

# TO-251-3L Plastic-Encapsulate Transistors

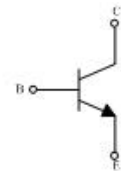
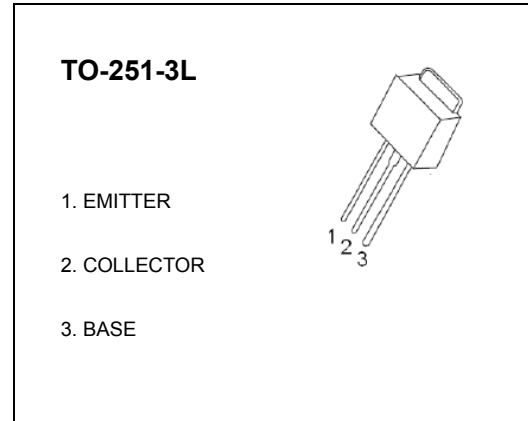
## 3DD13001 TRANSISTOR (NPN)

### FEATURES

- power switching applications

### MAXIMUM RATINGS (T<sub>A</sub>=25°C unless otherwise noted)

| Symbol           | Parameter                     | Value    | Units |
|------------------|-------------------------------|----------|-------|
| V <sub>CBO</sub> | Collector -Base Voltage       | 600      | V     |
| V <sub>CEO</sub> | Collector-Emitter Voltage     | 400      | V     |
| V <sub>EBO</sub> | Emitter-Base Voltage          | 7        | V     |
| I <sub>C</sub>   | Collector Current -Continuous | 0.2      | A     |
| P <sub>C</sub>   | Collector Power Dissipation   | 1.25     | W     |
| T <sub>J</sub>   | Junction Temperature          | 150      | °C    |
| T <sub>stg</sub> | Storage Temperature           | -55~+150 | °C    |



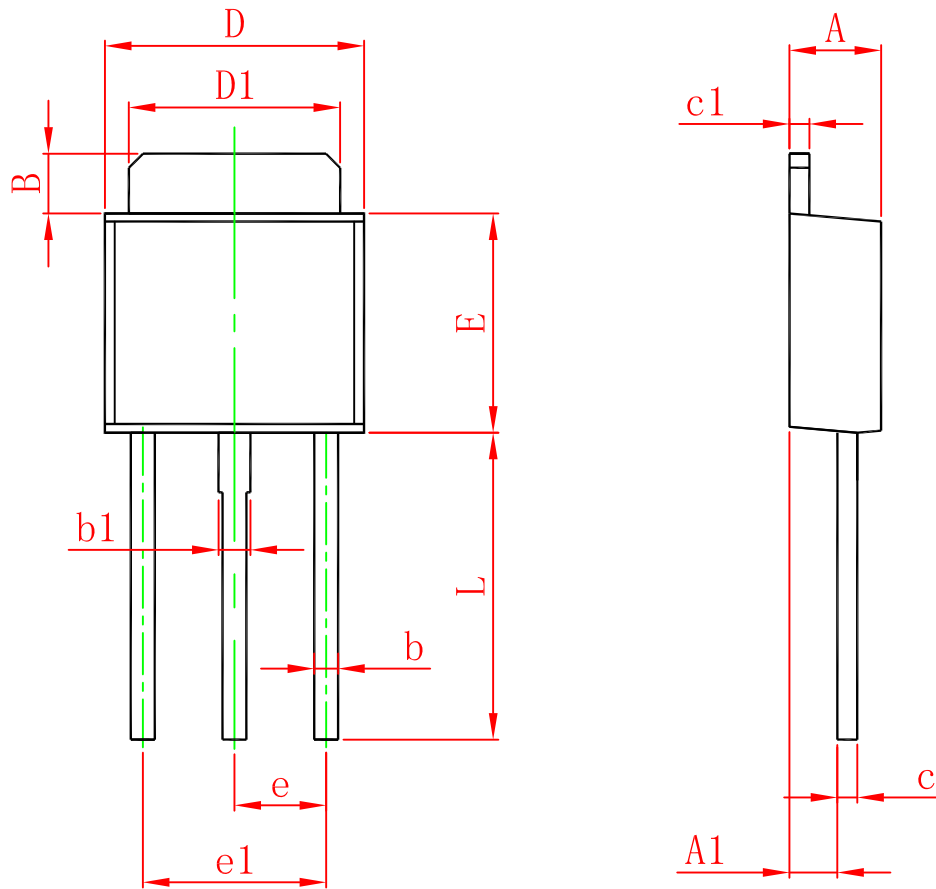
### ELECTRICAL CHARACTERISTICS (T<sub>A</sub>=25°C unless otherwise specified)

