

UNR221x Series (UN221x Series)

Silicon NPN epitaxial planar type

For digital circuits

■ Features

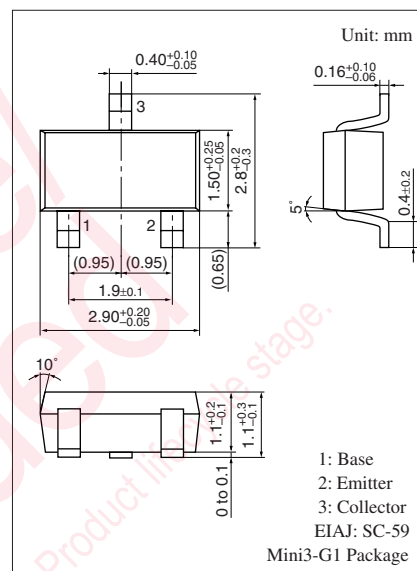
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- Mini type package allowing easy automatic insertion through tape packing and magazine packing

■ Resistance by Part Number

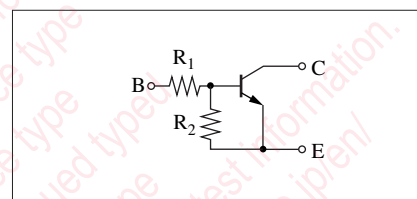
		Marking Symbol (R ₁)	(R ₂)
• UNR2210 (UN2210)	8L	47 kΩ	—
• UNR2211 (UN2211)	8A	10 kΩ	10 kΩ
• UNR2212 (UN2212)	8B	22 kΩ	22 kΩ
• UNR2213 (UN2213)	8C	47 kΩ	47 kΩ
• UNR2214 (UN2214)	8D	10 kΩ	47 kΩ
• UNR2215 (UN2215)	8E	10 kΩ	—
• UNR2216 (UN2216)	8F	4.7 kΩ	—
• UNR2217 (UN2217)	8H	22 kΩ	—
• UNR2218 (UN2218)	8I	0.51 kΩ	5.1 kΩ
• UNR2219 (UN2219)	8K	1 kΩ	10 kΩ
• UNR221D (UN221D)	8M	47 kΩ	10 kΩ
• UNR221E (UN221E)	8N	47 kΩ	22 kΩ
• UNR221F (UN221F)	8O	4.7 kΩ	10 kΩ
• UNR221K (UN221K)	8P	10 kΩ	4.7 kΩ
• UNR221L (UN221L)	8Q	4.7 kΩ	4.7 kΩ
• UNR221M (UN221M)	EL	2.2 kΩ	47 kΩ
• UNR221N (UN221N)	EX	4.7 kΩ	47 kΩ
• UNR221T (UN221T)	EZ	22 kΩ	47 kΩ
• UNR221V (UN221V)	FD	2.2 kΩ	2.2 kΩ
• UNR221Z (UN221Z)	FF	4.7 kΩ	22 kΩ

■ 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



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	μA
Emitter-base cutoff current (Collector open)	UNR2210/2215/2216/2217	I_{EBO}	$V_{\text{EB}} = -6\ \text{V}$, $I_{\text{C}} = 0$			0.01	mA
	UNR2213					0.1	
	UNR2212/2214/221D/ 221E/221M/221N/221T					0.2	
	UNR221Z					0.4	
	UNR2211					0.5	
	UNR221F/221K					1.0	
	UNR2219					1.5	
	UNR2218/221L/221V					2.0	
Forward current transfer ratio	UNR221V	h_{FE}	$V_{\text{CE}} = 10\ \text{V}$, $I_{\text{C}} = 5\ \text{mA}$	6		20	—
	UNR2218/221K/221L			20			
	UNR2219/221D/221F			30			
	UNR2211			35			
	UNR2212/221E			60			
	UNR221Z			60		200	
	UNR2213/2214/221M			80			
	UNR221N/221T			80		400	
	UNR2210*/2215*/2216*/2217*			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
UNR221V			$I_{\text{C}} = 10\ \text{mA}$, $I_{\text{B}} = 1.5\ \text{mA}$				
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
UNR2213/221K			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 3.5\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
UNR221D			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 10\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
UNR221E			$V_{\text{CC}} = 5\ \text{V}$, $V_{\text{B}} = 6\ \text{V}$, $R_{\text{L}} = 1\ \text{k}\Omega$				
Transition frequency		f_{T}	$V_{\text{CB}} = 10\ \text{V}$, $I_{\text{E}} = -2\ \text{mA}$, $f = 200\ \text{MHz}$		150		MHz
Input resistance	UNR2218	R_{I}		-30%	0.51	+30%	k Ω
	UNR2219				1.0		
	UNR221M/211V				2.2		
	UNR2216/221F/221L/ 221N/221Z				4.7		
	UNR2211/2214/2215/221K				10		
	UNR2212/2217/221T				22		
	UNR2210/2213/221D/221E				47		

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

2. *: Rank classification

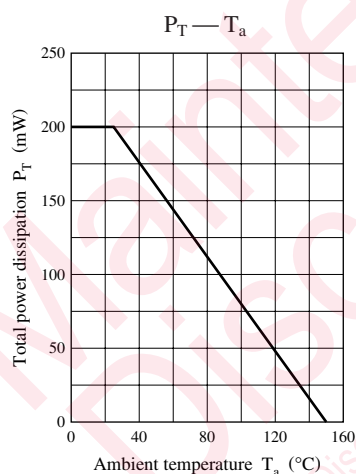
Rank	Q	R	S	No-rank
h_{FE}	160 to 260	210 to 340	290 to 460	160 to 460

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

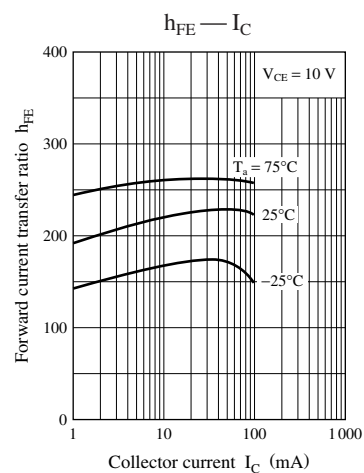
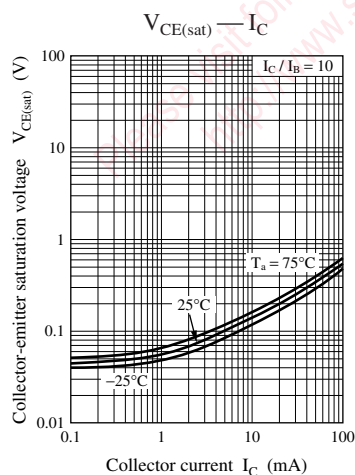
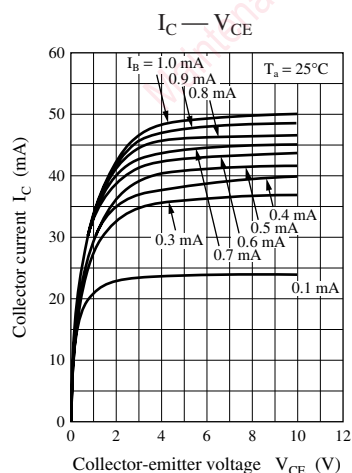
Parameter	Symbol	Conditions	Min	Typ	Max	Unit
Resistance ratio	UNR221M	R_1/R_2		0.047		—
	UNR221N			0.1		
	UNR2218/2219		0.08	0.10	0.12	
	UNR221Z			0.21		
	UNR2214		0.17	0.21	0.25	
	UNR221T			0.47		
	UNR221F		0.37	0.47	0.57	
	UNR221V			1.0		
	UNR2211/2212/2213/221L		0.8	1.0	1.2	
	UNR221K		1.70	2.13	2.60	
	UNR221E		1.70	2.14	2.60	
	UNR221D		3.7	4.7	5.7	

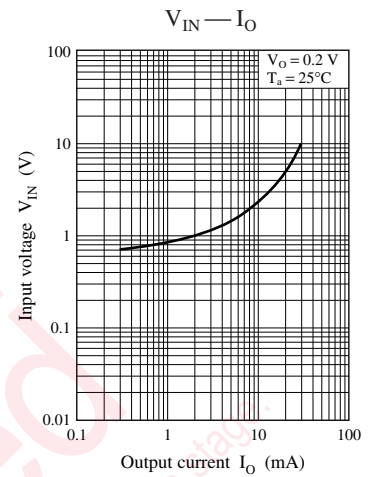
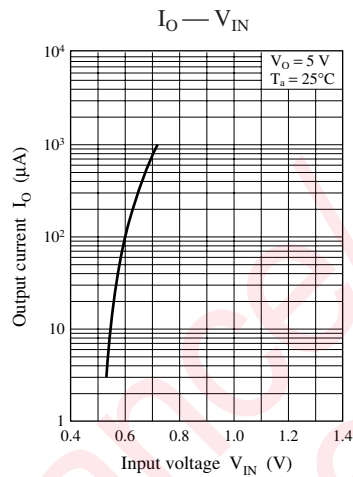
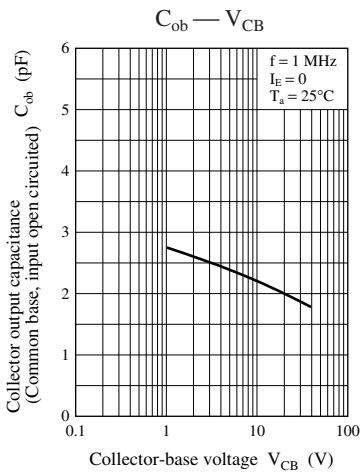
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

