

## High power PNP epitaxial planar bipolar transistor

### Features

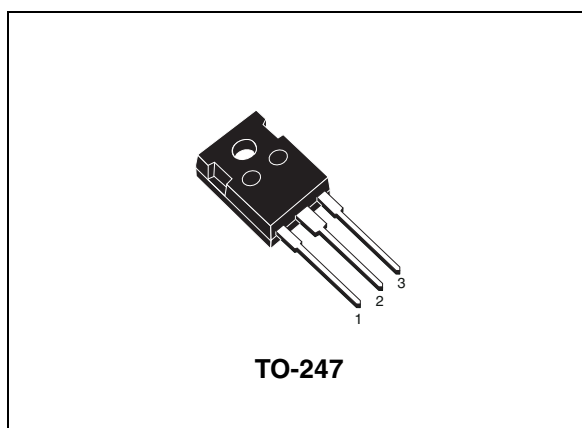
- High breakdown voltage  $V_{CEO} = -140\text{ V}$
- Complementary to 2STW4468
- Typical  $f_t = 20\text{ MHz}$
- Fully characterized at  $125\text{ }^\circ\text{C}$

### Applications

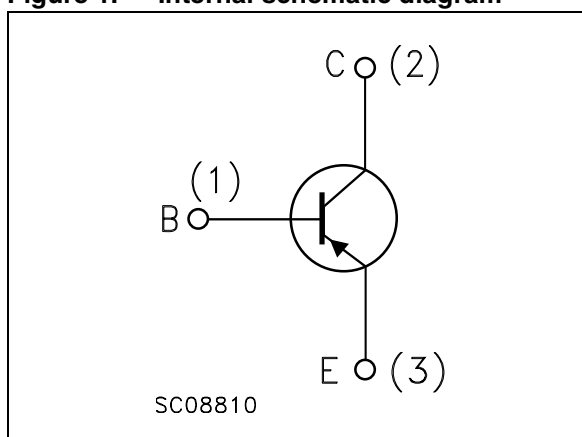
- Audio power amplifier

### 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. Recommended for 70 W to 100 W high fidelity audio frequency amplifier output stage.



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
2STW1695	2STW1695	TO-247	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum rating**

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

## 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	$I_{\text{C}} = -5\text{ A}$ $I_{\text{B}} = -500\text{ mA}$ $I_{\text{C}} = -7\text{ A}$ $I_{\text{B}} = -700\text{ mA}$			-0.5 -0.7	V 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	$I_{\text{C}} = -3\text{ A}$ $V_{\text{CE}} = -4\text{ V}$ $I_{\text{C}} = -5\text{ A}$ $V_{\text{CE}} = -4\text{ V}$	70 50		140	
$f_{\text{T}}$	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
$t_{\text{on}}$	Resistive load Turn-on time	$I_{\text{C}} = -5\text{ A}$ $V_{\text{CC}} = -60\text{ V}$		0.24		$\mu\text{s}$
$t_{\text{stg}}$	Storage time	$I_{\text{B}1} = -I_{\text{B}2} = -0.5\text{ A}$		1.2		$\mu\text{s}$
$t_{\text{f}}$	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

