

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

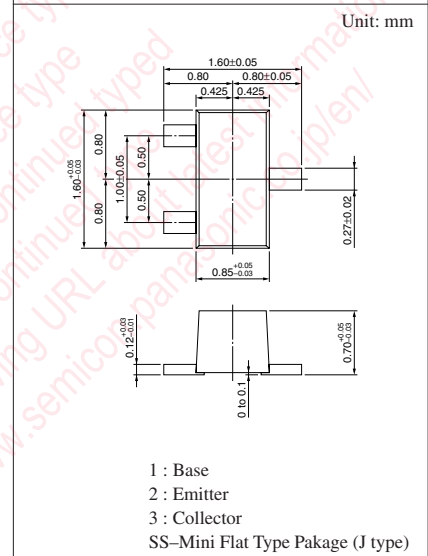
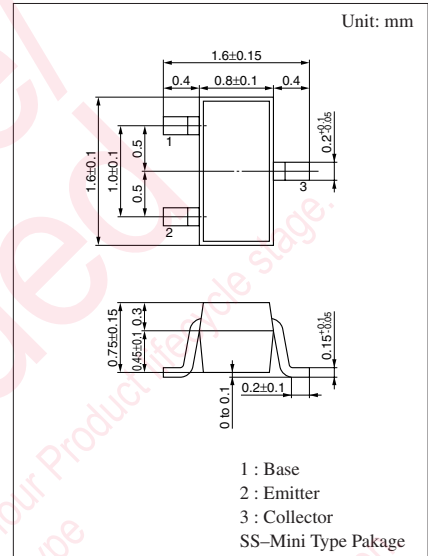
- Costs can be reduced through downsizing of the equipment and reduction of the number of parts.
- SS-Mini type package, allowing automatic insertion through tape packing and magazine packing.

Resistance by Part Number

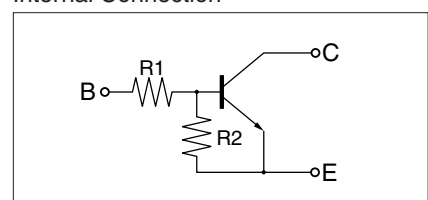
	Marking Symbol	(R ₁)	(R ₂)
• UNR9211	8A	10kΩ	10kΩ
• UNR9212	8B	22kΩ	22kΩ
• UNR9213	8C	47kΩ	47kΩ
• UNR9214	8D	10kΩ	47kΩ
• UNR9215	8E	10kΩ	—
• UNR9216	8F	4.7kΩ	—
• UNR9217	8H	22kΩ	—
• UNR9218	8I	0.51kΩ	5.1kΩ
• UNR9219	8K	1kΩ	10kΩ
• UNR9210	8L	47kΩ	—
• UNR921D	8M	47kΩ	10kΩ
• UNR921E	8N	47kΩ	22kΩ
• UNR921F	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 (T_a=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			V	
	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 ₁ = 1kΩ				0.2
			UNR921D	V _{CC} = 5V, V _B = 10V, R ₁ = 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		

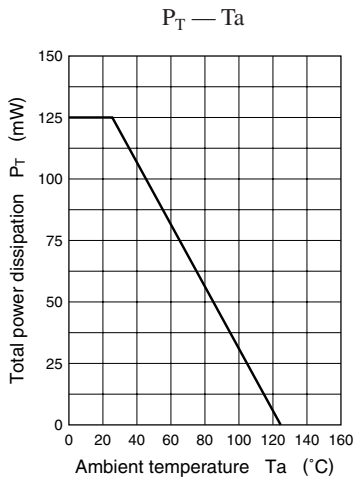
* h_{FE} rank classification (UNR9215/9216/9217/9210)

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

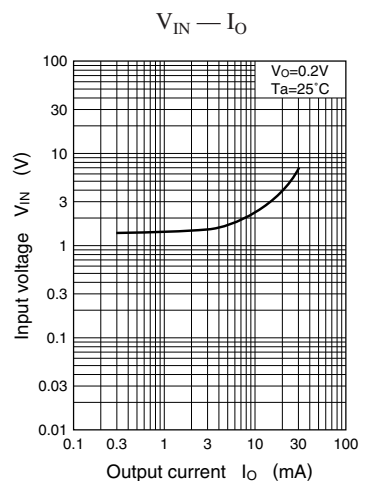
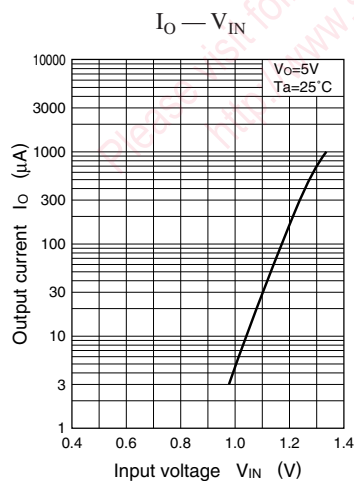
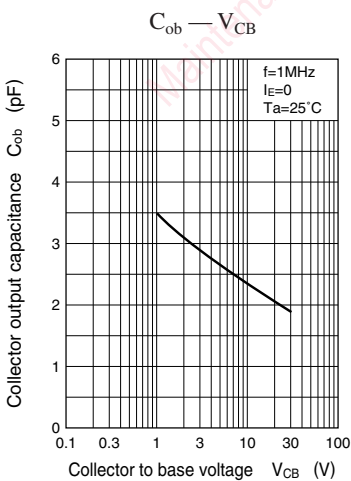
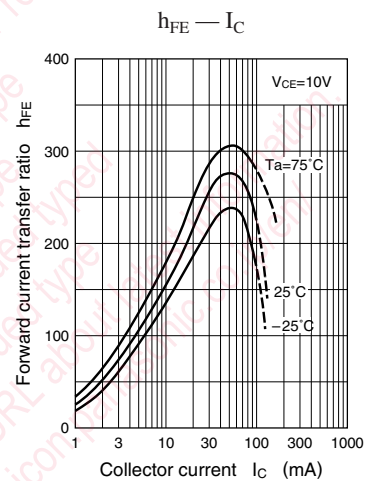
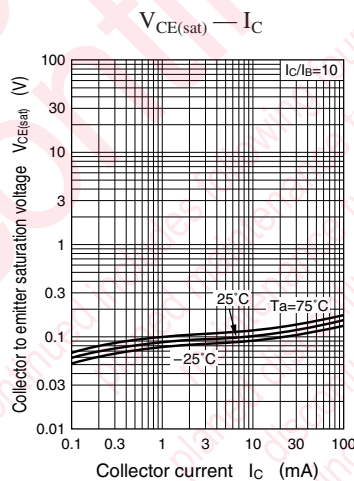
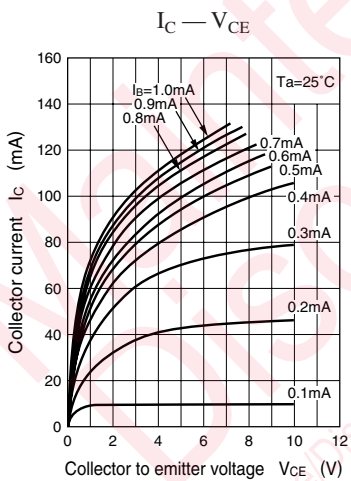
■ Electrical Characteristics (continued) (Ta=25°C)

