

## Complementary power transistors

### Features

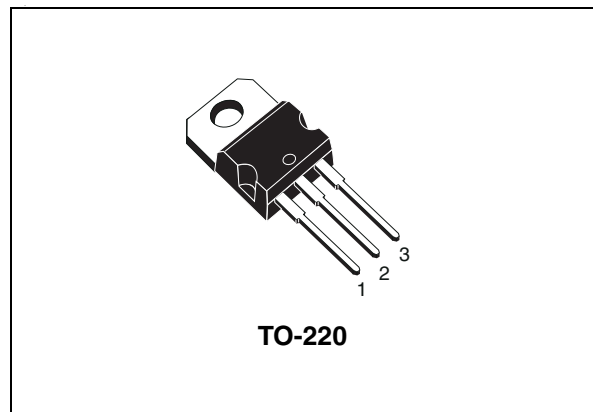
- Complementary PNP-NPN devices
- New enhanced series
- High switching speed
- $h_{FE}$  grouping
- $h_{FE}$  improved linearity

### Applications

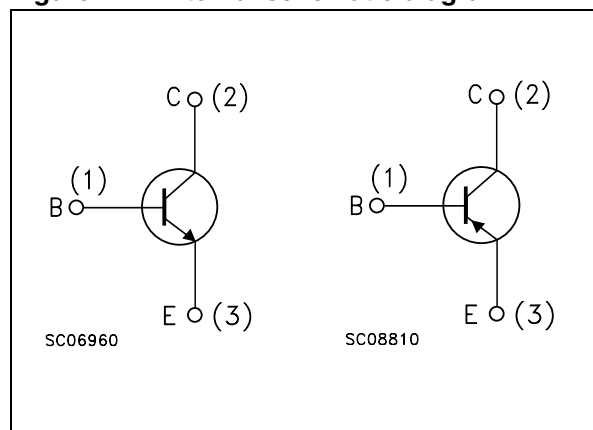
- General purpose circuits
- Audio amplifier
- Power linear and switching

### Description

The TIP41C is a base island technology NPN power transistor in TO-220 plastic package that make this device suitable for audio, power linear and switching applications. The complementary PNP type is TIP42C



**Figure 1. Internal schematic diagram**



**Table 1. Device summary**

Order code	Marking	Package	Packaging
TIP41C ( <i>Note 1 on page 4</i> )	TIP41C R TIP41C O TIP41C Y	TO-220	Tube
TIP42C ( <i>Note 1 on page 4</i> )	TIP42C R TIP42C O TIP42C Y	TO-220	Tube

# 1 Absolute maximum ratings

**Table 2. 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
$V_{EBO}$	Emitte-base voltage ( $I_C = 0$ )	5	V
$I_C$	Collector current	6	A
$I_{CM}$	Collector peak current ( $t_P < 5ms$ )	10	A
$I_B$	Base current	3	A
$P_{TOT}$	Total dissipation at $T_{case} = 25^\circ C$	65	W
$T_{stg}$	Storage temperature	-65 to 150	$^\circ C$
$T_J$	Max. operating junction temperature	150	$^\circ C$

*Note:* For PNP types voltage and current values are negative

## 2 Electrical characteristics

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

**Table 3. Electrical characteristics**

Symbol	Parameter	Test conditions	Min.	Typ.	Max.	Unit
$I_{\text{CEO}}$	Collector cut-off current ( $I_{\text{B}} = 0$ )	$V_{\text{CE}} = 60 \text{ V}$			0.7	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 ( $V_{\text{BE}} = 0$ )	$V_{\text{CE}} = 100 \text{ V}$			0.4	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	$I_{\text{C}} = 6 \text{ A}$ $I_{\text{B}} = 0.6 \text{ A}$			1.5	V
$V_{\text{BE(on)}}^{(1)}$	Base-emitter voltage	$I_{\text{C}} = 6 \text{ A}$ $V_{\text{CE}} = 4 \text{ V}$			2	V
$h_{\text{FE}}^{(1)}$	DC current gain	$I_{\text{C}} = 0.3 \text{ A}$ $V_{\text{CE}} = 4 \text{ V}$ $I_{\text{C}} = 3 \text{ A}$ $V_{\text{CE}} = 4 \text{ V}$ Group R Group O Group Y	30 15 15 24 42		75 28 44 75	

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

**Note:** 1 *Product is pre-selected in DC current gain (group R, group O and group Y). STMicroelectronics reserves the right to ship either groups according to production availability. Please contact your nearest STMicroelectronics sales office for delivery details.*

