

PNP SILICON TRIPLE DIFFUSED TRANSISTOR  
MP-3

## DESCRIPTION

2SA1400-Z is designed for High Voltage Switching, especially in Hybrid Integrated Circuits.

## FEATURES

- High Voltage :  $V_{CE0} = -400$  V
- High Speed :  $\tau_r \leq 1.0$   $\mu$ s
- Complement to 2SC3588-Z

## QUALITY GRADE

Standard

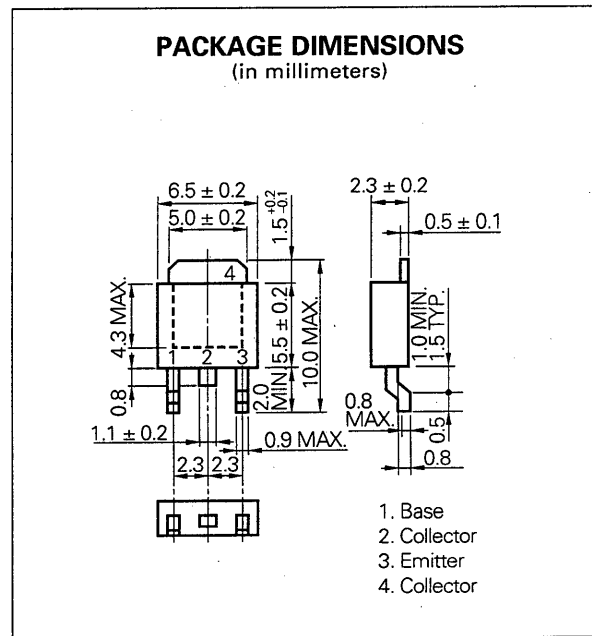
Please refer to "Quality grade on NEC Semiconductor Devices" (Document number IEI-1209) published by NEC Corporation to know the specification of quality grade on the devices and its recommended applications.

ABSOLUTE MAXIMUM RATINGS ( $T_a = 25$  °C)

|  |           |             |    |
|--|-----------|-------------|----|
| Collector to Base Voltage                  | $V_{CBO}$ | -400        | V  |
| Collector to Emitter Voltage               | $V_{CEO}$ | -400        | V  |
| Emitter to Base Voltage                    | $V_{EBO}$ | -7          | V  |
| Collector Current (DC)                     | $I_c$     | -0.5        | A  |
| Collector Current (Pulse)*                 | $I_c$     | -1.0        | A  |
| Total Power Dissipation ( $T_a = 25$ °C)** | $P_T$     | 2.0         | W  |
| Junction Temperature                       | $T_j$     | 150         | °C |
| Storage Temperature                        | $T_{stg}$ | -55 to +150 | °C |

\*  $PW \leq 300$   $\mu$ s, Duty Cycle  $\leq 10$  %

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

PACKAGE DIMENSIONS  
(in millimeters)

