

NEC

# SILICON TRANSISTOR

## 2SD1286-Z

### NPN SILICON EPITAXIAL TRANSISTOR

#### MP-3

#### DESCRIPTION

2SD1286-Z is designed for Switching, especially in Hybrid Integrate Circuits.

#### FEATURES

- High  $h_{FE}$  :  $h_{FE} = 2\ 000$  to  $30\ 000$
- Complement to 2SB963-Z

#### QUALITY GRADE

Standard

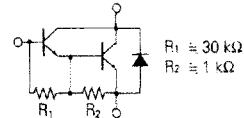
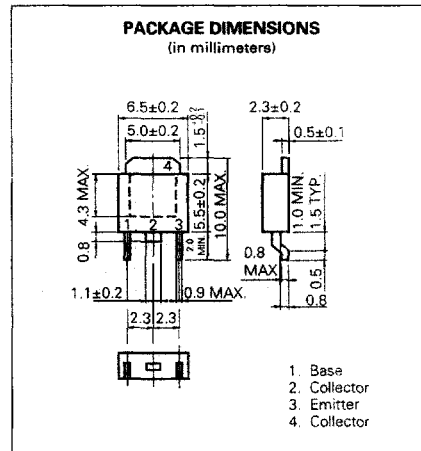
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

#### ABSOLUTE MAXIMUM RATINGS ( $T_a = 25\ ^\circ\text{C}$ )

|  |           |             |                  |
|--|-----------|-------------|------------------|
| Collector to Base Voltage                                | $V_{CE0}$ | 60          | V                |
| Collector to Emitter Voltage                             | $V_{CE0}$ | 60          | V                |
| Emitter to Base Voltage                                  | $V_{EB0}$ | 8           | V                |
| Collector Current (DC)                                   | $I_C$     | 1           | A                |
| Collector Current (Pulse)*                               | $I_C$     | 2           | A                |
| Total Power Dissipation ( $T_a = 25\ ^\circ\text{C}$ )** | $P_T$     | 2.0         | W                |
| Junction Temperature                                     | $T_j$     | 150         | $^\circ\text{C}$ |
| Storage Temperature                                      | $T_{stg}$ | -55 to +150 | $^\circ\text{C}$ |

\*  $PW \leq 10\ \text{ms}$ , Duty Cycle  $\leq 50\ \%$

\*\* When mounted on ceramic substrate of  $7.5\ \text{cm}^2 \times 0.7\ \text{mm}$



**ELECTRICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**

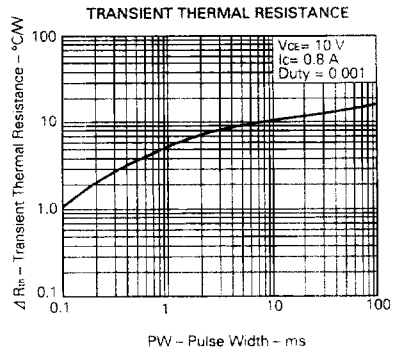
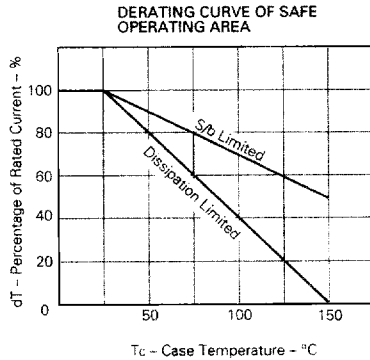
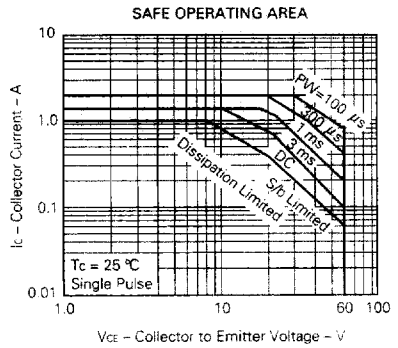
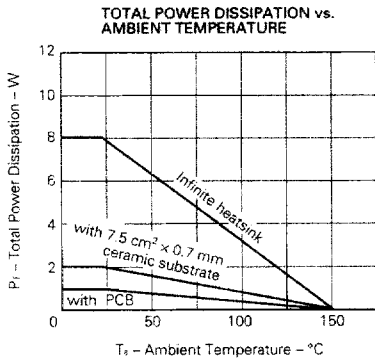
| CHARACTERISTIC               | SYMBOL                 | MIN.  | TYP. | MAX.   | UNIT | TEST CONDITIONS                                  |
|------------------------------|------------------------|-------|------|--------|------|--|
| Collector Cutoff Current     | I <sub>CO</sub>        |       |      | 10     | μA   | V <sub>CE</sub> = 60 V, I <sub>E</sub> = 0       |
| Emitter Cutoff Current       | I <sub>EO</sub>        |       |      | 1.0    | mA   | V <sub>EB</sub> = 5.0 V, I <sub>C</sub> = 0      |
| DC Current Gain              | h <sub>FE1</sub> *     | 1 000 |      |        |      | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 0.2 A  |
| DC Current Gain              | h <sub>FE2</sub> *     | 2 000 |      | 30 000 |      | V <sub>CE</sub> = 2.0 V, I <sub>C</sub> = 0.5 A  |
| Collector Saturation Voltage | V <sub>CE(sat)</sub> * |       |      | 1.5    | V    | I <sub>C</sub> = 500 mA, I <sub>B</sub> = 0.5 mA |
| Base Saturation Voltage      | V <sub>BE(sat)</sub> * |       |      | 2.0    | V    | I <sub>C</sub> = 500 mA, I <sub>B</sub> = 0.5 mA |
| Turn-on Time                 | t <sub>on</sub>        |       | 0.5  |        | μs   | I <sub>C</sub> = 0.5 A, R <sub>L</sub> = 100 Ω   |
| Storage Time                 | t <sub>stg</sub>       |       | 1.0  |        | μs   | I <sub>B1</sub> = -I <sub>B2</sub> = 0.1 mA      |
| Fall Time                    | t <sub>f</sub>         |       | 1.0  |        | μs   | V <sub>CC</sub> = 50 V                           |

