

## Description

- Complex type bipolar transistor

## Feature

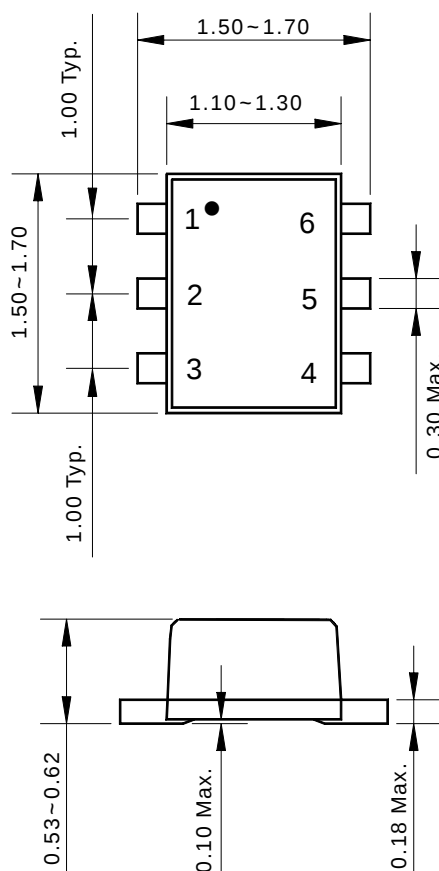
- Small package save PCB area
- Reduce quantity of parts and mounting cost
- Both SBT3906 chip and SBT3904 chip in SOT-563F package

## Ordering Information

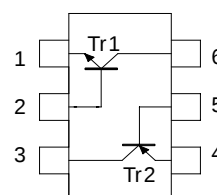
| Type NO. | Marking | Package Code |
|----------|---------|--------------|
| SUT394EF | UX      | SOT-563F     |

## Outline Dimensions

unit : mm



### • Equivalent Circuit



### PIN Connections

1. Emitter 1
2. Base 1
3. Collector 2
4. Emitter 2
5. Base 2
6. Collector 1

## Absolute Maximum Ratings [Tr1, Tr2]

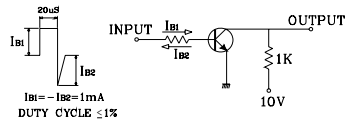
(Ta=25°C)

| Characteristic              | Symbol    | Rating    |      | Unit |
|-----------------------------|-----------|-----------|------|------|
|                             |           | Tr1       | Tr2  |      |
| Collector-base voltage      | $V_{CBO}$ | 60        | -40  | V    |
| Collector-emitter voltage   | $V_{CEO}$ | 40        | -40  | V    |
| Emitter-base voltage        | $V_{EBO}$ | 6         | -5   | V    |
| Collector current           | $I_C$     | 200       | -200 | mA   |
| Collector power dissipation | $P_C^*$   | 150       |      | mW   |
| Junction temperature        | $T_J$     | 150       |      | °C   |
| Storage temperature range   | $T_{stg}$ | -55 ~ 150 |      | °C   |

※: Total rating

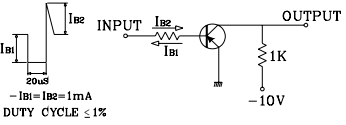
## Electrical Characteristics [ Tr1 ]

(Ta=25°C)