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

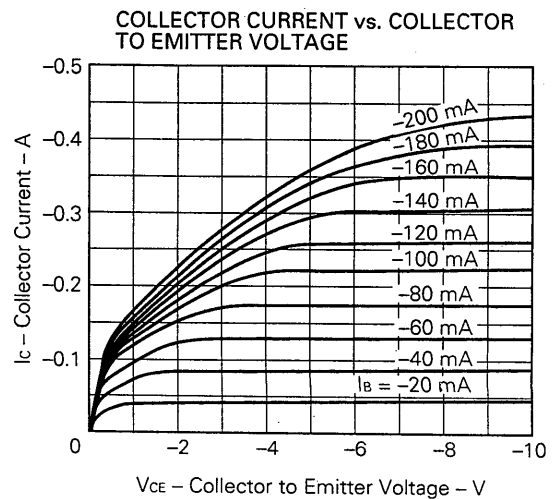
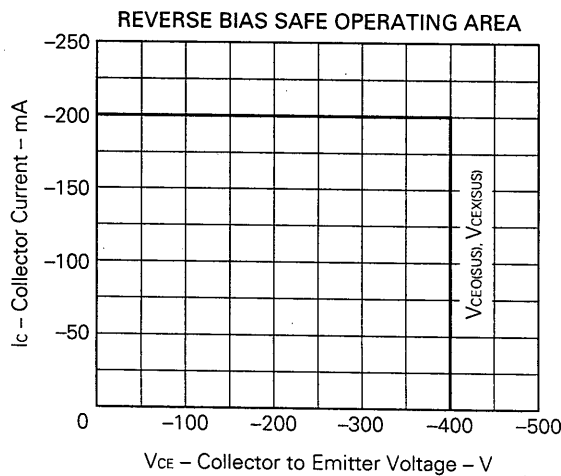
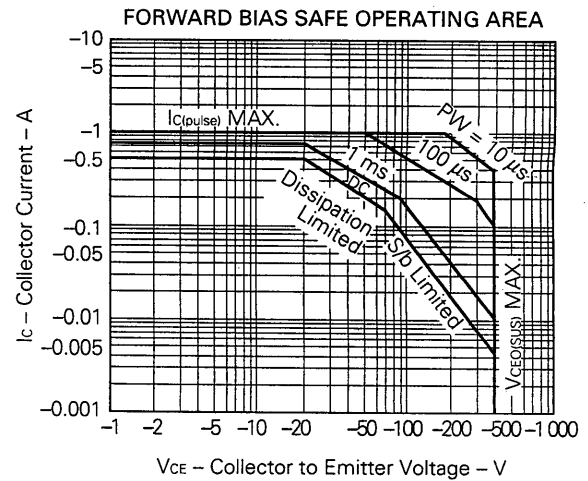
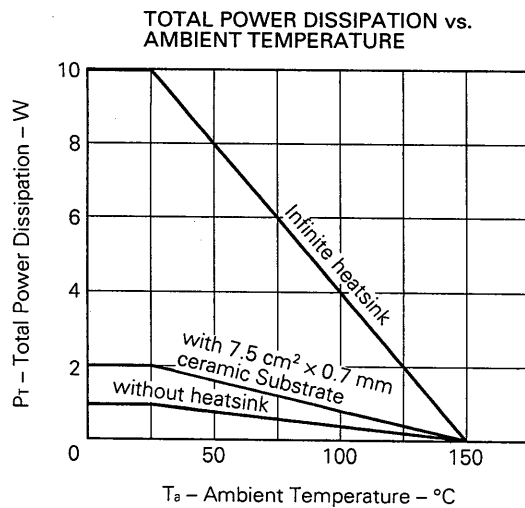
| CHARACTERISTIC               | SYMBOL                 | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS  |
|------------------------------|------------------------|------|------|------|------|--|
| Collector Cutoff Current     | I <sub>cBO</sub>       |      |      | -100 | μA   | V <sub>CB</sub> = -400 V, I <sub>E</sub> = 0                             |
| Emitter Cutoff Current       | I <sub>EBO</sub>       |      |      | -10  | μA   | V <sub>EB</sub> = -5.0 V, I <sub>C</sub> = 0                             |
| DC Current Gain              | h <sub>FE</sub> *      | 30   |      | 200  |      | V <sub>CE</sub> = -5.0 V, I <sub>C</sub> = -50 mA                        |
| Collector Saturation Voltage | V <sub>CE(sat)</sub> * |      |      | -1.0 | V    | I <sub>C</sub> = -100 mA, I <sub>B</sub> = -10 mA                        |
| Base Saturation Voltage      | V <sub>BE(sat)</sub> * |      |      | -1.2 | V    | I <sub>C</sub> = -100 mA, I <sub>B</sub> = -10 mA                        |
| Turn-on Time                 | t <sub>on</sub>        |      |      | 1.0  | μs   | I <sub>C</sub> = -100 mA, R <sub>L</sub> = 1.5 kΩ                        |
| Storage Time                 | t <sub>stg</sub>       |      |      | 5.0  | μs   | I <sub>B1</sub> = -I <sub>B2</sub> = -10 mA,<br>V <sub>CC</sub> = -150 V |
| Fall time                    | t <sub>r</sub>         |      |      | 1.0  | μs   | PW ≤ 50 μs, Duty Cycle ≤ 2 %   |

