

## High power PNP epitaxial planar bipolar transistor

### Features

- High breakdown voltage  $V_{CEO} = -230\text{ V}$
- Complementary to 2STC5242
- Fast-switching speed
- Typical  $f_T = 30\text{ MHz}$

### Application

- Audio power amplifier

### Description

This device is a PNP transistor manufactured using new BiT-LA (Bipolar Transistor for linear amplifier) technology. The resulting transistor shows good gain linearity behaviour.

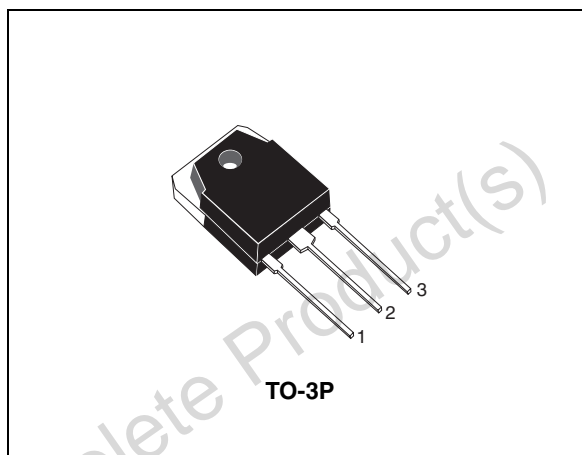


Figure 1. Internal schematic diagram

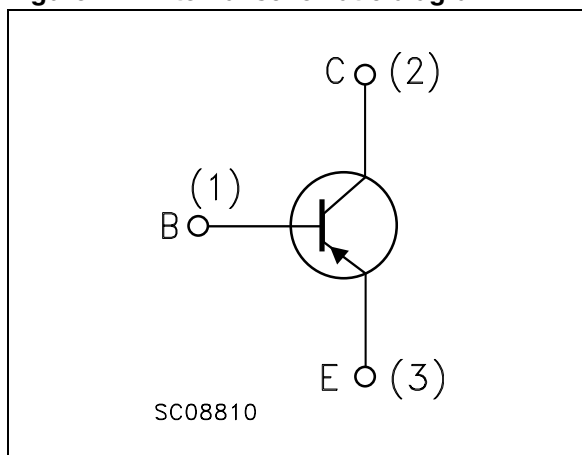


Table 1. Device summary

| Order code | Marking  | Package | Packaging |
|------------|----------|---------|-----------|
| 2STA1962   | 2STA1962 | TO-3P   | Tube      |

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

| Symbol    | Parameter                                 | Value      | Unit |
|-----------|---|------------|------|
| $V_{CBO}$ | Collector-base voltage ( $I_E = 0$ )      | -230       | V    |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ )   | -230       | V    |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )        | -5         | V    |
| $I_C$     | Collector current                         | -15        | A    |
| $I_{CM}$  | Collector peak current                    | -30        | A    |
| $P_{tot}$ | Total dissipation at $T_C = 25\text{ °C}$ | 150        | W    |
| $T_{stg}$ | Storage temperature                       | -55 to 150 | °C   |
| $T_J$     | Operating junction temperature            | 150        | °C   |

**Table 3. Thermal data**

| Symbol         | Parameter                            | Value | Unit |
|----------------|--------------------------------------|-------|------|
| $R_{thJ-case}$ | Thermal resistance junction-case Max | 0.83  | °C/W |