| Characteristic                       | Symbol        | Test Condition                                                                       | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|--------------------------------------------------------------------------------------|------|------|------|------|
| Collector-Base breakdown voltage     | $BV_{CBO}$    | $I_C = 10\mu A, I_E = 0$                                                             | 60   | -    | -    | V    |
| Collector-Emitter breakdown voltage  | $BV_{CEO}$    | $I_C = 1mA, I_B = 0$                                                                 | 40   | -    | -    | V    |
| Emitter-Base breakdown voltage       | $BV_{EBO}$    | $I_E = 10\mu A, I_C = 0$                                                             | 6    | -    | -    | V    |
| Collector cut-off current            | $I_{CEX}$     | $V_{CE} = 30V, V_{EB} = 3V$                                                          | -    | -    | 50   | nA   |
| DC current gain                      | $h_{FE}$      | $V_{CE} = 1V, I_C = 10mA$                                                            | 100  | -    | 300  | -    |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | $I_C = 50mA, I_B = 5mA$                                                              | -    | -    | 0.3  | V    |
| Transition frequency                 | $f_T$         | $V_{CE} = 20V, I_C = 10mA, f = 100MHz$                                               | 300  | -    | -    | MHz  |
| Collector output capacitance         | $C_{ob}$      | $V_{CB} = 5V, I_E = 0, f = 1MHz$                                                     | -    | -    | 4    | pF   |
| Delay time                           | $t_d$         |  | -    | -    | 35   | ns   |
| Rise time                            | $t_r$         |                                                                                      | -    | -    | 35   | ns   |
| Storage time                         | $t_{stg}$     |                                                                                      | -    | -    | 200  | ns   |
| Fall Time                            | $t_f$         |                                                                                      | -    | -    | 50   | ns   |

## Electrical Characteristics [ Tr2 ]

(Ta=25°C)

| Characteristic                       | Symbol        | Test Condition                                                                       | Min. | Typ. | Max. | Unit |
|--------------------------------------|---------------|--------------------------------------------------------------------------------------|------|------|------|------|
| Collector-Base breakdown voltage     | $BV_{CBO}$    | $I_C = -10\mu A, I_E = 0$                                                            | -40  | -    | -    | V    |
| Collector-Emitter breakdown voltage  | $BV_{CEO}$    | $I_C = -1mA, I_B = 0$                                                                | -40  | -    | -    | V    |
| Emitter-Base breakdown voltage       | $BV_{EBO}$    | $I_E = -10\mu A, I_C = 0$                                                            | -5   | -    | -    | V    |
| Collector cut-off current            | $I_{CEX}$     | $V_{CE} = -30V, V_{EB} = -3V$                                                        | -    | -    | -50  | nA   |
| DC current gain                      | $h_{FE}$      | $V_{CE} = -1V, I_C = -10mA$                                                          | 100  | -    | 300  | -    |
| Collector-Emitter saturation voltage | $V_{CE(sat)}$ | $I_C = -50mA, I_B = -5mA$                                                            | -    | -    | -0.4 | V    |
| Transition frequency                 | $f_T$         | $V_{CE} = -20V, I_C = -10mA, f = 100MHz$                                             | 250  | -    | -    | MHz  |
| Collector output capacitance         | $C_{ob}$      | $V_{CB} = -5V, I_E = 0, f = 1MHz$                                                    | -    | -    | 4.5  | pF   |
| Delay time                           | $t_d$         |  | -    | -    | 35   | ns   |
| Rise time                            | $t_r$         |                                                                                      | -    | -    | 35   | ns   |
| Storage time                         | $t_{stg}$     |                                                                                      | -    | -    | 225  | ns   |
| Fall Time                            | $t_f$         |                                                                                      | -    | -    | 75   | ns   |

Electrical Characteristic Curves  
[ Tr1 ]