Common characteristics chart

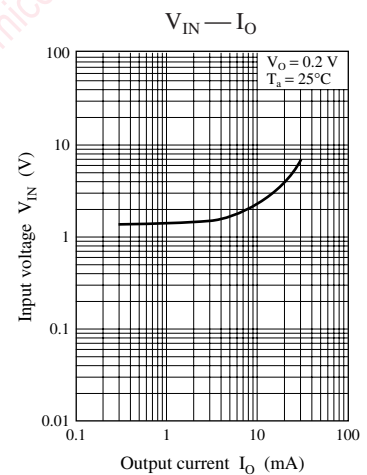
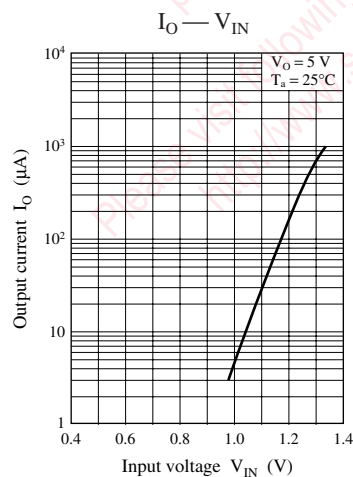
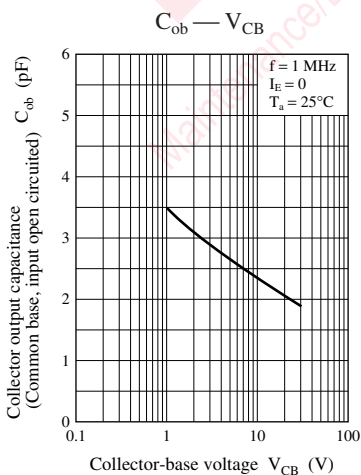
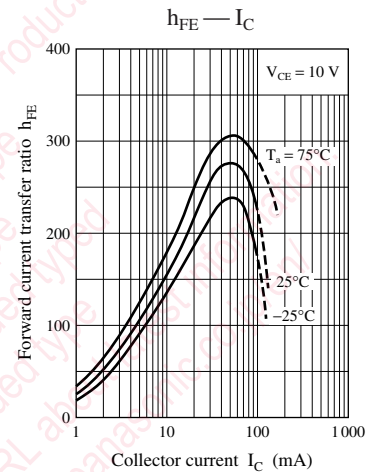
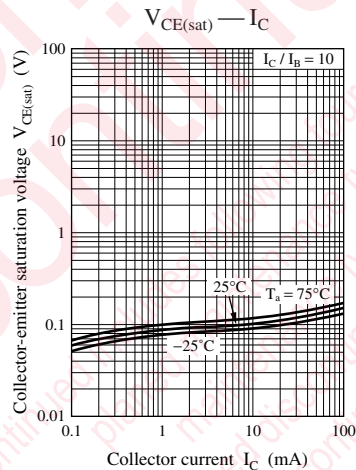
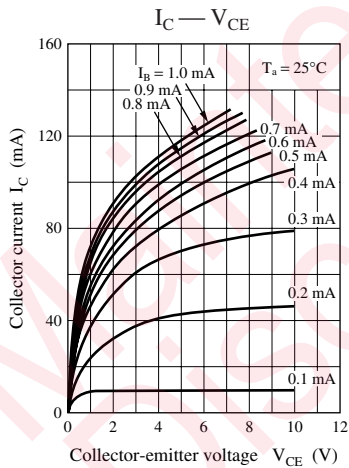


Characteristics charts of UNR2210

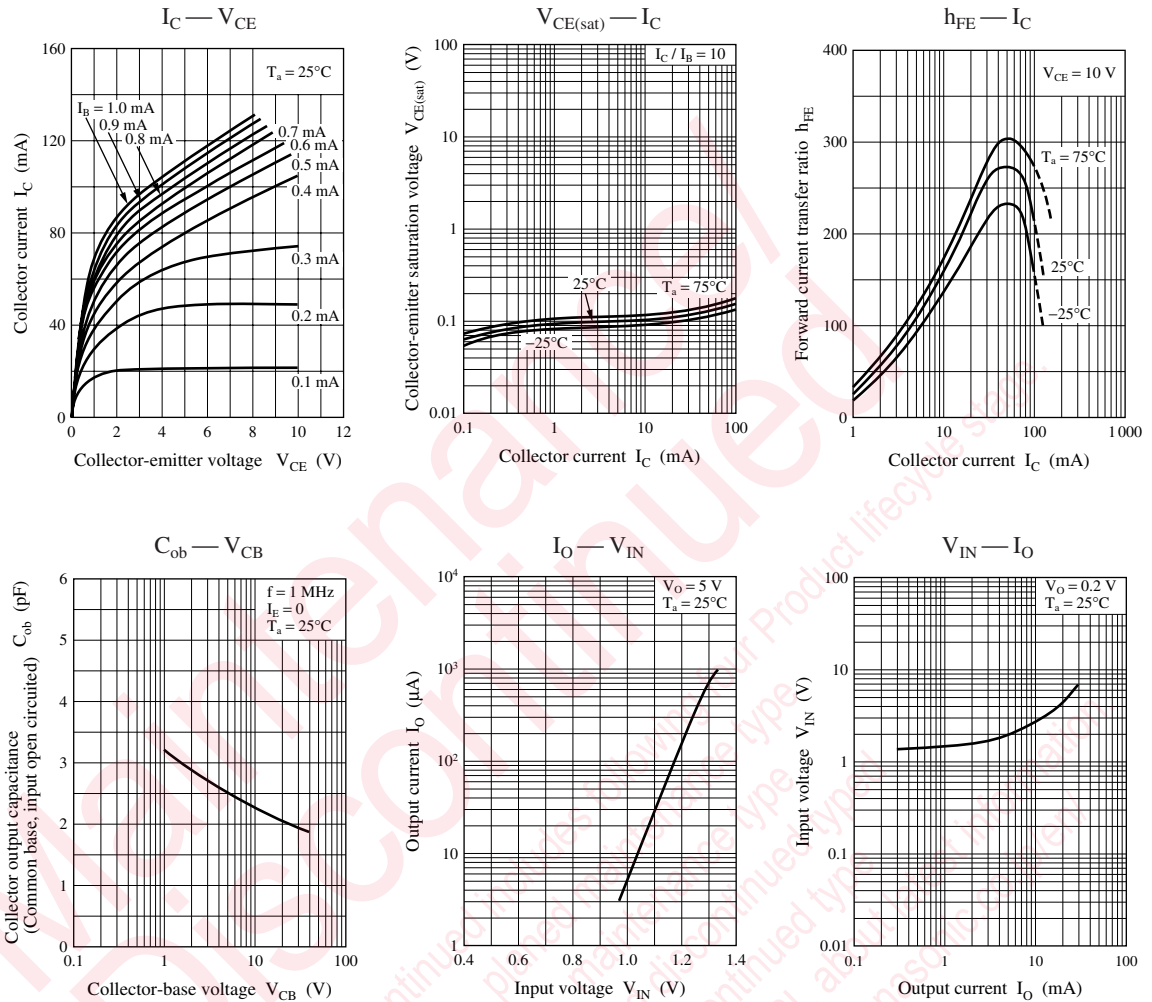




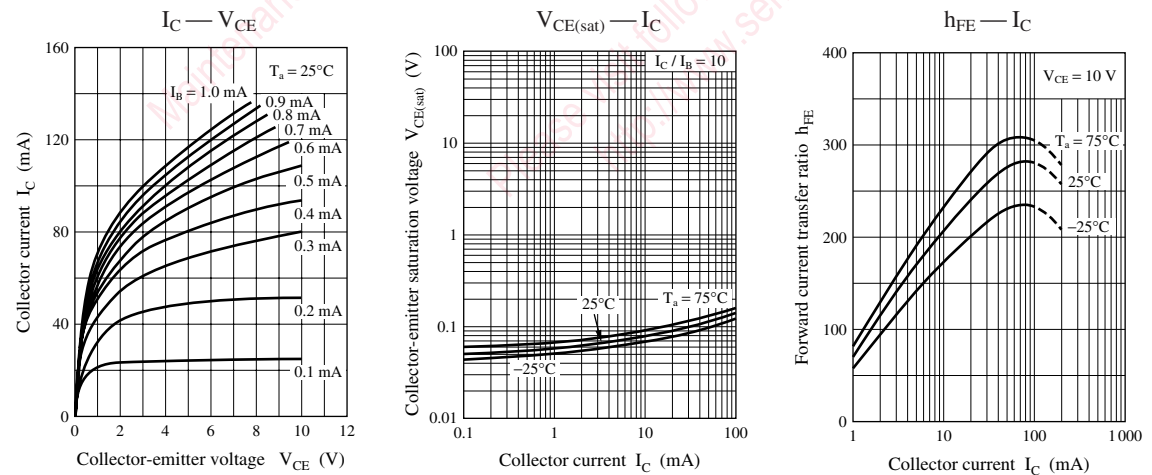
Characteristics charts of UNR2211

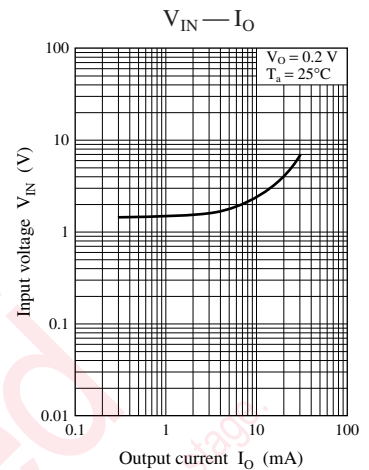
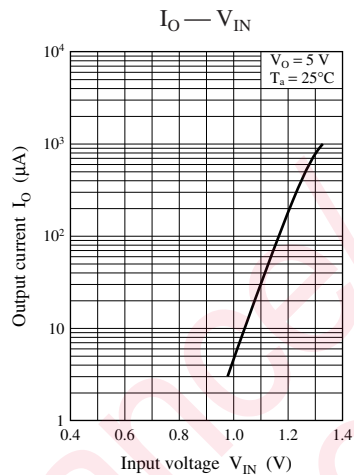
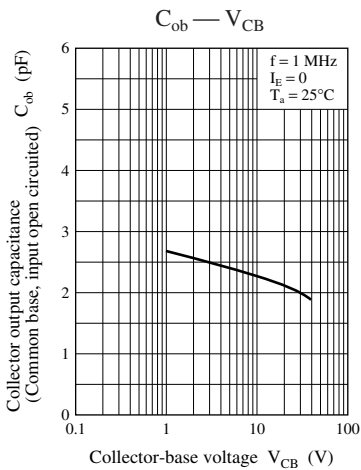