## 2 Electrical characteristics

( $T_{\text{case}} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

**Table 4. Electrical characteristics**

| Symbol  | Parameter   | Test conditions  | Min.     | Typ.                | Max. | Unit  |
|---|---|--|----------|---------------------|------|---|
| $I_{\text{CBO}}$                                    | Collector cut-off current<br>( $I_{\text{E}} = 0$ )           | $V_{\text{CB}} = -230\text{ V}$  |          |                     | -5   | $\mu\text{A}$                                   |
| $I_{\text{EBO}}$                                    | Emitter cut-off current<br>( $I_{\text{C}} = 0$ )             | $V_{\text{EB}} = -5\text{ V}$  |          |                     | -5   | $\mu\text{A}$                                   |
| $V_{(\text{BR})\text{CEO}}^{(1)}$                   | Collector-emitter breakdown<br>voltage ( $I_{\text{B}} = 0$ ) | $I_{\text{C}} = -50\text{ mA}$   | -230     |                     |      | V   |
| $V_{(\text{BR})\text{CBO}}$                         | Collector-base breakdown<br>voltage ( $I_{\text{E}} = 0$ )    | $I_{\text{C}} = -100\text{ }\mu\text{A}$   | -230     |                     |      | V   |
| $V_{(\text{BR})\text{EBO}}^{(1)}$                   | Emitter-base breakdown<br>voltage ( $I_{\text{C}} = 0$ )      | $I_{\text{E}} = -1\text{ mA}$  | -5       |                     |      | V   |
| $V_{\text{CE(sat)}}^{(1)}$                          | Collector-emitter saturation<br>voltage                       | $I_{\text{C}} = -8\text{ A}$ $I_{\text{B}} = -800\text{ mA}$   |          |                     | -3   | V   |
| $V_{\text{BE}}$                                     | Base-emitter voltage  | $I_{\text{C}} = -7\text{ A}$ $V_{\text{CE}} = -5\text{ V}$   |          |                     | -1.5 | V   |
| $h_{\text{FE}}$                                     | DC current gain   | $I_{\text{C}} = -1\text{ A}$ $V_{\text{CE}} = -5\text{ V}$<br>$I_{\text{C}} = -7\text{ A}$ $V_{\text{CE}} = -5\text{ V}$ | 80<br>35 |                     | 160  |   |
| $t_{\text{on}}$<br>$t_{\text{s}}$<br>$t_{\text{f}}$ | Resistive load<br>Turn-on time<br>Storage time<br>Fall time   | $V_{\text{CC}} = -60\text{ V}$ $I_{\text{C}} = -5\text{ A}$<br>$I_{\text{B1}} = -I_{\text{B2}} = -0.5\text{ A}$          |          | 0.24<br>1.2<br>0.21 |      | $\mu\text{s}$<br>$\mu\text{s}$<br>$\mu\text{s}$ |
| $f_{\text{T}}$                                      | Transition frequency  | $I_{\text{C}} = -1\text{ A}$ $V_{\text{CE}} = -5\text{ V}$   |          | 30                  |      | MHz   |
| $C_{\text{CBO}}$                                    | Collector-base capacitance<br>( $I_{\text{E}} = 0$ )          | $V_{\text{CB}} = -10\text{ V}$ $f = 1\text{ MHz}$  |          | 150                 |      | pF  |

