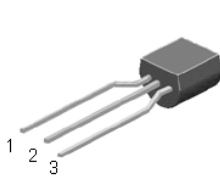


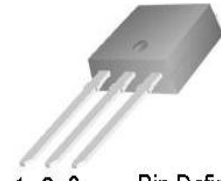
High Voltage NPN Transistor



TO-92

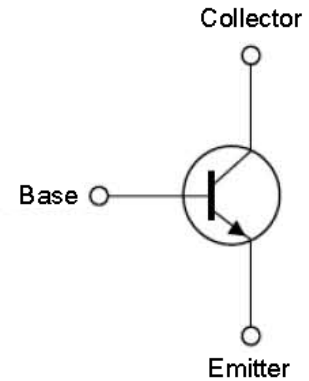
Pin Definition

1. Emitter
2. Collector
3. Base



- TO-251
- Pin Definition
1. Base
 2. Collector
 3. Emitter

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 | $^\circ C$ |
| Operating Junction and Storage Temperature Range | TSTG | -55 ~ +150 | $^\circ C$ |

ELECTRICAL CHARACTERISTICS (T_c = 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 | VCE = 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 _r | VCE=10V, IC=0.1A | 4 | — | — | MHz |
| Output Capacitance | C _{ob} | VCE=10V, f=0.1MHz | — | 21 | — | pF |

Resistive Load Switching Time (Ratings)

| | | | | | | |
|--------------|------------------|---|---|------|-----|----|
| Delay Time | t _d | V _{CC} =125V, IC=1A, IB1=IB2=0.2A, t _p =25μS Duty Cycle ≤ 1% | — | 0.05 | 0.2 | μS |
| Rise Time | t _r | | — | 1.1 | — | μS |
| Storage Time | t _{STG} | | — | 2 | 4 | μS |
| Fall Time | t _f | | — | 0.4 | 0.7 | μS |

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

Thermal Performance

| Parameter | Symbol | Limit | Unit |
|--|-------------------|-------|------|
| Junction to Case Thermal Resistance (TO-92) | R _{θ JC} | 83.3 | °C/W |
| Junction to Ambient Thermal Resistance (TO-92) | R _{θ JA} | 200 | °C/W |

