

High power PNP epitaxial planar bipolar transistor

Features

- High breakdown voltage $V_{CE0} = -140\text{ V}$
- 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.

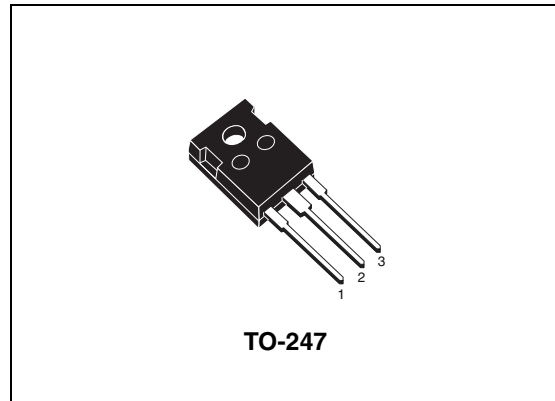


Figure 1. Internal schematic diagram

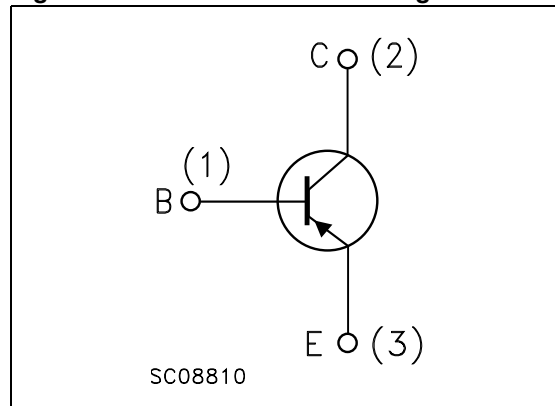


Table 1. Device summary

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

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = -140\text{ V}$			-0.1	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = -6\text{ V}$			-0.1	μA
$V_{(\text{BR})\text{CEO}}$	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_{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_{T}	Transition frequency	$I_{\text{C}} = -0.5\text{ A}$ $V_{\text{CE}} = -12\text{ V}$		20		MHz
C_{CBO}	Collector-base capacitance ($I_{\text{E}} = 0$)	$V_{\text{CB}} = -10\text{ V}$ $f = 1\text{ MHz}$		225		pF
t_{on} t_{stg} t_{f}	Resistive load					
	Turn-on time	$I_{\text{C}} = -5\text{ A}$ $V_{\text{CC}} = -60\text{ V}$		0.24		μs
	Storage time	$I_{\text{B}1} = -I_{\text{B}2} = -0.5\text{ A}$		1.2		μs
	Fall time			0.24		μs

