

High power NPN epitaxial planar bipolar transistor

Features

- High breakdown voltage $V_{CE0} = 250\text{ V}$
- Complementary to 2ST2121
- Fast-switching speed
- Typical $f_t = 25\text{ MHz}$
- Fully characterized at $125\text{ }^\circ\text{C}$

Applications

- Audio power amplifier

Description

The device is a NPN transistor manufactured using new BiT-LA (Bipolar transistor for linear amplifier) technology. The resulting transistor shows good gain linearity behaviour.

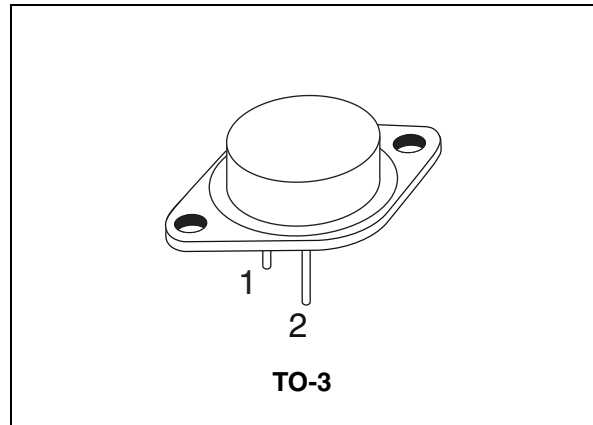


Figure 1. Internal schematic diagram

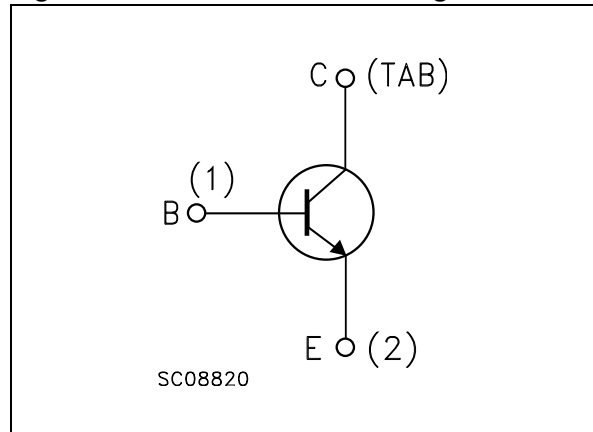


Table 1. Device summary

Order code	Marking	Package	Packaging
2ST5949	2ST5949	TO-3	tray

1 Electrical ratings

Table 2. Absolute maximum rating

Symbol	Parameter	Value	Unit
V_{CB0}	Collector-base voltage ($I_E = 0$)	250	V
V_{CEO}	Collector-emitter voltage ($I_B = 0$)	250	V
V_{EBO}	Emitter-base voltage ($I_C = 0$)	6	V
I_C	Collector current	17	A
I_{CM}	Collector peak current ($t_p < 5\text{ms}$)	34	A
P_{TOT}	Total dissipation at $T_C = 25^\circ\text{C}$	250	W
T_{stg}	Storage temperature	-65 to 200	$^\circ\text{C}$
T_J	Max. operating junction temperature	200	$^\circ\text{C}$

Table 3. Thermal data

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	0.7	$^\circ\text{C}/\text{W}$

2 Electrical characteristics

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

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 250 \text{ V}$			5	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 6 \text{ V}$			5	μA
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ($I_{\text{B}} = 0$)	$I_{\text{C}} = 50 \text{ mA}$	250			V
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ($I_{\text{E}} = 0$)	$I_{\text{C}} = 100 \mu\text{A}$	250			V
$V_{(\text{BR})\text{EBO}}^{(1)}$	Emitter-base breakdown voltage ($I_{\text{C}} = 0$)	$I_{\text{E}} = 1 \text{ mA}$	6			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 8 \text{ A}$ $I_{\text{B}} = 800 \text{ mA}$			3	V
$V_{\text{BE}}^{(1)}$	Base-emitter on voltage	$I_{\text{C}} = 7 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$			1.5	V
h_{FE}	DC current gain	$I_{\text{C}} = 1 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$ $I_{\text{C}} = 7 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$	80 35		160	
f_{T}	Transition frequency	$I_{\text{C}} = 1 \text{ A}$ $V_{\text{CE}} = 5 \text{ V}$		25		MHz

