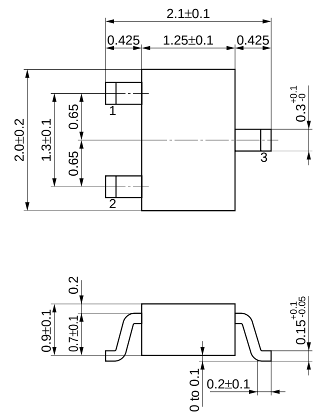
# UN5111/5112/5113/5114/5115/5116/5117/5118/5119/5110/511D/511E/511F/511H/511L/511M/511N/511T/511V/511Z

## Silicon PNP epitaxial planer transistor

For digital circuits

Unit: mm



1 : Base
2 : Emitter
3 : Collector

EIAJ : SC–70
S–Mini Type Package

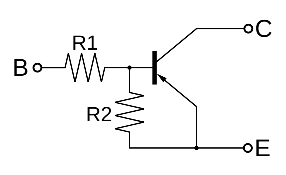
### Features

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

### Resistance by Part Number

| | Marking Symbol | ($R_1$) | ($R_2$) |
|---|---|---|---|
| UN5111 | 6A | 10kΩ | 10kΩ |
| UN5112 | 6B | 22kΩ | 22kΩ |
| UN5113 | 6C | 47kΩ | 47kΩ |
| UN5114 | 6D | 10kΩ | 47kΩ |
| UN5115 | 6E | 10kΩ | — |
| UN5116 | 6F | 4.7kΩ | — |
| UN5117 | 6H | 22kΩ | — |
| UN5118 | 6I | 0.51Ω | 5.1kΩ |
| UN5119 | 6K | 1kΩ | 10kΩ |
| UN5110 | 6L | 47kΩ | — |
| UN511D | 6M | 47kΩ | 10kΩ |
| UN511E | 6N | 47kΩ | 22kΩ |
| UN511F | 6O | 4.7kΩ | 10kΩ |
| UN511H | 6P | 2.2kΩ | 10kΩ |
| UN511L | 6Q | 4.7kΩ | 4.7kΩ |
| UN511M | EI | 2.2kΩ | 47kΩ |
| UN511N | EW | 4.7kΩ | 47kΩ |
| UN511T | EY | 22kΩ | 47kΩ |
| UN511V | FC | 2.2kΩ | 2.2kΩ |
| UN511Z | FE | 4.7kΩ | 22kΩ |

### Internal Connection



### Absolute Maximum Ratings (Ta=25˚C)

| Parameter | Symbol | Ratings | Unit |
|---|---|---|---|
| Collector to base voltage | $V_{CBO}$ | –50 | V |
| Collector to emitter voltage | $V_{CEO}$ | –50 | V |
| Collector current | $I_C$ | –100 | mA |
| Total power dissipation | $P_T$ | 150 | mW |
| Junction temperature | $T_j$ | 150 | ˚C |
| Storage temperature | $T_{stg}$ | –55 to +150 | ˚C |

## ■ Electrical Characteristics (Ta=25˚C)

| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|---|
| Collector cutoff current | | $I_{CBO}$ | $V_{CB}$ = –50V, $I_E$ = 0 | | | – 0.1 | µA |
| | | $I_{CEO}$ | $V_{CE}$ = –50V, $I_B$ = 0 | | | – 0.5 | µA |
| Emitter cutoff current | UN5111 | $I_{EBO}$ | $V_{EB}$ = –6V, $I_C$ = 0 | | | – 0.5 | mA |
| | UN5112/5114/511E/511D/511M/511N/511T | | | | | – 0.2 | |
| | UN5113 | | | | | – 0.1 | |
| | UN5115/5116/5117/5110 | | | | | – 0.01 | |
| | UN511F/511H | | | | | –1.0 | |
| | UN5119 | | | | | –1.5 | |
| | UN5118/511L/511V | | | | | –2.0 | |
| | UN511Z | | | | | – 0.4 | |
| Collector to base voltage | | $V_{CBO}$ | $I_C$ = –10µA, $I_E$ = 0 | –50 | | | V |
| | UN511N/511T/511V/511Z | | | –50 | | | |
| Collector to emitter voltage | | $V_{CEO}$ | $I_C$ = –2mA, $I_B$ = 0 | –50 | | | V |
| | UN511N/511T | | | –50 | | | |
| Forward current transfer ratio | UN5111 | $h_{FE}$ | $V_{CE}$ = –10V, $I_C$ = –5mA | 35 | | | |
| | UN5112/511E | | | 60 | | | |
| | UN5113/5114/511M | | | 80 | | | |
| | UN5115*/5116*/5117*/5110* | | | 160 | | 460 | |
| | UN511F/511D/5119/511H | | | 30 | | | |
| | UN5118/511L | | | 20 | | | |
| | UN511N/511T | | | 80 | | 400 | |
| | UN511V | | | 6 | | 20 | |
| | UN511Z | | | 60 | | 200 | |
| Collector to emitter saturation voltage | | $V_{CE(sat)}$ | $I_C$ = –10mA, $I_B$ = – 0.3mA | | | – 0.25 | V |
| | UN511V | | $I_C$ = –10mA, $I_B$ = –1.5mA | | | – 0.25 | |
| Output voltage high level | | $V_{OH}$ | $V_{CC}$ = –5V, $V_B$ = – 0.5V, $R_L$ = 1kΩ | –4.9 | | | V |
| Output voltage low level | | $V_{OL}$ | $V_{CC}$ = –5V, $V_B$ = –2.5V, $R_L$ = 1kΩ | | | – 0.2 | V |
| | UN5113 | | $V_{CC}$ = –5V, $V_B$ = –3.5V, $R_L$ = 1kΩ | | | – 0.2 | |
| | UN511D | | $V_{CC}$ = –5V, $V_B$ = –10V, $R_L$ = 1kΩ | | | – 0.2 | |
| | UN511E | | $V_{CC}$ = –5V, $V_B$ = –6V, $R_L$ = 1kΩ | | | – 0.2 | |
| Transition frequency | | $f_T$ | $V_{CB}$ = –10V, $I_E$ = 1mA, f = 200MHz | | 80 | | MHz |
| | UN511Z | | $V_{CB}$ = –10V, $I_E$ = 1mA, f = 200MHz | | 150 | | |
| Input resistance | UN5111/5114/5115 | $R_1$ | | (–30%) | 10 | (+30%) | kΩ |
| | UN5112/5117/511T | | | | 22 | | |
| | UN5113/5110/511D/511E | | | | 47 | | |
| | UN5116/511F/511L/511N/511Z | | | | 4.7 | | |
| | UN5118 | | | | 0.51 | | |
| | UN5119 | | | | 1 | | |
| | UN511H/511M/511V | | | | 2.2 | | |

* $h_{FE}$ rank classification (UN5115/5116/5117/5110)

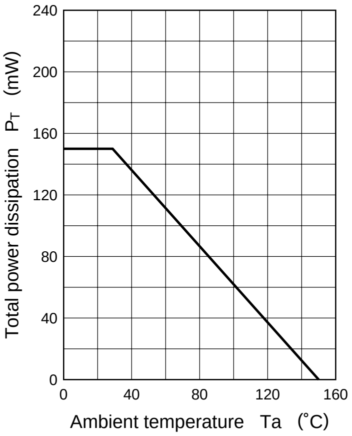
| Rank | Q | R | S |
|---|---|---|---|
| $h_{FE}$ | 160 to 260 | 210 to 340 | 290 to 460 |

## ■ Electrical Characteristics (continued) (Ta=25˚C)

| Parameter | | Symbol | Conditions | min | typ | max | Unit |
|---|---|---|---|---|---|---|---|
| Resistance ratio | UN5111/5112/5113/511L | $R_1/R_2$ | | 0.8 | 1.0 | 1.2 | |
| | UN5114 | | | 0.17 | 0.21 | 0.25 | |
| | UN5118/5119 | | | 0.08 | 0.1 | 0.12 | |
| | UN511D | | | | 4.7 | | |
| | UN511E | | | | 2.14 | | |
| | UN511F/511T | | | | 0.47 | | |
| | UN511H | | | 0.17 | 0.22 | 0.27 | |
| | UN511M | | | | 0.047 | | |
| | UN511N | | | | 0.1 | | |
| | UN511V | | | | 1.0 | | |
| | UN511Z | | | | 0.21 | | |