1. Pulsed: pulse duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

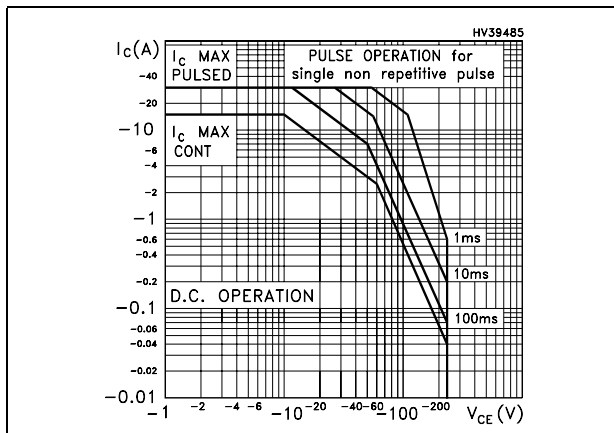


Figure 3. Derating curve

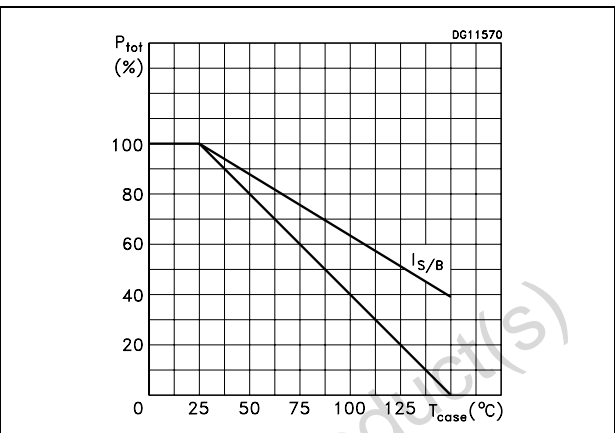


Figure 4. Output characteristics

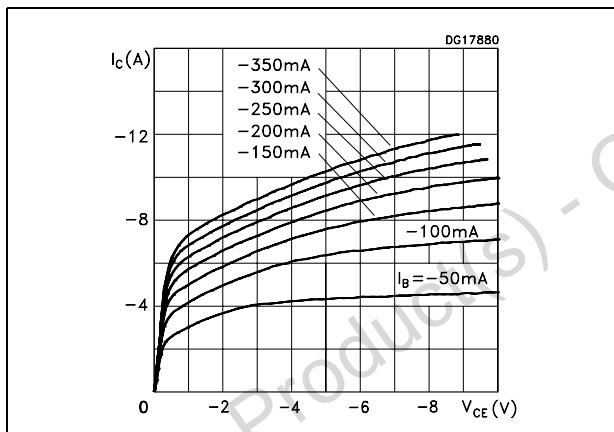


Figure 5. DC current gain

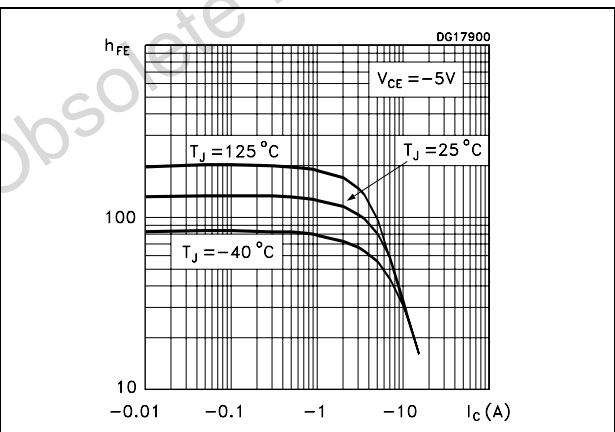


Figure 6. Collector-emitter saturation voltage

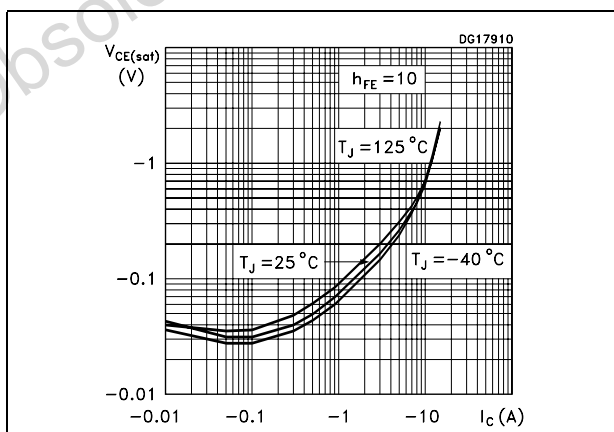
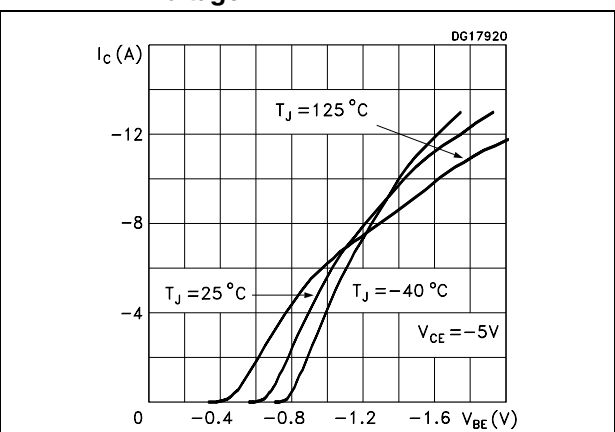
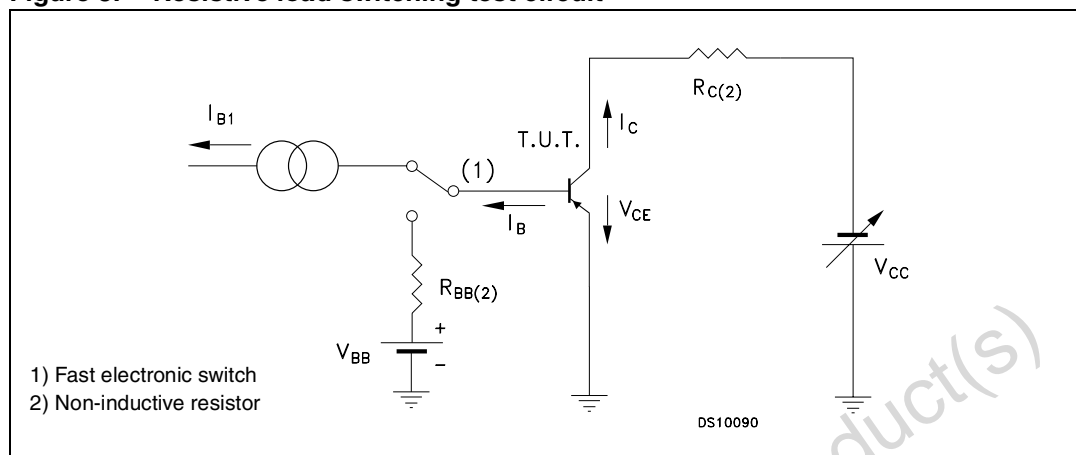