1. Pulsed: Pulse duration = 300 μs , duty cycle $\leq 1.5\%$

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

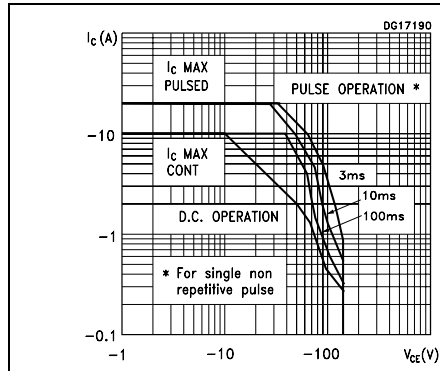


Figure 3. Output characteristics

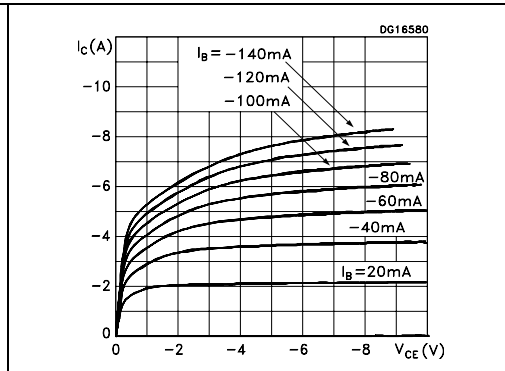


Figure 4. DC current gain

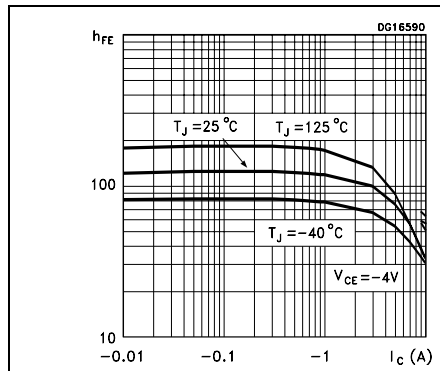


Figure 5. Collector-emitter saturation voltage

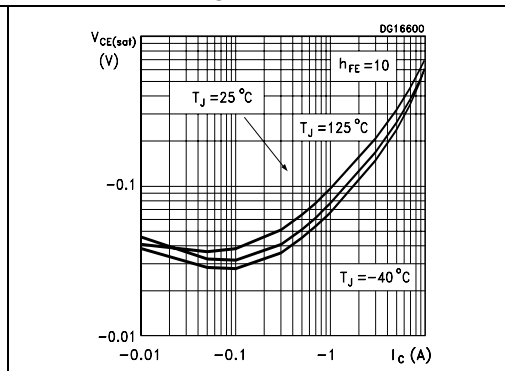


Figure 6. Base-emitter voltage

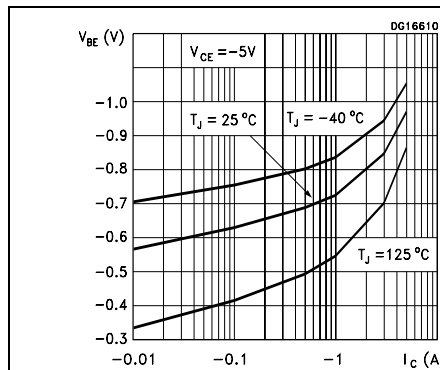
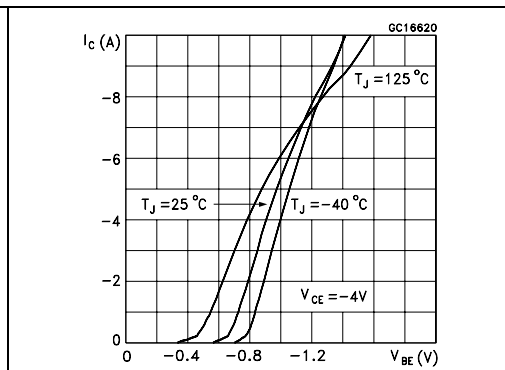
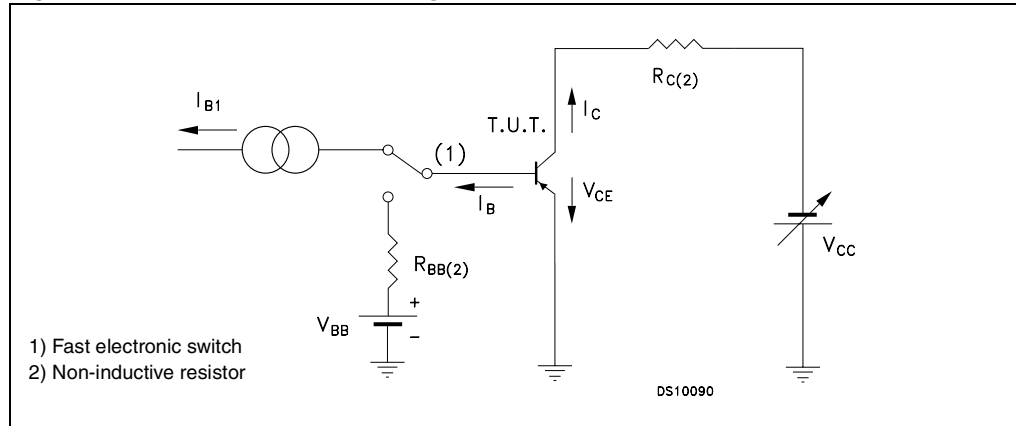


Figure 7. Base-emitter voltage



2.2 Test circuit

Figure 8. Resistive load switching test circuit

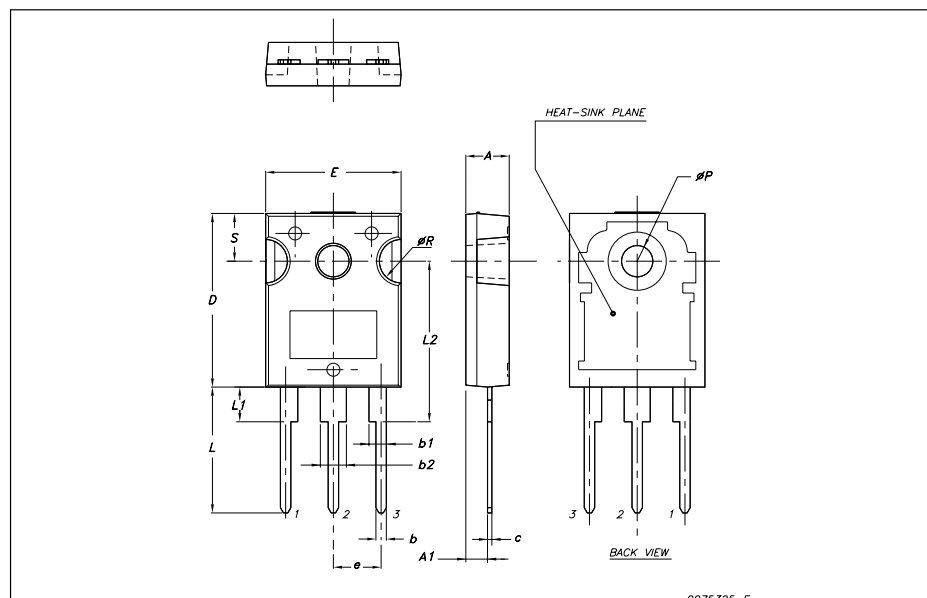


3 Package mechanical data

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

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	
øP	3.55		3.65
øR	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 2 , 3 , 4 , 5 , 6 , 7 .
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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