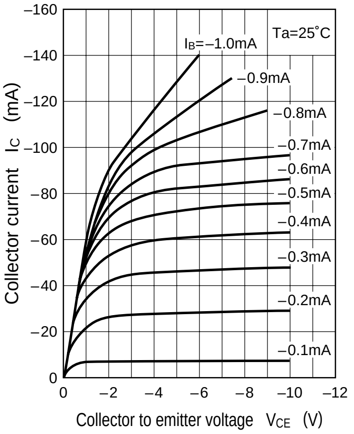
## Common characteristics chart

$P_T$ — Ta

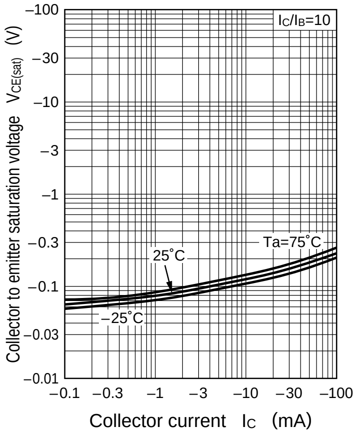


## Characteristics charts of UN5111

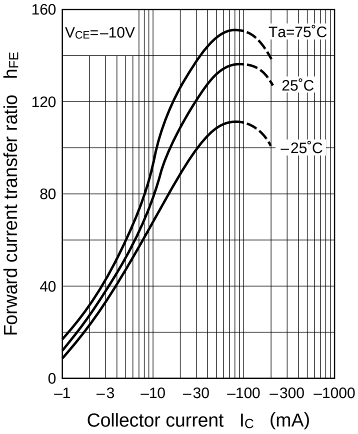
$I_C$ — $V_{CE}$



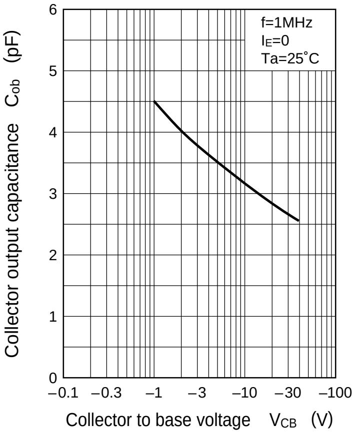
$V_{CE(sat)}$ — $I_C$



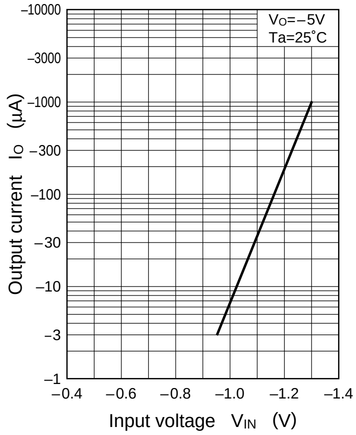
$h_{FE}$ — $I_C$



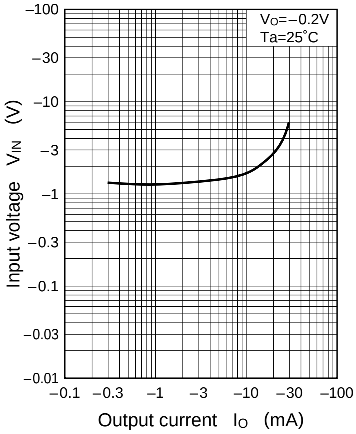
$C_{ob}$ — $V_{CB}$



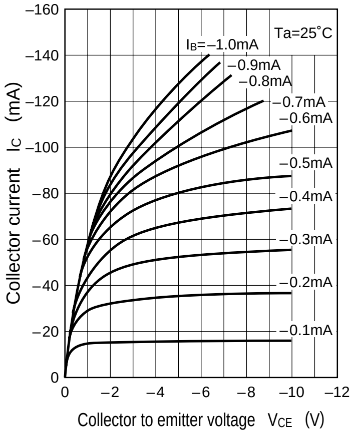
$I_O$ — $V_{IN}$

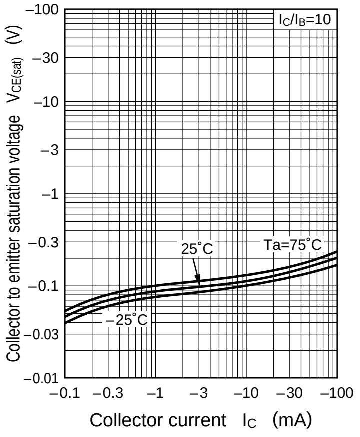


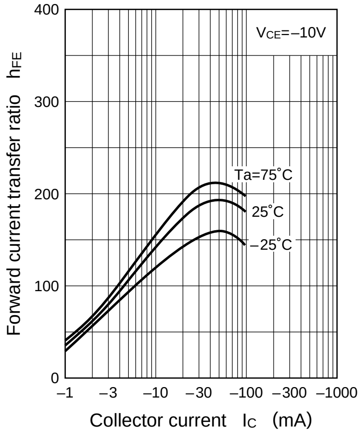
$V_{IN}$ — $I_O$

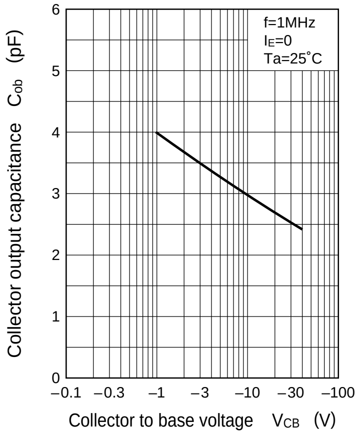


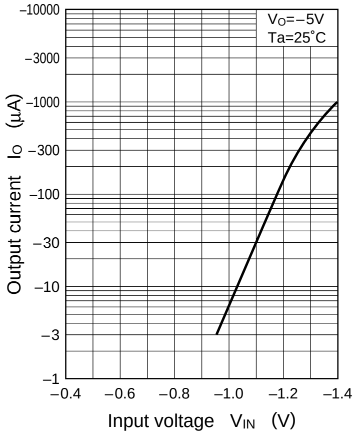
## Characteristics charts of UN5112

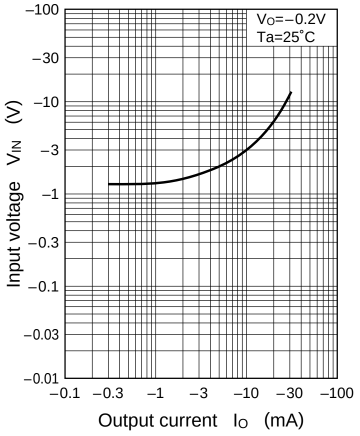

$I_C$ — $V_{CE}$


$V_{CE(sat)}$ — $I_C$

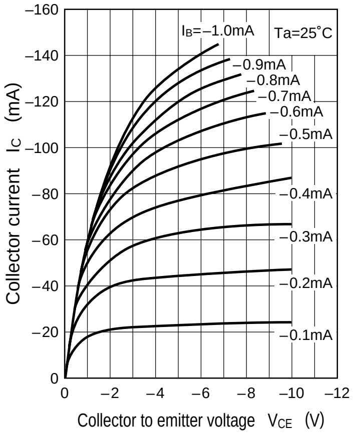

$h_{FE}$ — $I_C$

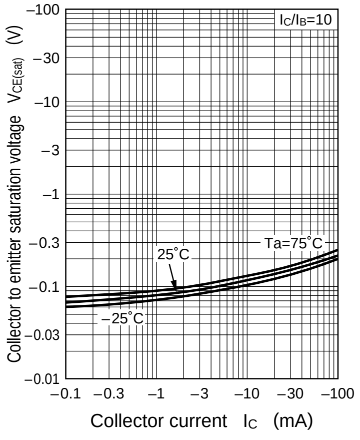

$C_{ob}$ — $V_{CB}$

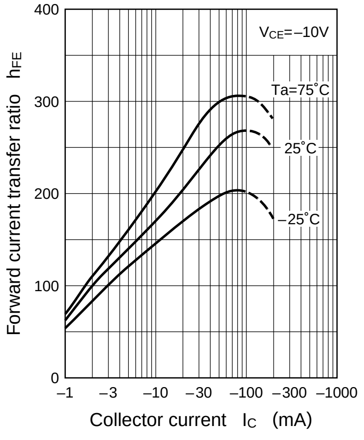

$I_O$ — $V_{IN}$


$V_{IN}$ — $I_O$

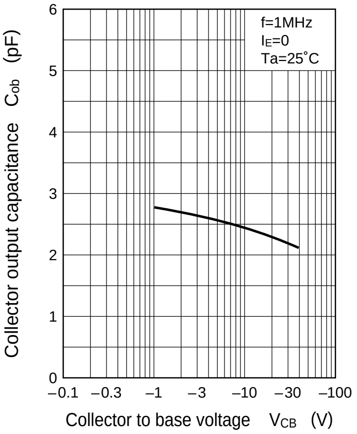
## Characteristics charts of UN5113


$I_C$ — $V_{CE}$

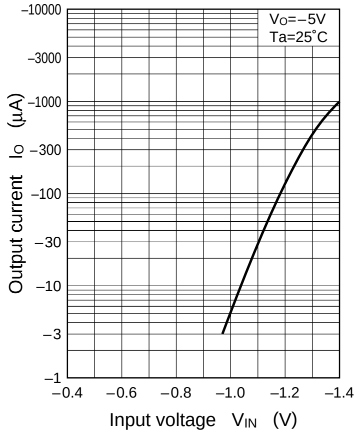

$V_{CE(sat)}$ — $I_C$


$h_{FE}$ — $I_C$

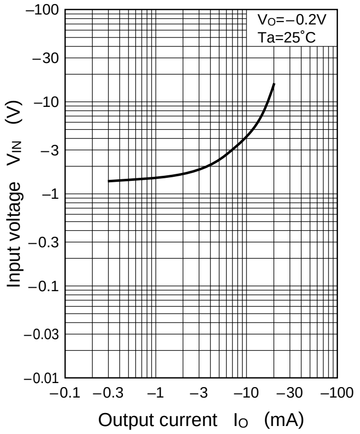
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