Characteristics charts of UNR2212

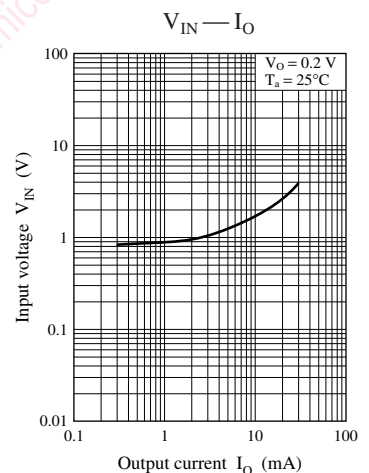
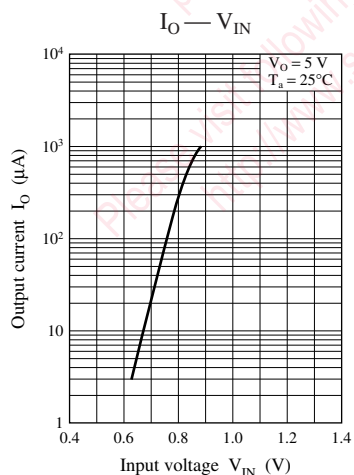
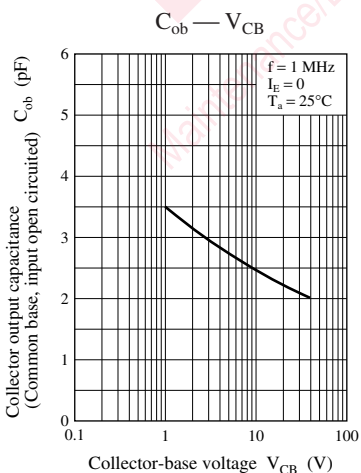
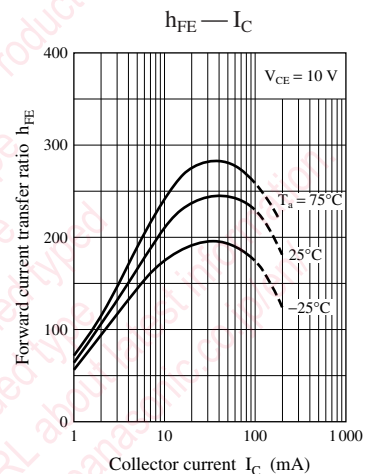
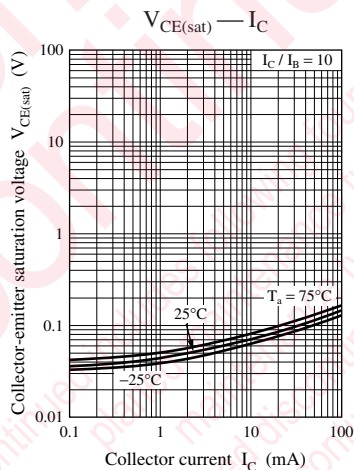
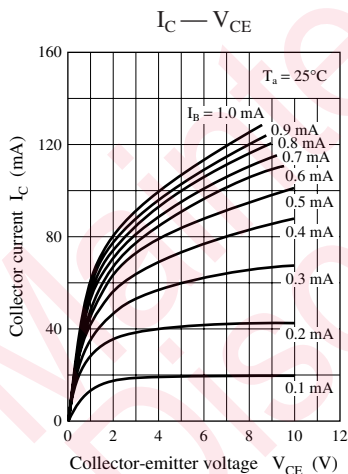


Characteristics charts of UNR2213

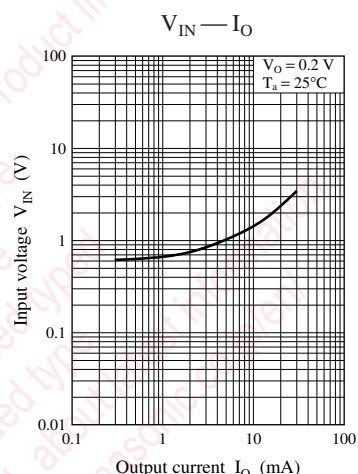
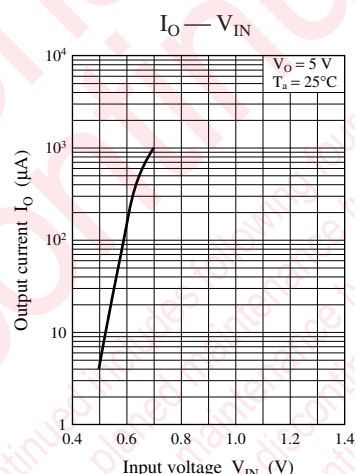
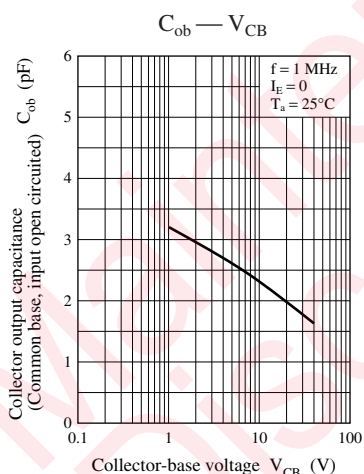
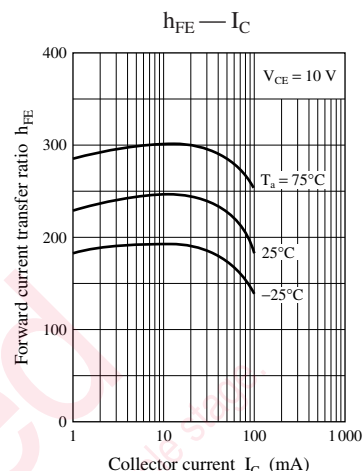
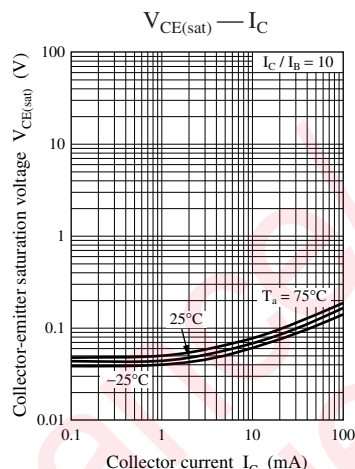
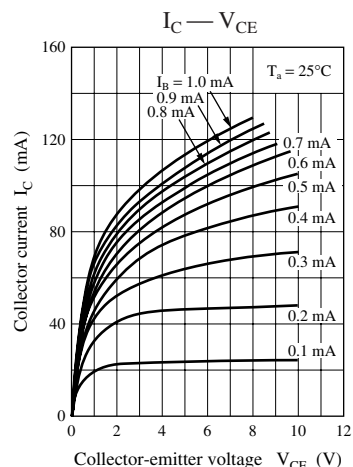




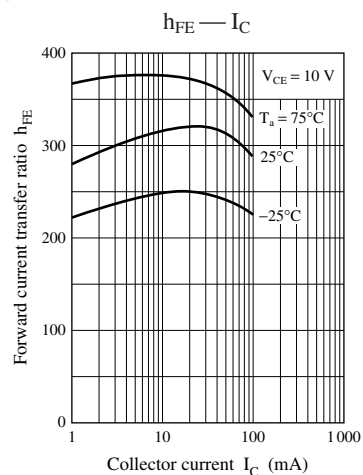
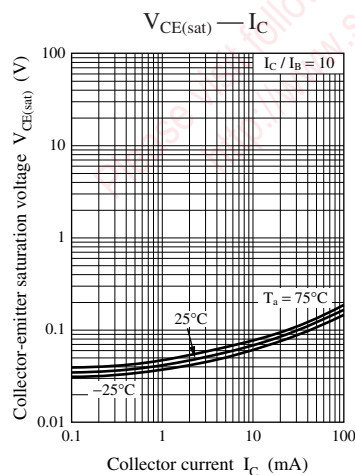
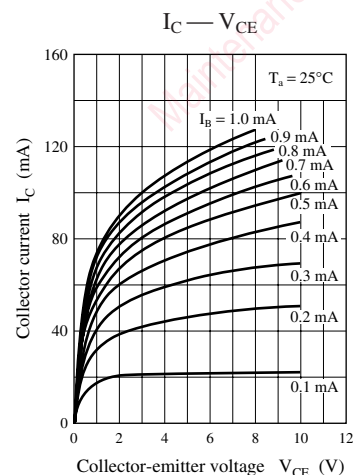
Characteristics charts of UNR2214

