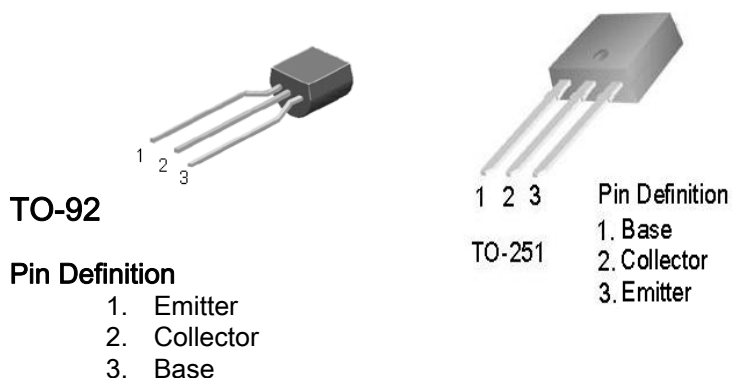
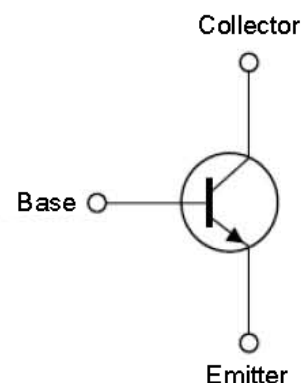


## High Voltage NPN Transistor



### INTERNAL SCHEMATIC DIAGRAM



## Features

- High Voltage
- High Switch Speed
- $BV_{CEO} : 530V$
- $BV_{CBO} : 900V$
- $I_C : 1.5A$
- $V_{CE(SAT)} : 0.5V @ I_C / I_B = 0.5A / 0.1A$
- Silicon Triple Diffused Type

## Application

- Electronic Ballasts
- Adapter
- Charger
- Lighting

## ABSOLUTE MAXIMUM RATINGS ( $T_c = 25^{\circ}C$ )

| Parameter                                        | Symbol | Max Rating | Unit |
|--------------------------------------------------|--------|------------|------|
| Collector-Base Voltage                           | VCBO   | 900        | V    |
| Collector-Emitter Voltage                        | VCEO   | 530        | V    |
| Emitter-Base Voltage                             | VEBO   | 10         | V    |
| Collector Current(DC)                            | IC     | 1.5        | A    |
| Collector Current(Pulse)                         | ICP    | 3          | A    |
| Total Power Dissipation(TO92)                    | Ptot   | 1.96       | W    |
| Total Power Dissipation(TO251)                   |        | 30         |      |
| Junction Temperature                             | TJ     | 150        | °C   |
| Operating Junction and Storage Temperature Range | TSTG   | -55 ~ +150 | °C   |

**ELECTRICAL CHARACTERISTICS ( T<sub>c</sub> = 25°C )**

| Parameter                            | Symbol    | Test Condition       | Min | Typ | Max | Unit |
|--------------------------------------|-----------|----------------------|-----|-----|-----|------|
| Collector-Base Voltage               | BVCBO     | IC = 1mA, IB=0       | 900 | —   | —   | V    |
| Collector-Emitter Breakdown Voltage  | BVCEO     | IC = 10mA, IE=0      | 530 | —   | —   | V    |
| Emitter- Base Breakdown Voltage      | BVEBO     | IE = 1mA, IC=0       | 9   | —   | —   | V    |
| Collector Cutoff Current             | ICBO      | VCB = 800V, IE=0     | —   | —   | 10  | μA   |
| Emitter Cutoff Current               | IEBO      | VEB = 10V, IC=0      | —   | —   | 0.5 | μA   |
| DC Current Gain                      | hFE1      | VCE = 5V, IC=1mA     | 15  | —   | 40  |      |
|                                      | hFE2      | VCE = 5V, IC=400mA   | 20  | —   | 40  |      |
|                                      | hFE3      | VCE = 5V, IC=1A      | 6   | —   | 40  |      |
| Collector-Emitter Saturation Voltage | VCE(SAT1) | IC/IB = 0.5A / 0.1A  | —   | 0.3 | 0.5 | V    |
|                                      | VCE(SAT2) | IC/IB = 1.0A / 0.25A | —   | 0.5 | 1   |      |
|                                      | VCE(SAT3) | IC/IB = 1.5A / 0.5A  | —   | 0.9 | 2   |      |
| Base-Emitter Saturation Voltage      | VBE(SAT1) | IC/IB = 0.5A / 0.1A  | —   | —   | 1   | V    |
|                                      | VBE(SAT2) | IC/IB = 1.0A / 0.25A | —   | —   | 1.2 |      |