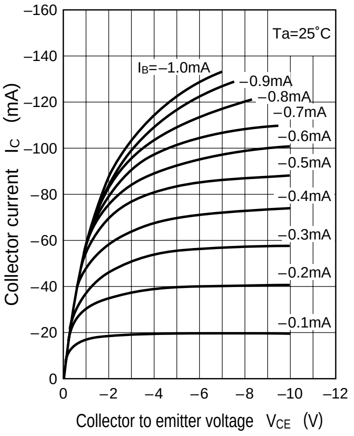


$V_{IN}$ — $I_O$

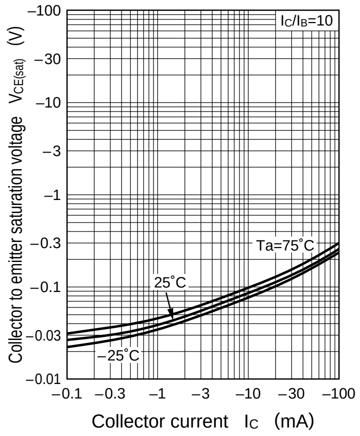


## Characteristics charts of UN5114

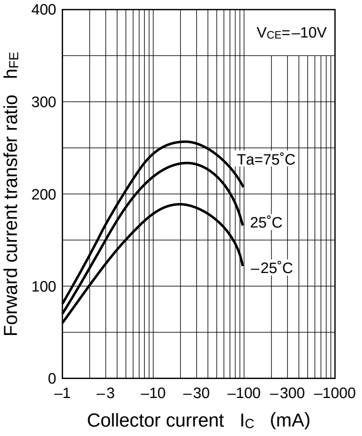
$I_C$ — $V_{CE}$



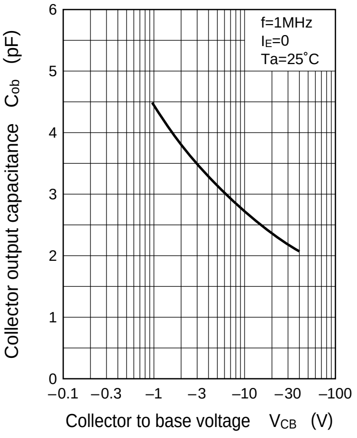
$V_{CE(sat)}$ — $I_C$



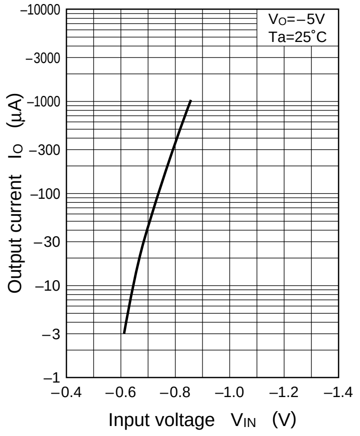
$h_{FE}$ — $I_C$



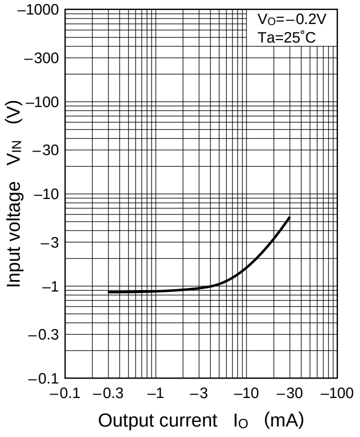
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

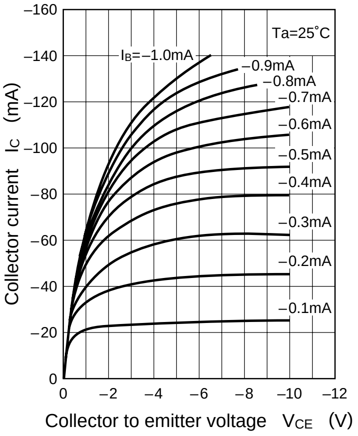


$V_{IN}$ — $I_O$

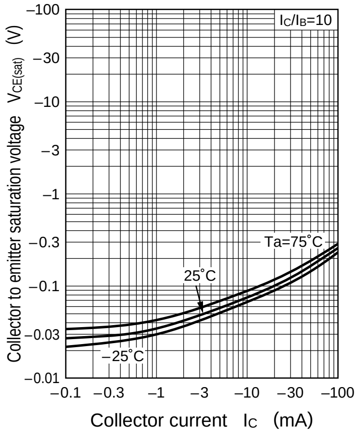


## Characteristics charts of UN5115

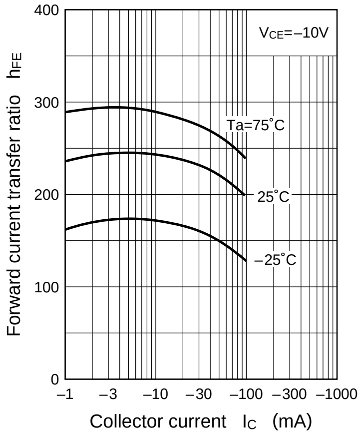
$I_C$ — $V_{CE}$



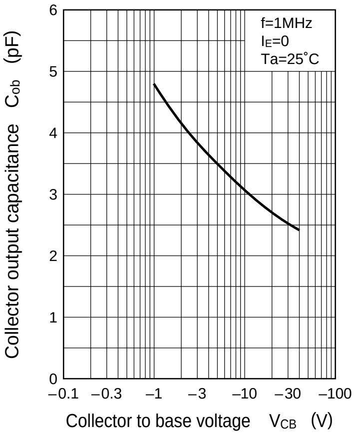
$V_{CE(sat)}$ — $I_C$



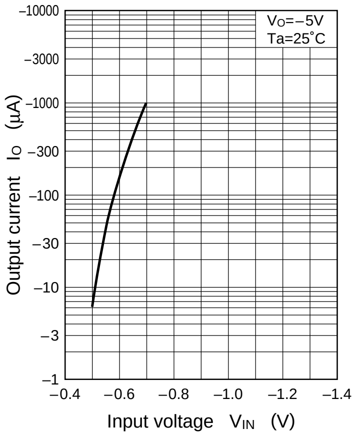
$h_{FE}$ — $I_C$



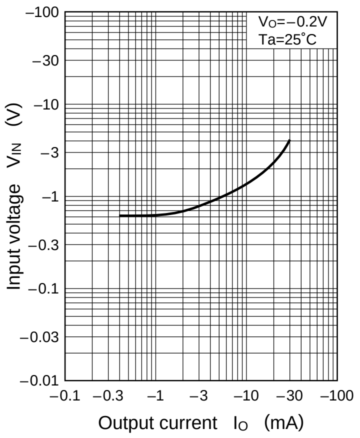
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

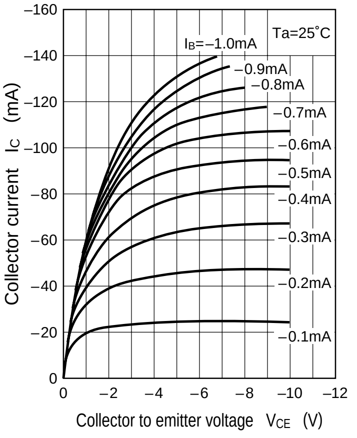


$V_{IN}$ — $I_O$

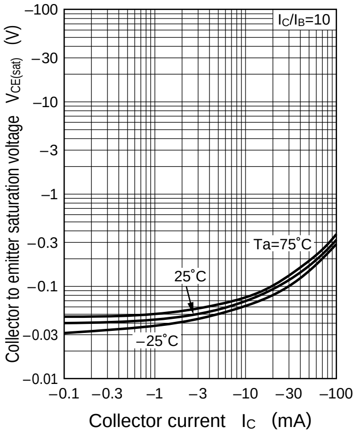


## Characteristics charts of UN5116

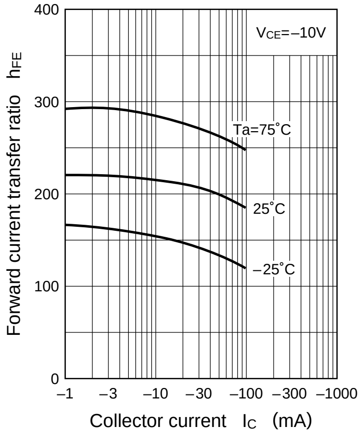
$I_C$ — $V_{CE}$



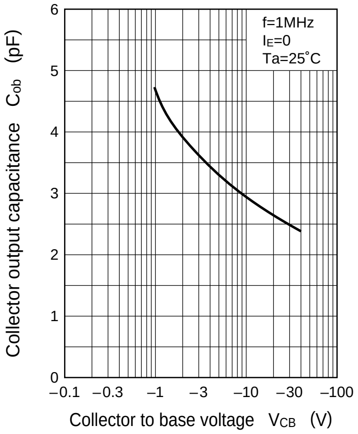
$V_{CE(sat)}$ — $I_C$



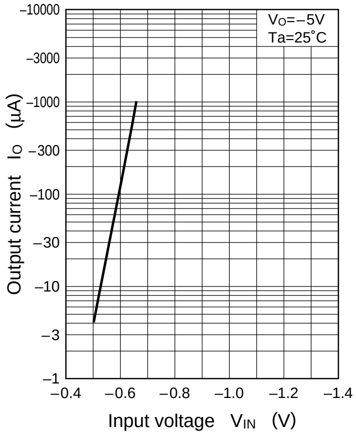
$h_{FE}$ — $I_C$



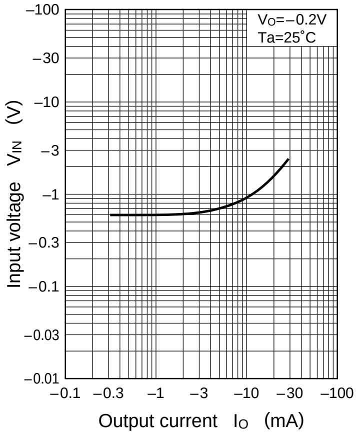
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

