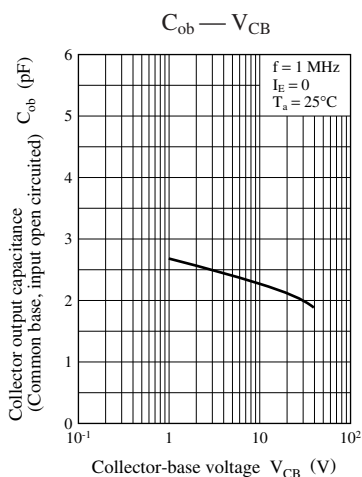


Characteristics charts of UNR5212

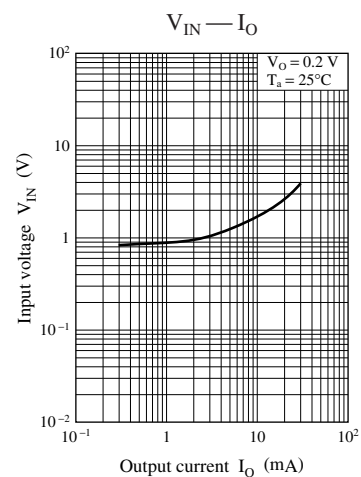
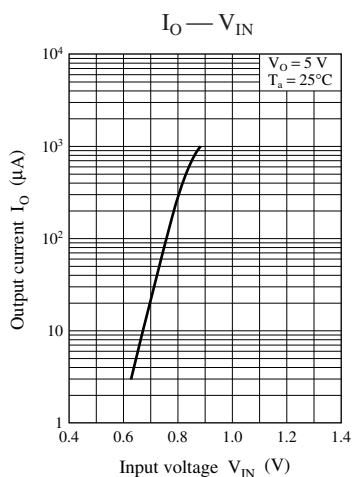
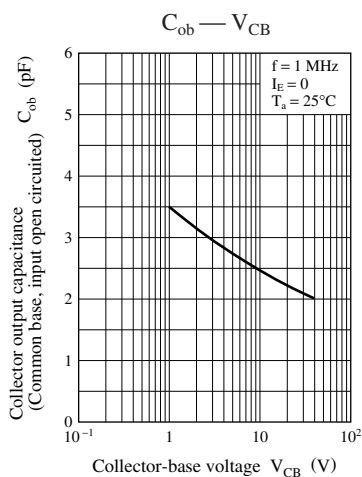
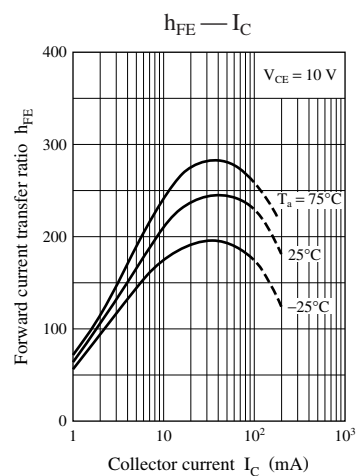
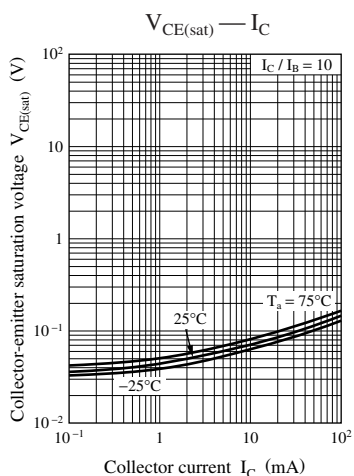
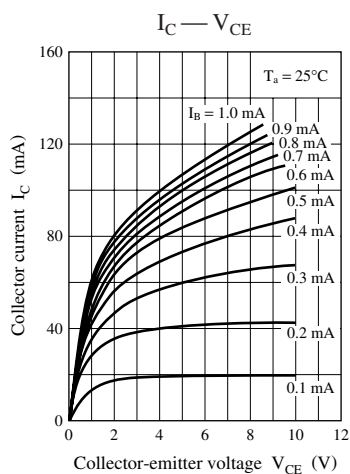


Characteristics charts of UNR5213

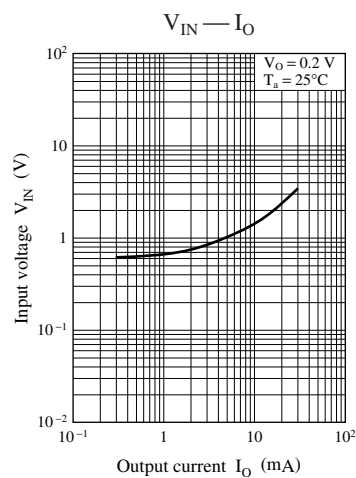
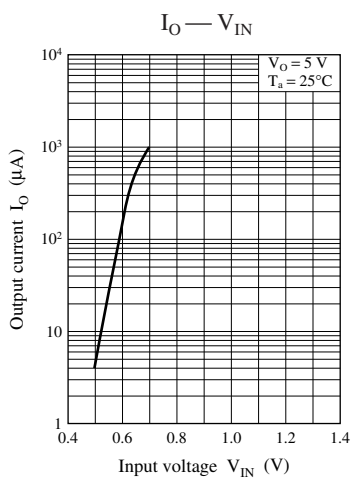
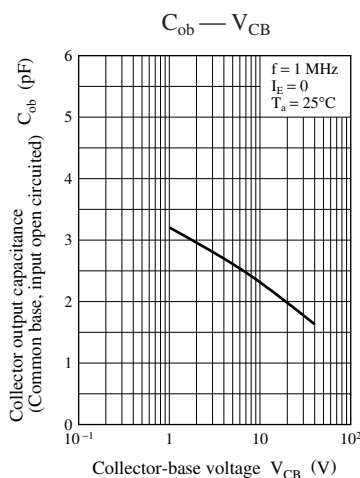
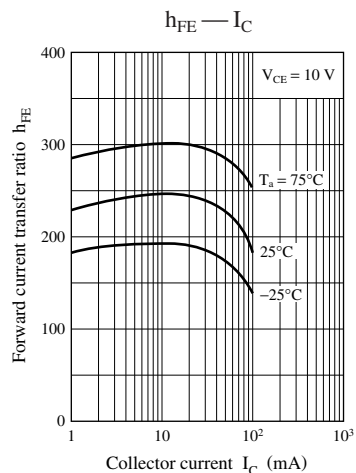
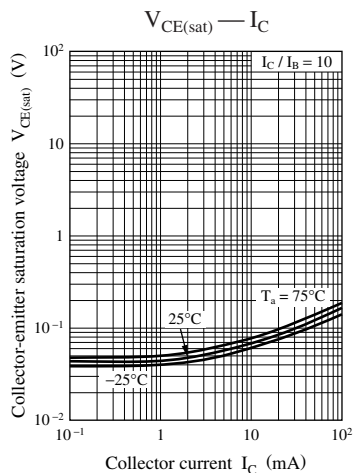
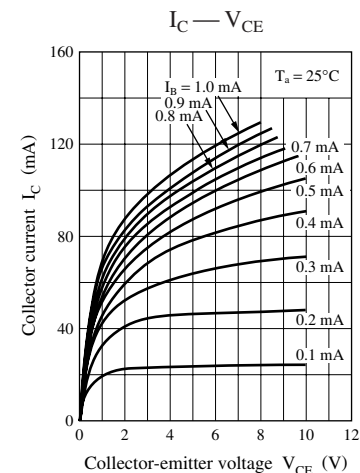




