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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 $125\text{ }^\circ\text{C}$

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.

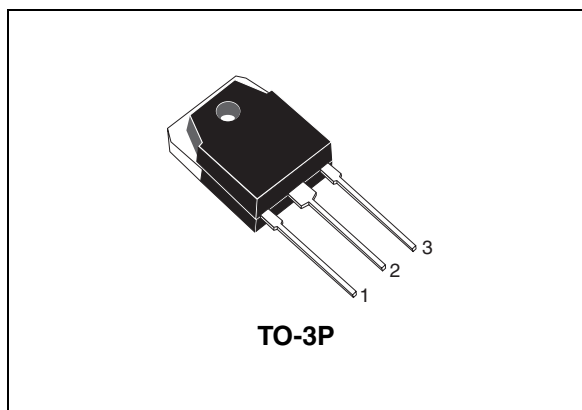


Figure 1. Internal schematic diagram

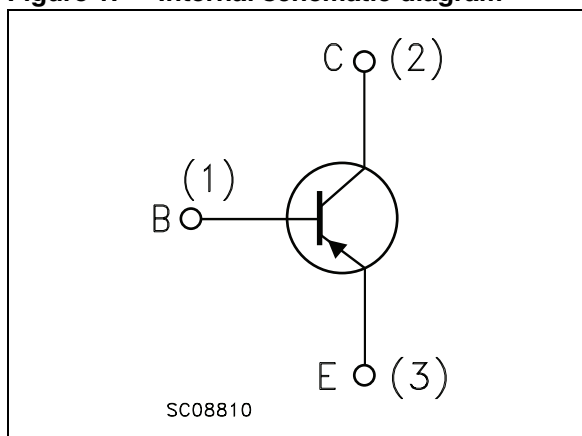


Table 1. Device summary

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

($T_{\text{case}} = 25\text{ }^{\circ}\text{C}$; 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

