UNR521xG Series

Silicon NPN epitaxial planar type

For digital circuits

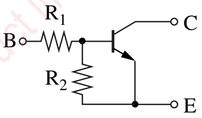
■ Features

- 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

■ Package

- Code
  SMini3-F2
- Pin Name
  1: Base
  2: Emitter
  3: Collector

■ Internal Connection



■ Resistance by Part Number

	Marking symbol	(R_1)	(R_2)
• UNR5210G	8L	47 kΩ	—
• UNR5211G	8A	10 kΩ	10 kΩ
• UNR5212G	8B	22 kΩ	22 kΩ
• UNR5213G	8C	47 kΩ	47 kΩ
• UNR5214G	8D	10 kΩ	47 kΩ
• UNR5215G	8E	10 kΩ	—
• UNR5216G	8F	4.7 kΩ	—
• UNR5217G	8H	22 kΩ	—
• UNR5218G	8I	0.51 kΩ	5.1 kΩ
• UNR5219G	8K	1 kΩ	10 kΩ
• UNR521DG	8M	47 kΩ	10 kΩ
• UNR521EG	8N	47 kΩ	22 kΩ
• UNR521FG	8O	4.7 kΩ	10 kΩ
• UNR521KG	8P	10 kΩ	4.7 kΩ
• UNR521LG	8Q	4.7 kΩ	4.7 kΩ
• UNR521MG	EL	2.2 kΩ	47 kΩ
• UNR521NG	EX	4.7 kΩ	47 kΩ
• UNR521TG	EZ	22 kΩ	47 kΩ
• UNR521VG	FD	2.2 kΩ	2.2 kΩ
• UNR521ZG	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	150	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	–55 to +150	°C

■ Electrical Characteristics $T_a = 25°C \pm 3°C$

Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)		V_{CBO}	$I_C = 10\ \mu A$, $I_E = 0$	50			V
Collector-emitter voltage (Base open)		V_{CEO}	$I_C = 2$ mA, $I_B = 0$	50			V
Collector-base cutoff current (Emitter open)		I_{CBO}	$V_{CB} = 50$ V, $I_E = 0$			0.1	μA
Collector-emitter cutoff current (Base open)		I_{CEO}	$V_{CE} = 50$ V, $I_B = 0$			0.5	
Emitter-base cutoff current (Collector open)	UNR5210G/5215G/5216G/5217G	I_{EBO}	$V_{EB} = 6$ V, $I_C = 0$			0.01	mA
	UNR5213G					0.1	
	UNR5212G/5214G/521DG/521EG/521MG/521NG/521TG					0.2	
	UNR521ZG					0.4	
	UNR5211G					0.5	
	UNR521FG/521KG					1.0	
	UNR5219G					1.5	
	UNR5218G/521LG/521VG					2.0	
Forward current transfer ratio	UNR521VG	h_{FE}	$V_{CE} = 10$ V, $I_C = 5$ mA	6		20	—
	UNR5218G/521KG/521LG			20			
	UNR5219G/521DG/521FG			30			
	UNR5211G			35			
	UNR5212G/521EG			60			
	UNR521ZG			60		200	
	UNR5213G/5214G/521MG			80			
	UNR521NG/521TG			80		400	
	UNR5210G*/5215G*/5216G*/5217G*			160		460	
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 10$ mA, $I_B = 0.3$ mA			0.25	V
	UNR521VG		$I_C = 10$ mA, $I_B = 1.5$ mA				
Output voltage high-level		V_{OH}	$V_{CC} = 5$ V, $V_B = 0.5$ V, $R_L = 1$ kΩ	4.9			V
Output voltage low-level		V_{OL}	$V_{CC} = 5$ V, $V_B = 2.5$ V, $R_L = 1$ kΩ			0.2	V
	UNR5213G/521KG		$V_{CC} = 5$ V, $V_B = 3.5$ V, $R_L = 1$ kΩ				
	UNR521DG		$V_{CC} = 5$ V, $V_B = 10$ V, $R_L = 1$ kΩ				
	UNR521EG		$V_{CC} = 5$ V, $V_B = 6.0$ V, $R_L = 1$ kΩ				
Transition frequency		f_T	$V_{CB} = 10$ V, $I_E = -2$ mA, f = 200 MHz		150		MHz
Input resistance	UNR5218G	R_1		−30%	0.51	+30%	kΩ
	UNR5219G				1.0		
	UNR521MG/521VG				2.2		
	UNR5216G/521FG/521LG/521NG/521ZG				4.7		
	UNR5211G/5214G/5215G/521KG				10		
	UNR5212G/5217G/521TG				22		
	UNR5210G/5213G/521DG/521EG				47		

Note) 1. Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.
2. *: Rank classification

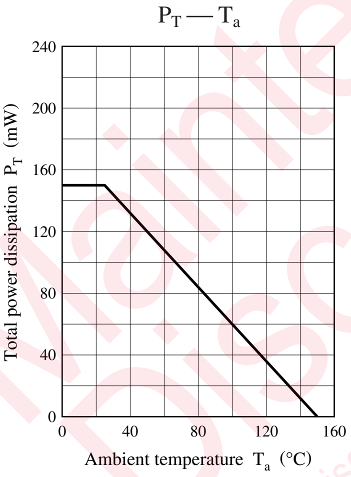
Rank	Q	R	S	No-rank
h_{FE}	160 to 260	210 to 340	290 to 460	160 to 460

■ Electrical Characteristics (continued) $T_a = 25°C \pm 3°C$

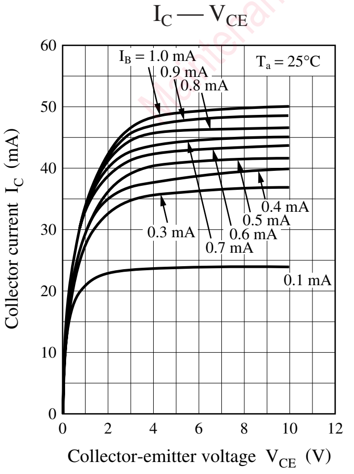
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Resistance ratio	UNR521MG	R_1/R_2			0.047		—
	UNR521NG				0.1		
	UNR5218G/5219G			0.08	0.10	0.12	
	UNR521ZG				0.21		
	UNR5214G			0.17	0.21	0.25	
	UNR521TG				0.47		
	UNR521FG			0.37	0.47	0.57	
	UNR521VG				1.0		
	UNR5211G/5212G/5213G/521LG			0.8	1.0	1.2	
	UNR521KG			1.70	2.13	2.60	
	UNR521EG			1.70	2.14	2.60	
	UNR521DG			3.7	4.7	5.7	

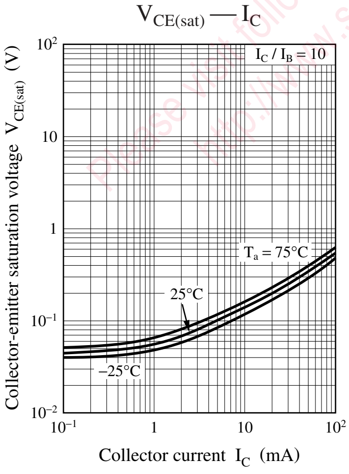
Note) Measuring methods are based on JAPANESE INDUSTRIAL STANDARD JIS C 7030 measuring methods for transistors.

