

# KSB13003H

**SemiHow**  
Know-How for Semiconductor

# KSB13003H

## High Voltage Switch Mode Application

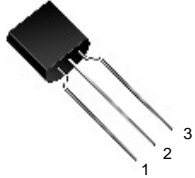
- High voltage, High speed power switching
- Suitable for Electronic Ballast up to 21W

## Absolute Maximum Ratings $T_C=25^\circ\text{C}$ unless otherwise noted

1.5 Amperes  
 NPN Silicon Power Transistor  
 1.1 Watts

| CHARACTERISTICS                                 | SYMBOL    | RATING  | UNIT             |
|---|-----------|---------|------------------|
| Collector-Base Voltage                          | $V_{CBO}$ | 900     | V                |
| Collector-Emitter Voltage                       | $V_{CEO}$ | 530     | V                |
| Emitter-Base Voltage                            | $V_{EBO}$ | 9       | V                |
| Collector Current(DC)                           | $I_C$     | 1.5     | A                |
| Collector Current(Pulse)                        | $I_{CP}$  | 3       | A                |
| Base Current                                    | $I_B$     | 0.75    | A                |
| Collector Dissipation( $T_C=25^\circ\text{C}$ ) | $P_C$     | 1.10    | W                |
| Junction Temperature                            | $T_J$     | 150     | $^\circ\text{C}$ |
| Storage Temperature                             | $T_{STG}$ | -55~150 | $^\circ\text{C}$ |

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 1. Base  
 2. Collector  
 3. Emitter



## Electrical Characteristics $T_C=25^\circ\text{C}$ unless otherwise noted

| CHARACTERISTICS                       | SYMBOL                 | Test Condition  | Min     | Typ. | Max        | Unit          |
|---------------------------------------|------------------------|---|---------|------|------------|---------------|
| Collector-Base Breakdown Voltage      | $V_{CBO}$              | $I_C=500\mu\text{A}, I_E=0$   | 900     |      |            | V             |
| Collector-Emitter Breakdown Voltage   | $V_{CEO}$              | $I_C=10\text{mA}, I_B=0$  | 530     |      |            | V             |
| Emitter Cut-off Current               | $I_{EBO}$              | $V_{EB}=9.0\text{V}, I_C=0$   |         |      | 10         | $\mu\text{A}$ |
| *DC Current Gain                      | $h_{FE1}$<br>$h_{FE2}$ | $V_{CE}=10\text{V}, I_C=0.4\text{A}$<br>$V_{CE}=10\text{V}, I_C=1\text{A}$                          | 20<br>6 |      | 40         | -<br>-        |
| *Collector-Emitter Saturation Voltage | $V_{CE}(\text{sat})$   | $I_C=0.5\text{A}, I_B=0.1\text{A}$<br>$I_C=1.5\text{A}, I_B=0.5\text{A}$                            |         |      | 0.8<br>2.5 | V<br>V        |
| *Base-Emitter Saturation Voltage      | $V_{BE}(\text{sat})$   | $I_C=0.5\text{A}, I_B=0.1\text{A}$  |         |      | 1.0        | V             |
| Output Capacitance                    | $C_{ob}$               | $V_{CB}=10\text{V}, f=0.1\text{MHz}$  |         | 21   |            | pF            |
| Current Gain Bandwidth Product        | $f_T$                  | $V_{CE}=10\text{V}, I_C=0.1\text{A}$  | 4       |      |            | MHz           |
| Turn on Time                          | $t_{on}$               | $V_{CC}=125\text{V}, I_C=2\text{A}$<br>$I_{B1}=0.2\text{A}, I_{B2}=-0.2\text{A}$<br>$R_L=125\Omega$ |         |      | 1.1        | $\mu\text{s}$ |
| Storage Time                          | $t_{stg}$              |   |         |      | 4.0        | $\mu\text{s}$ |
| Fall Time                             | $t_F$                  |   |         |      | 0.7        | $\mu\text{s}$ |

\* Pulse Test: Pulse Width $\leq 300\mu\text{s}$ , Duty Cycles $\leq 2\%$

Note.

| hFE1<br>Classification | R | 20 ~ 30 |
|------------------------|---|---------|
|                        | O | 25 ~ 35 |
|                        | Y | 30 ~ 40 |

Package Mark information.

