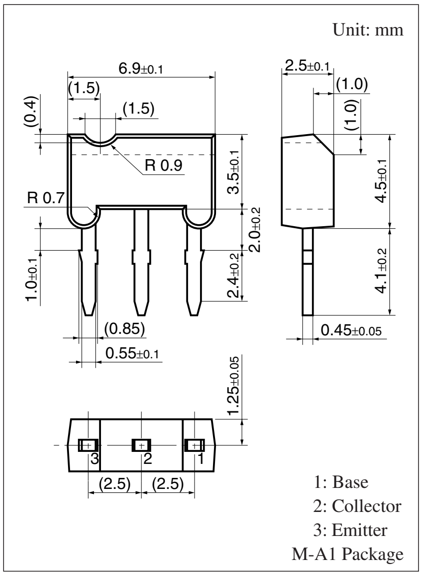
UNR121x Series (UN121x Series)

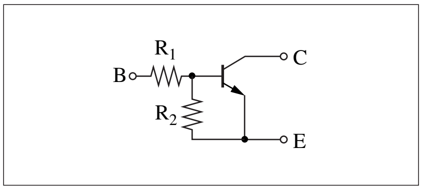
Silicon NPN epitaxial planar type

For digital circuits



M-A1 Package

Internal Connection



■ Features

- Costs can be reduced through downsizing of the equipment and reduction of the number of parts
- M type package allowing easy automatic and manual insertion as well as stand-alone fixing to the printed circuit board

■ Resistance by Part Number

	(R_1)	(R_2)
• UNR1210 (UN1210)	47 kΩ	—
• UNR1211 (UN1211)	10 kΩ	10 kΩ
• UNR1212 (UN1212)	22 kΩ	22 kΩ
• UNR1213 (UN1213)	47 kΩ	47 kΩ
• UNR1214 (UN1214)	10 kΩ	47 kΩ
• UNR1215 (UN1215)	10 kΩ	—
• UNR1216 (UN1216)	4.7 kΩ	—
• UNR1217 (UN1217)	22 kΩ	—
• UNR1218 (UN1218)	0.51 kΩ	5.1 kΩ
• UNR1219 (UN1219)	1 kΩ	10 kΩ
• UNR121D (UN121D)	47 kΩ	10 kΩ
• UNR121E (UN121E)	47 kΩ	22 kΩ
• UNR121F (UN121F)	4.7 kΩ	10 kΩ
• UNR121K (UN121K)	10 kΩ	4.7 kΩ
• UNR121L (UN121L)	4.7 kΩ	4.7 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	400	mW
Junction temperature	T_j	150	°C
Storage temperature	T_{stg}	−55 to +150	°C

Note) The part numbers in the parenthesis show conventional part number.

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

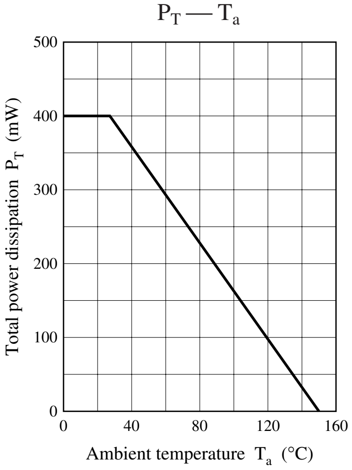
Parameter		Symbol	Conditions	Min	Typ	Max	Unit
Collector-base voltage (Emitter open)		V_{CBO}	$I_C = 10\ \mu A$, $I_E = 0$	50			V
Collector-emitter voltage (Base open)		V_{CEO}	$I_C = 2\ mA$, $I_B = 0$	50			V
Collector-base cutoff current (Emitter open)		I_{CBO}	$V_{CB} = 50\ V$, $I_E = 0$			0.1	µA
Collector-emitter cutoff current (Base open)		I_{CEO}	$V_{CE} = 50\ V$, $I_B = 0$			0.5	µA
Emitter-base cutoff current (Collector open)	UNR1211	I_{EBO}	$V_{EB} = 6\ V$, $I_C = 0$			0.5	mA
	UNR1212/1214/121D/121E					0.2	
	UNR1213					0.1	
	UNR1210/1215/1216/1217					0.01	
	UNR121F/121K					1.0	
	UNR1219					1.5	
	UNR1218/121L					2.0	
Forward current transfer ratio	UNR1211	h_{FE}	$V_{CE} = 10\ V$, $I_C = 5\ mA$	35			—
	UNR1212/121E			60			
	UNR1213/1214			80			
	UNR1210 */1215 */1216 */ 1217 *			160		460	
	UNR1219/121D/121F			30			
	UNR1218/121K/121L			20			
Collector-emitter saturation voltage		$V_{CE(sat)}$	$I_C = 10\ mA$, $I_B = 0.3\ mA$			0.25	V
Output voltage high-level		V_{OH}	$V_{CC} = 5\ V$, $V_B = 0.5\ V$, $R_L = 1\ k\Omega$	4.9			V
Output voltage low-level		V_{OL}	$V_{CC} = 5\ V$, $V_B = 2.5\ V$, $R_L = 1\ k\Omega$			0.2	V
	UNR1213/121K		$V_{CC} = 5\ V$, $V_B = 3.5\ V$, $R_L = 1\ k\Omega$				
	UNR121D		$V_{CC} = 5\ V$, $V_B = 10\ V$, $R_L = 1\ k\Omega$				
	UNR121E		$V_{CC} = 5\ V$, $V_B = 6\ V$, $R_L = 1\ k\Omega$				
Transition frequency		f_T	$V_{CB} = 10\ V$, $I_E = -2\ mA$, $f = 200\ MHz$		80		MHz
Input resistance	UNR1211/1214/1215/121K	R_1		−30%	10	+30%	kΩ
	UNR1212/1217				22		
	UNR1210/1213/121D/121E				47		
	UNR1216/121F/121L				4.7		
	UNR1218				0.51		
	UNR1219				1		
Resistance ratio	UNR1211/1212/1213/121L	R_1/R_2		0.8	1.0	1.2	—
	UNR1214			0.17	0.21	0.25	
	UNR1218/1219			0.08	0.1	0.12	
	UNR121D				4.7		
	UNR121E				2.14		
	UNR121F				0.47		
	UNR121K				2.13		

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

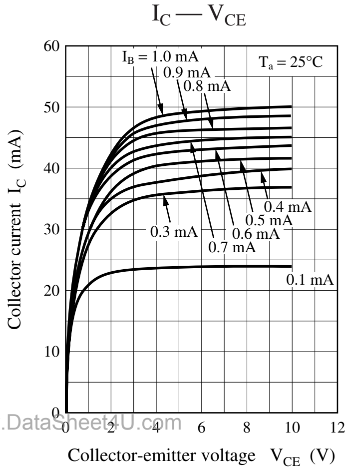
2. *: Rank classification (UNR1110/1115/1116/1117)

