

## High power NPN epitaxial planar bipolar transistor

### Features

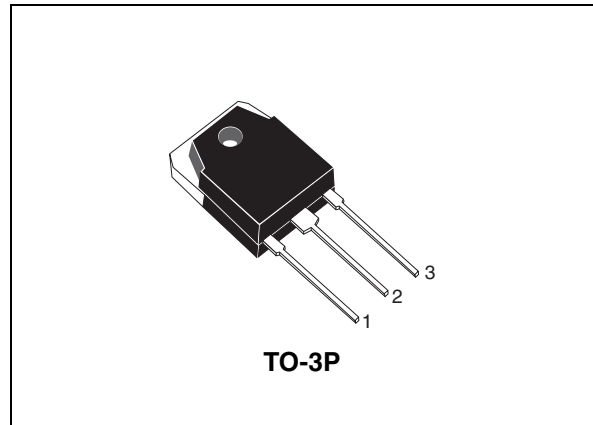
- High breakdown voltage  $V_{CEO} = 250\text{ V}$
- Complementary to 2STA2120
- Fast-switching speed
- Typical  $f_t = 25\text{ MHz}$
- Fully characterized at  $125\text{ }^\circ\text{C}$

### Applications

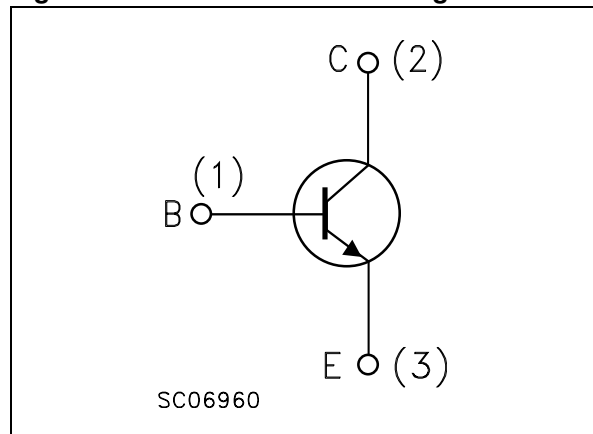
- Audio power amplifier

### 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
2STC5948	2STC5948	TO-3P	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum rating**

Symbol	Parameter	Value	Unit
$V_{CBO}$	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 $T_C = 25\text{ }^\circ\text{C}$	200	W
$T_{stg}$	Storage temperature	-65 to 150	$^\circ\text{C}$
$T_J$	Max. operating junction temperature	150	$^\circ\text{C}$

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thj-case}$	Thermal resistance junction-case max	0.625	$^\circ\text{C/W}$

## 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 ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 250\text{ V}$			5	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 6\text{ V}$			5	$\mu\text{A}$
$V_{(\text{BR})\text{CEO}}^{(1)}$	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
$V_{\text{CE}(\text{sat})}^{(1)}$	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
$h_{\text{FE}}$	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	
$f_{\text{T}}$	Transition frequency	$I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$		25		MHz