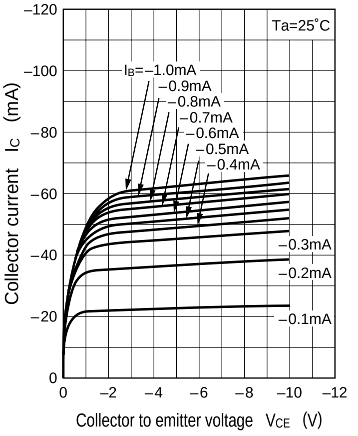


$V_{IN}$ — $I_O$

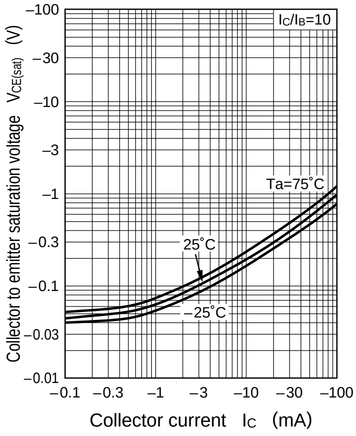


## Characteristics charts of UN5117

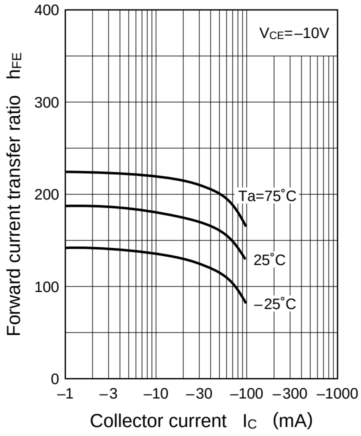
$I_C$ — $V_{CE}$



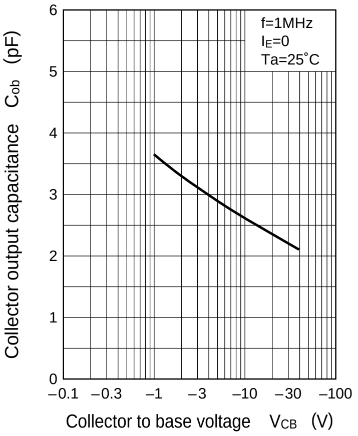
$V_{CE(sat)}$ — $I_C$



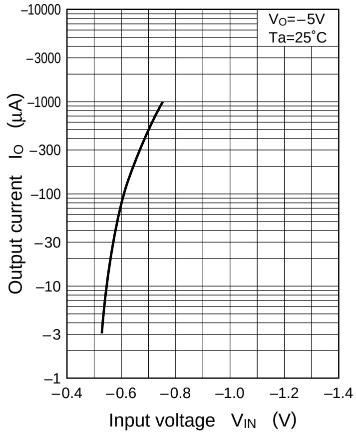
$h_{FE}$ — $I_C$



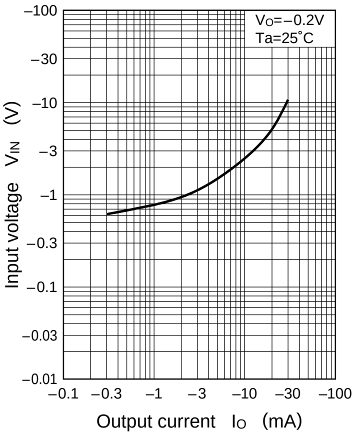
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

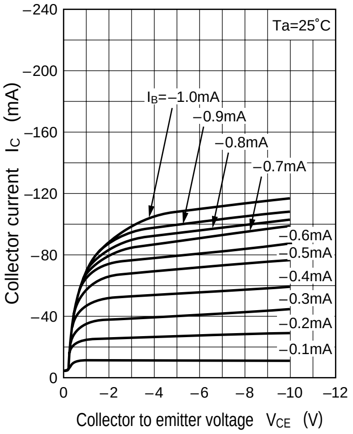


$V_{IN}$ — $I_O$

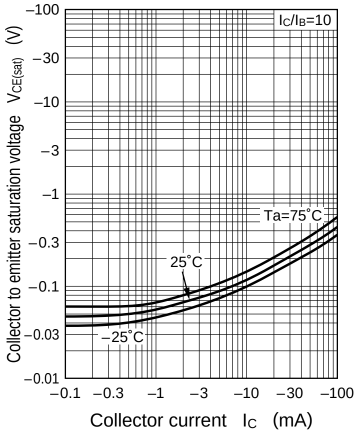


## Characteristics charts of UN5118

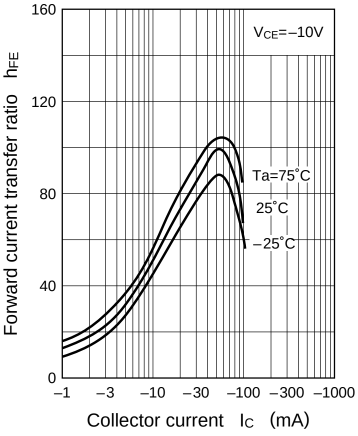
$I_C$ — $V_{CE}$



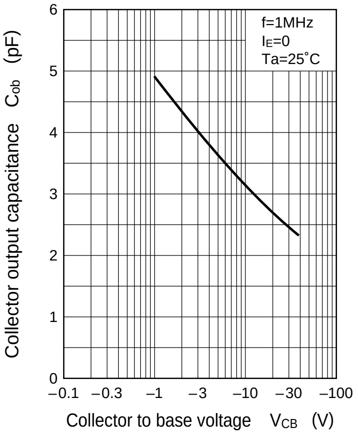
$V_{CE(sat)}$ — $I_C$



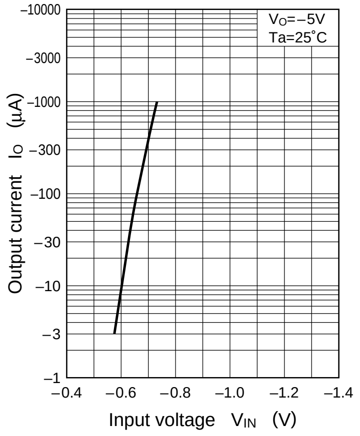
$h_{FE}$ — $I_C$



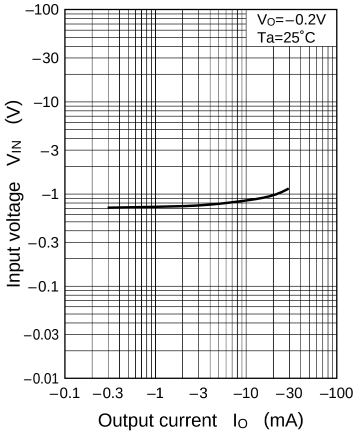
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