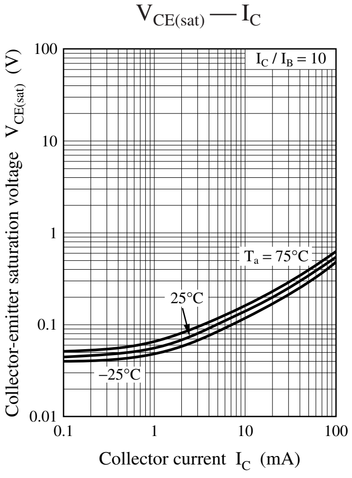
Rank	Q	R	S
h_{FE}	160 to 260	210 to 340	290 to 460

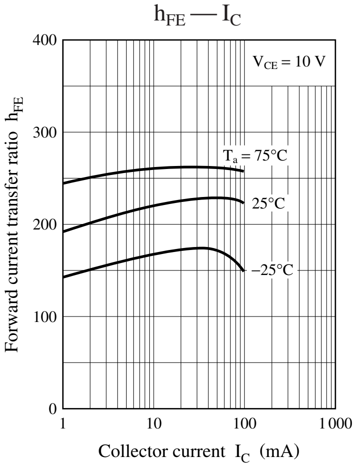
Common characteristics chart

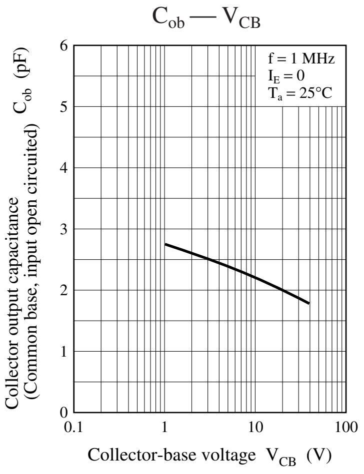

P_T — T_a

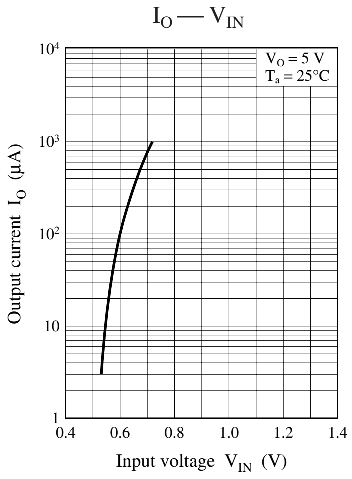
Characteristics charts of UNR1210

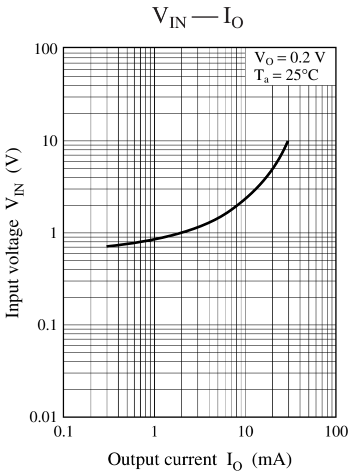

I_C — V_{CE}


$V_{CE(sat)}$ — I_C


h_{FE} — I_C

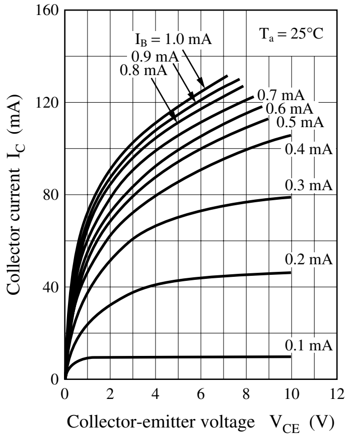

C_{ob} — V_{CB}


I_O — V_{IN}

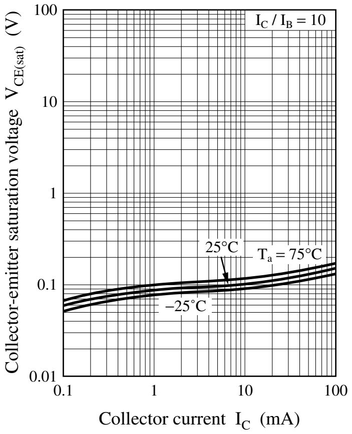

V_{IN} — I_O

Characteristics charts of UNR1211

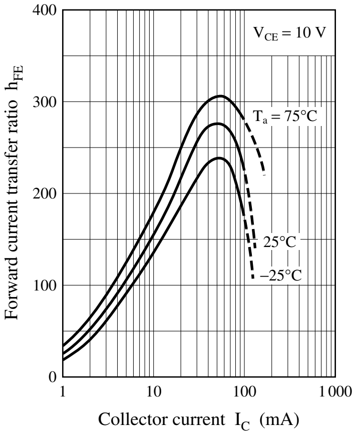
I_C — V_{CE}



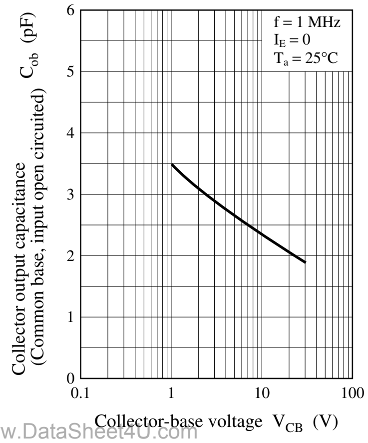
$V_{CE(sat)}$ — I_C



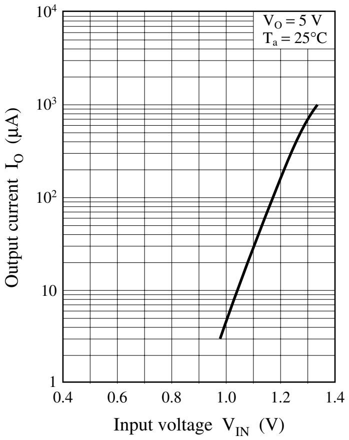
h_{FE} — I_C



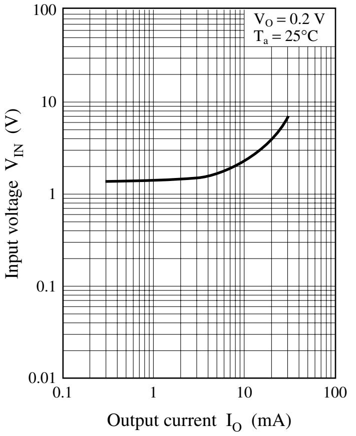
C_{ob} — V_{CB}



I_O — V_{IN}

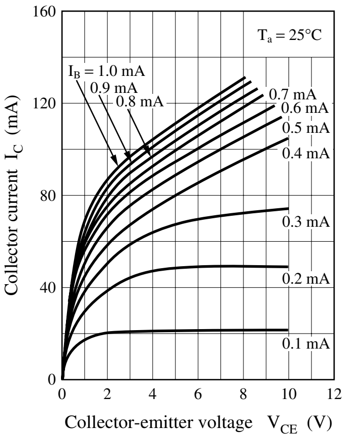


