UN1211/1212/1213/1214/1215/1216/1217/1218/1219/1210/121D/121E/121F/121K/121L

Silicon PNP Epitaxial Planar Type

For digital circuits

■ Features

- Downsizing of equipment and fewer parts used allow reduced costs.
- An M type mold package that allows easy manual and automatic insertion. Can be firmly mounted flush to PCB surface.

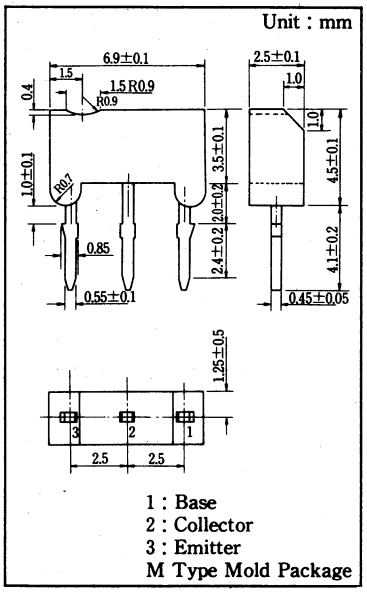
■ Resistor value by various kinds

	(R_1)	(R_2)
● UN 1211	10 kΩ	10 kΩ
● UN 1212	22 kΩ	22 kΩ
● UN 1213	47 kΩ	47 kΩ
● UN 1214	10 kΩ	47 kΩ
● UN 1215	10 kΩ	–
● UN 1216	4.7 kΩ	–
● UN 1217	22 kΩ	–
● UN 1218	0.51 kΩ	5.1 kΩ
● UN 1219	1 kΩ	10 kΩ
● UN 1210	47 kΩ	–
● UN 121D	47 kΩ	10 kΩ
● UN 121E	47 kΩ	22 kΩ
● UN 121F	4.7 kΩ	10 kΩ
● UN 121K	10 kΩ	4.7 kΩ
● UN 121L	4.7 kΩ	4.7 kΩ

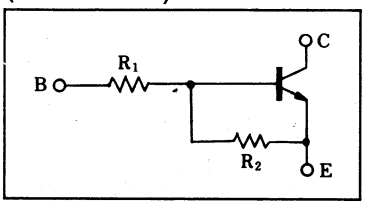
■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Collector Current	I_C	100	mA
Collector Power Dissipation	P_C	400	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−55~+150	°C

■ Package Dimensions



(Inner Circuit)



■ Electrical Characteristics (Ta=25°C)

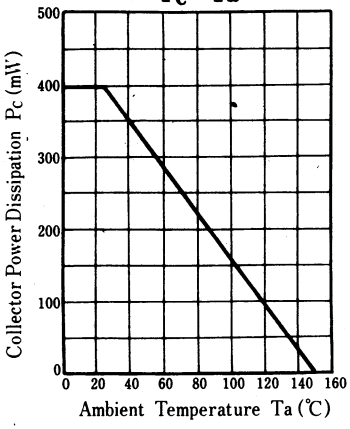
Item		Symbol	Condition	min.	typ.	max.	Unit
Collector Cutoff Current		I_{CBO}	V_{CB}=50V, I_E= 0			0.1	μA
		I_{CEO}	V_{CE}=50V, I_B= 0			0.5	μA
Emitter Cutoff Current	UN 1211	I_{EBO}	V_{EB}= 6 V, I_C= 0			0.5	mA
	UN 1212/1214/121E/121D					0.2	
	UN 1213					0.1	
	UN 1215/1216/1217/1210					0.01	
	UN 121F/121K					1.0	
	UN 1219					1.5	
	UN 1218/121L					2.0	
Collector-Base Voltage		V_{CBO}	I_C=10 μA, I_E= 0	50			V
Collector-Emitter Voltage		V_{CEO}	I_C= 2 mA, I_B= 0	50			V
DC Current Gain	UN 1211	h_{FE}	V_{CE}=10V, I_C= 5 mA	35			
	UN 1212/121E			60			
	UN 1213/1214			80		460	
	UN 1215*/1216*/1217*/1210*			160			
	UN 121F/121D/1219			30			
	UN 1218/121K/121L			20			
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=10mA, I_B=0.3mA			0.25	V
High Level Output Voltage		V_{OH}	V_{CC}= 5 V, V_B=0.5V, R_L= 1 kΩ	4.9			V
Low Level Output Voltage		V_{OL}	V_{CC}= 5 V, V_B=2.5V, R_L= 1 kΩ			0.2	V
	UN 1213/121K		V_{OC}= 5 V, V_B=3.5V, R_1= 1 kΩ			0.2	
	UN 121D		V_{CC}= 5 V, V_B=10V, R_1= 1 kΩ			0.2	
	UN 121E		V_{CC}= 5 V, V_B= 6 V, R_L= 1 kΩ			0.2	
Transition Frequency		f_T	V_{CB}=10V, I_E=− 2 mA, f=200MHz		80		MHz
Input Resistance	UN 1211/1214/1215/121K	R_1		(−30%)	10	(+30%)	kΩ
	UN 1211/1217				22		
	UN 1213/121D/121E/1210				47		
	UN 1216/121F/121L				4.7		
	UN 1218				0.51		
	UN 1219				1		
Resistance Ratio	UN 1211/1212/1213/121L	R_1/R_2		0.8	1.0	1.2	
	UN 1214			0.17	0.21	0.25	
	UN 1218/1219			0.08	0.1	0.12	
	UN 121D				4.7		
	UN 121F				2.14		
	UN 121E				0.47		
	UN 121K				2.13		

*h_{FE} Ranking (UN 1215/1216/1217/1210)

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

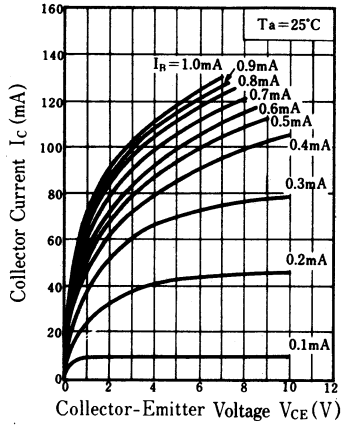
Common Characteristics Figure

$P_C - Ta$

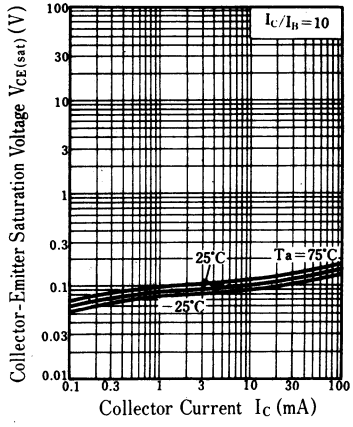


UN1211 Characteristics Figure

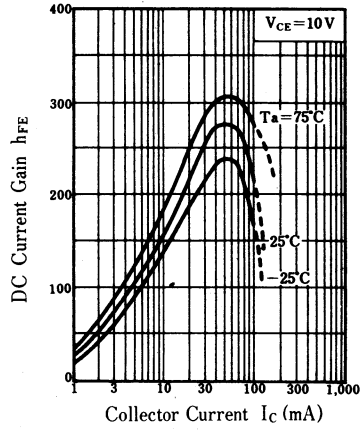
$I_C - V_{CE}$



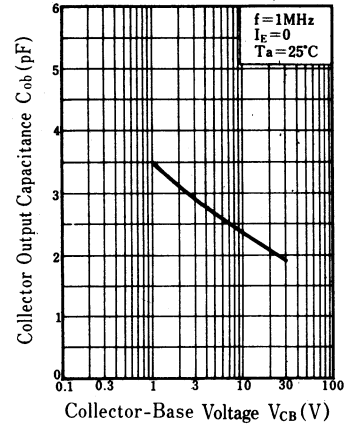
$V_{CE(sat)} - I_C$



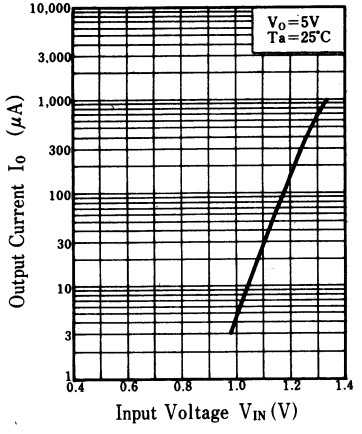
$h_{FE} - I_C$



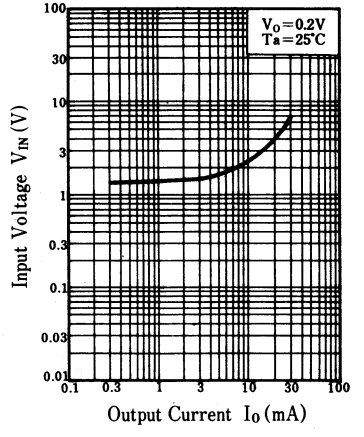
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

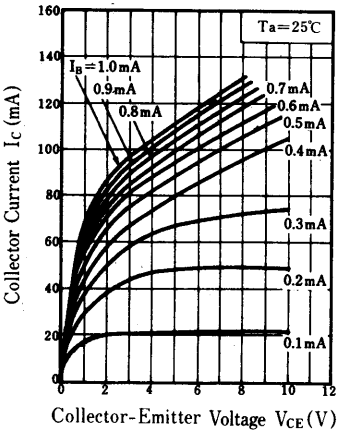


$V_{IN} - I_O$

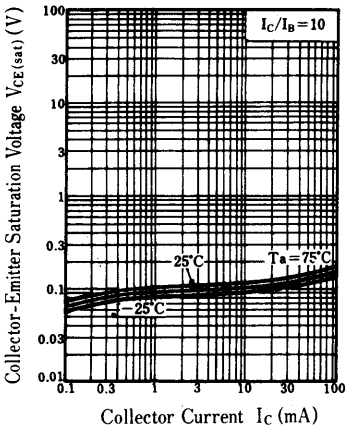


UN1212 Characteristics Figure

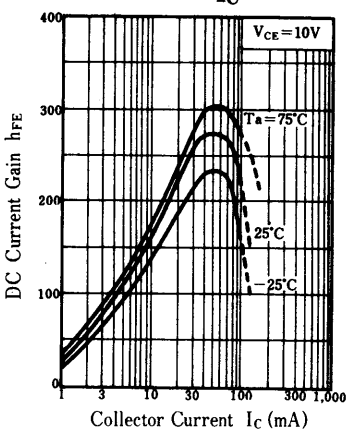
$I_C - V_{CE}$



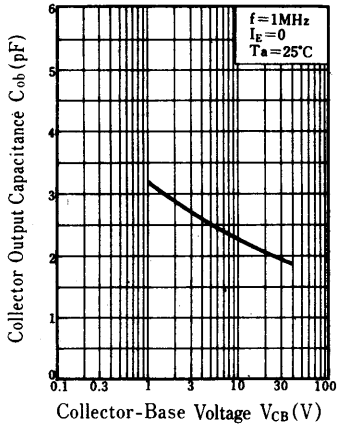
$V_{CE(sat)} - I_C$



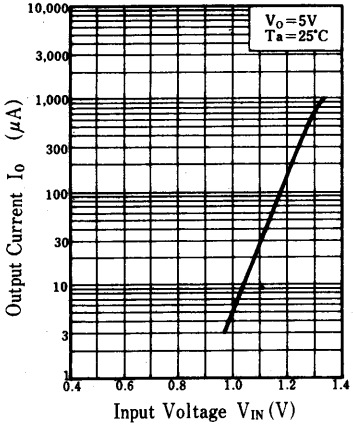
$h_{FE} - I_C$



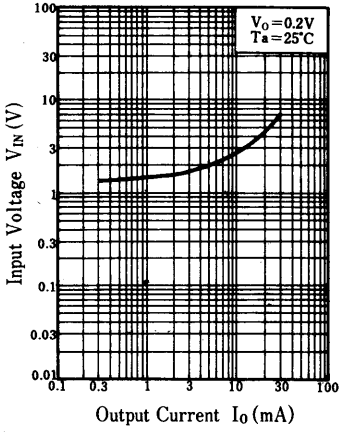
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