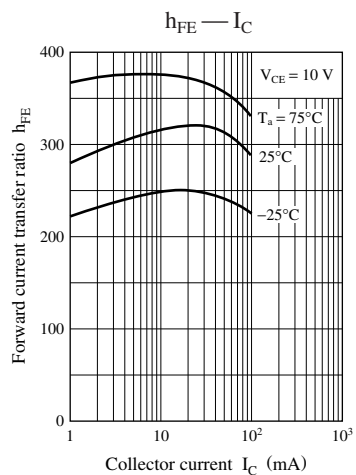
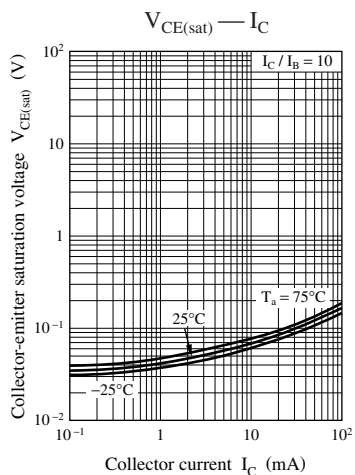
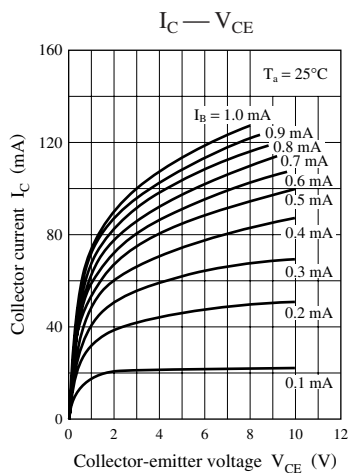
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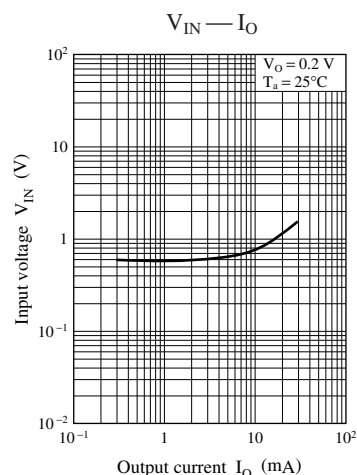
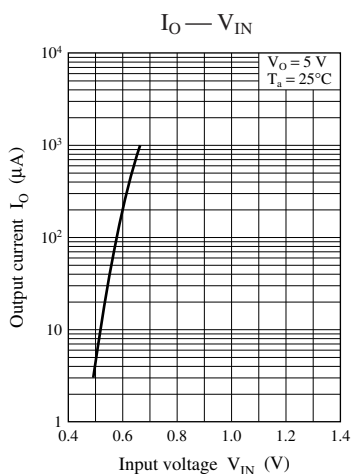
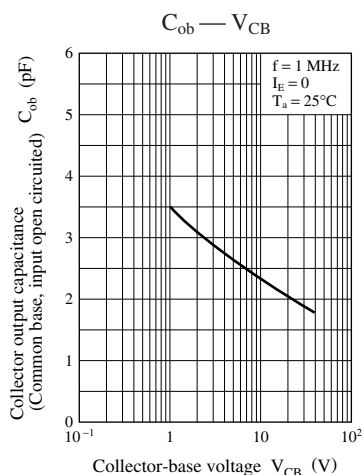


Characteristics charts of UNR5215

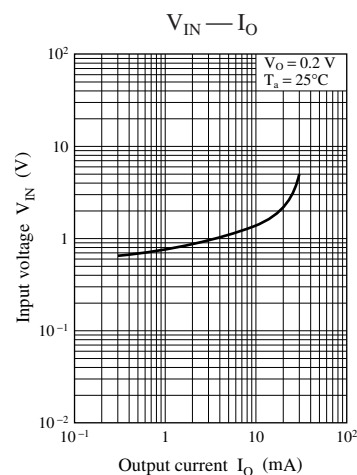
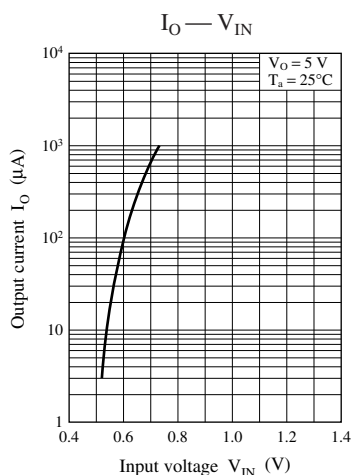
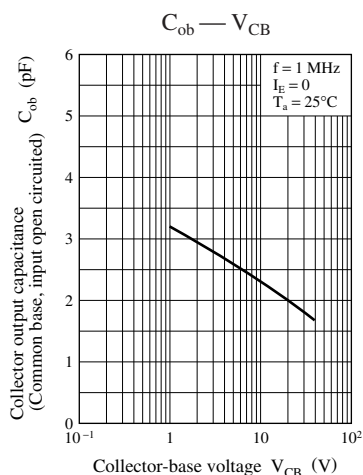
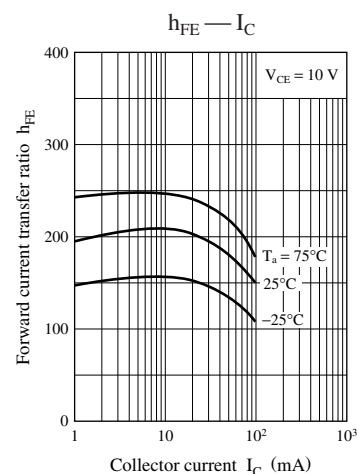
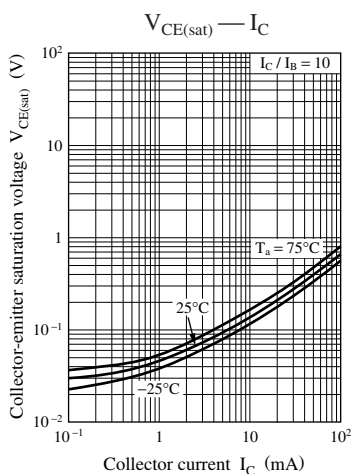
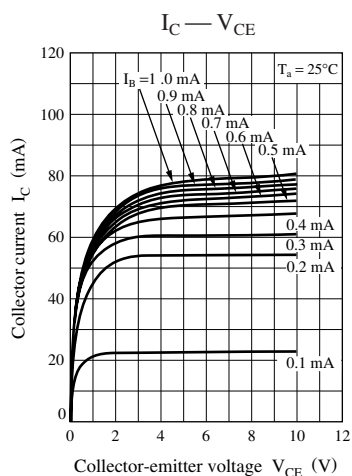


