# Silicon NPN Power Transistors TIP47/48/49/50

## DESCRIPTION

·With TO-220C package
·High sustaining voltage
: $V_{CEO(sus)}$ = 250~400V
·1A rated collector current

## APPLICATIONS

·High voltage and switching applications

## PINNING

| PIN | DESCRIPTION |
|---|---|
| 1 | Base |
| 2 | Collector;connected to mounting base |
| 3 | Emitter |

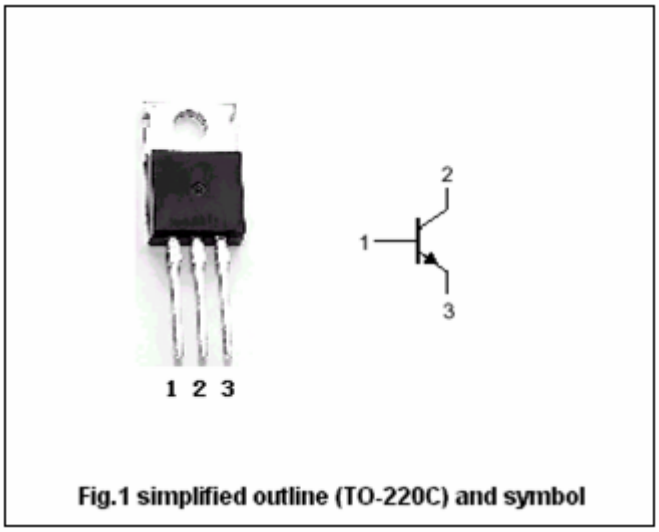

Fig.1 simplified outline (TO-220C) and symbol

## ABSOLUTE MAXIMUM RATINGS($T_C$=25□)

| SYMBOL | PARAMETER | | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| $V_{CBO}$ | Collector-base voltage | TIP47 | Open emitter | 350 | V |
| | | TIP48 | | 400 | |
| | | TIP49 | | 450 | |
| | | TIP50 | | 500 | |
| $V_{CEO}$ | Collector-emitter voltage | TIP47 | Open base | 250 | V |
| | | TIP48 | | 300 | |
| | | TIP49 | | 350 | |
| | | TIP50 | | 400 | |
| $V_{EBO}$ | Emitter-base voltage | | Open collector | 5 | V |
| $I_C$ | Collector current (DC) | | | 1 | A |
| $I_{CM}$ | Collector current-Pulse | | | 2 | A |
| $I_B$ | Base current | | | 0.6 | A |
| $P_C$ | Collector power dissipation | | $T_C$=25□ | 40 | W |
| | | | $T_a$=25□ | 2 | |
| $T_j$ | Junction temperature | | | 150 | □ |
| $T_{stg}$ | Storage temperature | | | -65~150 | □ |

## CHARACTERISTICS

**Tj=25□ unless otherwise specified**

| SYMBOL | PARAMETER | | CONDITIONS | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{CEO(SUS)}$ | Collector-emitter sustaining voltage | TIP47 | $I_C$=30mA; $I_B$=0 | 250 | | | V |
| | | TIP48 | | 300 | | | |
| | | TIP49 | | 350 | | | |
| | | TIP50 | | 400 | | | |
| $V_{CE(sat)}$ | Collector-emitter saturation voltage | | $I_C$=1A ;$I_B$=0.2A | | | 1.0 | V |
| $V_{BE}$ | Base-emitter on voltage | | $I_C$=1A ; $V_{CE}$=10V | | | 1.5 | V |
| $I_{CEX}$ | Collector cut-off current | TIP47 | $V_{CE}$=350V; $V_{BE}$=0 | | | 1 | mA |
| | | TIP48 | $V_{CE}$=400V; $V_{BE}$=0 | | | | |
| | | TIP49 | $V_{CE}$=450V; $V_{BE}$=0 | | | | |
| | | TIP50 | $V_{CE}$=500V; $V_{BE}$=0 | | | | |
| $I_{CEO}$ | Collector cut-off current | TIP47 | $V_{CE}$=150V; $I_B$=0 | | | 1 | mA |
| | | TIP48 | $V_{CE}$=200V; $I_B$=0 | | | | |
| | | TIP49 | $V_{CE}$=250V; $I_B$=0 | | | | |
| | | TIP50 | $V_{CE}$=300V; $I_B$=0 | | | | |
| $I_{EBO}$ | Emitter cut-off current | | $V_{EB}$=5V; $I_C$=0 | | | 1 | mA |
| $h_{FE-1}$ | DC current gain | | $I_C$=0.3A ; $V_{CE}$=10V | 30 | | 150 | |
| $h_{FE-2}$ | DC current gain | | $I_C$=1A ; $V_{CE}$=10V | 10 | | | |
| $f_T$ | Transition frequency | | $I_C$=0.2A ; $V_{CE}$=10V | 10 | | | MHz |

Switching times

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $t_{on}$ | Turn-on time | $V_{CC}$=400V; $5I_{B1}$ = -2.5$I_{B2}$ = $I_C$ = 6A $R_L$ = 66.7Ω | | | 0.5 | μs |
| $t_{stg}$ | Storage time | | | | 3.0 | |
| $t_f$ | Fall time | | | | 0.3 | |

