

## Silicon NPN Power Transistors

## 2SC3972 2SC3972A

## DESCRIPTION

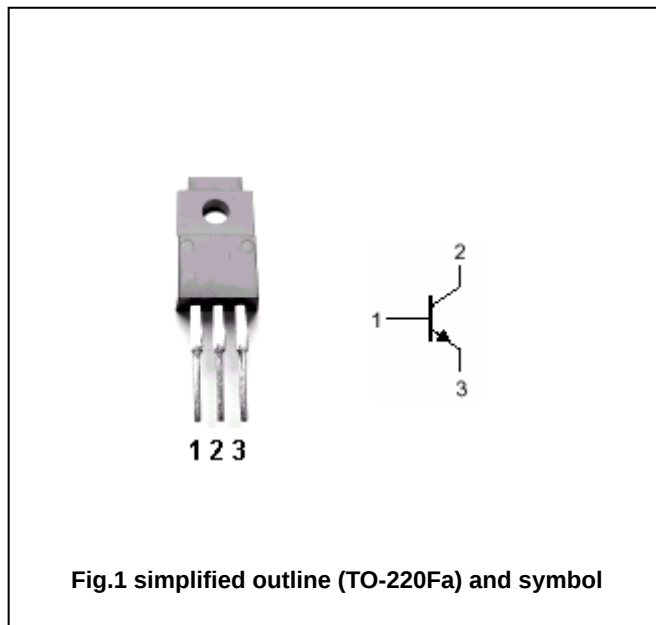
- With TO-220Fa package
- High speed switching
- High  $V_{CBO}$
- Wide area of safe operation

## APPLICATIONS

- For high breakdown voltate ,high-speed switching applications

## PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | Base        |
| 2   | Collector   |
| 3   | Emitter     |

Absolute maximum ratings ( $T_a=25^\circ\text{C}$ )

| SYMBOL    | PARAMETER                   |          | CONDITIONS     | VALUE   | UNIT |
|-----------|-----------------------------|----------|----------------|---------|------|
| $V_{CBO}$ | Collector-base voltage      | 2SC3972  | Open emitter   | 800     | V    |
|           |                             | 2SC3972A |                | 900     |      |
| $V_{CEO}$ | Collector-emitter voltage   |          | Open base      | 500     | V    |
| $V_{EBO}$ | Emitter-base voltage        |          | Open collector | 8       | V    |
| $I_C$     | Collector current (DC)      |          |                | 5       | A    |
| $I_{CM}$  | Collector current-Peak      |          |                | 10      | A    |
| $I_B$     | Base current                |          |                | 3       | A    |
| $P_C$     | Collector power dissipation | $T_C=25$ |                | 40      | W    |
|           |                             | $T_a=25$ |                | 2       |      |
| $T_j$     | Junction temperature        |          |                | 150     |      |
| $T_{stg}$ | Storage temperature         |          |                | -55~150 |      |

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## CHARACTERISTICS

Tj=25 unless otherwise specified

| SYMBOL        | PARAMETER                            |          | CONDITIONS                           | MIN | TYP. | MAX | UNIT |
|---------------|--------------------------------------|----------|--------------------------------------|-----|------|-----|------|
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage  |          | $I_C=10mA$ , $I_B=0$                 | 500 |      |     | V    |
| $V_{CEsat}$   | Collector-emitter saturation voltage |          | $I_C=2A$ ; $I_B=0.4A$                |     |      | 1.0 | V    |
| $V_{BEsat}$   | Base-emitter saturation voltage      |          | $I_C=2A$ ; $I_B=0.4A$                |     |      | 1.5 | V    |
| $I_{CBO}$     | Collector cut-off current            | 2SC3972  | $V_{CB}=800V$ ; $I_E=0$              |     |      | 0.1 | mA   |
|               |                                      | 2SC3972A | $V_{CB}=900V$ ; $I_E=0$              |     |      |     |      |
| $I_{EBO}$     | Emitter cut-off current              |          | $V_{EB}=5V$ ; $I_C=0$                |     |      | 0.1 | mA   |
| $h_{FE-1}$    | DC current gain                      |          | $I_C=0.1A$ ; $V_{CE}=5V$             | 15  |      |     |      |
| $h_{FE-2}$    | DC current gain                      |          | $I_C=2A$ ; $V_{CE}=5V$               | 8   |      |     |      |
| $f_T$         | Transition frequency                 |          | $I_C=0.5A$ ; $V_{CE}=10V$ ; $f=1MHz$ |     | 20   |     | MHz  |