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

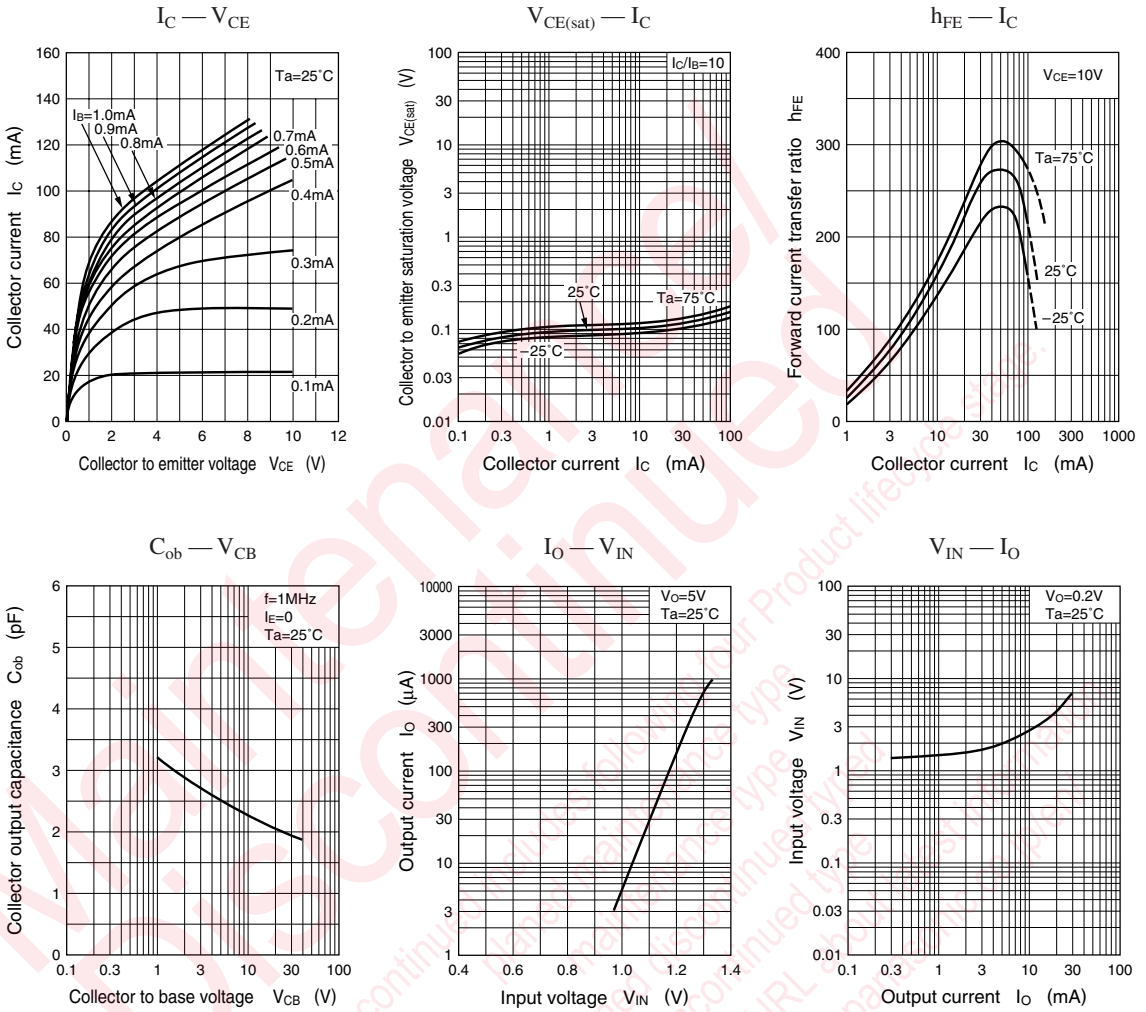
Common characteristics chart



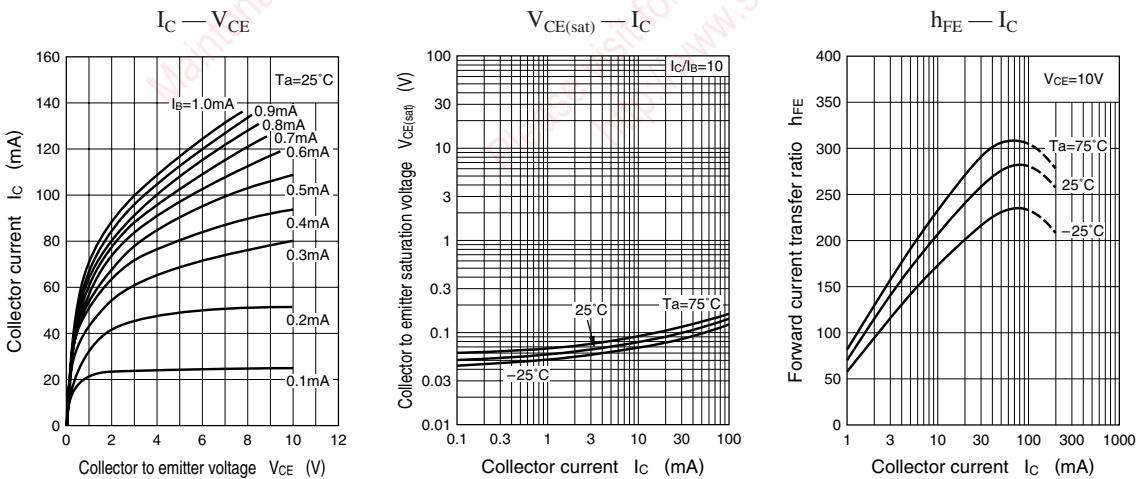
Characteristics charts of UNR9211

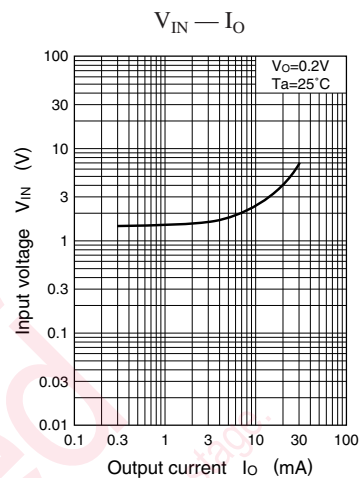
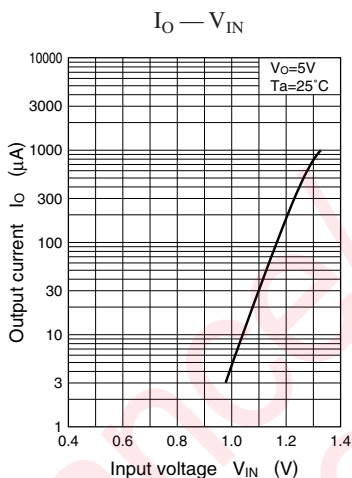
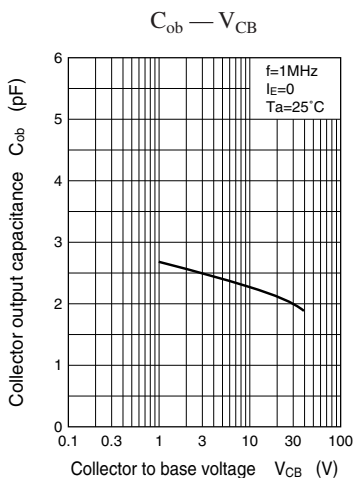


Characteristics charts of UNR9212

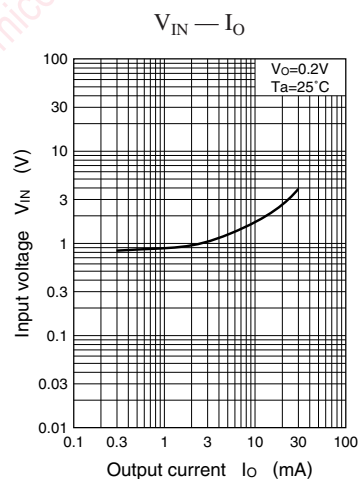
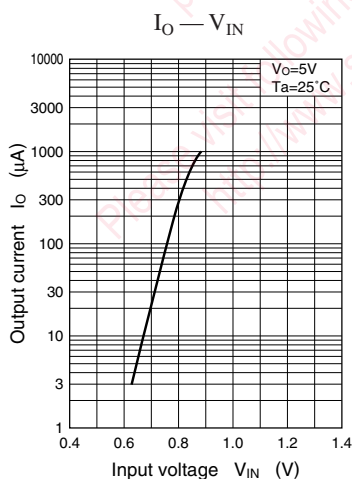
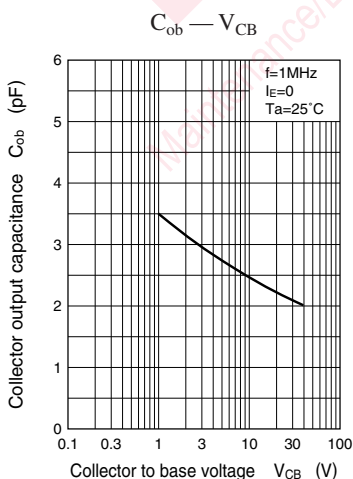
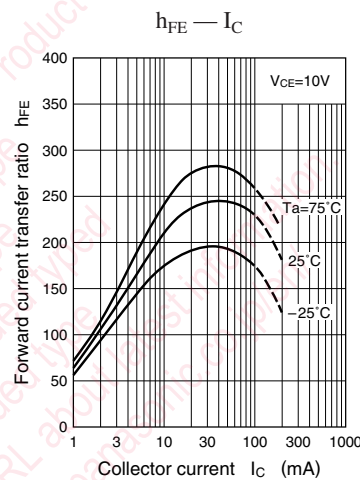
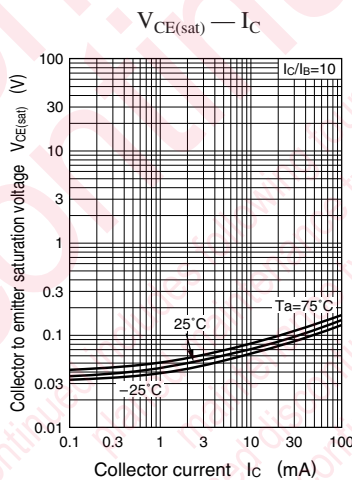
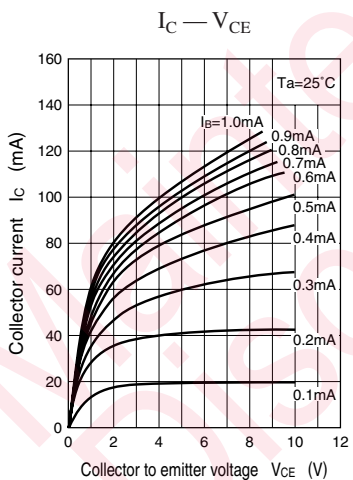