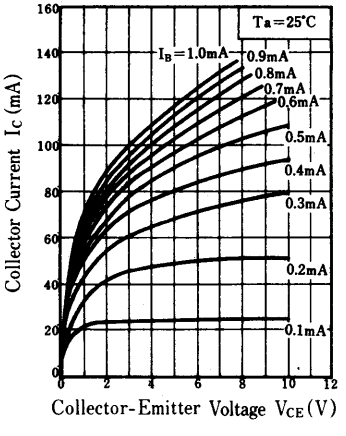


$V_{IN} - I_O$

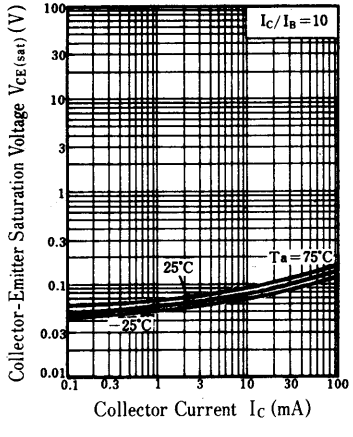


UN1213 Characteristics Figure

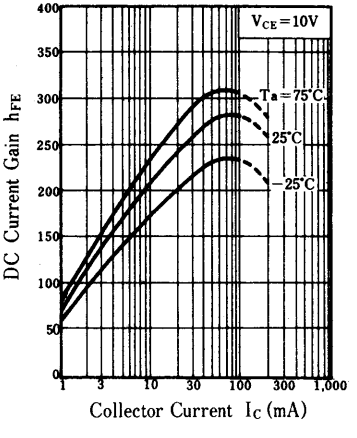
$I_C - V_{CE}$



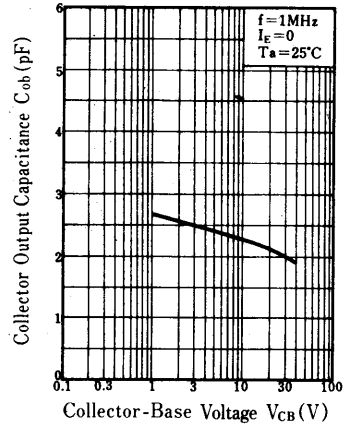
$V_{CE(sat)} - I_C$



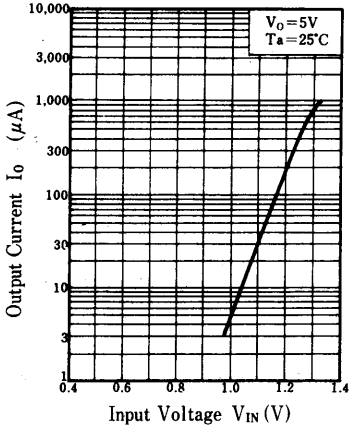
$h_{FE} - I_C$



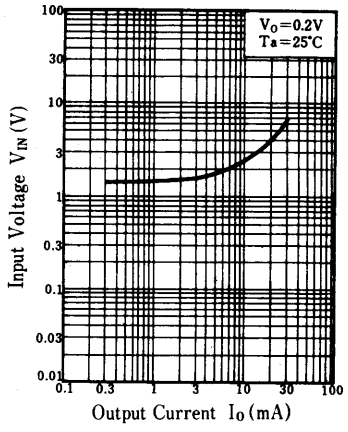
C_{ob}—V_{CB}



I_O—V_{IN}

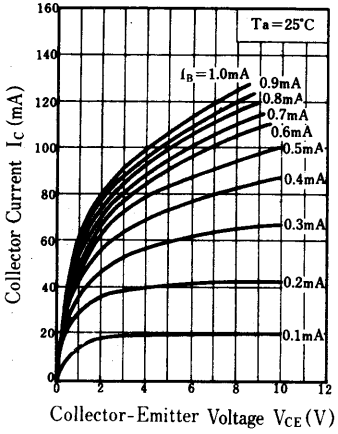


V_{IN}—I_O

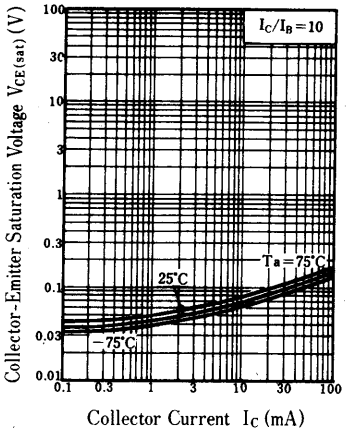


UN1214 Characteristics Figure

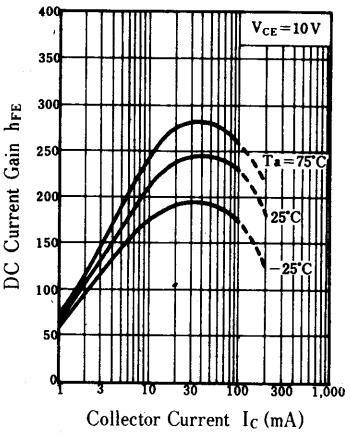
I_C—V_{CE}



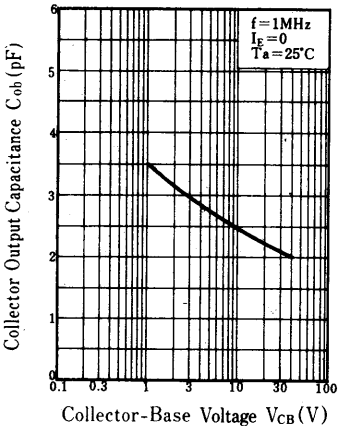
$V_{CE(sat)}$—I_C



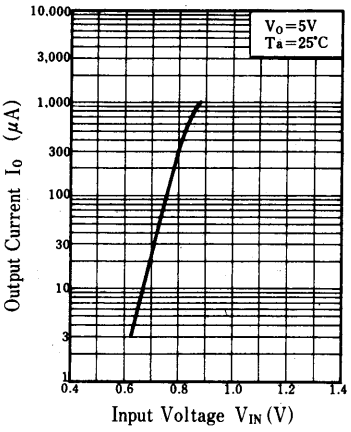
h_{FE}—I_C



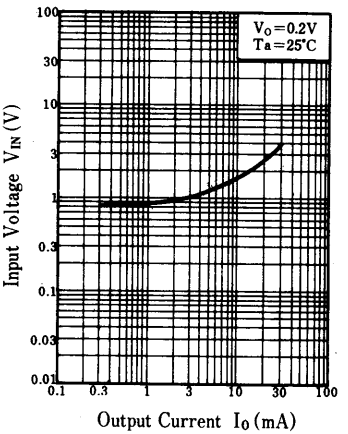
C_{ob}—V_{CB}



I_O—V_{IN}

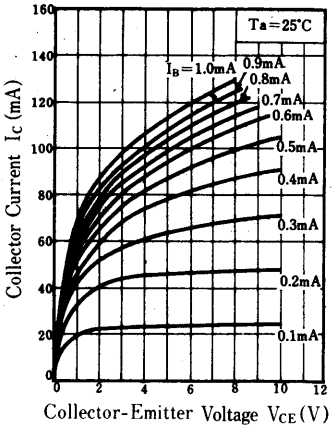


V_{IN}—I_O

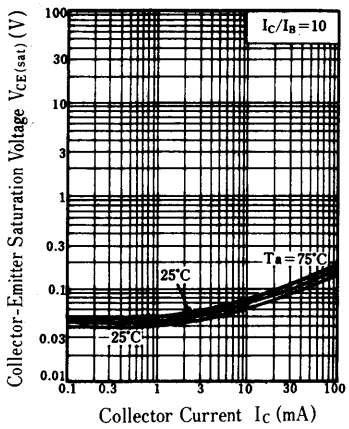


UN1215 Characteristics Figure

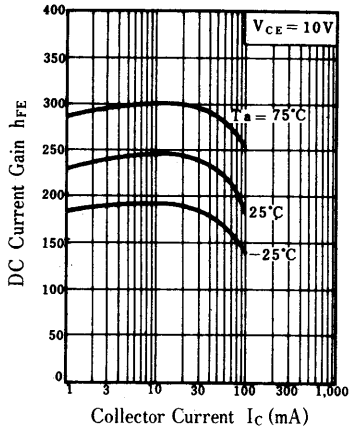
$I_C - V_{CE}$



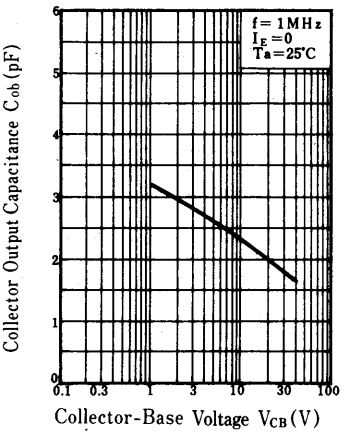
$V_{CE(sat)} - I_C$



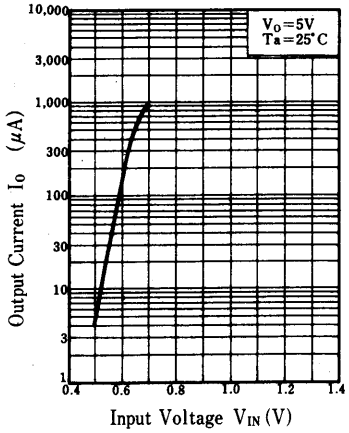
$h_{FE} - I_C$



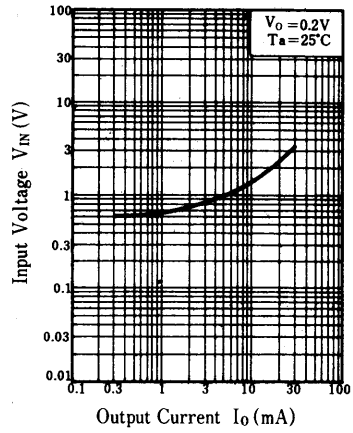
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

