2ST31A

Low voltage NPN power transistor

Features

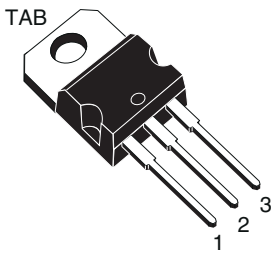
- High switching speed
- Good performances in terms of h_{FE} linearity

Application

- Linear and switching industrial applications

Description

The device is manufactured in planar technology with “base island” layout. The resulting transistor shows high gain performance coupled with low saturation voltage.



TO-220

Figure 1. Internal schematic diagram

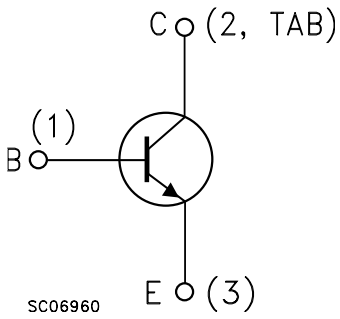


Table 1. Device summary

Order code	Marking	Package	Packaging
2ST31A	2ST31A	TO-220	Tube

1 Absolute maximum ratings

Table 2. Absolute maximum ratings

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base voltage (I_E = 0)	60	V
V_{CEO}	Collector-emitter voltage (I_B = 0)	60	V
V_{EBO}	Emitter-base voltage (I_C = 0)	5	V
I_C	Collector current	3	A
I_{CM}	Collector peak current	5	A
I_B	Base current	1	A
P_{TOT}	Total dissipation at T_{case} = 25°C	40	W
T_{STG}	Storage temperature	-65 to 150	°C
T_J	Max. operating junction temperature	150	°C

Table 3. Thermal data

Symbol	Parameter	Value	Unit
R_{thJC}	Thermal resistance junction-case max.	3.1	°C/W

2 Electrical characteristics

T_{case} = 25 °C unless otherwise specified.

Table 4. Electrical characteristics

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
I_{CEO}	Collector cut-off current (I_B = 0)	V_{CE} = 30 V			0.3	mA
I_{EBO}	Emitter cut-off current (I_C = 0)	V_{EB} = 5 V			1	mA
I_{CES}	Collector cut-off current (V_{BE} = 0)	V_{CE} = 60 V			0.2	mA
$V_{CEO(sus)}$(1)	Collector-emitter sustaining voltage (I_B = 0)	I_C = 30 mA	60			V
$V_{CE(sat)}$(1)	Collector-emitter saturation voltage	I_C = 3 A I_B = 375 mA			1.2	V
$V_{BE(sat)}$(1)	Base-emitter saturation voltage	I_C = 3 A I_B = 375 mA			1.45	V
h_{FE}(1)	DC current gain	I_C = 20 mA V_{CE} = 4 V I_C = 1 A V_{CE} = 4V	100 25	150		