**Note:** *For PNP types voltage e current values are negative.*

## 2.1 Typical characteristic (curves)

Figure 2. DC current gain (NPN)

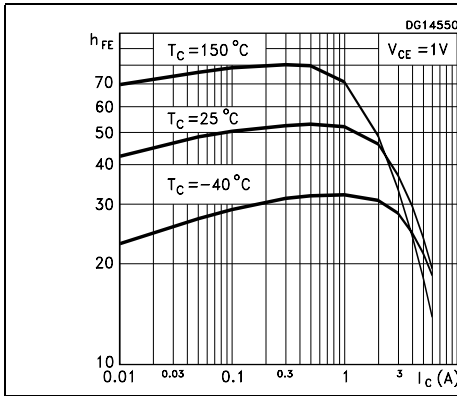


Figure 3. DC current gain (PNP)

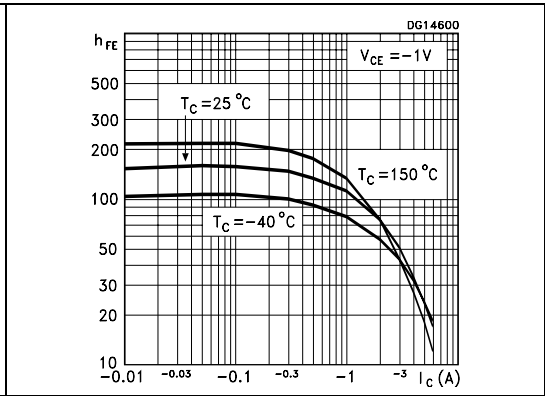


Figure 4. DC current gain (NPN)

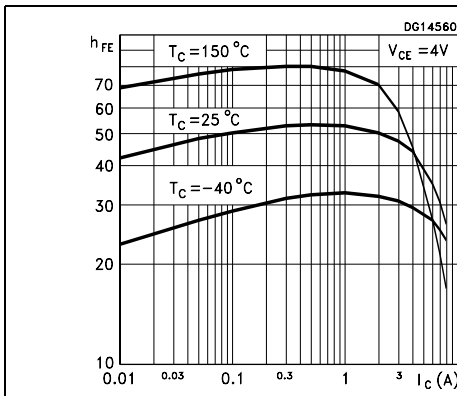


Figure 5. DC current gain (PNP)

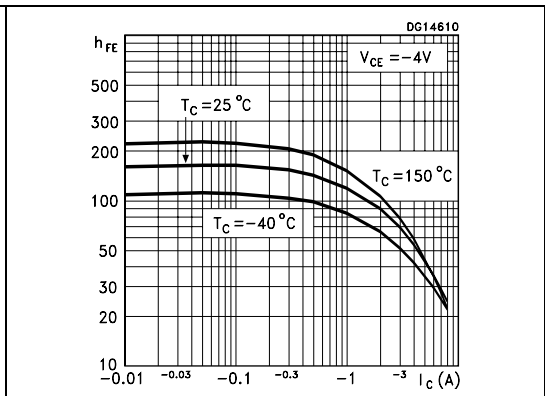


Figure 6. Collector-emitter saturation voltage (NPN)

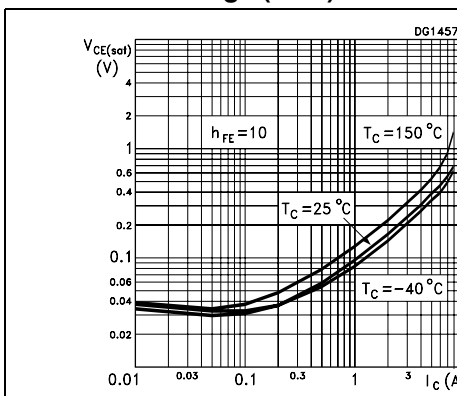
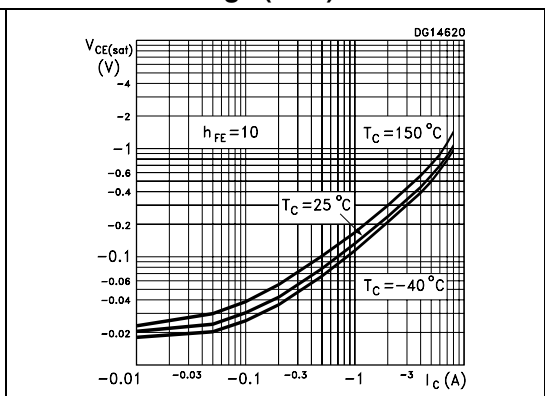
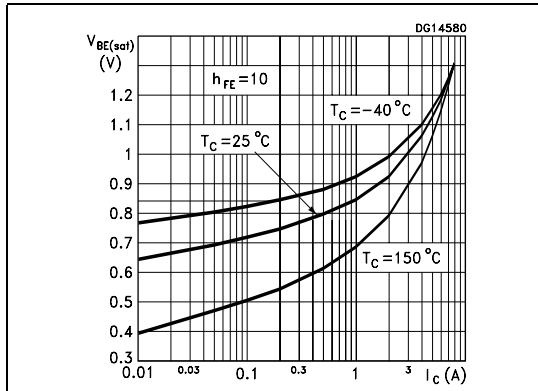