V_{IN} — I_O

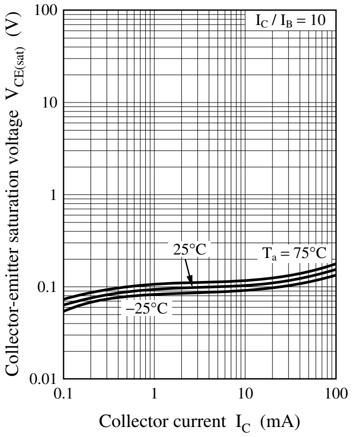


Characteristics charts of UNR1212

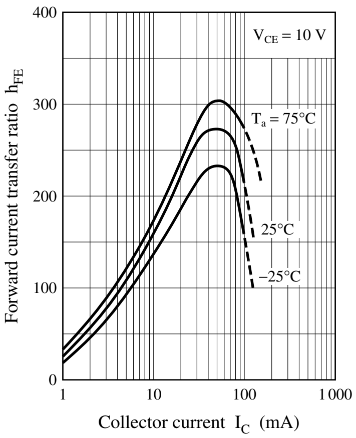
I_C — V_{CE}



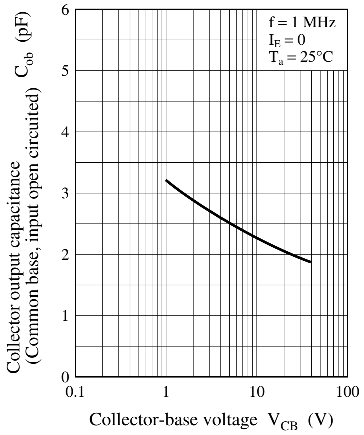
$V_{CE(sat)}$ — I_C



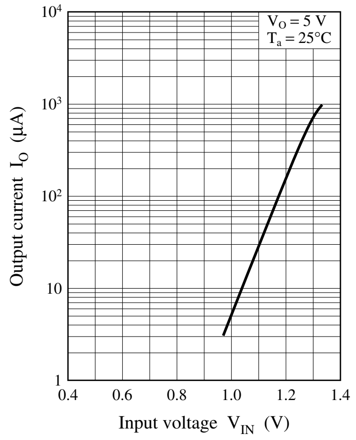
h_{FE} — I_C



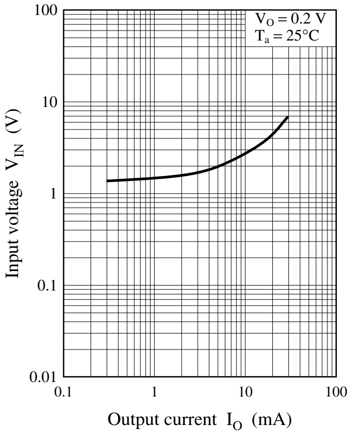
C_{ob} — V_{CB}



I_O — V_{IN}

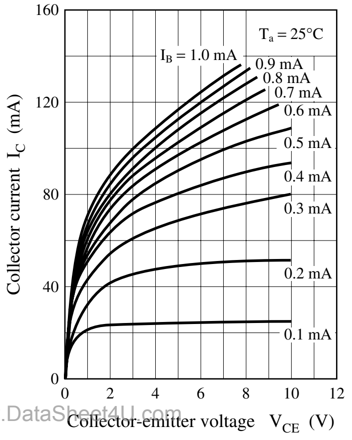


V_{IN} — I_O

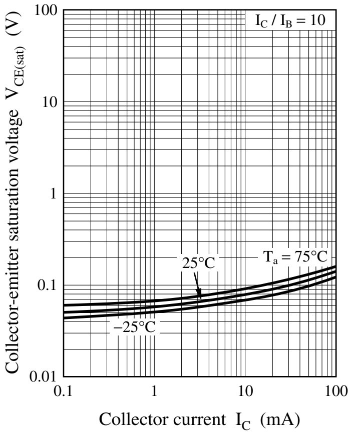


Characteristics charts of UNR1213

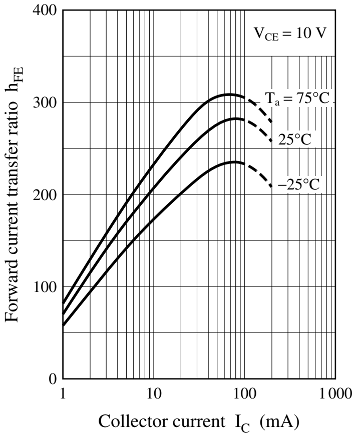
I_C — V_{CE}



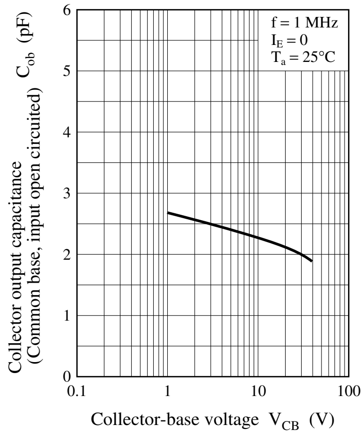
$V_{CE(sat)}$ — I_C



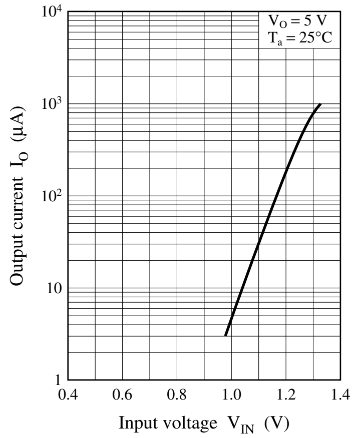
h_{FE} — I_C



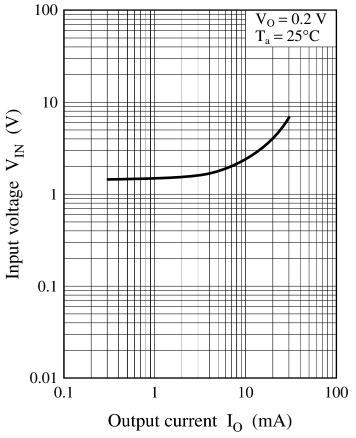
C_{ob} — V_{CB}



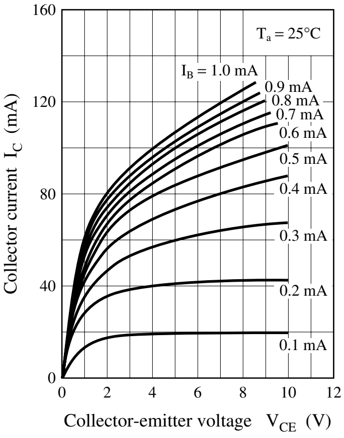
I_O — V_{IN}

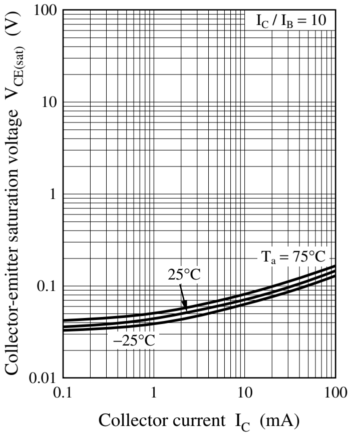


