

Silicon NPN Power Transistors

BD645/647/649/651

DESCRIPTION

- With TO-220C package
- Complement to type BD646/648/650/652
- DARLINGTON

APPLICATIONS

- For use in output stages in audio equipment ,general amplifier,and analogue switching applications

PINNING

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

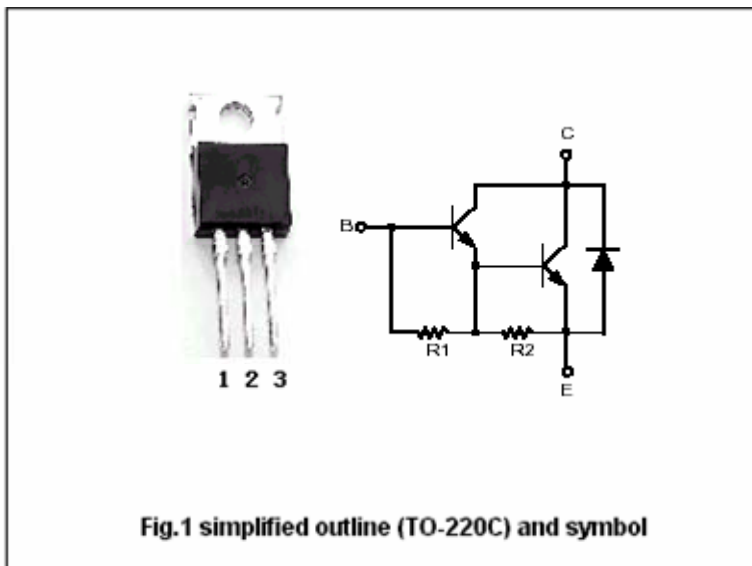


Fig.1 simplified outline (TO-220C) and symbol

Absolute maximum ratings(Ta=25 )

| SYMBOL           | PARAMETER                   | CONDITIONS         | VALUE   | UNIT |   |
|------------------|-----------------------------|--------------------|---------|------|---|
| V <sub>CBO</sub> | Collector-base voltage      | Open emitter       | BD645   | 80   | V |
|                  |                             |                    | BD647   | 100  |   |
|                  |                             |                    | BD649   | 120  |   |
|                  |                             |                    | BD651   | 140  |   |
| V <sub>CEO</sub> | Collector-emitter voltage   | Open base          | BD645   | 60   | V |
|                  |                             |                    | BD647   | 80   |   |
|                  |                             |                    | BD649   | 100  |   |
|                  |                             |                    | BD651   | 120  |   |
| V <sub>EBO</sub> | Emitter-base voltage        | Open collector     | 5       | V    |   |
| I <sub>C</sub>   | Collector current-DC        |                    | 8       | A    |   |
| I <sub>CM</sub>  | Collector current-Pulse     |                    | 12      | A    |   |
| I <sub>B</sub>   | Base current                |                    | 0.3     | mA   |   |
| P <sub>C</sub>   | Collector power dissipation | T <sub>C</sub> =25 | 62.5    | W    |   |
| T <sub>j</sub>   | Junction temperature        |                    | 150     |      |   |
| T <sub>stg</sub> | Storage temperature         |                    | -65~150 |      |   |

