



# 2SB1302

## Bipolar Transistor -20V, -5A, Low $V_{CE(sat)}$ PNP Single PCP

ON Semiconductor®

<http://onsemi.com>

### Applicaitons

- DC-DC converters, motor drivers, relay drivers, lamp drivers

### Features

- Adoption of FBET, MBIT processes
- Low collector to emitter saturation voltage
- Large current capacity
- Fast switching speed
- Ultrasmall size making it easy to provide high-density, small-sized hybrid IC's

### Specifications

Absolute Maximum Ratings at  $T_a=25^\circ\text{C}$ 

| Parameter                    | Symbol    | Conditions | Ratings | Unit |
|------------------------------|-----------|------------|---------|------|
| Collector to Base Voltage    | $V_{CBO}$ |            | -25     | V    |
| Collector to Emitter Voltage | $V_{CEO}$ |            | -20     | V    |
| Emitter to Base Voltage      | $V_{EBO}$ |            | -5      | V    |
| Collector Current            | $I_C$     |            | -5      | A    |
| Collector Current (Pulse)    | $I_{CP}$  |            | -8      | A    |

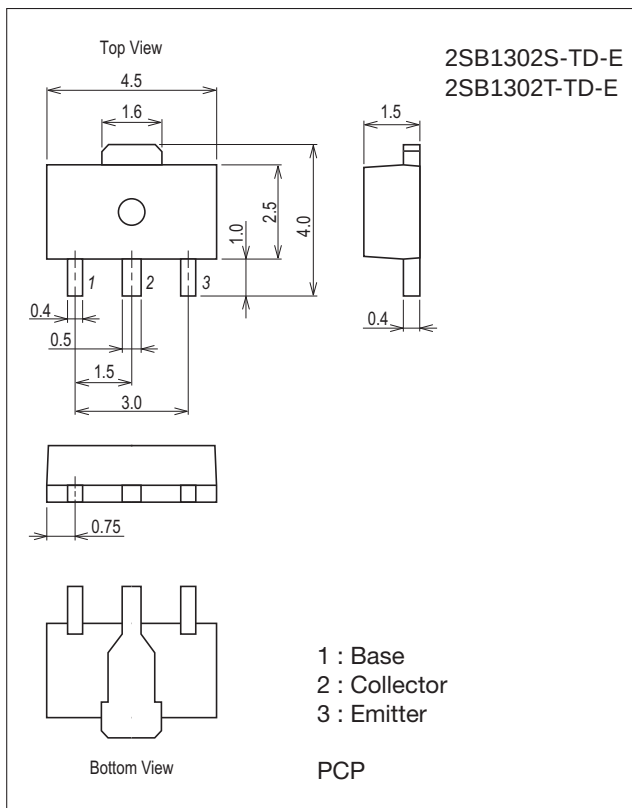
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Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

### Package Dimensions

unit : mm (typ)

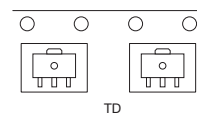
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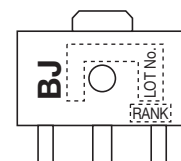
### Product & Package Information

- Package : PCP
- JEITA, JEDEC : SC-62, SOT-89, TO-243
- Minimum Packing Quantity : 1,000 pcs./reel

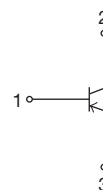
### Packing Type: TD



### Marking



### Electrical Connection



## 2SB1302

Continued from preceding page.

| Parameter             | Symbol    | Conditions                                                    | Ratings     | Unit |
|-----------------------|-----------|---------------------------------------------------------------|-------------|------|
| Collector Dissipation | $P_C$     | When mounted on ceramic substrate (250mm <sup>2</sup> ×0.8mm) | 1.3         | W    |
| Junction Temperature  | $T_j$     |                                                               | 150         | °C   |
| Storage Temperature   | $T_{stg}$ |                                                               | -55 to +150 | °C   |