Fig. 1  $I_C - V_{BE}$

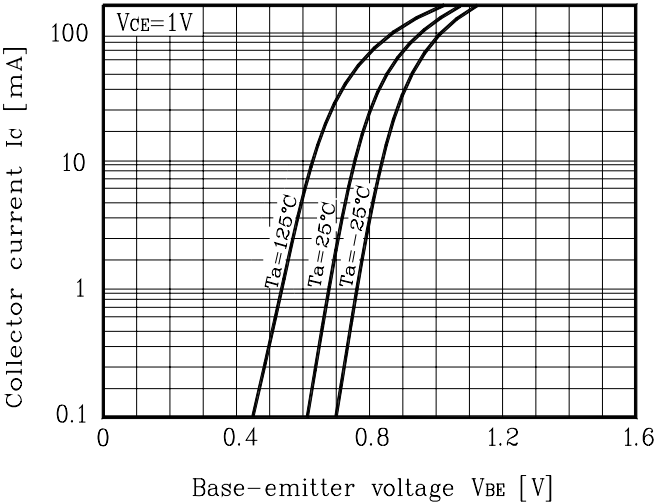


Fig. 2  $I_C - V_{CE}$

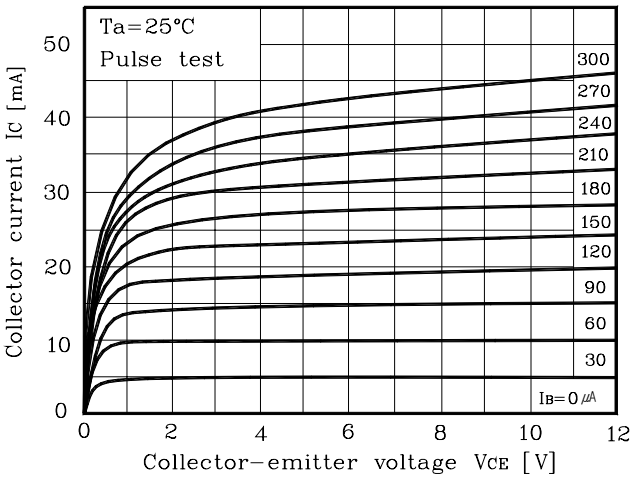


Fig. 3  $h_{FE} - I_C$

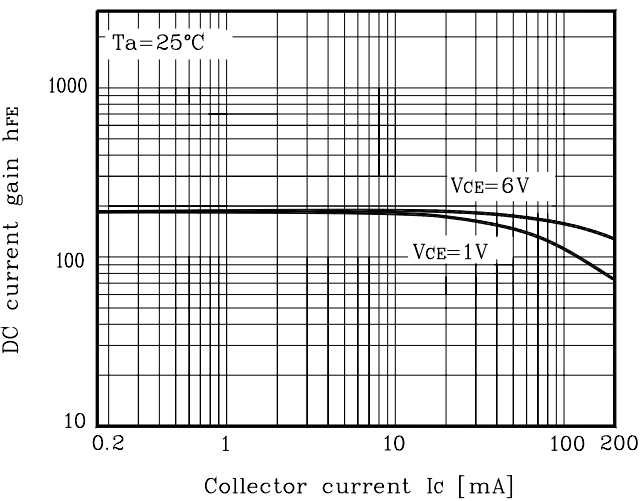
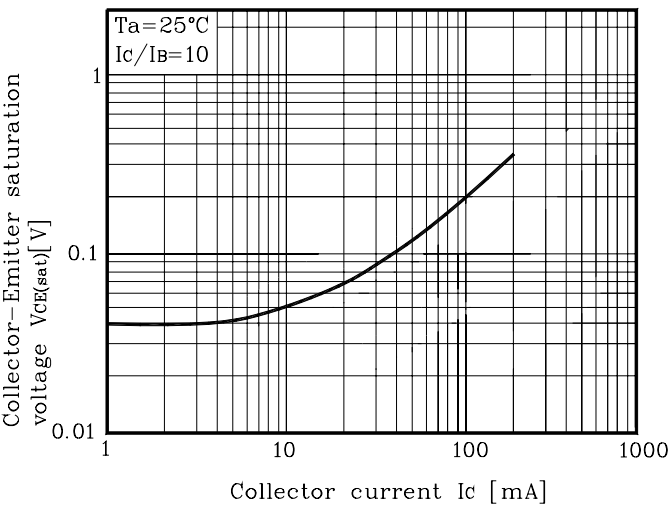


Fig. 4  $V_{CE(SAT)} - I_C$



# Electrical Characteristic Curves

[ Tr2 ]