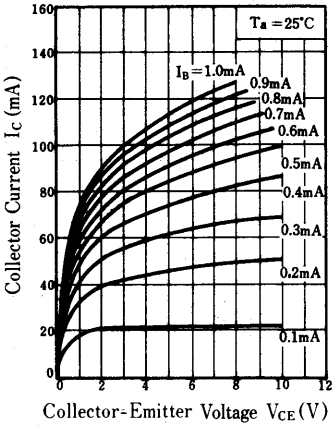


$V_{IN} - I_O$

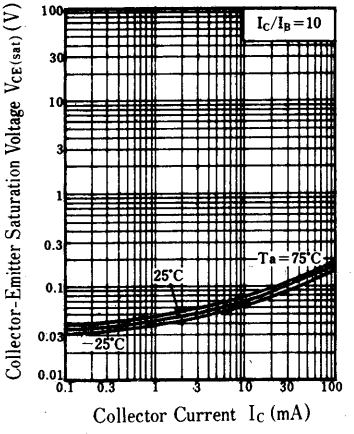


UN1216 Characteristics Figure

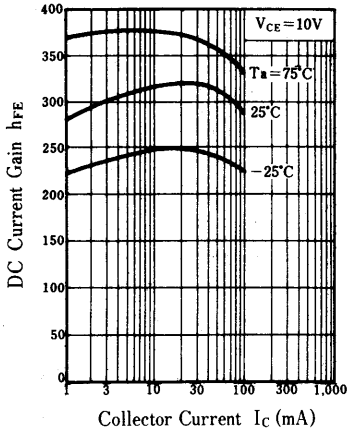
$I_C - V_{CE}$



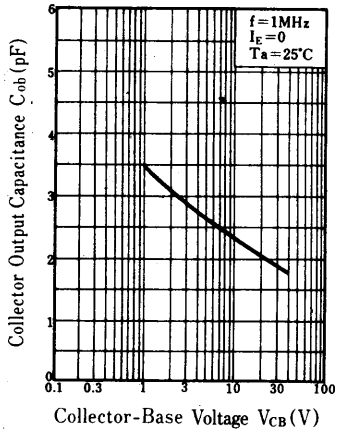
$V_{CE(sat)} - I_C$



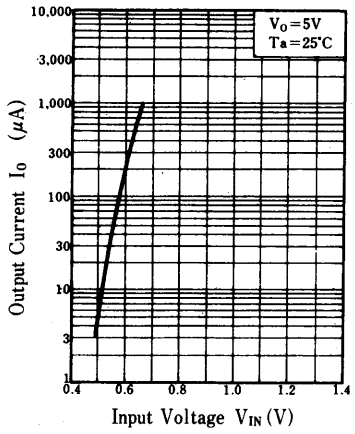
$h_{FE} - I_C$



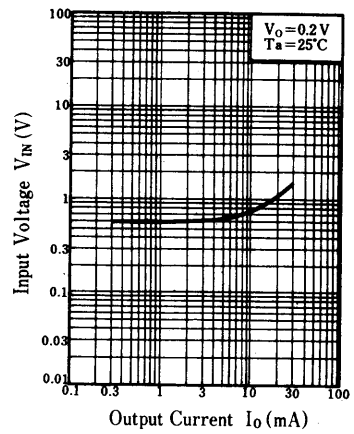
$C_{ob}-V_{CB}$



I_O-V_{IN}

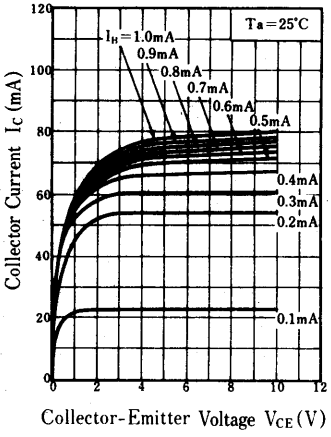


$V_{IN}-I_O$

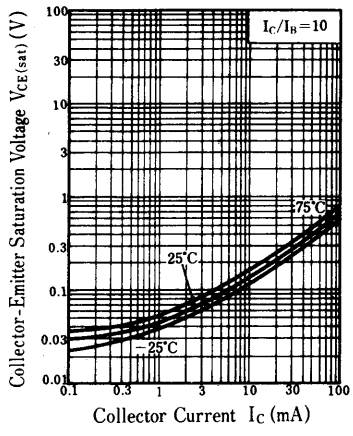


UN1217 Characteristics Figure

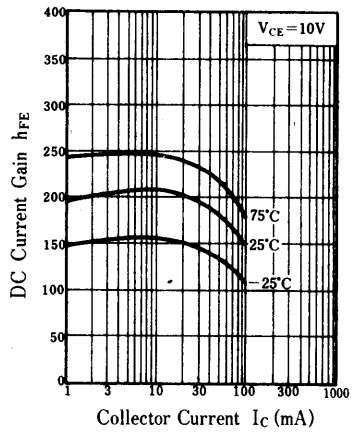
I_C-V_{CE}



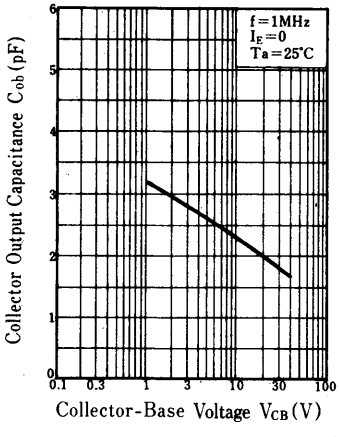
$V_{CE(sat)}-I_C$



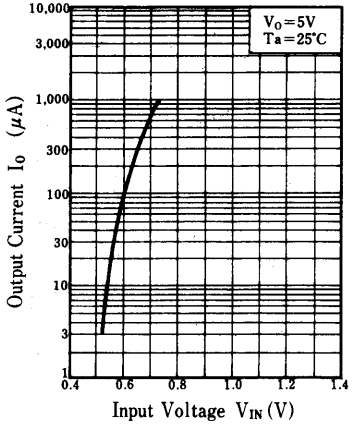
$h_{FE}-I_C$



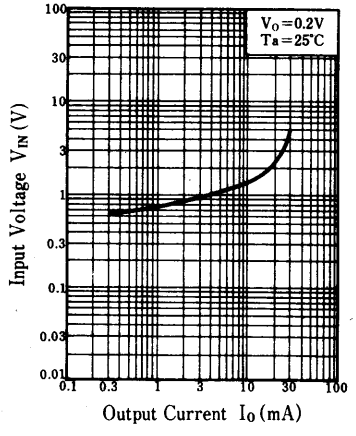
$C_{ob}-V_{CB}$



I_O-V_{IN}

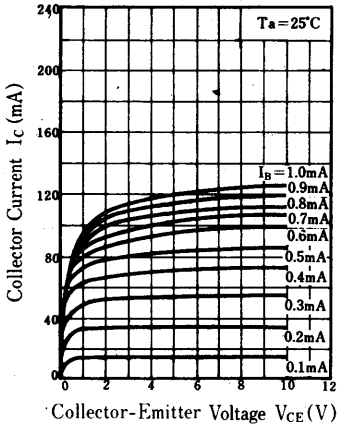


$V_{IN}-I_O$

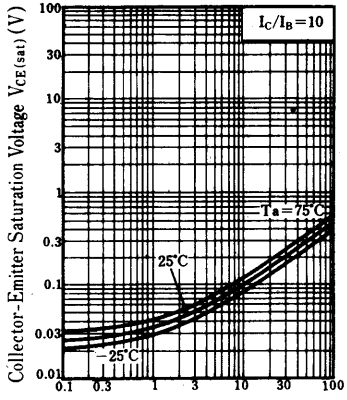


UN1218 Characteristics Figure

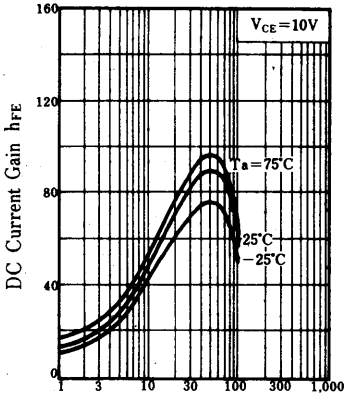
$I_C - V_{CE}$



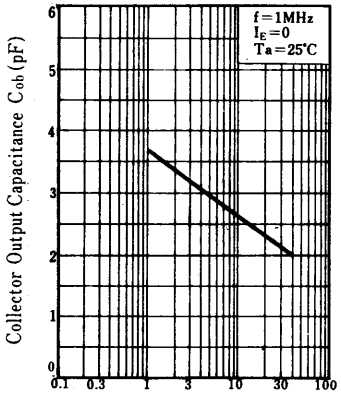
$V_{CE(sat)} - I_C$



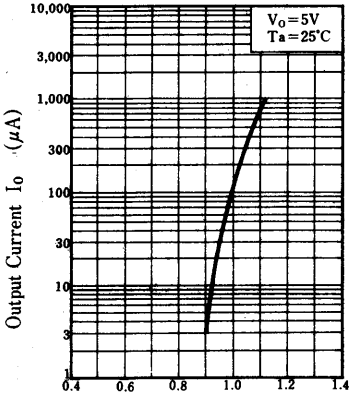
$h_{FE} - I_C$



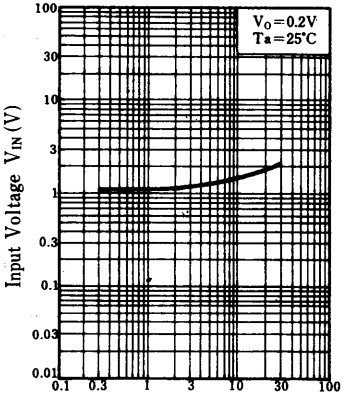
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