Characteristics charts of UNR5216

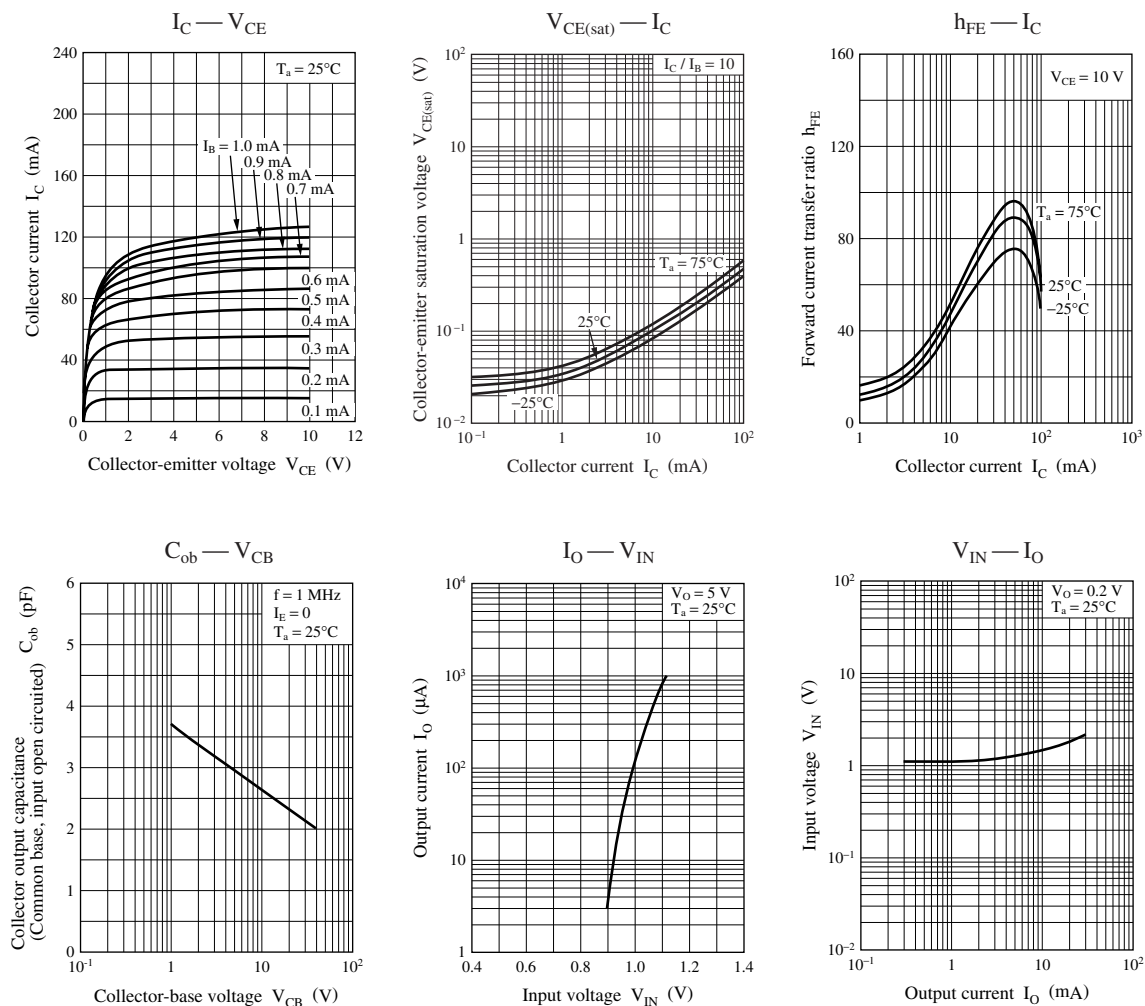




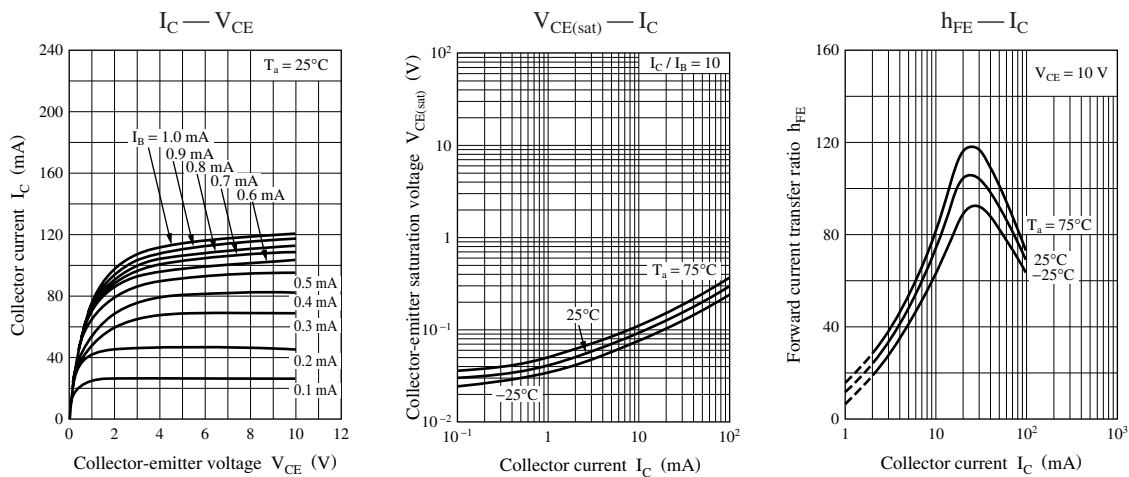
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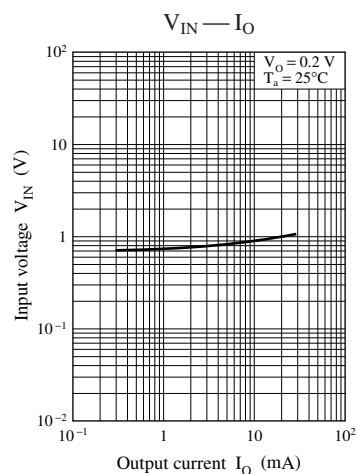
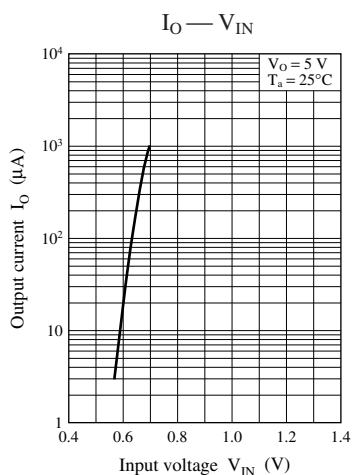
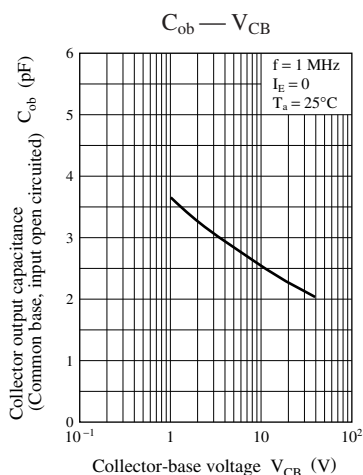


