

### General features

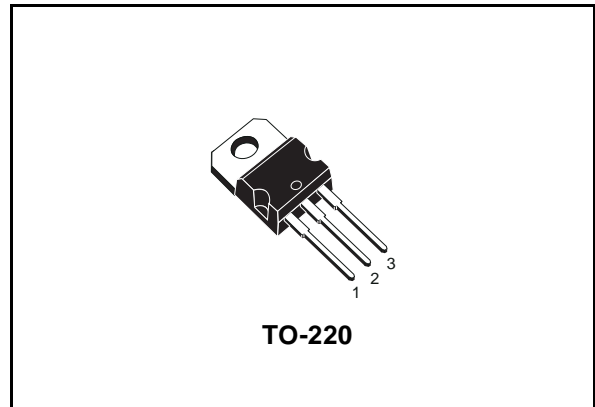
- New enhanced series
- High switching speed
- $h_{FE}$  improved linearity
- $h_{FE}$  Grouping

### Applications

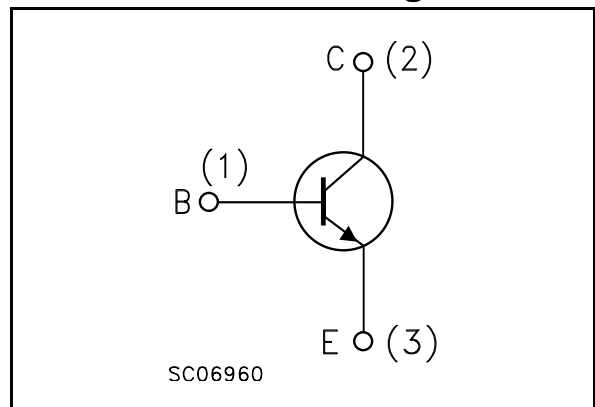
- Linear and switching industrial application

### Description

The TIP31C is a base island technology **NPN power transistor** in TO-220 plastic package with better performances than the industry standard TIP31C that make this device suitable for audio, power linear and switching applications. The PNP type is TIP32C.



### Internal schematic diagram



### Order codes

Part Number	Marking	Package	Packing
TIP31C <i>Note: on page 4</i>	TIP31C R TIP31C O TIP31C Y	TO-220	Tube

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# 1 Absolute maximum ratings

Table 1. Absolute maximum ratings

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base voltage ( $I_E = 0$ )	100	V
$V_{CEO}$	Collector-emitter voltage ( $I_B = 0$ )	100	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 $T_{case} = 25^\circ\text{C}$	40	W
	Total dissipation at $T_{amb} = 25^\circ\text{C}$	2	W
$T_{stg}$	Storage temperature	-65 to 150	$^\circ\text{C}$
$T_J$	Max. operating junction temperature	150	$^\circ\text{C}$

## 2 Electrical characteristics

( $T_{\text{case}} = 25^{\circ}\text{C}$  unless otherwise specified)

**Table 2. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 60\text{V}$			0.3	mA
$I_{\text{EBO}}$	Emitter cut-off current ( $I_{\text{C}} = 0$ )	$V_{\text{EB}} = 5\text{V}$			1	mA
$I_{\text{CES}}$	Collector cut-off current ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 100\text{V}$			0.2	mA
$V_{\text{CEO(sus)}}^{(1)}$	Collector-emitter sustaining voltage ( $I_{\text{B}} = 0$ )	$I_{\text{C}} = 30\text{mA}$	100			V
$V_{\text{CE(sat)}}^{(1)}$	Collector-emitter saturation voltage	$I_{\text{C}} = 3\text{A}$ $I_{\text{B}} = 375\text{mA}$			1.2	V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter voltage	$I_{\text{C}} = 3\text{A}$ $V_{\text{CE}} = 4\text{V}$			1.8	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 1\text{A}$ $V_{\text{CE}} = 4\text{V}$ $I_{\text{C}} = 3\text{A}$ $V_{\text{CE}} = 4\text{V}$ Group R Group O Group Y	25  10 20 40		24 44 50	

