

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.

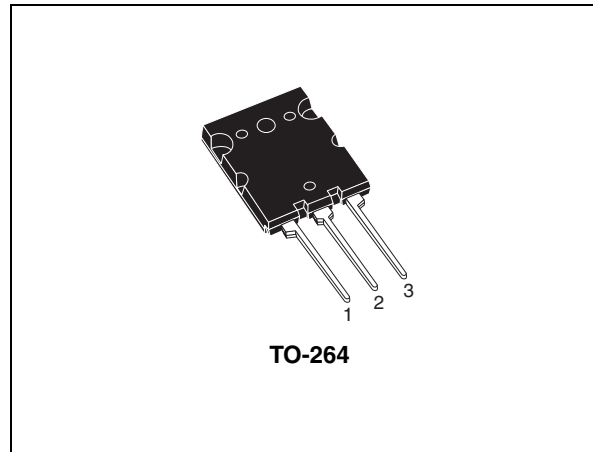


Figure 1. Internal schematic diagram

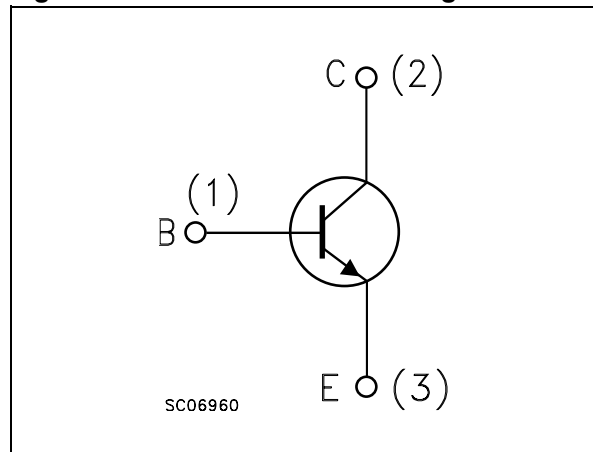


Table 1. Device summary

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_{CBO}	Collector cut-off current ($I_{\text{E}} = 0$)	$V_{\text{CB}} = 230\text{ V}$			5	μA
I_{EBO}	Emitter cut-off current ($I_{\text{C}} = 0$)	$V_{\text{EB}} = 5\text{ V}$			5	μA
$V_{(\text{BR})\text{CEO}}^{(1)}$	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_{BE}	Base-emitter voltage	$I_{\text{C}} = 7\text{ A}$ $V_{\text{CE}} = 5\text{ V}$			1.5	V
h_{FE}	DC current gain	$I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$ $I_{\text{C}} = 7\text{ A}$ $V_{\text{CE}} = 5\text{ V}$	55 35	80	120	
t_{on} t_{s} t_{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		μs μs μs
f_{T}	Transition frequency	$I_{\text{C}} = 1\text{ A}$ $V_{\text{CE}} = 5\text{ V}$		30		MHz
C_{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 μs , duty cycle $\leq 1.5\%$

