

## High power PNP epitaxial planar bipolar transistor

### Features

- High breakdown voltage  $V_{CEO} = -250\text{ V}$
- Complementary to 2STC5948
- Typical  $f_t = 25\text{ MHz}$
- Fully characterized at  $125\text{ °C}$

### Application

- Audio power amplifier

### Description

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

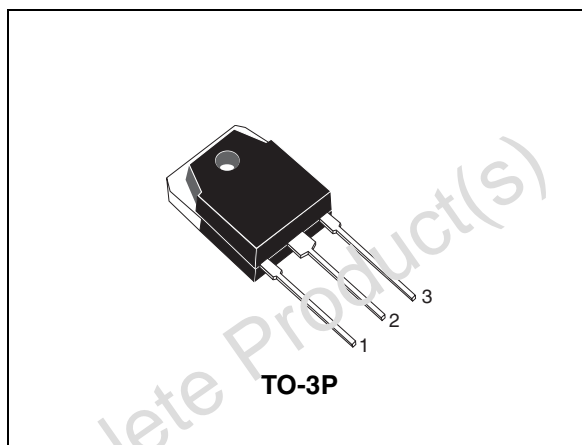


Figure 1. Internal schematic diagram

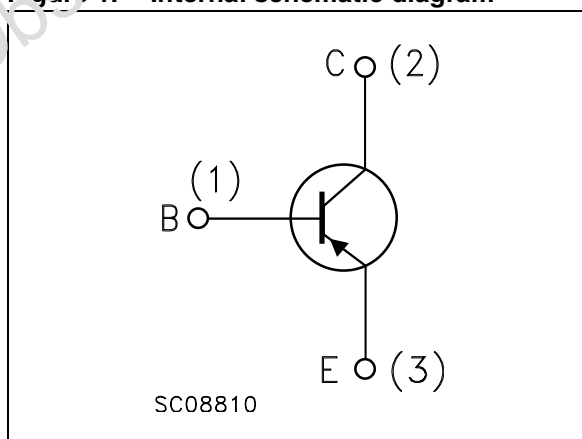


Table 1. Device summary

| Order code | Marking  | Package | Packaging |
|------------|----------|---------|-----------|
| 2STA2120   | 2STA2120 | TO-3P   | Tube      |

# 1 Electrical ratings

**Table 2. Absolute maximum rating**

| Symbol    | Parameter                               | Value      | Unit |
|-----------|-----------------------------------------|------------|------|
| $V_{CBO}$ | Collector-base voltage ( $I_E = 0$ )    | -250       | V    |
| $V_{CEO}$ | Collector-emitter voltage ( $I_B = 0$ ) | -250       | V    |
| $V_{EBO}$ | Emitter-base voltage ( $I_C = 0$ )      | -6         | V    |
| $I_C$     | Collector current                       | -17        | A    |
| $I_{CM}$  | Collector peak current ( $t_p < 5$ ms)  | -34        | A    |
| $P_{TOT}$ | Total dissipation at $T_c = 25$ °C      | 200        | W    |
| $T_{stg}$ | Storage temperature                     | -65 to 150 | °C   |
| $T_J$     | Max. operating junction temperature     | 150        | °C   |

**Table 3. Thermal data**

| Symbol         | Parameter                               | Value | Unit |
|----------------|-----------------------------------------|-------|------|
| $R_{thj-case}$ | Thermal resistance junction-case<br>max | 0.625 | °C/W |

## 2 Electrical characteristics

( $T_{\text{case}} = 25\text{ °C}$ ; unless otherwise specified)