Characteristics charts of UNR5218

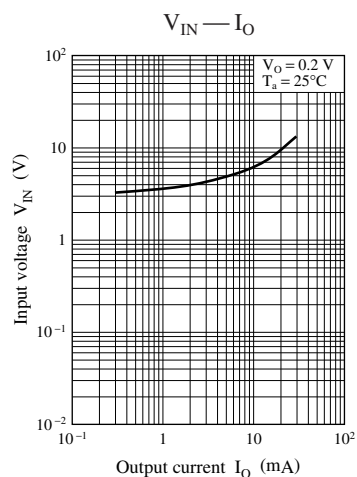
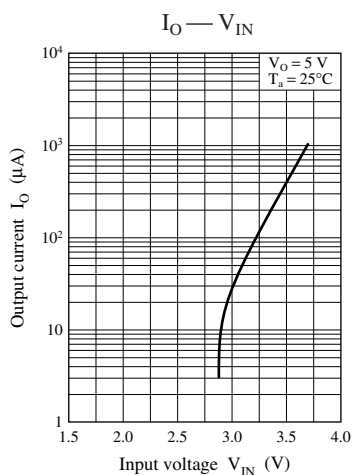
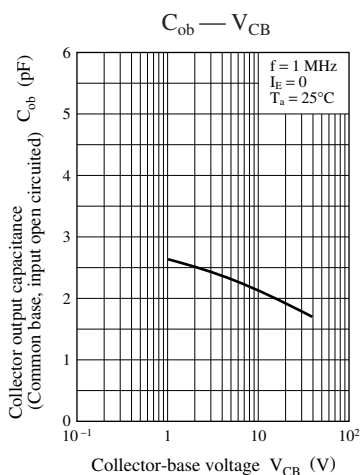
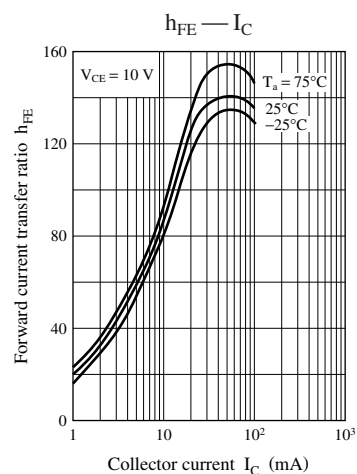
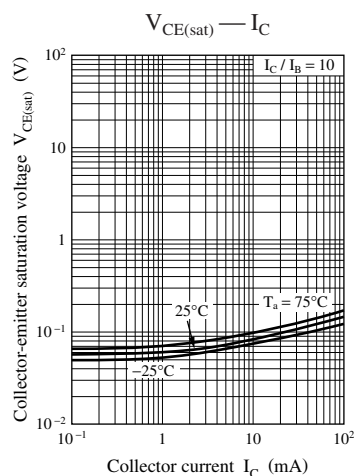
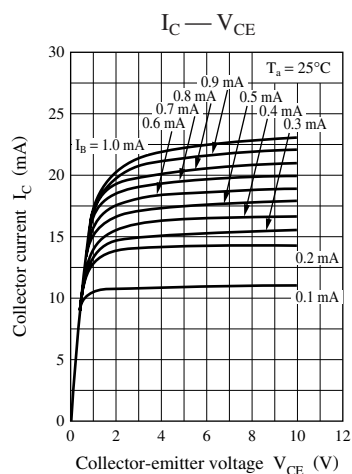


Characteristics charts of UNR5219

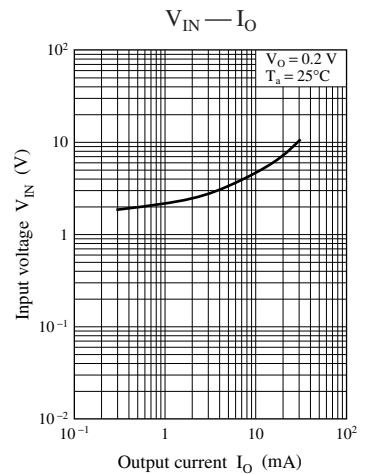
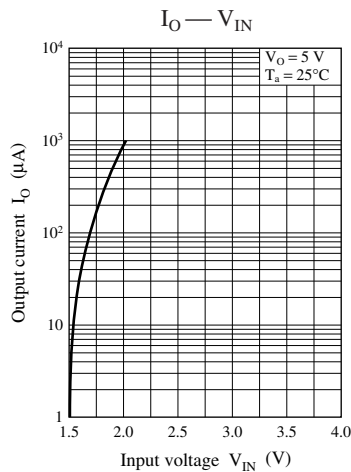
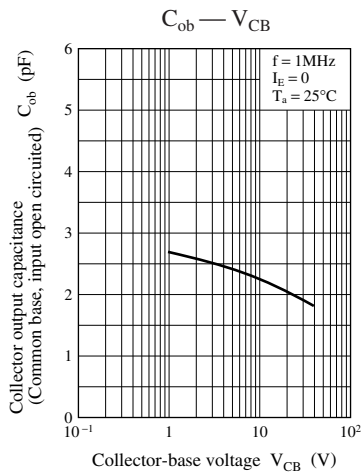
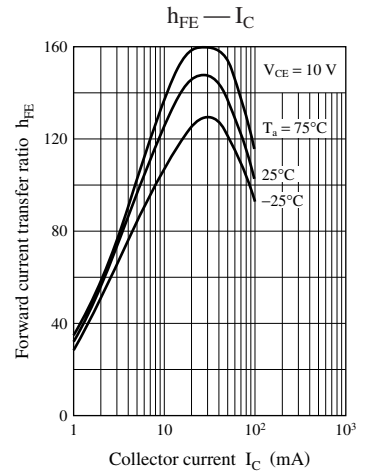
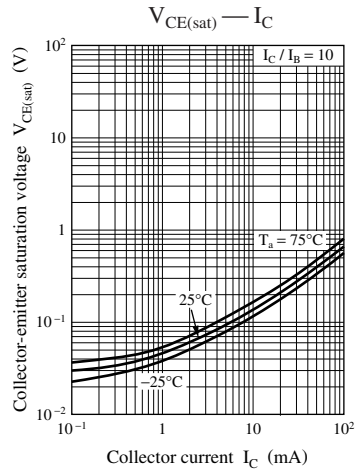
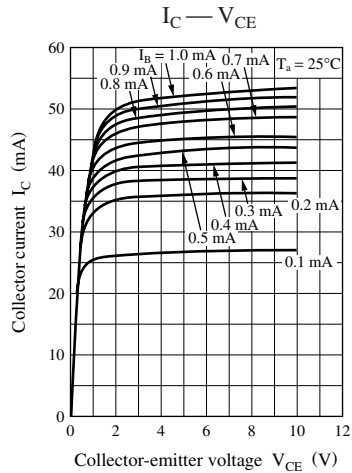