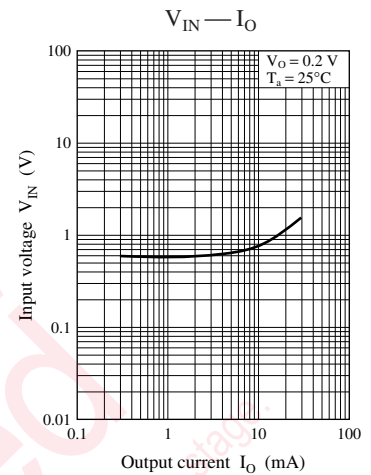
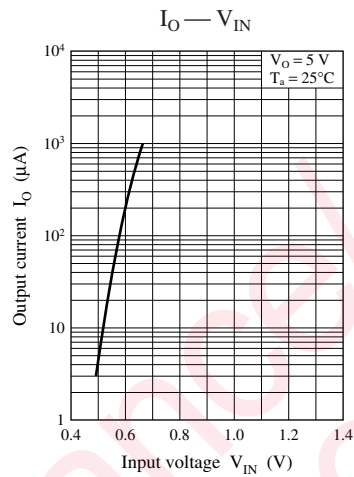
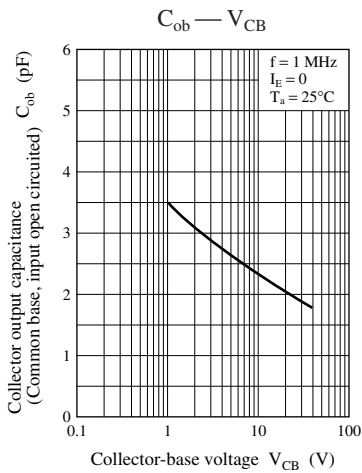


Characteristics charts of UNR2215

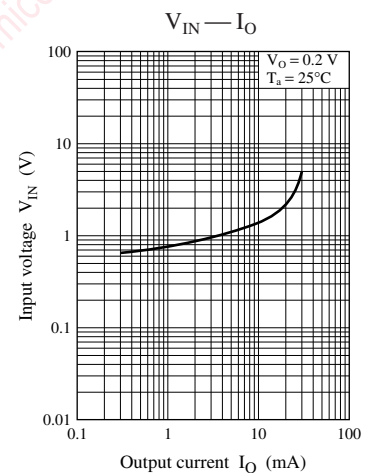
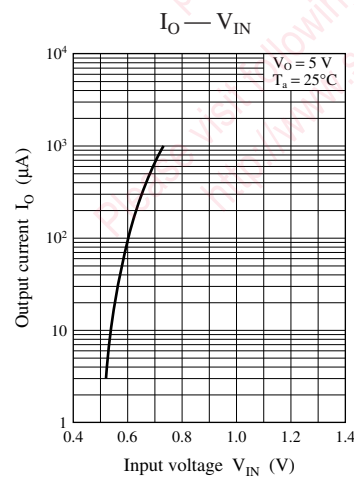
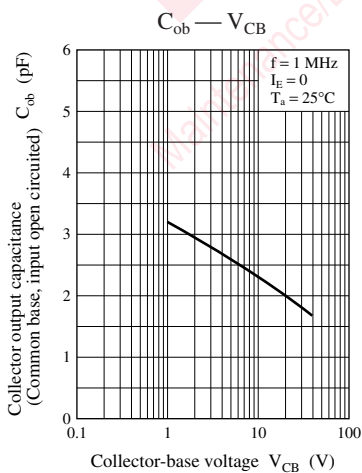
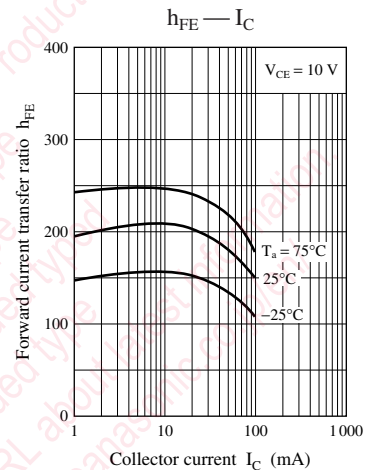
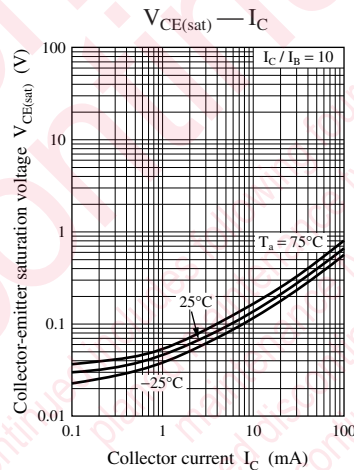
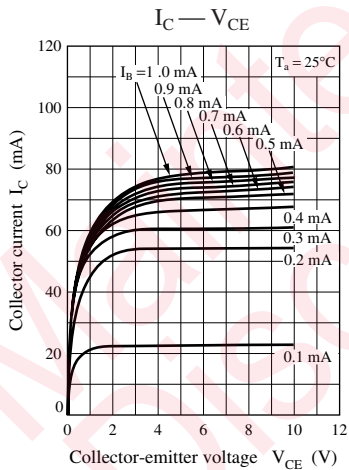


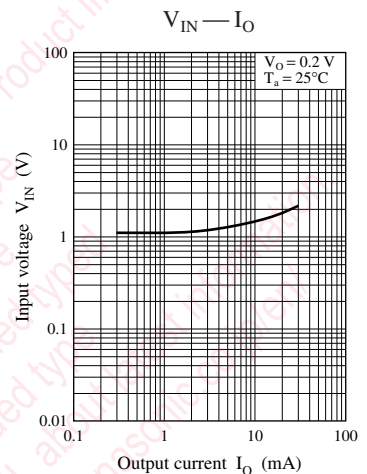
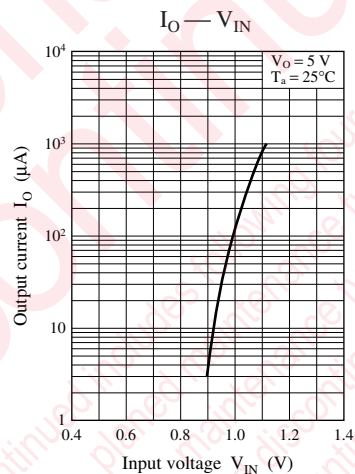
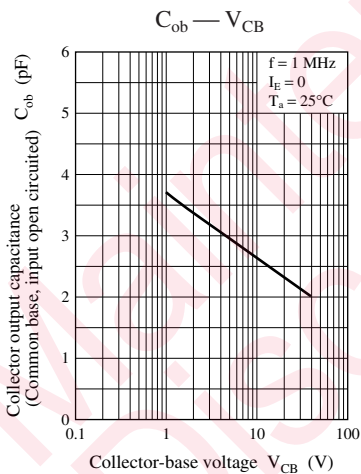
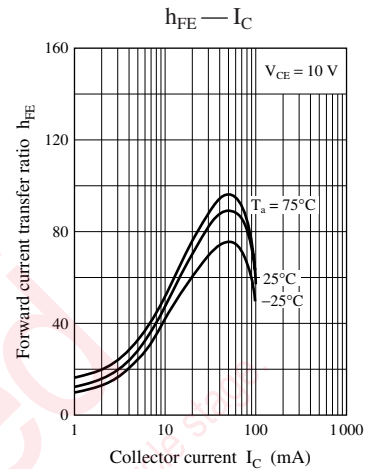
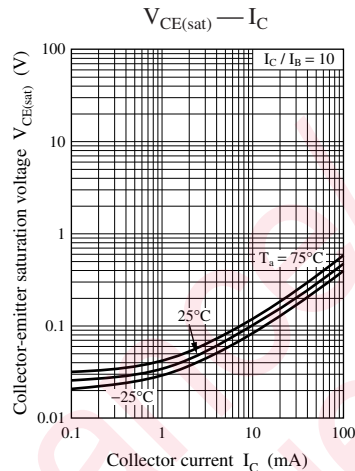
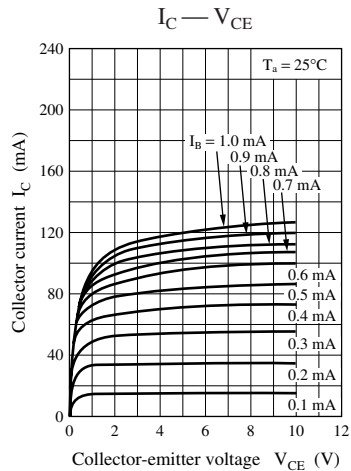
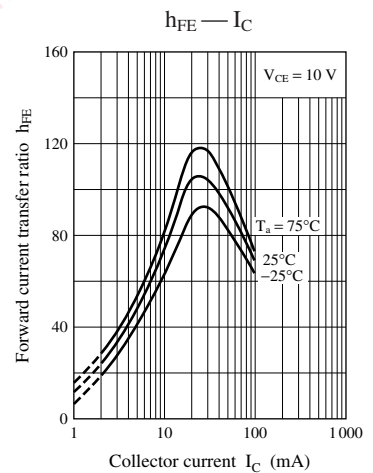
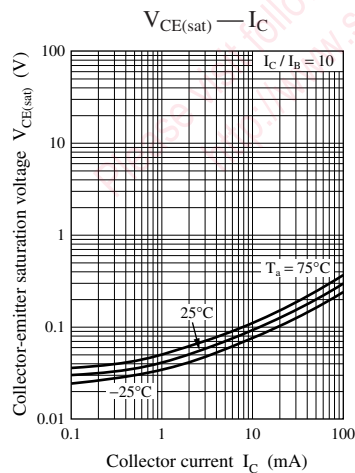
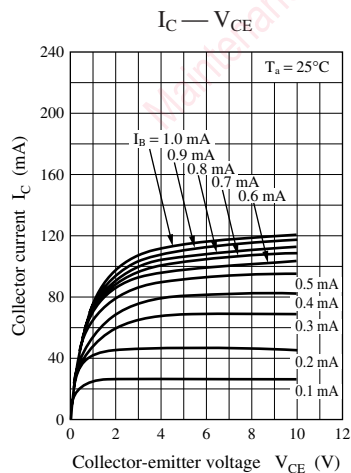
Characteristics charts of UNR2216