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## BD645/647/649/651

## CHARACTERISTICS

T<sub>j</sub>=25 unless otherwise specified

| SYMBOL               | PARAMETER                            |       | CONDITIONS  | MIN  | TYP. | MAX | UNIT |
|----------------------|--------------------------------------|-------|---|--|------|-----|------|
| V <sub>(BR)CEO</sub> | Collector-emitter breakdown voltage  | BD645 | I <sub>C</sub> =30mA, I <sub>B</sub> =0   | 60   |      |     | V    |
|                      |                                      | BD647 |   | 80   |      |     |      |
|                      |                                      | BD649 |   | 100  |      |     |      |
|                      |                                      | BD651 |   | 120  |      |     |      |
| V <sub>CEsat-1</sub> | Collector-emitter saturation voltage |       | I <sub>C</sub> =3A, I <sub>B</sub> =12mA  |  |      | 2.0 | V    |
| V <sub>CEsat-2</sub> | Collector-emitter saturation voltage |       | I <sub>C</sub> =5A, I <sub>B</sub> =50mA  |  |      | 2.5 | V    |
| V <sub>BEsat</sub>   | Base-emitter saturation voltage      |       | I <sub>C</sub> =5A, I <sub>B</sub> =50mA  |  |      | 3.0 | V    |
| V <sub>BE</sub>      | Base-emitter on voltage              |       | I <sub>C</sub> =3A; V <sub>CE</sub> =3V   |  |      | 2.5 | V    |
| I <sub>CBO</sub>     | Collector cut-off current            | BD645 | V <sub>CB</sub> =60V, I <sub>E</sub> =0<br>V <sub>CB</sub> =40V, I <sub>E</sub> =0; T <sub>C</sub> =150 | 0.2  |      | 2.0 | mA   |
|                      |                                      | BD647 |   | V <sub>CB</sub> =80V, I <sub>E</sub> =0<br>V <sub>CB</sub> =50V, I <sub>E</sub> =0; T <sub>C</sub> =150  | 0.2  | 2.0 |      |
|                      |                                      | BD649 |   | V <sub>CB</sub> =100V, I <sub>E</sub> =0<br>V <sub>CB</sub> =60V, I <sub>E</sub> =0; T <sub>C</sub> =150 | 0.2  | 2.0 |      |
|                      |                                      | BD651 |   | V <sub>CB</sub> =120V, I <sub>E</sub> =0<br>V <sub>CB</sub> =70V, I <sub>E</sub> =0; T <sub>C</sub> =150 | 0.2  | 2.0 |      |
| I <sub>CEO</sub>     | Collector cut-off current            | BD645 | V <sub>CE</sub> =30V, I <sub>B</sub> =0   |  |      | 0.5 | mA   |
|                      |                                      | BD647 |   | V <sub>CE</sub> =40V, I <sub>B</sub> =0  |      |     |      |
|                      |                                      | BD649 |   | V <sub>CE</sub> =50V, I <sub>B</sub> =0  |      |     |      |
|                      |                                      | BD651 |   | V <sub>CE</sub> =60V, I <sub>B</sub> =0  |      |     |      |
| I <sub>EBO</sub>     | Emitter cut-off current              |       | V <sub>EB</sub> =5V; I <sub>C</sub> =0  |  |      | 5   | mA   |
| h <sub>FE</sub>      | DC current gain                      |       | I <sub>C</sub> =3A; V <sub>CE</sub> =3V   | 750  |      |     |      |

## THERMAL CHARACTERISTICS

| SYMBOL              | PARAMETER                           | MAX | UNIT |
|---------------------|-------------------------------------|-----|------|
| R <sub>th j-c</sub> | Thermal resistance junction to case | 2.0 | /W   |