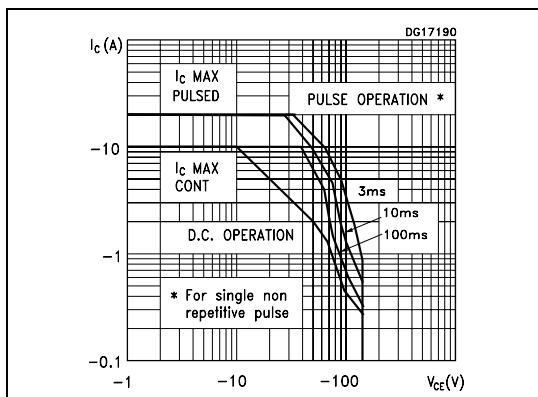


Figure 3. Output characteristics

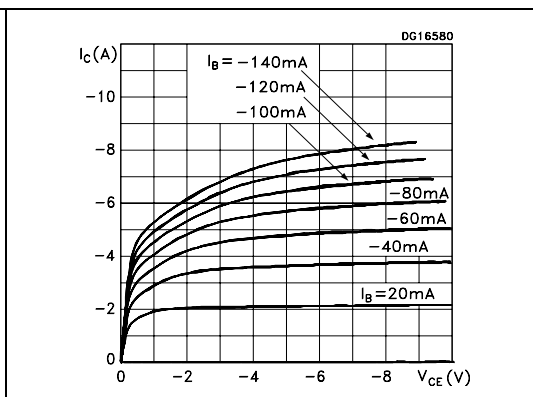


Figure 4. DC current gain

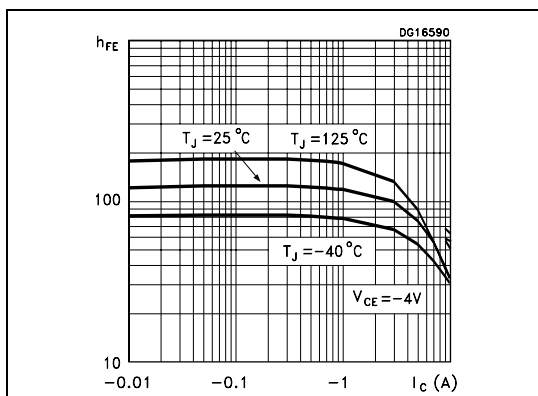


Figure 5. Collector-emitter saturation voltage

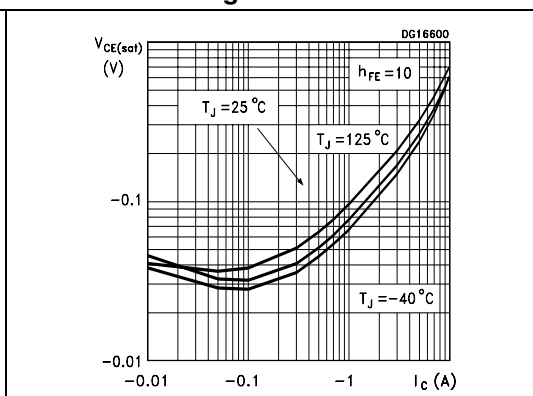


Figure 6. Base-emitter voltage

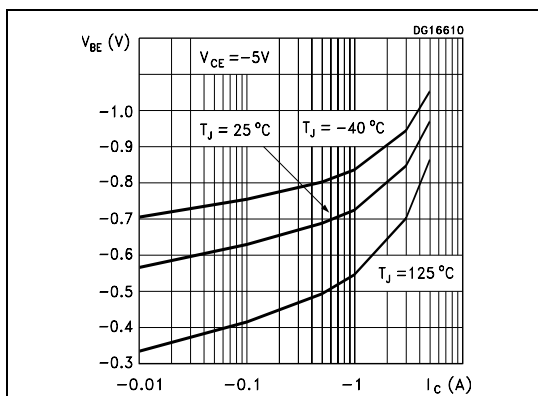
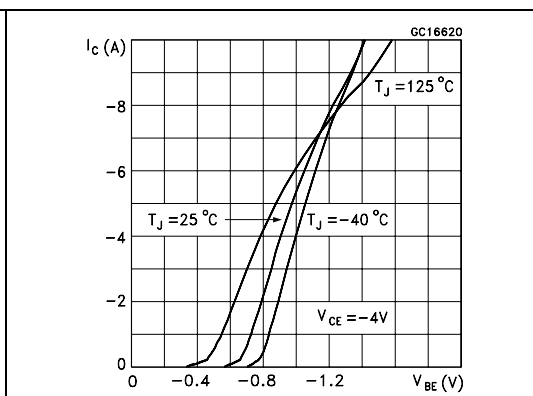
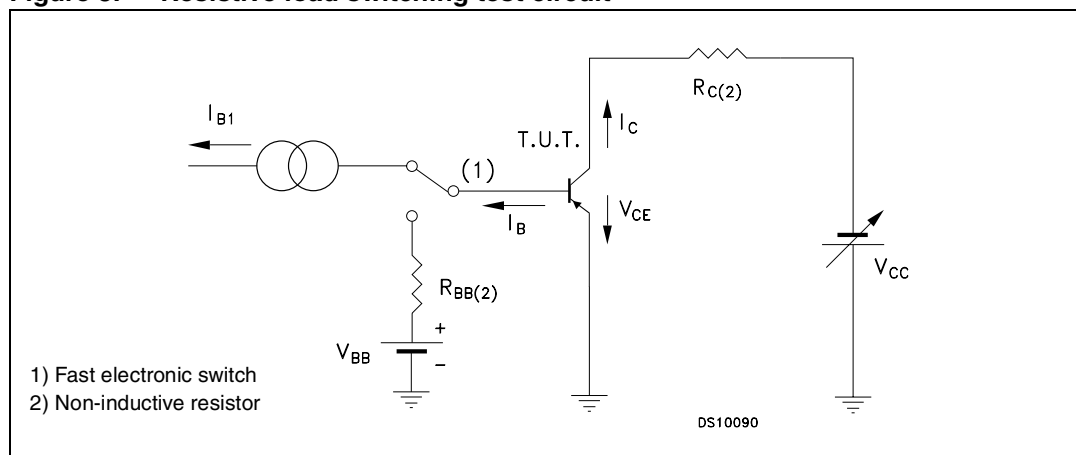