1. Pulse test: pulse duration ≤ 300 µs, duty cycle ≤ 2 %

2.1 Electrical characteristics (curve)

Figure 2. Safe operating area

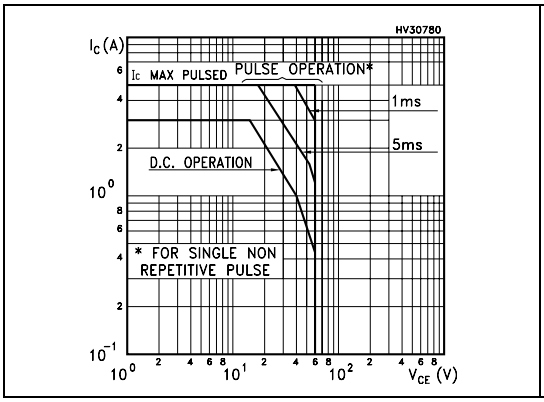


Figure 3. Derating curves

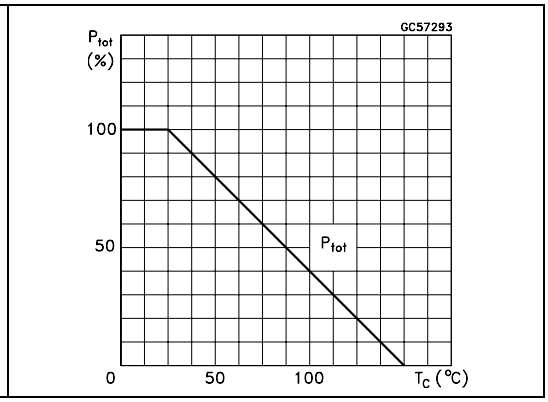


Figure 4. DC-current gain

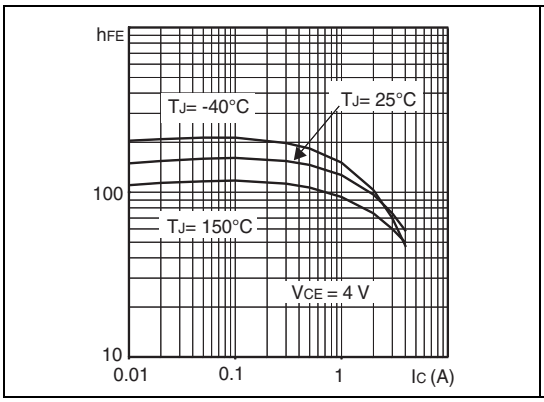


Figure 5. Base-emitter saturation voltage

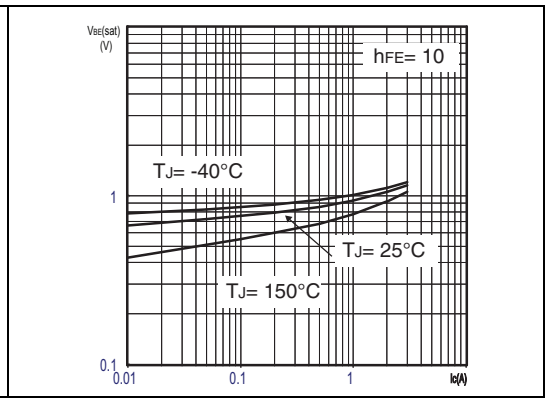
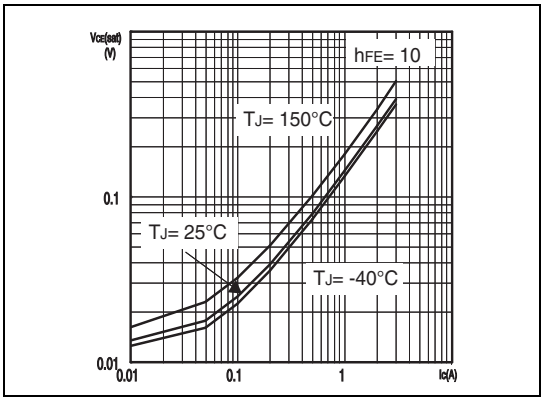


Figure 6. Collector-emitter saturation voltage



3 Package mechanical data

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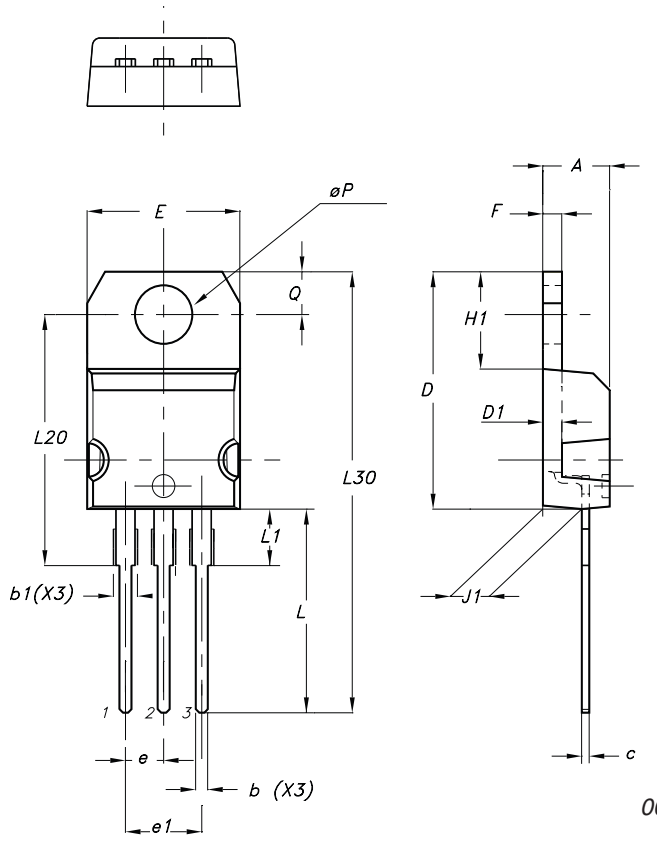
TO-220 type A mechanical data

Dim	mm		
	Min	Typ	Max
A	4.40		4.60
b	0.61		0.88
b1	1.14		1.70
c	0.48		0.70
D	15.25		15.75
D1		1.27	
E	10		10.40
e	2.40		2.70
e1	4.95		5.15
F	1.23		1.32
H1	6.20		6.60
J1	2.40		2.72
L	13		14
L1	3.50		3.93
L20		16.40	
L30		28.90	
∅P	3.75		3.85
Q	2.65		2.95



4 Revision history

Table 5. Document revision history

Date	Revision	Changes
24-Aug-2010	1	Initial release.
14-Dec-2010	2	Document status promoted from preliminary data to datasheet.

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