| S | H  | S   | SemiHow Symbol              |
|---|----|-----|-----------------------------|
| 1 | 3  | YWW | Y; year code, WW; week code |
| Y | WW | Z   | hFE1 Classification         |

# Typical Characteristics

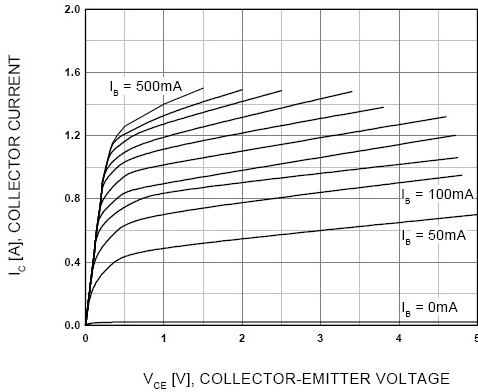


Figure 1. Static Characteristic

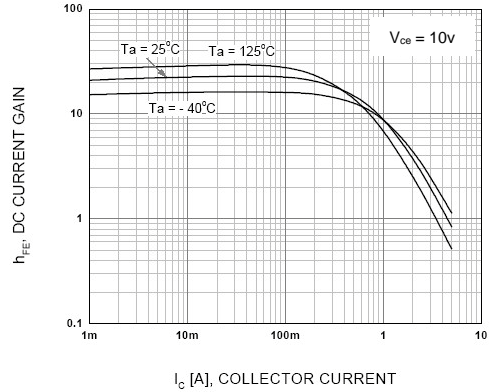


Figure 2. DC current Gain

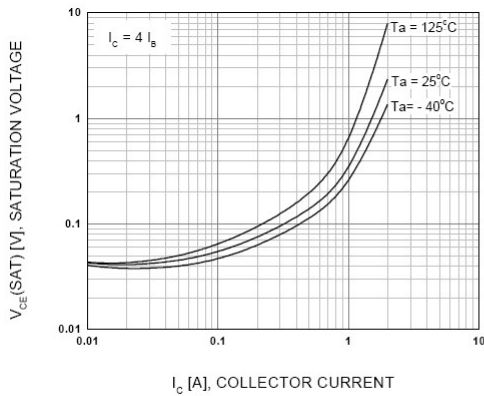


Figure 3. Collector-Emitter Saturation Voltage