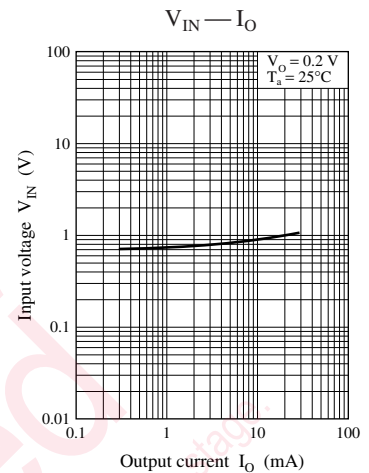
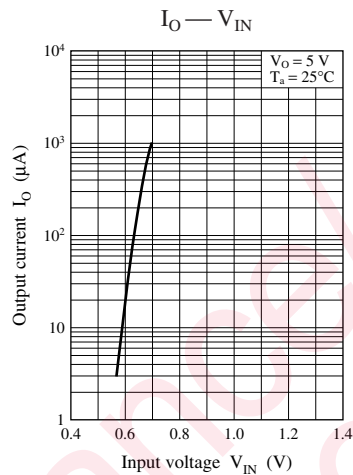
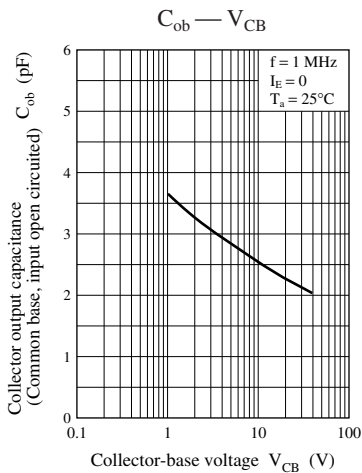




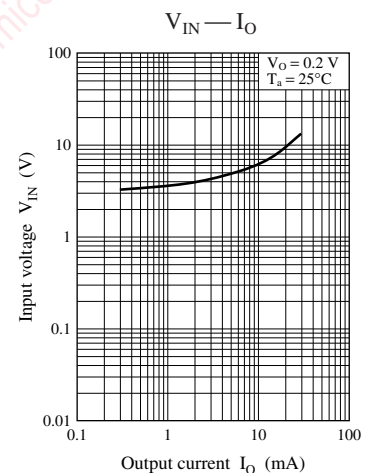
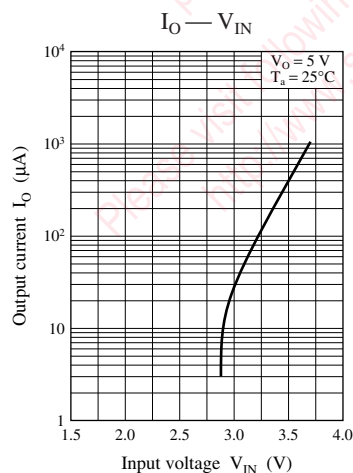
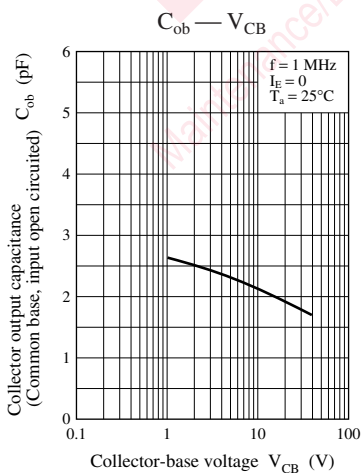
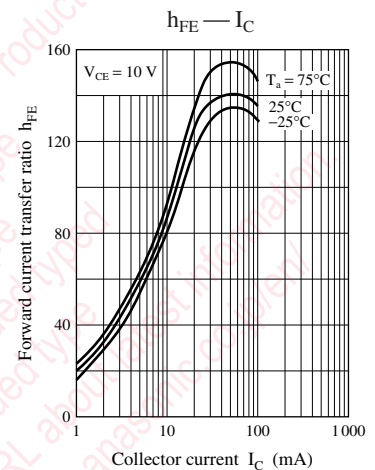
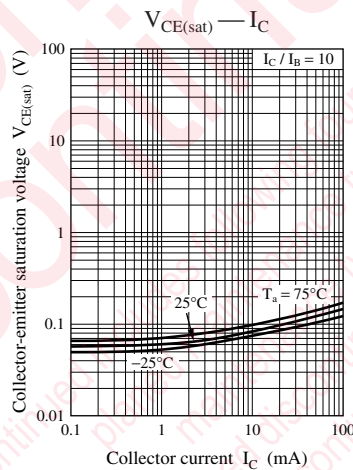
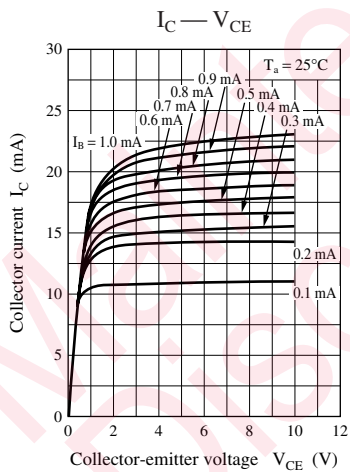
Characteristics charts of UNR2217



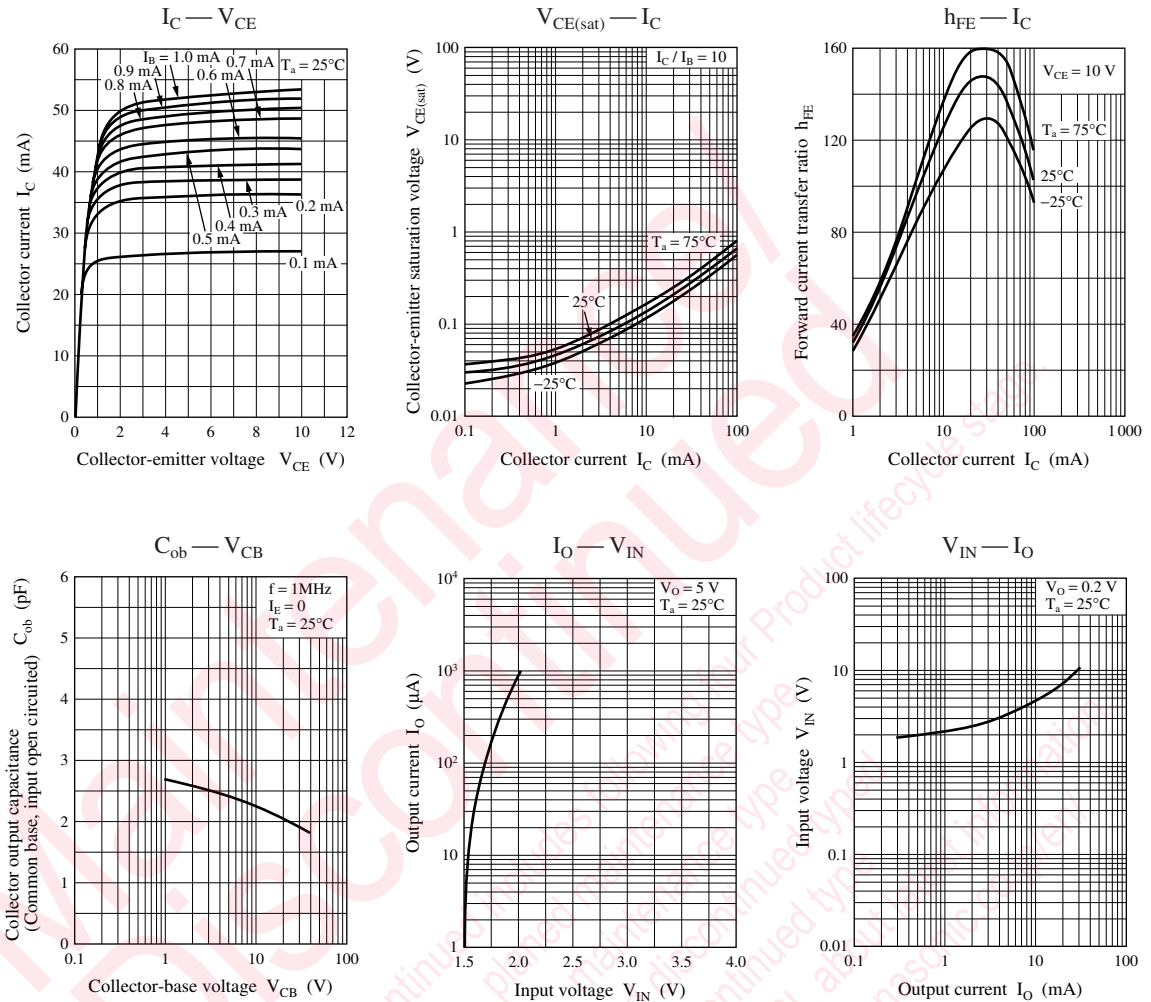
Characteristics charts of UNR2218**Characteristics charts of UNR2219**