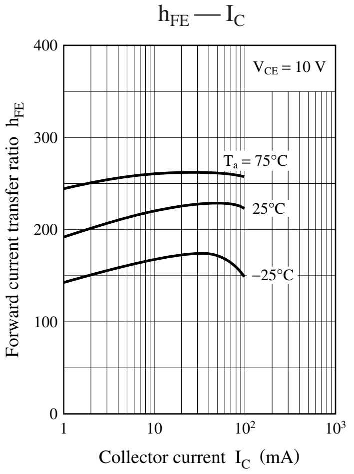
Common characteristics chart



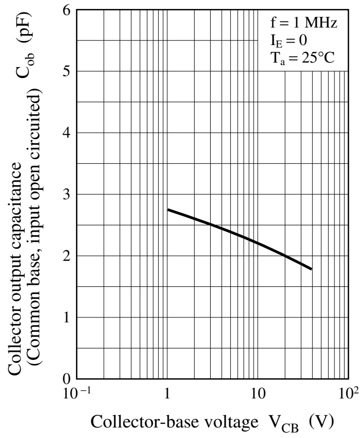
Characteristics charts of UNR5210G



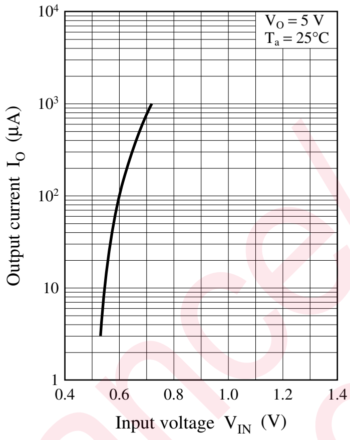




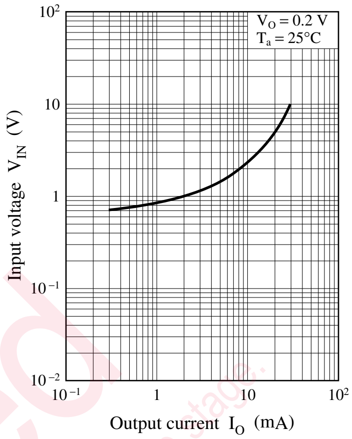
C_{ob} — V_{CB}



I_O — V_{IN}

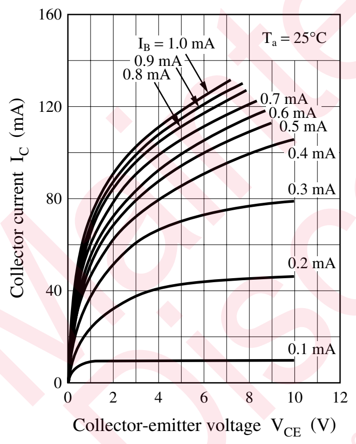


V_{IN} — I_O

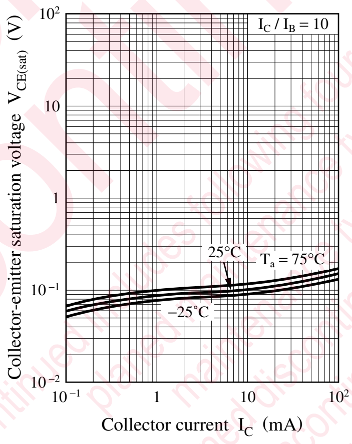


Characteristics charts of UNR5211G

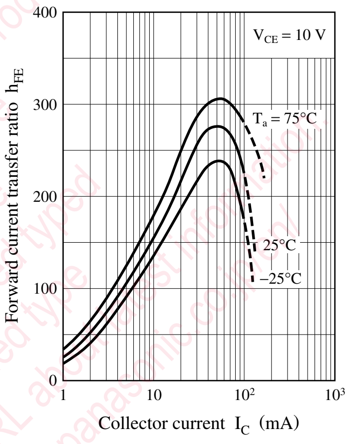
I_C — V_{CE}



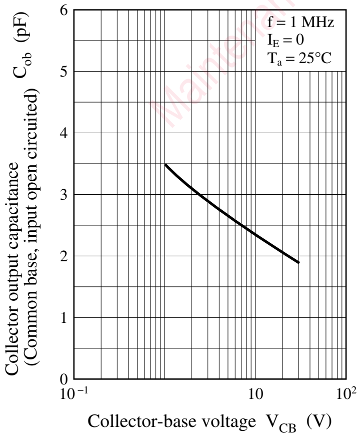
$V_{CE(sat)}$ — I_C



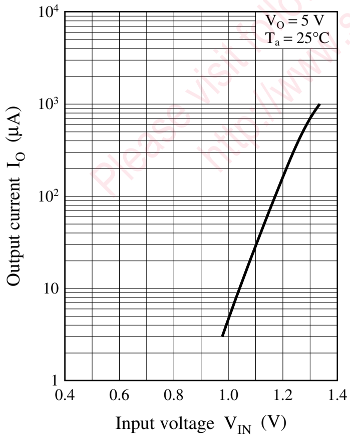
h_{FE} — I_C



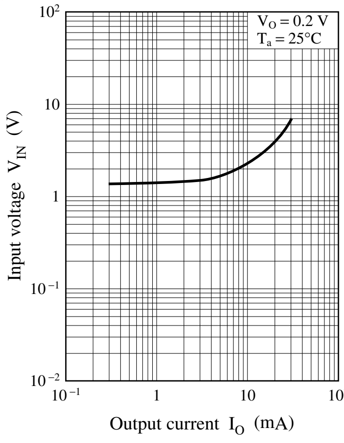
C_{ob} — V_{CB}



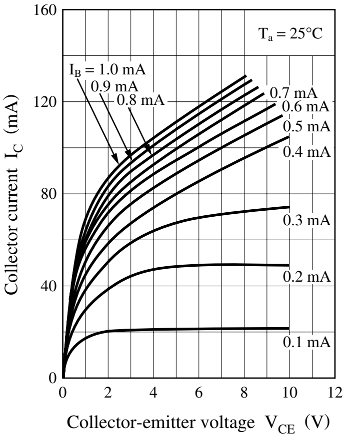
I_O — V_{IN}

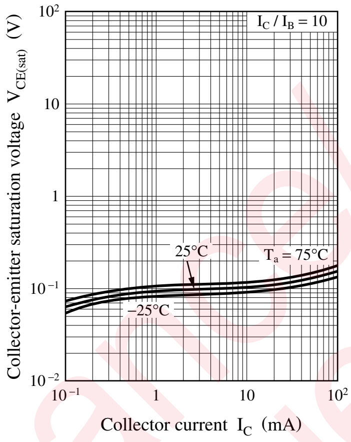


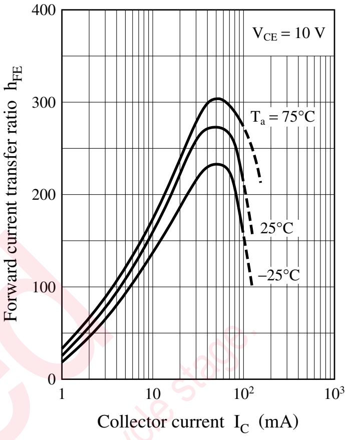
V_{IN} — I_O

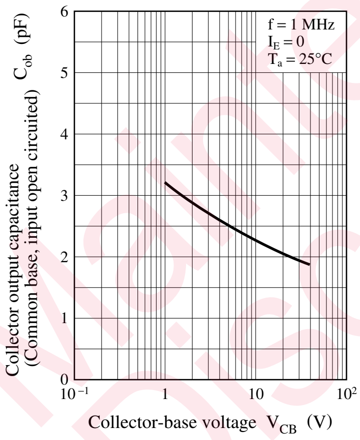


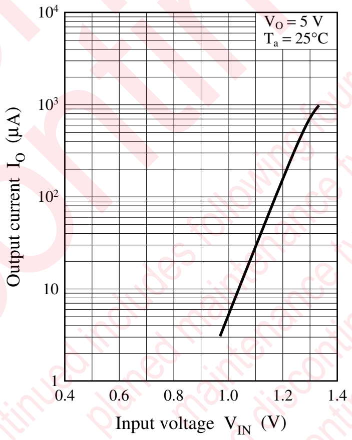
Characteristics charts of UNR5212G


I_C — V_{CE}


$V_{CE(sat)}$ — I_C


h_{FE} — I_C


C_{ob} — V_{CB}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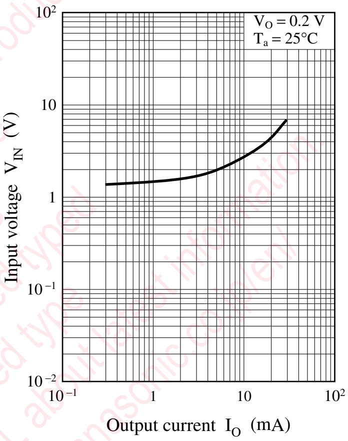
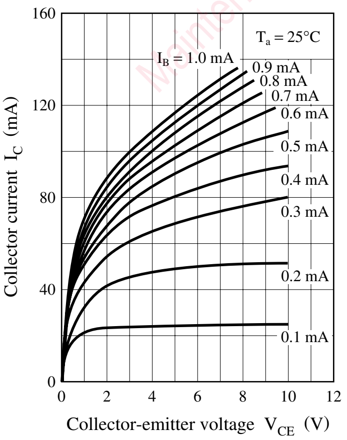
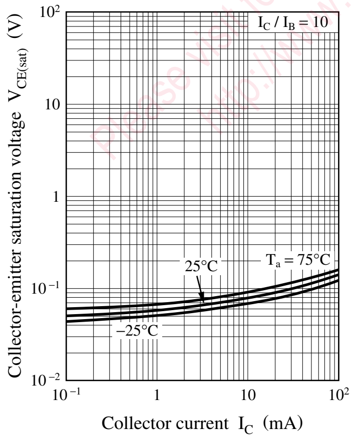
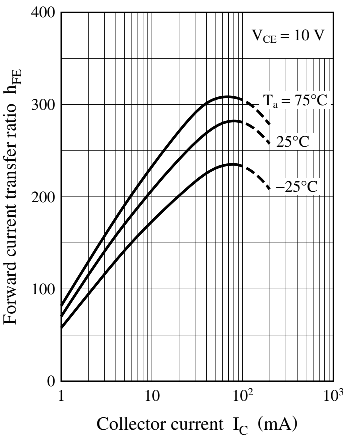

