# TIP33C
# TIP34C

## Complementary power transistors

## Features

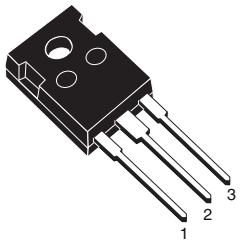
- Low collector-emitter saturation voltage
- Complementary NPN - PNP transistors

## Applications

- General purpose

## Description

The devices are manufactured in epitaxial-base planar technology and are suitable for power linear and switching applications.




**TO-247**

**Figure 1. Internal schematic diagrams**

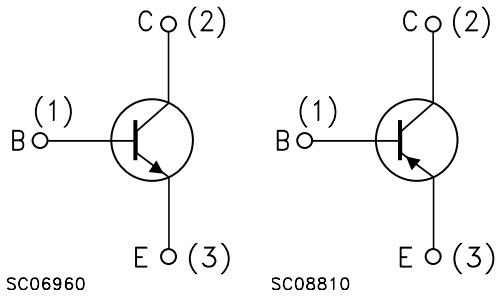



**Table 1. Device summary**

| Order code | Marking | Package | Packaging |
|---|---|---|---|
| TIP33C | TIP33C | TO-247 | Tube |
| TIP34C | TIP34C | | |

# 1 Electrical ratings

**Table 2. Absolute maximum ratings**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| | | NPN | TIP33C | |
| | | PNP | TIP34C | |
| $V_{CBO}$ | Collector-base voltage ($I_E$ = 0) | | 140 | V |
| $V_{CES}$ | Collector-emitter voltage ($V_{BE}$ = 0) | | 140 | 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 | | 10 | A |
| $I_{CM}$ | Collector peak current ($t_P$ < 5 ms) | | 15 | A |
| $I_B$ | Base current | | 3 | A |
| $P_{TOT}$ | Total dissipation at $T_{case}$ = 25 °C | | 80 | W |
| $T_{stg}$ | Storage temperature | | -65 to 150 | °C |
| $T_J$ | Max. operating junction temperature | | 150 | °C |

For PNP type voltage and current values are negative.

**Table 3. Thermal data**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $R_{thj\text{-}case}$ | Thermal resistance junction-case | max | 1.56 | °C/W |

# 2 Electrical characteristics

($T_{case}$ = 25 °C; unless otherwise specified)

**Table 4. Electrical characteristics**

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $I_{CES}$ | Collector cut-off current ($V_{BE}$ = 0) | $V_{CE}$ = 140 V | | | 0.4 | mA |
| $I_{CEO}$ | Collector cut-off current ($I_B$ = 0) | $V_{CE}$ = 60 V | | | 0.7 | mA |
| $I_{EBO}$ | Emitter cut-off current ($I_C$ = 0) | $V_{EB}$ = 5 V | | | 1 | mA |
| $V_{CEO(sus)}$ (1) | Collector-emitter sustaining voltage ($I_B$ = 0) | $I_C$ = 30 mA | 100 | | | V |
| $V_{CE(sat)}$ (1) | Collector-emitter saturation voltage | $I_C$ = 3 A $I_B$ = 0.3 A<br>$I_C$ = 10 A $I_B$ = 2.5 A | | | 1<br>4 | V<br>V |
| $V_{BE(on)}$ (1) | Base-emitter voltage | $I_C$ = 3 A $V_{CE}$ = 4 V<br>$I_C$ = 10 A $V_{CE}$ = 4 V | | | 1.6<br>3 | V<br>V |
| $h_{FE}$ (1) | DC current gain | $I_C$ = 1 A $V_{CE}$ = 4 V<br>$I_C$ = 3 A $V_{CE}$ = 4 V | 40<br>20 | | 100 | |
| $h_{fe}$ | Small signal current gain | $I_C$ = 0.5 A $V_{CE}$ = 10 V<br>f = 1 kHz | 3 | | | |
| $f_T$ | Transition frequency | $I_C$ = 0.5 A $V_{CE}$ = 10 V<br>f = 1 MHz | 3 | | | MHz |
| $t_{on}$<br>$t_s$<br>$t_f$ | Resistive load<br>Turn-on time<br>Storage time<br>Fall time | $V_{CC}$ = 30 V $I_C$ = 6 A<br>$I_{B1}$ = -$I_{B2}$ = 0.6 A $V_{BB}$ = -6 V<br>tp = 20 µs | | 0.6<br>0.4<br>1 | | µs<br>µs<br>µs |

