

## High power PNP epitaxial planar bipolar transistor

### Features

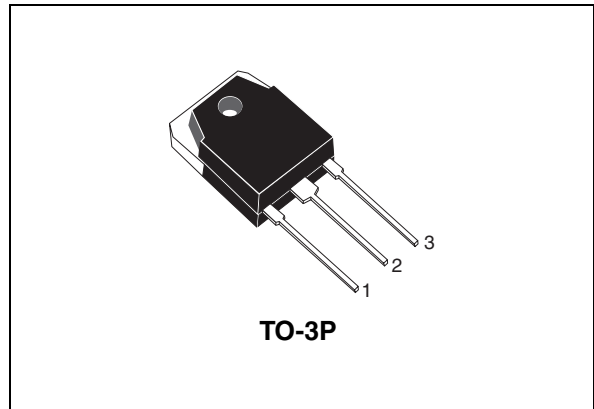
- High breakdown voltage  $V_{CE0} = -140\text{ V}$
- Complementary to 2STC4468
- Typical  $f_t = 20\text{ MHz}$
- Fully characterized at  $125\text{ °C}$

### Applications

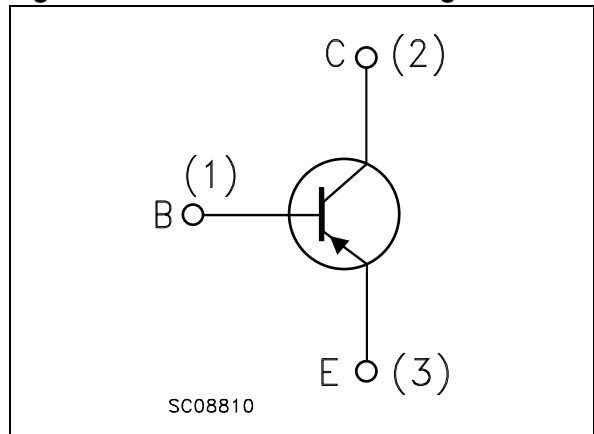
- Audio power amplifier

### Description

This device is an PNP transistor manufactured using BiT-LA (Bipolar transistor for linear amplifier) technology. The resulting transistor exhibits good gain linearity behavior. Recommended for 70 W to 100 W high fidelity audio frequency amplifier output stages.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
2STA1695	2STA1695	TO-3P	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	-140	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	-140	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	-6	V
$I_C$	Collector current	-10	A
$I_{CM}$	Collector peak current ( $t_P < 5$ ms)	-20	A
$P_{tot}$	Total dissipation at $T_C = 25$ °C	100	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 max	1.25	°C/W
$R_{thj-amb}$	Thermal resistance junction-ambient max	35.7	°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 ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = -140\text{ V}$			-0.1	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = -6\text{ V}$			-0.1	$\mu\text{A}$
$V_{(\text{BR})\text{CEO}}$	Collector-emitter breakdown voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = -50\text{ mA}$	-140			V
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ( $I_{\text{E}} = 0$ )	$I_{\text{C}} = -100\text{ }\mu\text{A}$	-140			V
$V_{(\text{BR})\text{EBO}}^{(1)}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = -1\text{ mA}$	-6			V
$V_{\text{CE}(\text{sat})}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = -5\text{ A}$ $I_{\text{B}} = -500\text{ mA}$			-0.5	V
		$I_{\text{C}} = -7\text{ A}$ $I_{\text{B}} = -700\text{ mA}$			-0.7	V
$V_{\text{BE}}^{(1)}$	Base-emitter voltage	$V_{\text{CE}} = -5\text{ V}$ $I_{\text{C}} = -5\text{ A}$			-1.3	V
$h_{\text{FE}}$	DC current gain	$I_{\text{C}} = -3\text{ A}$ $V_{\text{CE}} = -4\text{ V}$	70		140	
		$I_{\text{C}} = -5\text{ A}$ $V_{\text{CE}} = -4\text{ V}$	50			
$f_{\text{T}}$	Transition frequency	$I_{\text{C}} = -0.5\text{ A}$ $V_{\text{CE}} = -12\text{ V}$		20		MHz
$C_{\text{CBO}}$	Collector-base capacitance ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = -10\text{ V}$ $f = 1\text{ MHz}$		225		pF
$t_{\text{on}}$ $t_{\text{stg}}$ $t_{\text{f}}$	Resistive load					
	Turn-on time	$I_{\text{C}} = -5\text{ A}$ $V_{\text{CC}} = -60\text{ V}$		0.24		$\mu\text{s}$
	Storage time	$I_{\text{B}1} = -I_{\text{B}2} = -0.5\text{ A}$		1.2		$\mu\text{s}$
	Fall time			0.24		$\mu\text{s}$