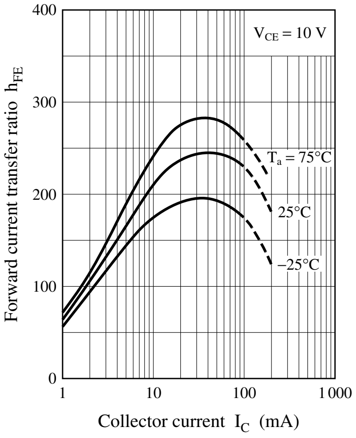
V_{IN} — I_O

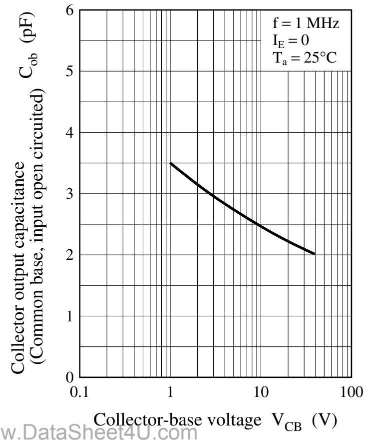


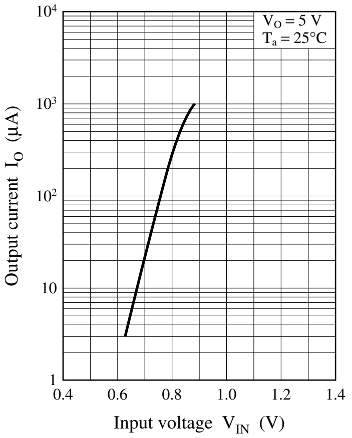
Characteristics charts of UNR1214

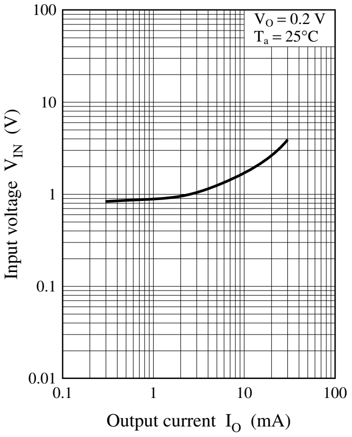

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

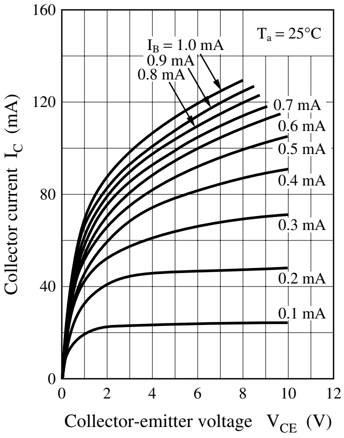

h_{FE} — I_C

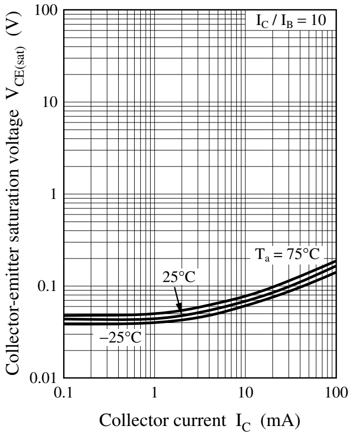

C_{ob} — V_{CB}

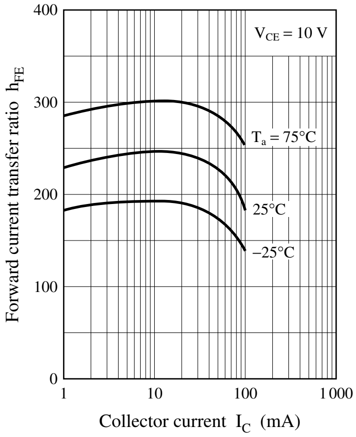

I_O — V_{IN}


V_{IN} — I_O

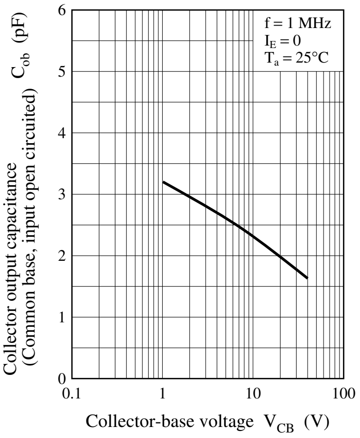
Characteristics charts of UNR1215


I_C — V_{CE}

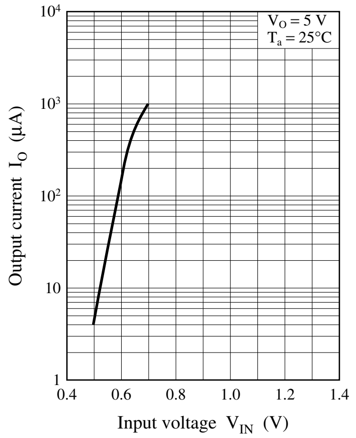

$V_{CE(sat)}$ — I_C


h_{FE} — I_C

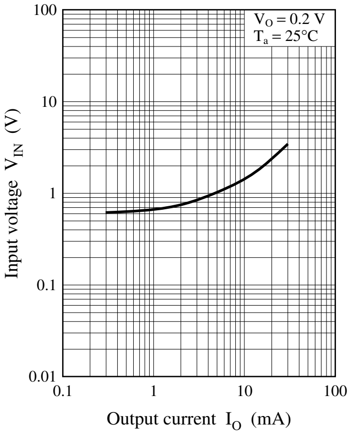
C_{ob} — V_{CB}



I_O — V_{IN}

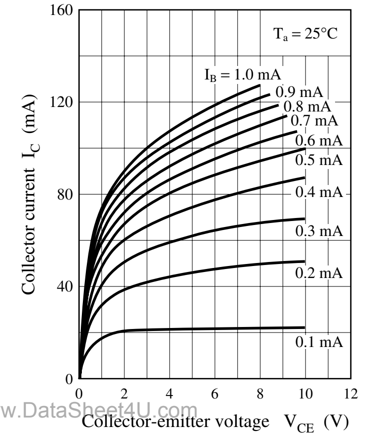


V_{IN} — I_O

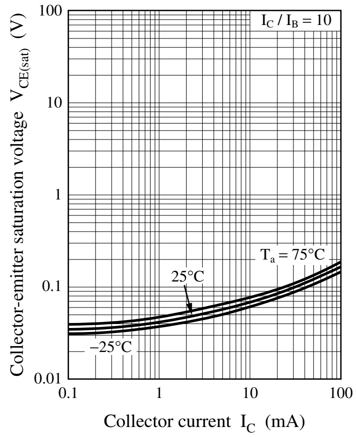


Characteristics charts of UNR1216