2.1 Electrical characteristics (curves)

Figure 2. Safe operating area

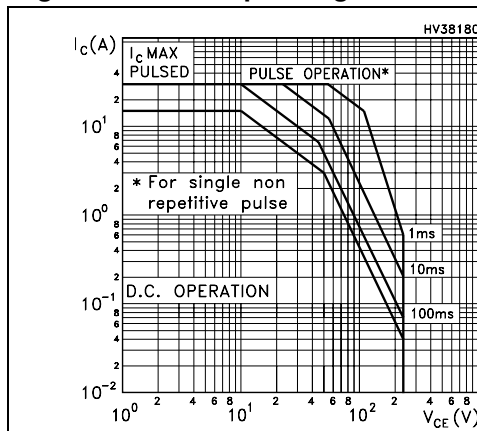
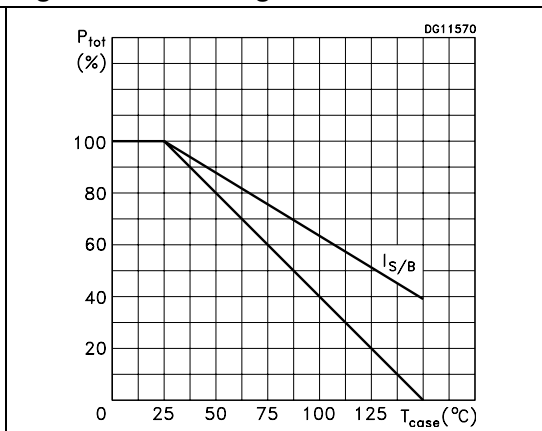
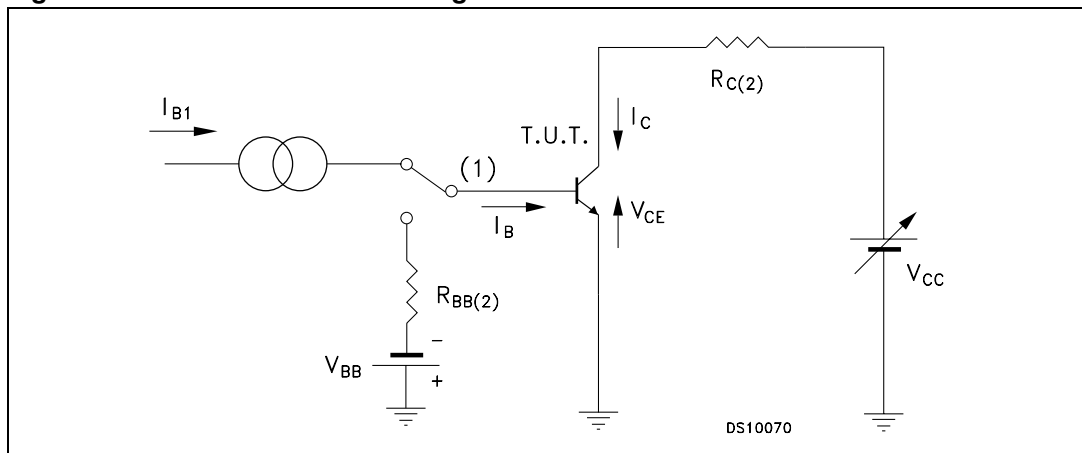


Figure 3. Derating curve



2.2 Test circuit

Figure 4. Resistive load switching test circuit



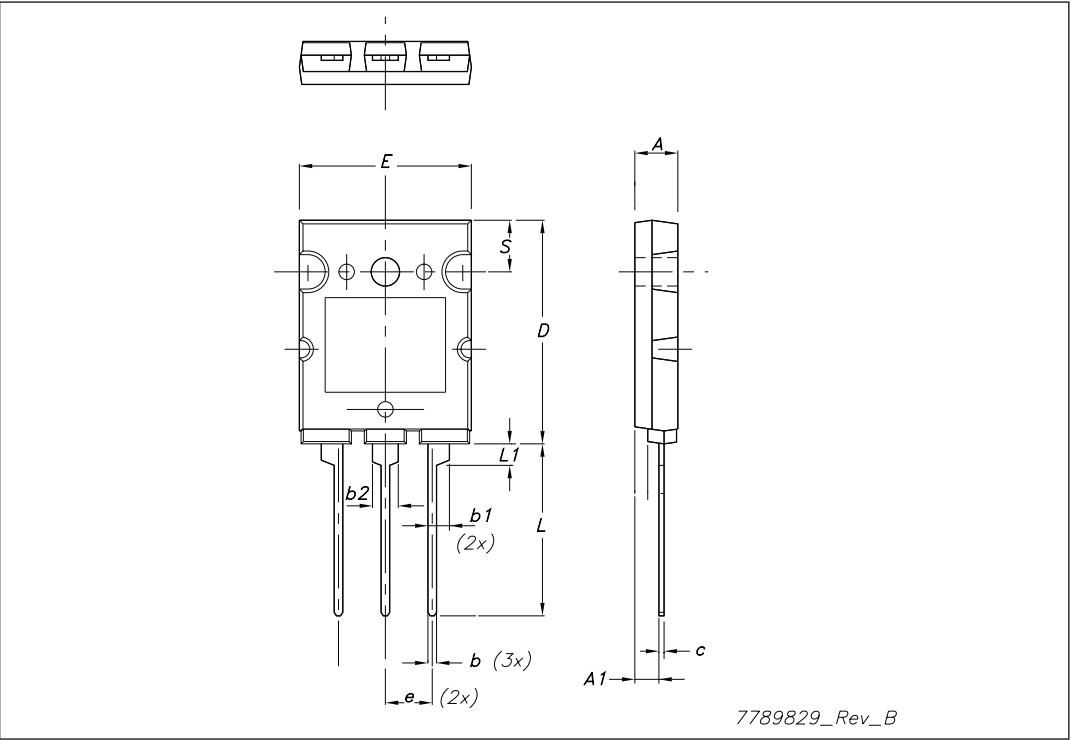
1. Fast electronic switch
2. Non-inductive resistor

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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