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

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

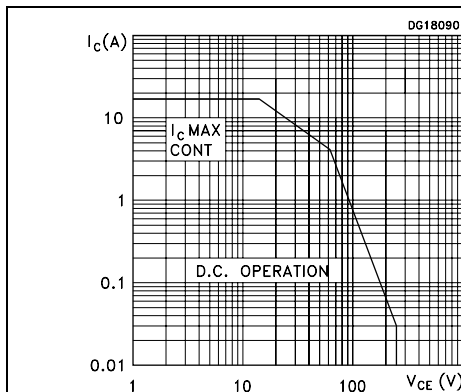


Figure 3. Derating curve

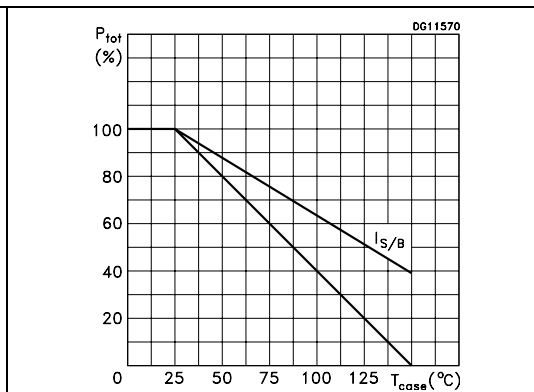


Figure 4. Output characteristics

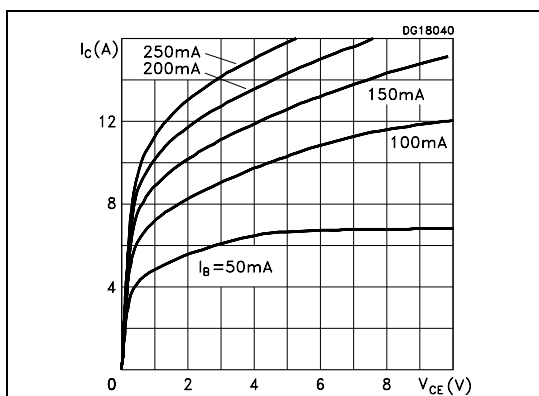


Figure 5. DC current gain

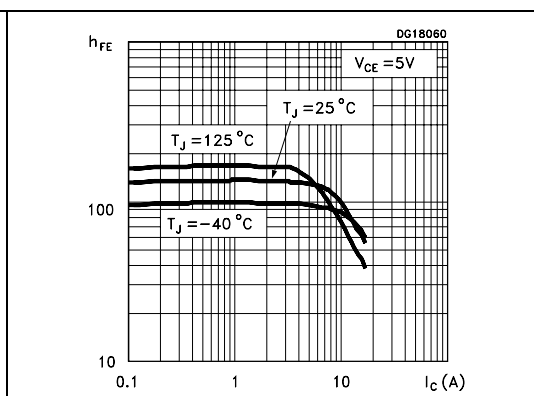


Figure 6. Collector-emitter saturation voltage

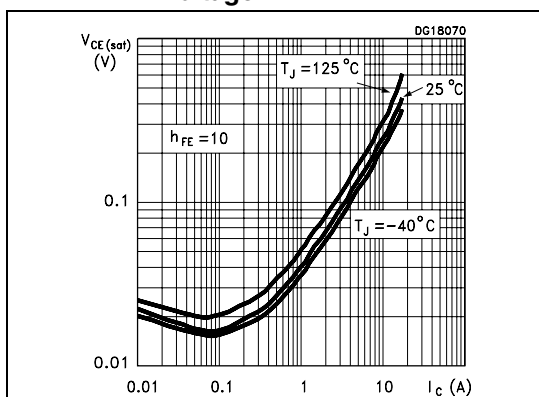
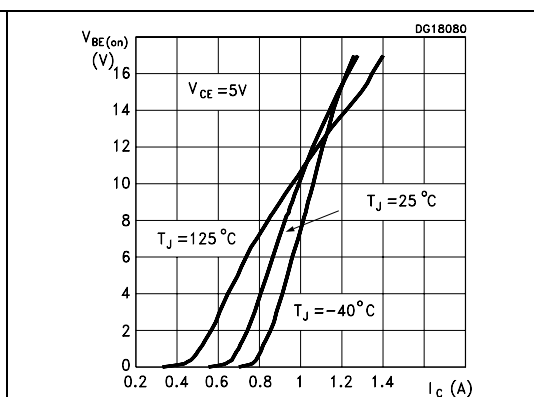


Figure 7. Base-emitter on voltage

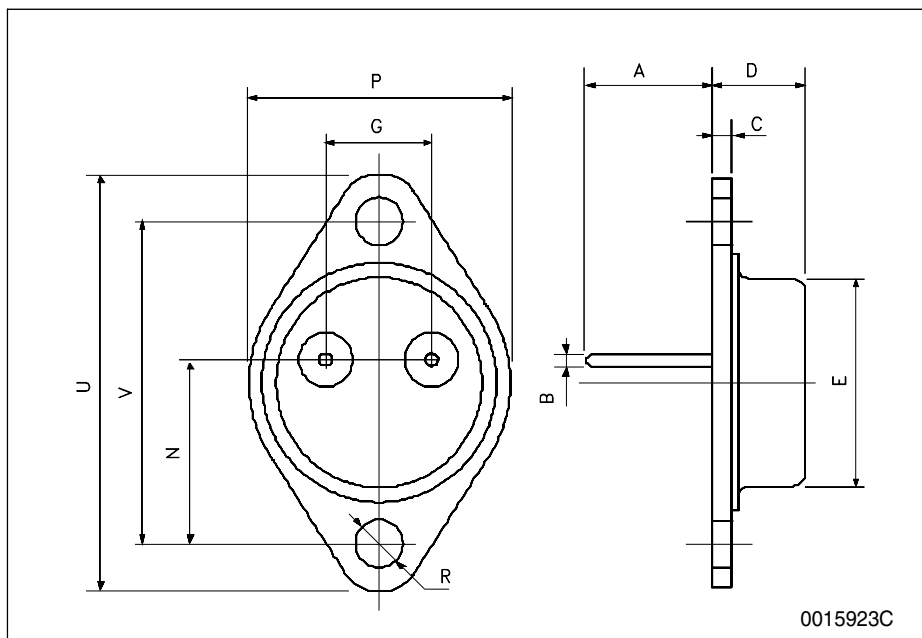


3 Package mechanical data

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-3 mechanical data

DIM.	mm.		
	min.	typ	max.
A	11.00		13.10
B	0.97		1.15
C	1.50		1.65
D	8.32		8.92
E	19.00		20.00
G	10.70		11.10
N	16.50		17.20
P	25.00		26.00
R	4.00		4.09
U	38.50		39.30
V	30.00		30.30



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
05-Dec-2007	1	Initial release.
05-May-2008	2	New graphics. Updated figure 7 and maximum operating junction temperature value.
11-Jul-2008	3	Updated figure 7 and maximum operating junction temperature value.

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