# High Voltage Fast Switching NPN Power Transistor

# 3DD13002

## Features

- High speed switching
- Small flat package

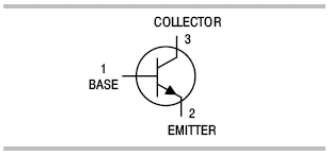
HF

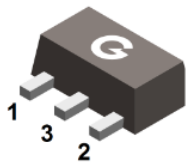
## Applications

- High voltage switch mode application

## Mechanical Data

- Case: SOT-89
- Molding compound: UL flammability classification rating 94V-0
- Terminals: Tin-plated; solderability per MIL-STD-202, Method 208




SOT-89

## Ordering Information

| Part Number | Package | Shipping Quantity | Marking Code |
|---|---|---|---|
| 3DD13002 | SOT-89 | 1000 pcs / Tape & Reel | 13002 |

## Maximum Ratings (@ $T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{CBO}$ | 600 | V |
| Collector-Emitter Breakdown Voltage | $V_{CEO}$ | 400 | V |
| Emitter-Base Breakdown Voltage | $V_{EBO}$ | 6 | V |
| Collector Current (Continuous) | $I_C$ | 1 | A |
| Collector Current ($t_p$ < 5ms) | $I_{CM}$ | 2 | A |

## Thermal Characteristics

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation ($T_A$ = 25°C) | $P_D$ | 1.25 | W |
| Thermal Resistance Junction-to-Air | $R_{\theta JA}$ | 100 | °C/W |
| Junction Temperature | $T_J$ | -55 ~ +150 | °C |
| Storage Temperature Range | $T_{STG}$ | -55 ~ +150 | °C |

## Electrical Characteristics (@ $T_A$ = 25°C unless otherwise specified)

| Parameter | Symbol | Test Condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Collector-Base Breakdown Voltage | $V_{(BR)CBO}$ | $I_C$ = 100μA, $I_E$ = 0 | 600 | - | - | V |
| Collector-Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = 1mA, $I_B$ = 0 | 400 | - | - | V |
| Emitter-Base Breakdown Voltage | $V_{(BR)EBO}$ | $I_E$ = 100μA, $I_C$ = 0 | 6 | - | - | V |
| Collector Cut-off Current | $I_{CBO}$ | $V_{CB}$ = 600V, $I_E$ = 0 | - | - | 100 | μA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$ = 6V, $I_C$ = 0 | - | - | 100 | μA |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ = 10V, $I_C$ = 200mA | 9 | - | 40 | - |
| | | $V_{CE}$ = 10V, $I_C$ = 250μA | 5 | - | - | - |
| Collector-emitter Saturation Voltage | $V_{CE(SAT)}$ | $I_C$ = 200mA, $I_B$ = 40mA | - | - | 0.8 | V |
| Base-emitter Saturation Voltage | $V_{BE(SAT)}$ | $I_C$ = 200mA, $I_B$ = 40mA | - | - | 1.1 | V |
| Transition Frequency | $f_T$ | $I_C$ = 0.1A, $V_{CE}$ = 10V, f = 1MHz | 5 | - | - | MHZ |
| Fall Time | $t_f$ | $I_C$ = 1A, $I_{B1}$ = $I_{B2}$ = 0.2A | - | - | 0.5 | μs |
| Storage Time | $t_s$ | $V_{CC}$ = 100V | - | - | 2.5 | μs |

## Classification of $h_{FE}$

| Range | 9-15 | 15-20 | 20-25 | 25-30 | 30-35 | 35-40 |
|---|---|---|---|---|---|---|