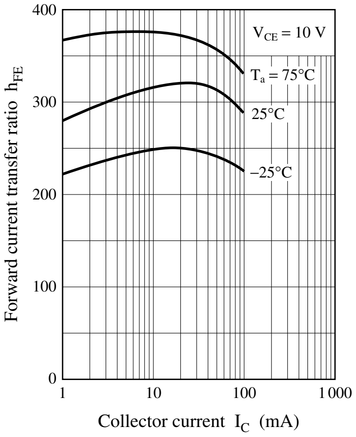
I_C — V_{CE}



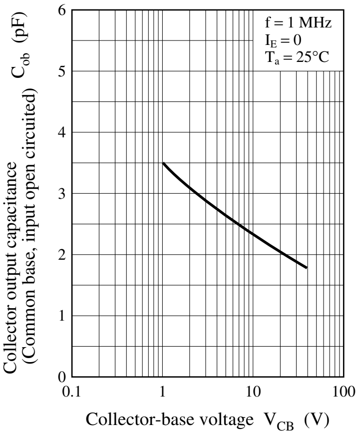
$V_{CE(sat)}$ — I_C



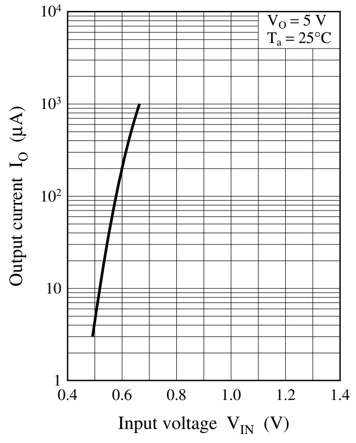
h_{FE} — I_C



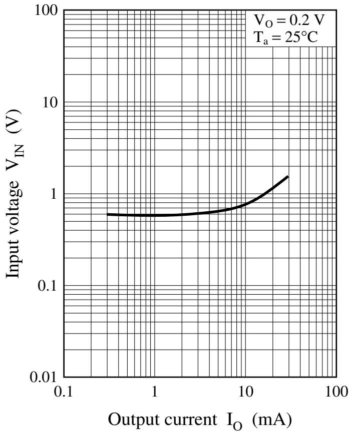
C_{ob} — V_{CB}



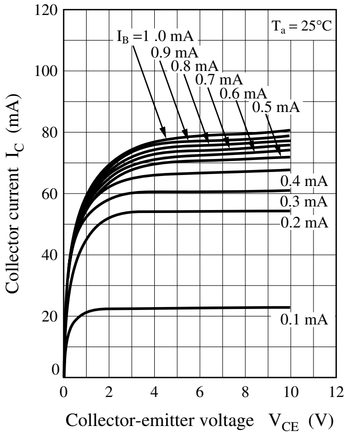
I_O — V_{IN}

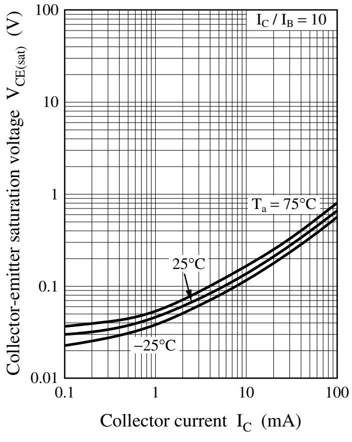


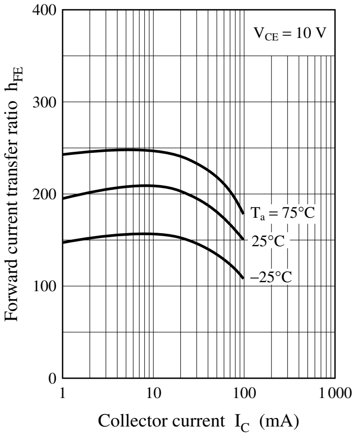
V_{IN} — I_O

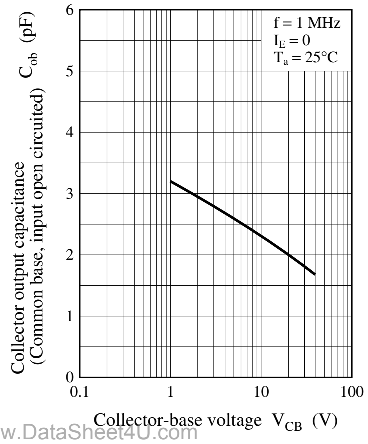


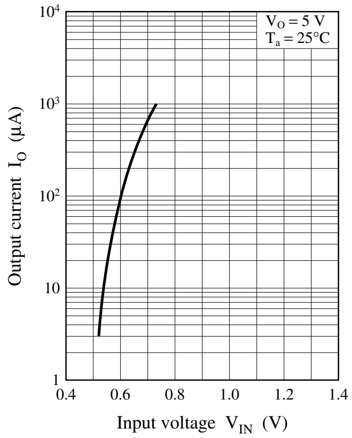
Characteristics charts of UNR1217

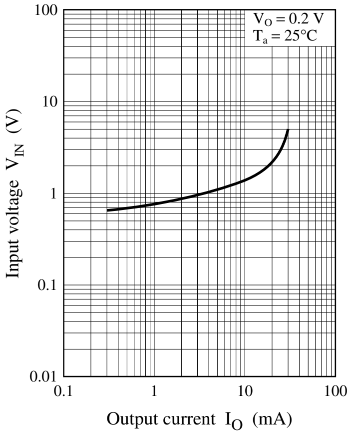

I_C — V_{CE}


$V_{CE(sat)}$ — I_C

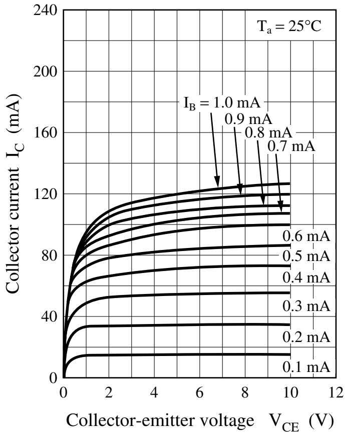

h_{FE} — I_C

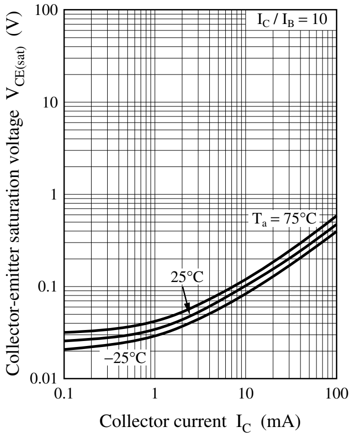

C_{ob} — V_{CB}

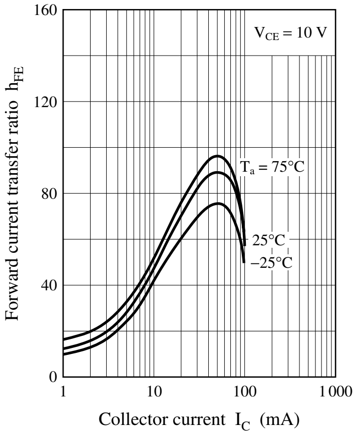

I_O — V_{IN}


V_{IN} — I_O

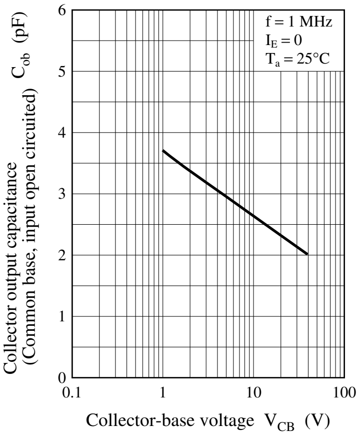
