

## High power NPN epitaxial planar bipolar transistor

### Features

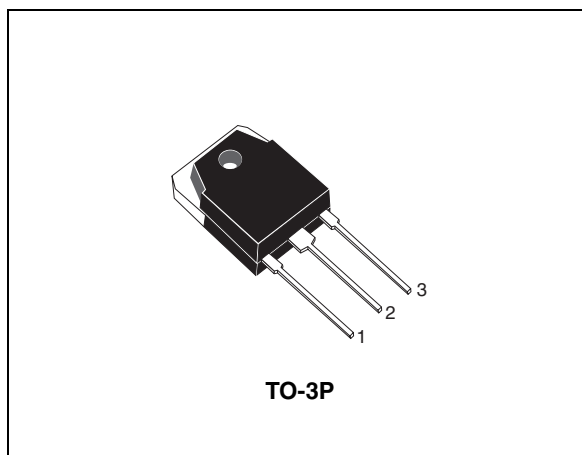
- High breakdown voltage  $V_{CE0} = 230\text{ V}$
- Complementary to 2STA1962
- Fast-switching speed
- Typical  $f_T = 30\text{ MHz}$

### Application

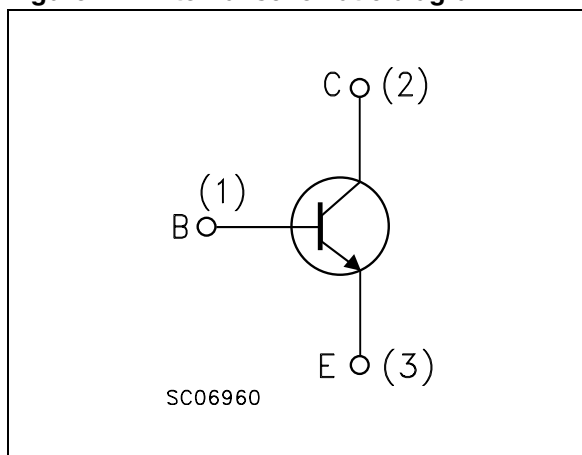
- Audio power amplifier

### Description

This 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
2STC5242	2STC5242	TO-3P	Tube

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	230	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	230	V
$V_{EBO}$	Emitter-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	15	A
$I_{CM}$	Collector peak current	30	A
$P_{tot}$	Total dissipation at $T_C = 25^\circ\text{C}$	150	W
$T_{stg}$	Storage temperature	-55 to 150	$^\circ\text{C}$
$T_J$	Operating junction temperature	150	$^\circ\text{C}$

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJ-case}$	Thermal resistance junction-case Max	0.83	$^\circ\text{C}/\text{W}$

## 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 ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 230\text{ V}$			5	$\mu\text{A}$
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{ V}$			5	$\mu\text{A}$
$V_{(\text{BR})\text{CEO}}^{(1)}$	Collector-emitter breakdown voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 50\text{ mA}$	230			V
$V_{(\text{BR})\text{CBO}}$	Collector-base breakdown voltage ( $I_{\text{E}} = 0$ )	$I_{\text{C}} = 100\text{ }\mu\text{A}$	230			V
$V_{(\text{BR})\text{EBO}}^{(1)}$	Emitter-base breakdown voltage ( $I_{\text{C}} = 0$ )	$I_{\text{E}} = 1\text{ mA}$	5			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 8\text{ A}$ $I_{\text{B}} = 800\text{ mA}$			3	V
$V_{\text{BE}}$	Base-emitter 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	
$t_{\text{on}}$ $t_{\text{s}}$ $t_{\text{f}}$	Resistive load Turn-on time Storage time Fall time	$V_{\text{CC}} = 60\text{ V}$ $I_{\text{C}} = 5\text{ A}$ $I_{\text{B1}} = -I_{\text{B2}} = 0.5\text{ A}$		0.24 4.7 0.6		$\mu\text{s}$ $\mu\text{s}$ $\mu\text{s}$
$f_{\text{T}}$	Transition frequency	$I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$		30		MHz
$C_{\text{CBO}}$	Collector-base capacitance ( $I_{\text{E}} = 0$ )	$V_{\text{CB}} = 10\text{ V}$ $f = 1\text{ MHz}$		150		pF