| Parameter                            | Symbol               | Test conditions  | Min | Typ | Max | Unit |
|--------------------------------------|----------------------|--|-----|-----|-----|------|
| Collector-base breakdown voltage     | V <sub>(BR)CBO</sub> | I <sub>C</sub> = 100μA, I <sub>E</sub> =0  | 600 |     |     | V    |
| Collector-emitter breakdown voltage  | V <sub>(BR)CEO</sub> | I <sub>C</sub> = 1mA, I <sub>B</sub> =0  | 400 |     |     | V    |
| Emitter-base breakdown voltage       | V <sub>(BR)EBO</sub> | I <sub>E</sub> = 100μA, I <sub>C</sub> =0  | 7   |     |     | V    |
| Collector cut-off current            | I <sub>CBO</sub>     | V <sub>CB</sub> = 600V, I <sub>E</sub> =0  |     |     | 100 | μA   |
| Collector cut-off current            | I <sub>CEO</sub>     | V <sub>CE</sub> = 400V, I <sub>B</sub> =0  |     |     | 200 | μA   |
| Emitter cut-off current              | I <sub>EBO</sub>     | V <sub>EB</sub> =7V, I <sub>C</sub> =0   |     |     | 100 | μA   |
| DC current gain                      | h <sub>FE(1)</sub>   | V <sub>CE</sub> = 20V, I <sub>C</sub> = 20mA   | 10  |     | 40  |      |
|                                      | h <sub>FE(2)</sub>   | V <sub>CE</sub> = 10V, I <sub>C</sub> = 0.25 mA  | 5   |     |     |      |
| Collector-emitter saturation voltage | V <sub>CE(sat)</sub> | I <sub>C</sub> = 50mA, I <sub>B</sub> = 10 mA  |     |     | 0.5 | V    |
| Base-emitter saturation voltage      | V <sub>BE(sat)</sub> | I <sub>C</sub> = 50 mA, I <sub>B</sub> = 10mA  |     |     | 1.2 | V    |
| Transition frequency                 | f <sub>T</sub>       | V <sub>CE</sub> = 20V, I <sub>C</sub> =20mA<br>f = 1MHz                                | 8   |     |     | MHz  |
| Fall time                            | t <sub>f</sub>       | I <sub>C</sub> =50mA, V <sub>CC</sub> =45V,<br>I <sub>B1</sub> =-I <sub>B2</sub> =5mA, |     |     | 0.3 | μs   |
| Storage time                         | t <sub>s</sub>       |  |     |     | 1.5 | μs   |

### CLASSIFICATION of h<sub>FE(1)</sub>

| Range | 10-13 | 13-16 | 16-19 | 19-22 | 22-25 | 25-28 | 28-31 | 31-34 | 34-37 | 37-40 |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|       |       |       |       |       |       |       |       |       |       |       |

# TO-251-3L Package Outline Dimensions



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 2.200                     | 2.400 | 0.087                | 0.094 |
| A1     | 1.050                     | 1.350 | 0.042                | 0.054 |
| B      | 1.350                     | 1.650 | 0.053                | 0.065 |
| b      | 0.500                     | 0.700 | 0.020                | 0.028 |
| b1     | 0.700                     | 0.900 | 0.028                | 0.035 |
| c      | 0.430                     | 0.580 | 0.017                | 0.023 |
| c1     | 0.430                     | 0.580 | 0.017                | 0.023 |
| D      | 6.350                     | 6.650 | 0.250                | 0.262 |
| D1     | 5.200                     | 5.400 | 0.205                | 0.213 |
| E      | 5.400                     | 5.700 | 0.213                | 0.224 |
| e      | 2.300 TYP.                |       | 0.091 TYP.           |       |
| e1     | 4.500                     | 4.700 | 0.177                | 0.185 |
| L      | 7.500                     | 7.900 | 0.295                | 0.311 |