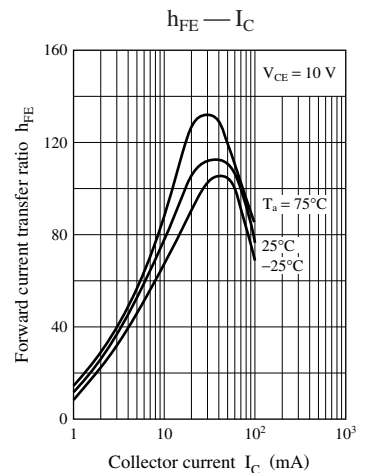
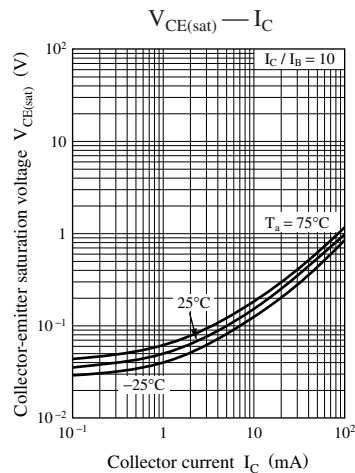
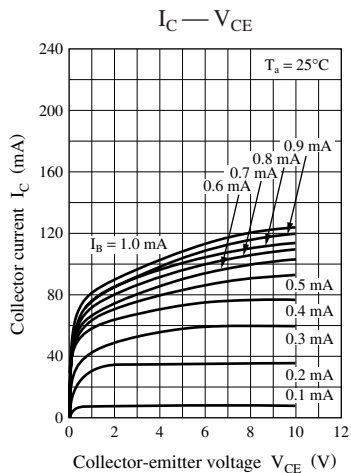
Characteristics charts of UNR521D

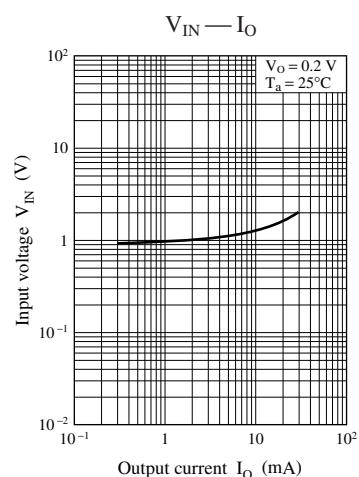
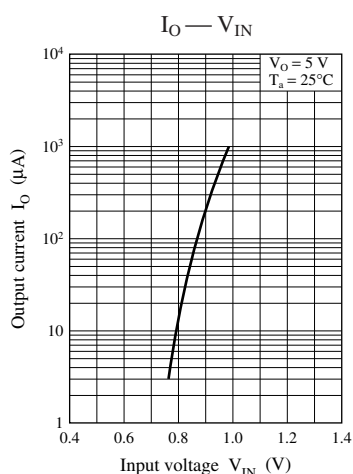
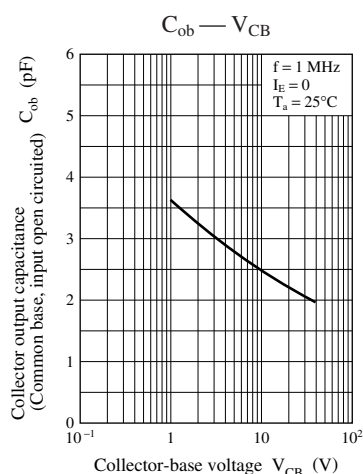


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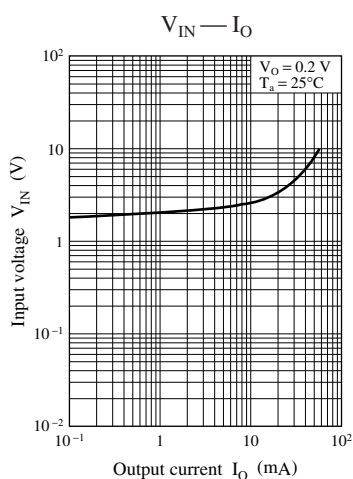
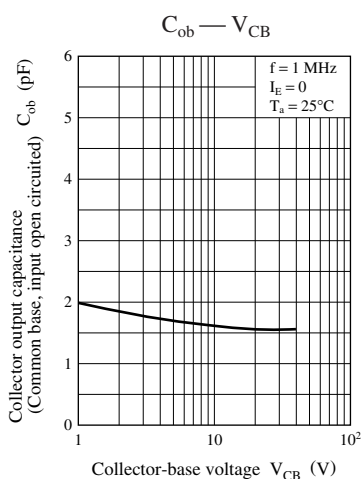
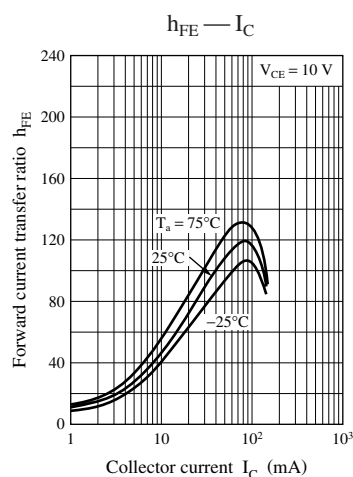
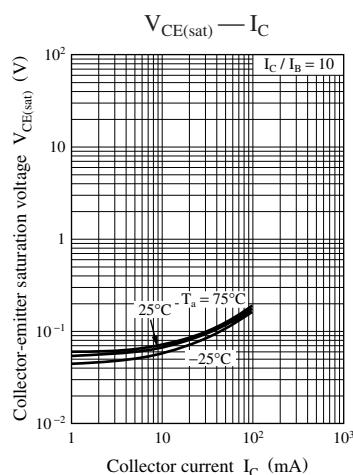
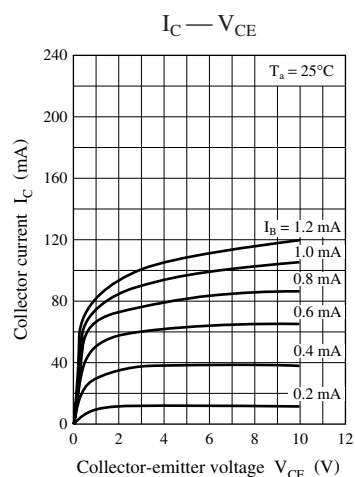