Characteristics charts of UNR1218


I_C — V_{CE}

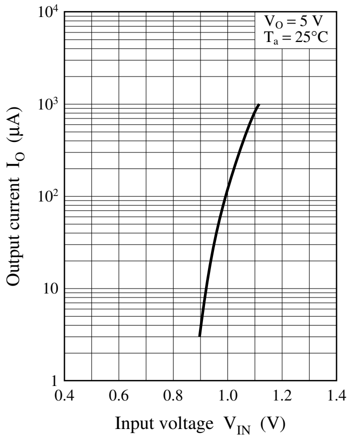

$V_{CE(sat)}$ — I_C


h_{FE} — I_C

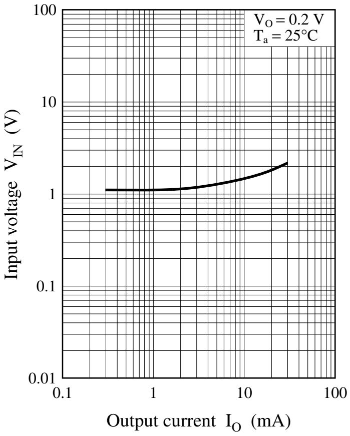
C_{ob} — V_{CB}



I_O — V_{IN}

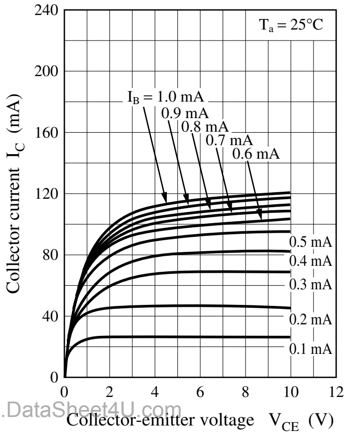


V_{IN} — I_O

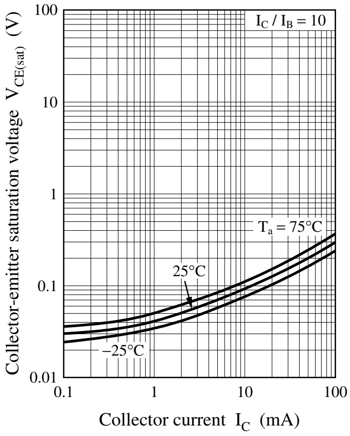


Characteristics charts of UNR1219

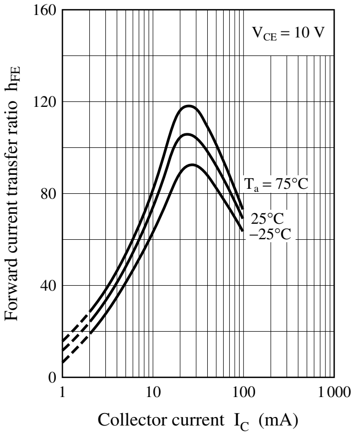
I_C — V_{CE}



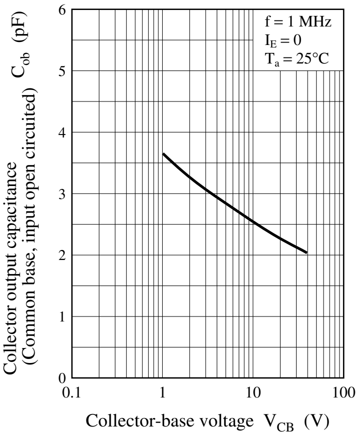
$V_{CE(sat)}$ — I_C



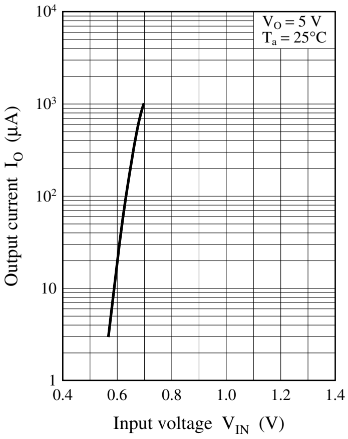
h_{FE} — I_C



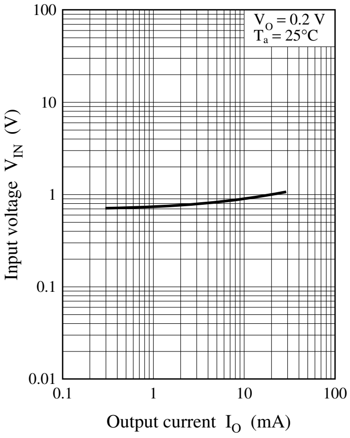
C_{ob} — V_{CB}



I_O — V_{IN}

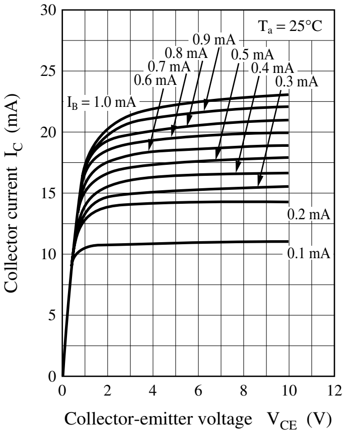


V_{IN} — I_O

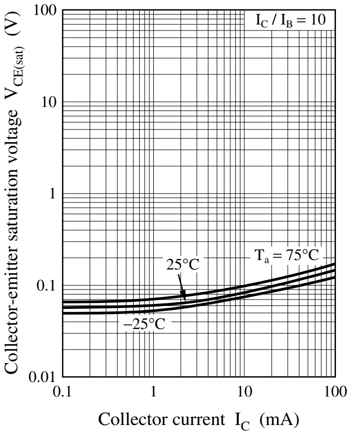


Characteristics charts of UNR121D

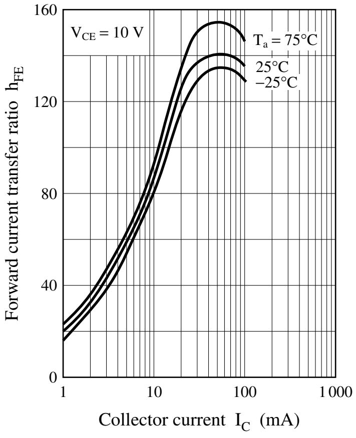
I_C — V_{CE}



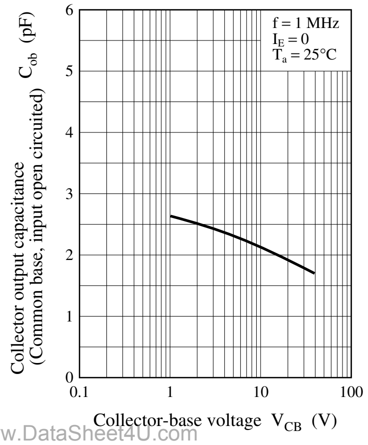