**PACKAGE OUTLINE**

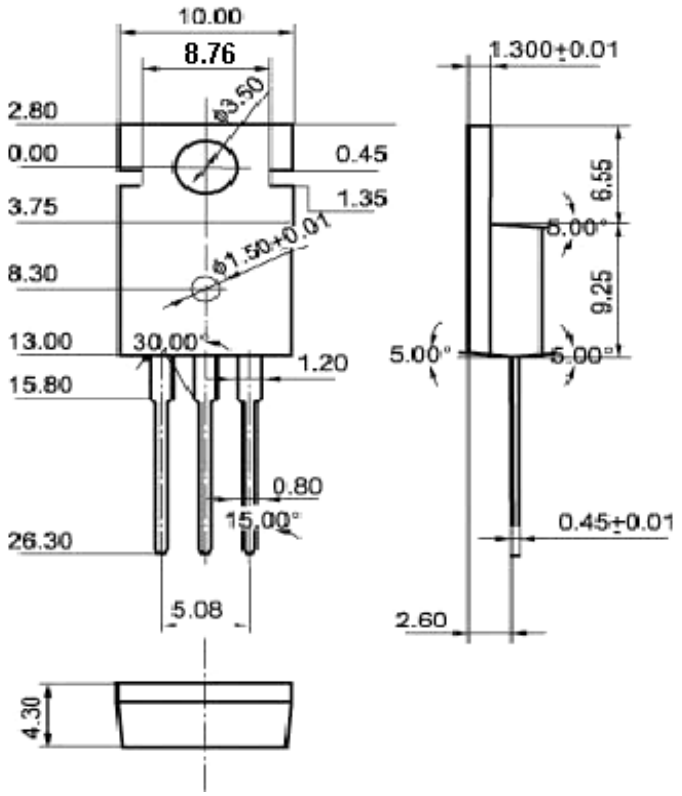


**Fig.2 Outline dimensions (unindicated tolerance:±0.10 mm)**

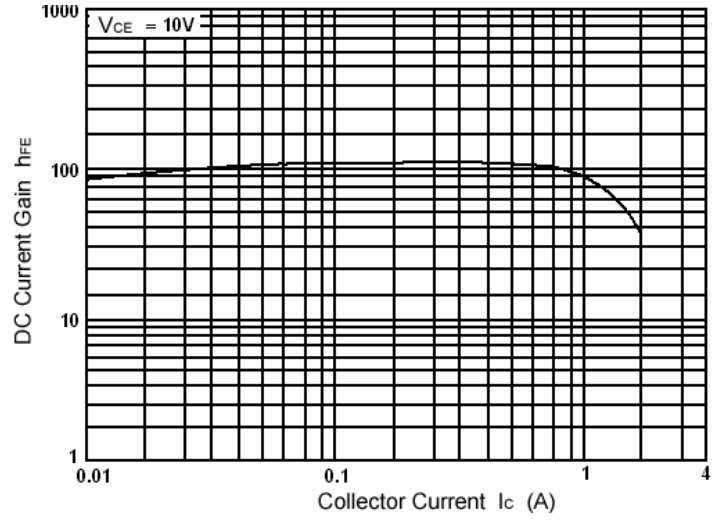


**Fig.3 DC current Gain**

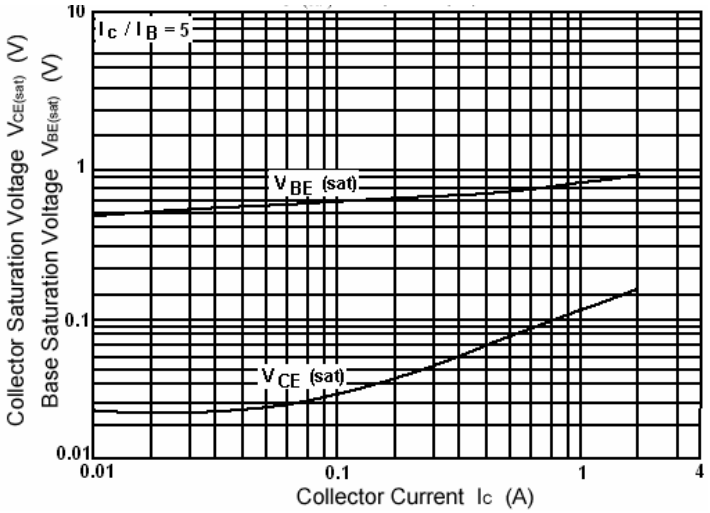


**Fig.4 Base-Emitter Saturation Voltage Collector-Emitter Saturation Voltage**

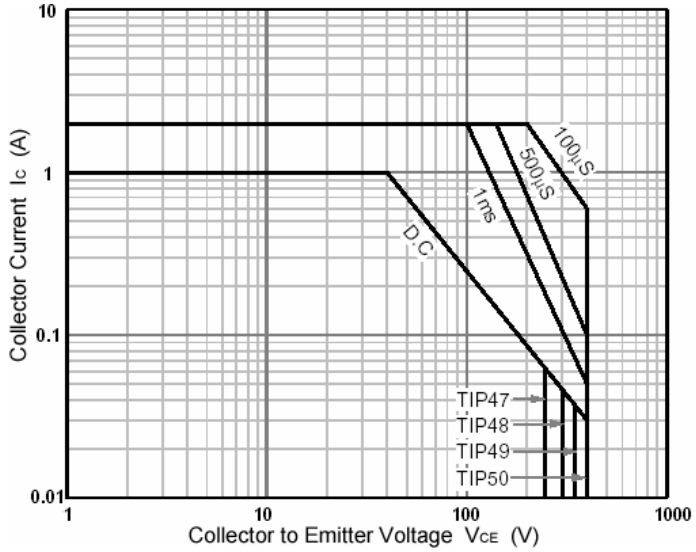


**Fig.5 Safe Operating Area**