**Dynamic**

|                    |                |                   |   |    |   |     |
|--------------------|----------------|-------------------|---|----|---|-----|
| Frequency          | f <sub>T</sub> | VCE=10V, IC=0.1A  | 4 | —  | — | MHz |
| Output Capacitance | Cob            | VCB=10V, f=01.MHz | — | 21 | — | pF  |

**Resistive Load Switching Time (Ratings)**

|              |                  |                                                                              |   |      |     |    |
|--------------|------------------|------------------------------------------------------------------------------|---|------|-----|----|
| Delay Time   | t <sub>d</sub>   | V <sub>CC</sub> =125V, IC=1A,<br>IB1=IB2=0.2A,<br>tp=25uS<br>Duty Cycle ≤ 1% | — | 0.05 | 0.2 | uS |
| Rise Time    | t <sub>r</sub>   |                                                                              | — | 1.1  | —   | uS |
| Storage Time | t <sub>STG</sub> |                                                                              | — | 2    | 4   | uS |
| Fall Time    | t <sub>f</sub>   |                                                                              | — | 0.4  | 0.7 | uS |

\*Note:pulse test: pulse width ≤ 300uS, duty cycle ≤ 2%

### Electrical Characteristics Curve ( $T_a = 25^\circ\text{C}$ , unless otherwise noted)

Figure 1. Static Characteristics

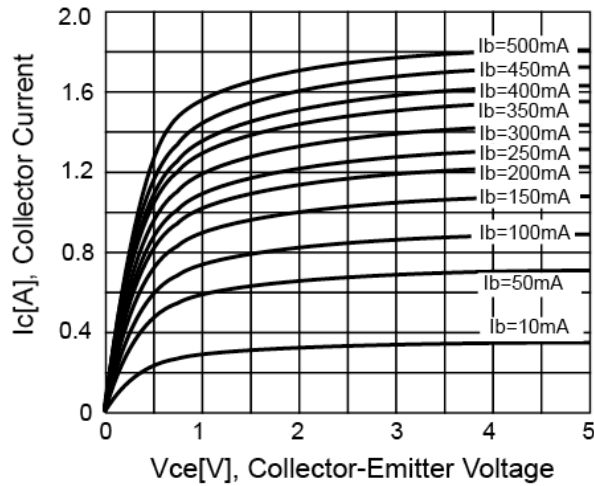


Figure 2. DC Current Gain

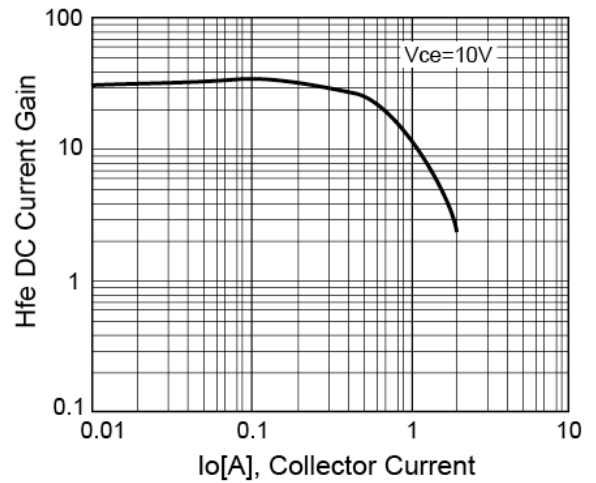


Figure 3.  $V_{ce(sat)}$  v.s.  $V_{be(sat)}$

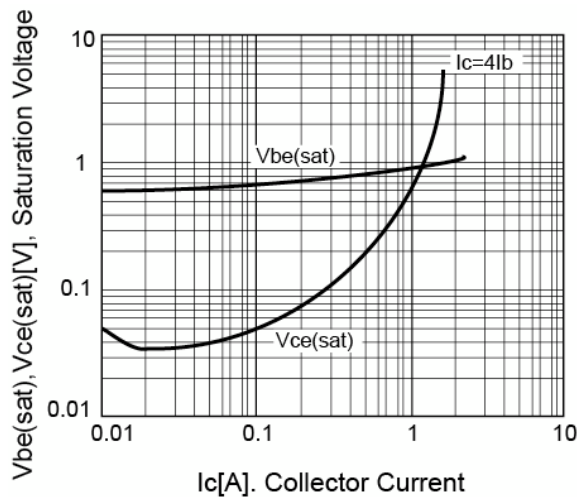


Figure 4. Power Derating

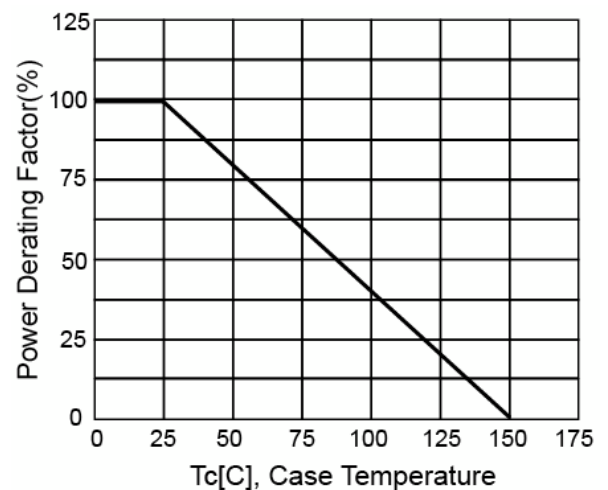


Figure 5. Reverse Bias SOA

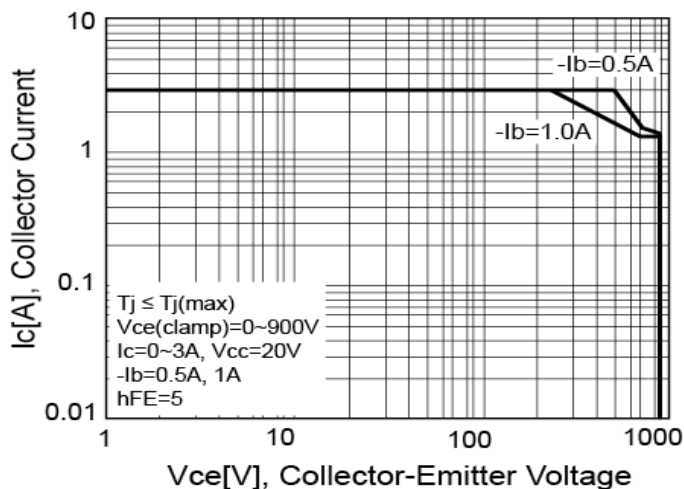
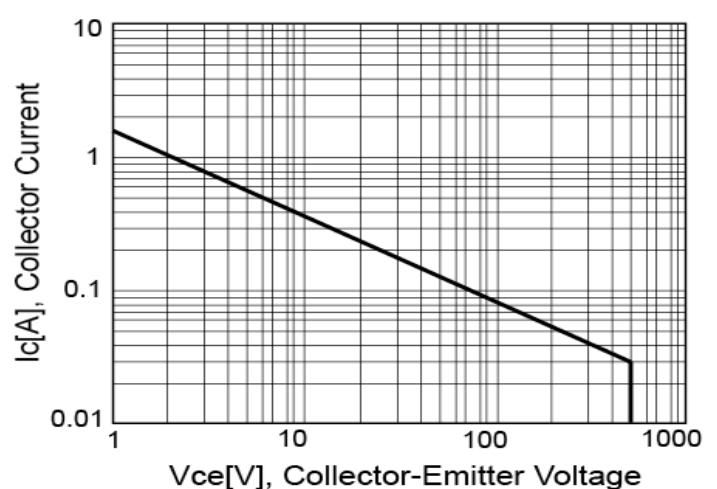