Figure 7. Base-emitter voltage



## 2.2 Test circuit

Figure 8. Resistive load switching test circuit

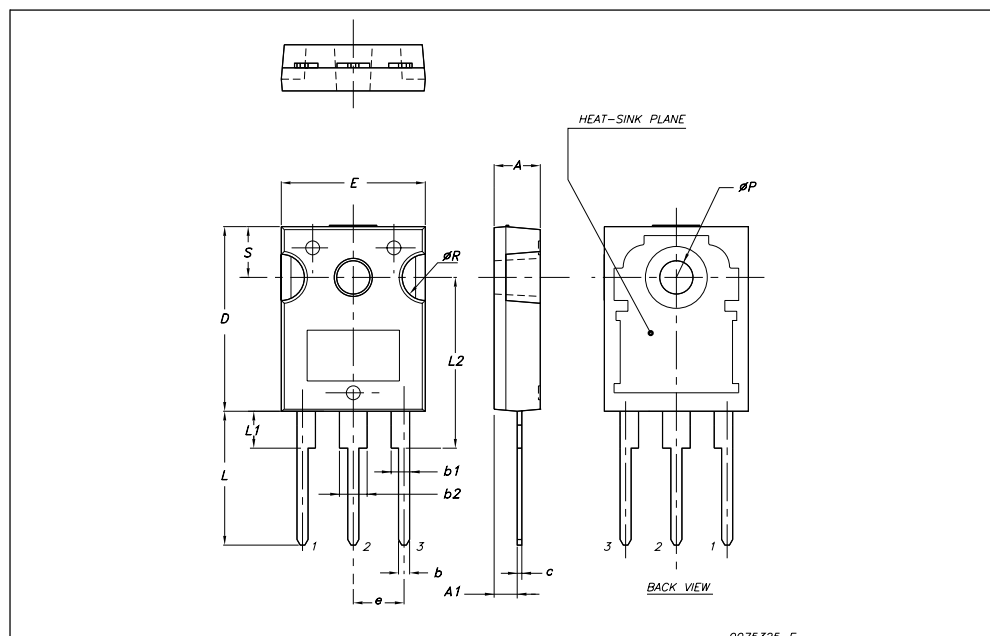


### 3 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a Lead-free second level interconnect . The category of second level interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com)

## TO-247 Mechanical data

Dim.	mm.		
	Min.	Typ	Max.
A	4.85		5.15
A1	2.20		2.60
b	1.0		1.40
b1	2.0		2.40
b2	3.0		3.40
c	0.40		0.80
D	19.85		20.15
E	15.45		15.75
e		5.45	
L	14.20		14.80
L1	3.70		4.30
L2		18.50	
$\varnothing P$	3.55		3.65
$\varnothing R$	4.50		5.50
S		5.50	



## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
23-Oct-2006	1	Initial release
23-Sep-2007	2	Added figures <a href="#">2</a> , <a href="#">3</a> , <a href="#">4</a> , <a href="#">5</a> , <a href="#">6</a> , <a href="#">7</a> .
20-Feb-2007	3	Document status promoted from preliminary data to datasheet.
06-Oct-2008	4	Content reworked to improve readability, no technical changes.



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