V_{IN} — I_O

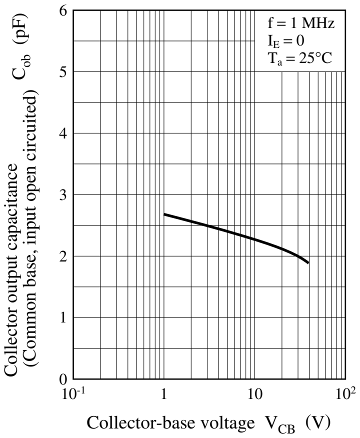
Characteristics charts of UNR5213G


I_C — V_{CE}

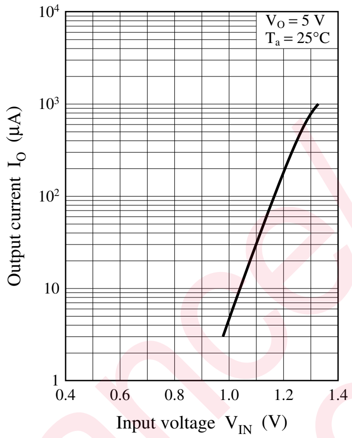

$V_{CE(sat)}$ — I_C


h_{FE} — I_C

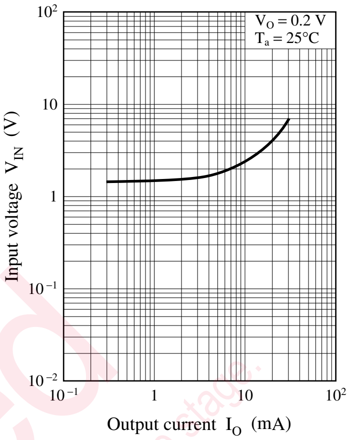
C_{ob} — V_{CB}



I_O — V_{IN}

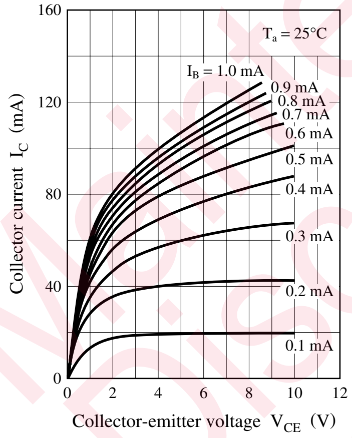


V_{IN} — I_O

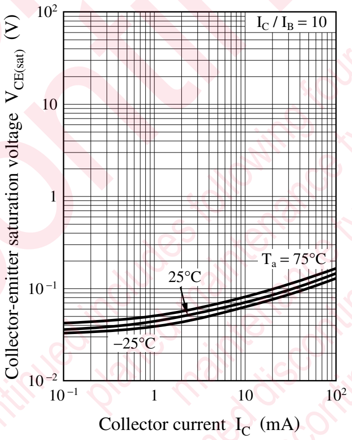


Characteristics charts of UNR5214G

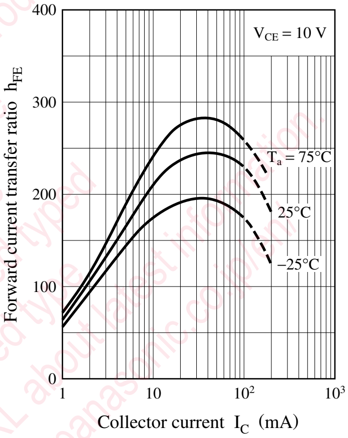
I_C — V_{CE}



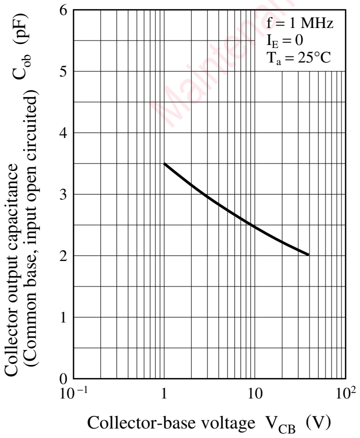
$V_{CE(sat)}$ — I_C



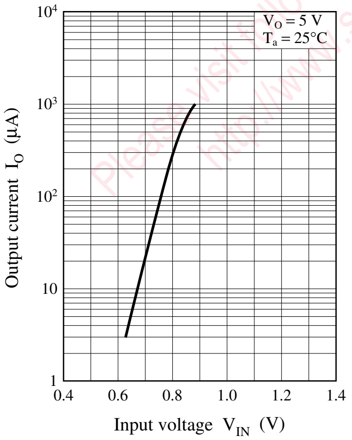
h_{FE} — I_C



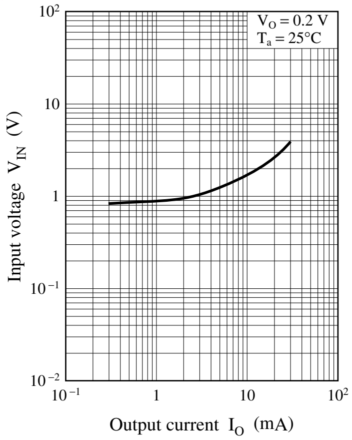
C_{ob} — V_{CB}



I_O — V_{IN}

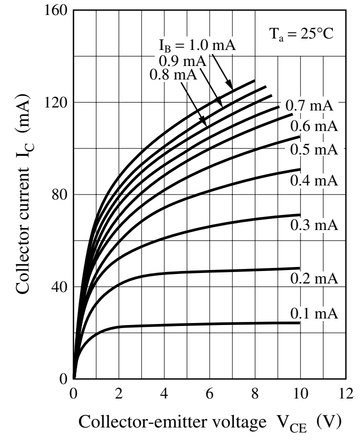


V_{IN} — I_O

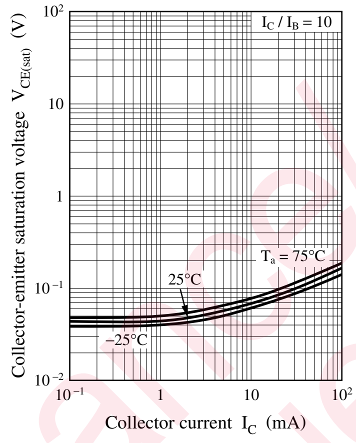


Characteristics charts of UNR5215G

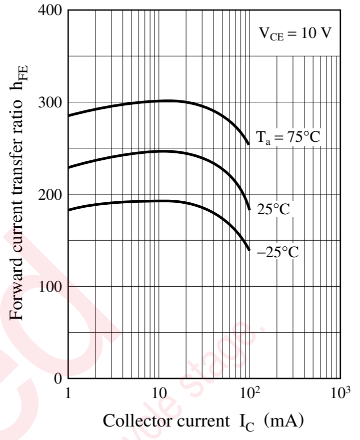
I_C — V_{CE}



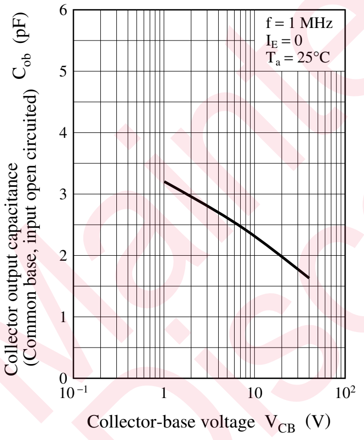
$V_{CE(sat)}$ — I_C



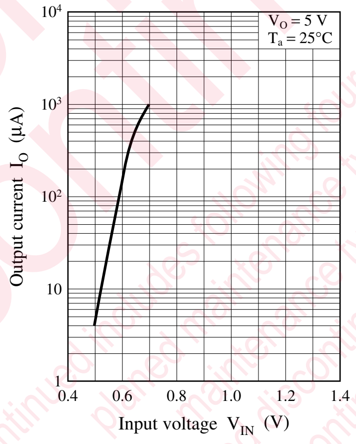
h_{FE} — I_C



C_{ob} — V_{CB}



I_O — V_{IN}



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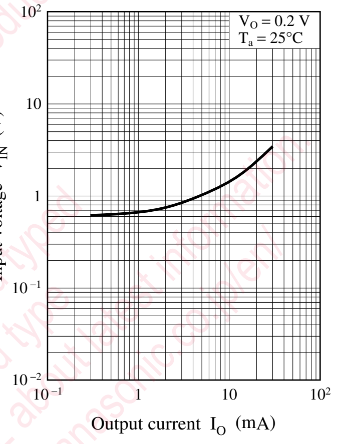
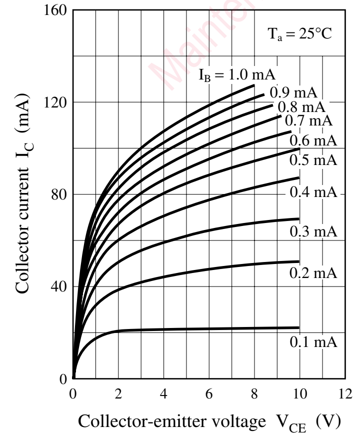
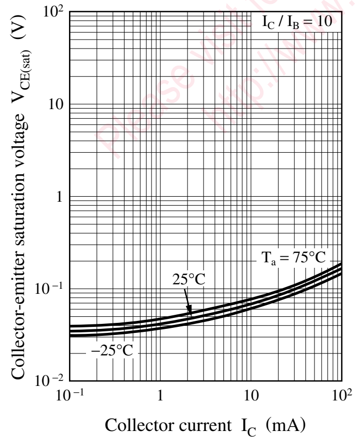