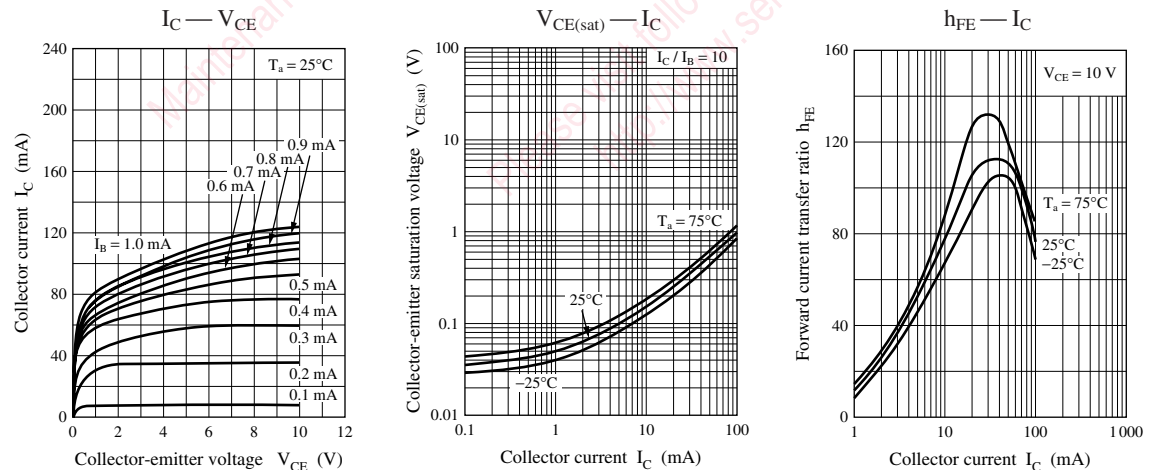
Characteristics charts of UNR221D

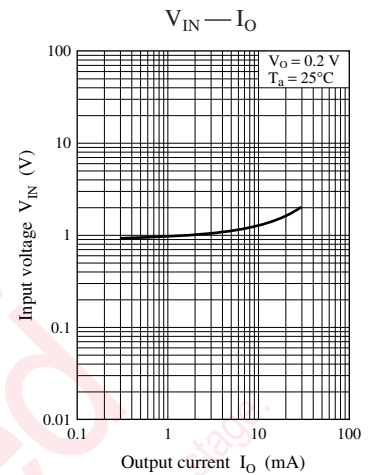
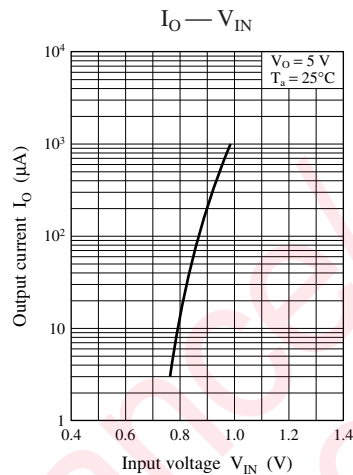
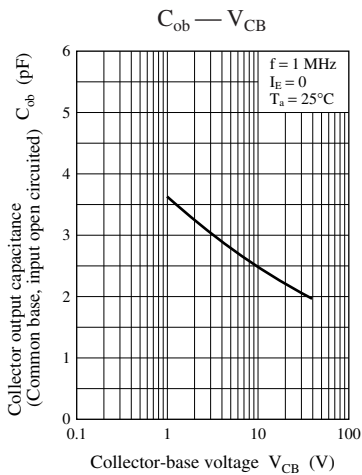


Characteristics charts of UNR221E

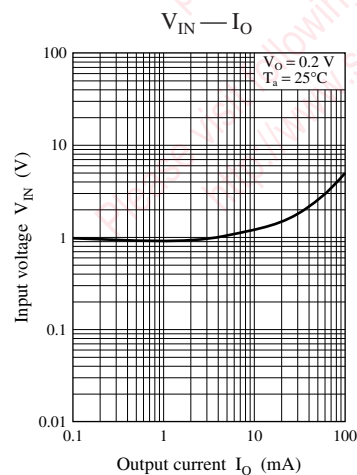
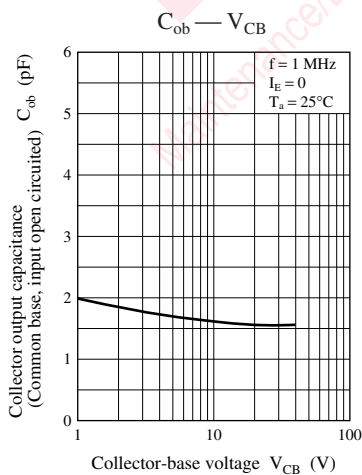
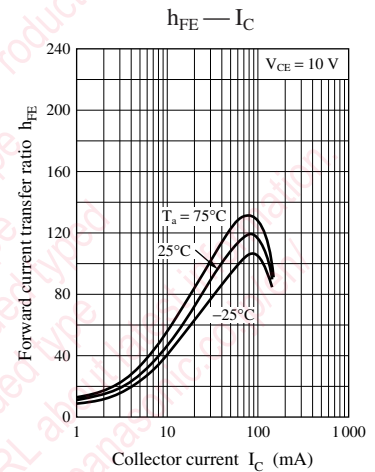
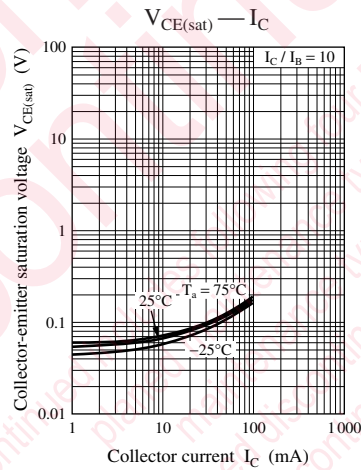
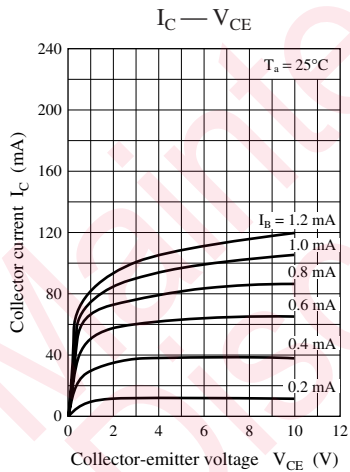


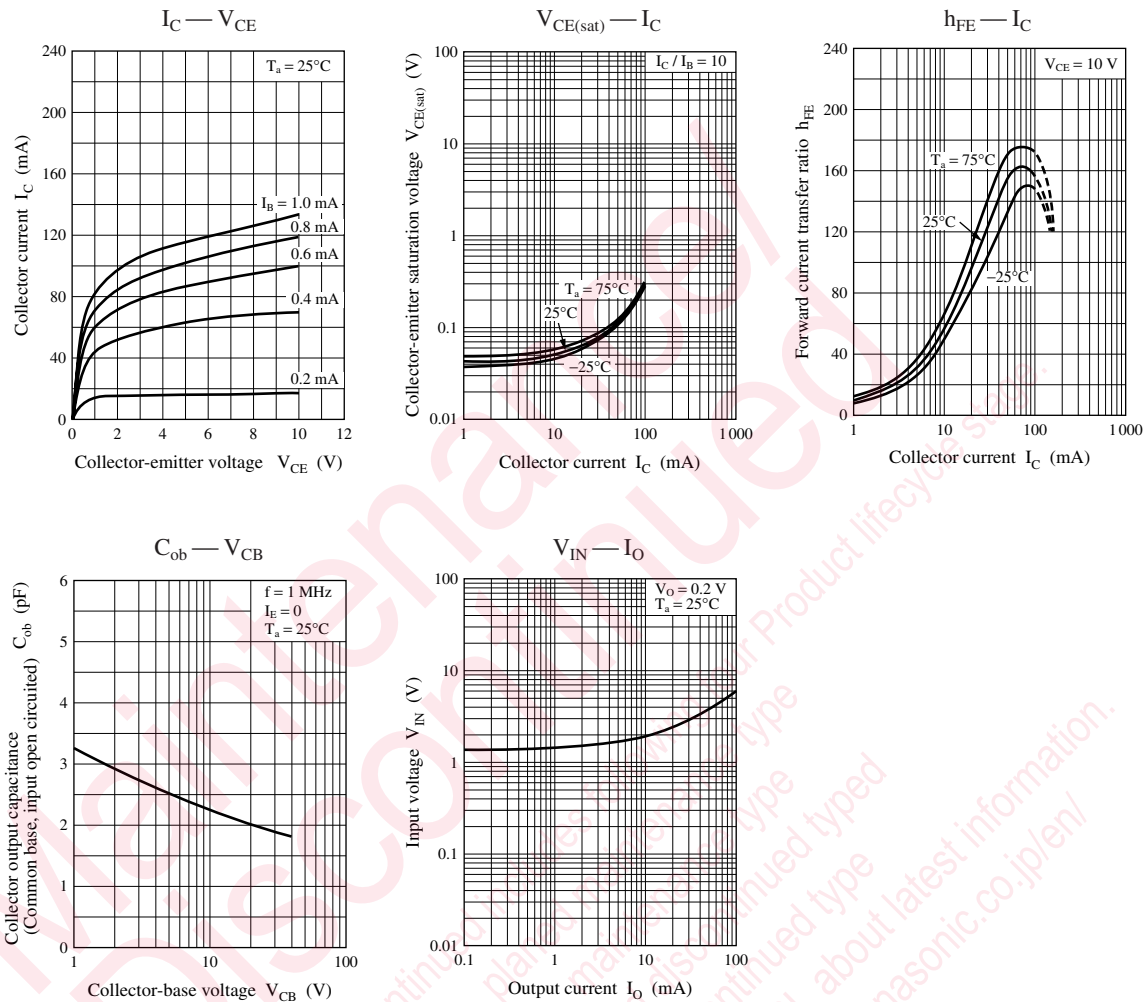
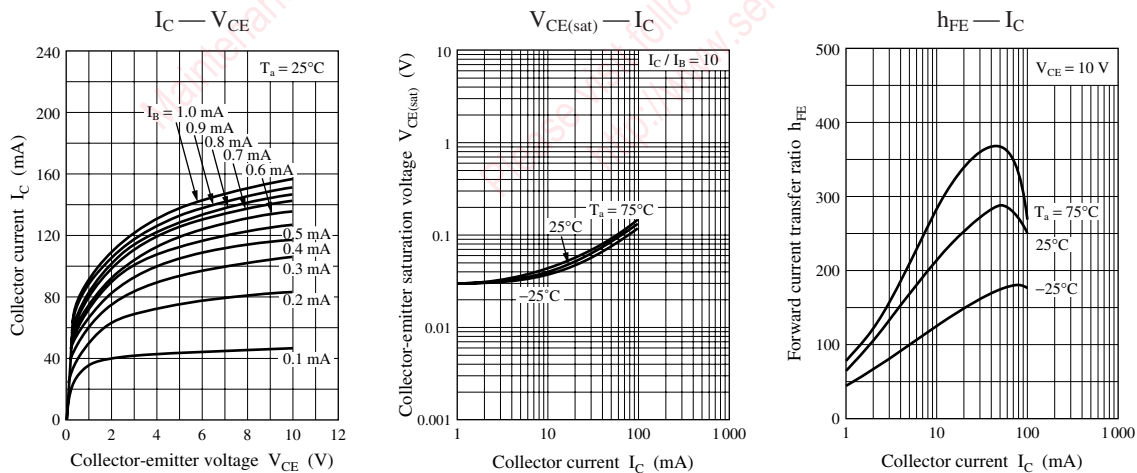
Characteristics charts of UNR221F