Characteristics charts of UNR9213

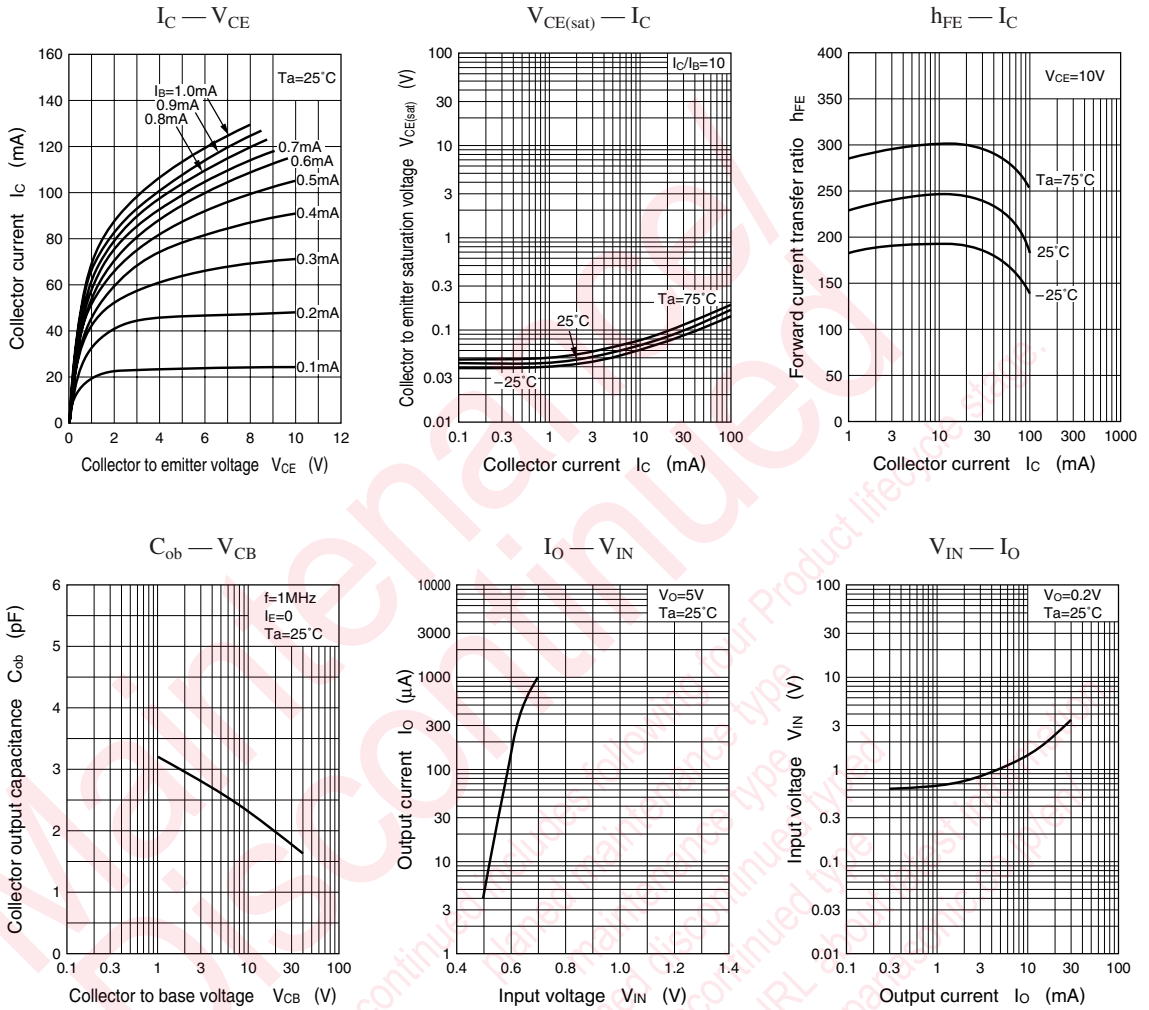




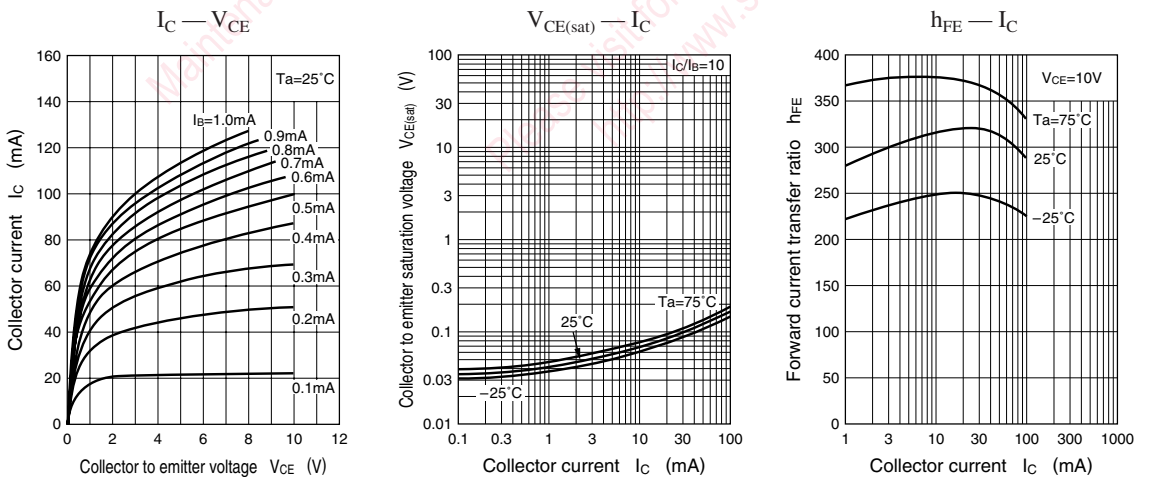
Characteristics charts of UNR9214

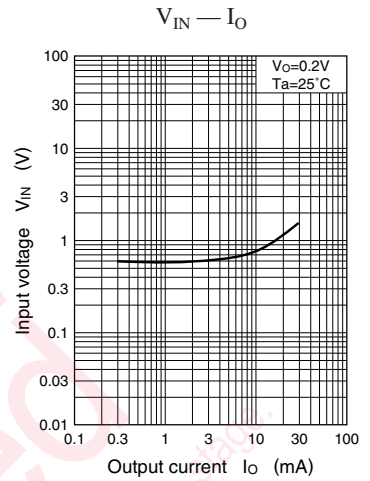
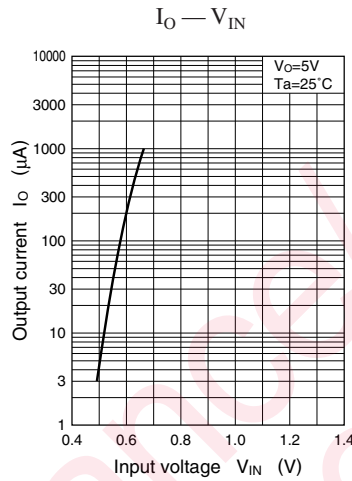
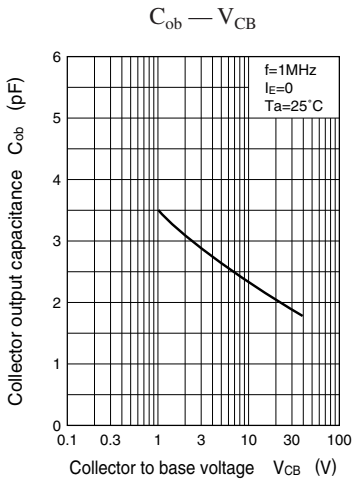