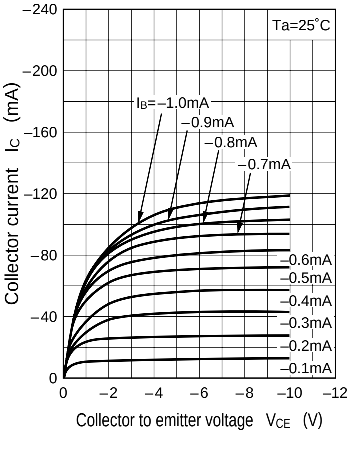


$V_{IN}$ — $I_O$

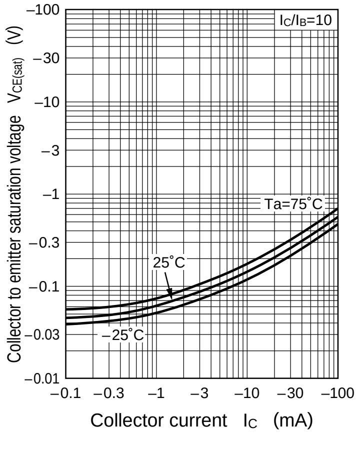


## Characteristics charts of UN5119

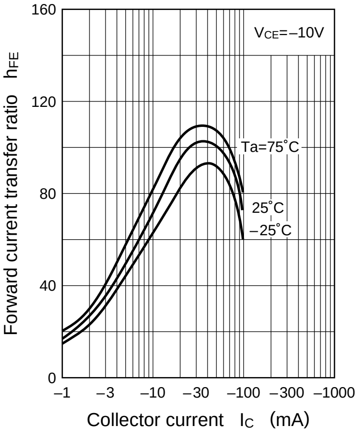
$I_C$ — $V_{CE}$



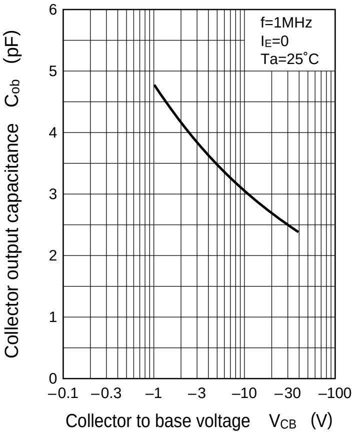
$V_{CE(sat)}$ — $I_C$



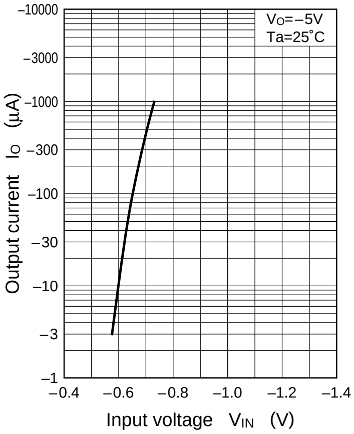
$h_{FE}$ — $I_C$



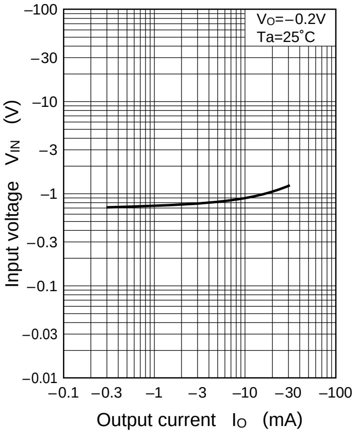
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