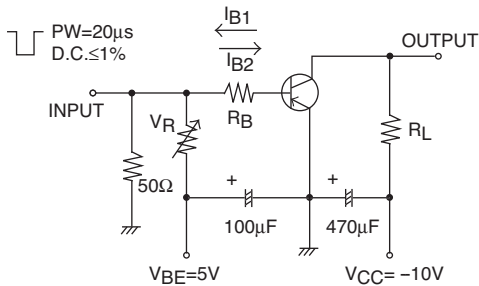
### Electrical Characteristics at $T_a=25^{\circ}\text{C}$

| Parameter                               | Symbol        | Conditions                             | Ratings |      |      | Unit |
|-----------------------------------------|---------------|----------------------------------------|---------|------|------|------|
|                                         |               |                                        | min     | typ  | max  |      |
| Collector Cutoff Current                | $I_{CBO}$     | $V_{CB}=-20\text{V}, I_E=0\text{A}$    |         |      | -500 | nA   |
| Emitter Cutoff Current                  | $I_{EBO}$     | $V_{EB}=-4\text{V}, I_C=0\text{A}$     |         |      | -500 | nA   |
| DC Current Gain                         | $h_{FE1}$     | $V_{CE}=-2\text{V}, I_C=-500\text{mA}$ | 140*    |      | 400* |      |
|                                         | $h_{FE2}$     | $V_{CE}=-2\text{V}, I_C=-4\text{A}$    | 60      |      |      |      |
| Gain-Bandwidth Product                  | $f_T$         | $V_{CE}=-5\text{V}, I_C=-200\text{mA}$ |         | 320  |      | MHz  |
| Output Capacitance                      | $C_{ob}$      | $V_{CB}=-10\text{V}, f=1\text{MHz}$    |         | 60   |      | pF   |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-3\text{A}, I_B=-60\text{mA}$     |         | -250 | -500 | mV   |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=-3\text{A}, I_B=-60\text{mA}$     |         | -1.0 | -1.3 | V    |
| Collector to Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=-10\mu\text{A}, I_E=0\text{A}$    | -25     |      |      | V    |
| Collector to Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=-1\text{mA}, R_{BE}=\infty$       | -20     |      |      | V    |
| Emitter to Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=-10\mu\text{A}, I_C=0\text{A}$    | -5      |      |      | V    |
| Turn-ON Time                            | $t_{on}$      | See specified Test Circuit.            |         | 40   |      | ns   |
| Storage Time                            | $t_{stg}$     |                                        |         | 200  |      | ns   |
| Fall Time                               | $t_f$         |                                        |         | 10   |      | ns   |

\* : 2SB1302 is classified by 500mA  $h_{FE}$  as follows :

| Rank     | S          | T          |
|----------|------------|------------|
| $h_{FE}$ | 140 to 280 | 200 to 400 |