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

Figure 1. Static Characteristics

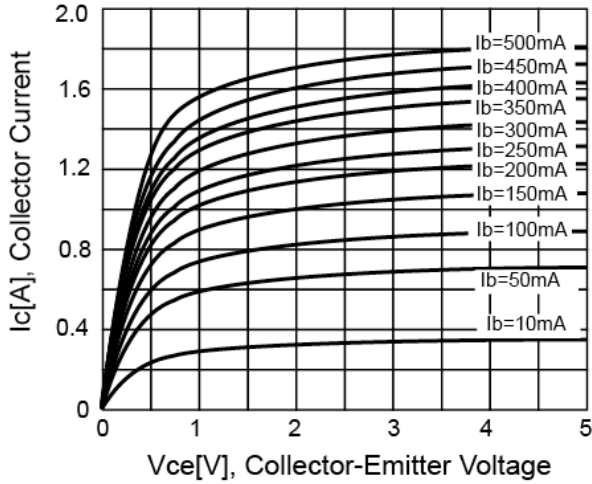


Figure 2. DC Current Gain

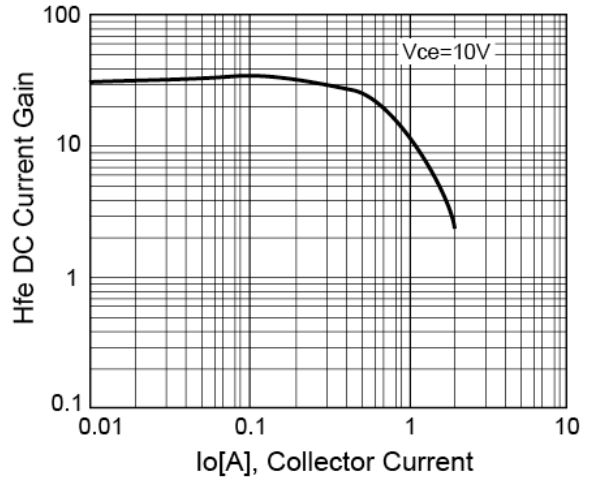


Figure 3. $V_{CE(SAT)}$ V.S. $V_{BE(SAT)}$

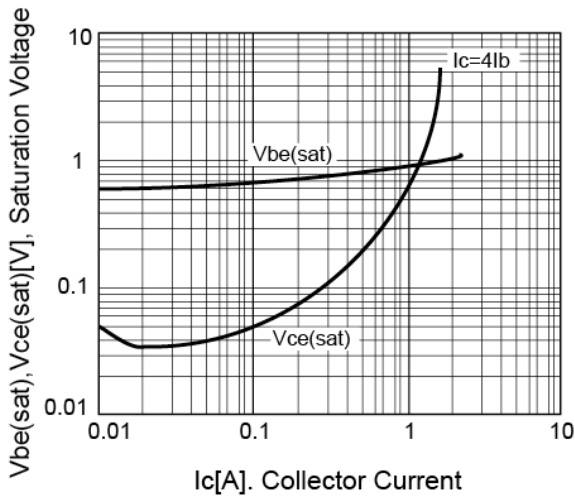


Figure 4. Power Derating

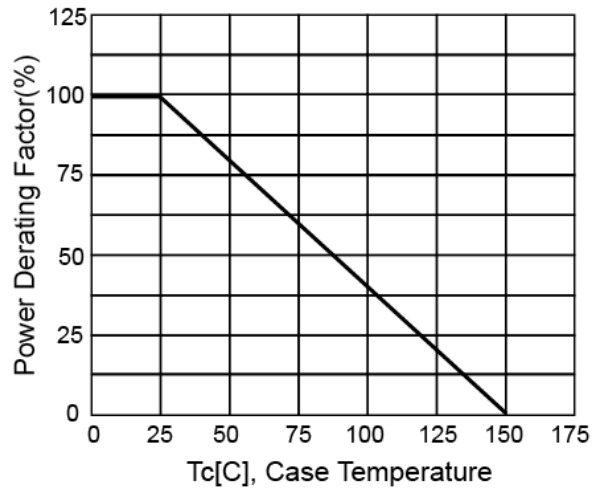


Figure 5. Reverse Bias SOA

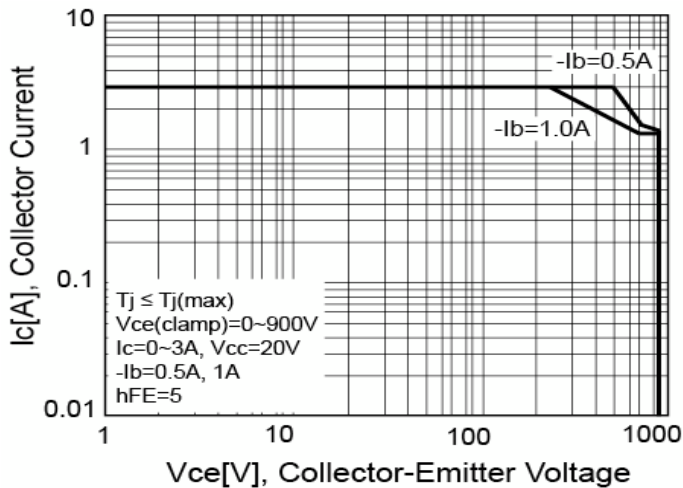
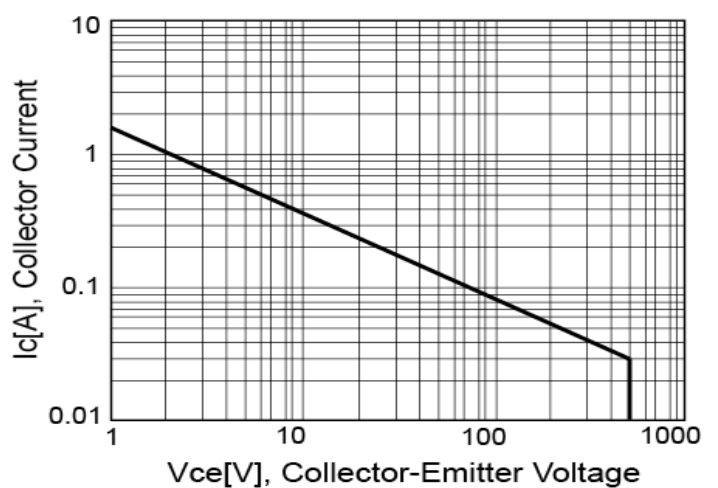