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

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

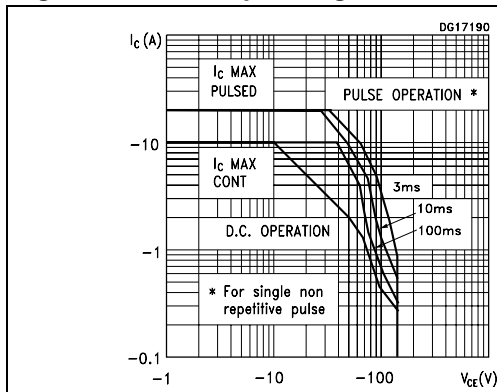


Figure 3. Power derating versus temperature

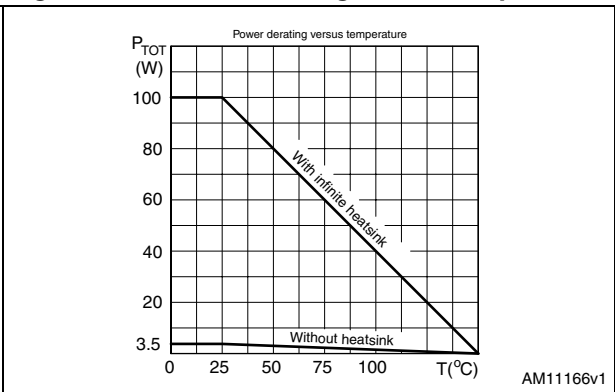


Figure 4. Output characteristics

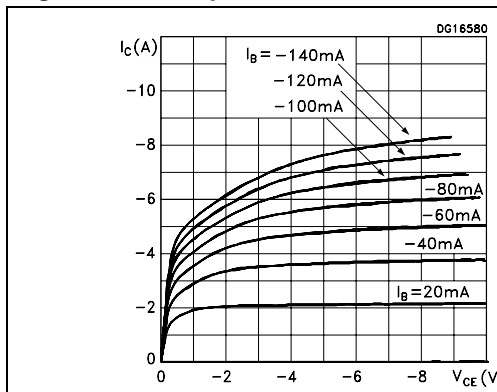