**Table 4. Electrical characteristics**

| Symbol                            | Parameter                                                     | Test conditions                                                                                                          | Min.     | Typ. | Max. | Unit          |
|-----------------------------------|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------|----------|------|------|---------------|
| $I_{\text{CBO}}$                  | Collector cut-off current<br>( $I_{\text{E}} = 0$ )           | $V_{\text{CB}} = -250\text{ V}$                                                                                          |          |      | -5   | $\mu\text{A}$ |
| $I_{\text{EBO}}$                  | Emitter cut-off current<br>( $I_{\text{C}} = 0$ )             | $V_{\text{EB}} = -6\text{ V}$                                                                                            |          |      | -5   | $\mu\text{A}$ |
| $V_{(\text{BR})\text{CEO}}^{(1)}$ | Collector-emitter<br>breakdown voltage ( $I_{\text{B}} = 0$ ) | $I_{\text{C}} = -50\text{ mA}$                                                                                           | -250     |      |      | V             |
| $V_{(\text{BR})\text{CBO}}$       | Collector-base breakdown<br>voltage ( $I_{\text{E}} = 0$ )    | $I_{\text{C}} = -100\text{ }\mu\text{A}$                                                                                 | -250     |      |      | V             |
| $V_{(\text{BR})\text{EBO}}^{(1)}$ | Emitter-base breakdown<br>voltage ( $I_{\text{C}} = 0$ )      | $I_{\text{E}} = -1\text{ mA}$                                                                                            | -6       |      |      | V             |
| $V_{\text{CE(sat)}}^{(1)}$        | Collector-emitter saturation<br>voltage                       | $I_{\text{C}} = -8\text{ A}$ $I_{\text{E}} = -500\text{ mA}$                                                             |          |      | -3   | V             |
| $V_{\text{BE}}^{(1)}$             | 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  |               |
| $f_{\text{T}}$                    | Transition frequency                                          | $I_{\text{C}} = -1\text{ A}$ $V_{\text{CE}} = -5\text{ V}$                                                               |          | 25   |      | MHz           |