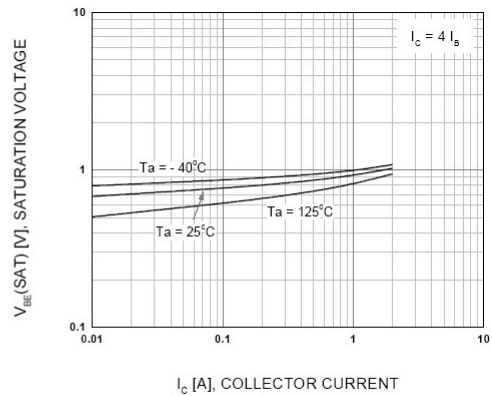


Figure 4. Base-Emitter Saturation Voltage

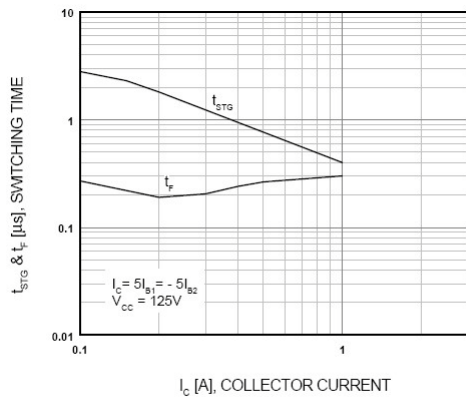


Figure 5. Resistive Load Switching Time

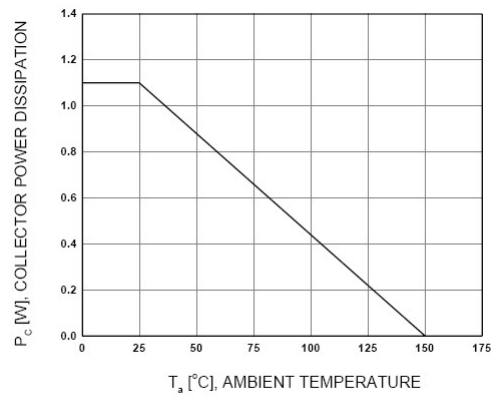


Figure 6. Power Derating

# Typical Characteristics

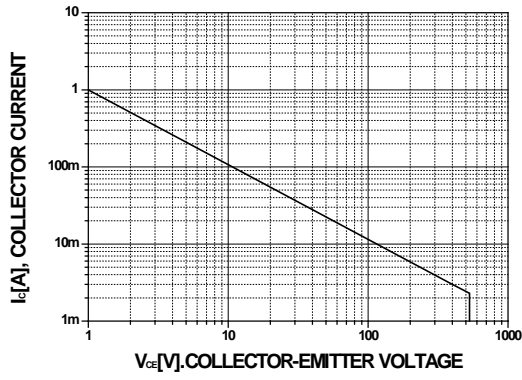


Figure 7. Forward Bias Safe Operating Area

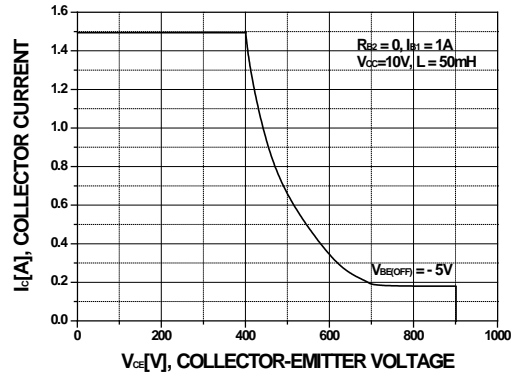
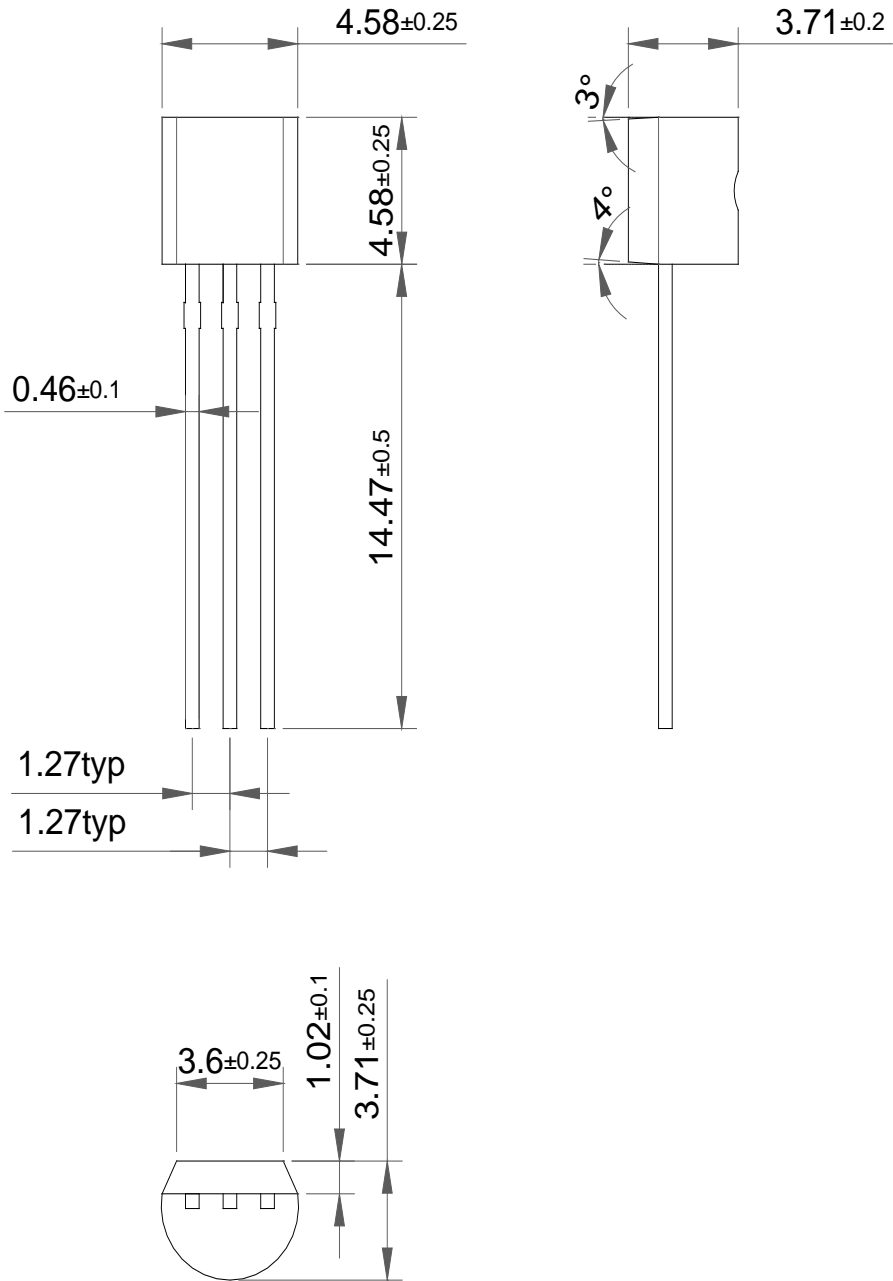