Characteristics charts of UNR5216G

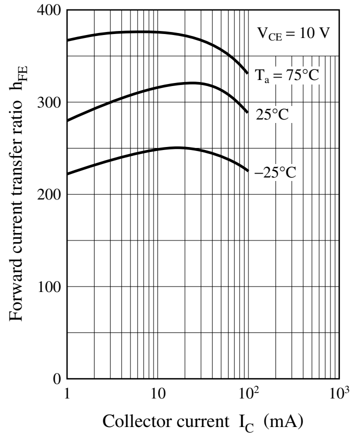
I_C — V_{CE}



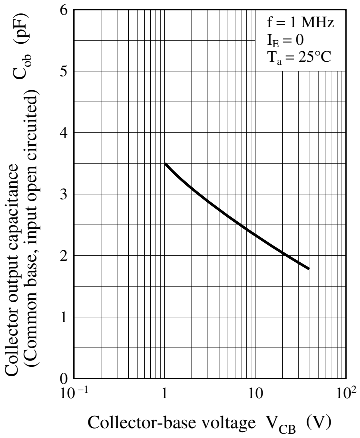
$V_{CE(sat)}$ — I_C



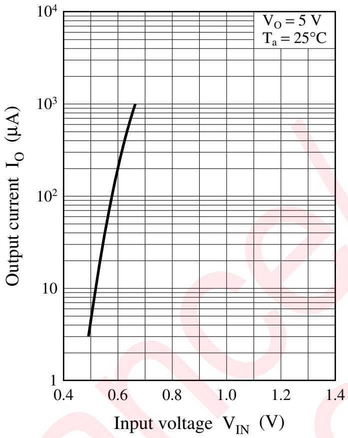
h_{FE} — I_C



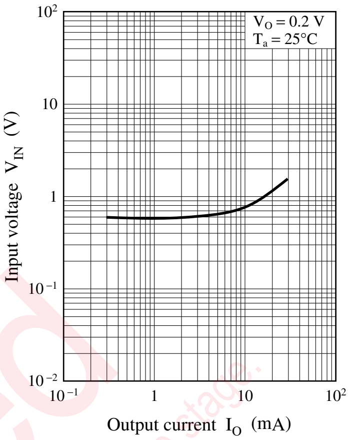
C_{ob} — V_{CB}



I_O — V_{IN}

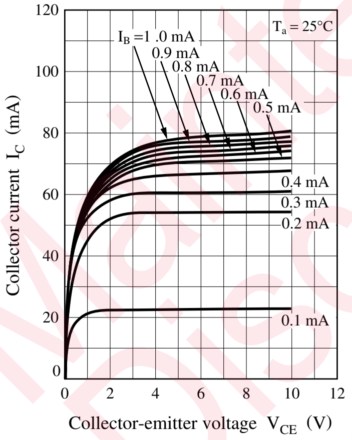


V_{IN} — I_O

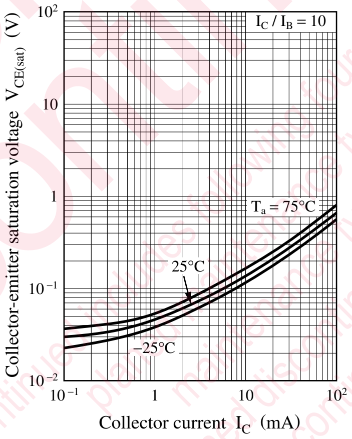


Characteristics charts of UNR5217G

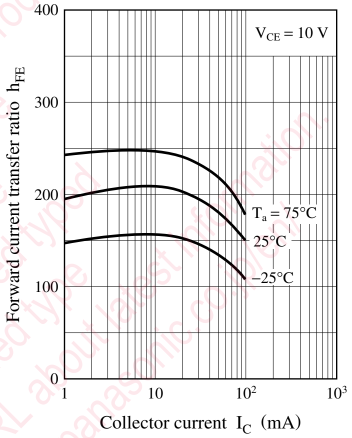
I_C — V_{CE}



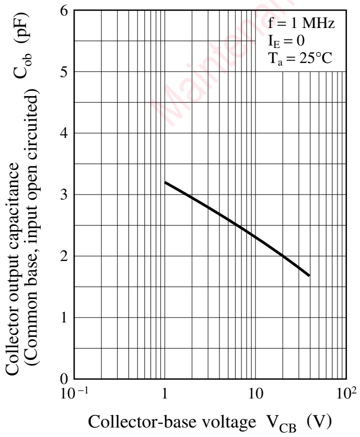
$V_{CE(sat)}$ — I_C



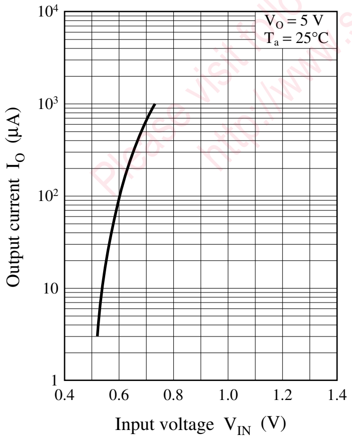
h_{FE} — I_C



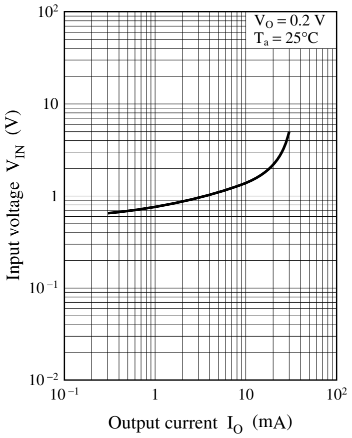
C_{ob} — V_{CB}



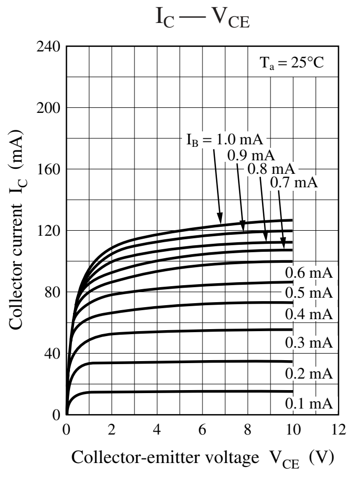
I_O — V_{IN}

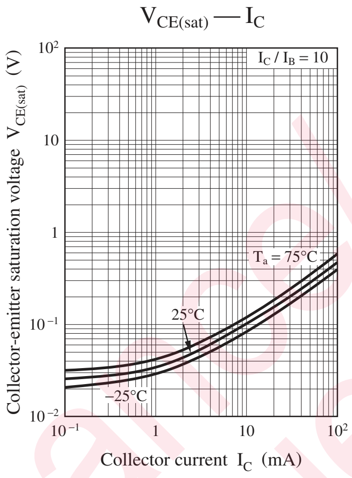


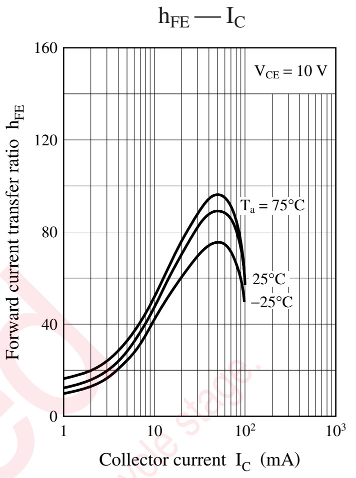
V_{IN} — I_O

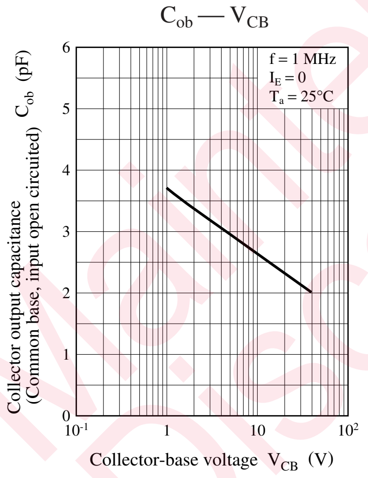


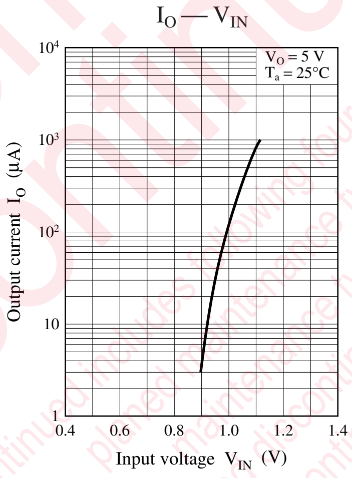
Characteristics charts of UNR5218G

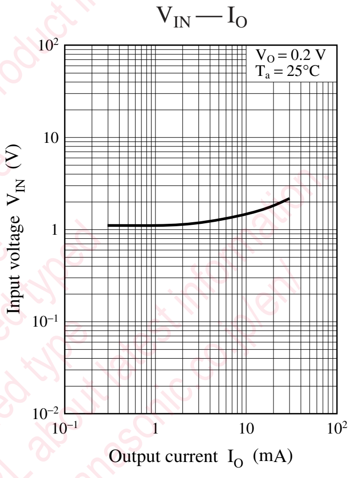




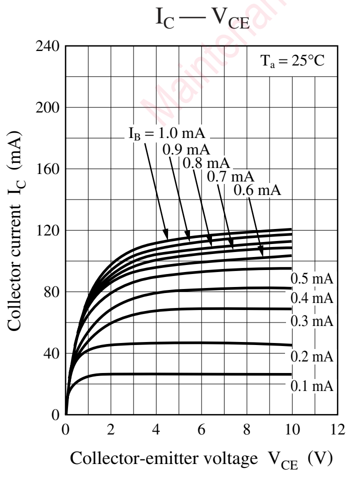