Characteristics charts of UNR9215

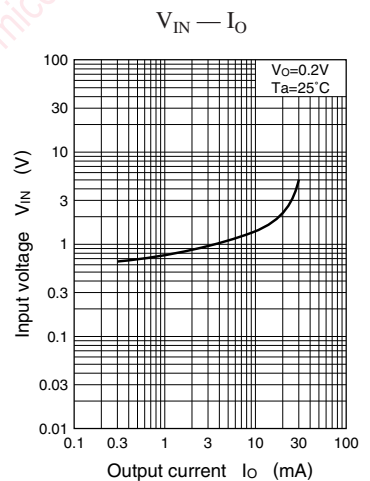
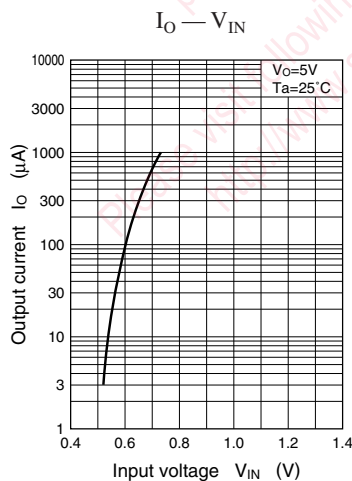
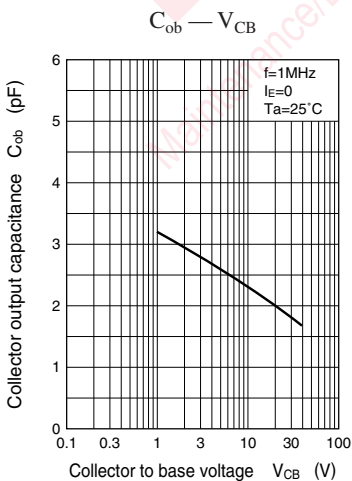
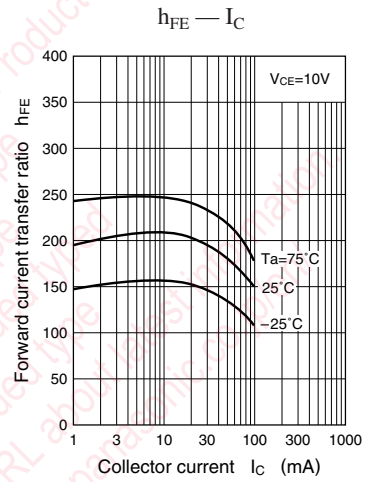
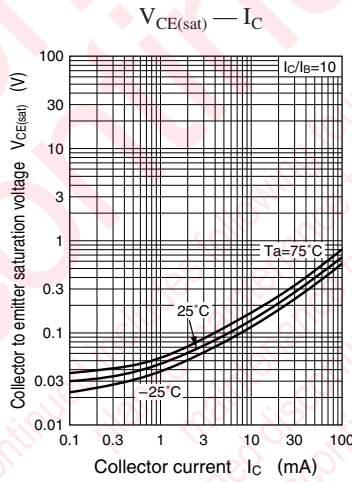
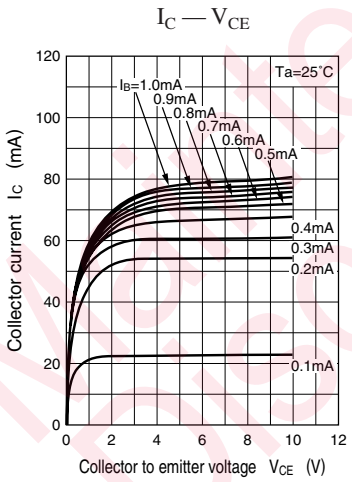


Characteristics charts of UNR9216

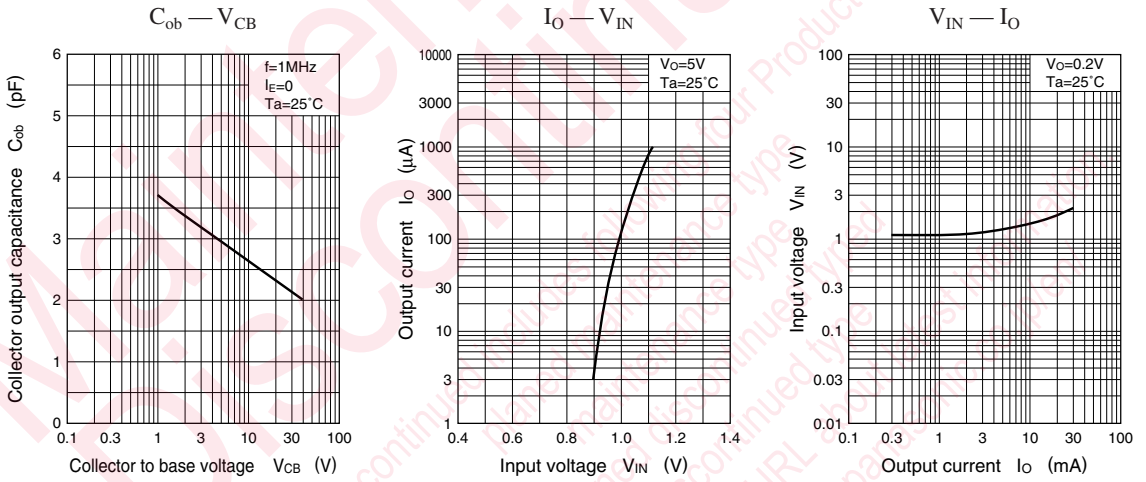
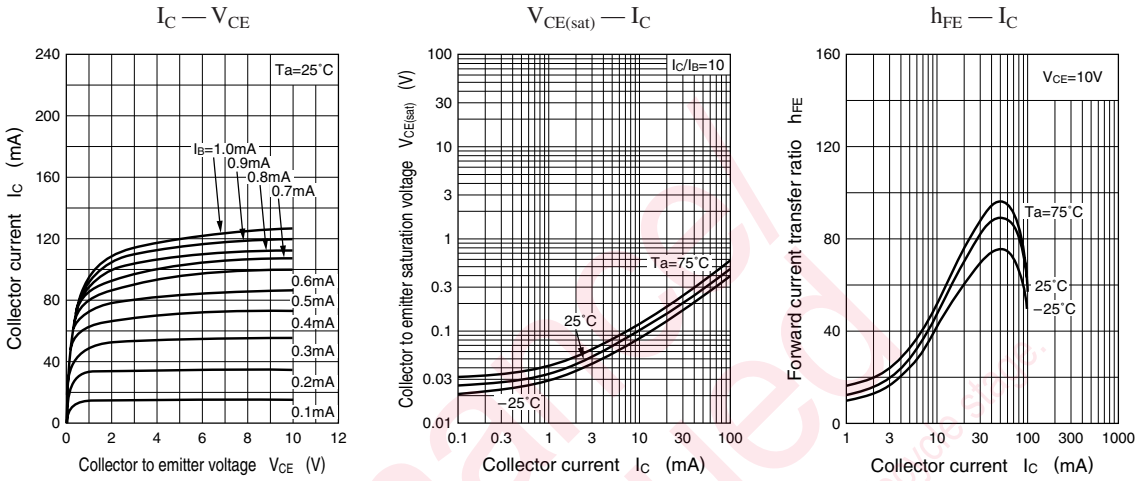




