2STW1693

High power PNP epitaxial planar bipolar transistor

Features

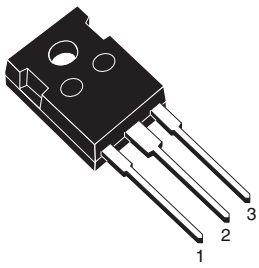
- High breakdown voltage V_{CEO} = -80 V
- Complementary to 2STW4466
- Typical f_t = 20 MHz
- Fully characterized at 125 °C

Applications

- Audio power amplifier

Description

The device is a PNP transistor manufactured in low voltage planar technology using base island layout. The resulting transistor shows good gain linearity coupled with low $V_{CE(sat)}$ behaviour. Recommended for 40W to 70W high fidelity audio frequency amplifier output stage.



TO-247

Figure 1. Internal schematic diagram

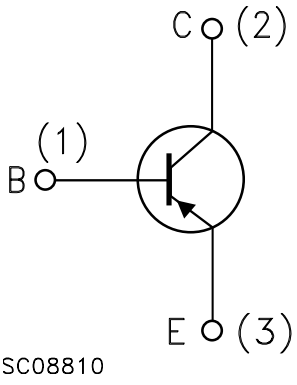


Table 1. Device summary

Order code	Marking	Package	Packaging
2STW1693	2STW1693	TO-247	Tube

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	-100	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	-80	V
V_{EBO}	Emitter-base voltage (I_C = 0)	-6	V
I_C	Collector current	-6	A
I_{CM}	Collector peak current (t_P < 5 ms)	-12	A
P_{TOT}	Total dissipation at T_c = 25 °C	60	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
$R_{thj\text{-}case}$	Thermal resistance junction-case	max	2.08	°C/W

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current (I_E = 0)	V_{CB} = -100 V			-0.1	µA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = -6 V			-0.1	µA
$V_{(BR)EBO}$	Emitter-base breakdown voltage (I_C = 0)	I_E = -1 mA	-6			V
$V_{(BR)CBO}$	Collector-base breakdown voltage (I_E = 0)	I_C = -100 µA	-100			V
$V_{(BR)CEO}$	Collector-emitter breakdown voltage (I_B = 0)	I_C = -50 mA	-80			V
$V_{CE(sat)}$ (1)	Collector-emitter saturation voltage	I_C = -2 A I_B = -200 mA I_C = -6 A I_B = -600 mA			-0.6 -1.5	V V
V_{BE} (1)	Base-emitter voltage	V_{CE} = -4 V I_C = -6 A			-1.5	V
h_{FE}	DC current gain	I_C = -2 A V_{CE} = -4 V	50		120	
f_T	Transition frequency	I_C = -0.5 A V_{CE} = -12 V		20		MHz
C_{CBO}	Collector-base capacitance (I_E = 0)	V_{CB} = -10 V f = 1 MHz		80		pF
	Resistive load					
t_{on}	Turn-on time	I_C = -3 A V_{CC} = -30 V		0.18		ns
t_{stg}	Storage time	I_{B1} = -I_{B2} = -0.3 A		0.6		ns
t_f	Fall time			0.09		ns