Figure 5. DC current gain

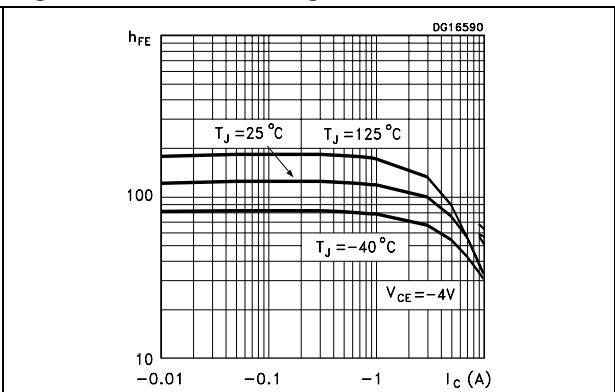


Figure 6. Collector-emitter saturation voltage Figure 7. Base-emitter voltage

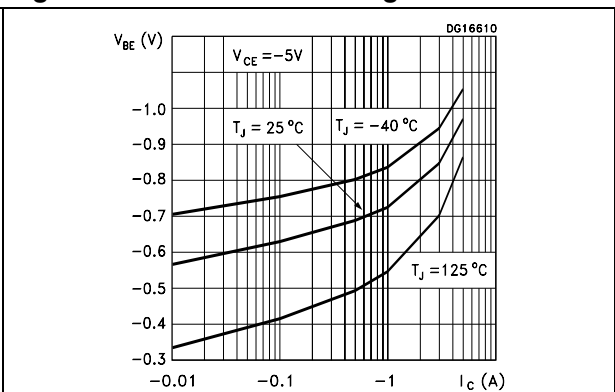
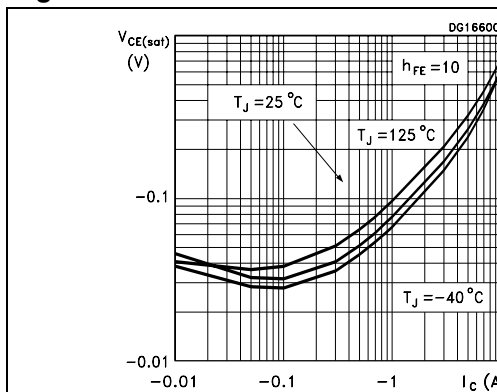
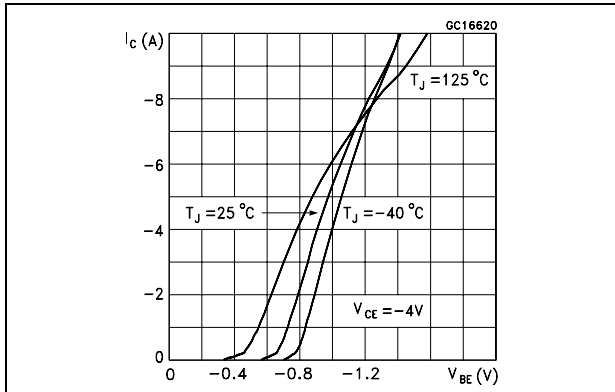
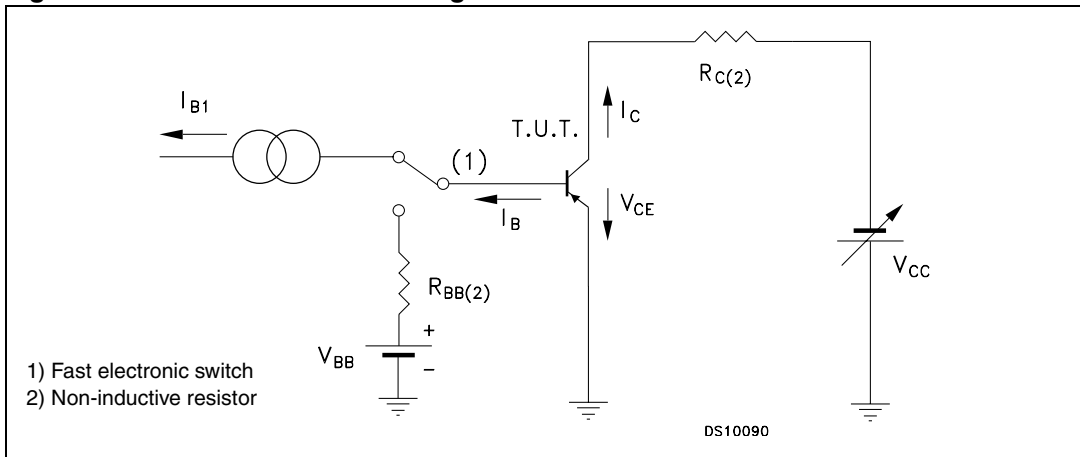