Figure 6. Safety Operating Area



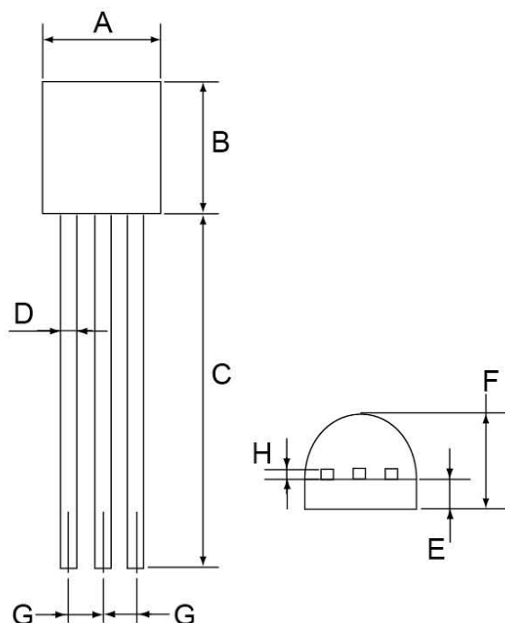
## Ordering Information

| Type NO | Marking | Package Code |
|---------|---------|--------------|
| WTBV49L | BV49    | TO-92        |

## Marking and Pin Define

|             |                                              |                    |                                                                                        |
|-------------|----------------------------------------------|--------------------|----------------------------------------------------------------------------------------|
| First Line  | WTC                                          | Company Name       |                                                                                        |
| Second Line | BV49L                                        | Product Code       |                                                                                        |
| Third Line  | <u>B</u> <u>K</u> <u>0</u> <u>T</u> <u>L</u> | 1st (Year Code)    | A-2010 B-2011 C-2012 ...                                                               |
|             |                                              | 2nd (Month Code)   | A-Jan, B-Feb, C-Mar, D-Apr, E-May, F-Jun, G-Jul, H-Aug, I-Sep, J-Oct, K-Nov, L-Dec     |
|             |                                              | 3rd (Lot Code)     | 0~9 , A~Z                                                                              |
|             |                                              | 4th (Product Code) | M - MOS , T - Transistor, L - Linear                                                   |
|             |                                              | 5th (Package Code) | I - TO251, D - TO252 , L - TO92, M - TO126, X - TO220, F - TO220F, Y - SOT89, S - SOP8 |
|             |                                              | 6th (Spec Code)    | (Reserve)                                                                              |

## TO-92 Package Dimension



| TO-92 DIMENSION |             |      |            |       |
|-----------------|-------------|------|------------|-------|
| DIM             | MILLIMETERS |      | INCHES     |       |
|                 | MIN         | MAX  | MIN        | MAX   |
| A               | 4.3         | 4.7  | 0.169      | 0.185 |
| B               | 4.3         | 4.7  | 0.169      | 0.185 |
| C               | 13.53(typ)  |      | 0.532(typ) |       |
| D               | 0.39        | 0.49 | 0.015      | 0.019 |
| E               | 1.18        | 1.28 | 0.046      | 0.5   |
| F               | 3.3         | 3.7  | 0.13       | 0.146 |
| G               | 1.27        | 1.31 | 0.05       | 0.051 |
| H               | 0.33        | 0.43 | 0.013      | 0.017 |