1. Pulsed duration = 300 µs, duty cycle ≤ 1.5%

2.1 Electrical characteristics (curves)

Figure 2. DC current gain

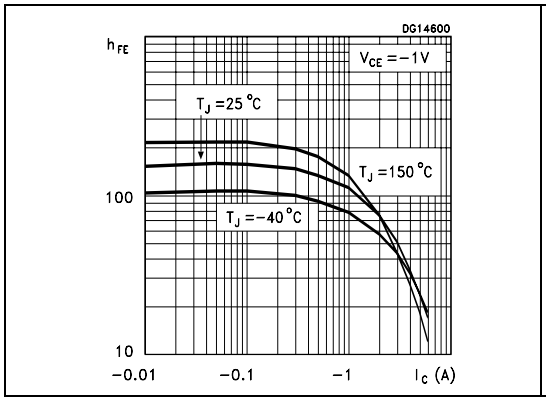


Figure 3. DC current gain

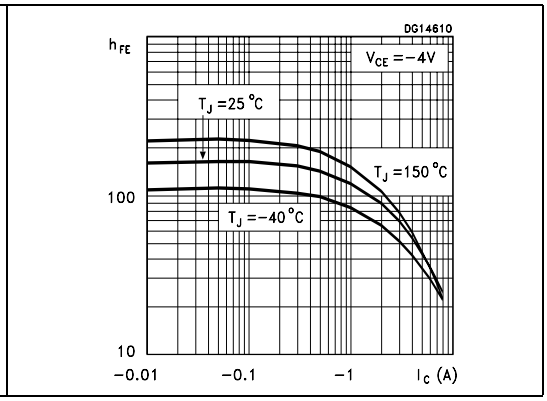


Figure 4. Collector-emitter saturation voltage

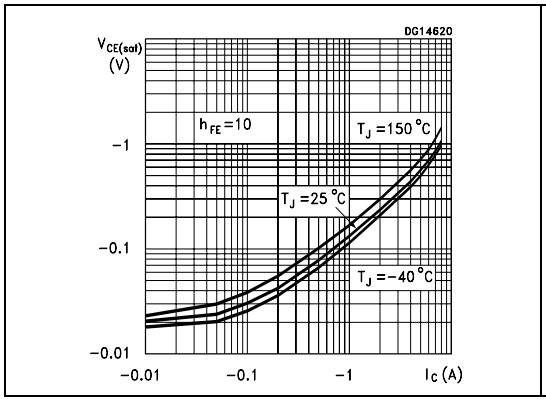


Figure 5. Base-emitter saturation voltage

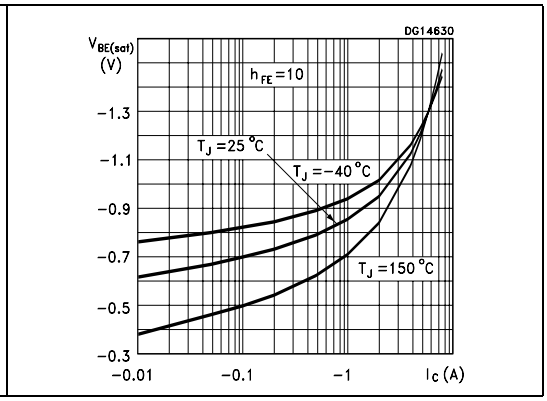


Figure 6. Base-emitter voltage

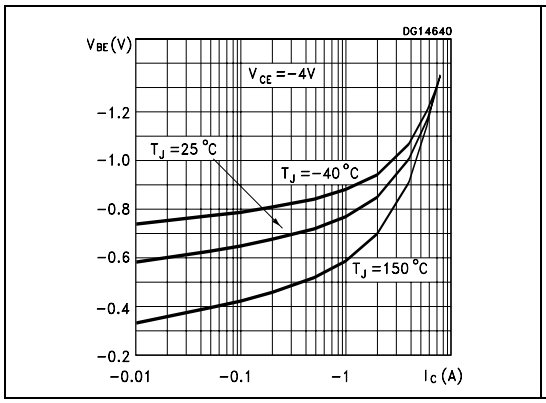


Figure 7. Resistive load switching time (on)

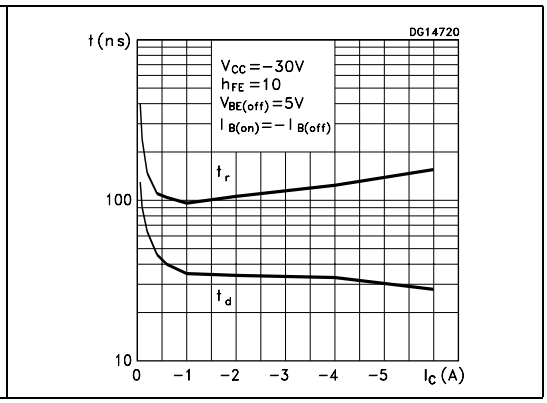


Figure 8. Resistive load switching time (off)