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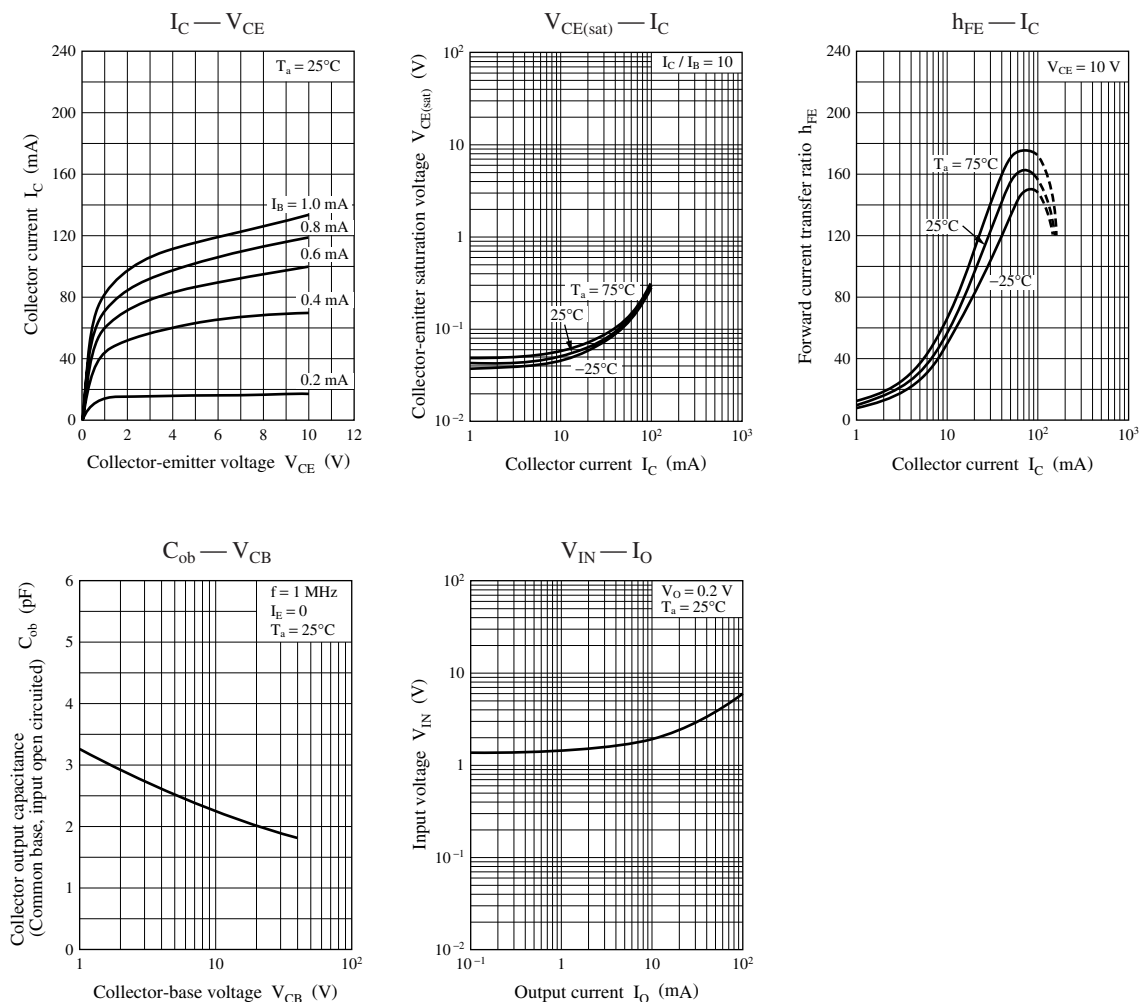




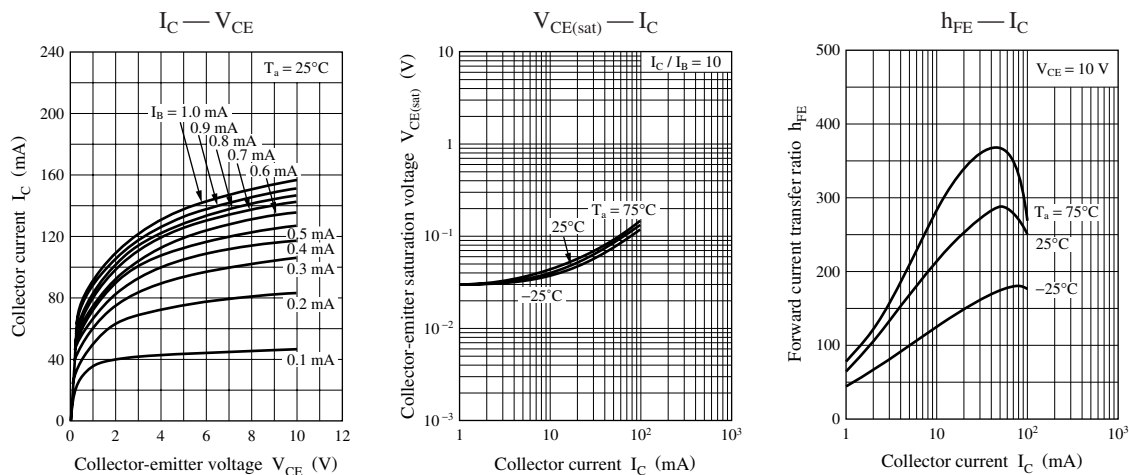
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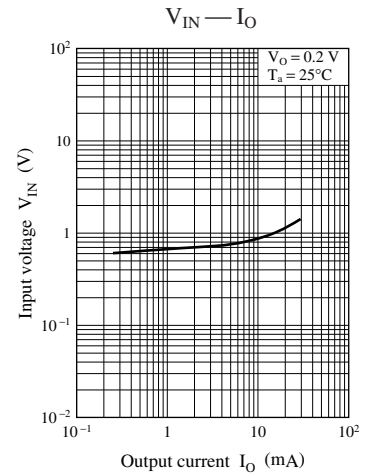
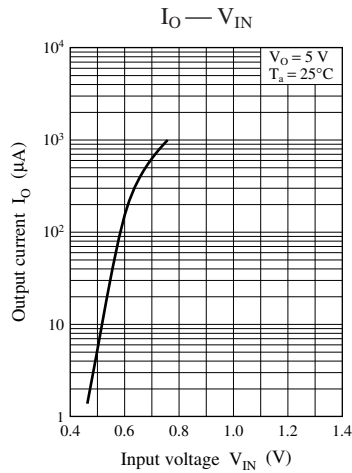
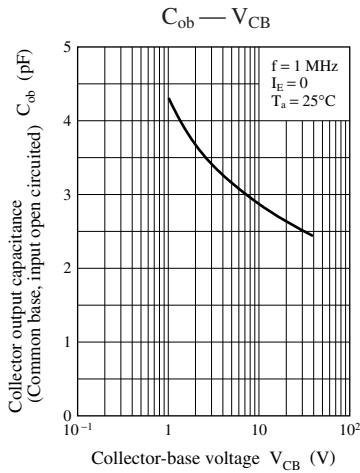


