

# 2SD1990

## Silicon NPN Triple-Diffused Planar Type

### Power Switching

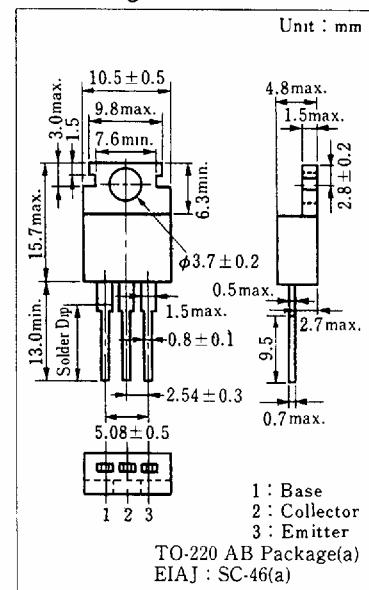
#### ■ Features

- High speed switching
- Good linearity of DC current gain ( $h_{FE}$ )
- Large collector power dissipation ( $P_C$ )

#### ■ Absolute Maximum Ratings ( $T_c=25^\circ\text{C}$ )

| Item                        | Symbol    | Value                  | Unit             |
|-----------------------------|-----------|------------------------|------------------|
| Collector-base voltage      | $V_{CB0}$ | 80                     | V                |
| Collector-emitter voltage   | $V_{CEO}$ | 60                     | V                |
| Emitter-base voltage        | $V_{EBO}$ | 6                      | V                |
| Peak collector current      | $I_{CP}$  | 8                      | A                |
| Collector current           | $I_C$     | 4                      | A                |
| Base-emitter voltage        | $I_B$     | 1                      | A                |
| Collector power dissipation | $P_C$     | $T_c=25^\circ\text{C}$ | 35               |
|                             |           | $T_a=25^\circ\text{C}$ | 1.4              |
| Junction temperature        | $T_j$     | 150                    | $^\circ\text{C}$ |
| Storage temperature         | $T_{stg}$ | -55 ~ +150             | $^\circ\text{C}$ |

#### ■ Package Dimensions



#### ■ Electrical Characteristics ( $T_c=25^\circ\text{C}$ )

| Item                                 | Symbol        | Condition  | min. | typ. | max. | Unit          |
|--------------------------------------|---------------|--|------|------|------|---------------|
| Collector cutoff current             | $I_{CBO}$     | $V_{CB}=80\text{V}, I_E=0$                           |      |      | 100  | $\mu\text{A}$ |
| Emitter cutoff current               | $I_{EBO}$     | $V_{EB}=6\text{V}, I_C=0$                            |      |      | 100  | $\mu\text{A}$ |
| Collector-emitter voltage            | $V_{CEO}$     | $I_C=25\text{mA}, I_B=0$                             | 60   |      |      | V             |
| DC current gain                      | $h_{FE1}$     | $V_{CE}=4\text{V}, I_C=1\text{A}$                    | 40   |      | 320  |               |
|                                      | $h_{FE2}$     | $V_{CE}=4\text{V}, I_C=4\text{A}$                    | 20   |      |      |               |
| Base-emitter voltage                 | $V_{BE}$      | $V_{CE}=4\text{V}, I_C=4\text{A}$                    |      |      | 2.0  | V             |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=4\text{A}, I_B=0.4\text{A}$                     |      |      | 1.5  | V             |
| Transition frequency                 | $f_T$         | $V_{CE}=12\text{V}, I_C=0.2\text{A}, f=10\text{MHz}$ |      | 80   |      | MHz           |
| Turn-on time                         | $t_{on}$      | $I_C=4\text{A}$                                      |      | 0.3  |      | $\mu\text{s}$ |
| Storage time                         | $t_{stg}$     | $I_{B1}=0.4\text{A}, I_{B2}=-0.4\text{A}$            |      | 1.0  |      | $\mu\text{s}$ |
| Collector current fall time          | $t_f$         | $V_{CC}=50\text{V}$                                  |      | 0.2  |      | $\mu\text{s}$ |

#### \* $h_{FE1}$ Classifications

| Class     | R     | Q      | P       | O       |
|-----------|-------|--------|---------|---------|
| $h_{FE1}$ | 40~90 | 70~150 | 120~250 | 160~320 |