1. Pulsed duration = 300 ms, duty cycle  $\geq 1.5\%$

**Note:** *Product is pre-selected in DC current gain (Group R, Group O and Group Y).  
STMicroelectronics reserves the right to ship each groups according to production  
availability. Please contact your nearest STMicroelectronics sales office for delivery details.*

# 2.1 Electrical characteristics (curve)

Figure 1. Safe Operating area

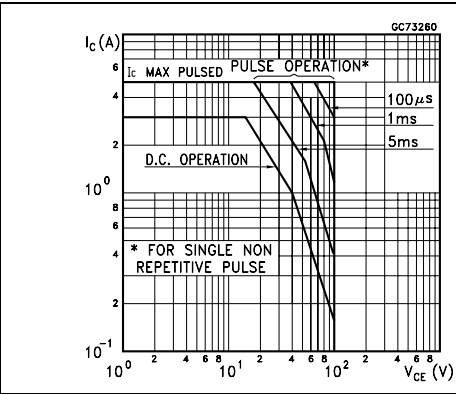


Figure 2. Derating curves

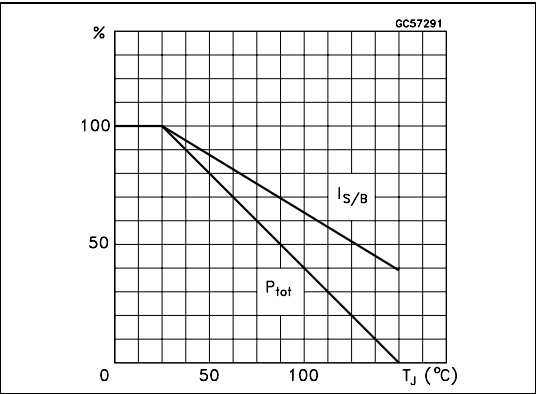


Figure 3. DC-current gain

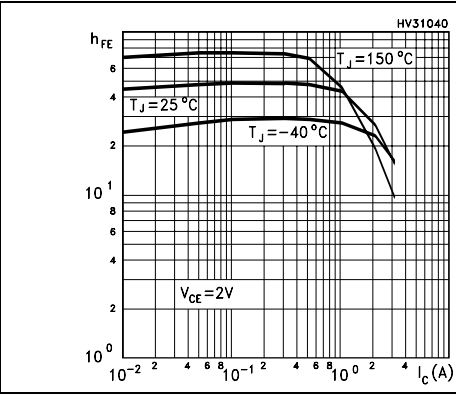


Figure 4. DC-current gain

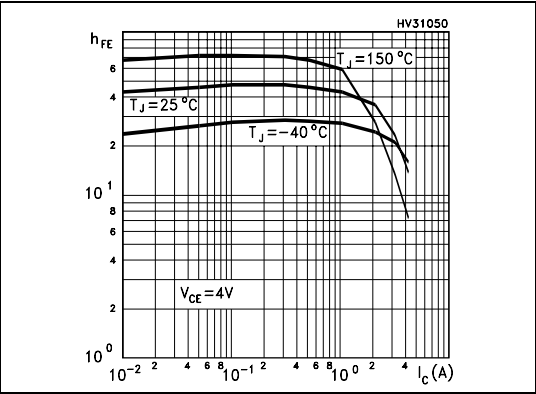


Figure 5. Collector-emitter saturation voltage

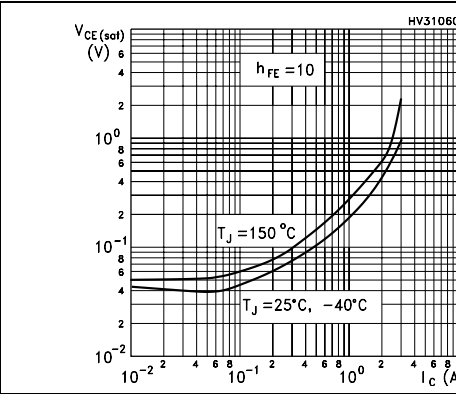


Figure 6. Base-emitter saturation voltage

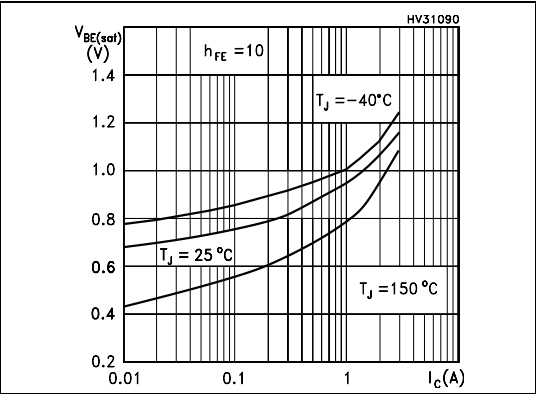