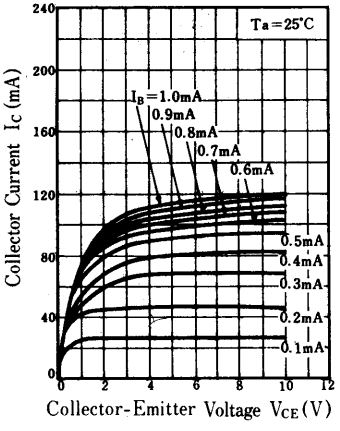


$V_{IN} - I_O$

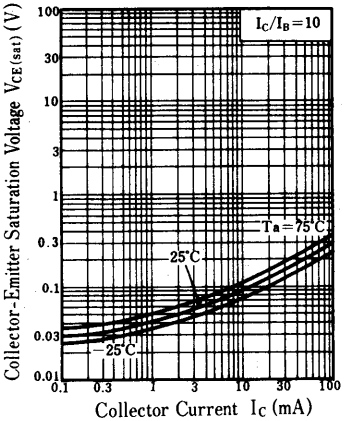


UN1219 Characteristics Figure

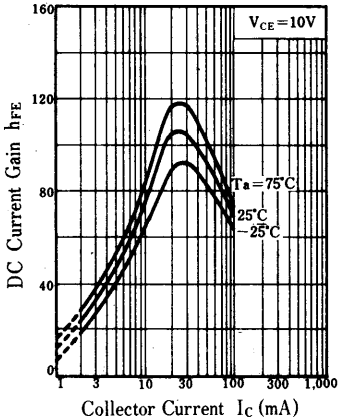
$I_C - V_{CE}$



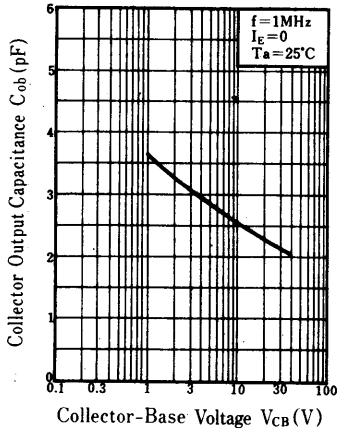
$V_{CE(sat)} - I_C$



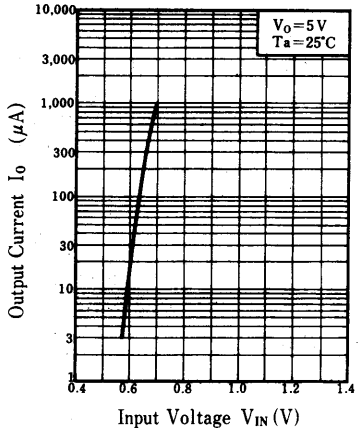
$h_{FE} - I_C$



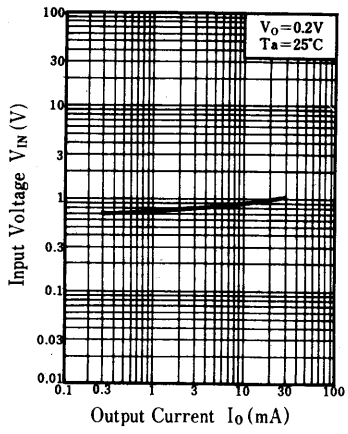
$C_{ob}-V_{CB}$



I_O-V_{IN}

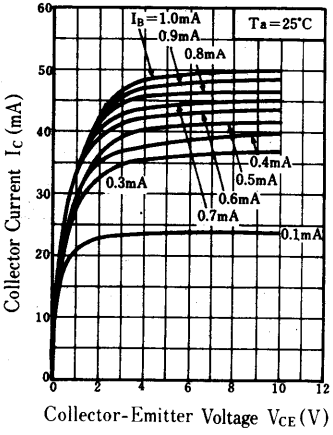


$V_{IN}-I_O$

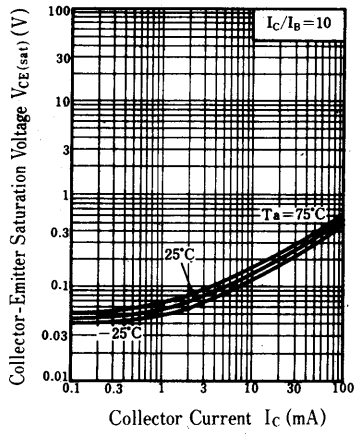


UN1210 Characteristics Figure

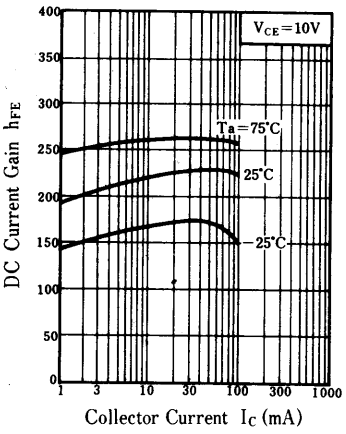
I_C-V_{CE}



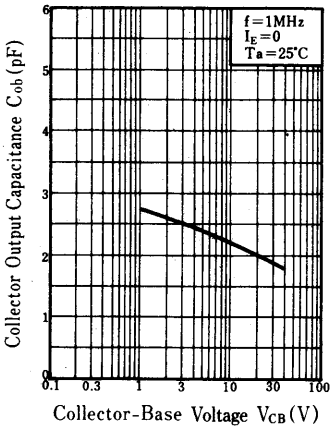
$V_{CE(sat)}-I_C$



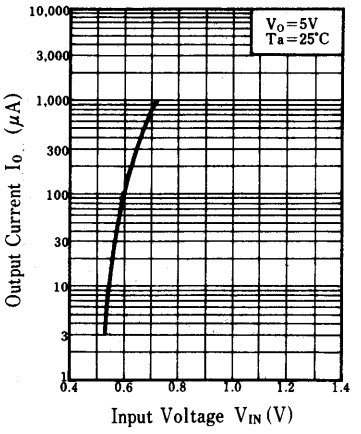
$h_{FE}-I_C$



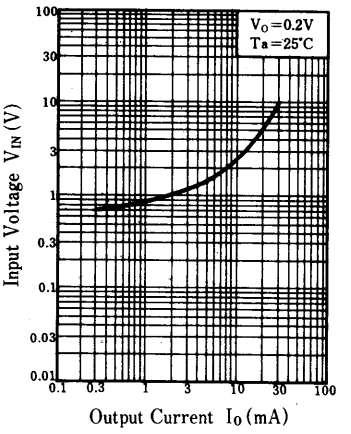
$C_{ob}-V_{CB}$



I_O-V_{IN}

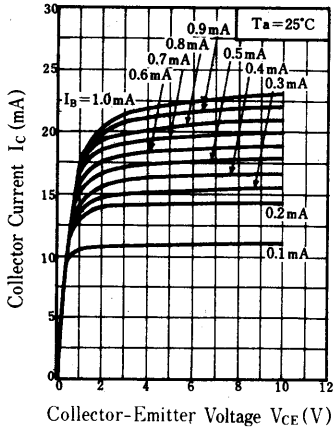


$V_{IN}-I_O$

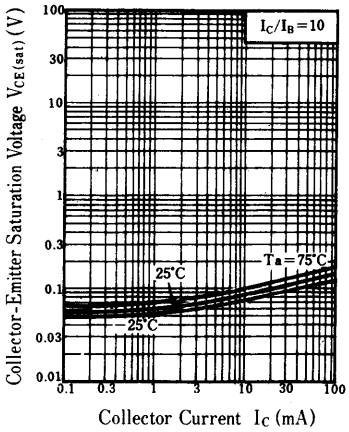


UN121D Characteristics Figure

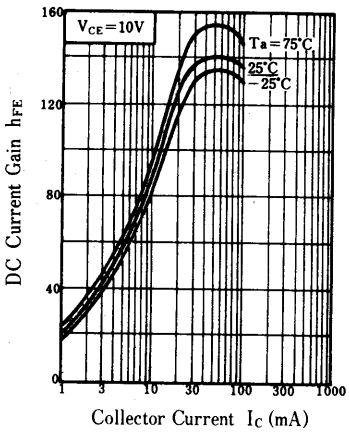
$I_C - V_{CE}$



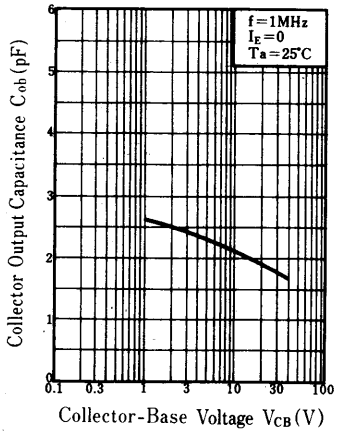
$V_{CE(sat)} - I_C$



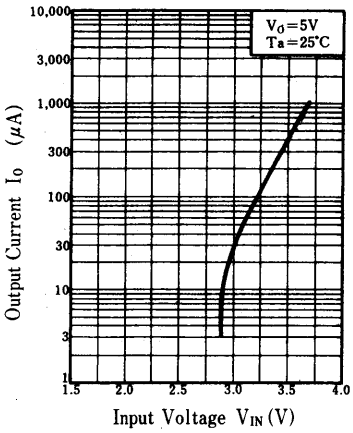
$h_{FE} - I_C$



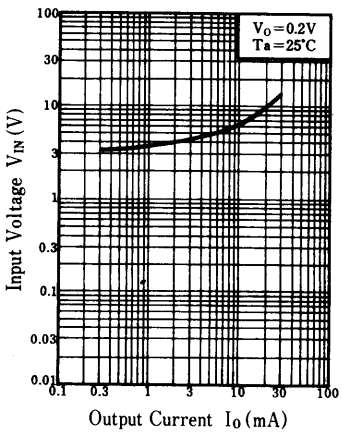
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