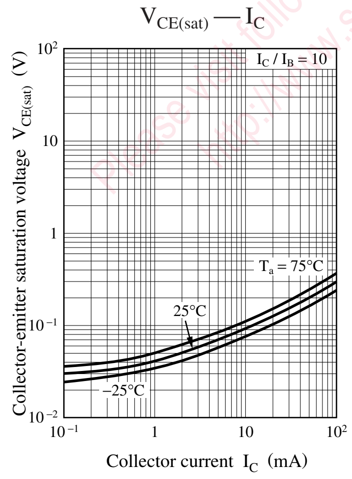


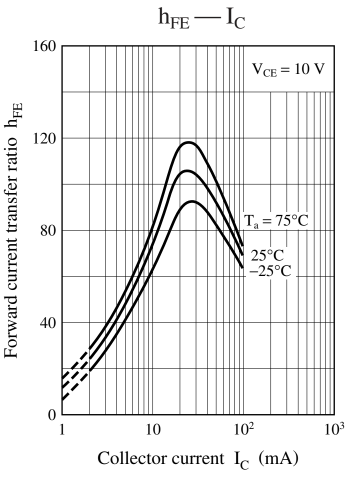




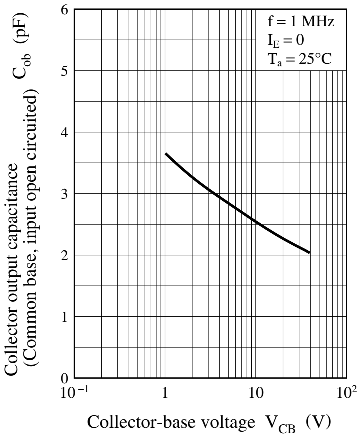
Characteristics charts of UNR5219G



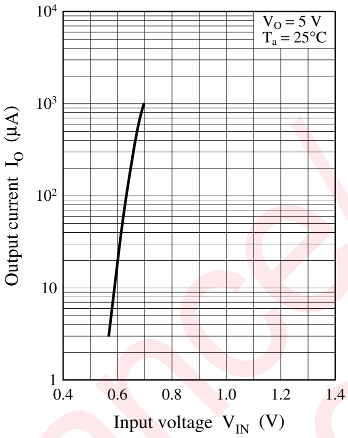




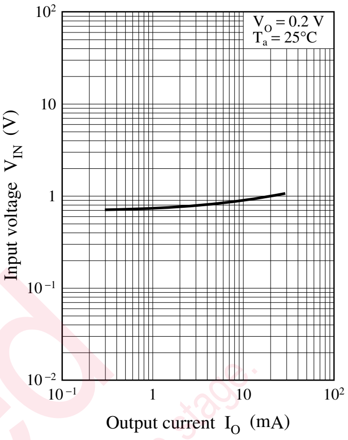
C_{ob} — V_{CB}



I_O — V_{IN}

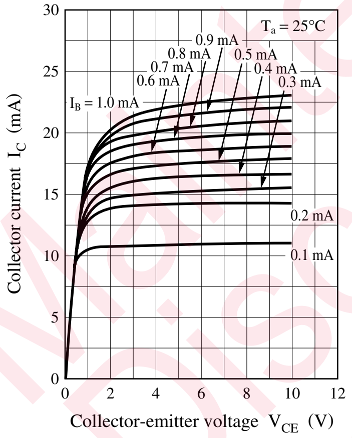


V_{IN} — I_O

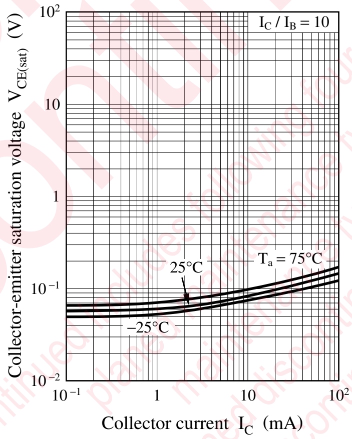


Characteristics charts of UNR521DG

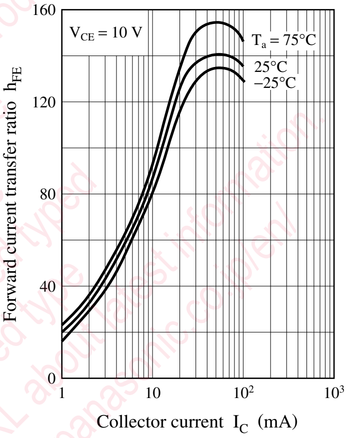
I_C — V_{CE}



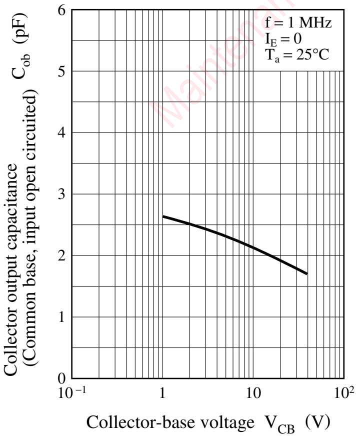
$V_{CE(sat)}$ — I_C



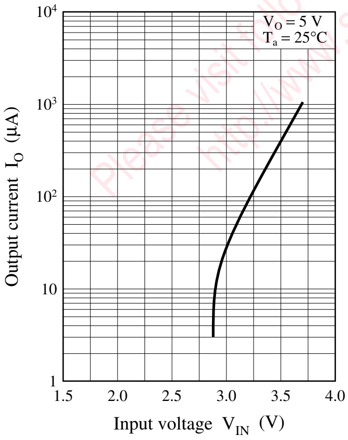
h_{FE} — I_C



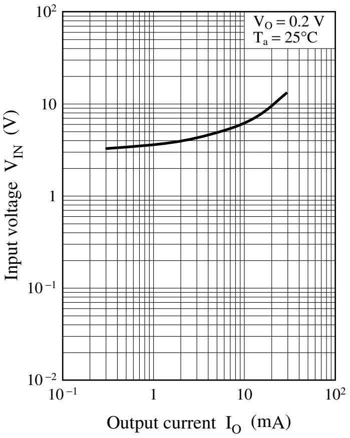
C_{ob} — V_{CB}



I_O — V_{IN}

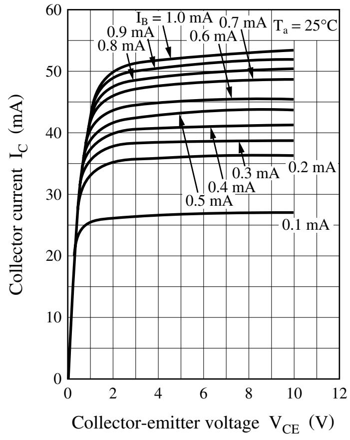


V_{IN} — I_O

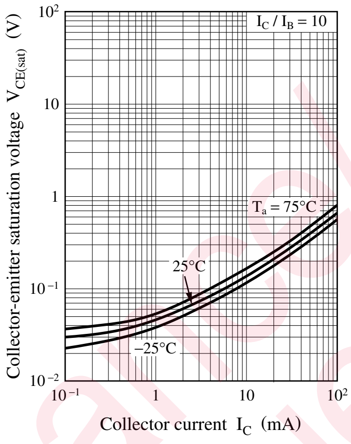


Characteristics charts of UNR521EG

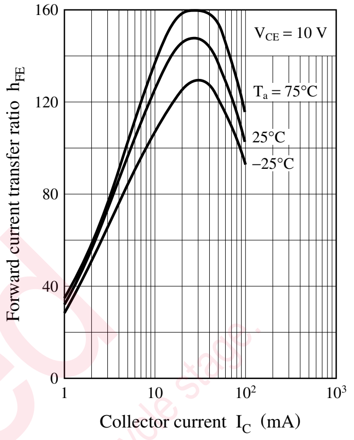
I_C — V_{CE}



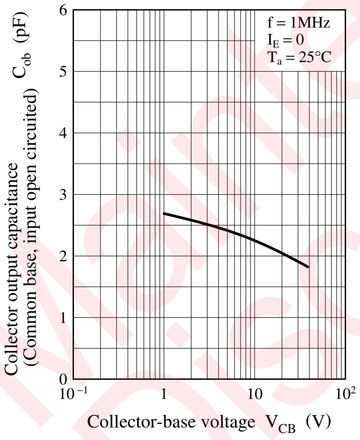
$V_{CE(sat)}$ — I_C



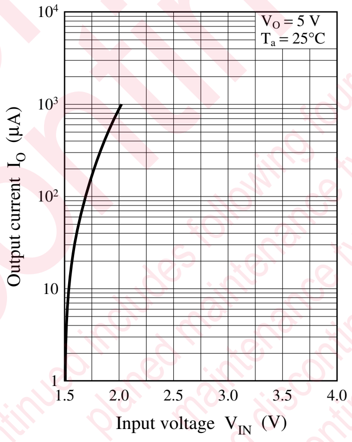
h_{FE} — I_C



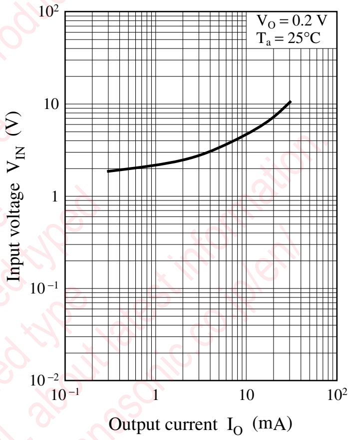