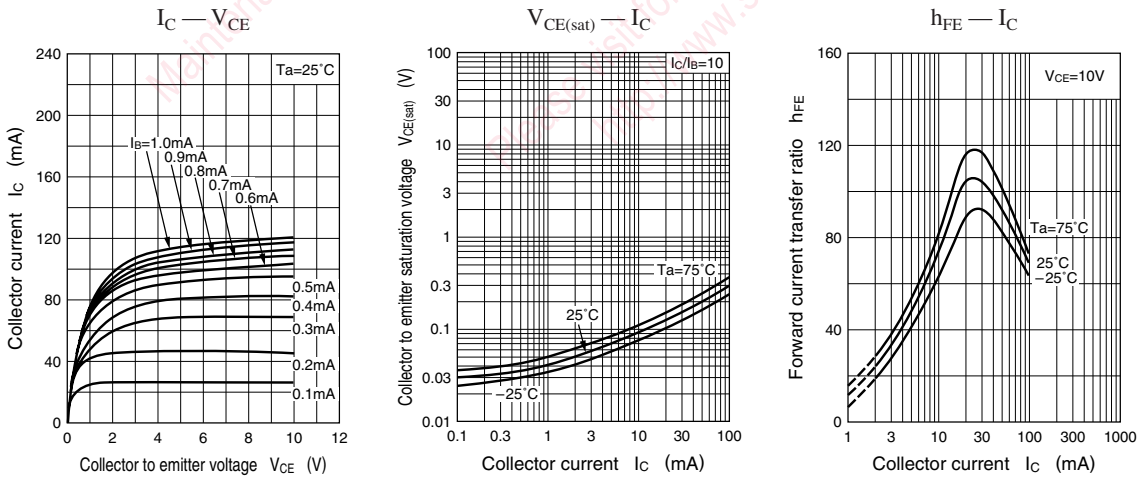
Characteristics charts of UNR9217

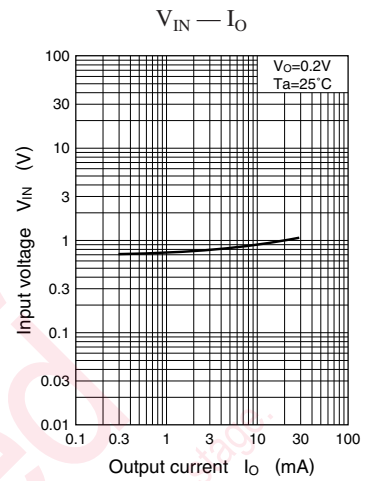
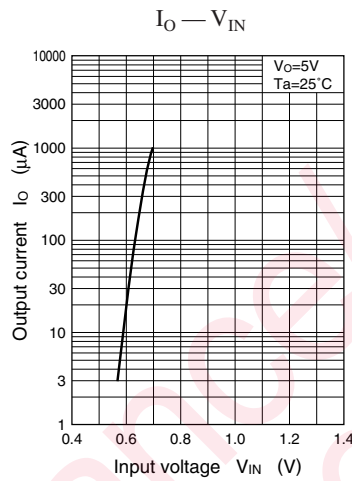
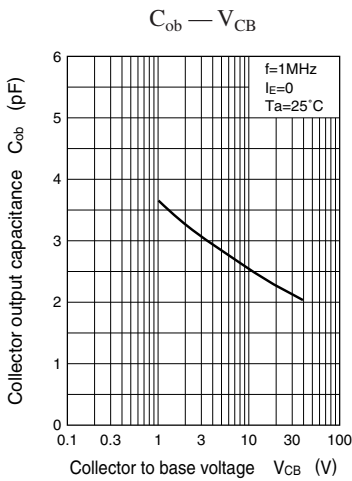


Characteristics charts of UNR9218

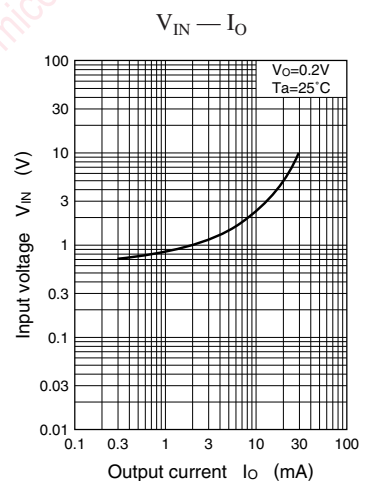
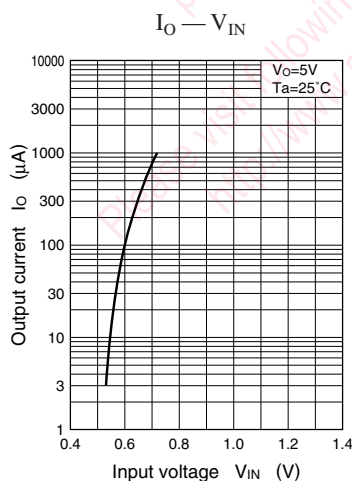
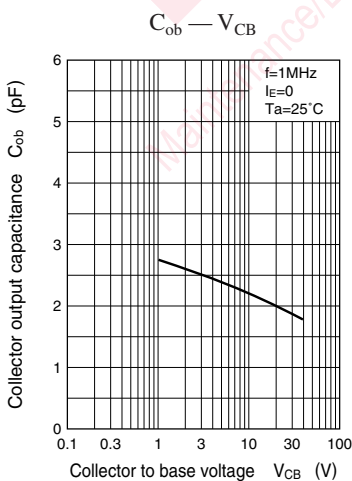
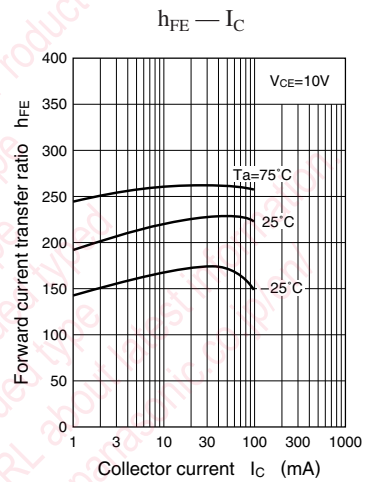
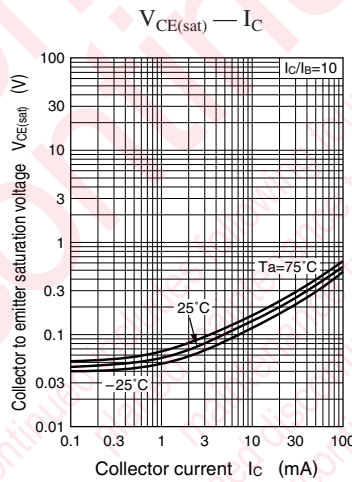
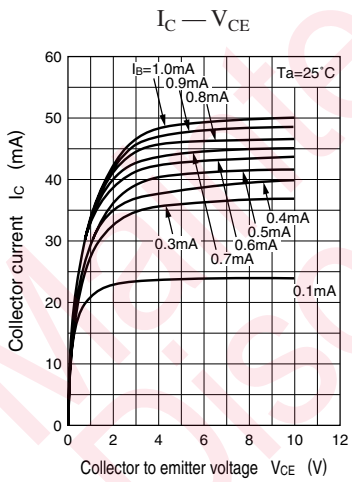