1. Pulsed duration = 300  $\mu\text{s}$ , duty cycle  $\leq 1.5\%$

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

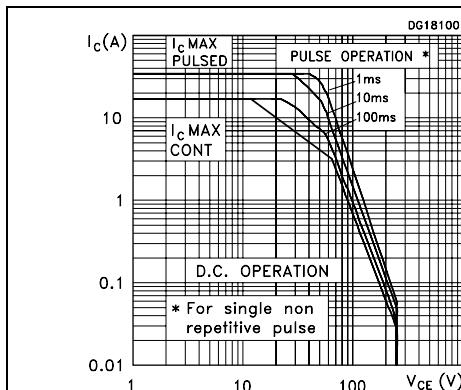


Figure 3. Derating curve

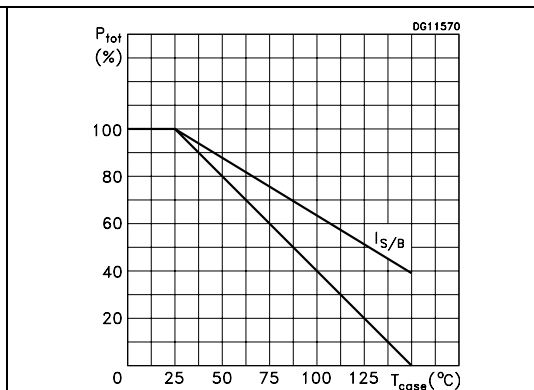


Figure 4. Output characteristics

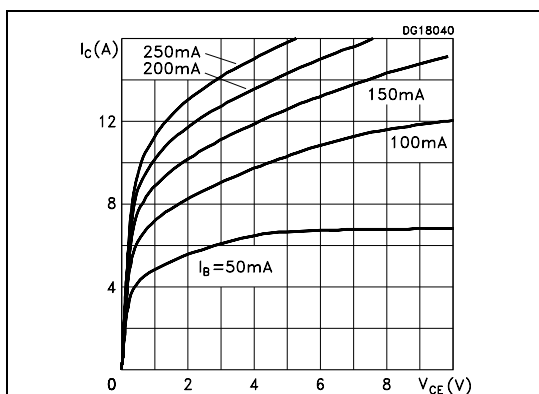


Figure 5. DC current gain

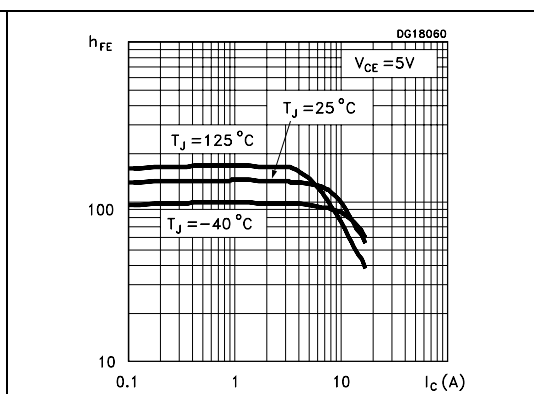


Figure 6. Collector-emitter saturation voltage

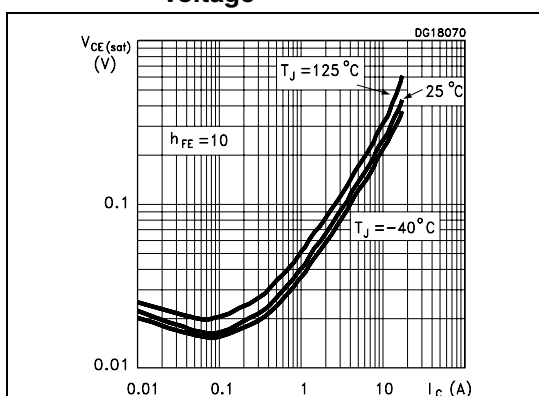
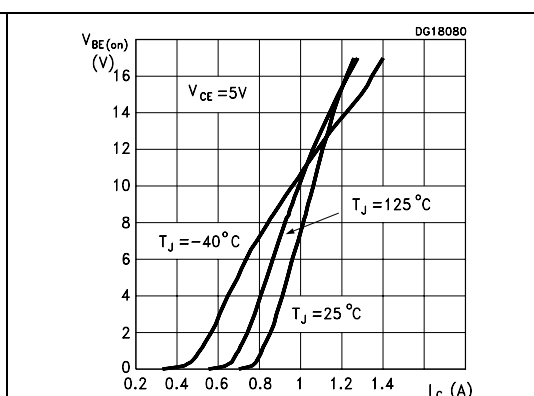


Figure 7. Base-emitter on voltage

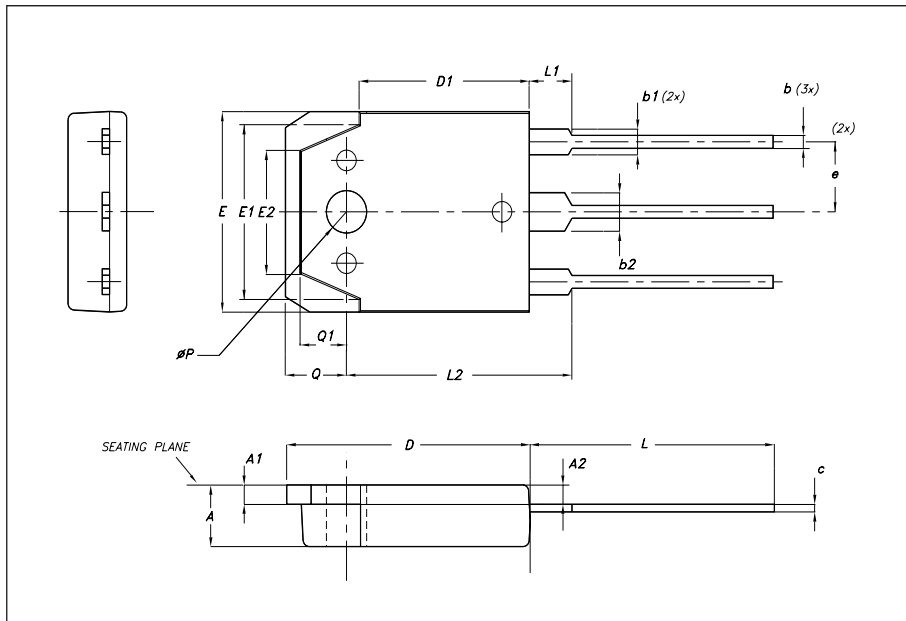


### 3 Package mechanical data

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](http://www.st.com)

**TO-3P Mechanical data**

DIM.	mm.		
	MIN.	TYP	MAX.
A	4.6		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
P	3.10		3.30
Q		5	
Q1		3.80	



## 4 Revision history

**Table 5. Document revision history**

Date	Revision	Changes
26-Nov-2007	1	Initial release.
06-May-2008	2	New graphics.

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