

**Inchange Semiconductor**

**Product Specification**

**Silicon NPN Power Transistors**

**TIP150/151/152**

**DESCRIPTION**

- With TO-220C package
- DARLINGTON

**APPLICATIONS**

- For use in automotive ignition, switching and motor control applications

**PINNING**

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

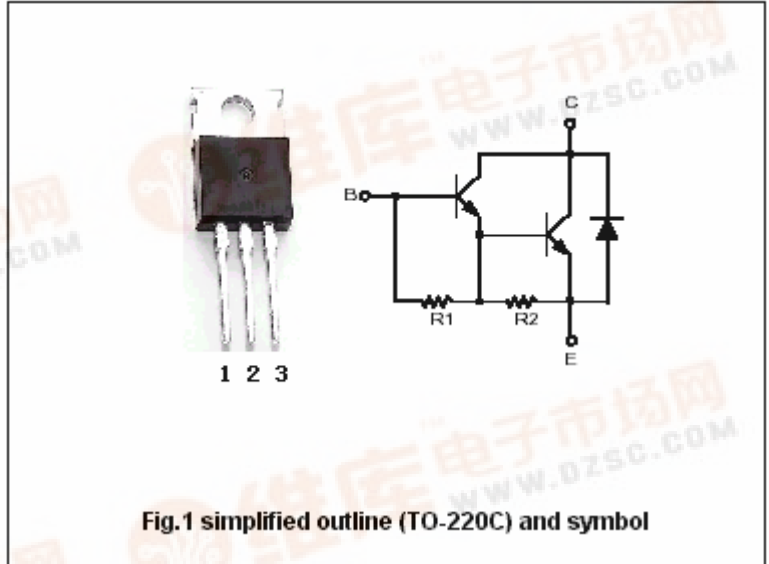


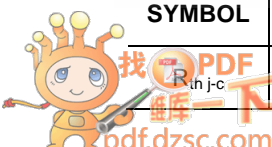
Fig.1 simplified outline (TO-220C) and symbol

**Absolute maximum ratings(Tc=25 )**

| SYMBOL           | PARAMETER                   | CONDITIONS         | VALUE   | UNIT |
|------------------|-----------------------------|--------------------|---------|------|
| V <sub>CBO</sub> | Collector-base voltage      | TIP150             | 300     | V    |
|                  |                             | TIP151             | 350     |      |
|                  |                             | TIP152             | 400     |      |
| V <sub>CEO</sub> | Collector-emitter voltage   | TIP150             | 300     | V    |
|                  |                             | TIP151             | 350     |      |
|                  |                             | TIP152             | 400     |      |
| V <sub>EBO</sub> | Emitter-base voltage        | Open collector     | 8       | V    |
| I <sub>C</sub>   | Collector current-DC        |                    | 7       | A    |
| I <sub>CM</sub>  | Collector current-Pulse     |                    | 10      | A    |
| I <sub>B</sub>   | Base current-DC             |                    | 1.5     | A    |
| P <sub>C</sub>   | Collector power dissipation | T <sub>C</sub> =25 | 80      | W    |
| T <sub>j</sub>   | Junction temperature        |                    | 150     |      |
| T <sub>stg</sub> | Storage temperature         |                    | -65~150 |      |

**THERMAL CHARACTERISTICS**

| SYMBOL               | PARAMETER                           | VALUE | UNIT |
|----------------------|-------------------------------------|-------|------|
| R <sub>th(j-c)</sub> | Thermal resistance junction to case | 1.56  | /W   |



## Silicon NPN Power Transistors

## TIP150/151/152

## 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  | TIP150 | I <sub>C</sub> =10mA, I <sub>B</sub> =0         | 300 |      |     | V    |
|                       |                                      | TIP151 |   | 350 |      |     |      |
|                       |                                      | TIP152 |   | 400 |      |     |      |
| V <sub>(BR)CBO</sub>  | Collector-base breakdown voltage     | TIP150 | I <sub>C</sub> =1mA, I <sub>E</sub> =0          | 300 |      |     | V    |
|                       |                                      | TIP151 |   | 350 |      |     |      |
|                       |                                      | TIP152 |   | 400 |      |     |      |
| V <sub>CEsat-1</sub>  | Collector-emitter saturation voltage |        | I <sub>C</sub> =1A, I <sub>B</sub> =10mA        |     |      | 1.5 | V    |
| V <sub>CEsat-2</sub>  | Collector-emitter saturation voltage |        | I <sub>C</sub> =2A, I <sub>B</sub> =100mA       |     |      | 1.5 | V    |
| V <sub>CEsat-3</sub>  | Collector-emitter saturation voltage |        | I <sub>C</sub> =5A, I <sub>B</sub> =250mA       |     |      | 2.0 | V    |
| V <sub>BE sat-1</sub> | Base-emitter saturation voltage      |        | I <sub>C</sub> =2A, I <sub>B</sub> =100mA       |     |      | 2.2 | V    |
| V <sub>BE sat-2</sub> | Base-emitter saturation voltage      |        | I <sub>C</sub> =5A, I <sub>B</sub> =250mA       |     |      | 2.3 | V    |
| I <sub>CEO</sub>      | Collector cut-off current            | TIP150 | V <sub>CE</sub> =300V, I <sub>B</sub> =0        |     |      | 250 | μA   |
|                       |                                      | TIP151 | V <sub>CE</sub> =350V, I <sub>B</sub> =0        |     |      |     |      |
|                       |                                      | TIP152 | V <sub>CE</sub> =400V, I <sub>B</sub> =0        |     |      |     |      |
| I <sub>EBO</sub>      | Emitter cut-off current              |        | V <sub>EB</sub> =8V; I <sub>C</sub> =0          |     |      | 15  | mA   |
| h <sub>FE-1</sub>     | DC current gain                      |        | I <sub>C</sub> =2.5A; V <sub>CE</sub> =5V       | 150 |      |     |      |
| h <sub>FE-2</sub>     | DC current gain                      |        | I <sub>C</sub> =5A; V <sub>CE</sub> =5V         | 50  |      |     |      |
| h <sub>FE-3</sub>     | DC current gain                      |        | I <sub>C</sub> =7A; V <sub>CE</sub> =5V         | 15  |      |     |      |
| V <sub>F</sub>        | Diode forward voltage                |        | I <sub>F</sub> =7A                              |     |      | 3.5 | V    |
| C <sub>OB</sub>       | Output capacitance                   |        | I <sub>E</sub> =0; V <sub>CB</sub> =10V; f=1MHz |     |      | 150 | pF   |