Figure 8. Reverse Bias Safe Operating Area

Package Dimension

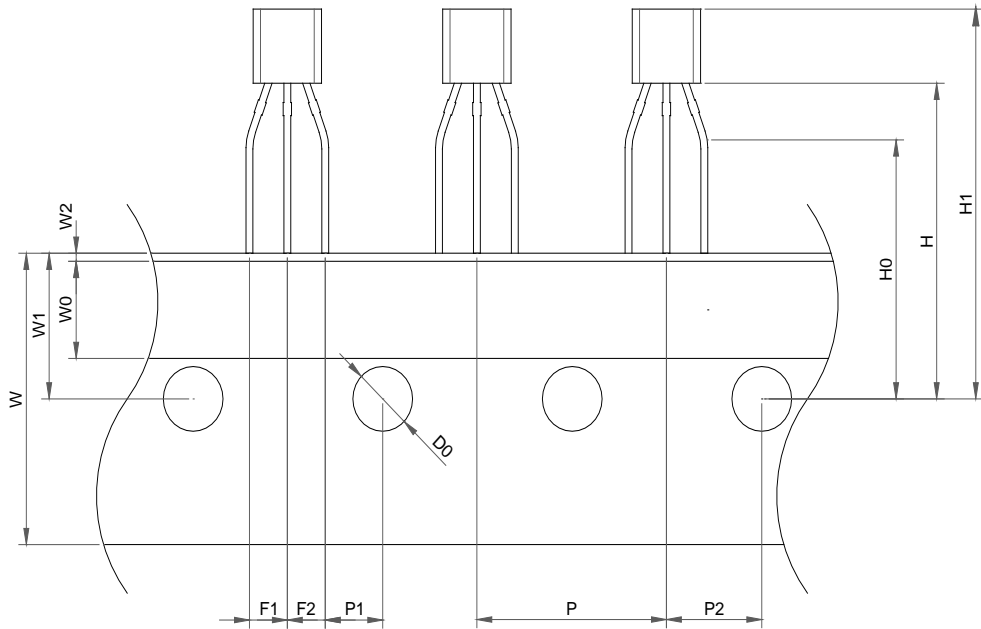
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Dimensions in Millimeters

## Package Dimension

## TO-92 TAPING



| Item                                       | Symbol | Dimension [mm] |           |
|--|--------|----------------|-----------|
|  |        | Reference      | Tolerance |
| Component pitch                            | P      | 12.7           | ±0.5      |
| Side lead to center of feed hole           | P1     | 3.85           | ±0.5      |
| Center lead to center of feed hole         | P2     | 6.35           | ±0.5      |
| Lead pitch                                 | F1,F2  | 2.5            | +0.2/-0.1 |
| Carrier Tape width                         | W      | 18.0           | +1.0/-0.5 |
| Adhesive tape width                        | W0     | 6.0            | ±0.5      |
| Tape feed hole location                    | W1     | 9.0            | ±0.5      |
| Adhesive tape position                     | W2     | 1.0 MAX        |           |
| Center of feed hole to bottom of component | H      | 19.5           | ±1        |
| Center of feed hole to lead form           | H0     | 16.0           | ±0.5      |
| Component height                           | H1     | 27.0 max       |           |
| Tape feed hole diameter                    | D0     | 4.0            | ±0.2      |