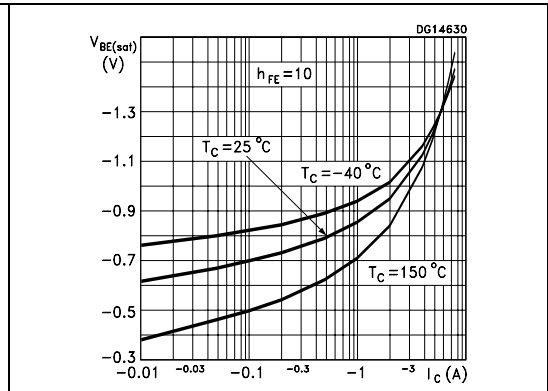
Figure 7. Collector-emitter saturation voltage (PNP)



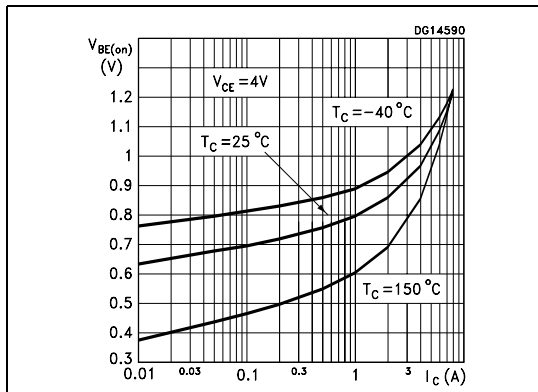
**Figure 8. Base-emitter saturation voltage (NPN)**



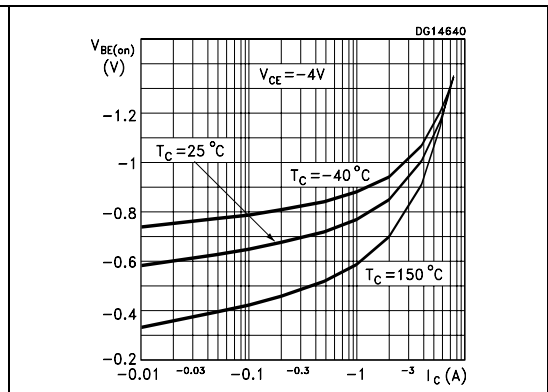
**Figure 9. Base-emitter saturation voltage (PNP)**



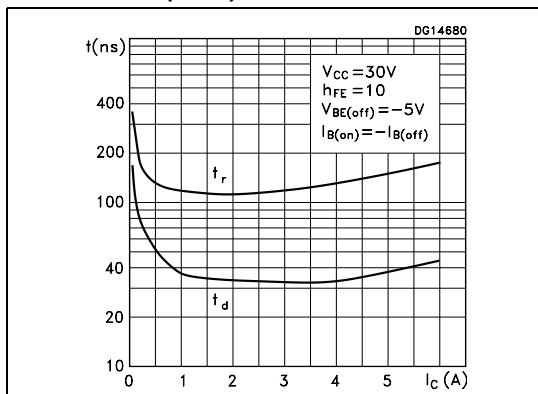
**Figure 10. Base-emitter voltage (NPN)**