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

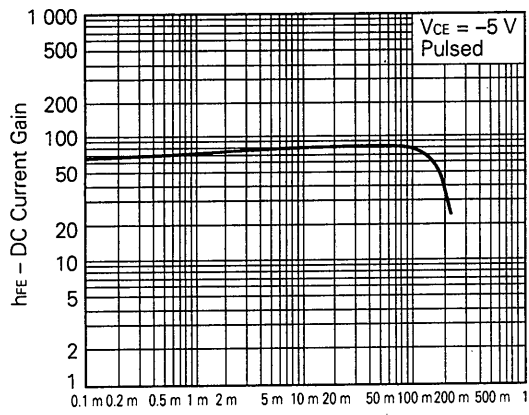
h<sub>FE</sub> Classification

| MARKING         | N        | M        | L         | K          |
|-----------------|----------|----------|-----------|------------|
| h <sub>FE</sub> | 30 to 60 | 40 to 80 | 60 to 120 | 100 to 200 |

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

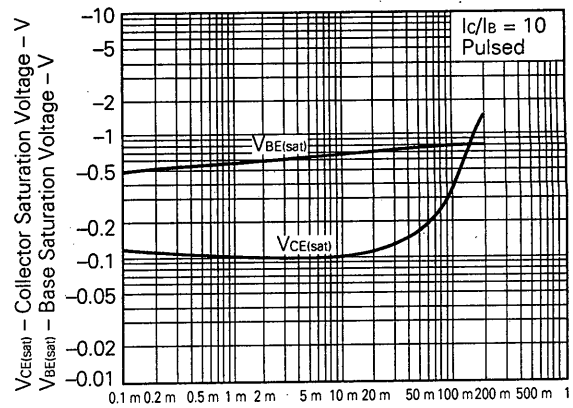


DC CURRENT GAIN vs. COLLECTOR CURRENT



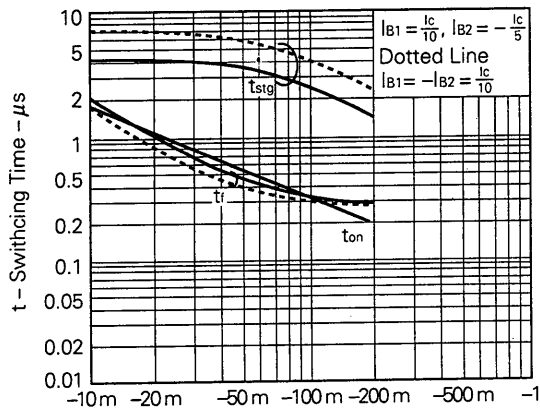
$I_C$  - Collector Current - A

BASE COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



$I_C$  - Collector Current - A

TURN ON TIME, STORAGE TIME AND FALL TIME vs. COLLECTOR CURRENT



$I_C$  - Collector Current - A

**Reference**

| Application note name   | No.      |
|---|----------|
| Quality control of NEC semiconductors devices.                | TEI-1202 |
| Quality control guide of semiconductors devices.              | MEI-1202 |
| Assembly manual of semiconductors devices.                    | IEI-1207 |
| Design of Push-Pull Type Switching Regulators (Basic).        | TEB-1002 |
| Design of Push-Pull Type Switching Regulators (Applications). | TEB-1003 |
| Optimum Base Drive Conditions of Switching Power Transistors. | TEB-1014 |

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Application examples recommended by NEC Corporation.

Standard: Computer, Office equipment, Communication equipment, Test and Measurement equipment, Machine tools, Industrial robots, Audio and Visual equipment, Other consumer products, etc.

Special: Automotive and Transportation equipment, Traffic control systems, Antidisaster systems, Anticrime systems, etc.