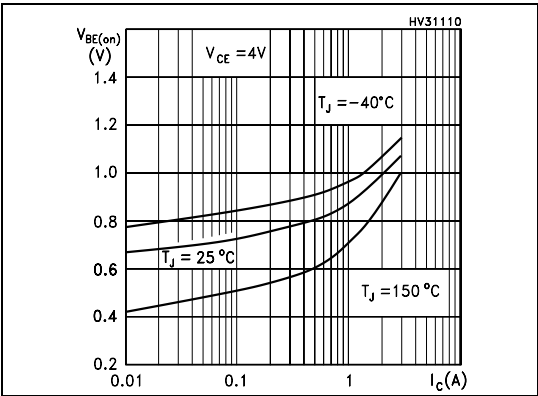


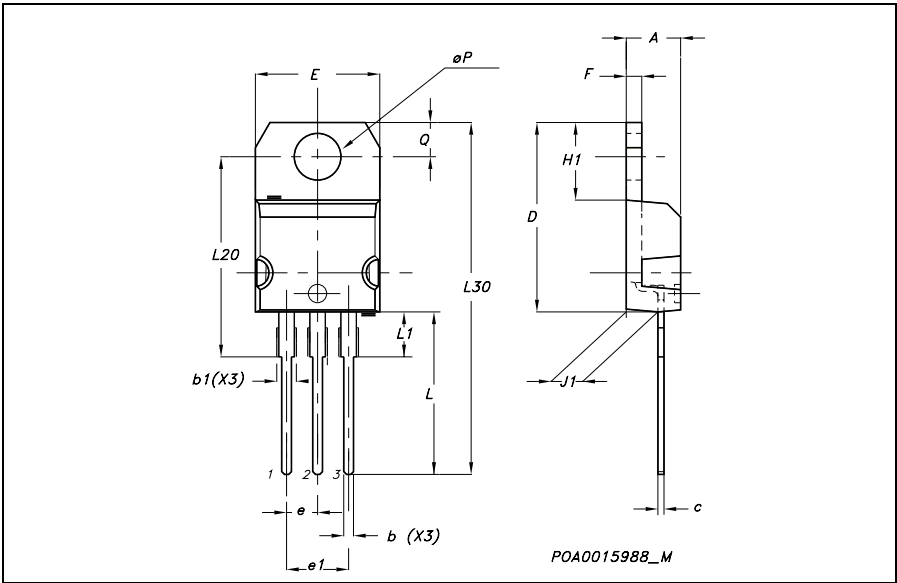
Figure 7. Base-emitter on voltage



### 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-220 MECHANICAL DATA						
DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
b	0.61		0.88	0.024		0.034
b1	1.15		1.70	0.045		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.60		0.620
E	10		10.40	0.393		0.409
e	2.40		2.70	0.094		0.106
e1	4.95		5.15	0.194		0.202
F	1.23		1.32	0.048		0.052
H1	6.20		6.60	0.244		0.256
J1	2.40		2.72	0.094		0.107
L	13		14	0.511		0.551
L1	3.50		3.93	0.137		0.154
L20		16.40			0.645	
L30		28.90			1.137	
øP	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116





## 4 Revision history

**Table 3. Revision history**

Date	Revision	Changes
20-Apr-2006	1	New release

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