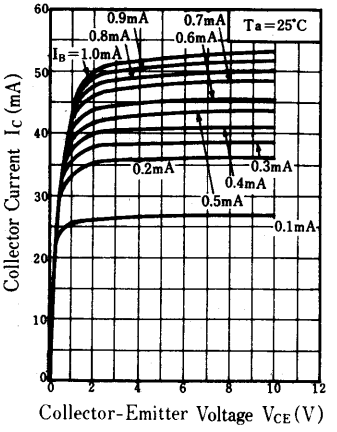


$V_{IN} - I_O$

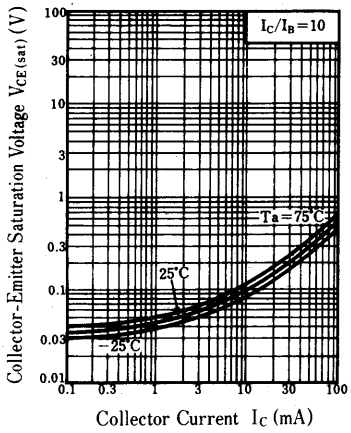


UN121E Characteristics Figure

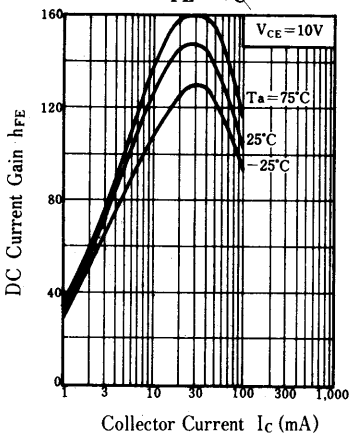
$I_C - V_{CE}$



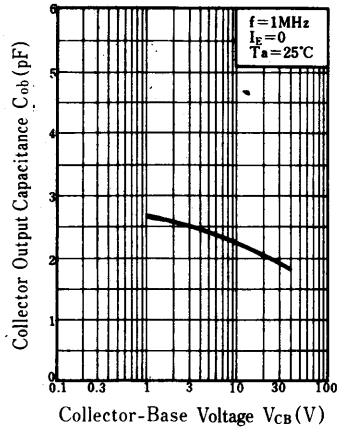
$V_{CE(sat)} - I_C$



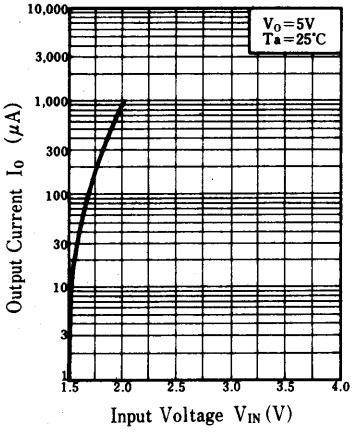
$h_{FE} - I_C$



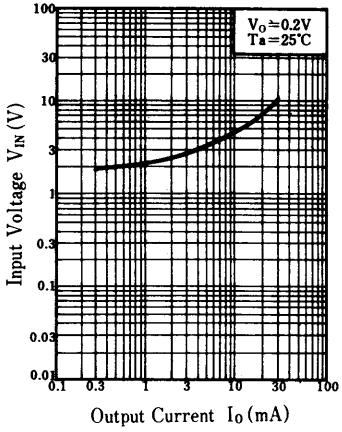
$C_{ob}-V_{CB}$



I_O-V_{IN}

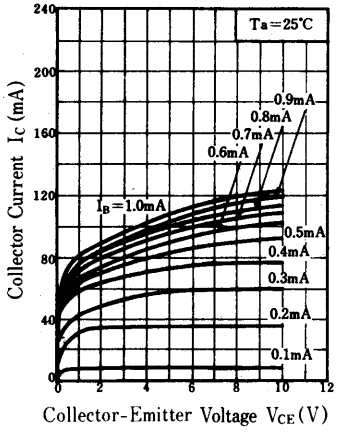


$V_{IN}-I_O$

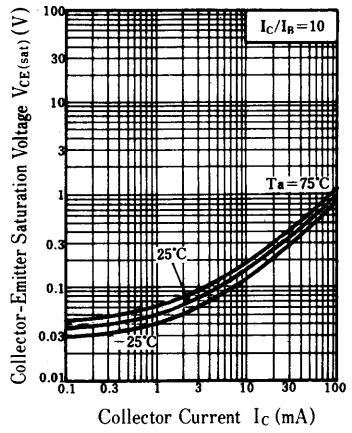


UN121F Characteristics Figure

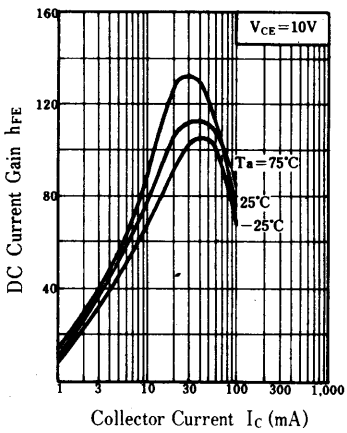
I_C-V_{CE}



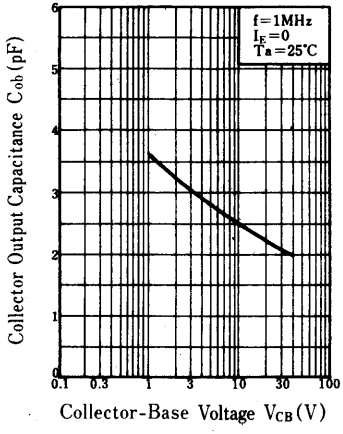
$V_{CE(sat)}-I_C$



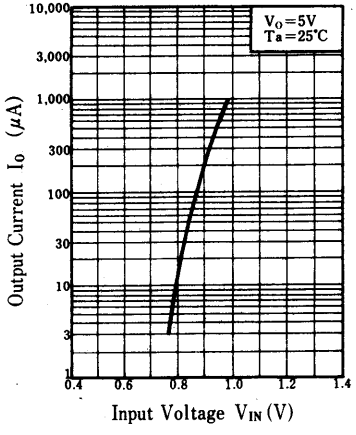
$h_{FE}-I_C$



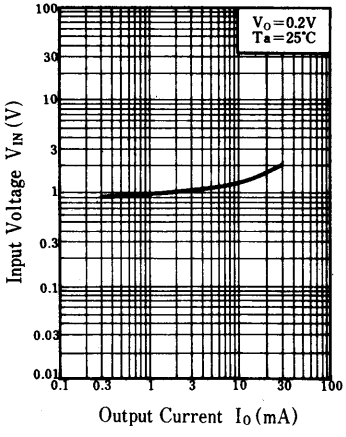
$C_{ob}-V_{CB}$



I_O-V_{IN}

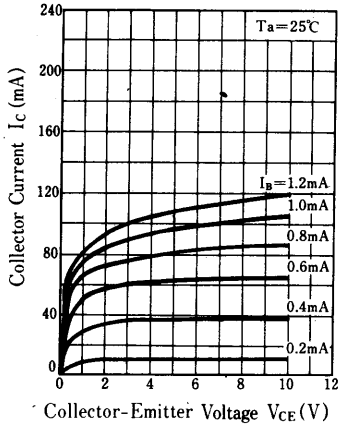


$V_{IN}-I_O$

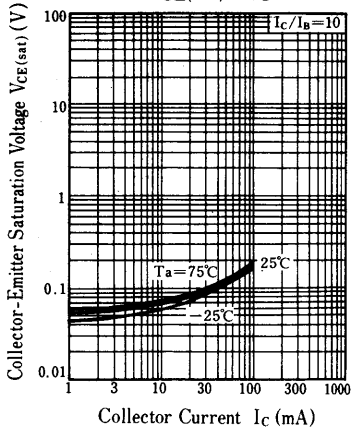


UN121K Characteristics Figure

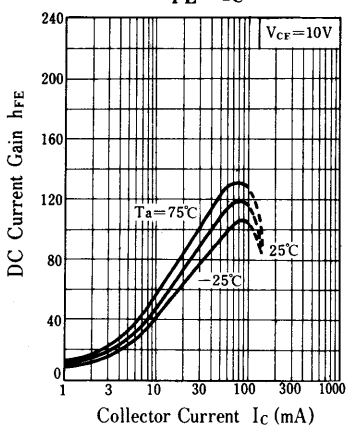
$I_C - V_{CE}$



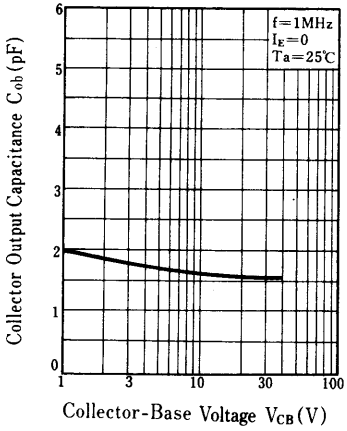
$V_{CE(sat)} - I_C$



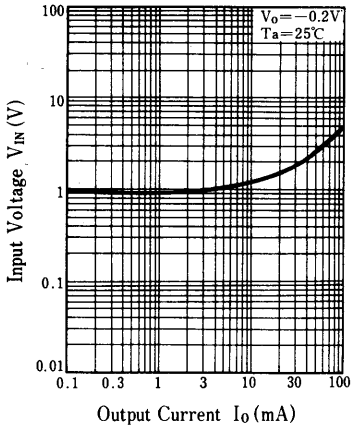
$h_{FE} - I_C$



$C_{ob} - V_{CB}$

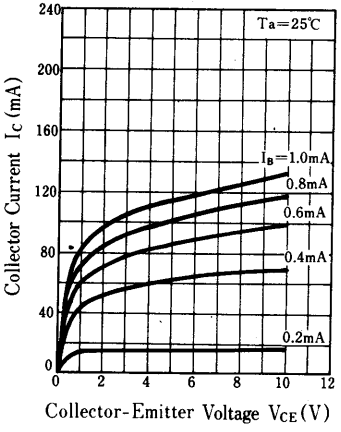


$V_{IN} - I_O$

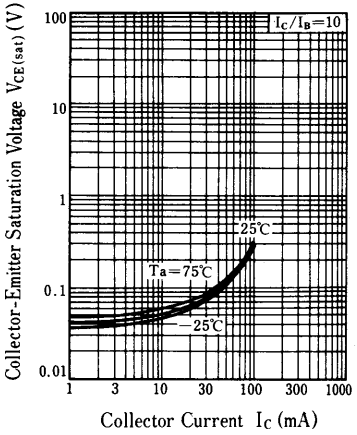


UN121L Characteristics Figure

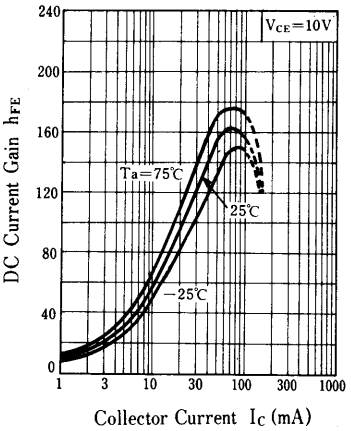
$I_C - V_{CE}$



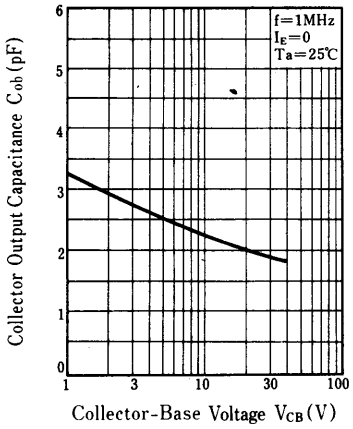
$V_{CE(sat)} - I_C$



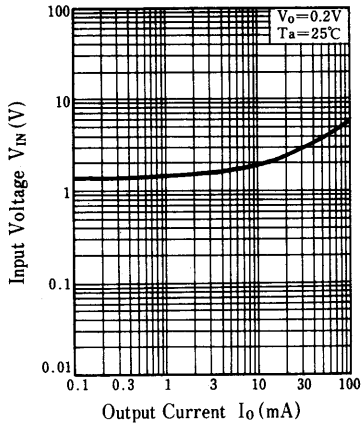
$h_{FE} - I_C$



$C_{ob} - V_{CB}$



$V_{IN} - I_O$



UN1221/1222/1223/1224

Silicon NPN Epitaxial Planar Type

For digital circuits

■ Features

- Downsizing of equipment and fewer parts used allow reduced costs
- An M type mold package that allows easy manual and automatic insertion. Can be firmly mounted flush to PCB surface.

