# Silicon NPN Power Transistors BUT56 BUT56A

## DESCRIPTION

·With TO-220C package
·High voltage;high speed
·High power dissipation

## APPLICATIONS

·Switching mode power supply

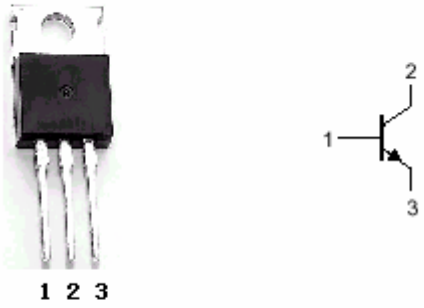



Fig.1 simplified outline (TO-220C) and symbol

### PINNING

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

### Absolut maximum ratings (Ta=25□)

| SYMBOL | PARAMETER | | CONDITIONS | VALUE | UNIT |
|---|---|---|---|---|---|
| $V_{CBO}$ | Collector-base voltage | BUT56 | Open emitter | 800 | V |
| | | BUT56A | | 1000 | |
| $V_{CEO}$ | Collector-emitter voltage | BUT56 | Open base | 400 | V |
| | | BUT56A | | 450 | |
| $V_{EBO}$ | Emitter-base voltage | | Open collector | 6 | V |
| $I_C$ | Collector current | | | 8 | A |
| $I_{CM}$ | Collector current-peak | | | 10 | A |
| $I_{BM}$ | Base current-peak | | | 4 | A |
| $P_{tot}$ | Total power dissipation | | $T_C$=25□ | 100 | W |
| $T_j$ | Junction temperature | | | 150 | □ |
| $T_{stg}$ | Storage temperature | | | -65~150 | □ |

### THERMAL CHARACTERISTICS

| SYMBOL | PARAMETER | MAX | UNIT |
|---|---|---|---|
| $R_{th\ j\text{-}c}$ | Thermal resistance junction to mounting case | 1.25 | K/W |

## CHARACTERISTICS

**Tj=25□ unless otherwise specified**

| SYMBOL | PARAMETER | | CONDITIONS | MIN | TYP. | MAX | UNIT |
|---|---|---|---|---|---|---|---|
| $V_{(BR)CEO}$ | Collector-emitter breakdown voltage | BUT56 | $I_C$=100mA ;$L_C$=125mH | 400 | | | V |
| | | BUT56A | | 450 | | | |
| $V_{(BR)EBO}$ | Emitter-base breakdown voltage | | $I_E$=1mA ;$I_C$=0 | 6 | | | V |
| $V_{CEsat}$ | Collector-emitter saturation voltage | | $I_C$=4A ;$I_B$=0.8A | | | 5.0 | V |
| $V_{BEsat}$ | Base-emitter saturation voltage | | $I_C$=4A ;$I_B$=0.8A | | | 2.0 | V |
| $I_{CES}$ | Collector cut-off current | BUT56 | $V_{CE}$=800V; $V_{BE}$=0 $T_j$=150□ | | | 1.0<br>2.0 | mA |
| | | BUT56A | $V_{CE}$=1000V; $V_{BE}$=0 $T_j$=150□ | | | 1.0<br>2.0 | |
| $h_{FE-1}$ | DC current gain | | $I_C$=1A ; $V_{CE}$=5V | 15 | | 45 | |
| $h_{FE-2}$ | DC current gain | BUT56 | $I_C$=4A ; $V_{CE}$=5V | 5.5 | | | |
| | | BUT56A | $I_C$=3A ; $V_{CE}$=2V | 4 | | | |
| $f_T$ | Transition frequency | | $I_C$=0.5A ;$V_{CE}$=10V;f=1.0MHz | | 10 | | MHz |

Switching times

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $t_{off}$ | Turn-off time | | $I_C$=4A ;$I_{B1}$=-$I_{B2}$=1.25A $t_p$=20μs | | | 4 | μs |
| $t_f$ | Fall time | | | | | 1 | μs |

**PACKAGE OUTLINE**

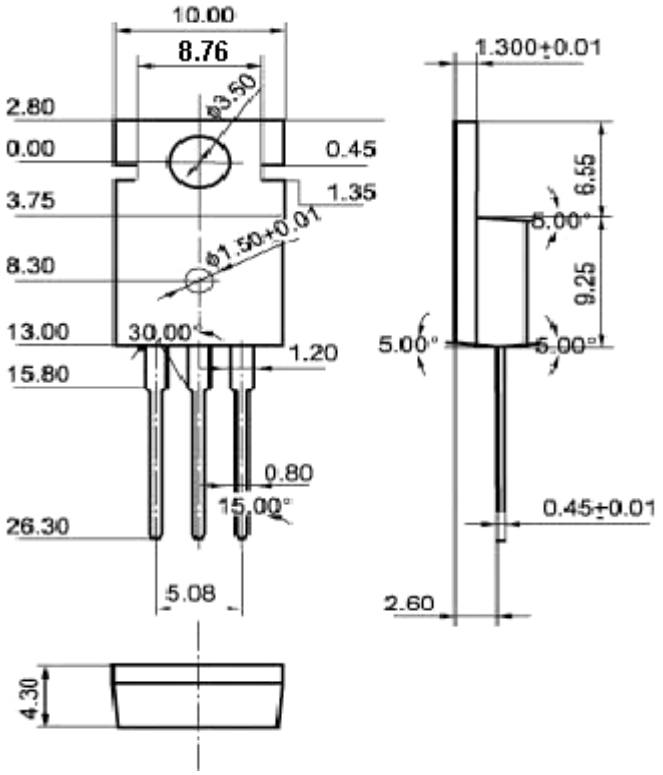



**Fig.2 Outline dimensions (unindicated tolerance:±0.10mm)**