**Figure 11. Base-emitter voltage (PNP)**



**Figure 12. Resistive load switching time (NPN)**



**Figure 13. Resistive load switching time (PNP)**

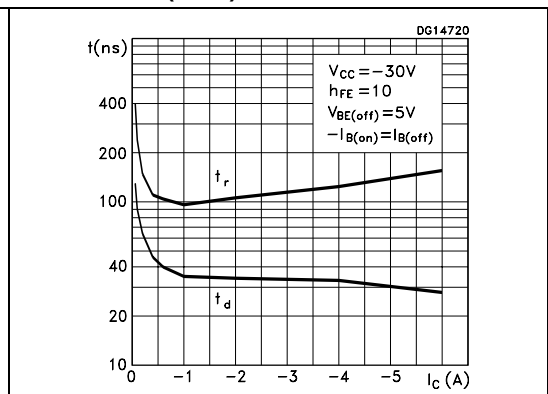


Figure 14. Resistive load switching time (NPN)      Figure 15. Resistive load switching time (PNP)

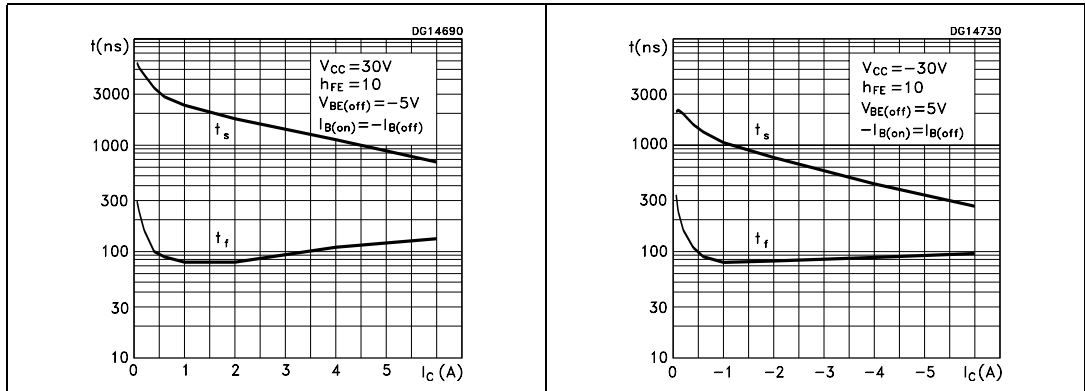
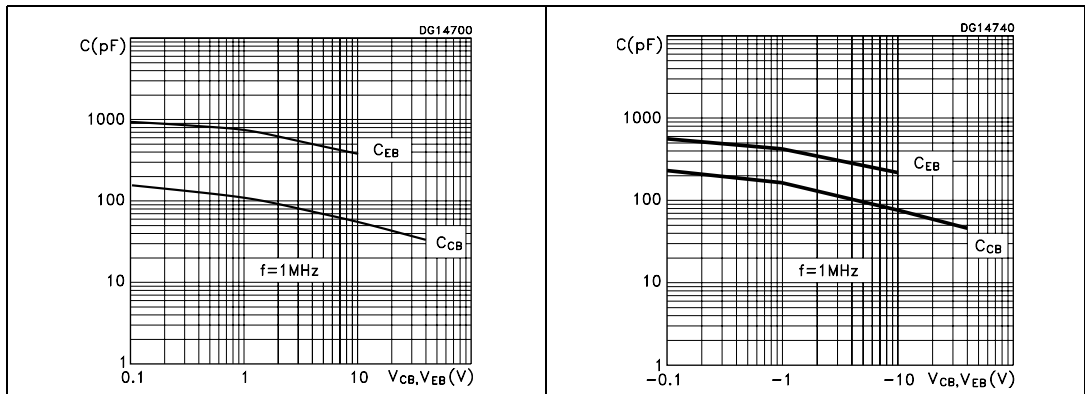


Figure 16. Collector-base and collector-emitter capacitance (NPN)      Figure 17. Collector-base and collector-emitter capacitance (PNP)