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

## 2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

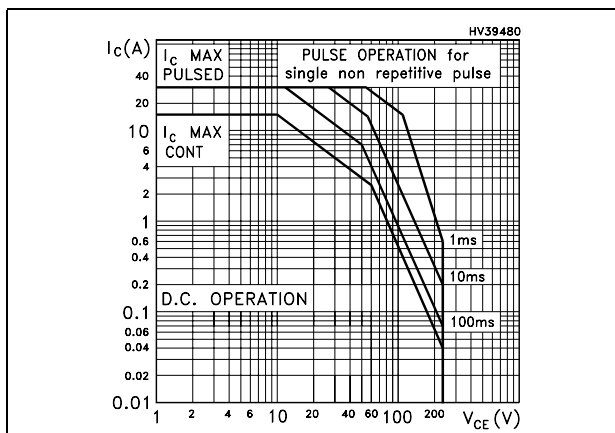


Figure 3. Derating curve

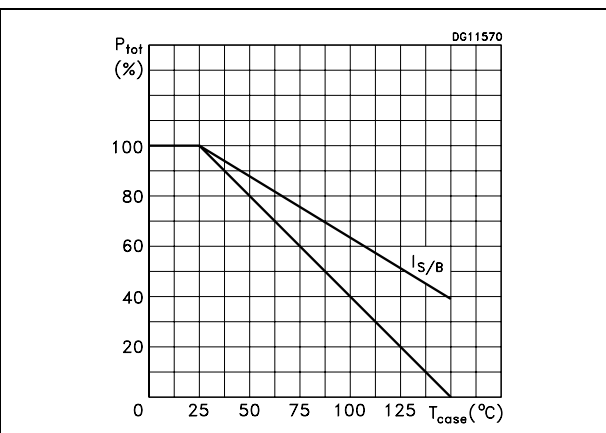


Figure 4. Output characteristics

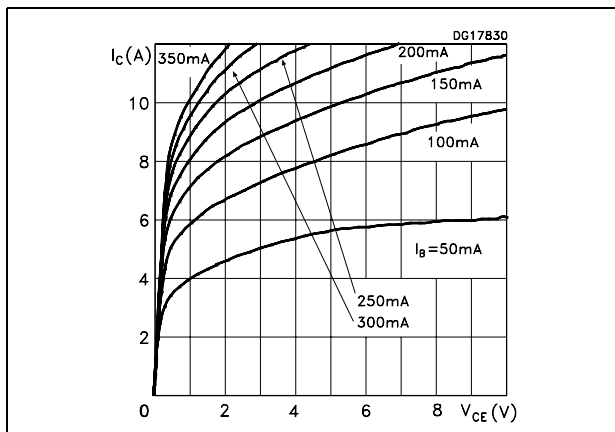


Figure 5. DC current gain

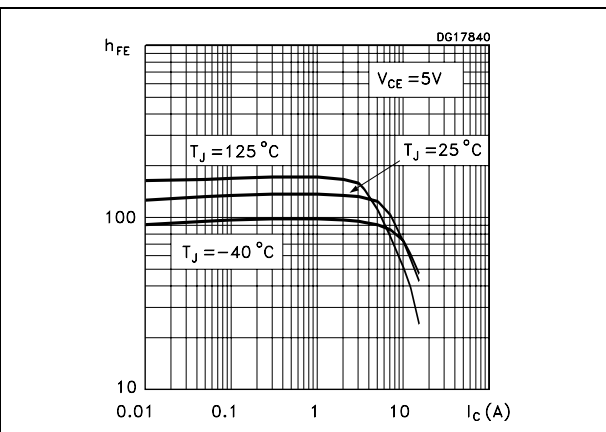


Figure 6. Collector-emitter saturation voltage

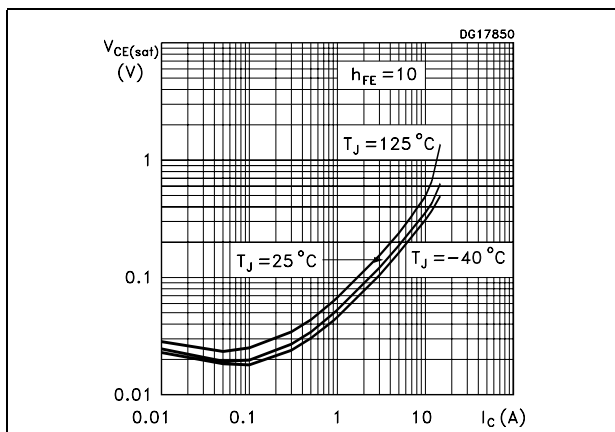
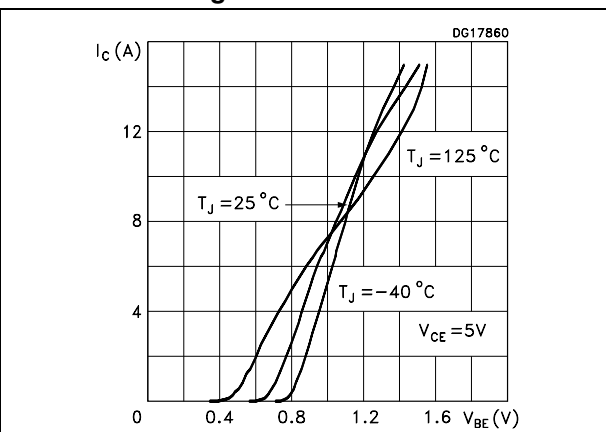
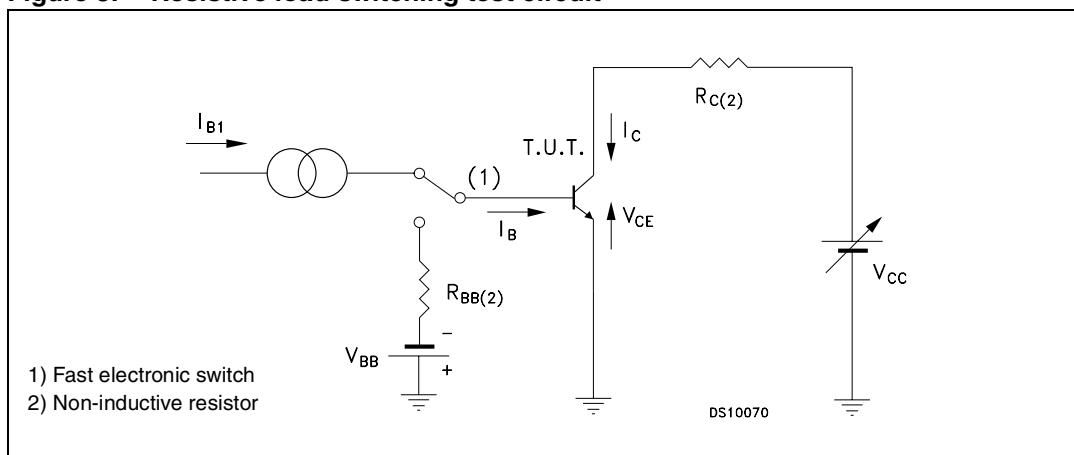


Figure 7. Collector current vs base-emitter voltage