## Ratings and Characteristic Curves (@ $T_A$ = 25°C unless otherwise specified)

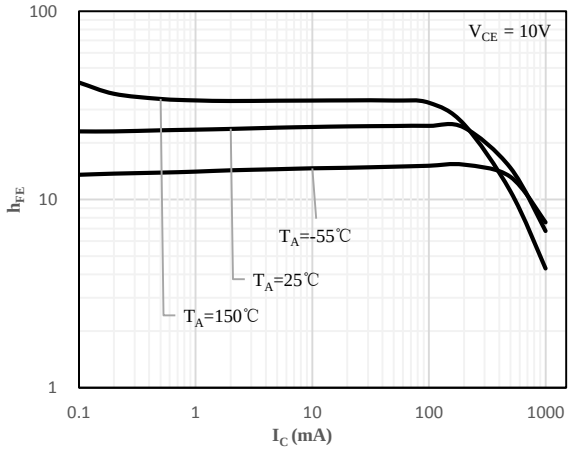



Fig 1 $h_{FE}$ vs. $I_C$

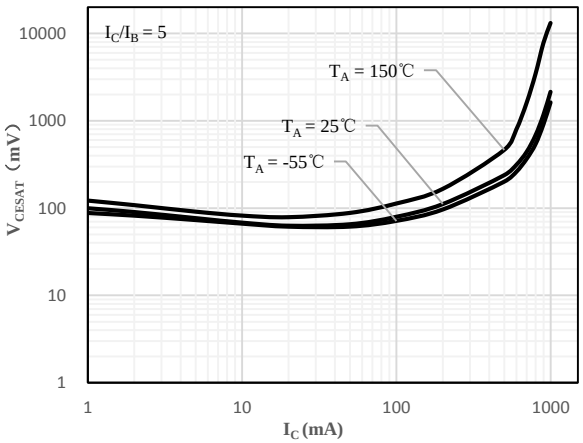



Fig 2 $V_{CE(sat)}$ vs. $I_C$

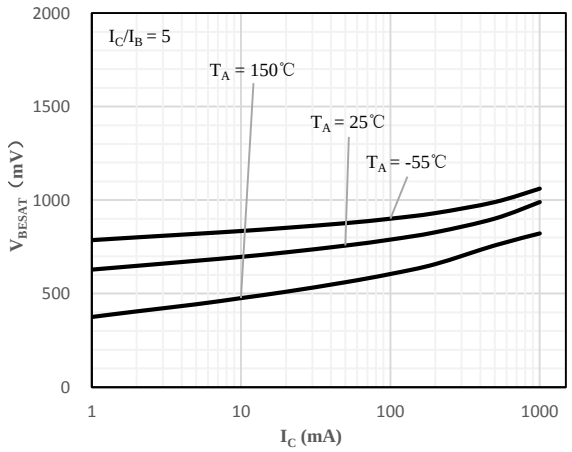



Fig 3 $V_{BE(sat)}$ vs. $I_C$

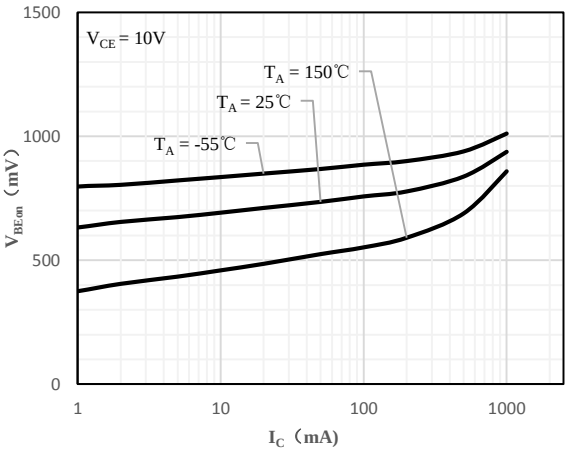



Fig 4 $V_{BE(ON)}$ vs. $I_C$

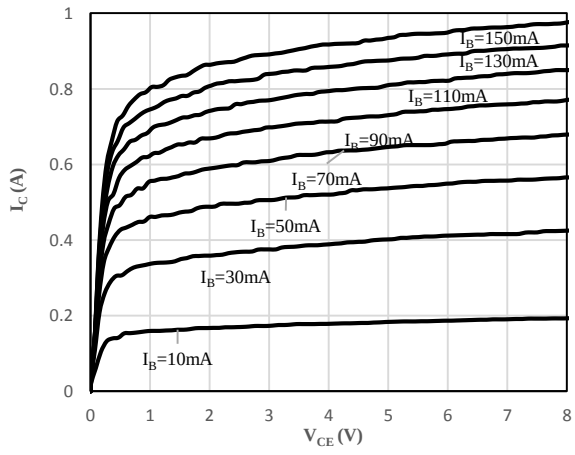



Fig 5 $I_C$ vs. $V_{CE}$

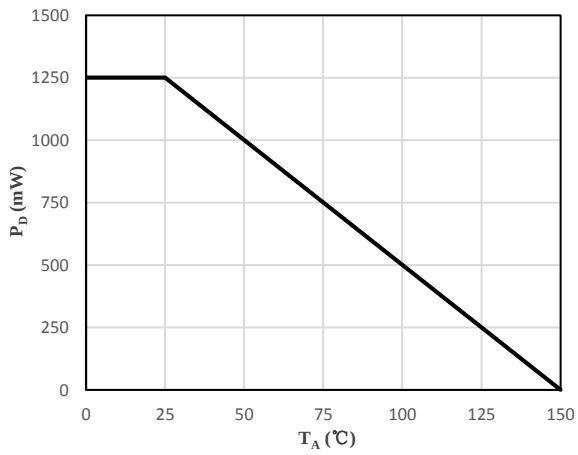