$V_{CE(sat)}$ — I_C



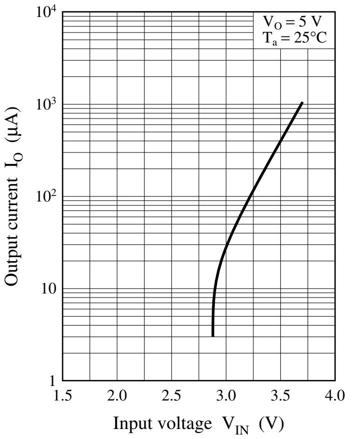
h_{FE} — I_C



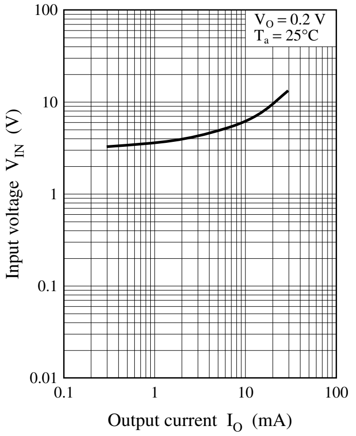
C_{ob} — V_{CB}



I_O — V_{IN}

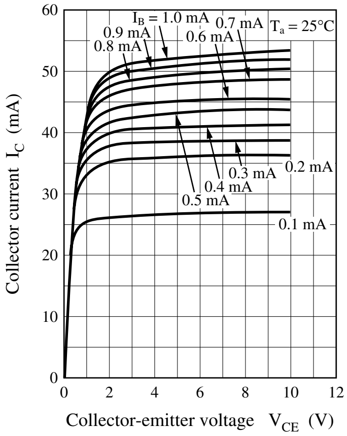


V_{IN} — I_O

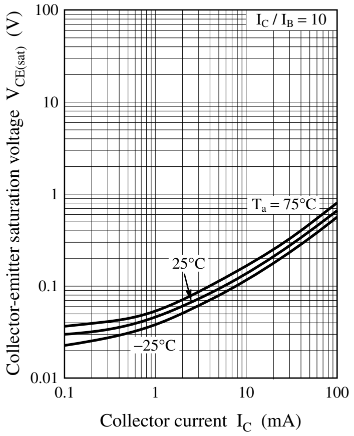


Characteristics charts of UNR121E

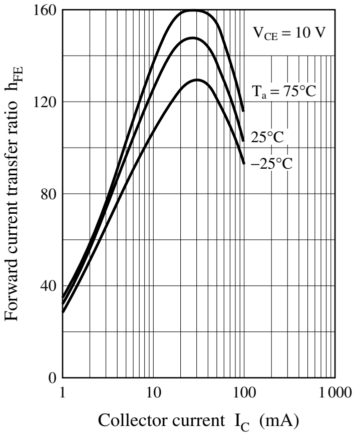
I_C — V_{CE}



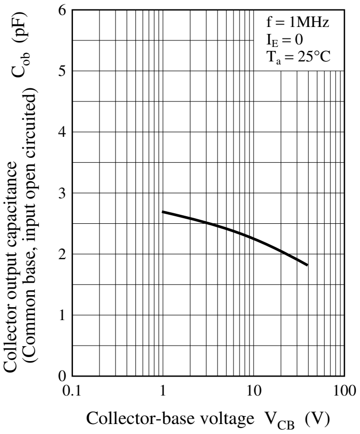
$V_{CE(sat)}$ — I_C



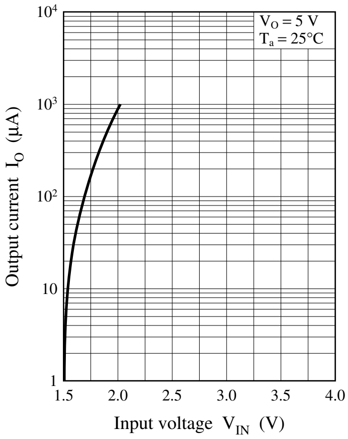
h_{FE} — I_C



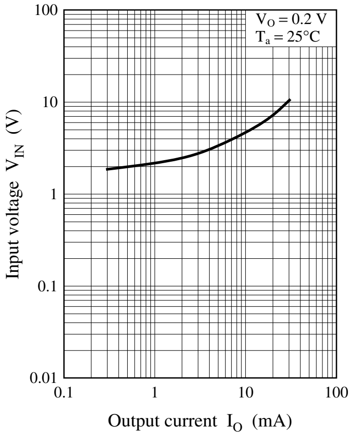
C_{ob} — V_{CB}



I_O — V_{IN}

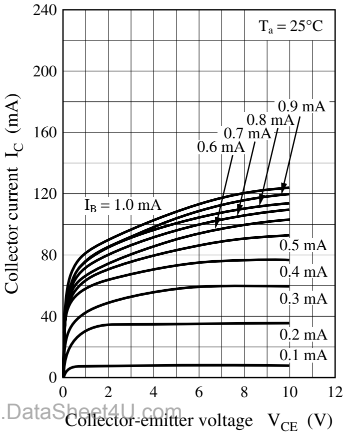


V_{IN} — I_O

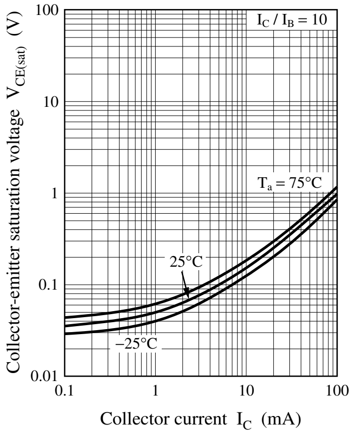


Characteristics charts of UNR121F

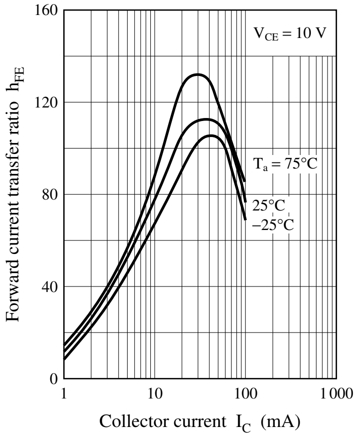
I_C — V_{CE}



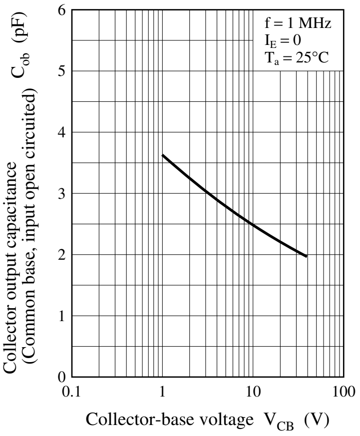
$V_{CE(sat)}$ — I_C



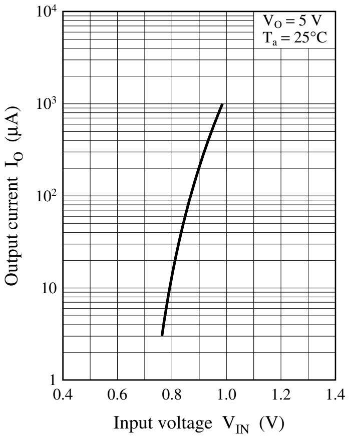