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PACKAGE OUTLINE

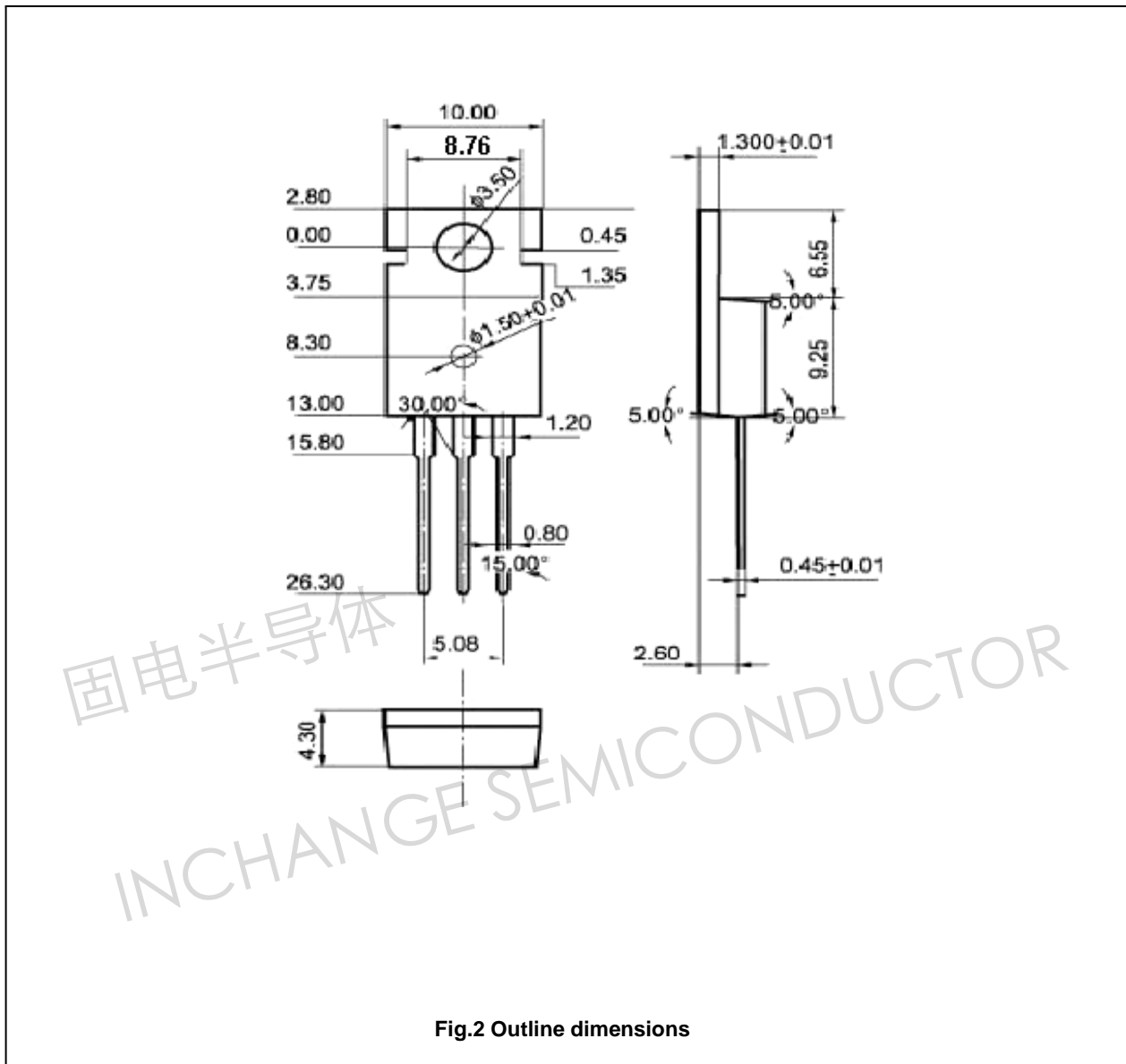


Fig.2 Outline dimensions

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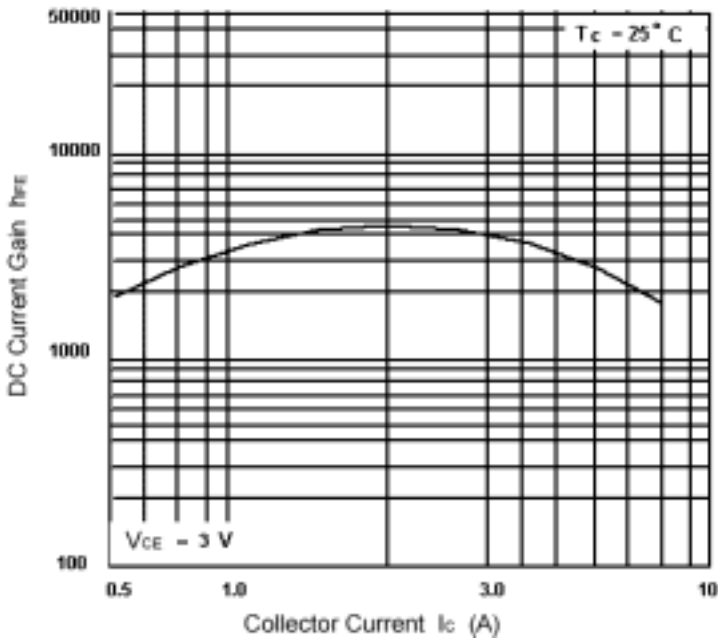