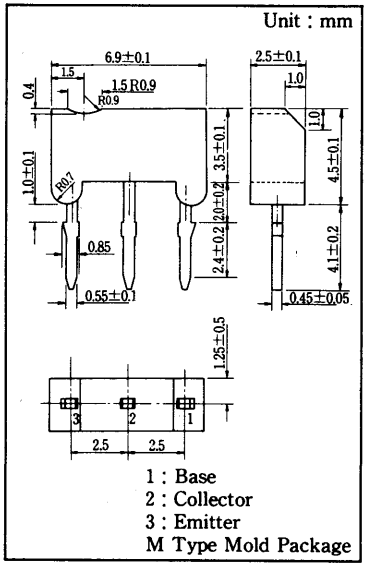
■ Resistor value by various kinds

	(R_1)	(R_2)
● UN 1221	2.2 kΩ	2.2 kΩ
● UN 1222	4.7 kΩ	4.7 kΩ
● UN 1223	10 kΩ	10 kΩ
● UN 1224	2.2 kΩ	10 kΩ

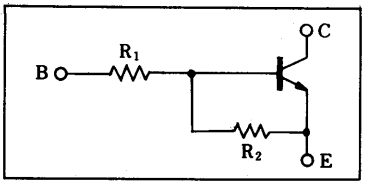
■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	50	V
Collector-Emitter Voltage	V_{CEO}	50	V
Collector Current	I_C	500	mA
Collector Power Dissipation	P_C	600	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−55~+150	°C

■ Package Dimensions



(Inner Circuit)

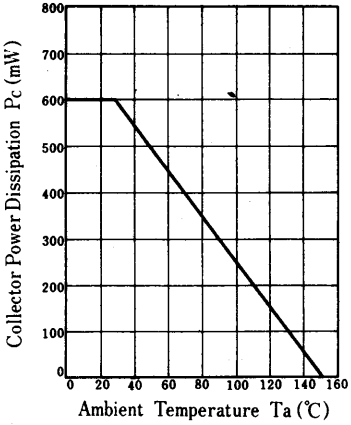


■ Electrical Characteristics (Ta=25°C)

Item		Symbol	Condition	min.	typ.	max.	Unit
Collector Cut-off Current		I_{CBO}	V_{CB}=50 V, I_E=0			1	μA
		I_{CEO}	V_{CE}=50 V, I_B=0			1	μA
Emitter Cut-off Current	UN 1221	I_{EBO}	V_{EB}=6 V, I_C=0			5	mA
	UN 1222					2	
	UN 1223/1224					1	
Collector-Base Voltage		V_{CBO}	I_C=10 μA, I_E=0	50			V
Collector-Emitter Voltage		V_{CEO}	I_C= 2 mA, I_B=0	50			V
DC Current Gain	UN 1221	h_{FE}	V_{CE}=10 V, I_C=100 mA	40			
	UN 1222			50			
	UN 1223/1224			60			
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=100 mA, I_B=5 mA			0.25	V
High Level Output Voltage		V_{OH}	V_{CC}=5 V, V_B=0.5 V, R_L=500 Ω	4.9			V
Low Level Output Voltage		V_{OL}	V_{CC}=5 V, V_B=3.5 V, R_L=500 Ω			0.2	V
Transition Frequency		f_T	V_{CB}=10V, I_E=−50mA, f=200MHz		200		MHz
Input Resistance	UN 1221/1224	R_1		(−30%)	2.2	(+30%)	kΩ
	UN 1222				4.7		
	UN 1223				10		
Resistance Ratio		R_1/R_2		0.8	1.0	1.2	
	UN 1224				0.22		

