

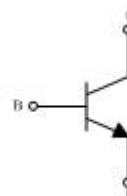
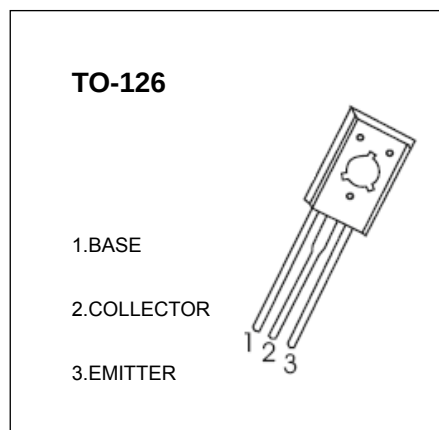
## TO-126 Plastic-Encapsulate Transistors

### 3DD13002 TRANSISTOR (NPN)

▪ power switching applications

#### MAXIMUM RATINGS ( $T_a=25^{\circ}\text{C}$ unless otherwise noted)

| Symbol    | Parameter                     | Value   | Unit               |
|-----------|-------------------------------|---------|--------------------|
| $V_{CBO}$ | Collector -Base Voltage       | 600     | V                  |
| $V_{CEO}$ | Collector-Emitter Voltage     | 400     | V                  |
| $V_{EBO}$ | Emitter-Base Voltage          | 6       | V                  |
| $I_C$     | Collector Current -Continuous | 1       | A                  |
| $P_C$     | Collector Power Dissipation   | 1.25    | W                  |
| $T_J$     | Junction Temperature          | 150     | $^{\circ}\text{C}$ |
| $T_{stg}$ | Storage Temperature           | -55~150 | $^{\circ}\text{C}$ |