Fig.3 DC current Gain

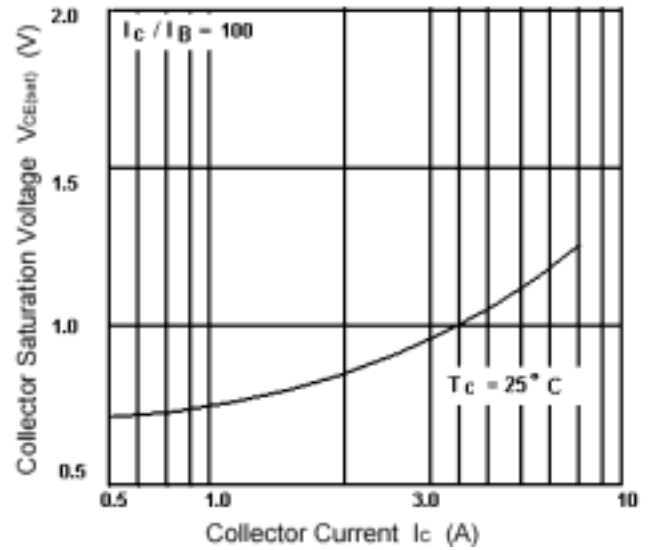


Fig.4 Collector-Emitter Saturation Voltage

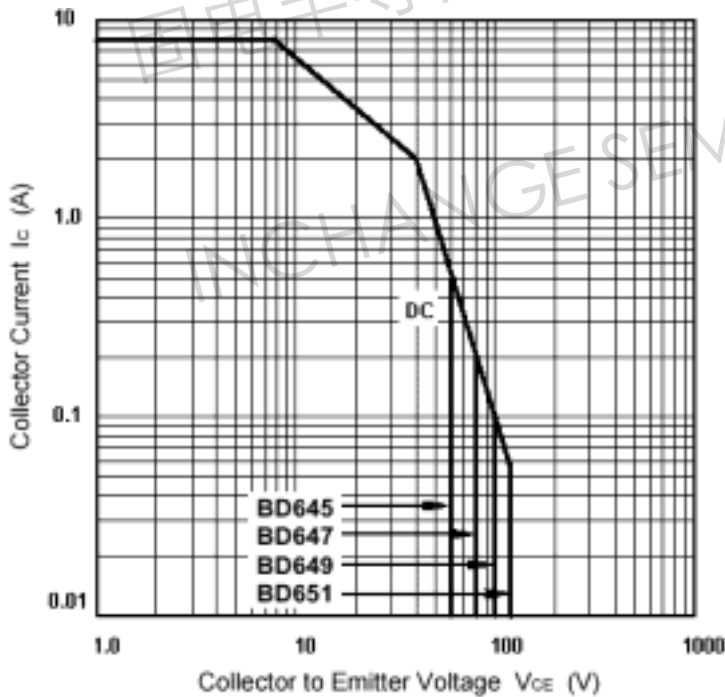


Fig.5 Safe Operating Area

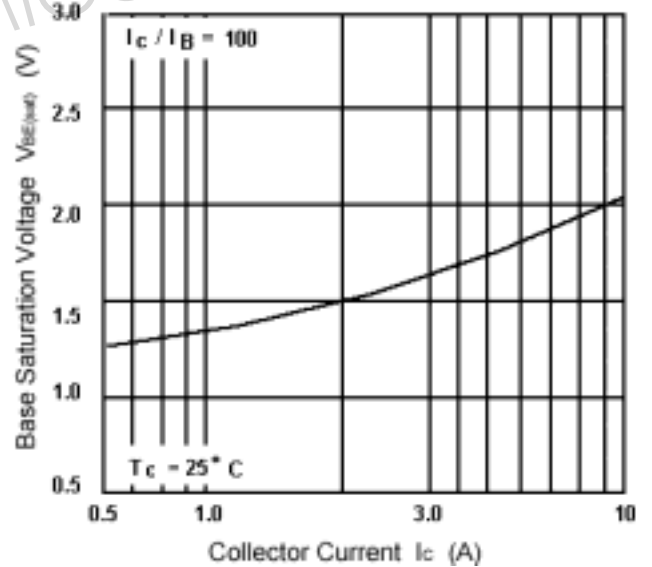


Fig.6 Base-Emitter Saturation Voltage