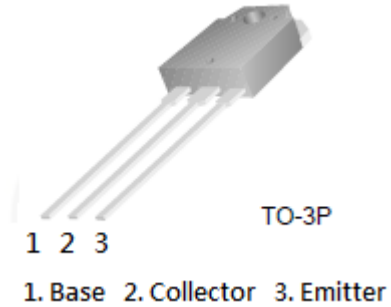


High Voltage NPN Power Transistor

Features

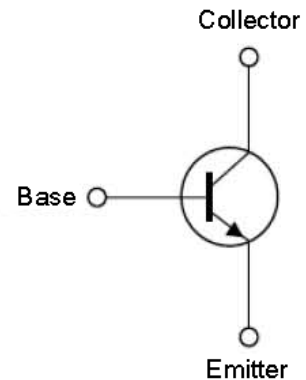
- High Voltage
- High Switch Speed
- $BV_{CEO} : 400V$
- $BV_{CBO} : 700V$
- $I_c : 12A$
- $V_{CE(SAT)} : 2V @ I_c / I_B = 8A / 1.6A$



Application

- Electronic Ballasts
- Adapter
- Lighting

INTERNAL SCHMATIC DIAGRAM



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

| Parameter | Symbol | Max rating | Unit |
|--|-----------|------------|-------------|
| Collector-Base Voltage | V_{CBO} | 700 | V |
| Collector-Emitter Voltage | V_{CEO} | 400 | V |
| Emitter-Base Voltage | V_{EBO} | 9 | V |
| Collector Current (DC) | I_c | 12 | A |
| Collector Current (Pulse) | | 24 | A |
| Base Current (DC) | I_B | 6 | A |
| Total Power Dissipation (TO-220) | P_D | 75 | W |
| Total Power Dissipation (TO-220F) | P_D | 30 | W |
| Junction Temperature | T_J | +150 | $^{\circ}C$ |
| Operating Junction and Storage Temperature Range | T_{STG} | -55 ~ +150 | $^{\circ}C$ |

Note: Single Pulse. $P_w=300\mu S$, $Duty \leq 2\%$

ELECTRICAL CHARACTERISTICS (T_c = 25°C)

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|--------------------------------------|-----------|-------------------|-----|-----|-----|------|
| Collector-Base Voltage | BVCBO | IC = 1mA, IB=0 | 700 | – | – | V |
| Collector-Emitter Breakdown Voltage | BVCEO | IC = 10mA, IE=0 | 400 | – | – | V |
| Emitter- Base Breakdown Voltage | BVEBO | IE = 1mA, IC=0 | 9 | – | – | V |
| Emitter Cutoff Current | IEBO | VEB = 9V, IC=0 | – | – | 1 | mA |
| DC Current Gain | hFE1 | VCE = 5V, IC=5A | 15 | – | 40 | |
| | hFE2 | VCE = 5V, IC=8A | 5 | – | 30 | |
| Collector-Emitter Saturation Voltage | VCE(SAT1) | IC = 5A, IB = 1A | – | – | 1.2 | V |
| | VCE(SAT2) | IC = 8A, IB =1.6A | – | – | 1.6 | |
| Base-Emitter Saturation Voltage | VBE(SAT1) | IC = 5A, IB = 1A | – | – | 1.5 | V |
| | VBE(SAT2) | IC = 8A, IB =1.6A | – | – | 2 | |

Dynamic

| | | | | | | |
|--------------------|----------------|---------------------|---|-----|---|-----|
| Frequency | f _T | VCE = 10V, IC=0.5A | 4 | – | – | MHz |
| Output Capacitance | Cob | VCB = 10V, f=0.1MHz | – | 180 | – | pF |

Resistive Load Switching Time (Ratings)

| | | | | | | |
|--------------|------------------|--|---|------|-----|----|
| Rise Time | t _r | V _{cc} =125V, IC=8A, IB1=1A, IB2=1.6A, tp=25uS Duty Cycle ≤ 2% | – | 0.75 | 1.3 | uS |
| Storage Time | t _{STG} | | – | 3 | 5 | uS |
| Fall Time | t _f | | – | 0.5 | 0.9 | uS |

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

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

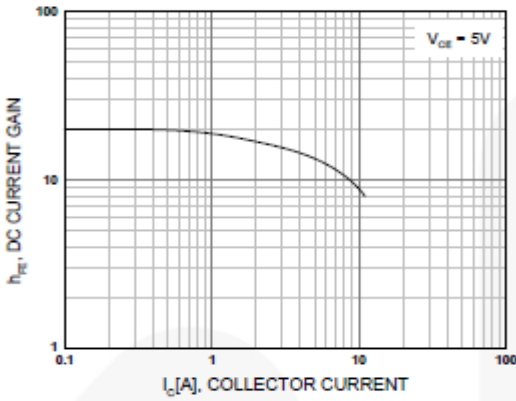


Figure 1. DC Current Gain

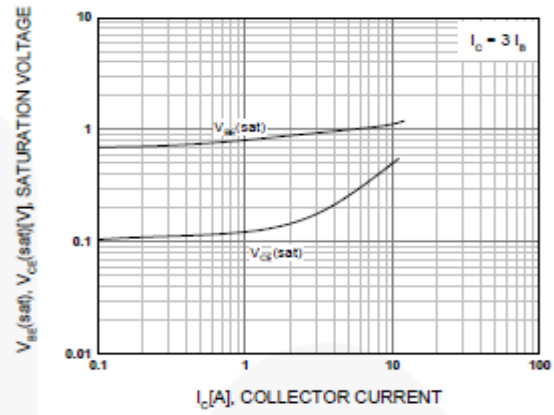


Figure 2. Base-Emitter Saturation Voltage and Collector-Emitter Saturation Voltage