## 2.2 Test circuit

Figure 18. Inductive load switching test circuit

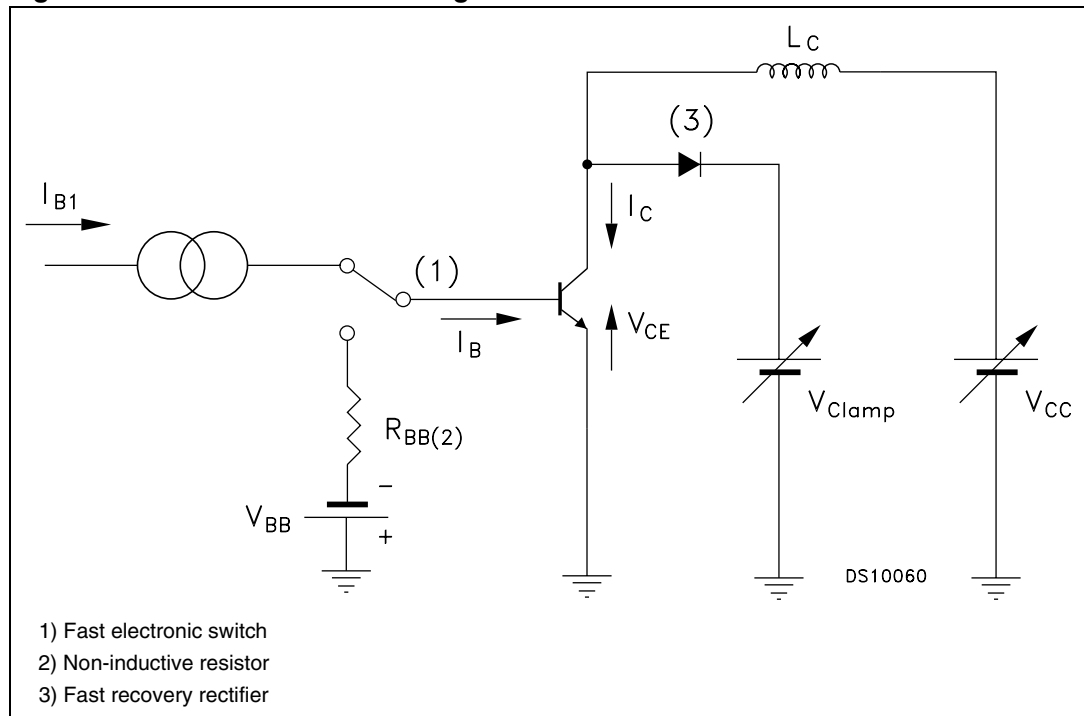
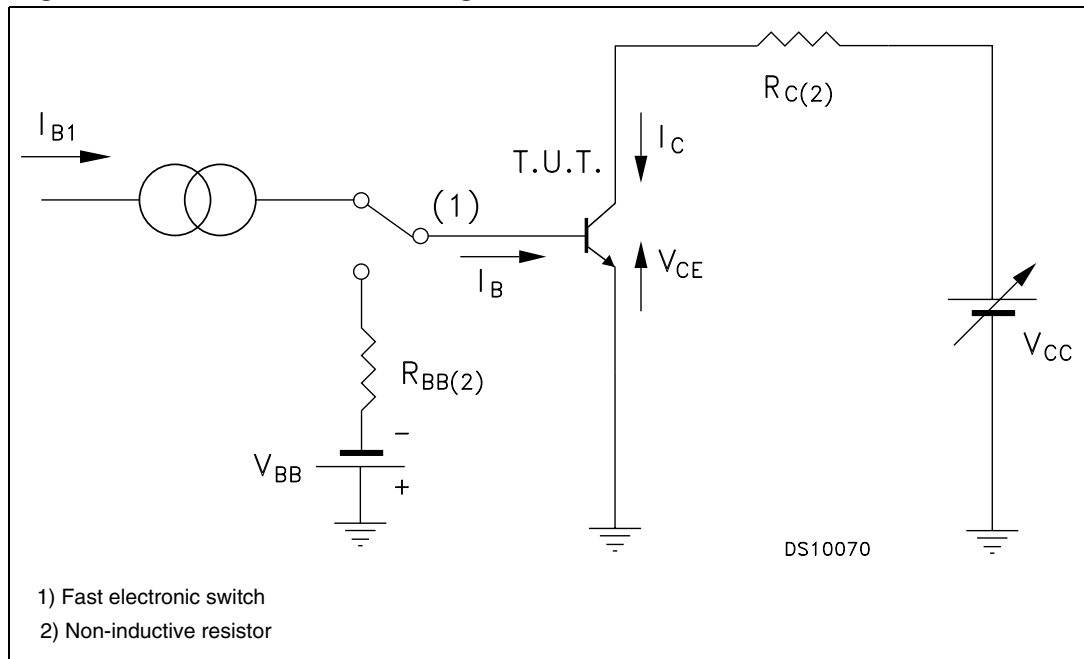


Figure 19. Resistive load switching test circuit



Note: For PNP types voltage e current values are negative.

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	1.14		1.70	0.044		0.066
c	0.49		0.70	0.019		0.027
D	15.25		15.75	0.6		0.62
D1		1.27			0.050	
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		0.051
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	
∅P	3.75		3.85	0.147		0.151
Q	2.65		2.95	0.104		0.116