Characteristics charts of UNR9219

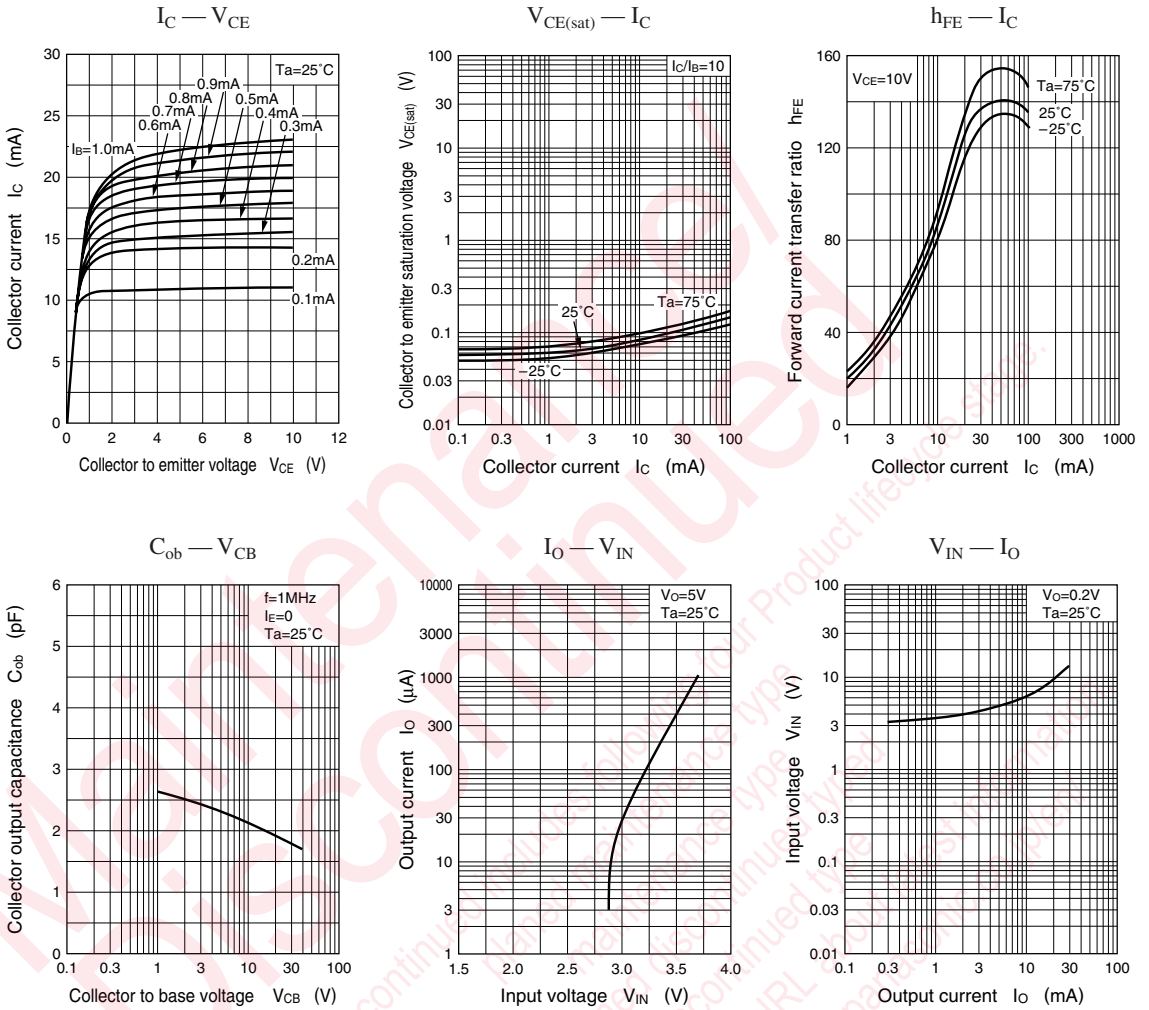




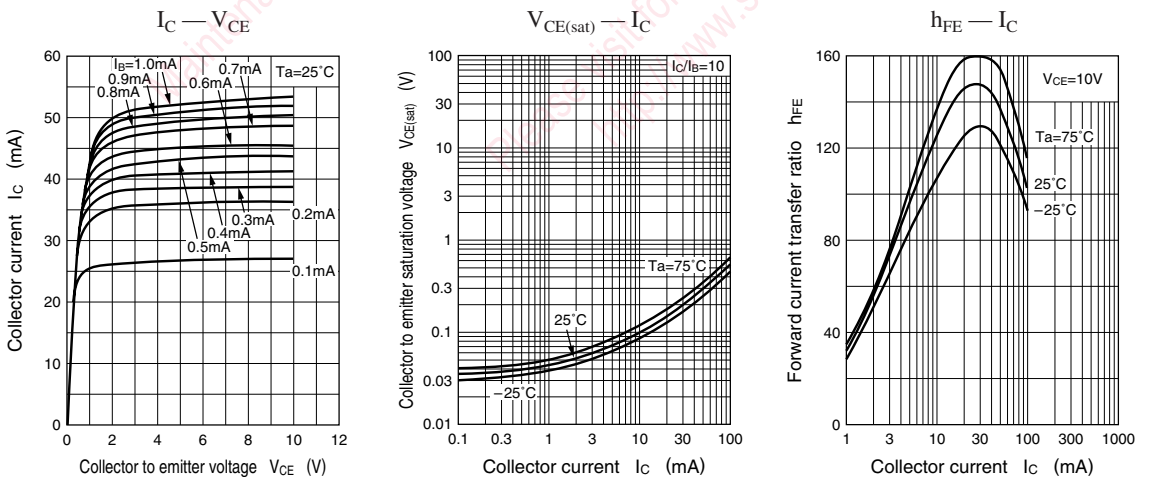
Characteristics charts of UNR9210

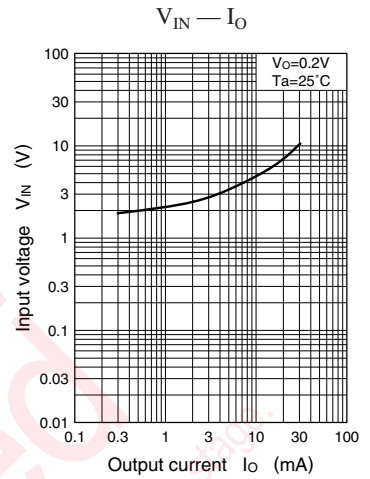
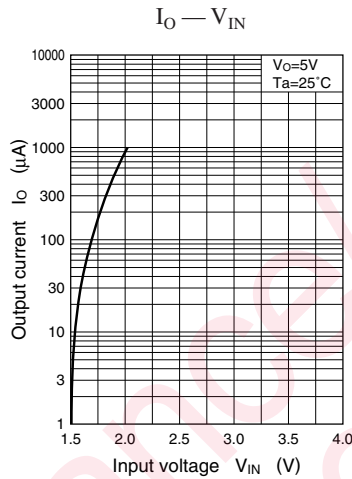
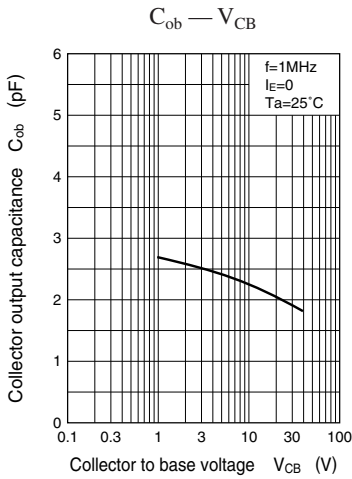


Characteristics charts of UNR921D

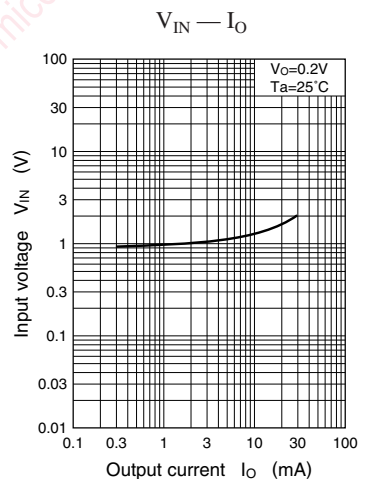
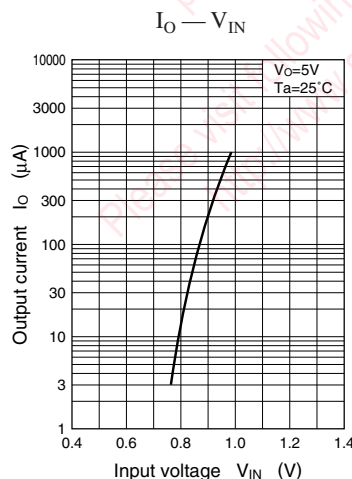
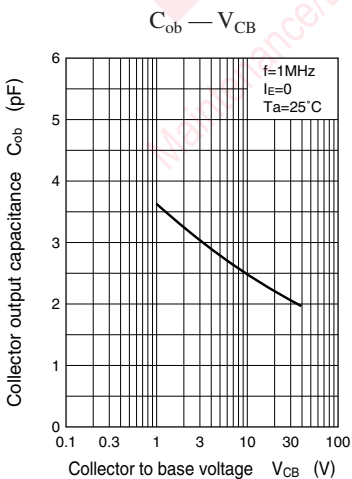
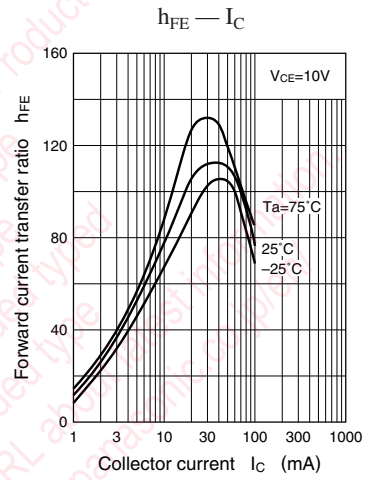
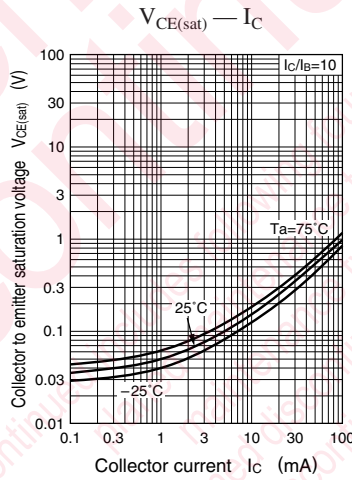
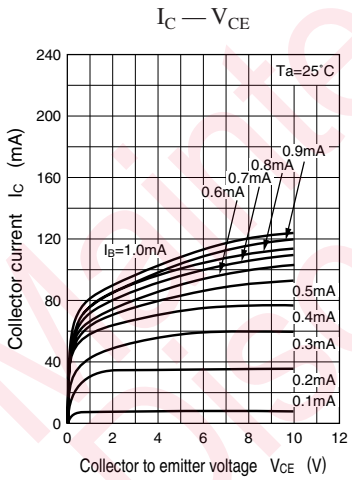