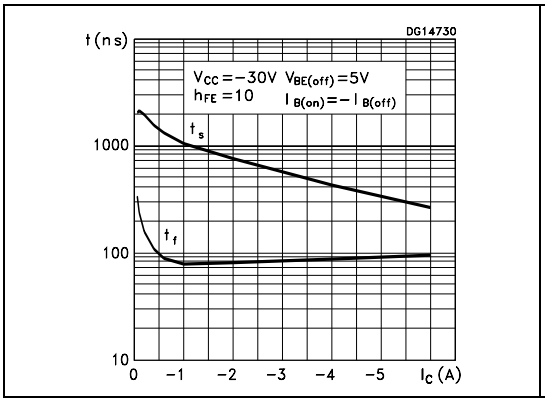
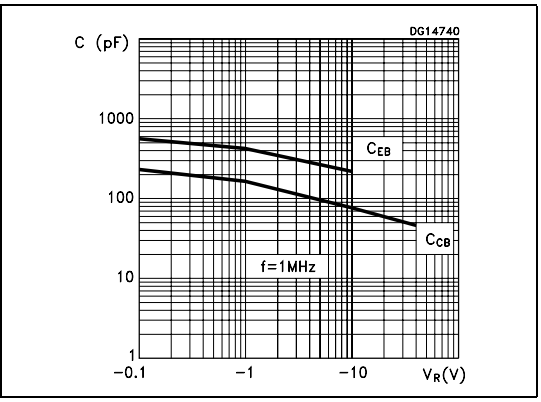


Figure 9. Collector-base and emitter-base capacitance

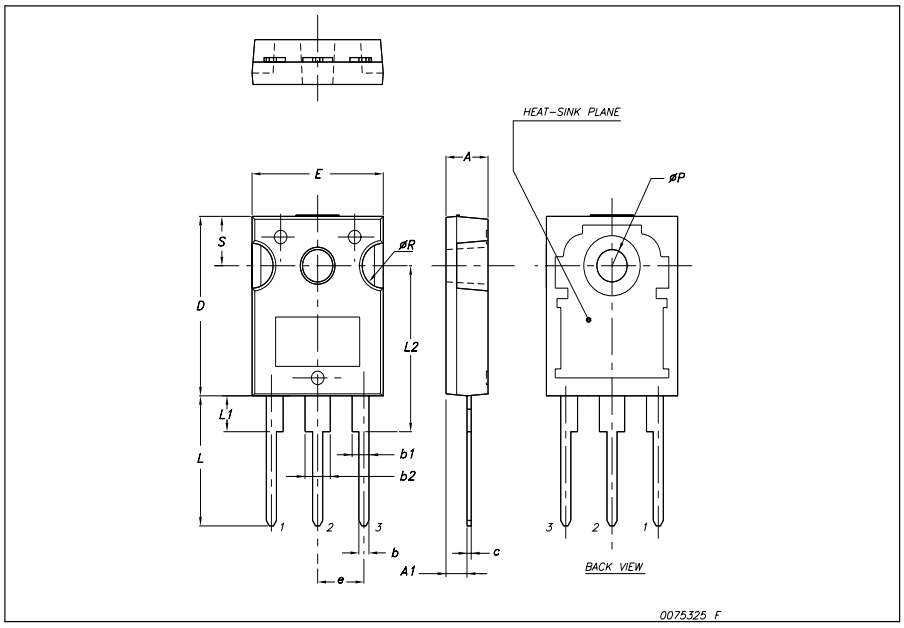


3 Package mechanical data

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
10-Oct-2007	1	Initial release
02-Oct-2008	2	Content reworked to improve readability, no technical changes.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

UNLESS EXPRESSLY APPROVED IN WRITING BY AN AUTHORIZE REPRESENTATIVE OF ST, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS, WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS “AUTOMOTIVE GRADE” MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com