Fig. 1  $I_C - V_{BE}$

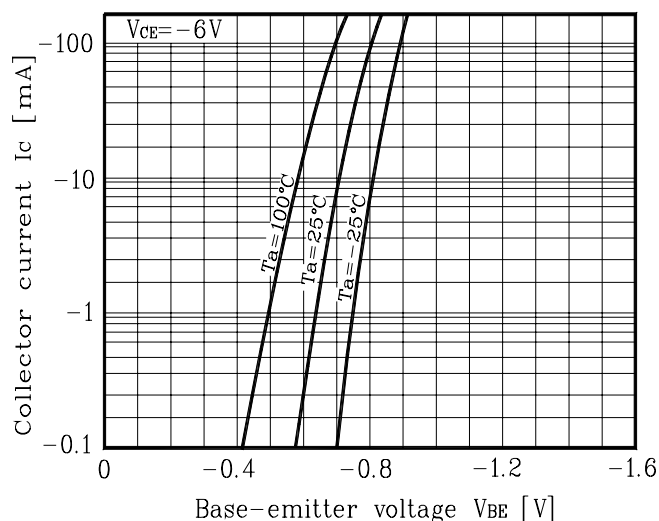


Fig. 2  $I_C - V_{CE}$

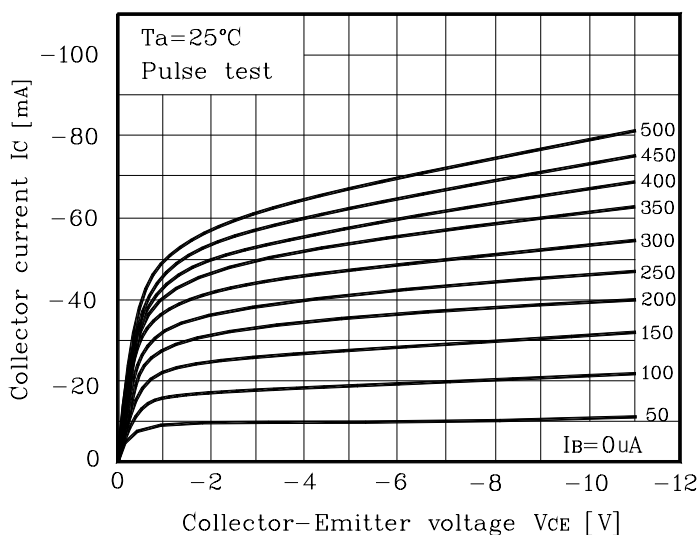


Fig. 3  $h_{FE} I_C$

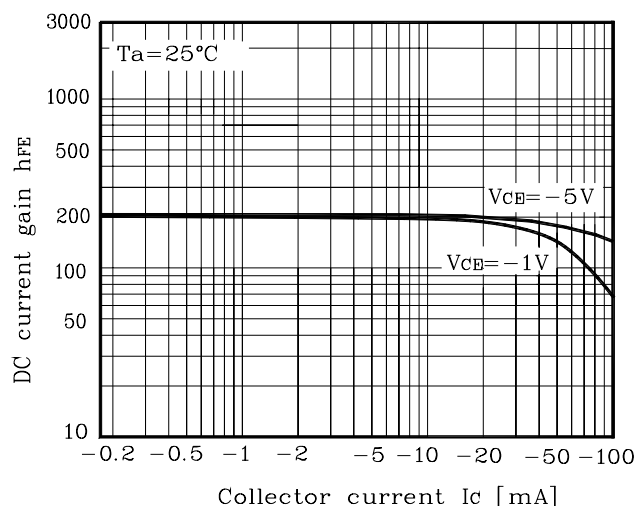
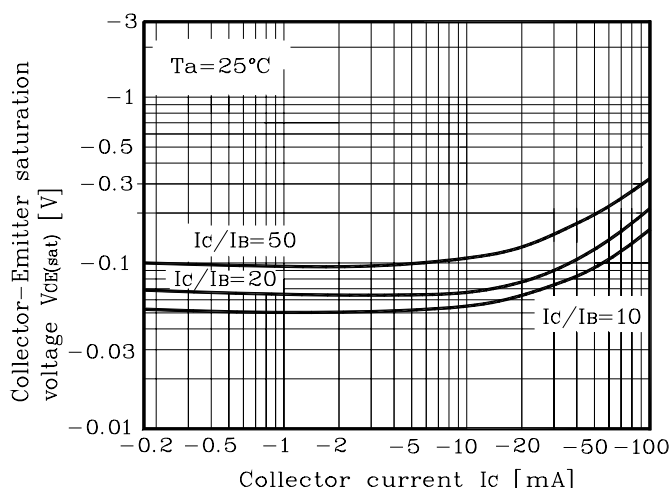


Fig. 4  $V_{CE(sat)} - I_C$



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