Characteristics charts of UNR921E

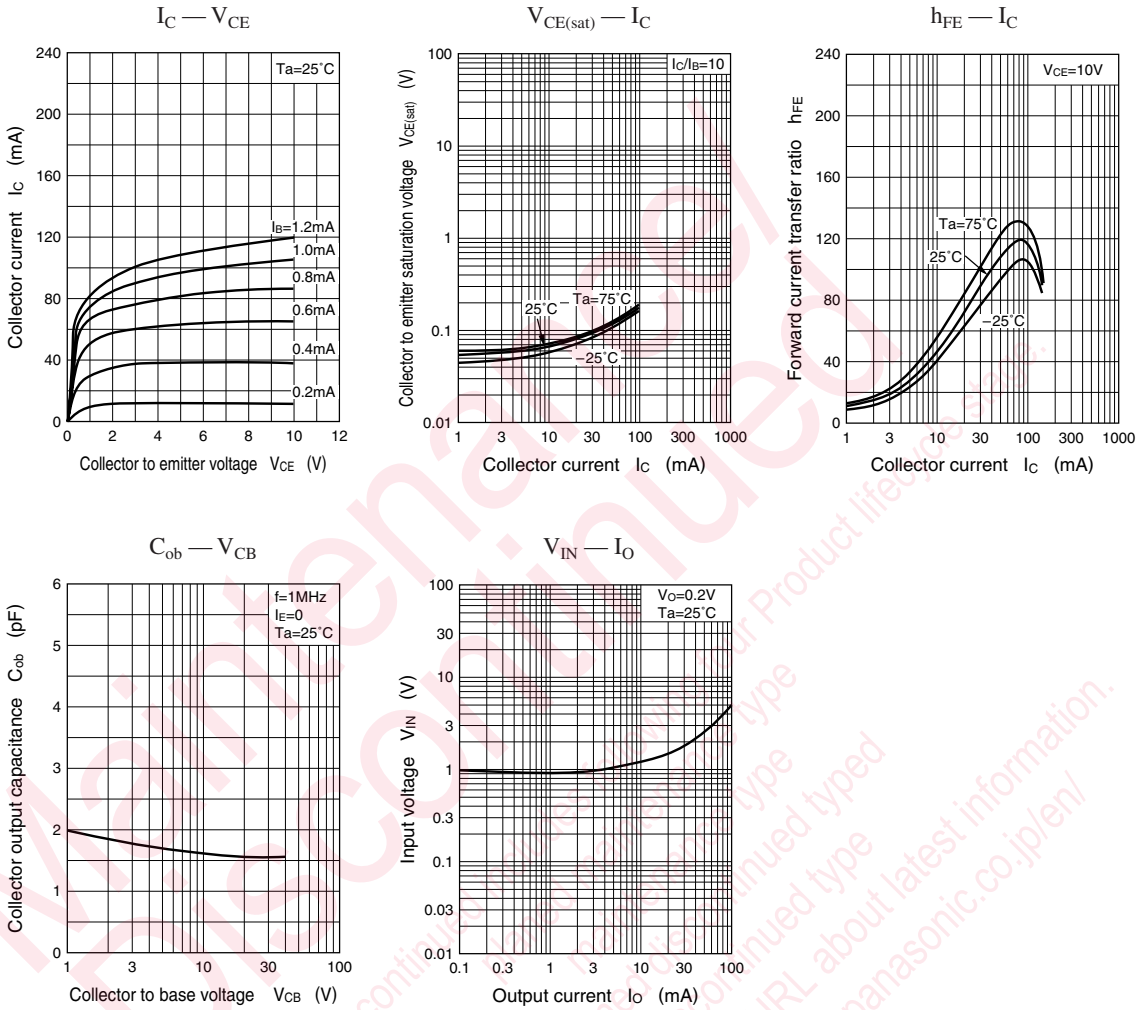




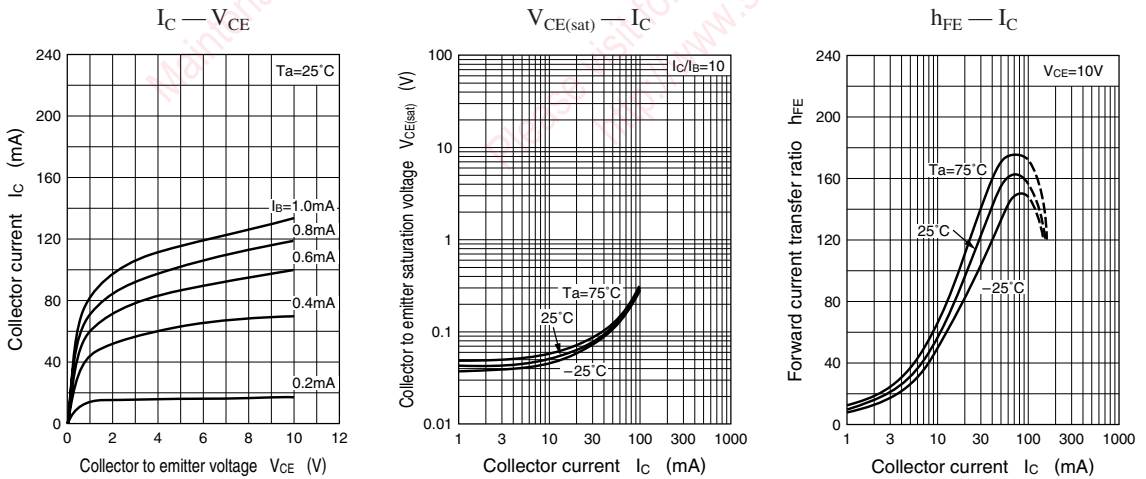
Characteristics charts of UNR921F

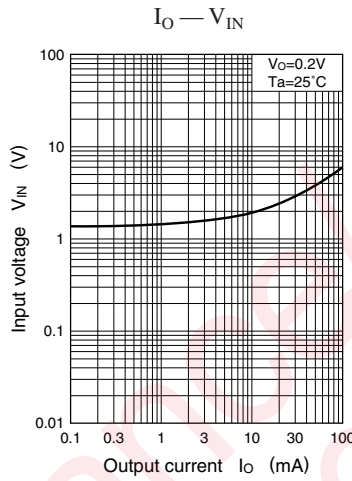
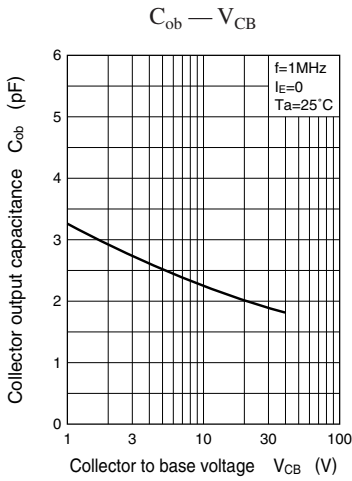