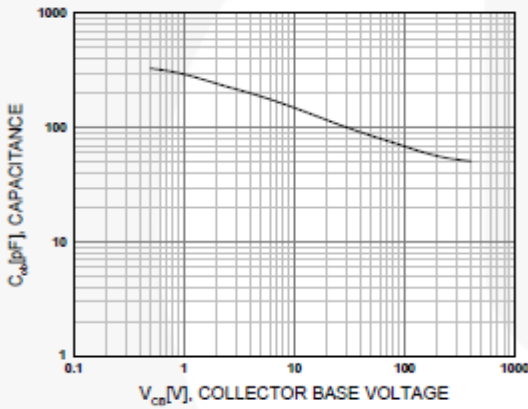


Figure 3. Collector Output Capacitance

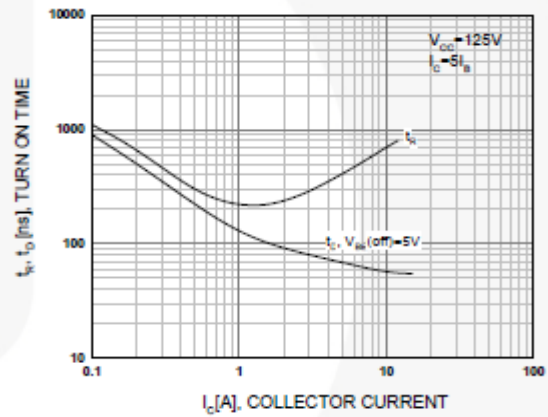


Figure 4. Turn-On Time

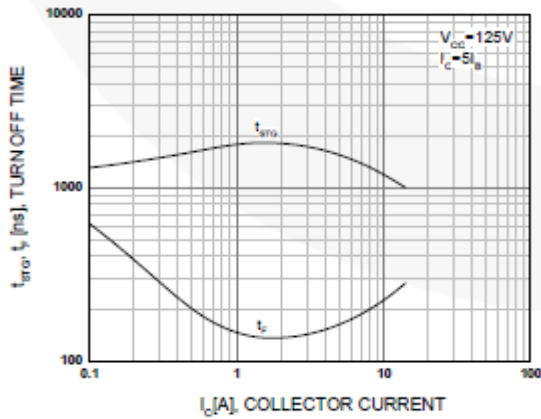


Figure 5. Turn-Off Time

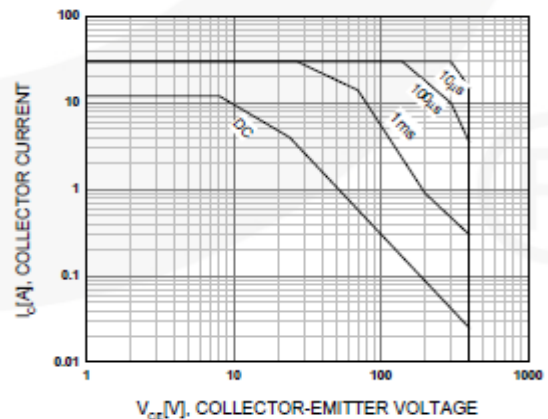


Figure 6. Forward Bias Safe Operating Area

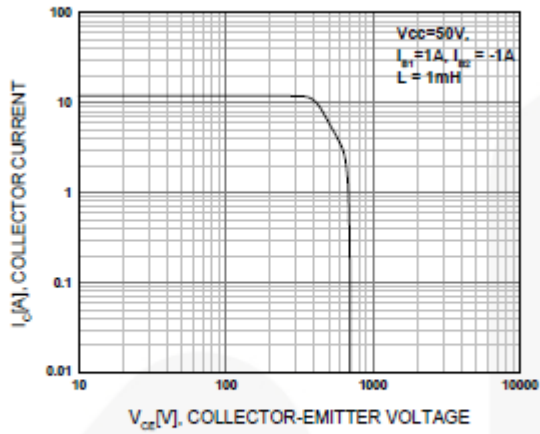


Figure 7. Reverse Bias Safe Operating Area

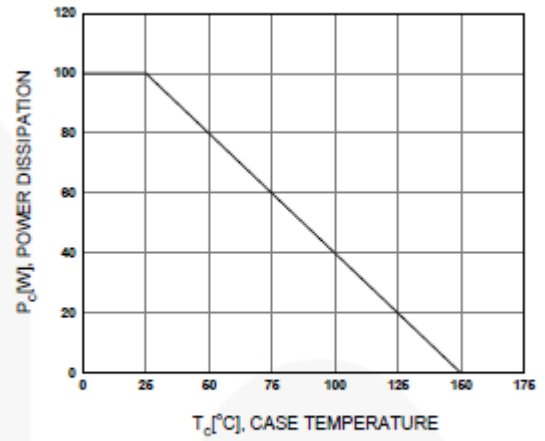
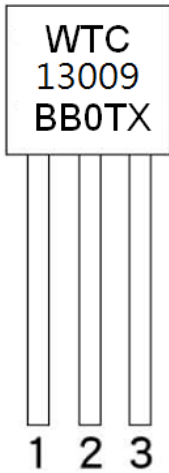


Figure 8. Power Derating

Ordering Information

| Type NO | Marking | Package Code |
|----------|---------|--------------|
| WTQ13009 | 13009 | TO-3P |

Marking and Pin Define



| | | | |
|-------------|-------|--------------------|---|
| First Line | WTC | Company Name | |
| Second Line | 13009 | Product Code | |
| Third Line | BB0TX | 1st (Year Code) | A-2010 B-2011 C-2012 D-2013 ... |
| | | 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, Q - TO3P |
| | | 6th (Spec Code) | (Reserve) |

TO-3P Package Dimension