## Switching times

|                |              |   |  |      |  |    |
|----------------|--------------|---|--|------|--|----|
| t <sub>d</sub> | Delay time   | V <sub>CC</sub> =250V; I <sub>C</sub> =5A<br>I <sub>B1</sub> =-I <sub>B2</sub> =250mA<br>t <sub>p</sub> =20 μs; Duty Cycle 2.0% |  | 0.03 |  | μs |
| t <sub>r</sub> | Rise time    |   |  | 0.18 |  | μs |
| t <sub>s</sub> | Storage time |   |  | 3.5  |  | μs |
| t <sub>f</sub> | Fall time    |   |  | 1.6  |  | μs |

PACKAGE OUTLINE

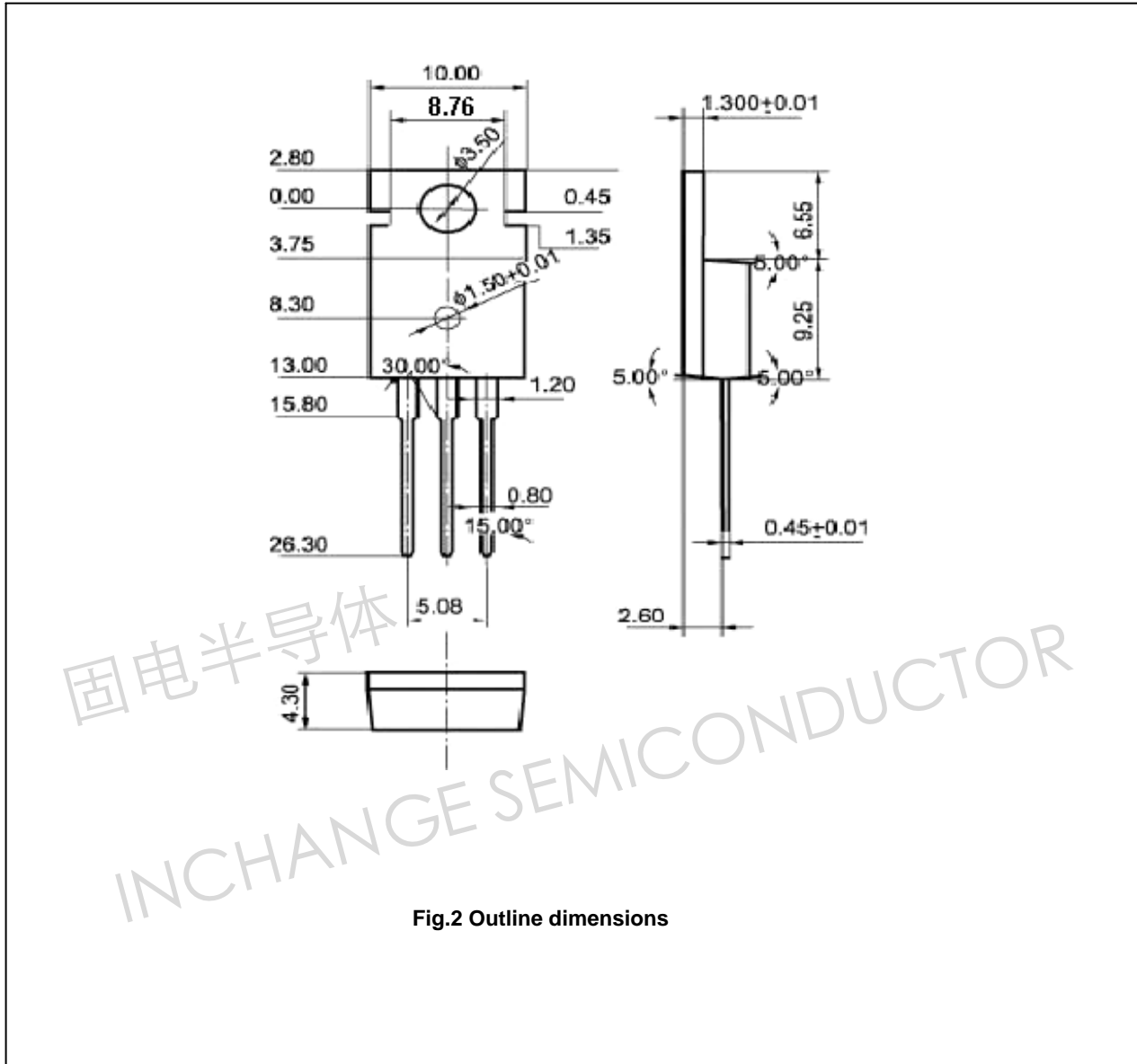


Fig.2 Outline dimensions