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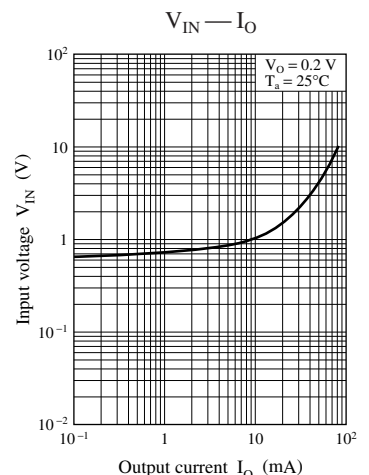
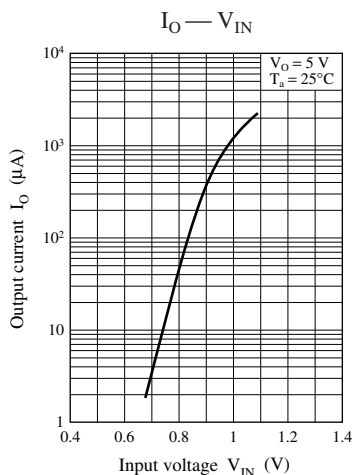
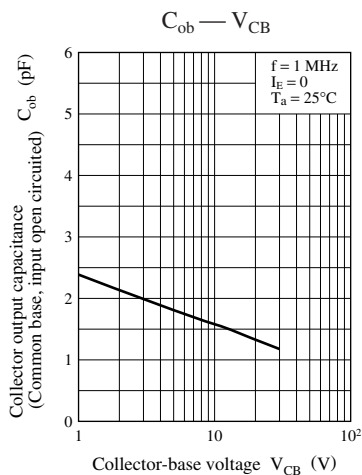
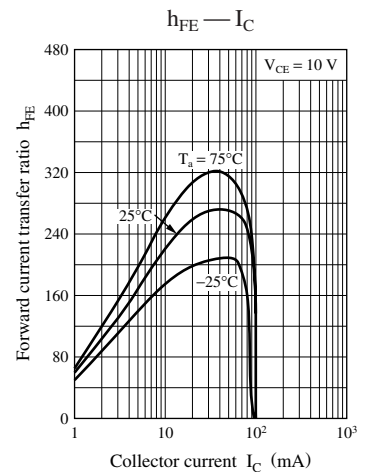
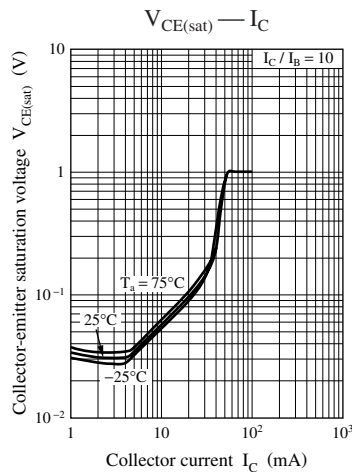
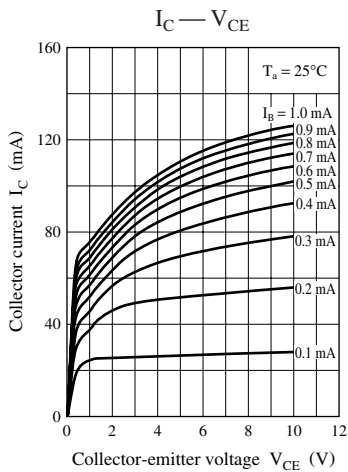


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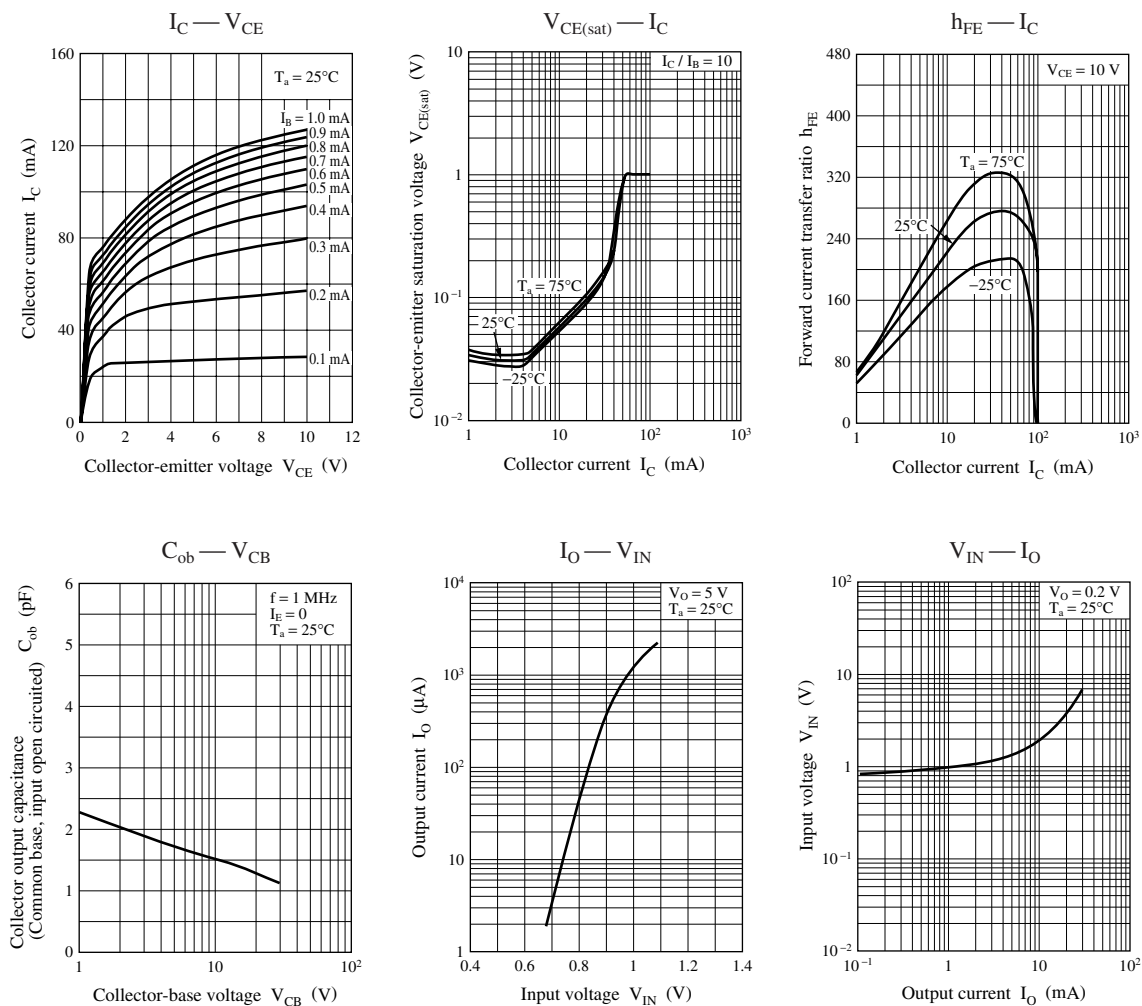