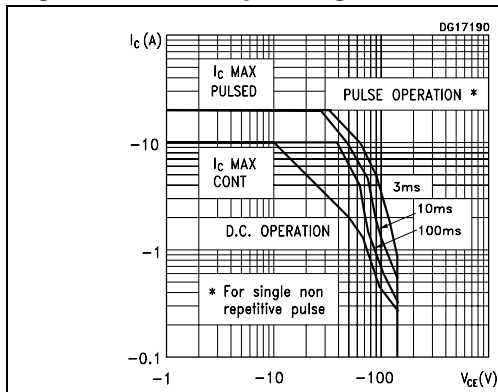


Figure 3. Power derating versus temperature

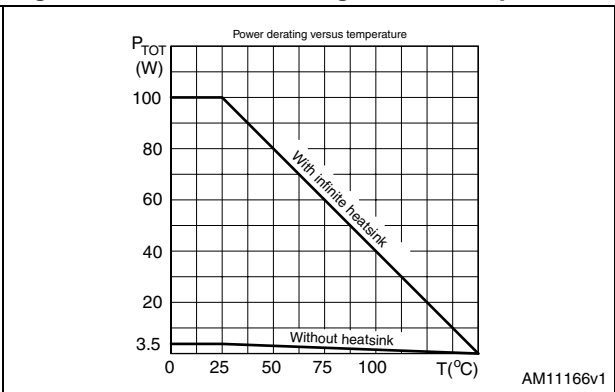


Figure 4. Output characteristics

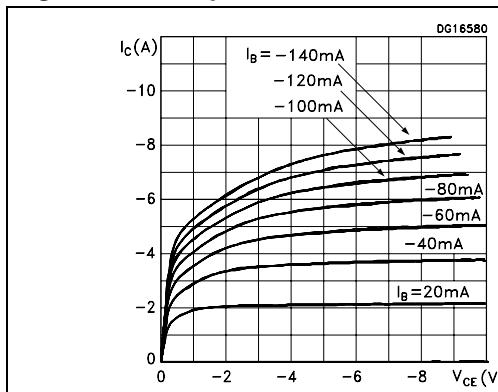


Figure 5. DC current gain

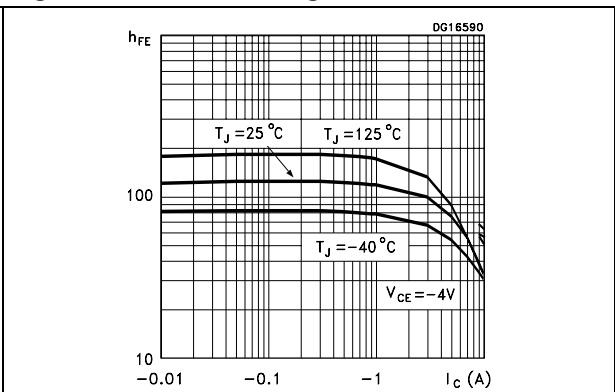


Figure 6. Collector-emitter saturation voltage Figure 7. Base-emitter voltage

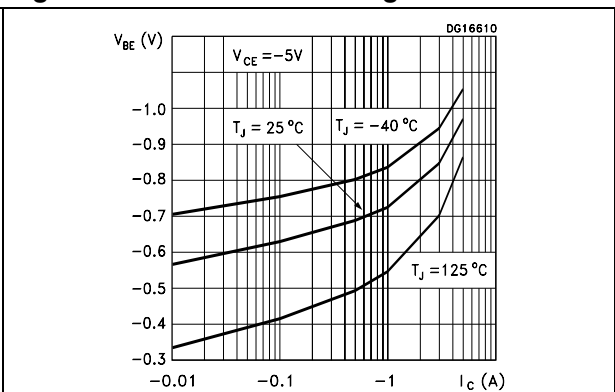
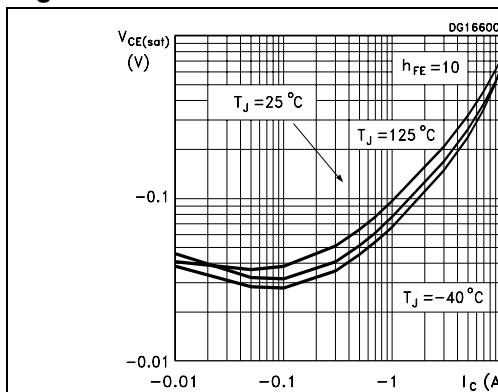
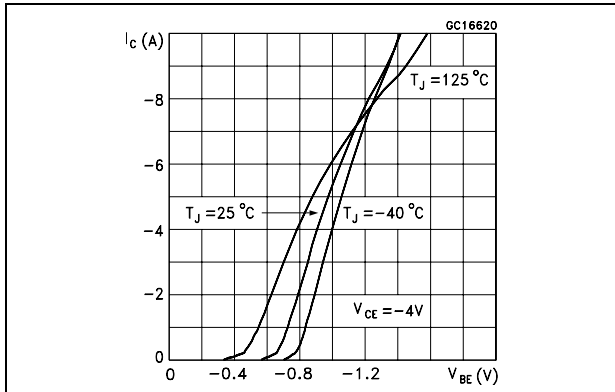
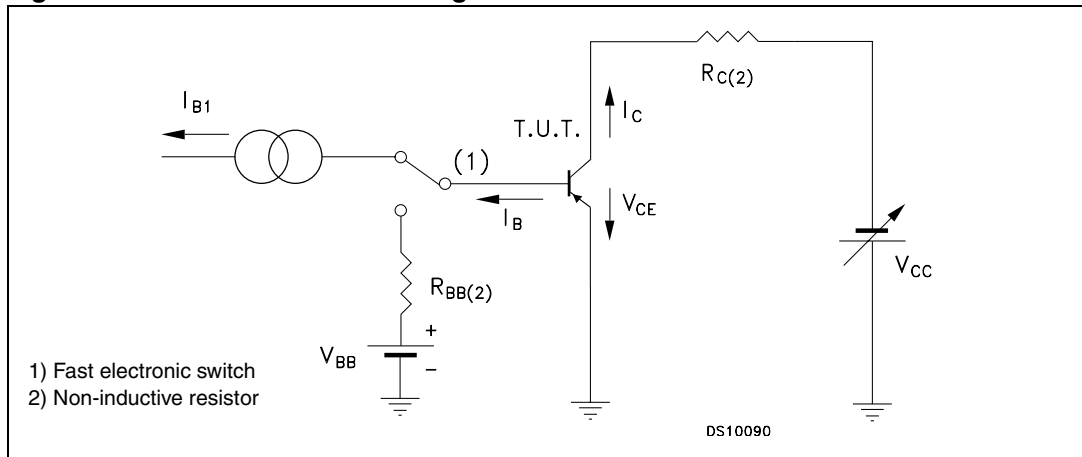