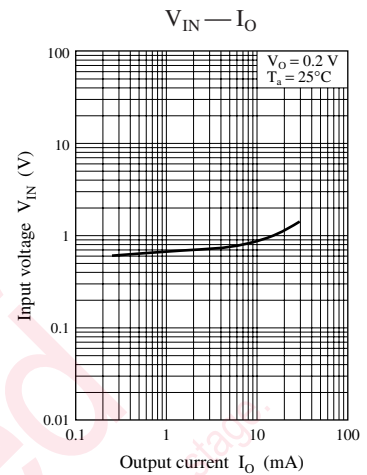
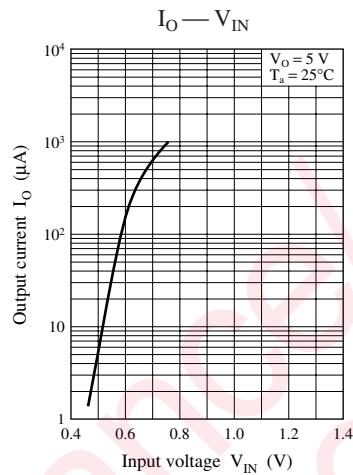
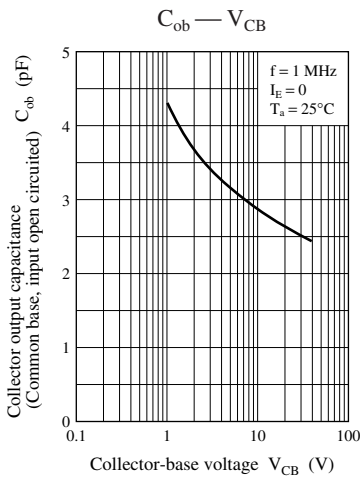




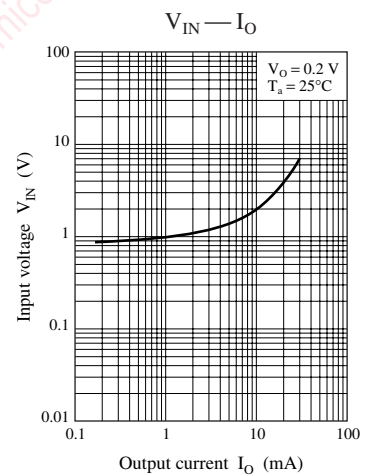
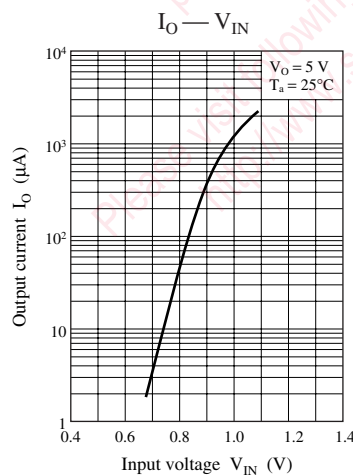
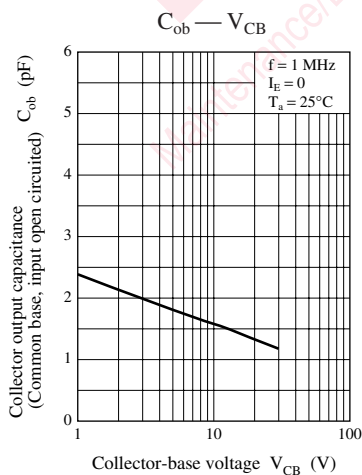
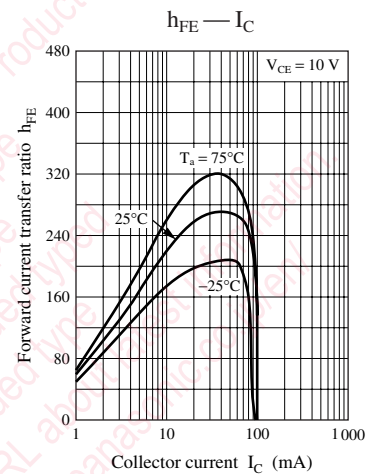
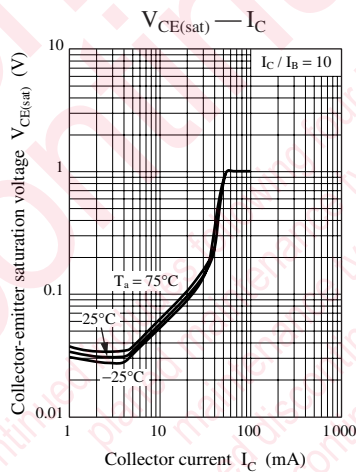
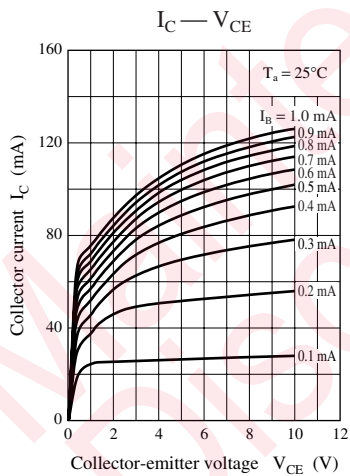
Characteristics charts of UNR221K



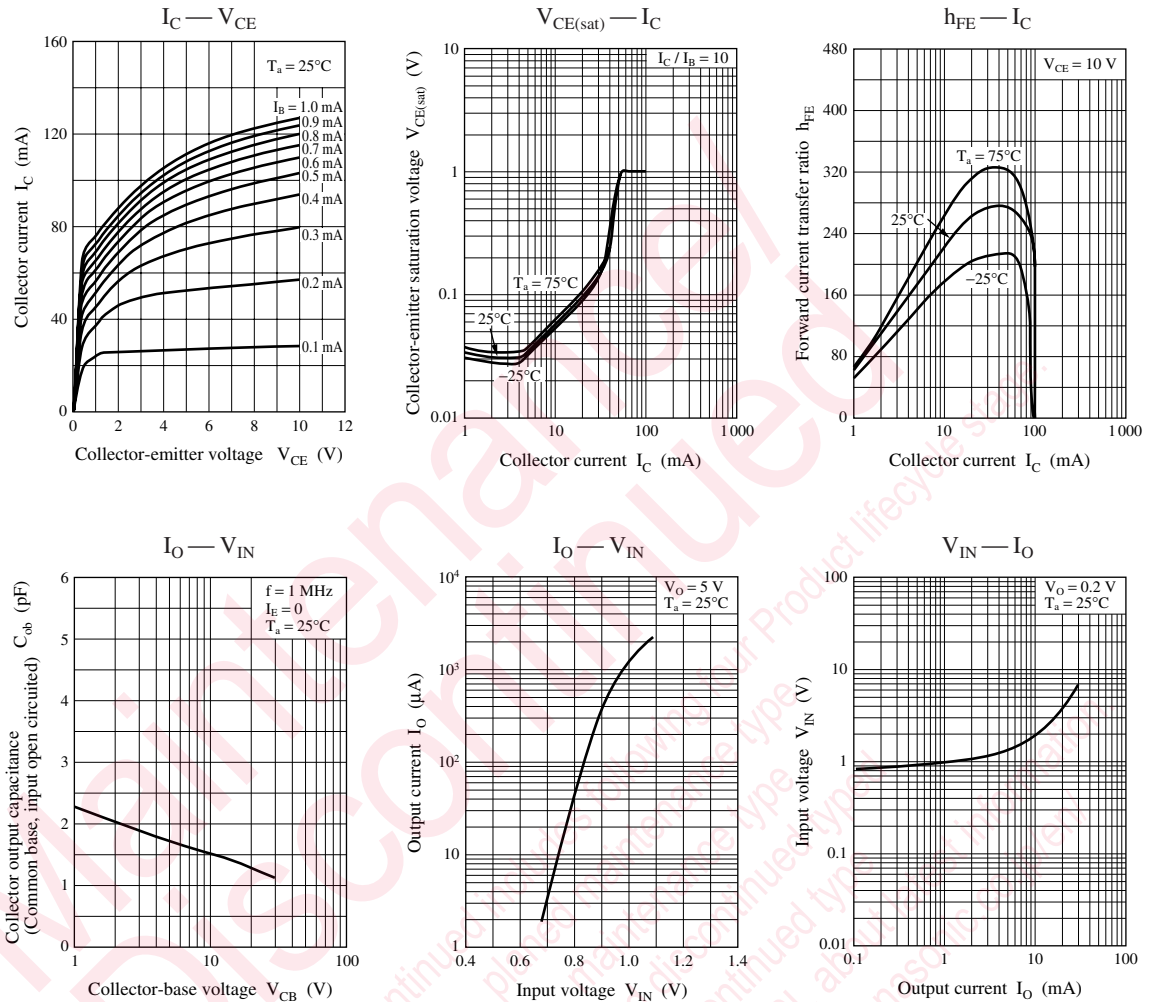
Characteristics charts of UNR221L**Characteristics charts of UNR221M**