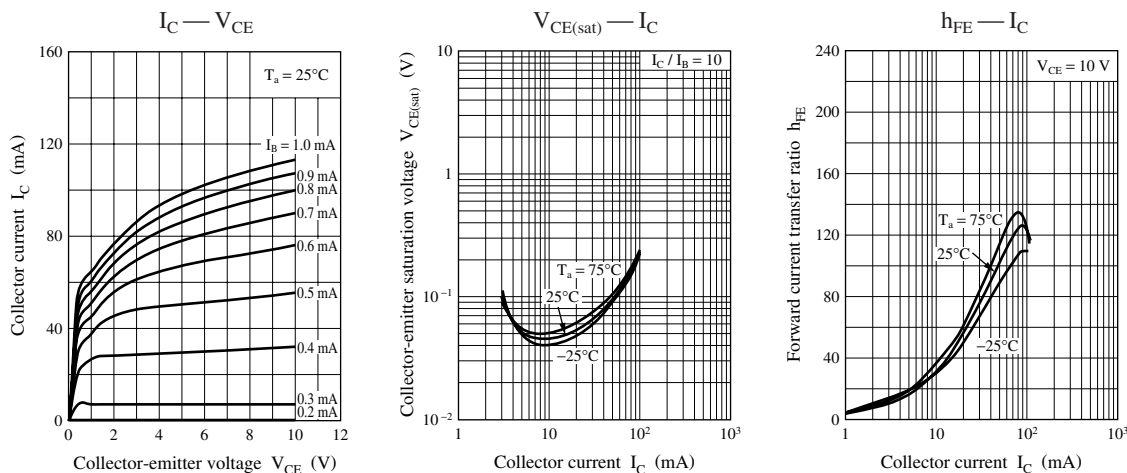
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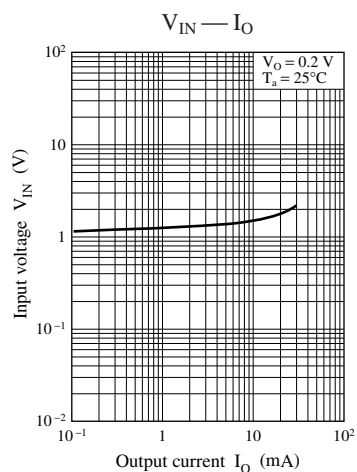
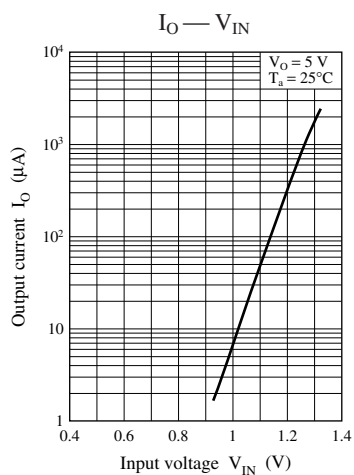
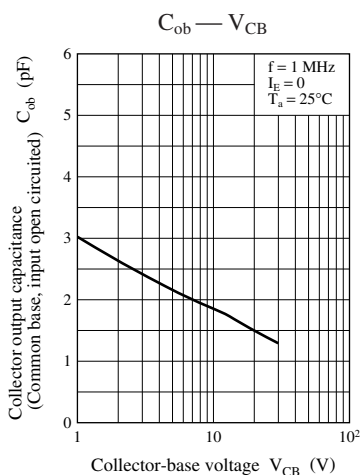


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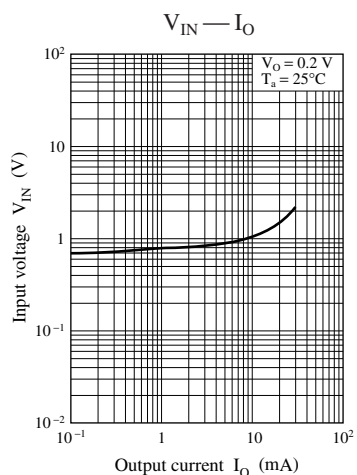
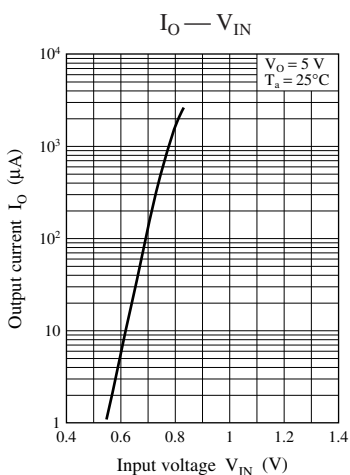
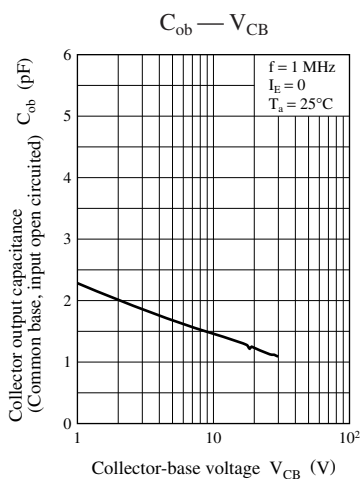
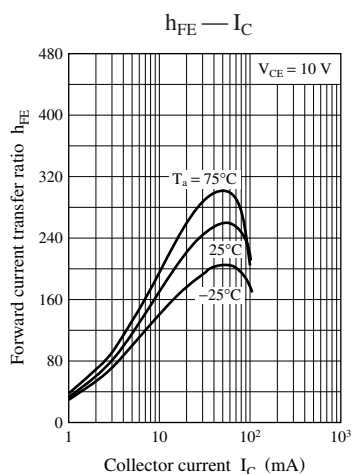
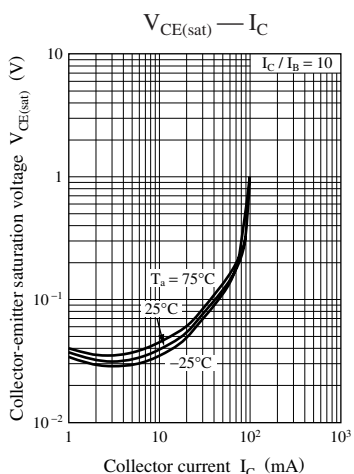
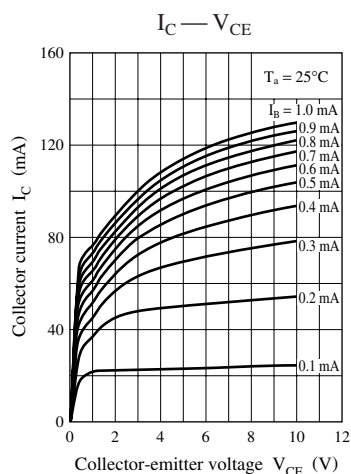


Characteristics charts of UNR521V





Characteristics charts of UNR521Z



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