#### ELECTRICAL CHARACTERISTICS ( $T_a=25^{\circ}\text{C}$ unless otherwise specified)

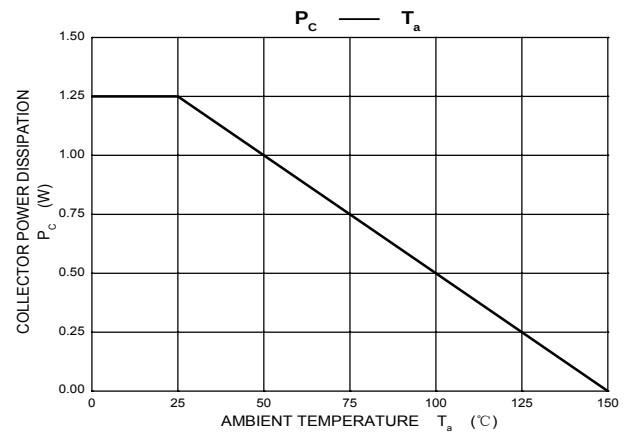
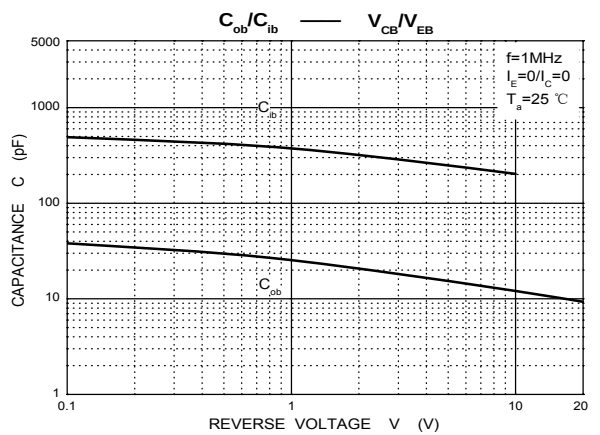
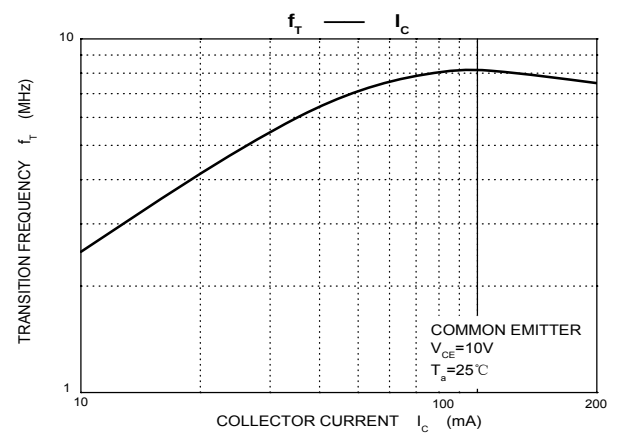
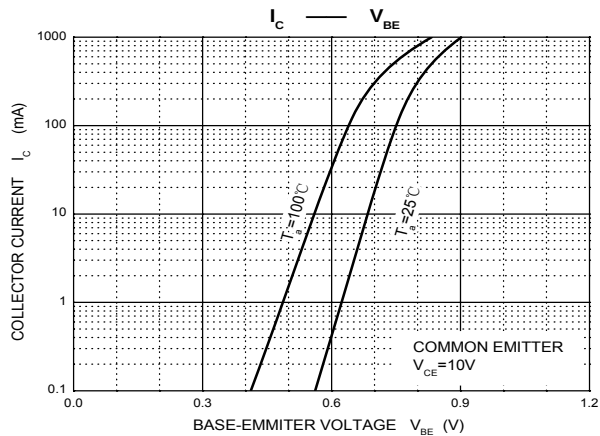
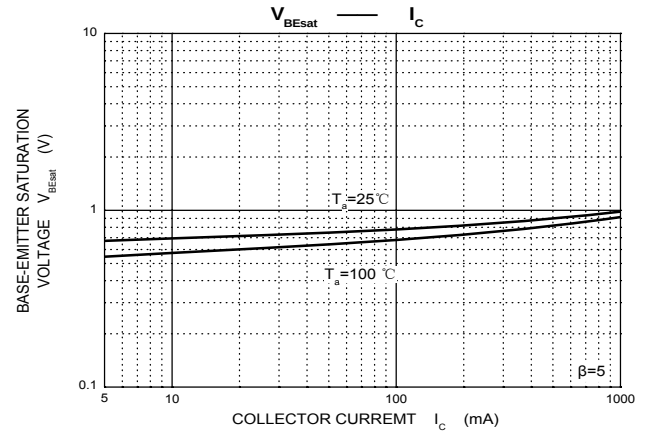
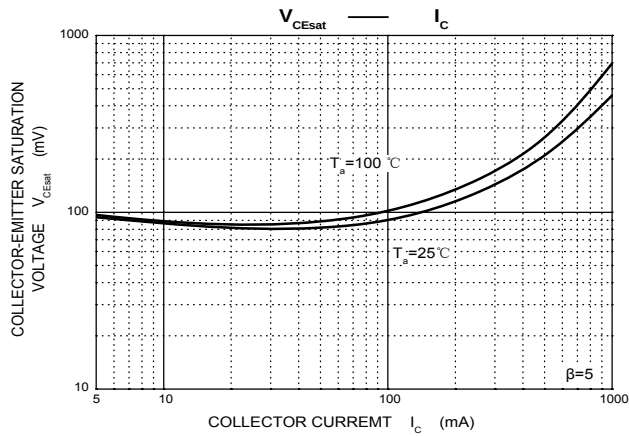
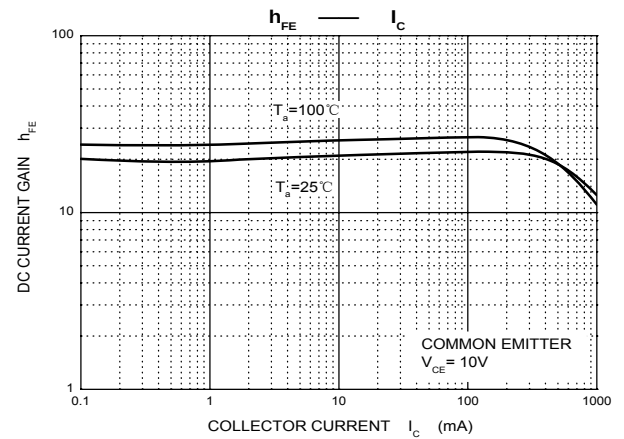
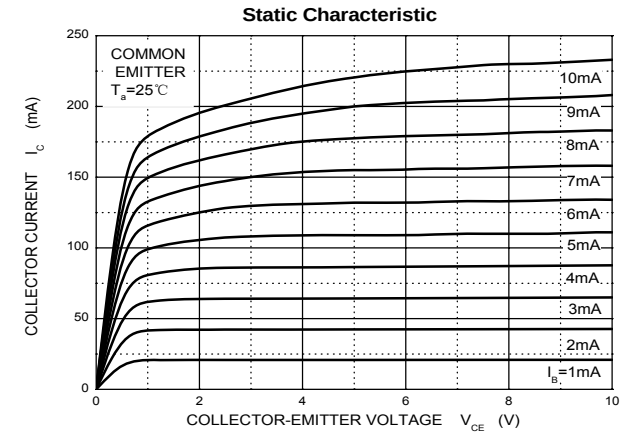
| Parameter                            | Symbol        | Test conditions                                                        | Min | Typ | Max | Unit          |
|--------------------------------------|---------------|------------------------------------------------------------------------|-----|-----|-----|---------------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=100\mu\text{A}$ , $I_E=0$                                         | 600 |     |     | V             |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=1\text{mA}$ , $I_B=0$                                             | 400 |     |     | V             |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=100\mu\text{A}$ , $I_C=0$                                         | 6   |     |     | V             |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=600\text{V}$ , $I_E=0$                                         |     |     | 100 | $\mu\text{A}$ |
|                                      | $I_{CEO}$     | $V_{CB}=400\text{V}$ , $I_E=0$                                         |     |     | 100 | $\mu\text{A}$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=7\text{V}$ , $I_C=0$                                           |     |     | 100 | $\mu\text{A}$ |
| Dc current gain                      | $h_{FE1}$     | $V_{CE}=10\text{V}$ , $I_C=200\text{mA}$                               | 9   |     | 40  |               |
|                                      | $h_{FE2}$     | $V_{CE}=10\text{V}$ , $I_C=0.25\text{mA}$                              | 5   |     |     |               |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=200\text{mA}$ , $I_B=40\text{mA}$                                 |     |     | 0.5 | V             |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C=200\text{mA}$ , $I_B=40\text{mA}$                                 |     |     | 1.1 | V             |
| Transition frequency                 | $f_T$         | $V_{CE}=10\text{V}$ , $I_C=100\text{mA}$<br>$f=1\text{MHz}$            | 5   |     |     | MHz           |
| Fall time                            | $t_f$         | $I_C=1\text{A}$ , $I_{B1}=-I_{B2}=0.2\text{A}$<br>$V_{CC}=100\text{V}$ |     |     | 0.5 | $\mu\text{s}$ |
| Storage time                         | $t_s$         |                                                                        |     |     | 2.5 | $\mu\text{s}$ |