C_{ob} — V_{CB}



I_O — V_{IN}

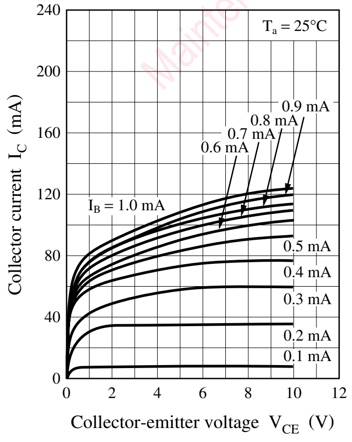


V_{IN} — I_O

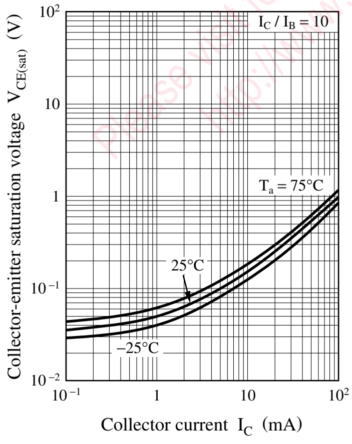


Characteristics charts of UNR521FG

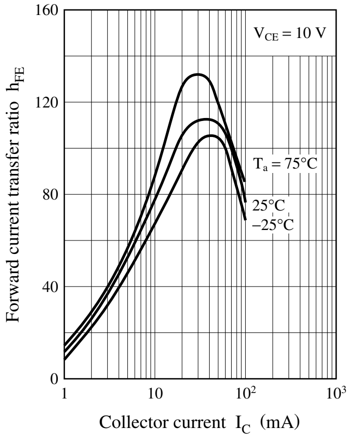
I_C — V_{CE}

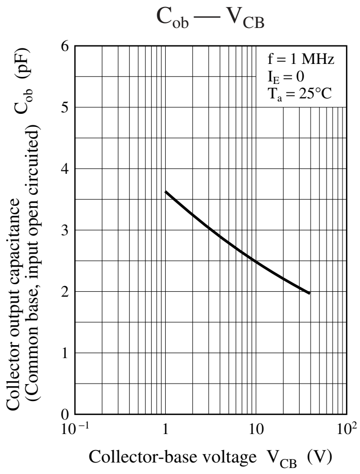


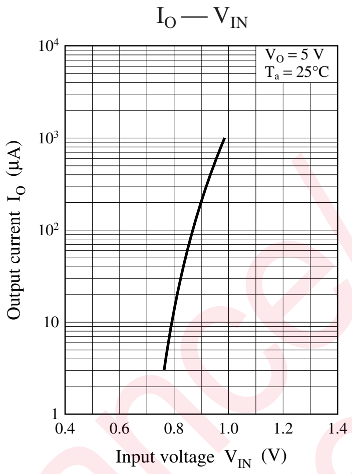
$V_{CE(sat)}$ — I_C

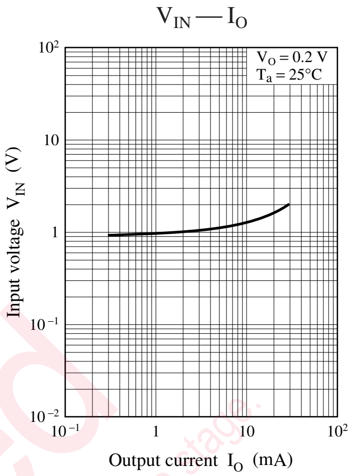


h_{FE} — I_C

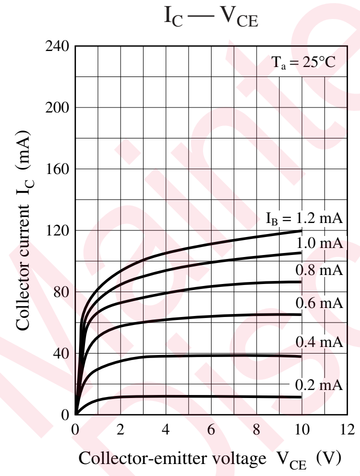


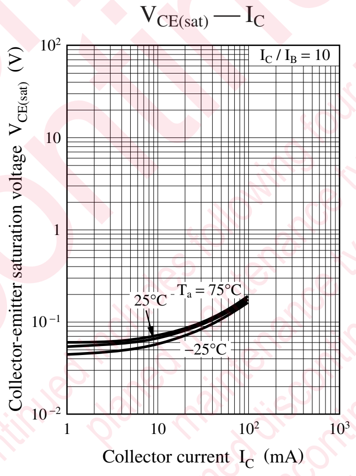


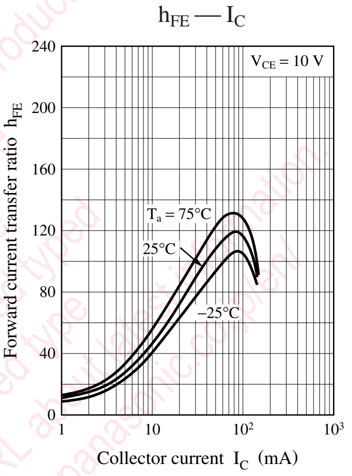


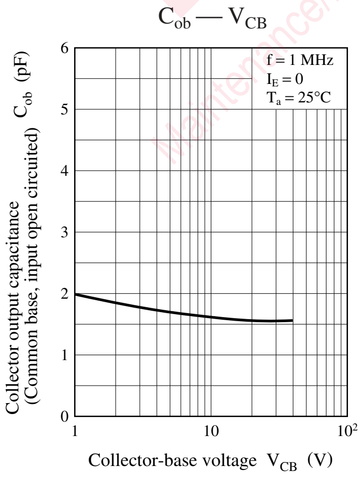


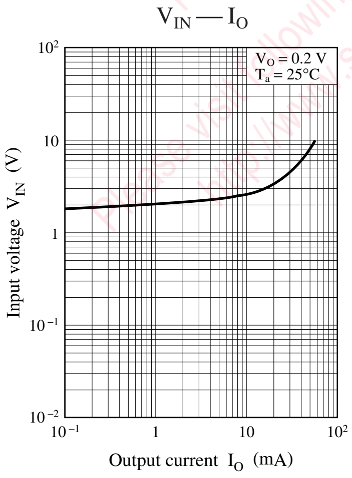
Characteristics charts of UNR521KG



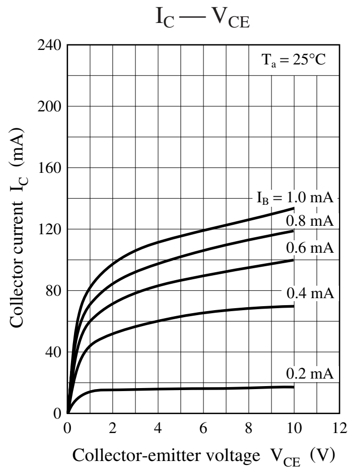


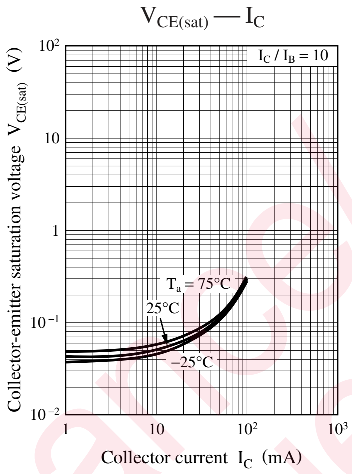


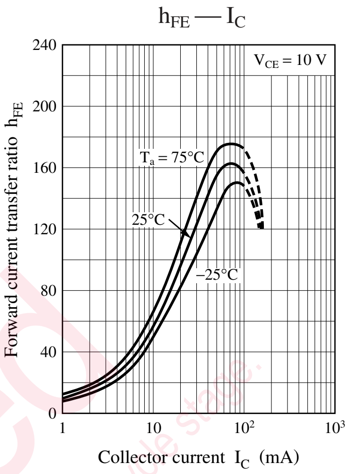


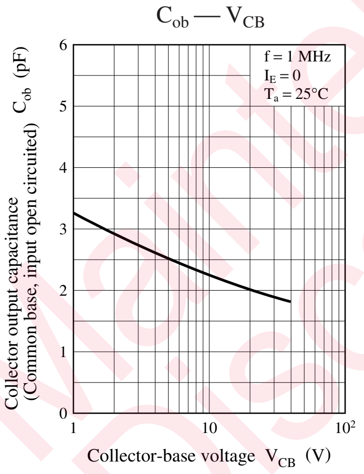


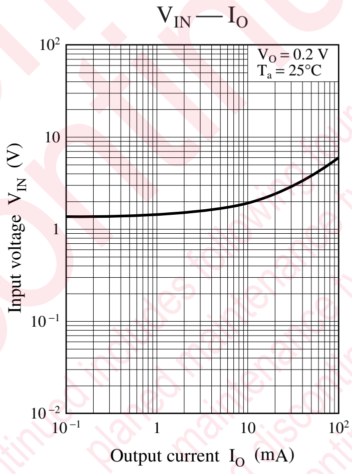
Characteristics charts of UNR521LG


I_C — V_{CE}

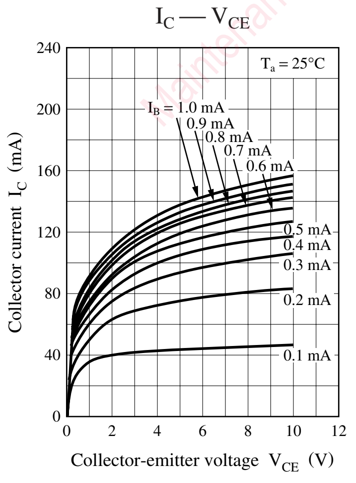

$V_{CE(sat)}$ — I_C

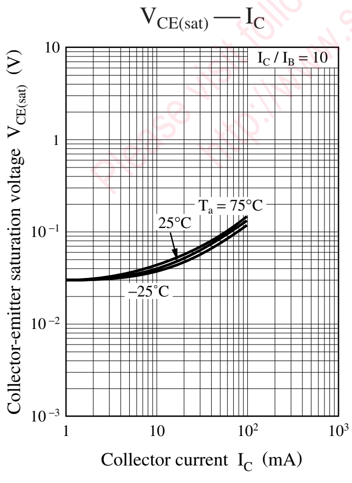

h_{FE} — I_C