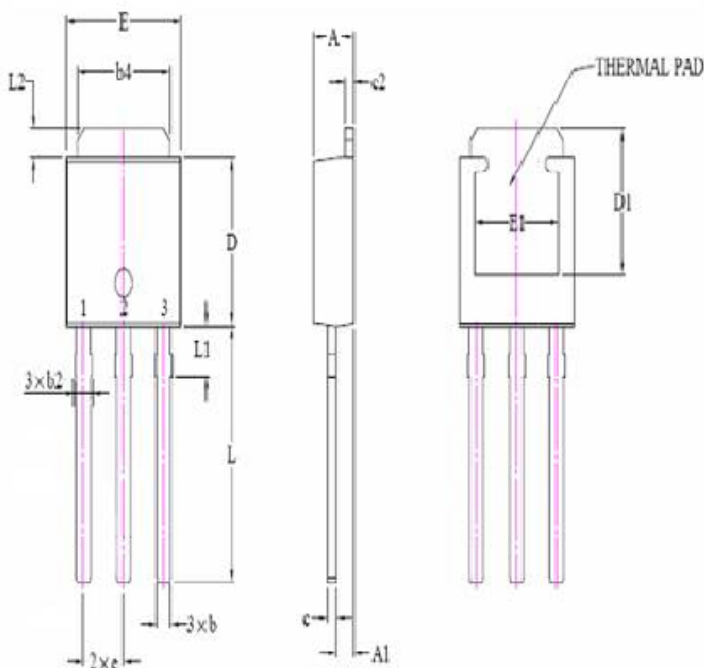
## Ordering Information

| Type NO | Marking | Package Code |
|---------|---------|--------------|
| WTI49   | 49I     | TO-251       |

## Marking and Pin Define

|             |           |                    |                                                                                       |
|-------------|-----------|--------------------|---------------------------------------------------------------------------------------|
| First Line  | WTC       | Company Name       |                                                                                       |
| Second Line | 49I       | Product Code       |                                                                                       |
| Third Line  | A J 0 T M | 1st (Year Code)    | A-2010 B-2011 C-2012 ...                                                              |
|             |           | 2nd (Month Code)   | A-Jan, B-Feb, C-Mar, D-Apr, E-May, F-Jun, G-Jul, H-Aug, I-Sep, J-Oct, K-Nov, L-Dec    |
|             |           | 3rd (Lot Code)     | 0~9, A~Z                                                                              |
|             |           | 4th (Product Code) | M - MOS, T - Transistor, L - Linear                                                   |
|             |           | 5th (Package Code) | I - TO251, D - TO252, L - TO92, M - TO126, X - TO220, F - TO220F, Y - SOT89, S - SOP8 |
|             |           | 6th (Spec Code)    | (Reserve)                                                                             |

## TO-251 Package Dimension



| Symbol | TO-251DL    |       |           |       |
|--------|-------------|-------|-----------|-------|
|        | Millimeters |       | Inches    |       |
|        | Min         | Max   | Min       | Max   |
| A      | 2.230       | 2.420 | 0.087     | 0.095 |
| A1     | 0.890       | 1.140 | 0.035     | 0.045 |
| b      | 0.550       | 0.670 | 0.022     | 0.026 |
| b2     | 0.700       | 0.850 | 0.030     | 0.038 |
| b4     | 5.200       | 5.400 | 0.205     | 0.213 |
| c      | 0.450       | 0.570 | 0.018     | 0.023 |
| c2     | 0.450       | 0.550 | 0.018     | 0.022 |
| D      | 5.950       | 6.250 | 0.234     | 0.246 |
| D1     | 4.300       | 4.500 | 0.165     | 0.177 |
| E      | 5.400       | 5.700 | 0.212     | 0.254 |
| E1     | 4.750       | 4.850 | 0.187     | 0.191 |
| e      | 2.28 REF    |       | 0.090 REF |       |
| L      | 8.900       | 9.500 | 0.350     | 0.374 |
| L1     | 1.900       | 2.290 | 0.075     | 0.090 |
| L2     | 0.900       | 1.000 | 0.035     | 0.039 |