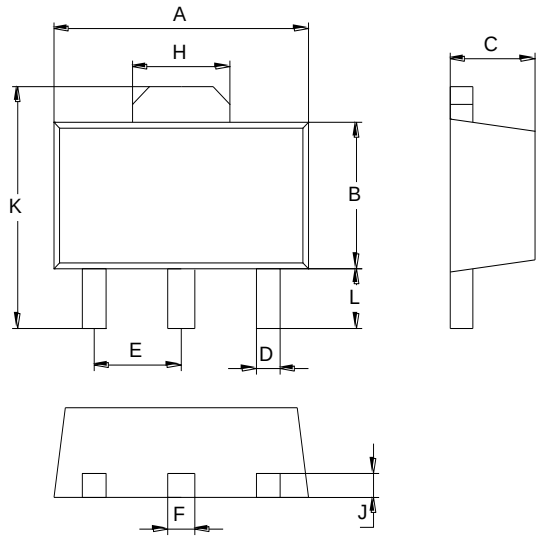



Fig 6 $P_D$ vs. $T_A$

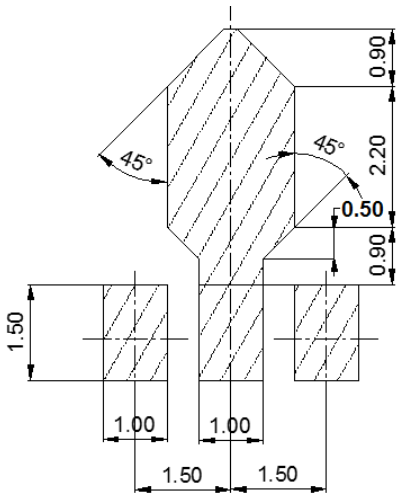
## Package Outline Dimensions (Unit: mm)




| SOT-89 | | |
|---|---|---|
| **Dimension** | **Min.** | **Max.** |
| A | 4.30 | 4.70 |
| B | 2.25 | 2.65 |
| C | 1.30 | 1.70 |
| D | 0.30 | 0.50 |
| E | 1.40 | 1.60 |
| F | 0.38 | 0.58 |
| H | 1.60 | 1.80 |
| J | 0.30 | 0.50 |
| L | 0.90 | 1.10 |
| K | 3.95 | 4.35 |

## Mounting Pad Layout (Unit: mm)

### SOT-89

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