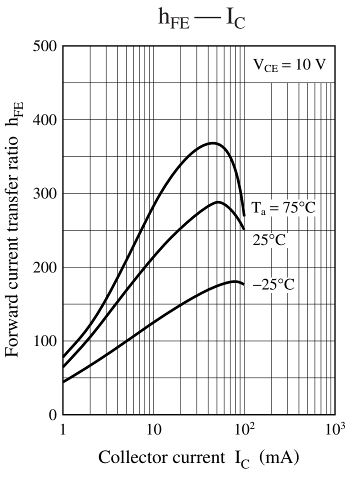

C_{ob} — V_{CB}

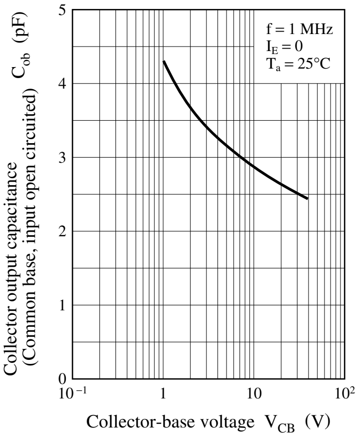

V_{IN} — I_O

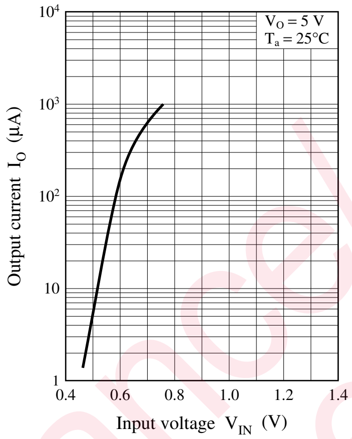
Characteristics charts of UNR521MG

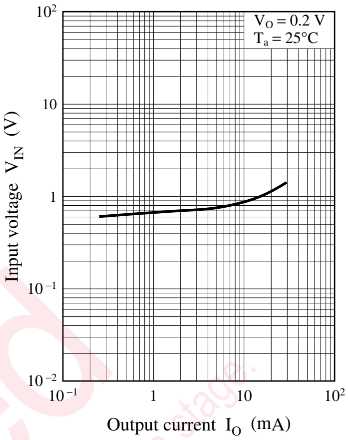

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

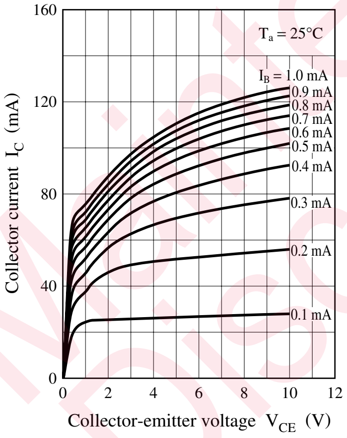

h_{FE} — I_C

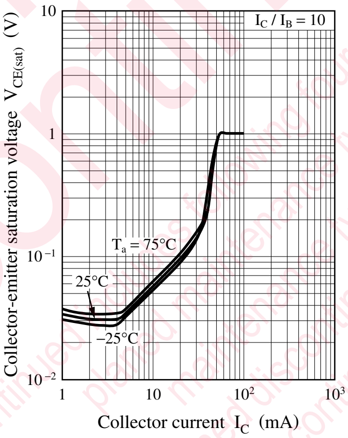

C_{ob} — V_{CB}

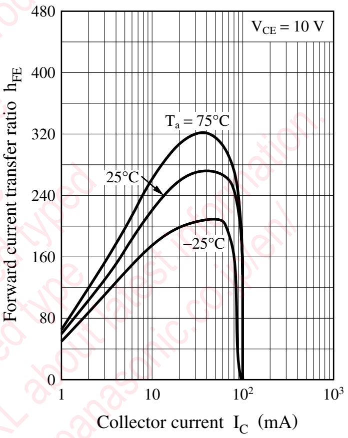

I_O — V_{IN}

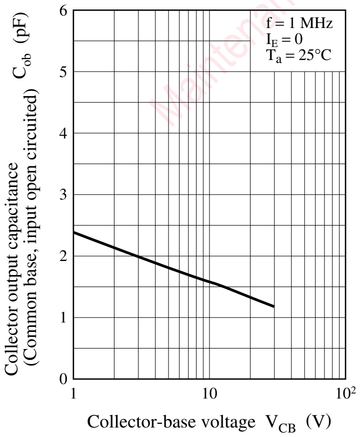

V_{IN} — I_O

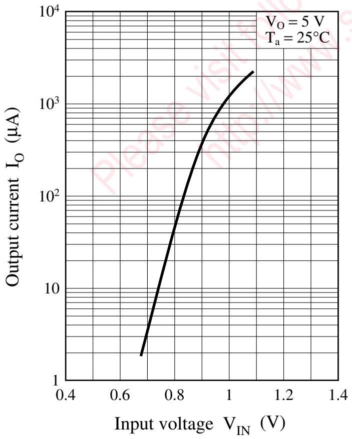
Characteristics charts of UNR521NG

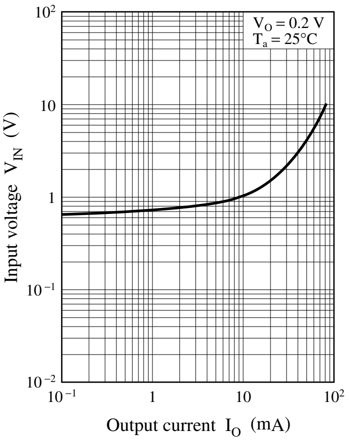

I_C — V_{CE}


$V_{CE(sat)}$ — I_C


h_{FE} — I_C

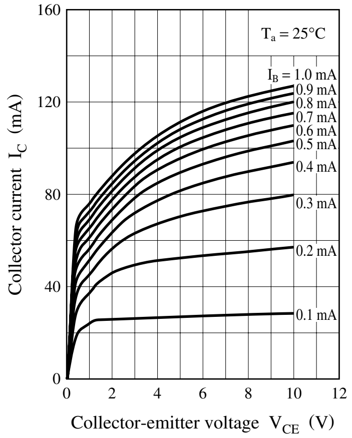

C_{ob} — V_{CB}


I_O — V_{IN}

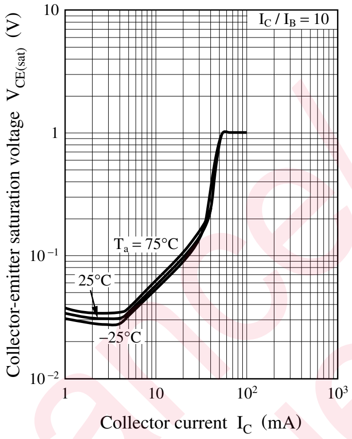

V_{IN} — I_O

Characteristics charts of UNR521TG

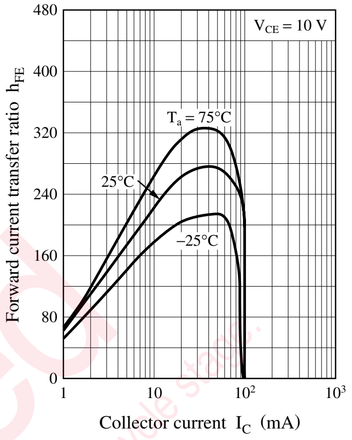
I_C — V_{CE}



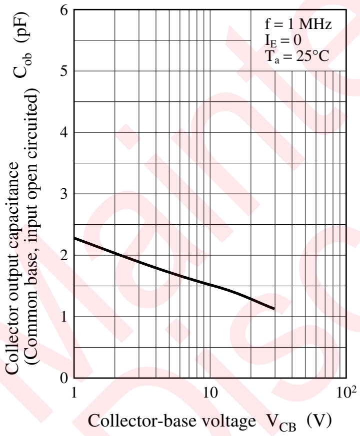
$V_{CE(sat)}$ — I_C



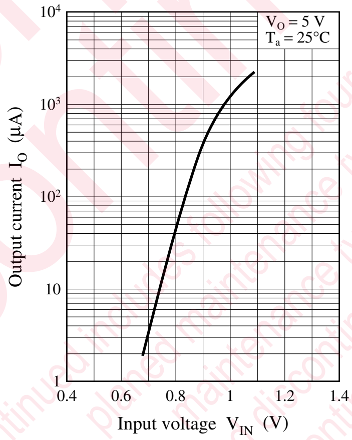
h_{FE} — I_C