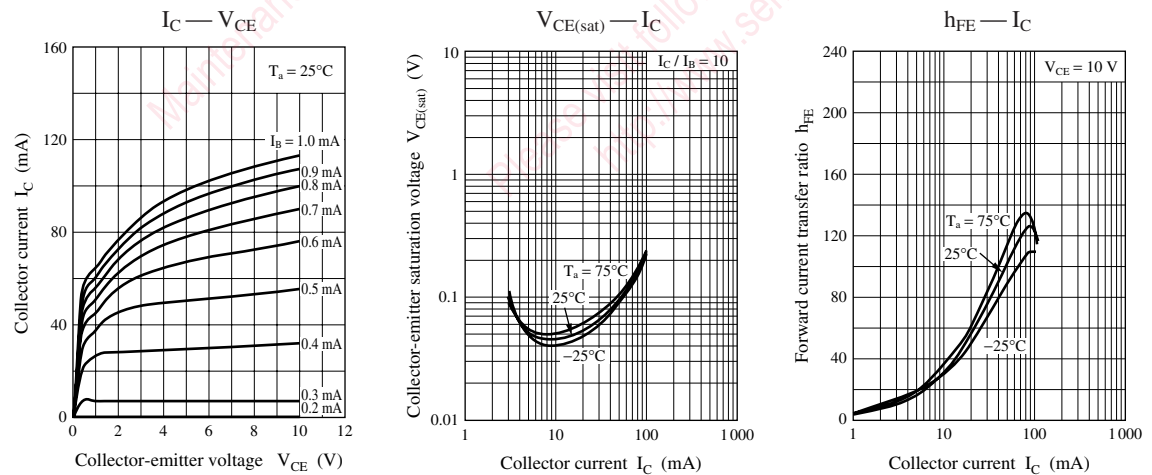
Characteristics charts of UNR221N

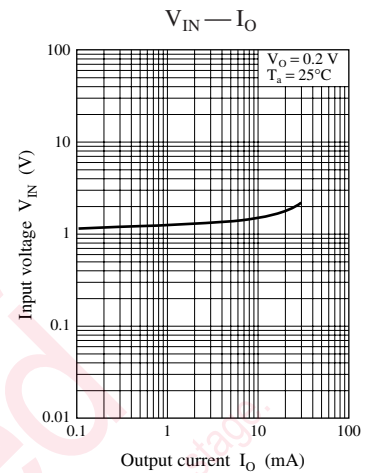
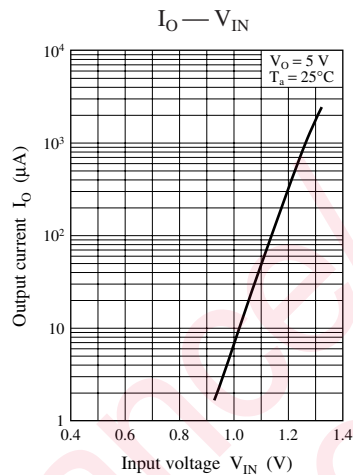
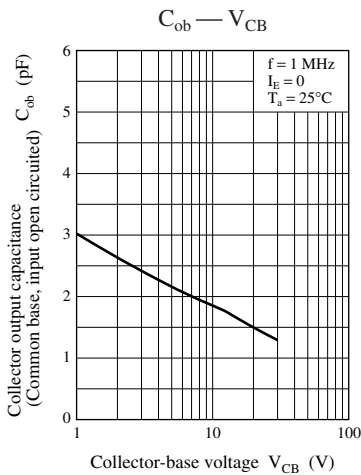


Characteristics charts of UNR221T

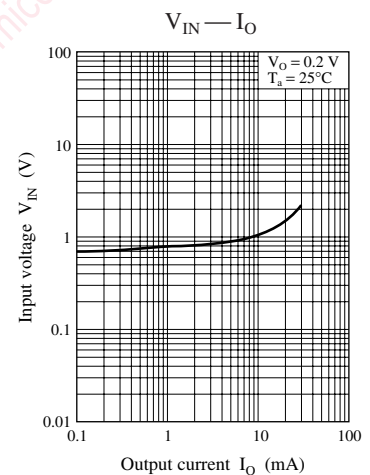
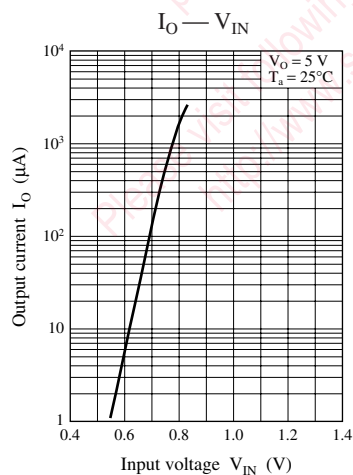
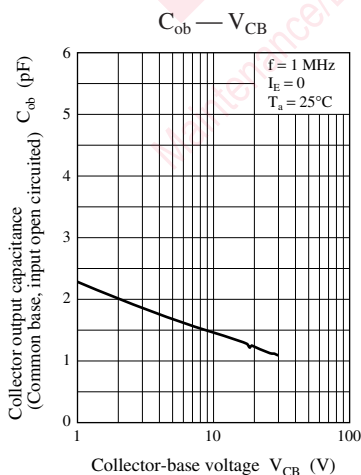
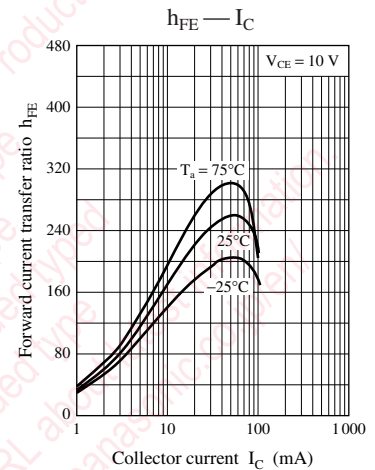
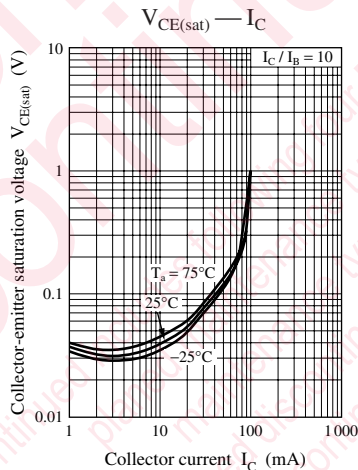
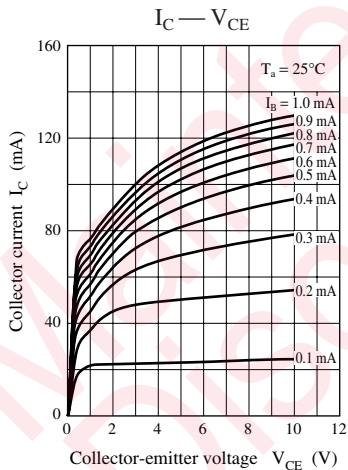


Characteristics charts of UNR221V





Characteristics charts of UNR221Z



utions in using the technical information and scribed in this book

s book is to be exported or provided to non-residents, the laws and
rd to security export control, must be observed.

ly to show the main characteristics and application circuit examples
l property right or other right owned by our company or any other
any as to the infringement upon any such right owned by any other
rmation described in this book.

standard applications or general electronic equipment (such as office
and household appliances).

ng applications:

biles, traffic control equipment, combustion equipment, life support
reliability are required, or if the failure or malfunction of the prod-

k are subject to change without notice for modification and/or im-
use of the products, therefore, ask for the most up-to-date Product
atisfy your requirements.

bsolute maximum rating and the guaranteed operating conditions
(.). Especially, please be careful not to exceed the range of absolute
er-off and mode-switching. Otherwise, we will not be liable for any

take into the consideration of incidence of break down and failure
n the systems such as redundant design, arresting the spread of fire
al injury, fire, social damages, for example, by using the products.

own and characteristics change due to external factors (ESD, EOS,
mounting or at customer's process. When using products for which
shelf life and the elapsed time since first opening the packages.

ly or partially, without the prior written permission of Matsushita

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 View [UNR221700L](#) on WIN SOURCE

 [Panasonic](#) Information

Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management