h_{FE} — I_C



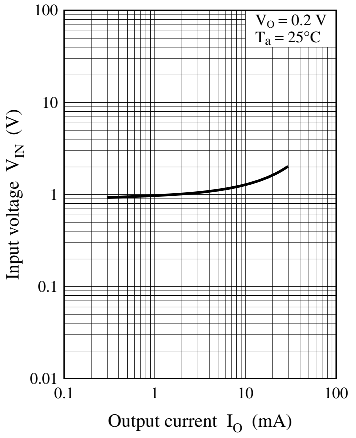
C_{ob} — V_{CB}



I_O — V_{IN}

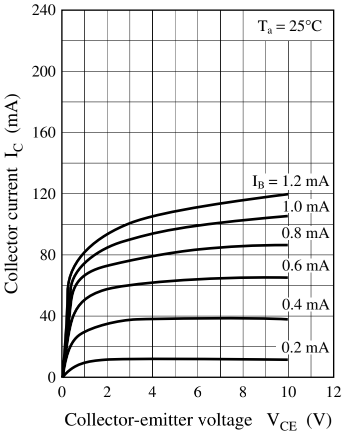


V_{IN} — I_O

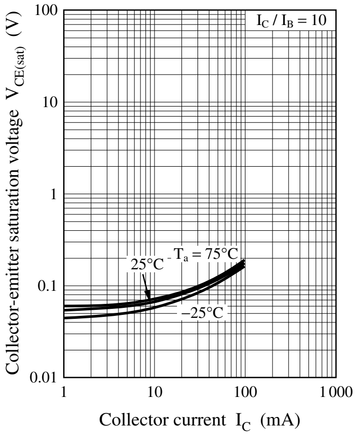


Characteristics charts of UNR121K

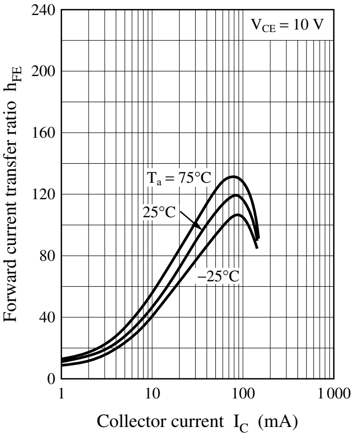
I_C — V_{CE}



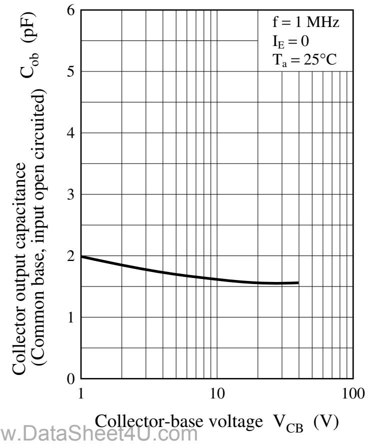
$V_{CE(sat)}$ — I_C



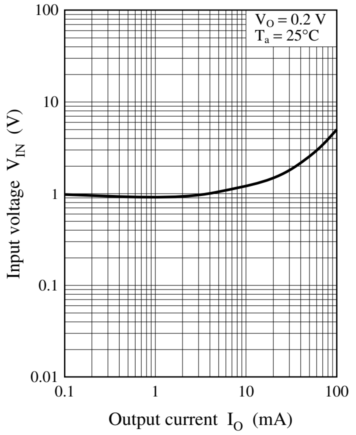
h_{FE} — I_C



C_{ob} — V_{CB}

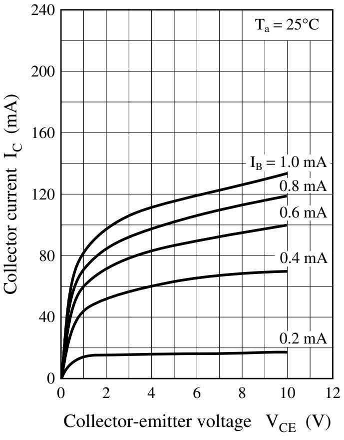


V_{IN} — I_O

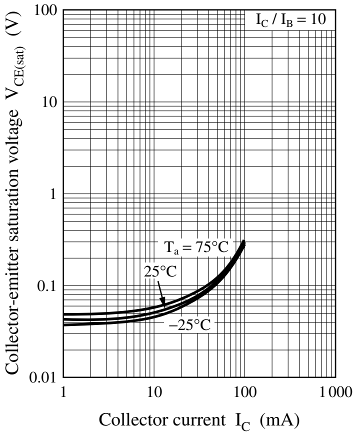


Characteristics charts of UNR121L

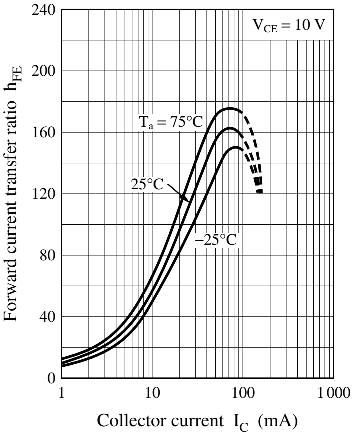
I_C — V_{CE}

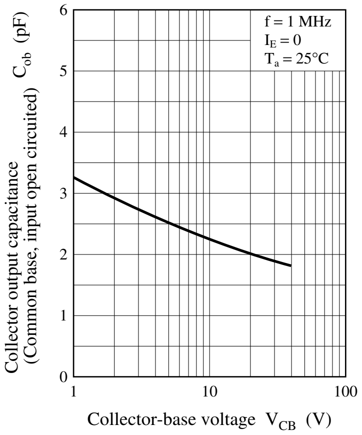


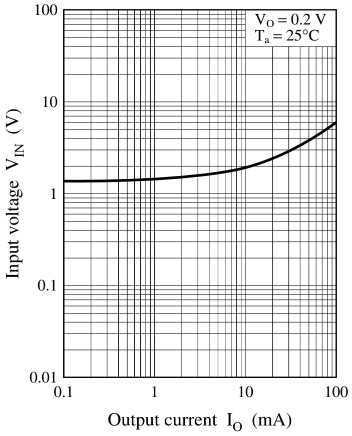
$V_{CE(sat)}$ — I_C



h_{FE} — I_C




C_{ob} — V_{CB}


V_{IN} — I_O

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