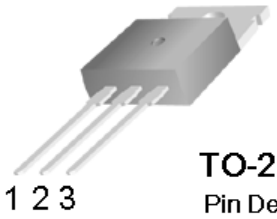
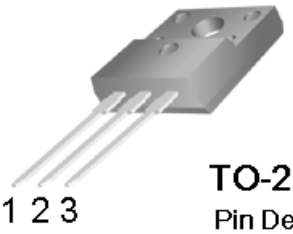
# High Voltage NPN Power Transistor




**TO-220**
Pin Definition
1. Base
2. Collector
3. Emitter




**TO-220F**
Pin Definition
1. Base
2. Collector
3. Emitter

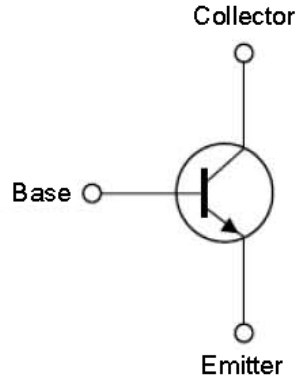
## Features

- High Voltage
- High Switch Speed
- $BV_{CEO}$ : 400V
- $BV_{CBO}$ : 700V
- $I_C$ : 4A
- $V_{CE(SAT)}$ : 1.3V @ $I_C$ / $I_B$ = 2.5A / 0.6A

## Application

- Electronic Ballasts
- Adapter
- Lighting

INTERNAL SCHMATIC DIAGRAM




## ABSOLUTE MAXIMUM RATINGS ( Ta = 25℃ )

| Parameter | Symbol | Max rating | Unit |
|---|---|---|---|
| Collector-Base Voltage | VCBO | 700 | V |
| Collector-Emitter Voltage | VCEO | 400 | V |
| Emitter-Base Voltage | VEBO | 9 | V |
| Collector Current (DC) | $I_C$ | 4 | A |
| Collector Current (Pulse) | | 8 | |
| Base Current (DC) | $I_B$ | 2 | A |
| Base Current (Pulse) | | 4 | |
| Total Power Dissipation (TO-220) | $P_{Btot}$ | 75 | W |
| Total Power Dissipation (TO-220F) | | 30 | |
| Junction Temperature | $T_J$ | +150 | ℃ |
| Operating Junction and Storage Temperature Range | $T_{STG}$ | -55 ~ +150 | ℃ |

Note: Single Pulse. Pw=300uS, Duty≦ 2%

## ELECTRICAL SPECIFICATIONS

| 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 = 0.1mA, IC=0 | 9 | – | – | V |
| Collector Cutoff Current | ICEO | VCE = 400V, IE=0 | – | – | 250 | uA |
| Collector Cutoff Current | ICBO | VCB = 700V, IE=0 | – | – | 1 | mA |
| Emitter Cutoff Current | IEBO | VEB = 9V, IC=0 | – | – | 1 | mA |
| DC Current Gain | hFE1 | VCE = 5V, IC=10mA | 15 | – | – | V |
| | hFE2 | VCE = 5V, IC=1A | 15 | – | 35 | |
| | hFE3 | VCE = 5V, IC=1A | 8 | – | – | |
| Collector-Emitter Saturation Voltage | VCE(SAT1) | IC = 0.8A, IB =0.1A | – | – | 1.1 | V |
| | VCE(SAT2) | IC = 2A, IB =0.4A | – | – | 1.3 | |
| Base-Emitter Saturation Voltage | VBE(SAT1) | IC = 1A, IB =0.2A | – | – | 1.2 | V |
| | VBE(SAT2) | IC = 2A, IB =0.4A | – | – | 1.3 | |
| Turn On Time | $t_{on}$ | Vcc = 125V, Ic = 2A, IB1=1B2=0.4A, tp=25uS Duty Cycle ≦ 1% | – | 0.2 | 0.5 | uS |
| Storage Time | $t_{STG}$ | | – | 2.2 | 3 | uS |
| Fall Time | $t_f$ | | – | 0.2 | 0.5 | uS |