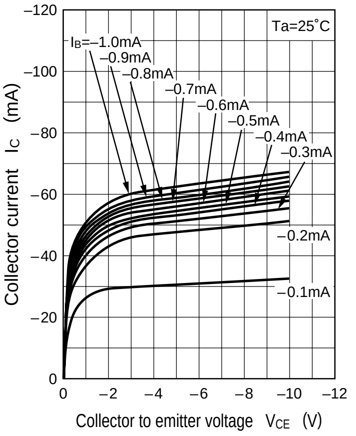


$V_{IN}$ — $I_O$

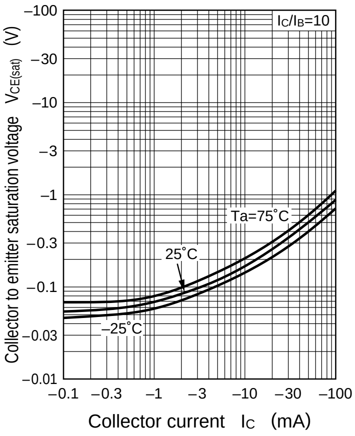


## Characteristics charts of UN5110

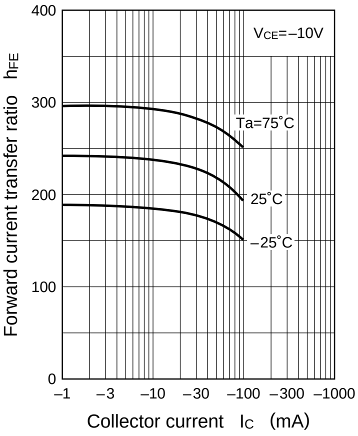
$I_C$ — $V_{CE}$



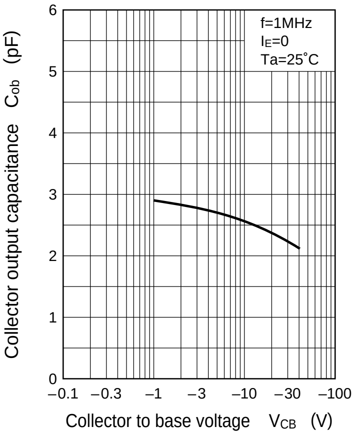
$V_{CE(sat)}$ — $I_C$



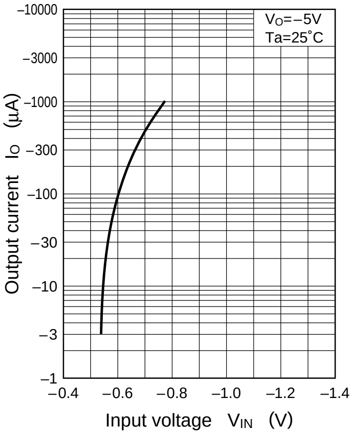
$h_{FE}$ — $I_C$



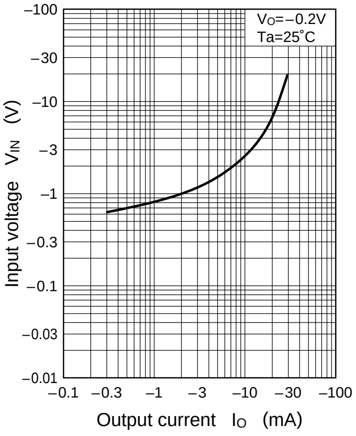
$C_{ob}$ — $V_{CB}$



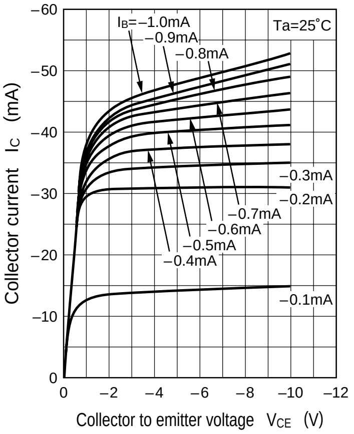
$I_O$ — $V_{IN}$

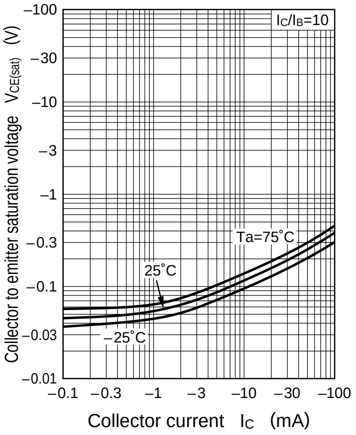


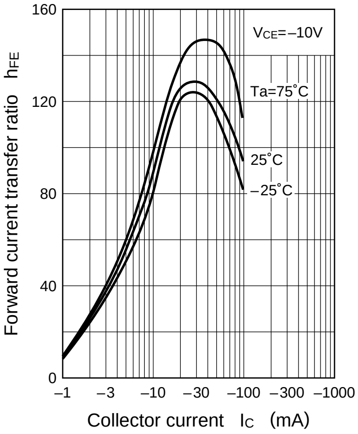
$V_{IN}$ — $I_O$

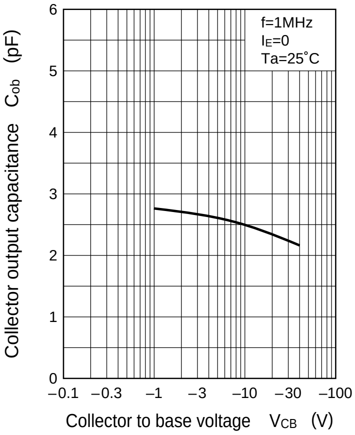


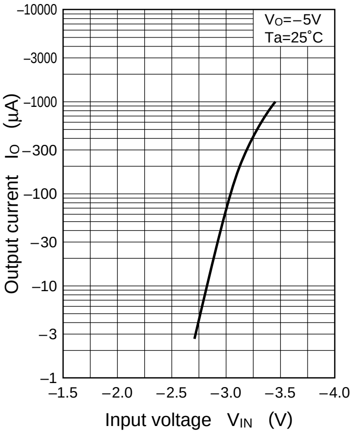
## Characteristics charts of UN511D

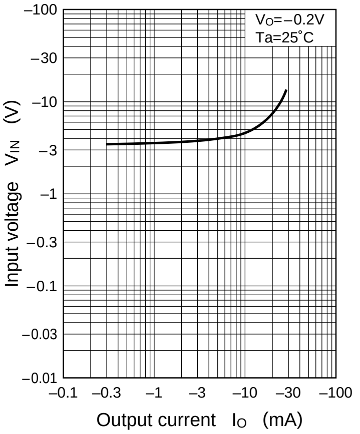

$I_C$ — $V_{CE}$


$V_{CE(sat)}$ — $I_C$

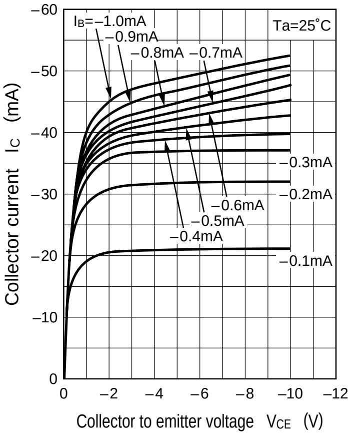

$h_{FE}$ — $I_C$

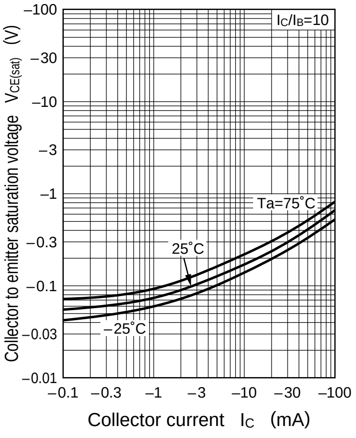

$C_{ob}$ — $V_{CB}$

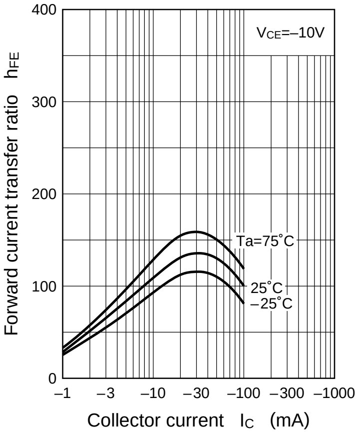

$I_O$ — $V_{IN}$


$V_{IN}$ — $I_O$

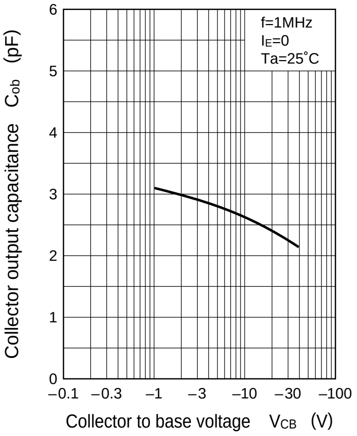
## Characteristics charts of UN511E


$I_C$ — $V_{CE}$

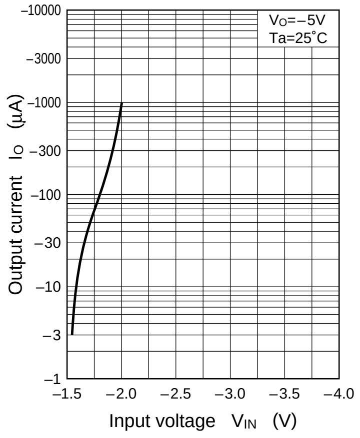

$V_{CE(sat)}$ — $I_C$


$h_{FE}$ — $I_C$

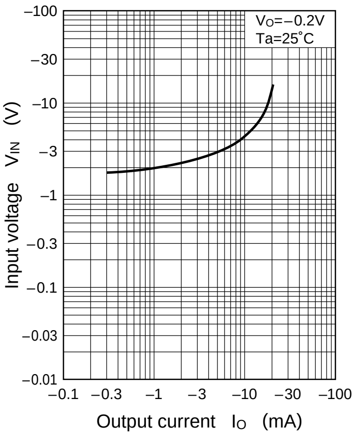
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

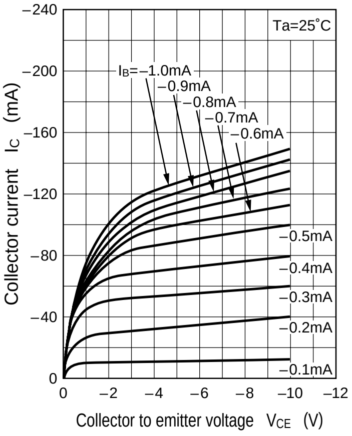


$V_{IN}$ — $I_O$

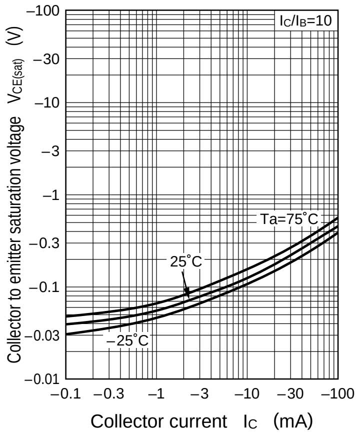


## Characteristics charts of UN511F

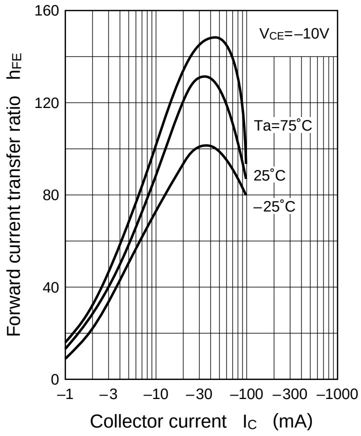
$I_C$ — $V_{CE}$



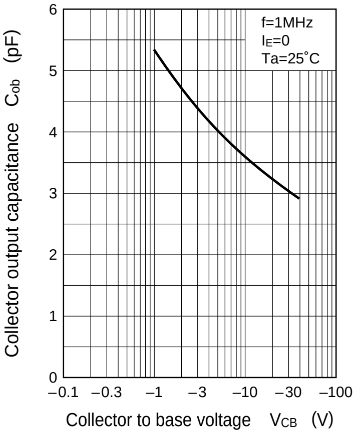
$V_{CE(sat)}$ — $I_C$



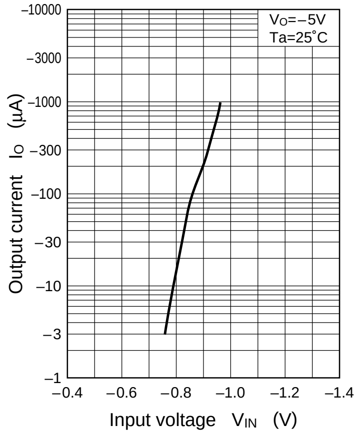
$h_{FE}$ — $I_C$



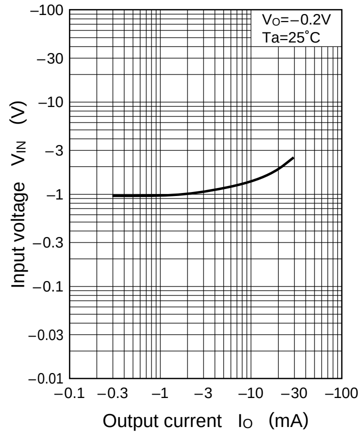
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