\* Pulsed: PW ≤ 350 μs, Duty Cycle ≤ 2 %

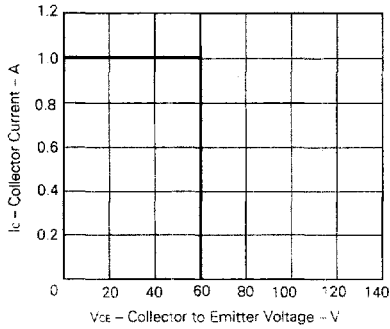
**h<sub>FE</sub> Classification**

| MARKING | M              | L               | K               |
|---------|----------------|-----------------|-----------------|
| hFE2    | 2 000 to 5 000 | 4 000 to 10 000 | 8 000 to 30 000 |

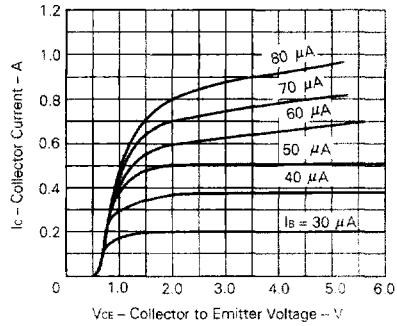
**TYPICAL CHARACTERISTICS (T<sub>a</sub> = 25 °C)**



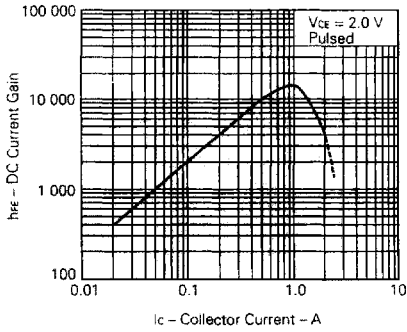
REVERSE BIAS SAFE OPERATING AREA



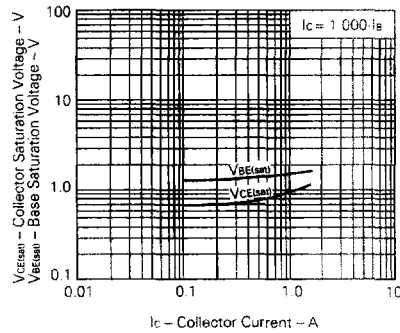
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



DC CURRENT GAIN vs. COLLECTOR CURRENT



BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



SWITCHING TIME ( $t_{on}$ ,  $t_{sig}$ ,  $t_f$ ) TEST CIRCUIT