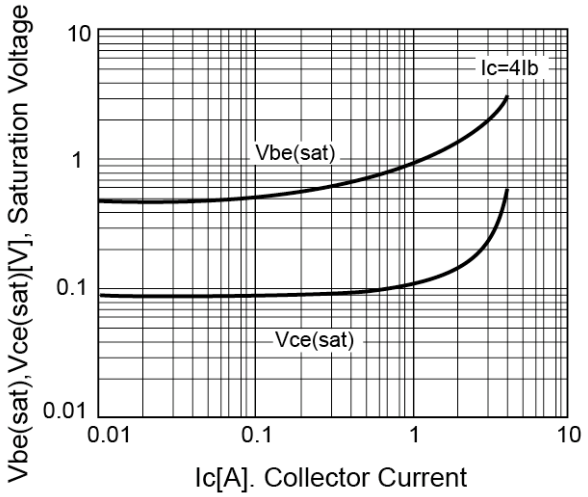
## Dynamic

| Parameter | Symbol | Test Condition | Min | Typ | Max | Unit |
|---|---|---|---|---|---|---|
| Frequency | $f_T$ | VCE = 10V, IC=0.5A | 4 | – | – | MHz |
| Output Capacitance | Cob | VCB = 10V, f=0.1MHz | – | 65 | – | pF |

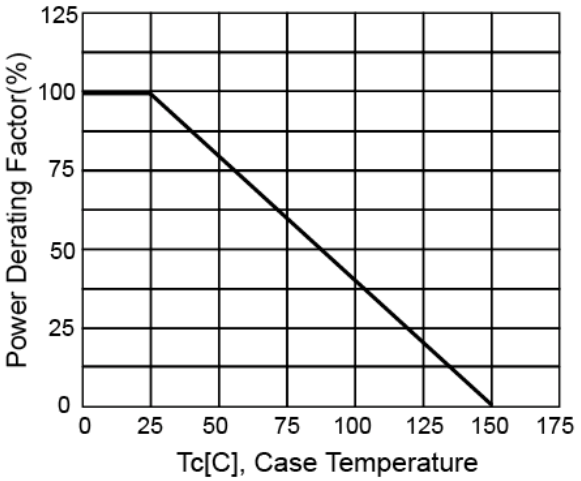
Note: Pulse test: pulse width ≦ 300uS, duty cycle ≦ 2%