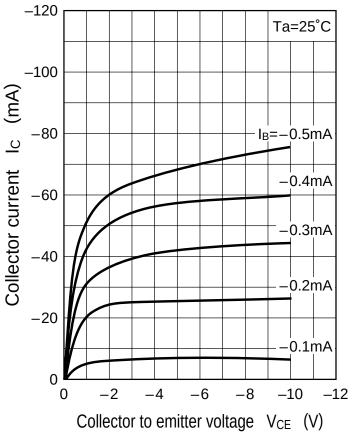


$V_{IN}$ — $I_O$

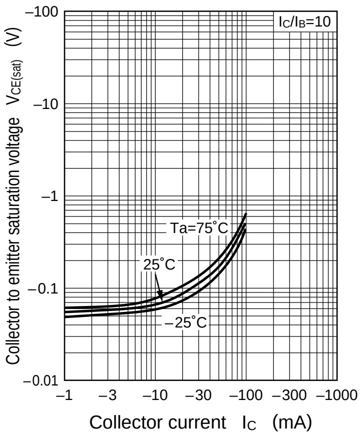


## Characteristics charts of UN511H

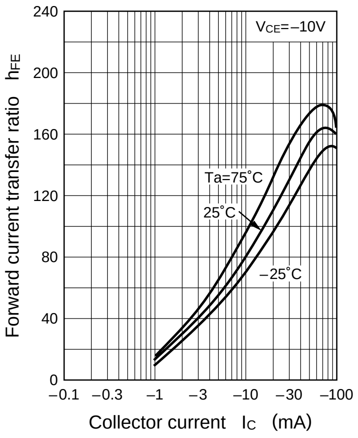
$I_C$ — $V_{CE}$



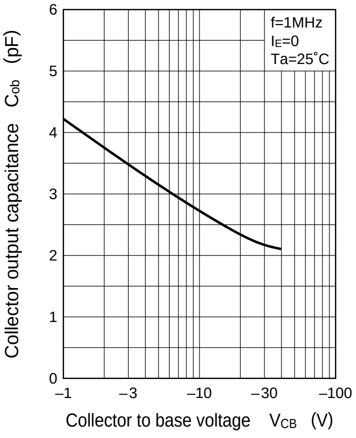
$V_{CE(sat)}$ — $I_C$



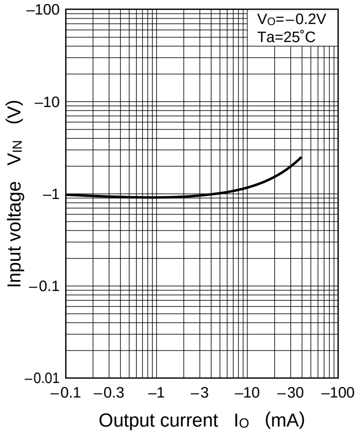
$h_{FE}$ — $I_C$



$C_{ob}$ — $V_{CB}$

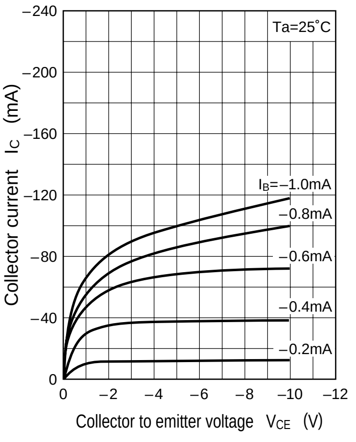


$V_{IN}$ — $I_O$

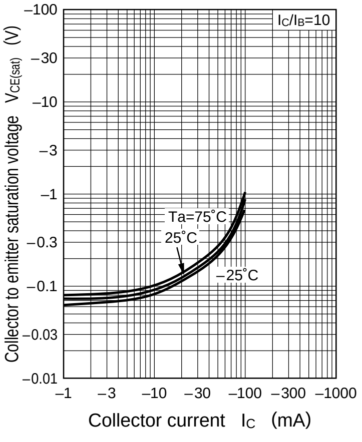


## Characteristics charts of UN511L

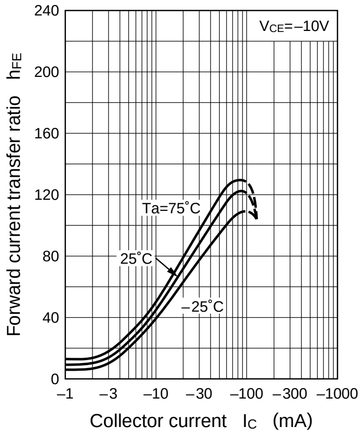
$I_C$ — $V_{CE}$



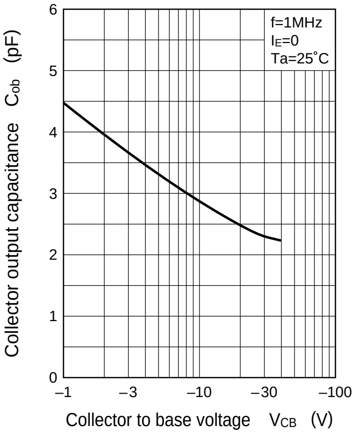
$V_{CE(sat)}$ — $I_C$



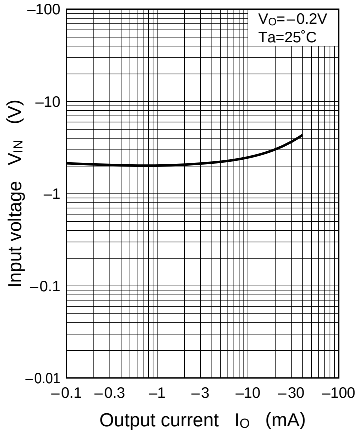
$h_{FE}$ — $I_C$



$C_{ob}$ — $V_{CB}$

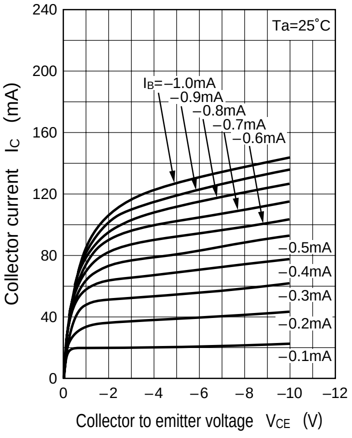


$V_{IN}$ — $I_O$

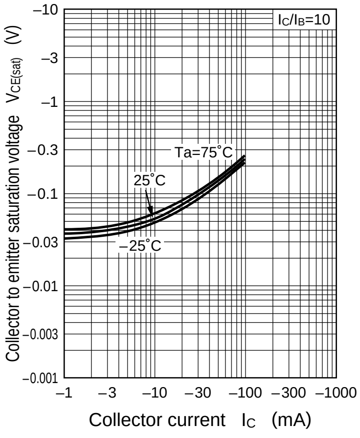


## Characteristics charts of UN511M

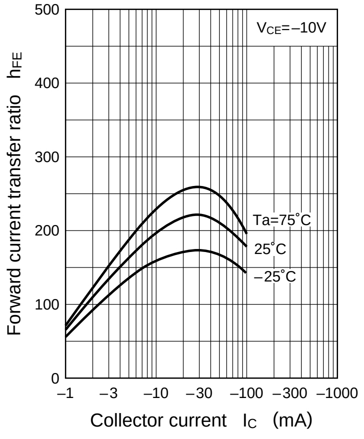
$I_C$ — $V_{CE}$



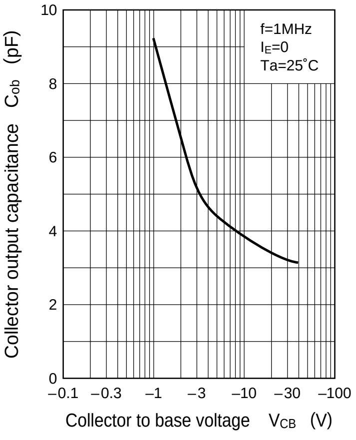
$V_{CE(sat)}$ — $I_C$



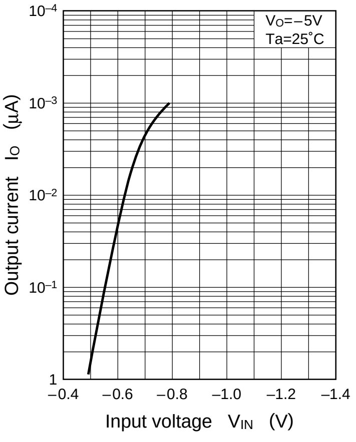
$h_{FE}$ — $I_C$



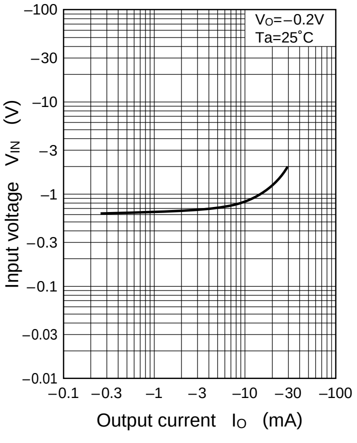
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

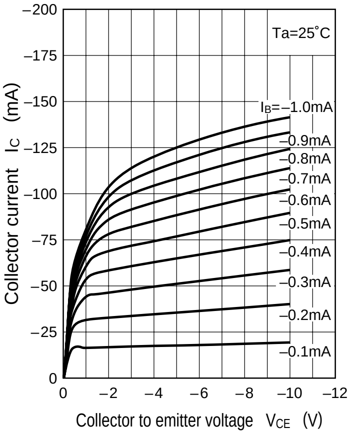


$V_{IN}$ — $I_O$

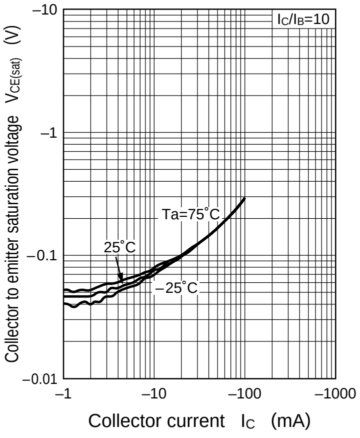


## Characteristics charts of UN511N

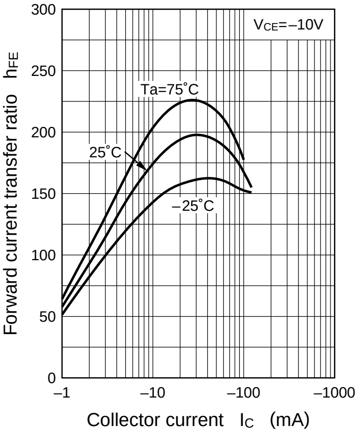
$I_C$ — $V_{CE}$



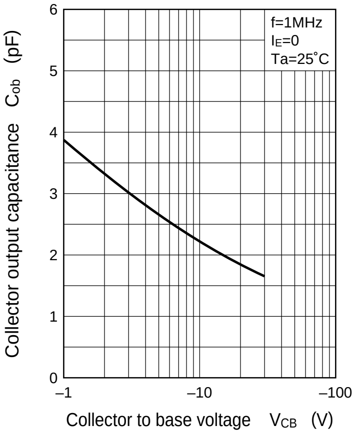
$V_{CE(sat)}$ — $I_C$



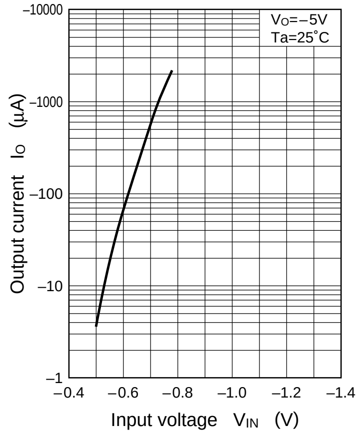
$h_{FE}$ — $I_C$



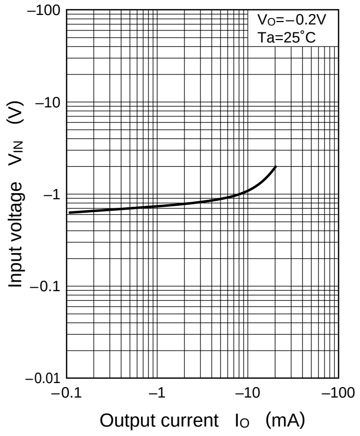
$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$