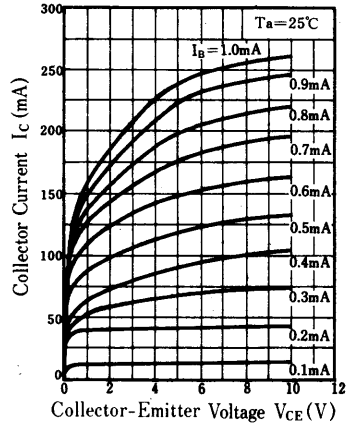
Common Characteristics Figure

P_C—Ta

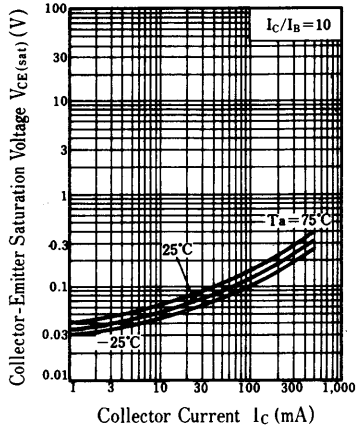


UN1221 Characteristics Figure

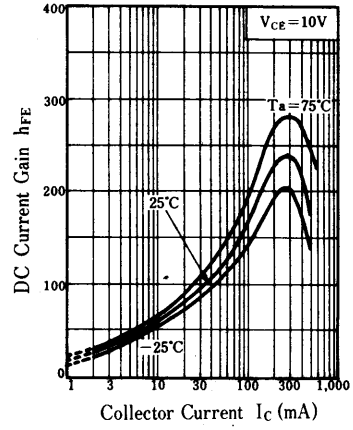
I_C—V_{CE}



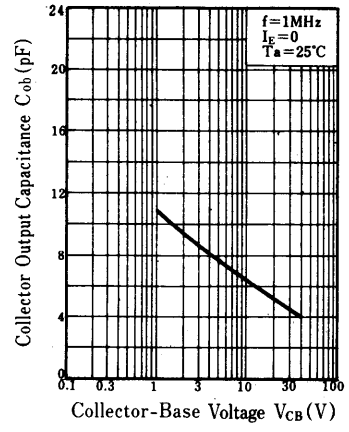
$V_{CE(sat)}$—I_C



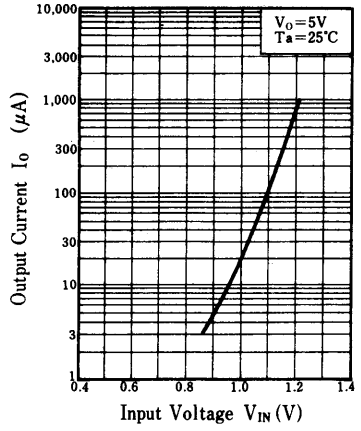
h_{FE}—I_C



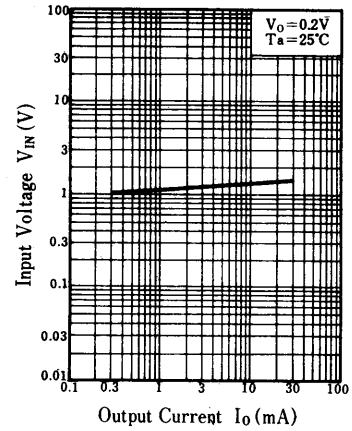
C_{ob}—V_{CB}



I_O—V_{IN}

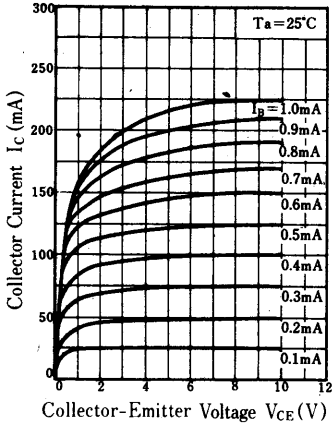


V_{IN}—I_O

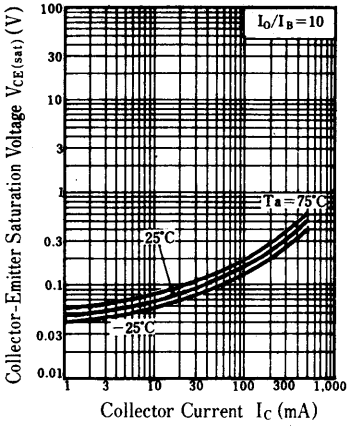


UN1222 Characteristics Figure

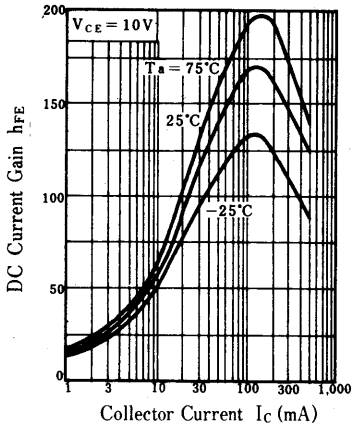
$I_C - V_{CE}$



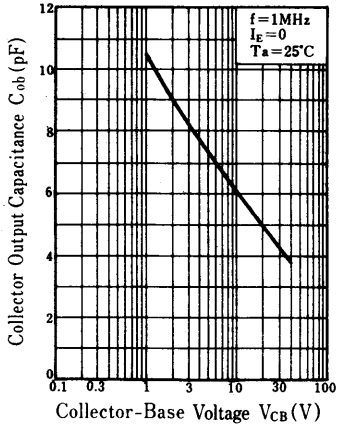
$V_{CE(sat)} - I_C$



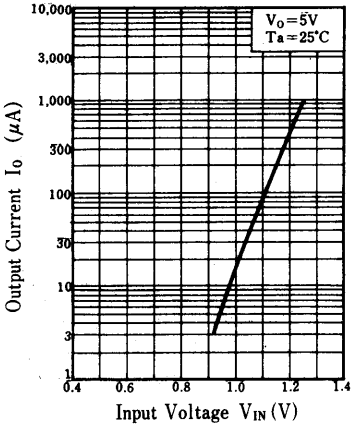
$h_{FE} - I_C$



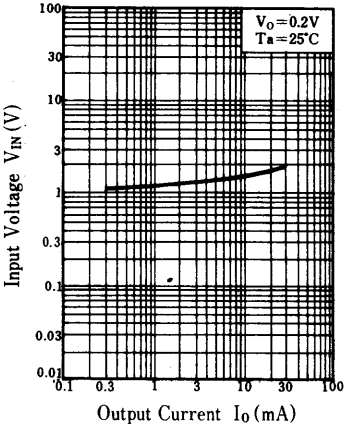
$C_{ob} - V_{CB}$



$I_O - V_{IN}$

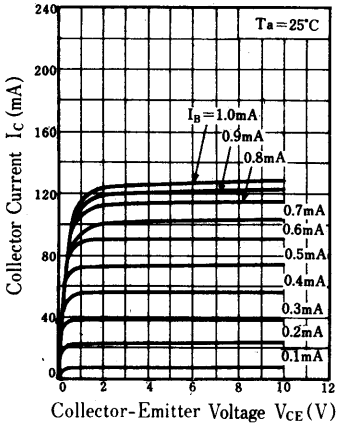


$V_{IN} - I_O$

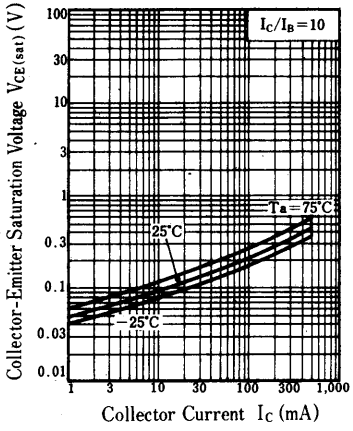


UN1223 Characteristics Figure

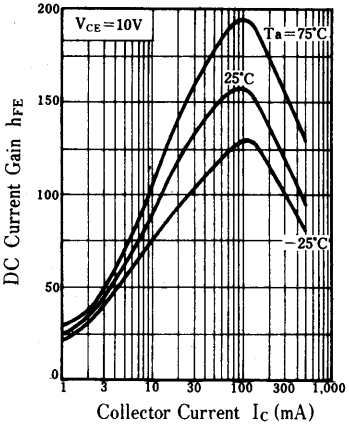
$I_C - V_{CE}$



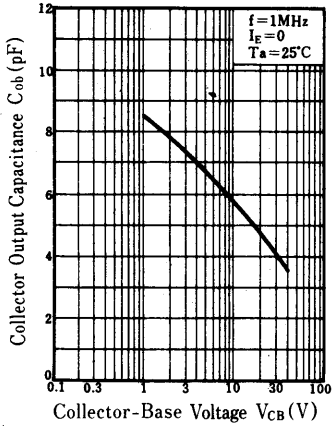
$V_{CE(sat)} - I_C$



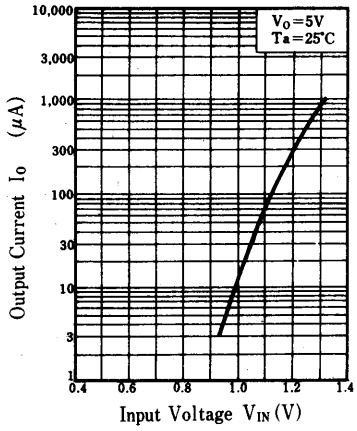
$h_{FE} - I_C$



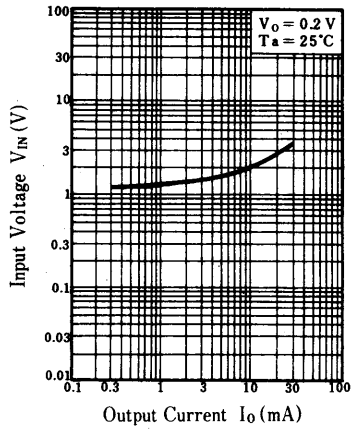
$C_{ob}-V_{CB}$



I_O-V_{IN}

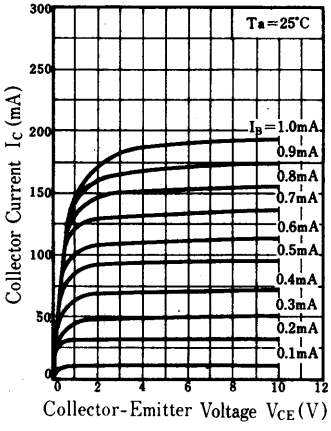


$V_{IN}-I_O$

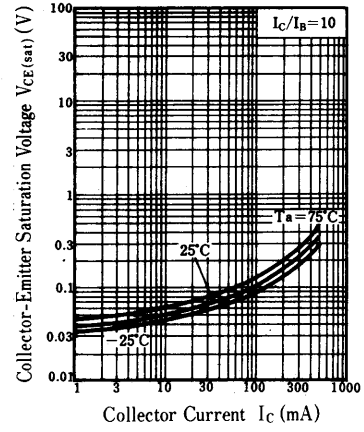


UN1224 Characteristics Figure

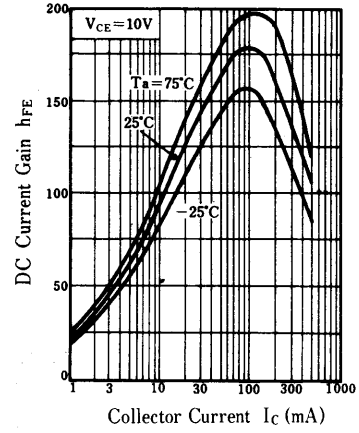
I_C-V_{CE}



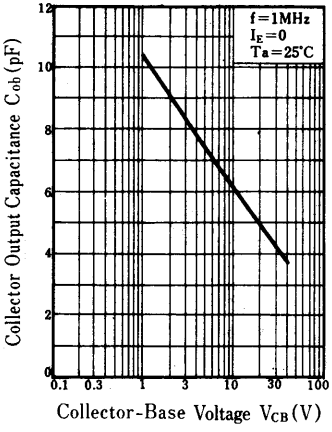
$V_{CE(sat)}-I_C$



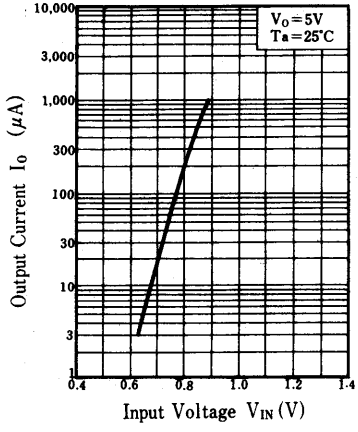
$h_{FE}-I_C$



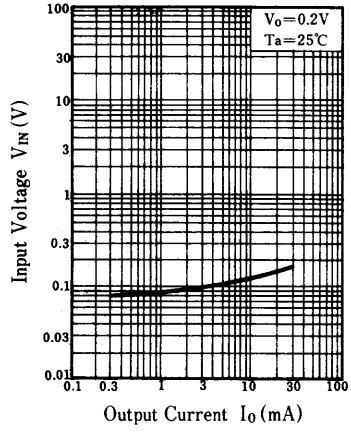
$C_{ob}-V_{CB}$



I_O-V_{IN}



$V_{IN}-I_O$



UN1231/1231A

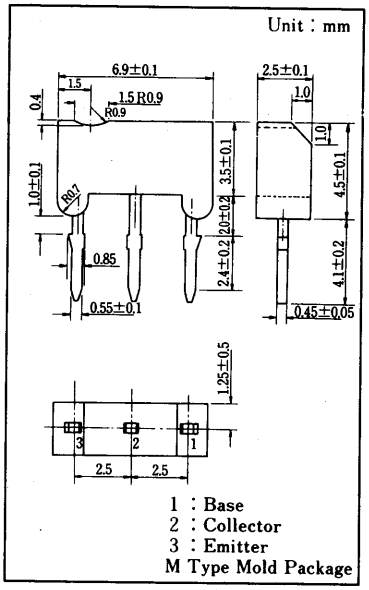
Silicon NPN Epitaxial Planar Type

For low-frequency amplification

■ Features

- High DC current gain h_{FE}
- An M type mold package
- Downsizing of equipment and fewer parts used allow reduced costs

■ Package Dimensions

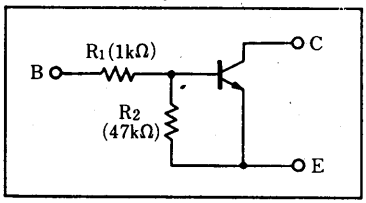


■ Absolute Maximum Ratings (Ta=25°C)

Item		Symbol	Value	Unit
Collector-Base Voltage	UN1231	V_{CBO}	20	V
	UN1231A		60	
Collector-Emitter Voltage	UN1231	V_{CEO}	20	V
	UN1231A		50	
Collector Current		I_C	0.7	A
Peak Collector Current		I_{CP}	1.5	A
Collector Power Dissipation		P_C*	1.0	W
Junction Temperature		T_j	150	°C
Storage Temperature		T_{stg}	−55~+150	°C

*Copper foil on PCB against Collector: 1.7mm thick, 1cm² in area

(Inner Circuit)

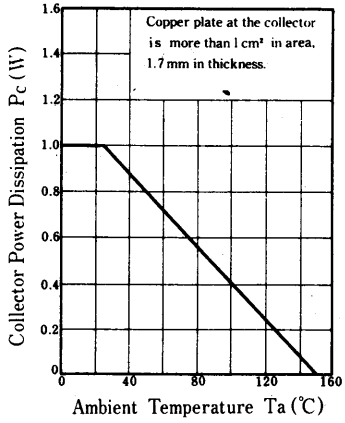


■ Electrical Characteristics (Ta=25°C)

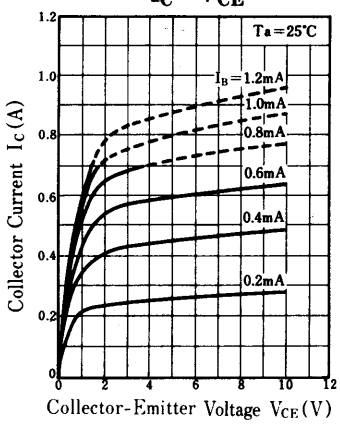
Item		Symbol	Condition	min.	typ.	max.	Unit
Collector Cutoff Current		I_{CBO}	V_{CB}=15V, I_E=0			1	μA
		I_{CEO}	V_{CE}=15V, I_B=0			10	μA
Emitter Cutoff Current		I_{EBO}	V_{EB}=14V, I_C=0			0.5	mA
Collector-Base Voltage	UN1231	V_{CBO}	I_C=10μA, I_E=0	20			V
	UN1231A			60			
Collector-Emitter Voltage	UN1231	V_{CEO}	I_C=1mA, I_B=0	20			V
	UN1231A			50			
DC Current Gain		h_{FE}	V_{CE}=10V, I_C=150mA*	800		2100	
Collector-Emitter Saturation Voltage		$V_{CE(sat)}$	I_C=100mA, I_B=5mA*			0.4	V
Input Resistance		R_1		0.7	1	1.3	kΩ
Resistance Ratio		R_1/R_2			0.021		