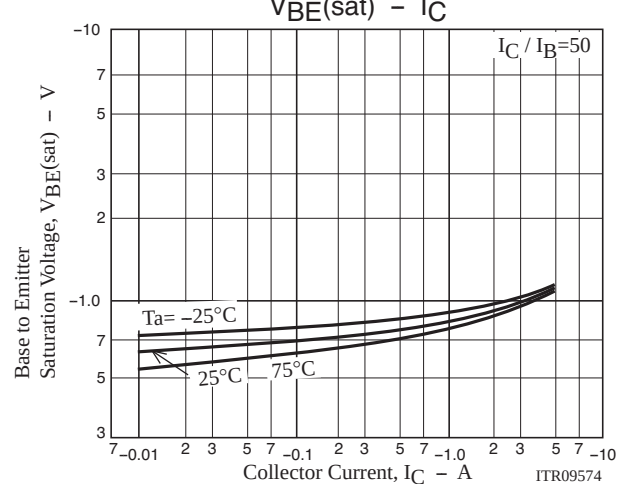
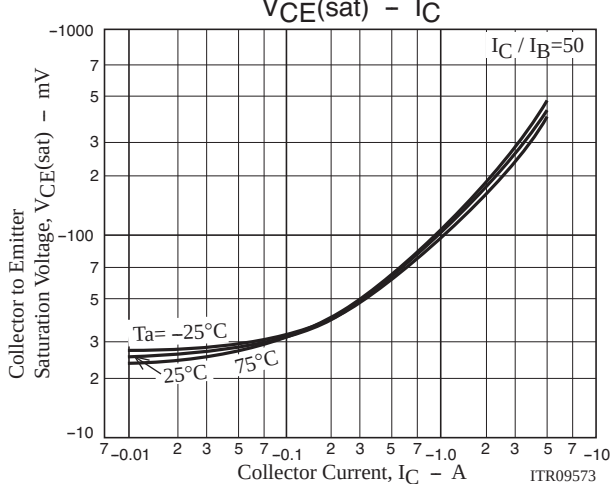
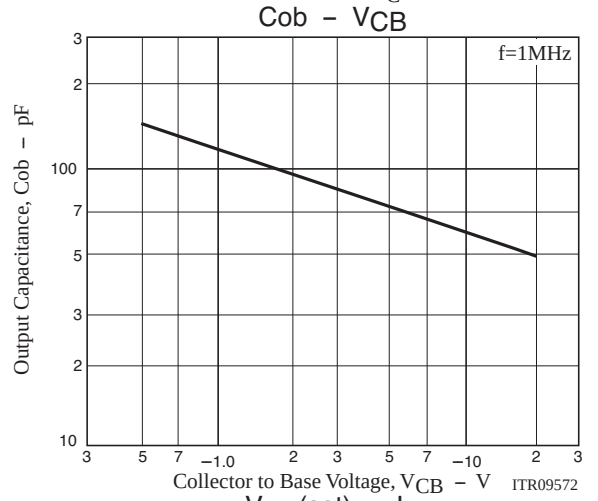
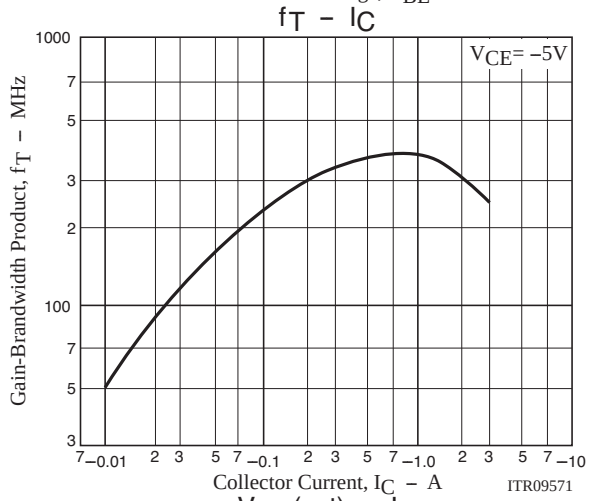
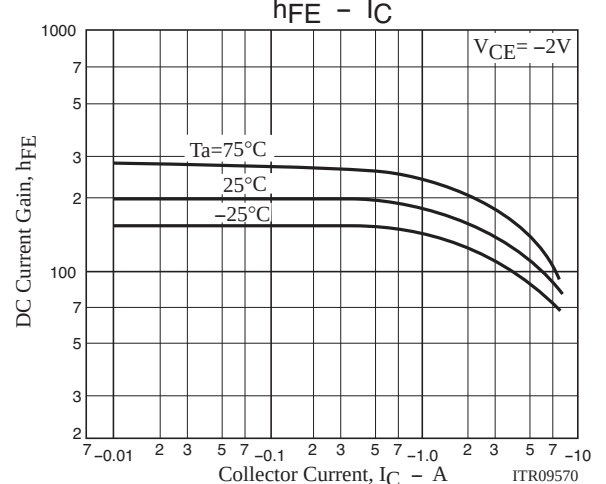
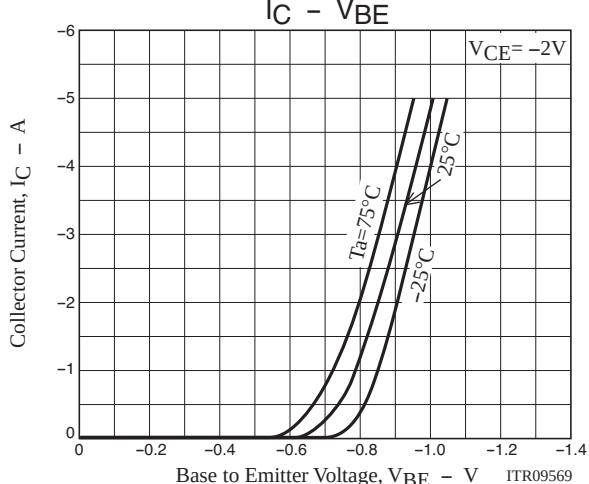
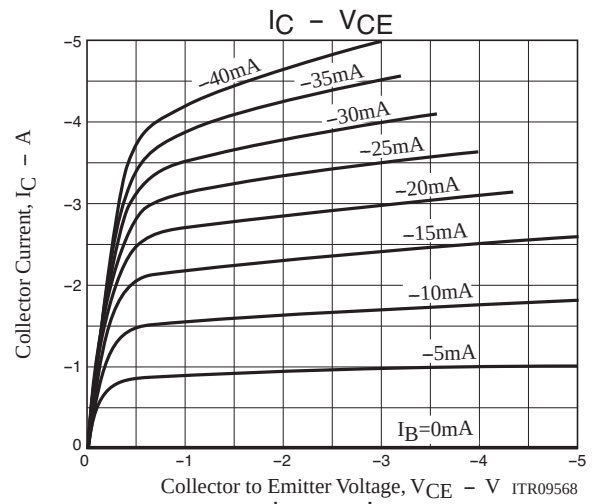
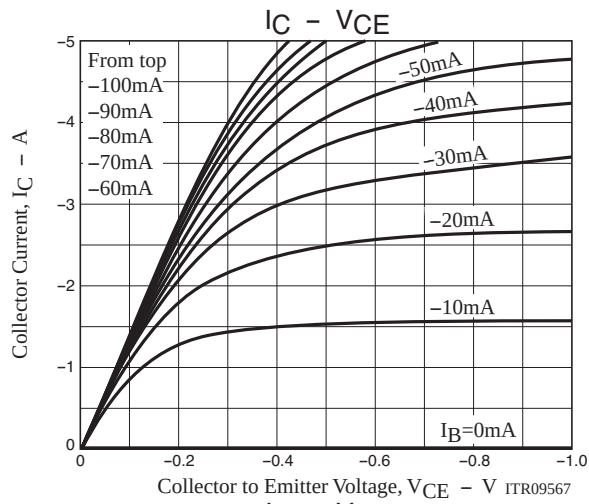
### Switching Time Test Circuit