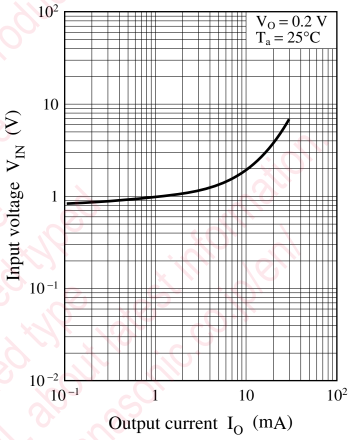
C_{ob} — V_{CB}



I_O — V_{IN}

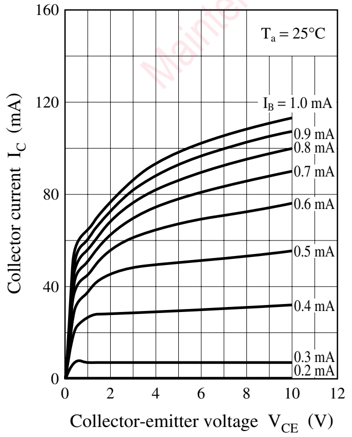


V_{IN} — I_O

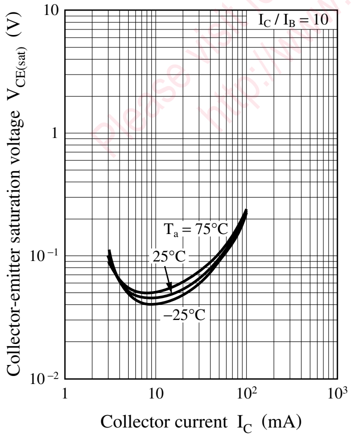


Characteristics charts of UNR521VG

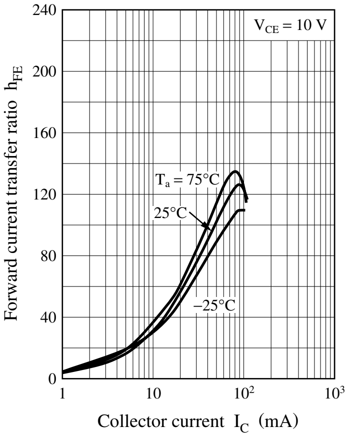
I_C — V_{CE}

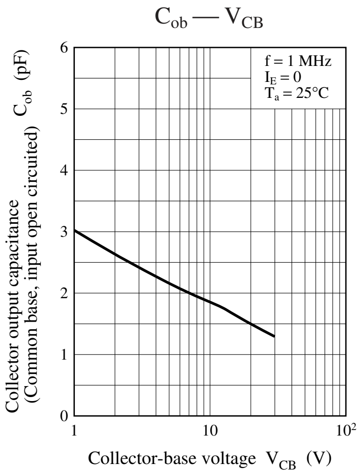


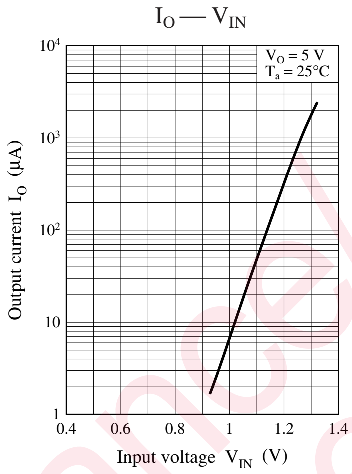
$V_{CE(sat)}$ — I_C

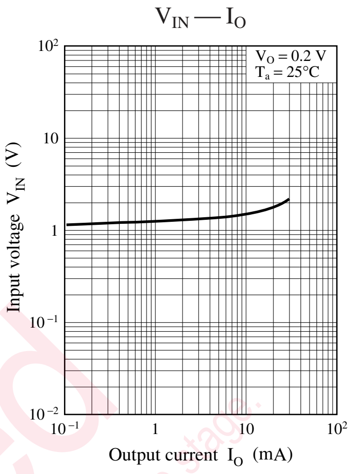


h_{FE} — I_C

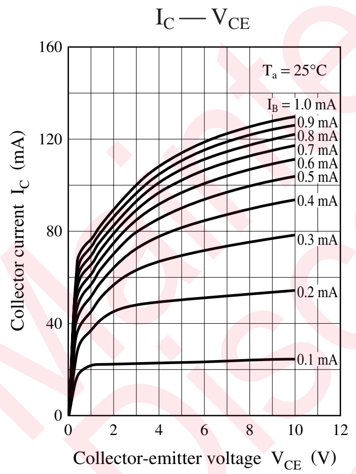


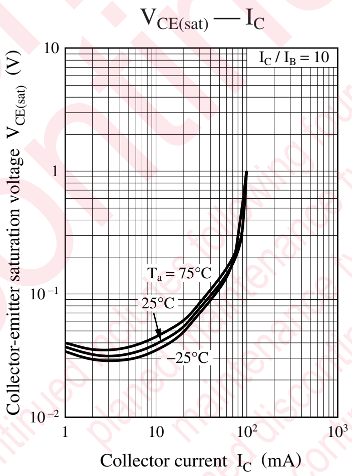


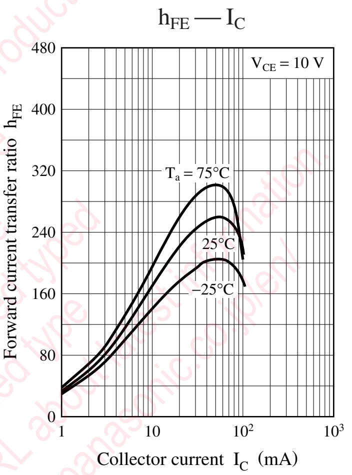


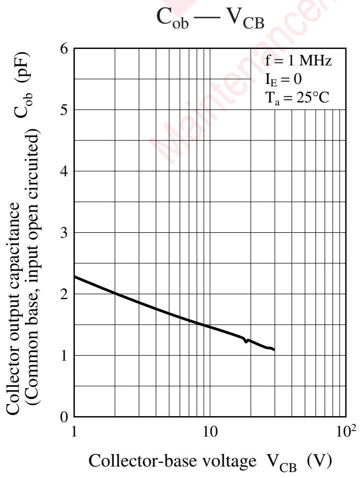


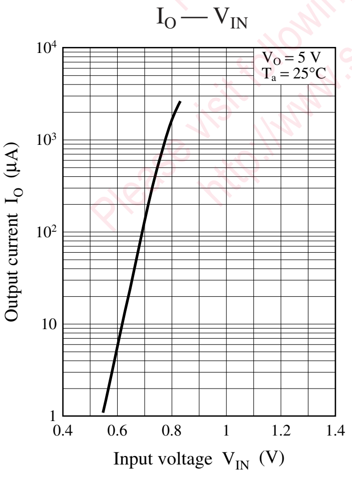
Characteristics charts of UNR521ZG

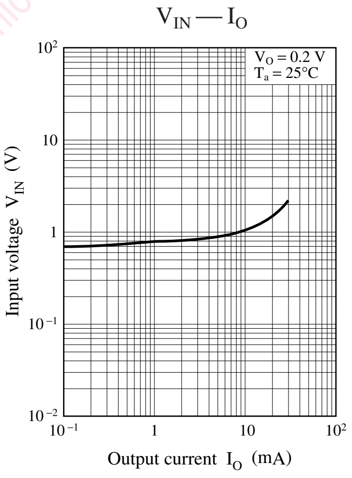






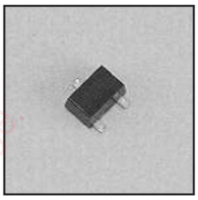


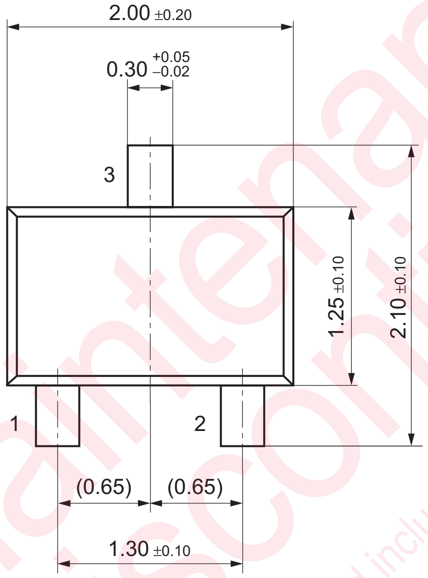


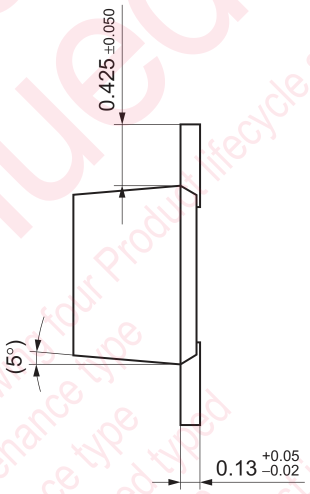


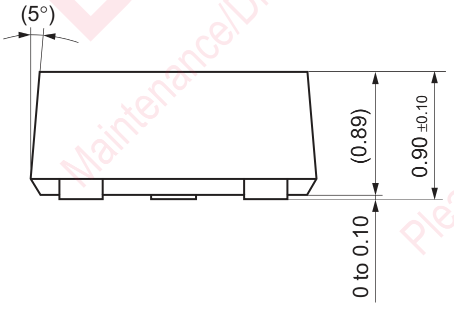
SMini3-F2

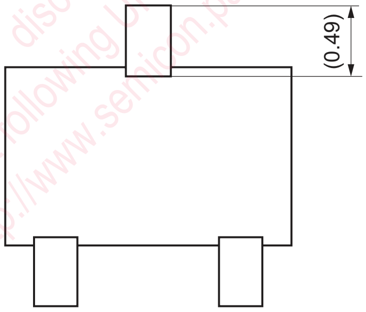
Unit: mm











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