* Pulse Test

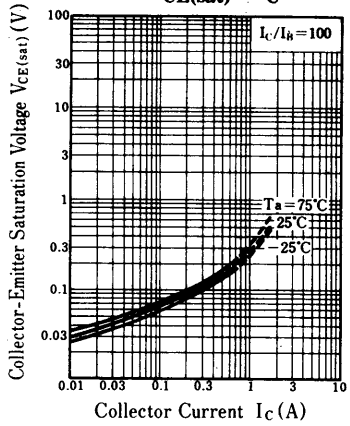
P_C—Ta



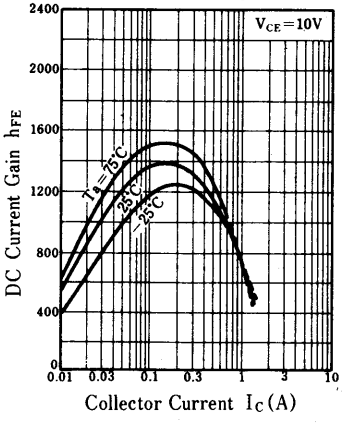
I_C—V_{CE}



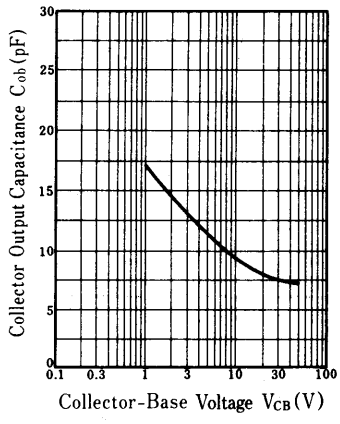
$V_{CE(sat)}$—I_C



h_{FE}—I_C



C_{ob}—V_{CB}



Type Number List

■ Resistor Built-in Transistors

Type No	Page	Type No	Page	Type No	Page	Type No	Page	Type No	Page
●UN1000 series		UN1222	825	UN221E	836	UN4218	846	UN5210	854
UN1111	793	UN1223	825	UN221F	836	UN4219	846	UN521D	854
UN1112	793	UN1224	825	UN221K	836	UN4210	846	UN521E	854
UN1113	793	UN1231/A	829	UN221L	836	UN421D	846	UN521F	854
UN1114	793			UN2221	839	UN421E	846	UN521K	854
UN1115	793	●UN2000 series		UN2222	839	UN421F	846	UN521L	854
UN1116	793	UN2111	831	UN2223	839	UN421K	846		
UN1117	793	UN2112	831	UN2224	839	UN421L	846	●UN6000 series	
UN1118	793	UN2113	831			UN4221	849	UN6111	857
UN1119	793	UN2114	831	●UN4000 series		UN4222	849	UN6112	857
UN1110	793	UN2115	831	UN4111	841	UN4223	849	UN6113	857
UN111D	793	UN2116	831	UN4112	841	UN4224	849	UN6114	857
UN111E	793	UN2117	831	UN4113	841			UN6115	857
UN111F	793	UN2118	831	UN4114	841	●UN5000 series		UN6116	857
UN111H	793	UN2119	831	UN4115	841	UN5111	851	UN6117	857
UN111L	793	UN2110	831	UN4116	841	UN5112	851	UN6118	857
UN1121	806	UN211D	831	UN4117	841	UN5113	851	UN6119	857
UN1122	806	UN211E	831	UN4118	841	UN5114	851	UN6110	857
UN1123	806	UN211F	831	UN4119	841	UN5115	851	UN611D	857
UN1124	806	UN211H	831	UN4110	841	UN5116	851	UN611E	857
UN112X	806	UN211L	831	UN411D	841	UN5117	851	UN611F	857
UN112Y	806	UN2121	834	UN411E	841	UN5118	851	UN611H	857
UN1211	812	UN2122	834	UN411F	841	UN5119	851	UN611L	857
UN1212	812	UN2123	834	UN411H	841	UN5110	851	UN6121	860
UN1213	812	UN2124	834	UN411L	841	UN511D	851	UN6122	860
UN1214	812	UN212X	834	UN4121	844	UN511E	851	UN6123	860
UN1215	812	UN212Y	834	UN4122	844	UN511F	851	UN6124	860
UN1216	812	UN2211	836	UN4123	844	UN511H	851	UN612X	860
UN1217	812	UN2212	836	UN4124	844	UN511L	851	UN612Y	860
UN1218	812	UN2213	836	UN412X	844	UN5211	854	UN6211	862
UN1219	812	UN2214	836	UN412Y	844	UN5212	854	UN6212	862
UN1210	812	UN2215	836	UN4211	846	UN5213	854	UN6213	862
UN121D	812	UN2216	836	UN4212	846	UN5214	854	UN6214	862
UN121E	812	UN2217	836	UN4213	846	UN5215	854	UN6215	862
UN121F	812	UN2218	836	UN4214	846	UN5216	854	UN6216	862
UN121K	812	UN2219	836	UN4215	846	UN5217	854	UN6217	862
UN121L	812	UN2210	836	UN4216	846	UN5218	854	UN6218	862
UN1221	825	UN221D	836	UN4217	846	UN5219	854	UN6219	862

Type Number List

■ Resistor Built-in Transistors

Type No	Page	Type No	Page	Type No	Page	Type No	Page	Type No	Page
UN6210	862	●UN7000 series		UN8119	869	UN812Y	872	UN821E	874
UN621D	862	UN7231	867	UN8110	869	UN8211	874	UN821F	874
UN621E	862			UN811D	869	UN8212	874	UN821K	874
UN621F	862	●UN8000 series		UN811E	869	UN8213	874	UN821L	874
UN621K	862	UN8111	869	UN811F	869	UN8214	874	UN8221	877
UN621L	862	UN8112	869	UN811H	869	UN8215	874	UN8222	877
UN6221	865	UN8113	869	UN811L	869	UN8216	874	UN8223	877
UN6222	865	UN8114	869	UN8121	872	UN8217	874	UN8224	877
UN6223	865	UN8115	869	UN8122	872	UN8218	874		
UN6224	865	UN8116	869	UN8123	872	UN8219	874		
		UN8117	869	UN8124	872	UN8210	874		
		UN8118	869	UN812X	872	UN821D	874		

UN4111/4112/4113/4114/4115/4116/4117/4118/4119/4110/411D/411E/411F/411H/411L

Silicon NPN Epitaxial Planar Type

For digital circuits

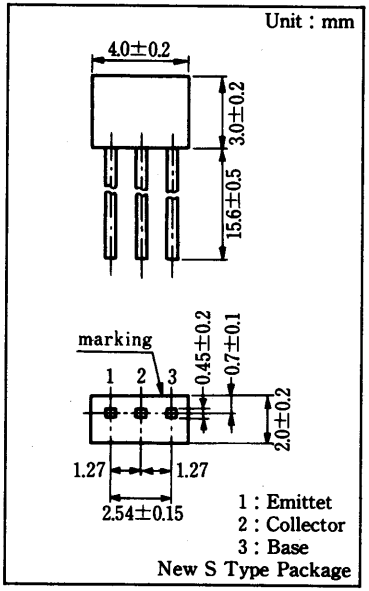
■ Features

- Downsizing of equipment and fewer parts used allow reduced costs
- A new S type package that allows automatic insertion by radial taping

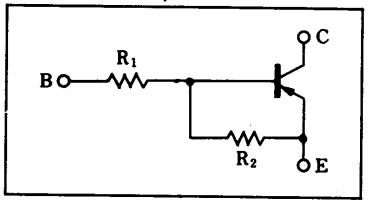
■ Resistor value by various kinds

	(R_1)	(R_2)
● UN 4111	10 kΩ	10 kΩ
● UN 4112	22 kΩ	22 kΩ
● UN 4113	47 kΩ	47 kΩ
● UN 4114	10 kΩ	47 kΩ
● UN 4115	10 kΩ	–
● UN 4116	4.7 kΩ	–
● UN 4117	22 kΩ	–
● UN 4118	0.51 kΩ	5.1 kΩ
● UN 4119	1 kΩ	10 kΩ
● UN 4110	47 kΩ	–
● UN 411D	47 kΩ	10 kΩ
● UN 411E	47 kΩ	22 kΩ
● UN 411F	4.7 kΩ	10 kΩ
● UN 411H	2.2 kΩ	10 kΩ
● UN 411L	4.7 kΩ	4.7 kΩ

■ Package Dimensions



(Inner Circuit)



■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	−50	V
Collector-Emitter Voltage	V_{CEO}	−50	V
Collector Current	I_C	−100	mA
Collector Power Dissipation	P_C	300	mW
Junction Temperature	T_j	150	°C
Storage Temperature	T_{stg}	−55~+150	°C

UN6111/6112/6113/6114/6115/6116/6117/6118/6119/6110/611D/611E/611F/611H/611L

Silicon PNP Epitaxial Planar Type

For digital circuits

■ Features

- Downsizing of equipment and fewer parts used allow reduced costs
- An MT1 type package that allows automatic insertion by radial taping

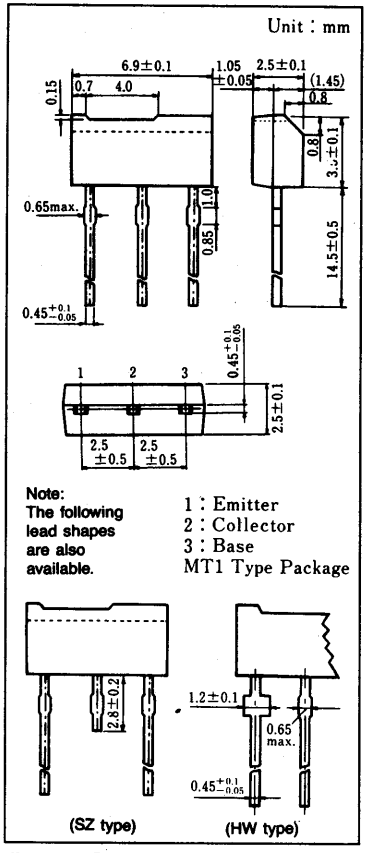
■ Resistor value by various kinds

	(R_1)	(R_2)
● UN 6111	10kΩ	10kΩ
● UN 6112	22kΩ	22kΩ
● UN 6113	47kΩ	47kΩ
● UN 6114	10kΩ	47kΩ
● UN 6115	10kΩ	—
● UN 6116	47kΩ	—
● UN 6117	22kΩ	—
● UN 6118	0.51kΩ	5.1kΩ
● UN 6119	1kΩ	10kΩ
● UN 6110	47kΩ	—
● UN 611D	47kΩ	10kΩ
● UN 611E	47kΩ	22kΩ
● UN 611F	4.7kΩ	10kΩ
● UN 611H	2.2kΩ	10kΩ
● UN 611L	4.7kΩ	4.7kΩ

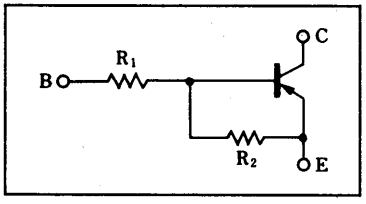
■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	−50	V
Collector-Emitter Voltage	V_{CEO}	−50	V
Collector Current	I_C	−100	mA
Collector Power Dissipation	P_C	400	mW
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	−55~+150	℃

■ Package Dimensions



(Inner Circuit)



UN8111/8112/8113/8114/8115/8116/8117/8118/8119/8110/811D/811E/811F/811H/811L

Silicon PNP Epitaxial Planar Type

For digital circuits

■ Features

- Downsizing of equipment and fewer parts used allow reduced costs
- An MT2 type package that allows automatic insertion by radial taping

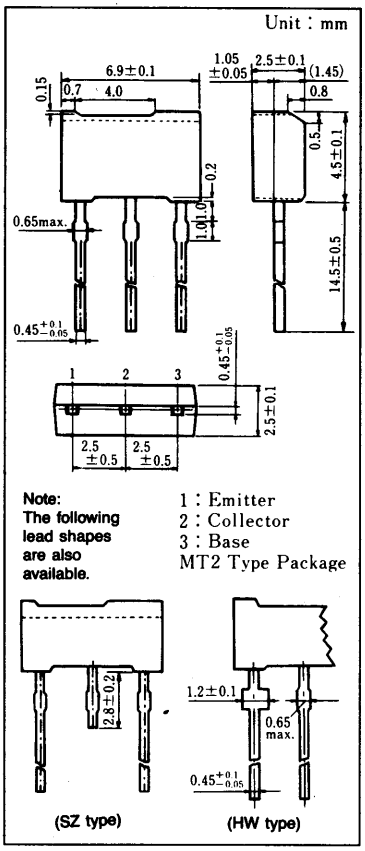
■ Resistor value by various kinds

	(R_1)	(R_2)
● UN 8111	10kΩ	10kΩ
● UN 8112	22kΩ	22kΩ
● UN 8113	47kΩ	47kΩ
● UN 8114	10kΩ	47kΩ
● UN 8115	10kΩ	—
● UN 8116	47kΩ	—
● UN 8117	22kΩ	—
● UN 8118	0.51kΩ	5.1kΩ
● UN 8119	1kΩ	10kΩ
● UN 8110	47kΩ	—
● UN 811D	47kΩ	10kΩ
● UN 811E	47kΩ	22kΩ
● UN 811F	4.7kΩ	10kΩ
● UN 811H	2.2kΩ	10kΩ
● UN 811L	4.7kΩ	4.7kΩ

■ Absolute Maximum Ratings (Ta=25°C)

Item	Symbol	Value	Unit
Collector-Base Voltage	V_{CBO}	−50	V
Collector-Emitter Voltage	V_{CEO}	−50	V
Collector Current	I_C	−100	mA
Collector Power Dissipation	P_C	400	mW
Junction Temperature	T_j	150	℃
Storage Temperature	T_{stg}	−55~+150	℃

■ Package Dimensions



(Inner Circuit)