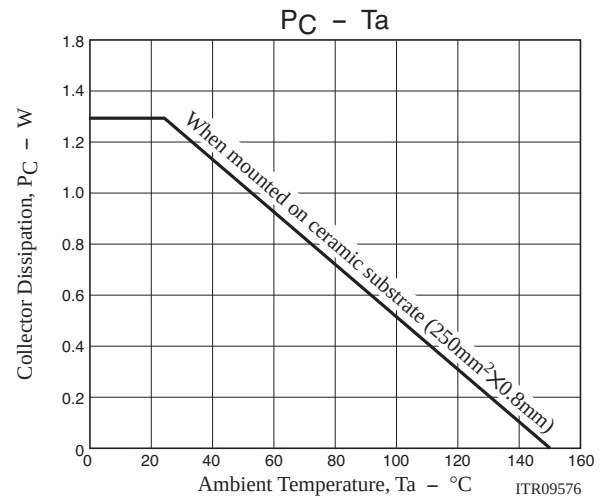
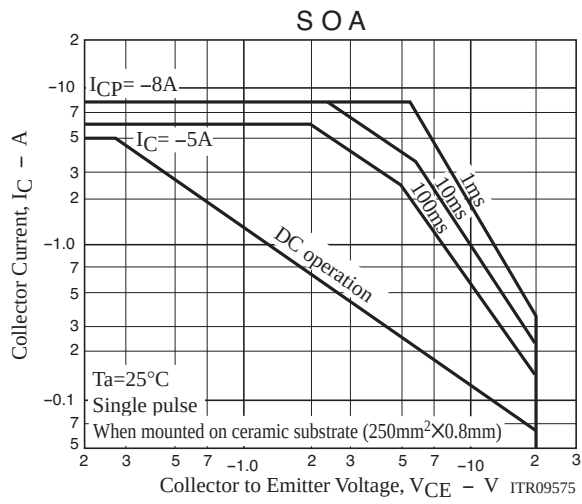