Figure 8. Base-emitter voltage



2.2 Test circuit

Figure 9. Resistive load switching test circuit



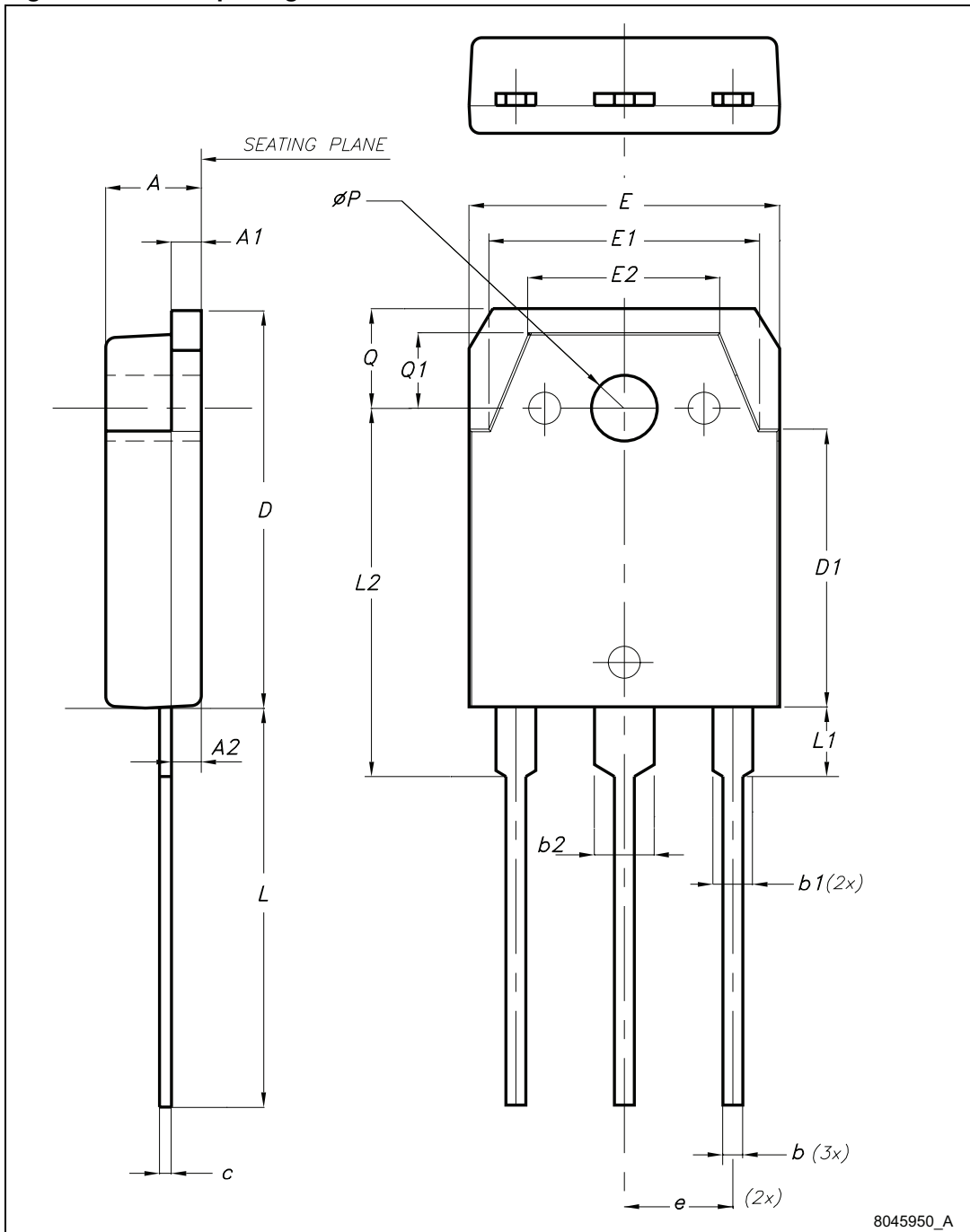
3 Package mechanical data

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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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