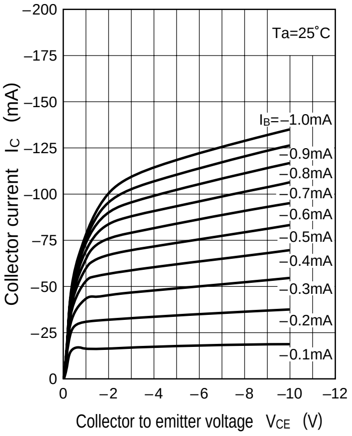


$V_{IN}$ — $I_O$

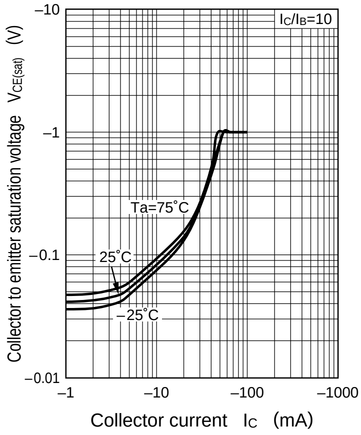


## Characteristics charts of UN511T

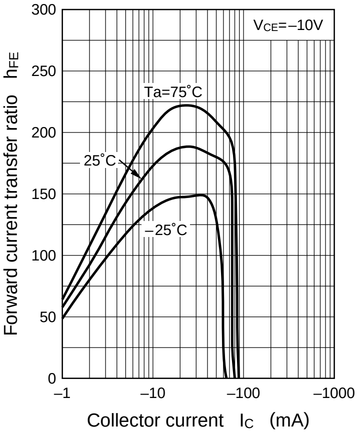
$I_C$ — $V_{CE}$



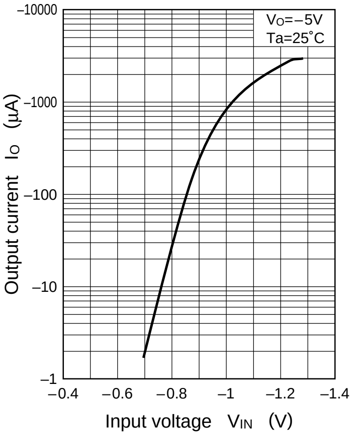
$V_{CE(sat)}$ — $I_C$



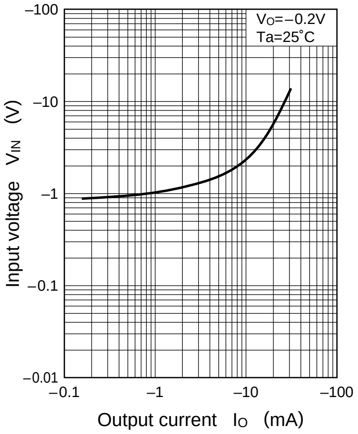
$h_{FE}$ — $I_C$



$I_O$ — $V_{IN}$

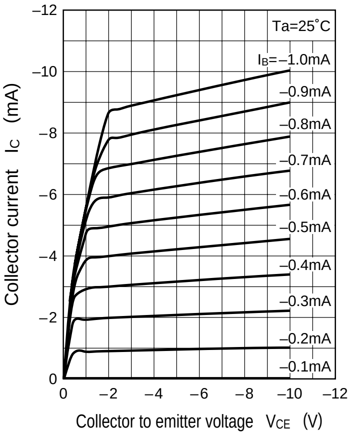


$V_{IN}$ — $I_O$

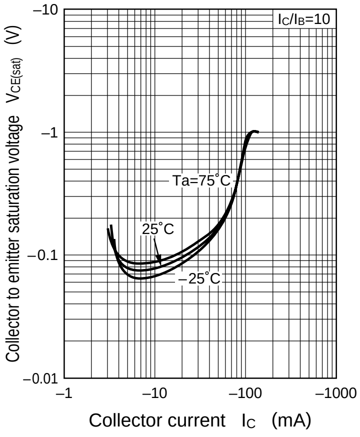


Characteristics charts of UN511V

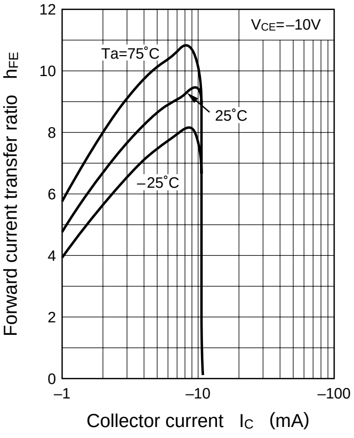
$I_C$ — $V_{CE}$



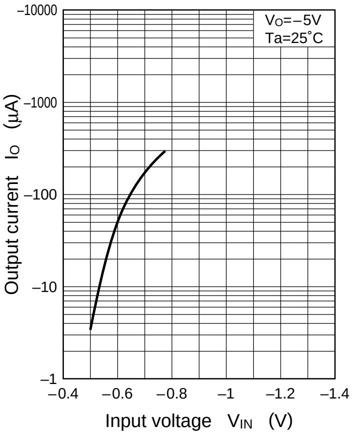
$V_{CE(sat)}$ — $I_C$



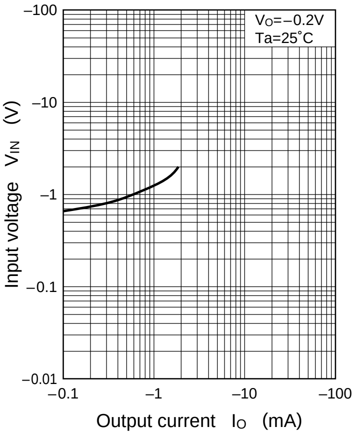
$h_{FE}$ — $I_C$



$I_O$ — $V_{IN}$

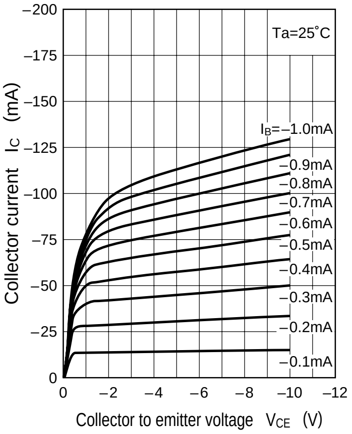


$V_{IN}$ — $I_O$

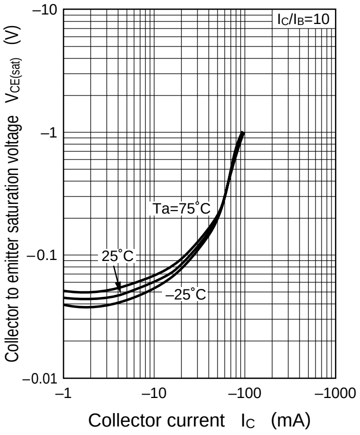


## Characteristics charts of UN511Z

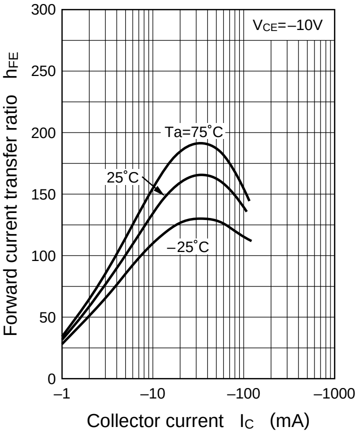
$I_C$ — $V_{CE}$



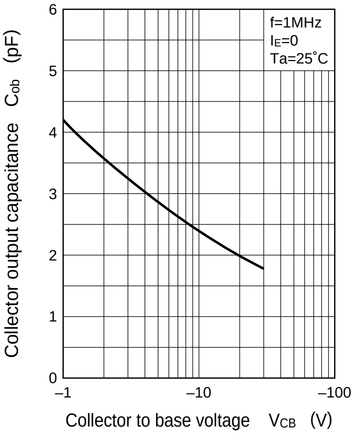
$V_{CE(sat)}$ — $I_C$



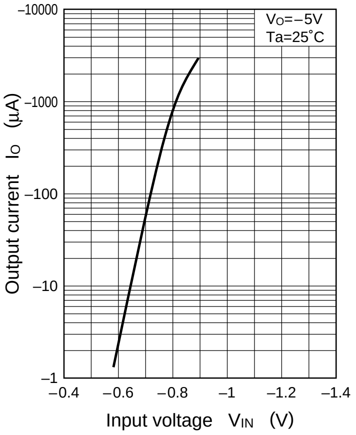
$h_{FE}$ — $I_C$



$C_{ob}$ — $V_{CB}$



$I_O$ — $V_{IN}$



$V_{IN}$ — $I_O$