

**COMPLEMENTARY SILICON POWER TRANSISTORS**

- SGS-THOMSON PREFERRED SALESTYPES

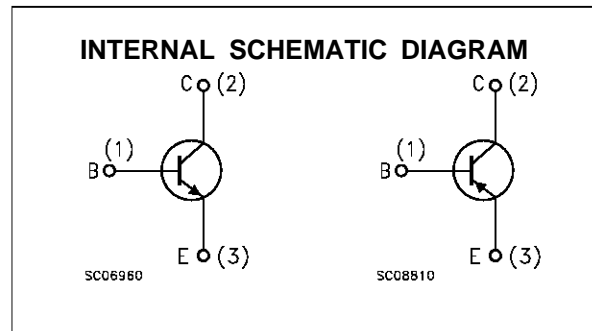
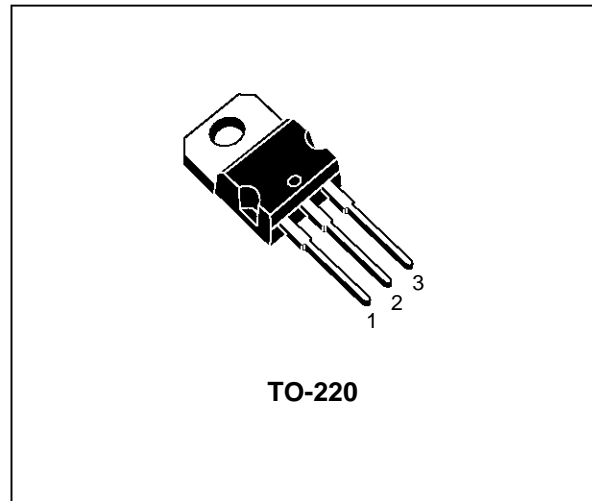
**APPLICATION**

- LINEAR AND SWITCHING INDUSTRIAL EQUIPMENT

**DESCRIPTION**

The TIP31A and TIP31C are silicon epitaxial-base NPN transistors in Jedec TO-220 plastic package, intended for use in medium power linear and switching applications.

TIP32B is PNP power transistor. The complementary PNP types for TIP31A and TIP31C are TIP32A and TIP32C.



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value			Unit
		NPN	TIP31C		
		PNP*	TIP32A	TIP32B	
$V_{CBO}$	Collector-Base Voltage ( $I_E = 0$ )	60	80	100	V
$V_{CEO}$	Collector-Emitter Voltage ( $I_B = 0$ )	60	80	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 $T_{case} \leq 25^\circ C$ $T_{amb} \leq 25^\circ C$	40			W
		2			W
$T_{stg}$	Storage Temperature	-65 to 150			$^\circ C$
$T_j$	Max. Operating Junction Temperature	150			$^\circ C$

\* For PNP types voltage and current values are negative

# TIP31A/TIP31C/TIP32A/TIP32B/TIP32C

## THERMAL DATA

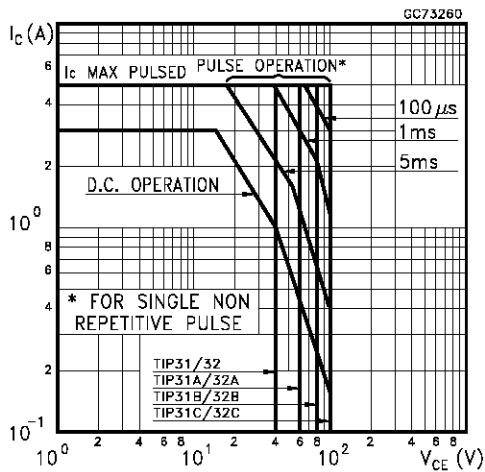
R <sub>thj-case</sub>	Thermal Resistance Junction-case	Max	3.12	°C/W
R <sub>thj-amb</sub>	Thermal Resistance Junction-ambient	Max	62.5	°C/W

## ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

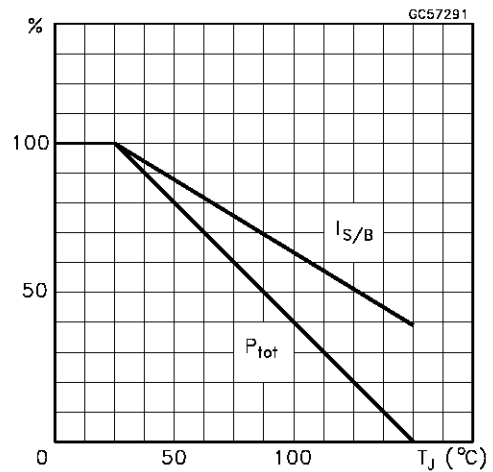
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CEO</sub>	Collector Cut-off Current (I <sub>B</sub> = 0)	for <b>TIP31A/32A</b> V <sub>CE</sub> = 30 V for <b>TIP31C/32B/32C</b> V <sub>CE</sub> = 60 V			0.3	mA
I <sub>CES</sub>	Collector Cut-off Current (V <sub>BE</sub> = 0)	for <b>TIP31A/32A</b> V <sub>CE</sub> = 60 V for <b>TIP/32B</b> V <sub>CE</sub> = 80 V for <b>TIP31C/32C</b> V <sub>CE</sub> = 100 V			0.2	mA
I <sub>EBO</sub>	Emitter Cut-off Current (I <sub>C</sub> = 0)	V <sub>EB</sub> = 5 V			1	mA
V <sub>CEO(sus)*</sub>	Collector-Emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 30 mA for <b>TIP31A/32A</b> for <b>TIP32B</b> for <b>TIP31C/32C</b>	60			V
V <sub>CE(sat)*</sub>	Collector-Emitter Saturation Voltage	I <sub>C</sub> = 3 A I <sub>B</sub> = 375 mA			1.2	V
V <sub>BE*</sub>	Base-Emitter Voltage	I <sub>C</sub> = 3 A V <sub>CE</sub> = 4 V			1.8	V
h <sub>FE*</sub>	DC Current Gain	I <sub>C</sub> = 1 A V <sub>CE</sub> = 4 V I <sub>C</sub> = 3 A V <sub>CE</sub> = 4 V	25		50	
h <sub>fe</sub>	Small Signal Current Gain	I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 10 V f = 1 KHz I <sub>C</sub> = 0.5 A V <sub>CE</sub> = 10 V f = 1 KHz	20			
			3			

\* Pulsed : pulse duration = 300 μs, duty cycle ≤ 2%  
For PNP types voltage and current values are negative.

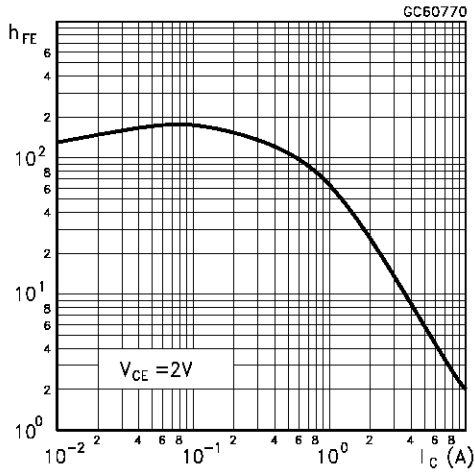
## Safe Operating Area



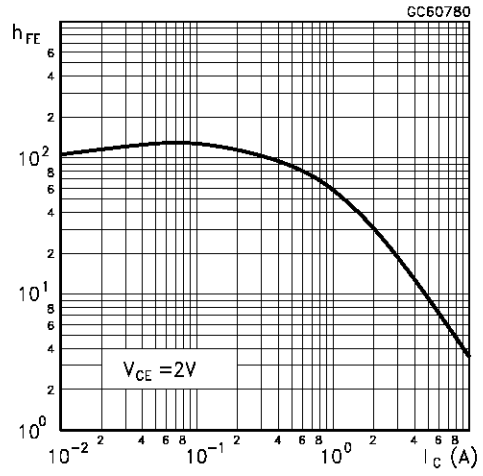
## Derating Curves



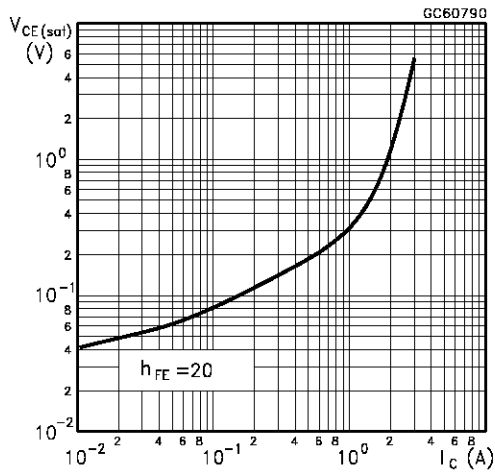
DC Current Gain (NPN type)



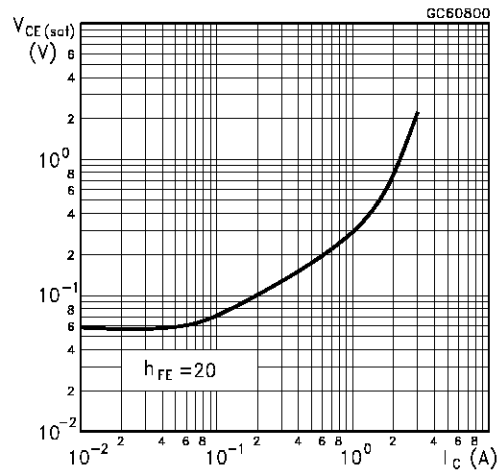
DC Current Gain (PNP type)



