

## High power NPN epitaxial planar bipolar transistor

Preliminary data

### Features

- High breakdown voltage  $V_{CE0} = 230\text{ V}$
- 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.

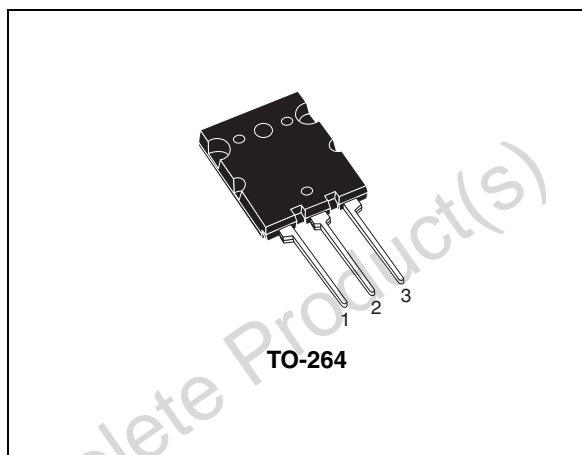


Figure 1. Internal schematic diagram

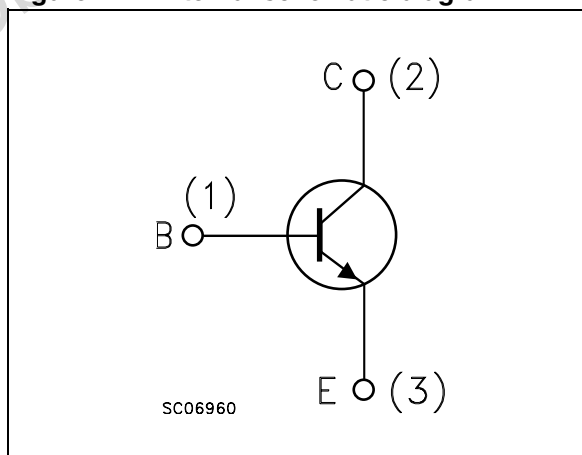


Table 1. Device summary

Order code	Marking	Package	Packaging
2SC5200	2SC5200	TO-264	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 $T_C = 25\text{ °C}$	150	W
$T_{STG}$	Storage temperature	-55 to 150	°C
$T_J$	Operating junction temperature	150	°C

**Table 3. Thermal data**

Symbol	Parameter	Value	Unit
$R_{thJC}$	Thermal resistance junction-case max	0.83	°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
$I_{\text{CBO}}$	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	$I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 7\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	55 35	80	120	
$t_{\text{on}}$ $t_{\text{s}}$ $t_{\text{f}}$	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

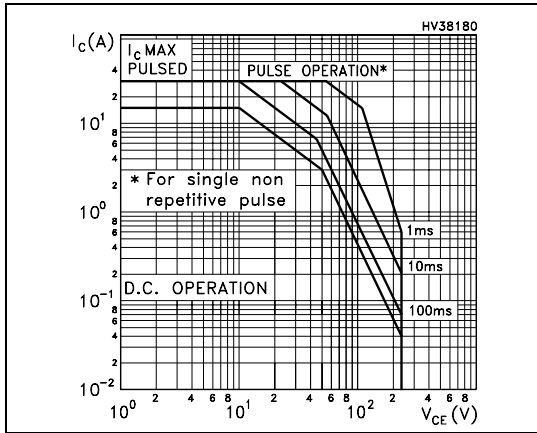
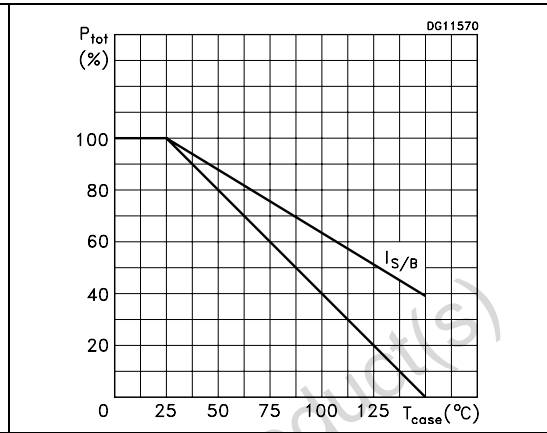
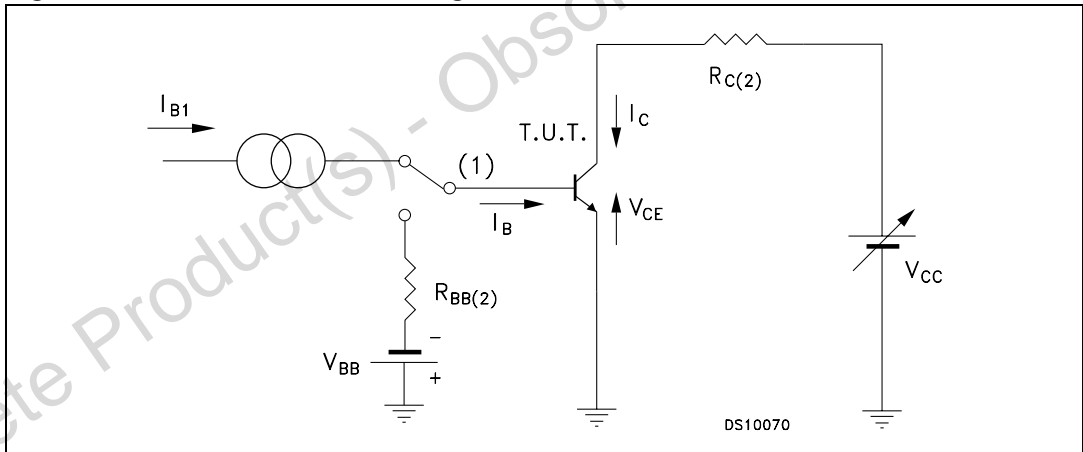