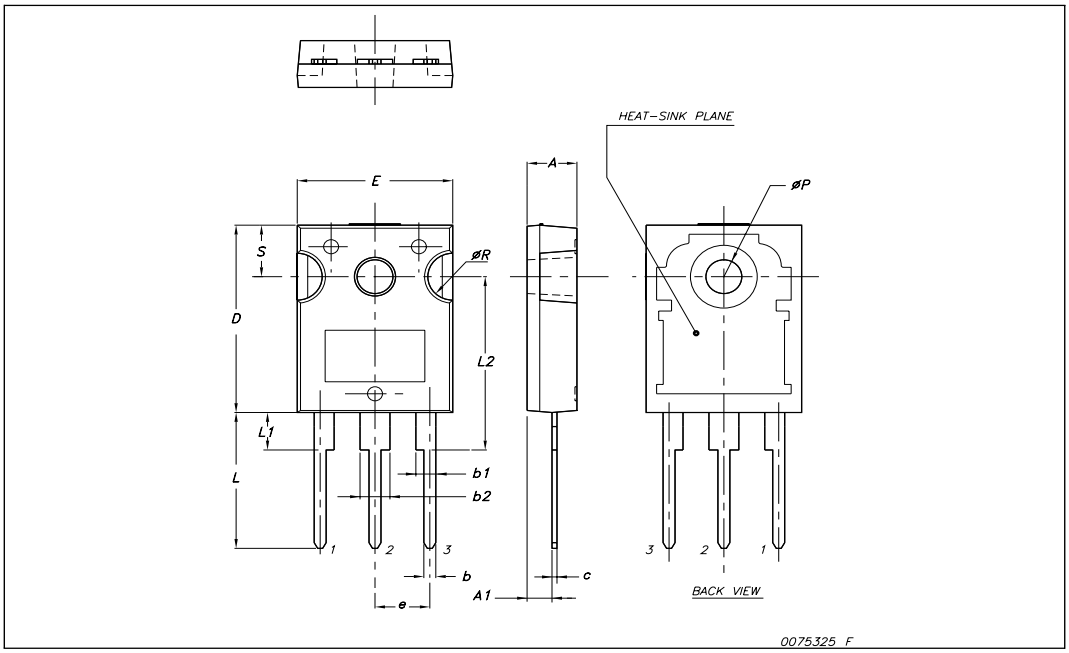
1. Pulsed duration = 300 ms, duty cycle ≥ 1.5%.

# 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

## TO-247 Mechanical data

| Dim. | mm. | | |
|---|---|---|---|
| | Min. | Typ | Max. |
| A | 4.85 | | 5.15 |
| A1 | 2.20 | | 2.60 |
| b | 1.0 | | 1.40 |
| b1 | 2.0 | | 2.40 |
| b2 | 3.0 | | 3.40 |
| c | 0.40 | | 0.80 |
| D | 19.85 | | 20.15 |
| E | 15.45 | | 15.75 |
| e | | 5.45 | |
| L | 14.20 | | 14.80 |
| L1 | 3.70 | | 4.30 |
| L2 | | 18.50 | |
| øP | 3.55 | | 3.65 |
| øR | 4.50 | | 5.50 |
| S | | 5.50 | |



# 4 Revision history

Table 5. Document revision history

| Date | Revision | Changes |
|---|---|---|
| 01-Oct-1999 | 2 | |
| 20-Feb-2008 | 3 | Package change from TO-218 to TO-247. |