$$I_C=10I_{B1}=-10I_{B2}=-2\text{A}$$

### Ordering Information

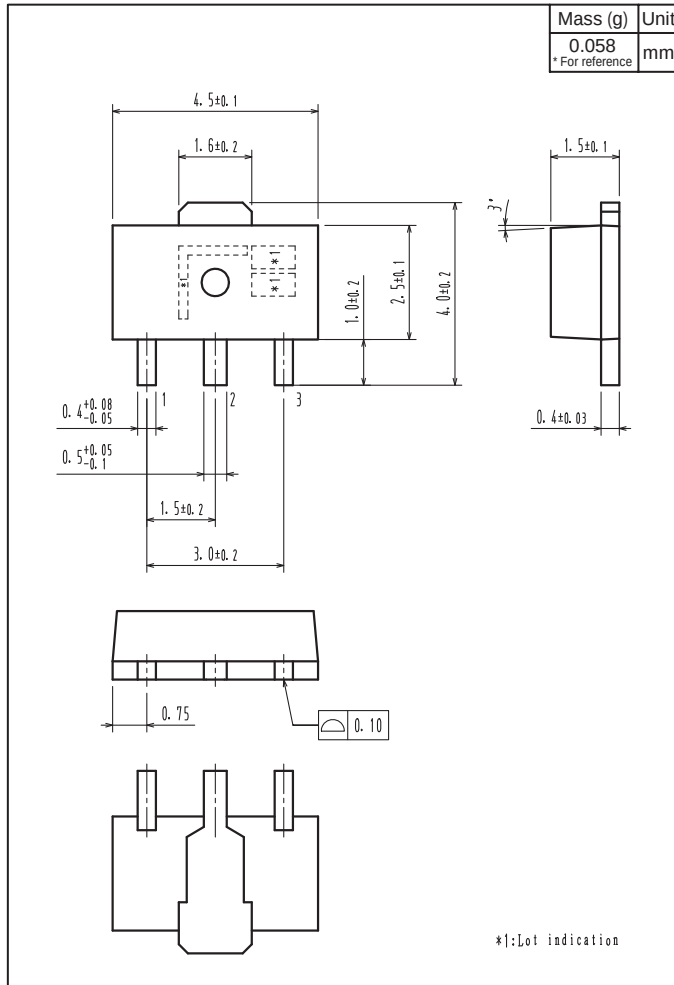
| Device        | Package | Shipping       | memo    |
|---------------|---------|----------------|---------|
| 2SB1302S-TD-E | PCP     | 1,000pcs./reel | Pb Free |
| 2SB1302T-TD-E | PCP     | 1,000pcs./reel |         |



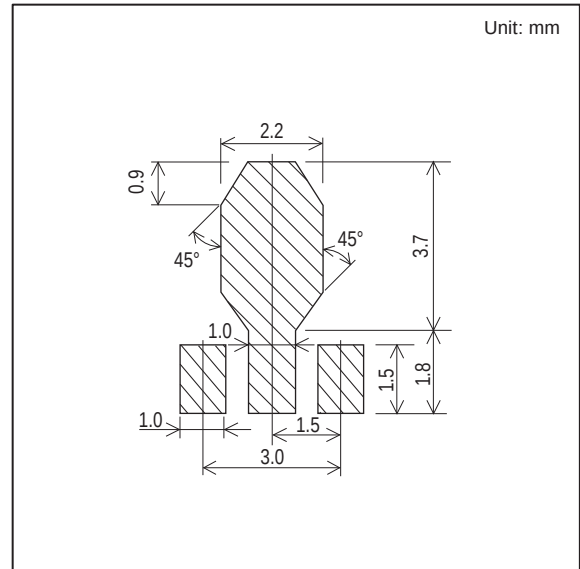


## Outline Drawing

2SB1302S-TD-E, 2SB1302T-TD-E



## Land Pattern Example



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