Figure 3. Derating curve



## 2.2 Test circuit

Figure 4. Resistive load switching test circuit



1. Fast electronic switch
2. Non-inductive resistor

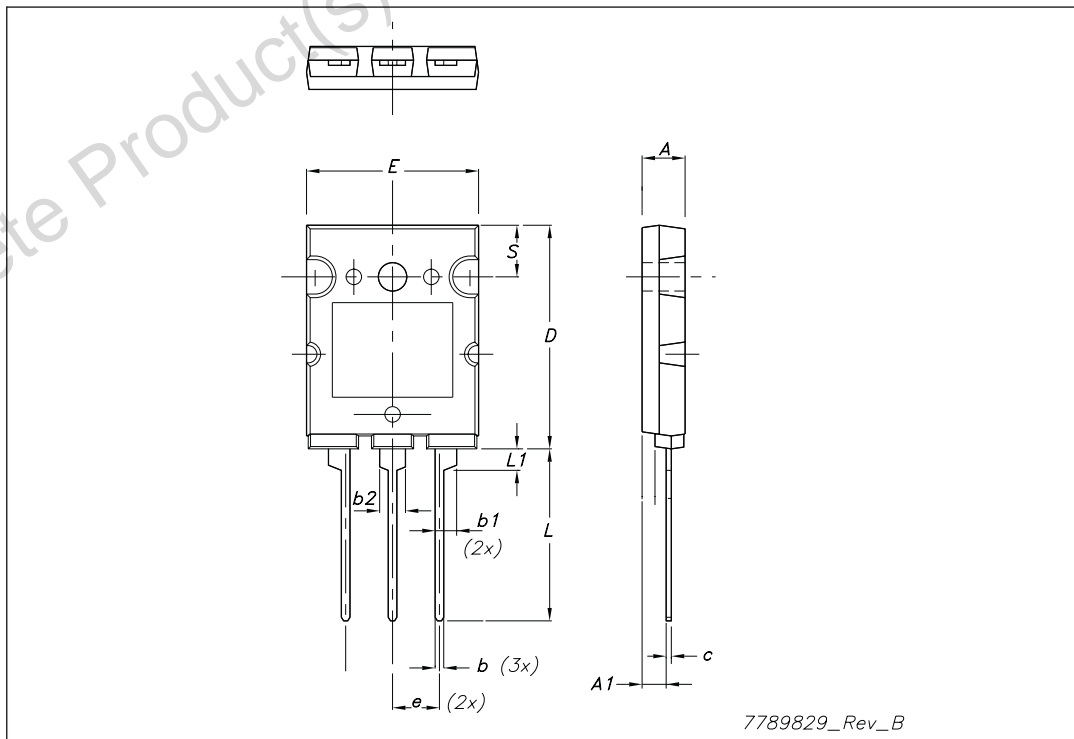
### 3 Package mechanical data

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**TO-264 Mechanical data**

Dim.	mm.		
	Min.	Typ	Max.
A	4.80		5.20
A1	2.50		3.10
b	0.90	1.0	1.25
b1		2.5	
b2		2.8	
c	0.50	0.60	0.85
D	25.6		26.4
E	19.80		20.20
e	5.15		5.75
L	19.50		20.50
L1	2.30		2.70
øP	3.55		3.65



## 4 Revision history

Table 5. Document revision history

Date	Revision	Changes
28-Sep-2009	1	Initial release.

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