#### CLASSIFICATION OF $h_{FE1}$

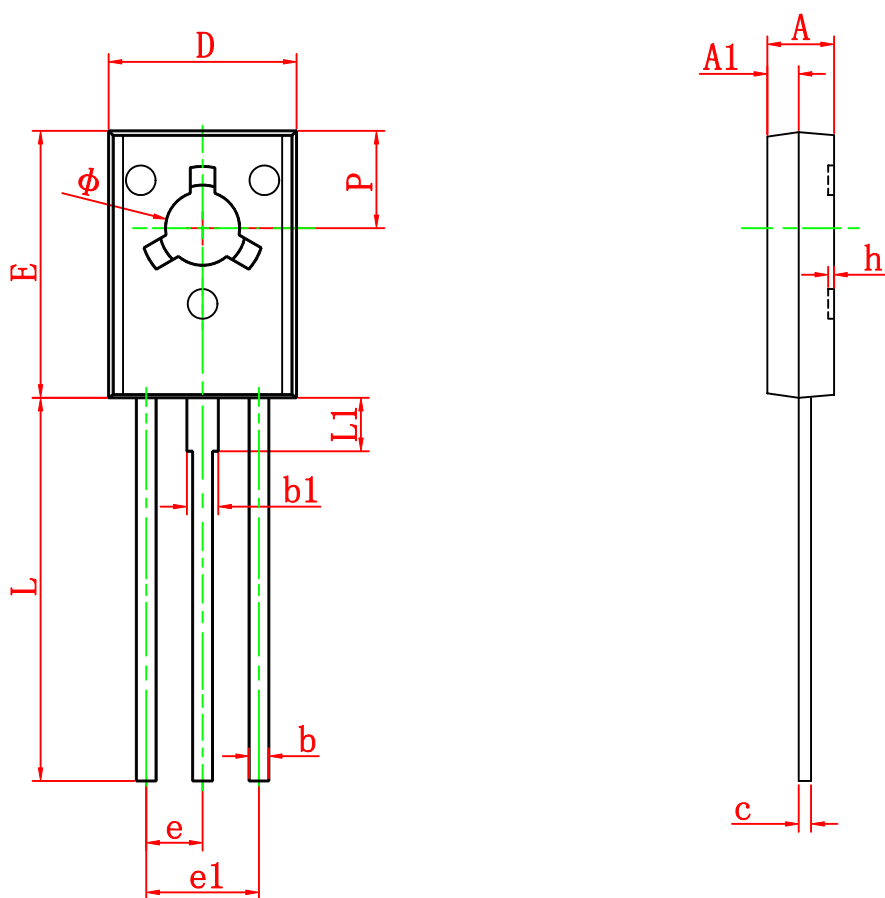
| Range | 9-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|-------|------|-------|-------|-------|-------|-------|
|-------|------|-------|-------|-------|-------|-------|

# Typical Characteristics

## 3DD13002



## TO-126 Package Outline Dimensions



| Symbol | Dimensions In Millimeters |        | Dimensions In Inches |       |
|--------|---------------------------|--------|----------------------|-------|
|        | Min                       | Max    | Min                  | Max   |
| A      | 2.500                     | 2.900  | 0.098                | 0.114 |
| A1     | 1.100                     | 1.500  | 0.043                | 0.059 |
| b      | 0.660                     | 0.860  | 0.026                | 0.034 |
| b1     | 1.170                     | 1.370  | 0.046                | 0.054 |
| c      | 0.450                     | 0.600  | 0.018                | 0.024 |
| D      | 7.400                     | 7.800  | 0.291                | 0.307 |
| E      | 10.600                    | 11.000 | 0.417                | 0.433 |
| e      | 2.290 TYP                 |        | 0.090 TYP            |       |
| e1     | 4.480                     | 4.680  | 0.176                | 0.184 |
| h      | 0.000                     | 0.300  | 0.000                | 0.012 |
| L      | 15.300                    | 15.700 | 0.602                | 0.618 |
| L1     | 2.100                     | 2.300  | 0.083                | 0.091 |
| P      | 3.900                     | 4.100  | 0.154                | 0.161 |
| $\Phi$ | 3.000                     | 3.200  | 0.118                | 0.126 |