Figure 6. Safety Operating Area



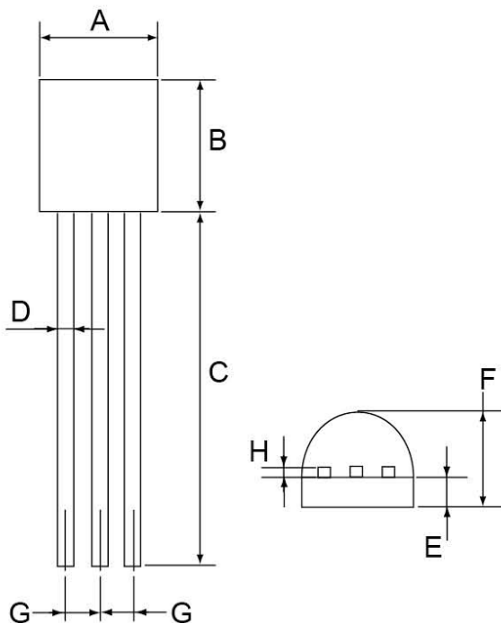
Ordering Information

| Type NO | Marking | Package Code |
|---------|---------|--------------|
| WTBV49L | BV49L | 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 |

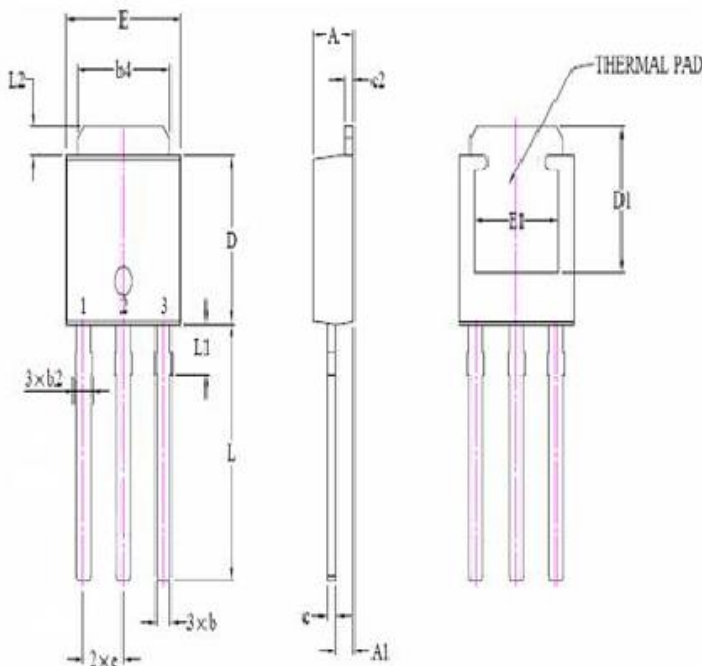
Ordering Information

| 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 | 0.760 | 0.860 | 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 | 4.200 | 4.600 | 0.165 | 0.177 |
| E | 5.400 | 5.700 | 0.212 | 0.224 |
| 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 |