Characteristics charts of UNR921K

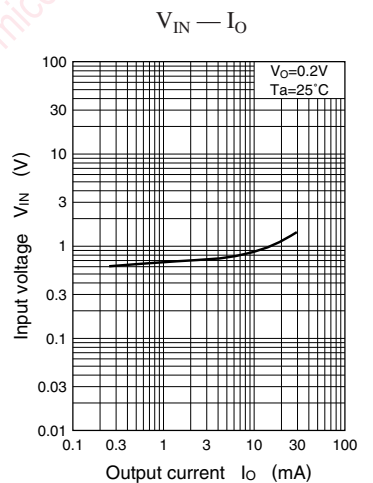
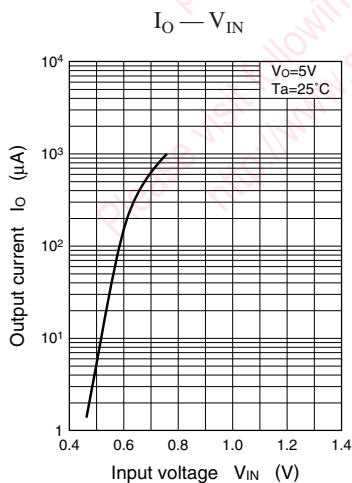
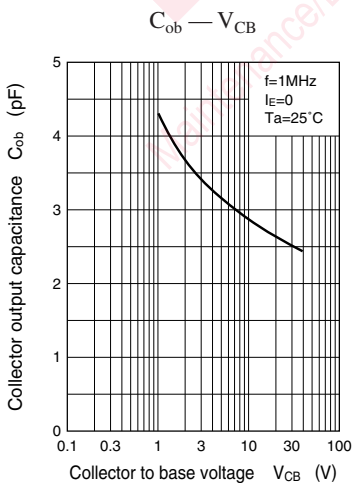
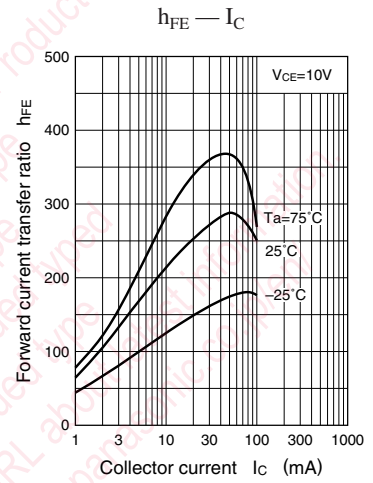
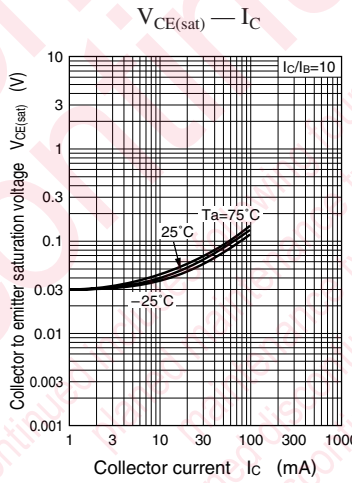
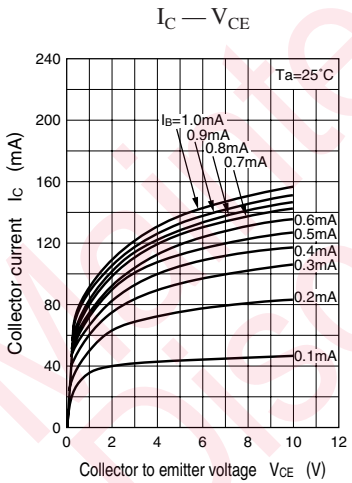


Characteristics charts of UNR921L

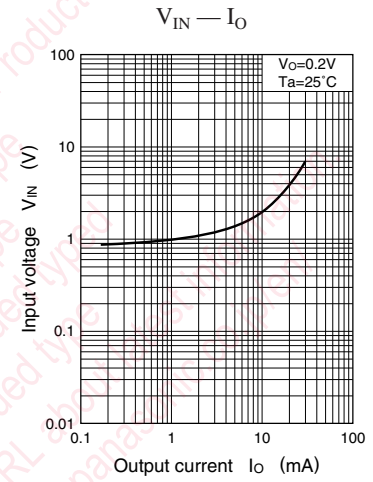
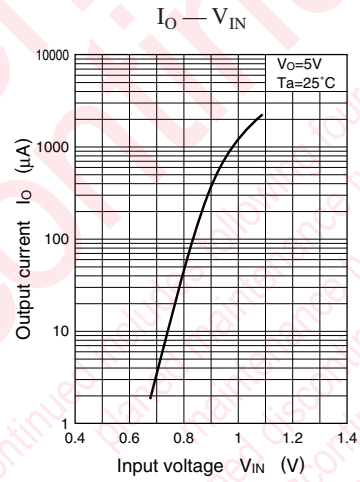
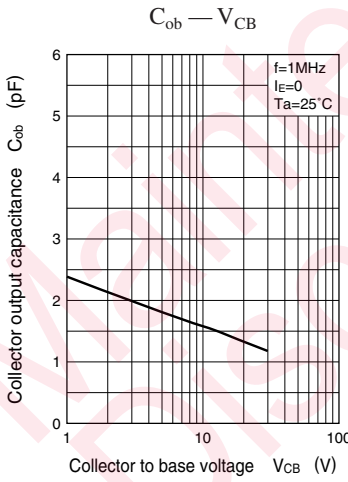
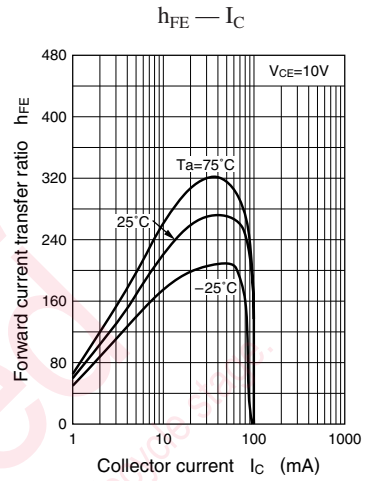
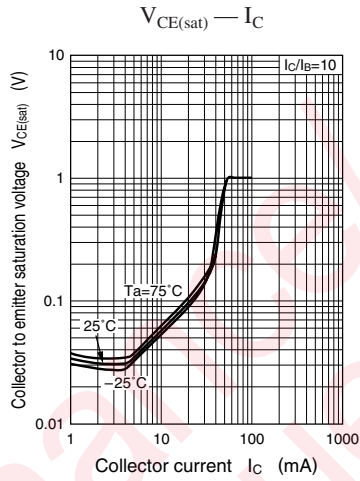
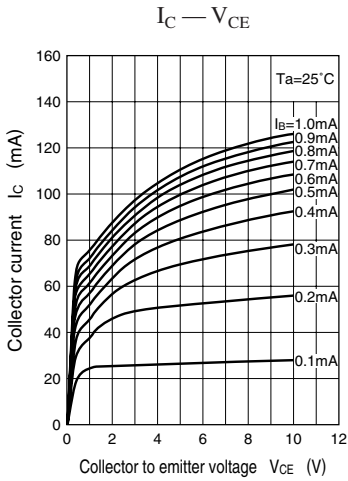




Characteristics charts of UNR921M



Characteristics charts of UNR921N



Request for your special attention and precautions in using the technical information and semiconductors described in this book

- (1) If any of the products or technical information described in this book is to be exported or provided to non-residents, the laws and regulations of the exporting country, especially, those with regard to security export control, must be observed.
- (2) The technical information described in this book is intended only to show the main characteristics and application circuit examples of the products, and no license is granted under any intellectual property right or other right owned by our company or any other company. Therefore, no responsibility is assumed by our company as to the infringement upon any such right owned by any other company which may arise as a result of the use of technical information described in this book.
- (3) The products described in this book are intended to be used for standard applications or general electronic equipment (such as office equipment, communications equipment, measuring instruments and household appliances).
Consult our sales staff in advance for information on the following applications:
 - Special applications (such as for airplanes, aerospace, automobiles, traffic control equipment, combustion equipment, life support systems and safety devices) in which exceptional quality and reliability are required, or if the failure or malfunction of the products may directly jeopardize life or harm the human body.
 - Any applications other than the standard applications intended.
- (4) The products and product specifications described in this book are subject to change without notice for modification and/or improvement. At the final stage of your design, purchasing, or use of the products, therefore, ask for the most up-to-date Product Standards in advance to make sure that the latest specifications satisfy your requirements.
- (5) When designing your equipment, comply with the range of absolute maximum rating and the guaranteed operating conditions (operating power supply voltage and operating environment etc.). Especially, please be careful not to exceed the range of absolute maximum rating on the transient state, such as power-on, power-off and mode-switching. Otherwise, we will not be liable for any defect which may arise later in your equipment.
 - Even when the products are used within the guaranteed values, take into the consideration of incidence of break down and failure mode, possible to occur to semiconductor products. Measures on the systems such as redundant design, arresting the spread of fire or preventing glitch are recommended in order to prevent physical injury, fire, social damages, for example, by using the products.
- (6) Comply with the instructions for use in order to prevent breakdown and characteristics change due to external factors (ESD, EOS, thermal stress and mechanical stress) at the time of handling, mounting or at customer's process. When using products for which damp-proof packing is required, satisfy the conditions, such as shelf life and the elapsed time since first opening the packages.
- (7) This book may be not reprinted or reproduced whether wholly or partially, without the prior written permission of Matsushita Electric Industrial Co., Ltd.