## 2.2 Test circuit

Figure 8. Resistive load switching test circuit

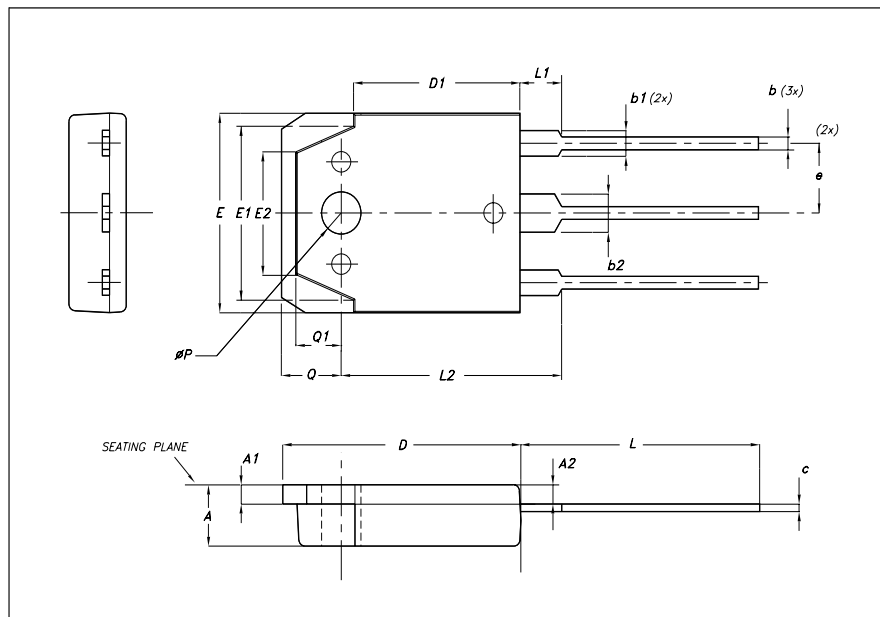


### 3 Package mechanical data

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](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**

<b>Date</b>	<b>Revision</b>	<b>Changes</b>
28-Sep-2007	1	Initial release.
11-Dec-2007	2	Document promoted from preliminary data to datasheet.
14-Jul-2008	3	Updated total power dissipation and relevant thermal resistance junction-case value.

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