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

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

Figure 3. Derating curve

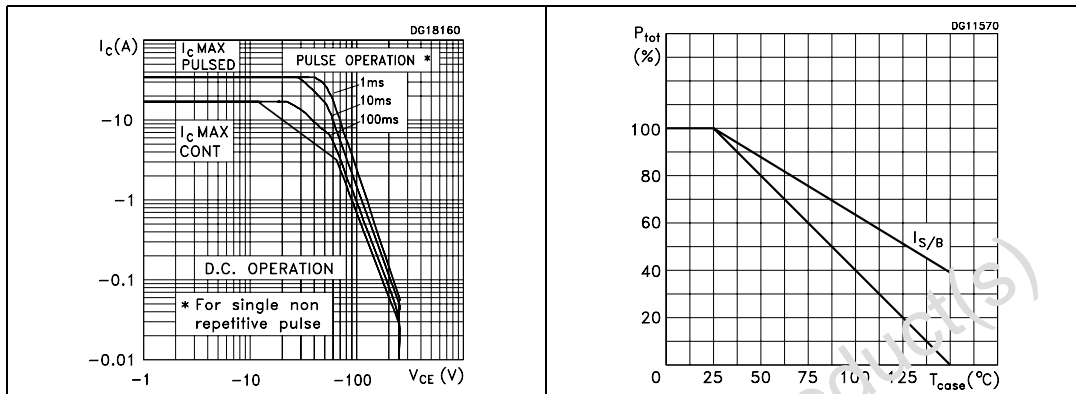


Figure 4. Output characteristics

Figure 5. D.C. current gain

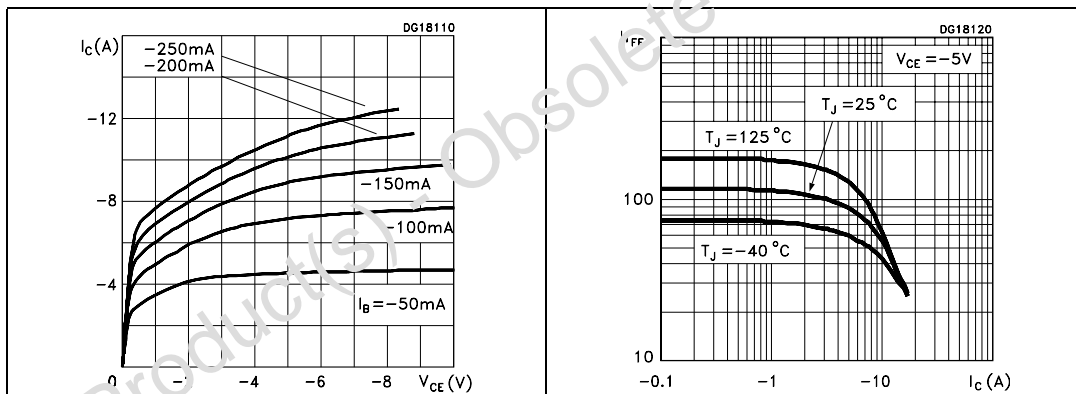
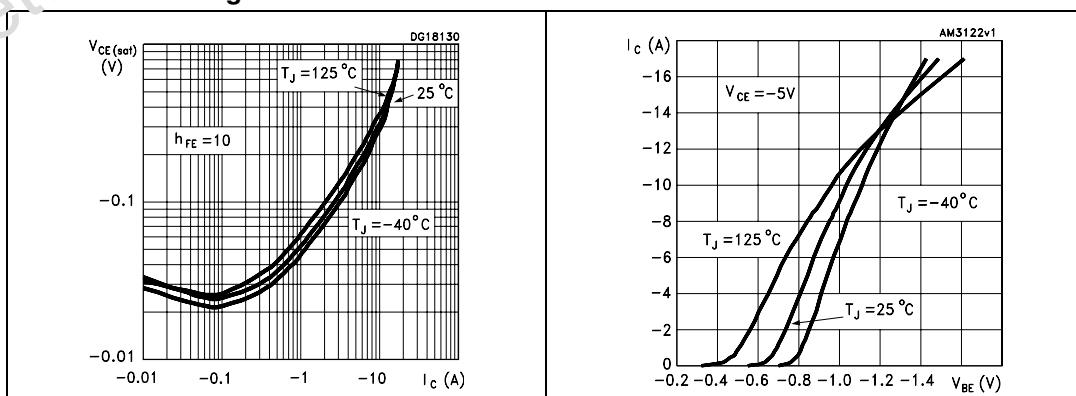


Figure 6. Collector-emitter saturation voltage

Figure 7. Base-emitter voltage



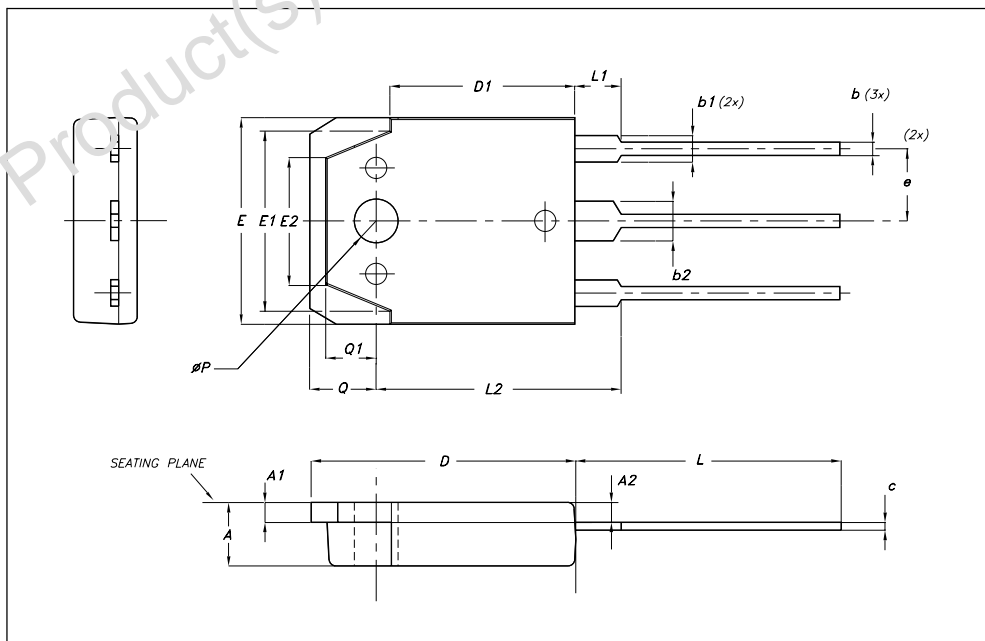
### 3 Package mechanical data

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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   |       | 13.50 |       |
| L2   | 18.20 | 13.40 | 18.60 |
| P    | 3.10  |       | 3.30  |
| Q    |       | 5     |       |
| Q1   |       | 3.80  |       |



## 4 Revision history

**Table 5. Document revision history**

| Date        | Revision | Changes                                                      |
|-------------|----------|--------------------------------------------------------------|
| 23-Nov-2007 | 1        | Initial release                                              |
| 09-May-2008 | 2        | Added new graphics.                                          |
| 07-Nov-2008 | 3        | Document status promoted from preliminary data to datasheet. |

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