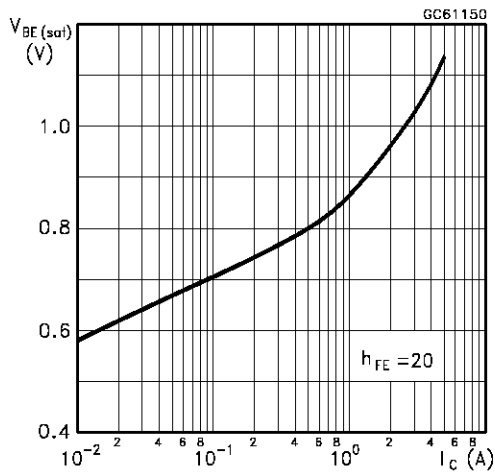
Collector-Emitter Saturation Voltage (NPN type)



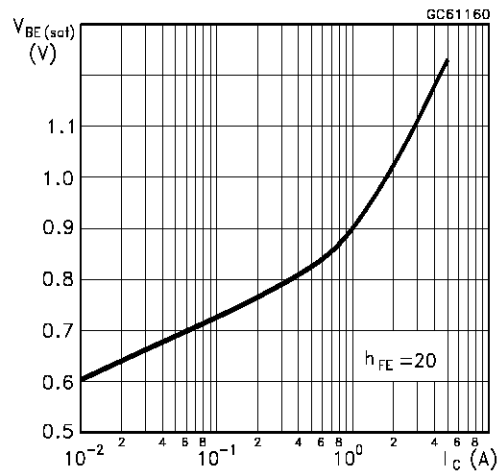
Collector-Emitter Saturation Voltage (PNP type)



Base-Emitter Saturation Voltage (NPN type)

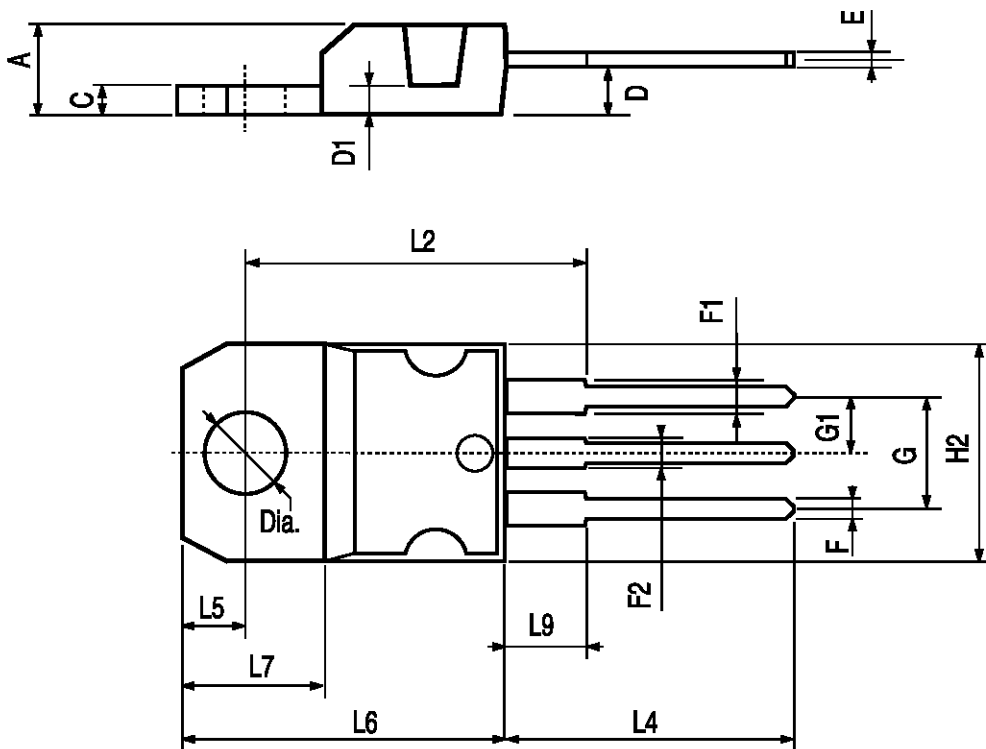


Collector-Base Capacitance (PNP type)



**TO-220 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A	4.40		4.60	0.173		0.181
C	1.23		1.32	0.048		0.051
D	2.40		2.72	0.094		0.107
D1		1.27			0.050	
E	0.49		0.70	0.019		0.027
F	0.61		0.88	0.024		0.034
F1	1.14		1.70	0.044		0.067
F2	1.14		1.70	0.044		0.067
G	4.95		5.15	0.194		0.203
G1	2.4		2.7	0.094		0.106
H2	10.0		10.40	0.393		0.409
L2		16.4			0.645	
L4	13.0		14.0	0.511		0.551
L5	2.65		2.95	0.104		0.116
L6	15.25		15.75	0.600		0.620
L7	6.2		6.6	0.244		0.260
L9	3.5		3.93	0.137		0.154
DIA.	3.75		3.85	0.147		0.151



P011C

Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1997 SGS-THOMSON Microelectronics - Printed in Italy - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES  
Australia - Brazil - Canada - China - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands -  
Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A  
...