Figure 7. Collector current vs base-emitter voltage



## 2.2 Test circuit

Figure 8. Resistive load switching test circuit



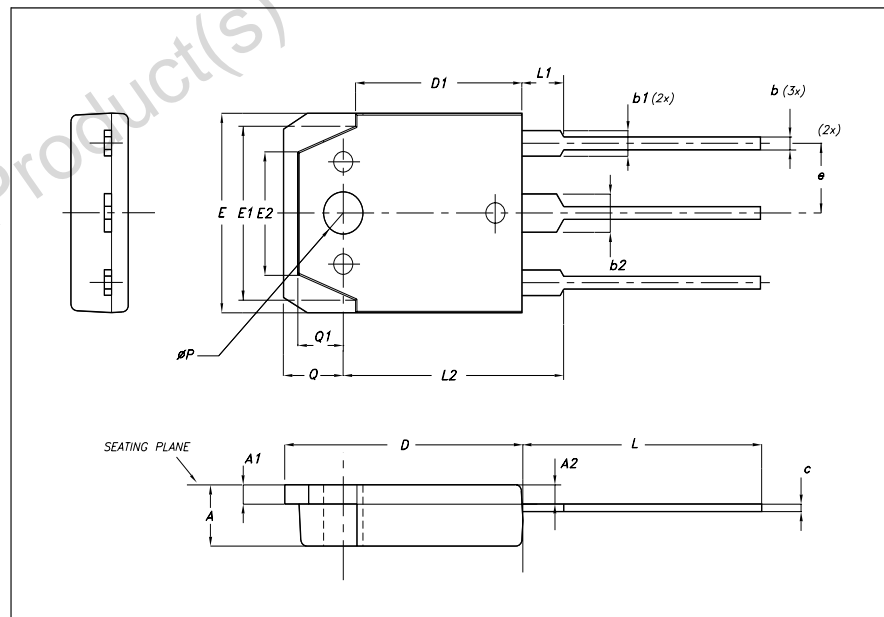
### 3 Package mechanical data

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## TO-3P Mechanical data

| DIM. | mm.   |       |       |
|------|-------|-------|-------|
|      | MIN.  | TYP   | MAX.  |
| A    | 4.6   |       | 5     |
| A1   | 1.45  | 1.50  | 1.65  |
| A2   | 1.20  | 1.40  | 1.60  |
| b    | 0.80  | 1     | 1.20  |
| b1   | 1.80  |       | 2.20  |
| b2   | 2.80  |       | 3.20  |
| c    | 0.55  | 0.60  | 0.75  |
| D    | 19.70 | 19.90 | 20.10 |
| D1   |       | 13.90 |       |
| E    | 15.40 |       | 15.80 |
| E1   |       | 13.60 |       |
| E2   |       | 9.60  |       |
| e    | 5.15  | 5.45  | 5.75  |
| L    | 19.50 | 20    | 20.50 |
| L1   |       | 3.50  |       |
| L2   | 18.20 | 18.40 | 18.60 |
| P    | 3.10  |       | 3.30  |
| Q    |       | 5     |       |
| Q1   |       | 3.80  |       |



## 4 Revision history

**Table 5. Document revision history**

| Date        | Revision | Changes  |
|-------------|----------|--|
| 28-Sep-2007 | 1        | Initial release.   |
| 12-Dec-2007 | 2        | Document promoted from preliminary data to datasheet.                                |
| 15-Jul-2008 | 3        | Updated total power dissipation and relevant thermal resistance junction-case value. |

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