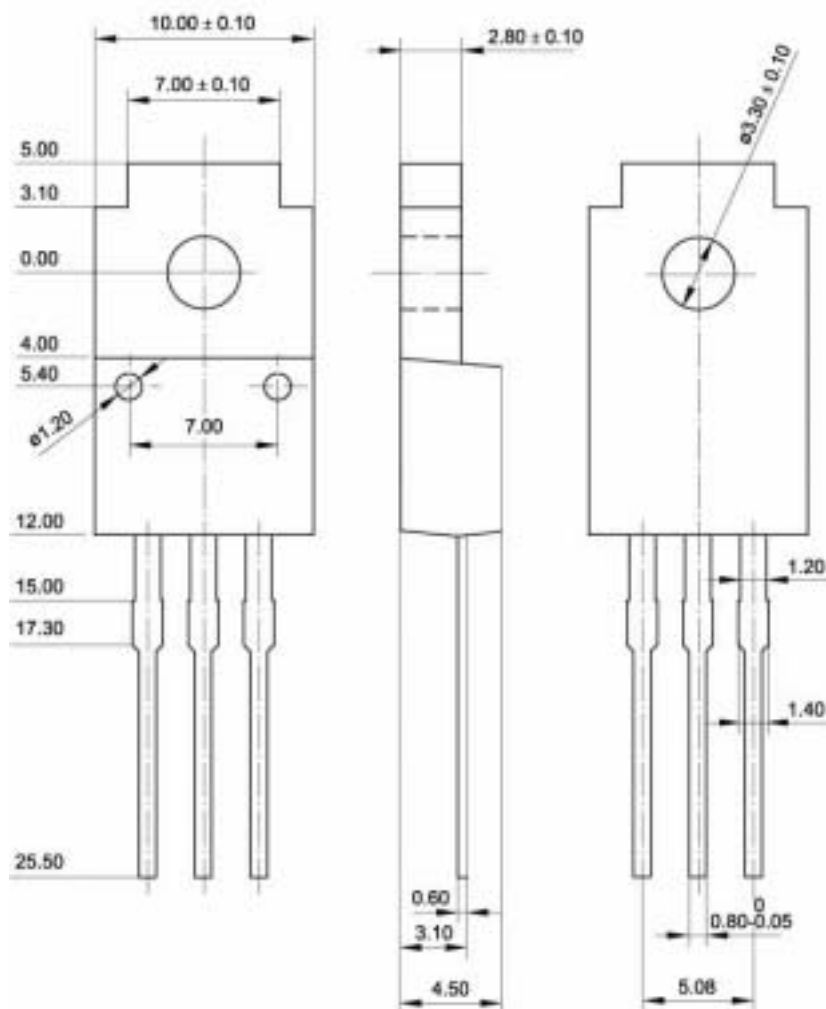
## Switching times

|          |              |                                                            |  |  |     |         |
|----------|--------------|------------------------------------------------------------|--|--|-----|---------|
| $t_{on}$ | Turn-on time | $I_C=2A$ ; $I_{B1}=0.4A$<br>$I_{B2}=-0.8A$ ; $V_{CC}=200V$ |  |  | 1.0 | $\mu s$ |
| $t_s$    | Storage time |                                                            |  |  | 3.0 | $\mu s$ |
| $t_f$    | Fall time    |                                                            |  |  | 0.3 | $\mu s$ |

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## PACKAGE OUTLINE

Fig.2 Outline dimensions (unindicated tolerance:  $\pm 0.15$  mm)

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