## Electrical Characteristics Curve (Ta = 25°C, unless otherwise noted)

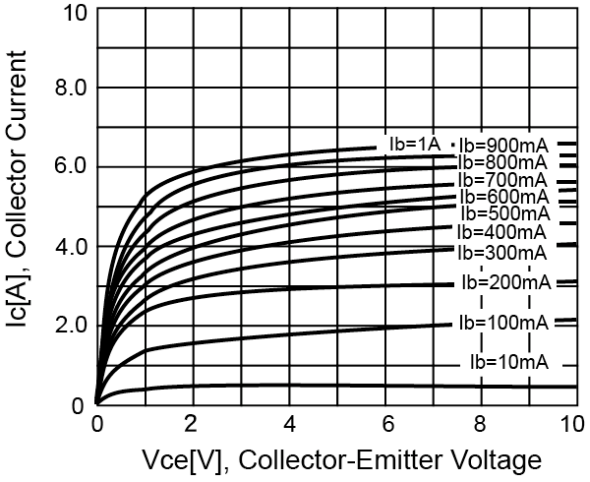
**$V_{CE(SAT)}$ v.s. $V_{BE(SAT}$**



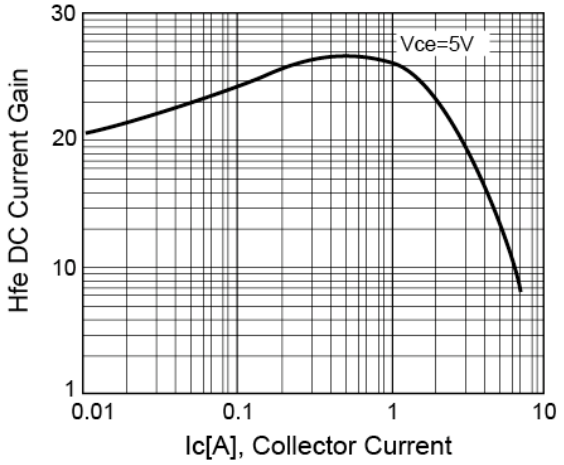

**Power Derating**




**Static Characteristics**




**DC Current Gain**




**Reverse Bias SOA**

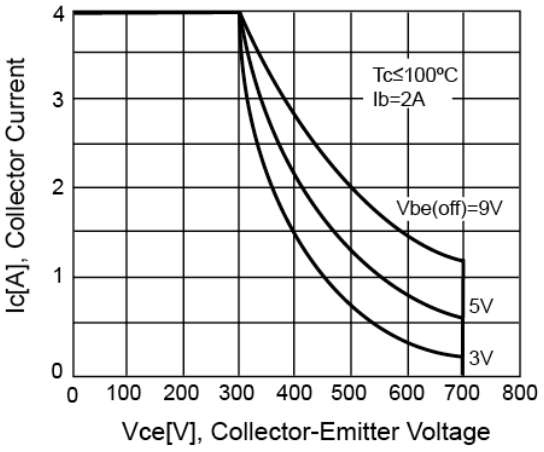
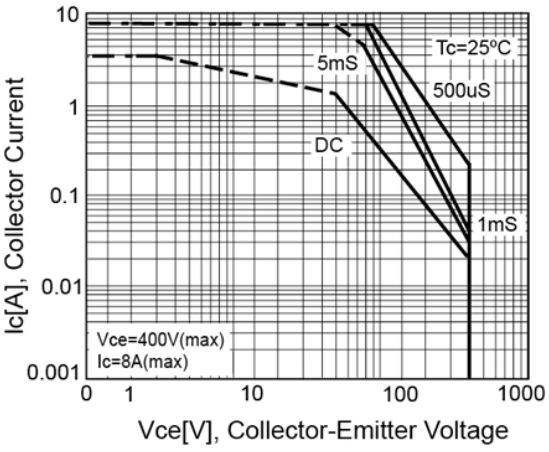


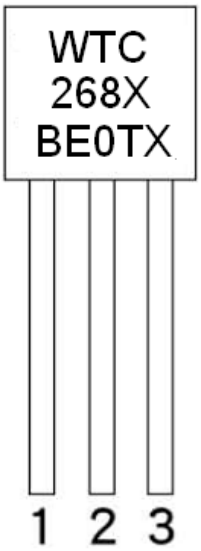

**Figure 6. Safety Operating Area**



## Ordering Information

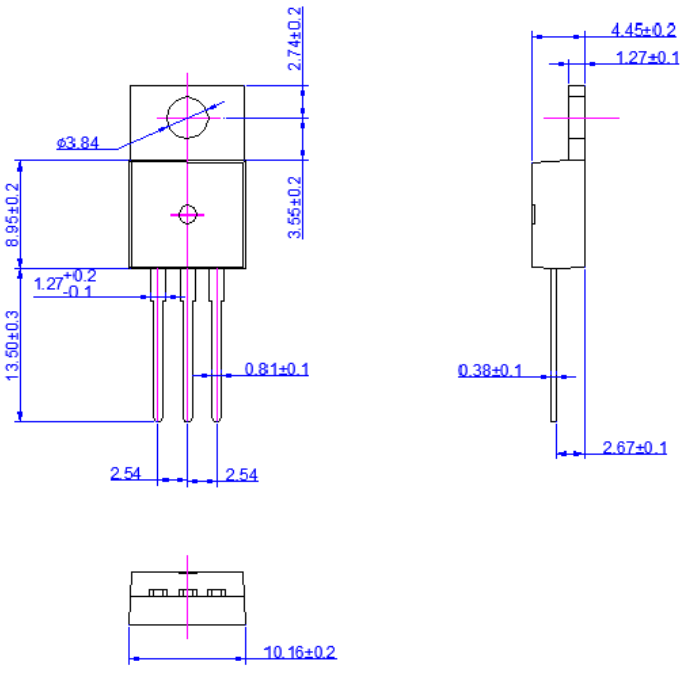
| Type NO | Marking | Package Code |
|---|---|---|
| WTX268 | 268X | TO-220 |

## Marking and Pin Define




| | | | |
|---|---|---|---|
| First Line | WTC | Company Name | |
| Second Line | 268X | Product Code | |
| Third Line | B E 0 T X | 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) | 0~1 , A~9 |
| | | 4th (Product Code) | M - MOS , T - Transistor |
| | | 5th (Package Code) | I - TO251, D - TO252 , L - TO92, M - TO126, X - TO220, F - TO220F |
| | | 6th (Spec Code) | (Reserve) |

## TO-220 Package Dimension



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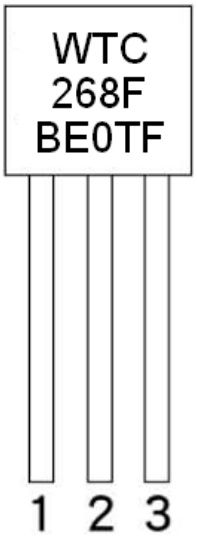


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