Figure 8. Base-emitter voltage



## 2.2 Test circuit

Figure 9. Resistive load switching test circuit



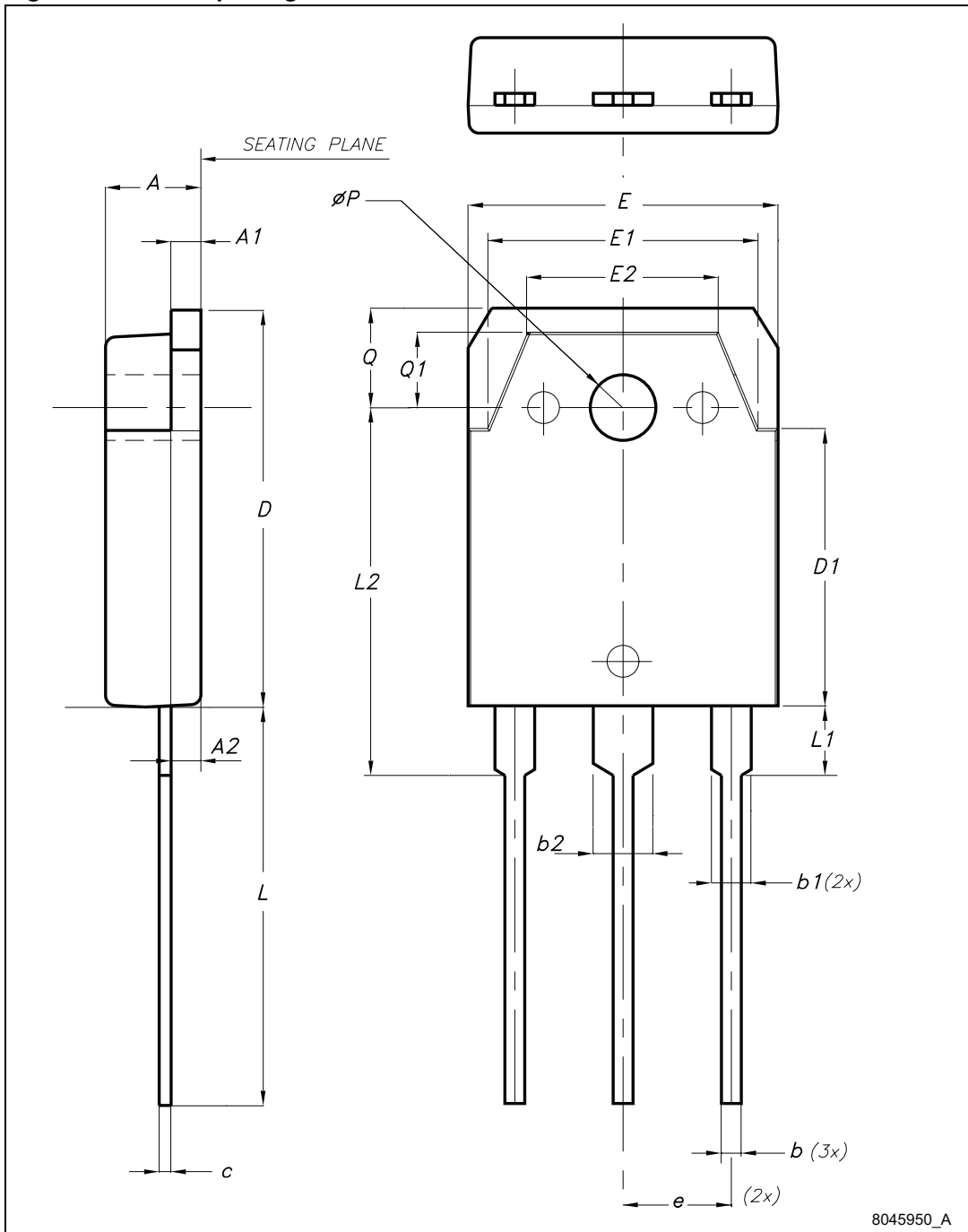
### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK<sup>®</sup> packages, depending on their level of environmental compliance. ECOPACK<sup>®</sup> specifications, grade definitions and product status are available at: [www.st.com](http://www.st.com). ECOPACK<sup>®</sup> is an ST trademark.

Table 5. TO-3P mechanical data

Dim.	mm		
	Min.	Typ.	Max
A	4.60		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
øP	3.10		3.30
Q		5	
Q1		3.80	

Figure 10. TO-3P package dimensions





## 4 Revision history

**Table 6. Document revision history**

Date	Revision	Changes
18-May-2007	1	Initial release
06-Nov-2008	2	Document status promoted from preliminary data to datasheet.
07-Feb-2012	3	– <i>Figure 3</i> inserted – Mechanical data updated

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