

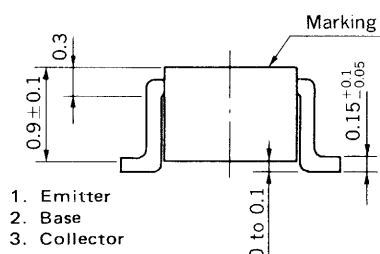
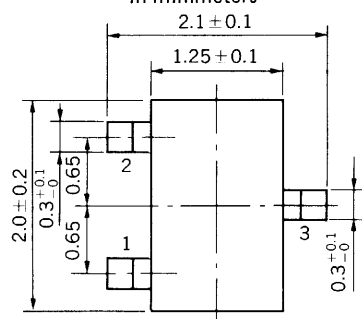
# SILICON TRANSISTOR

## 2SC4173

# HIGH FREQUENCY AMPLIFIER AND SWITCHING NPN SILICON EPITAXIAL TRANSISTOR

## PACKAGE DIMENSIONS

in millimeters



## FEATURES

- High Gain Bandwidth Product:  $f_T = 200 \text{ MHz MIN.}$
- Complementary to 2SA1608

### ABSOLUTE MAXIMUM RATINGS

Maximum Voltages and Current ( $T_a = 25^\circ\text{C}$ )

|                              |           |     |    |
|------------------------------|-----------|-----|----|
| Collector to Base Voltage    | $V_{CBO}$ | 60  | V  |
| Collector to Emitter Voltage | $V_{CEO}$ | 40  | V  |
| Emitter to Base Voltage      | $V_{EBO}$ | 5.0 | V  |
| Collector Current (DC)       | $I_C$     | 500 | mA |

### Maximum Power Dissipation

### Total Power Dissipation

$P_T$  150 mW

### Maximum Temperatures

|                           |                  |             |    |
|---------------------------|------------------|-------------|----|
| Junction Temperature      | T <sub>j</sub>   | 150         | °C |
| Storage Temperature Range | T <sub>sta</sub> | −55 to +150 | °C |

### ELECTRICAL CHARACTERISTICS ( $T_a = 25\text{ }^{\circ}\text{C}$ )

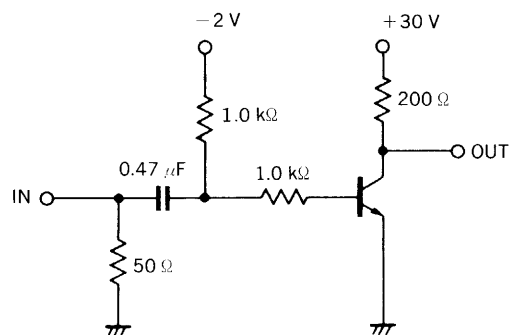
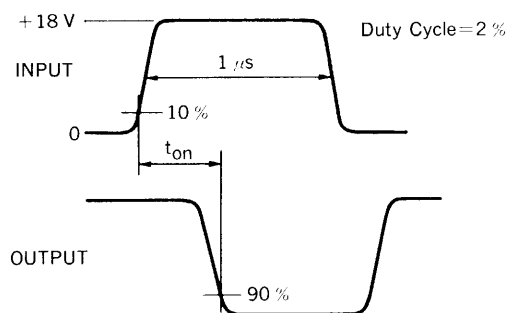
| CHARACTERISTIC               | SYMBOL        | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS                                     |
|------------------------------|---------------|------|------|------|------|-----------------------------------------------------|
| Collector Cutoff Current     | $I_{CBO}$     |      |      | 100  | nA   | $V_{CB} = 40\text{ V}, I_E = 0$                     |
| Emitter Cutoff Current       | $I_{EBO}$     |      |      | 100  | nA   | $V_{EB} = 4.0\text{ V}, I_C = 0$                    |
| DC Current Gain              | $h_{FE1}$     | 75   | 150  | 300  |      | $V_{CE} = 1.0\text{ V}, I_C = 150\text{ mA}$        |
| DC Current Gain              | $h_{FE2}$     | 20   | 75   |      |      | $V_{CE} = 2.0\text{ V}, I_C = 500\text{ mA}$        |
| Collector Saturation Voltage | $V_{CE(sat)}$ |      | 0.25 | 0.75 | V    | $I_C = 500\text{ mA}, I_B = 50\text{ mA}$           |
| Base Saturation Voltage      | $V_{BE(sat)}$ |      | 1.0  | 1.2  | V    | $I_C = 500\text{ mA}, I_B = 50\text{ mA}$           |
| Gain Bandwidth Product       | $f_T$         | 200  | 400  |      | MHz  | $V_{CE} = 10\text{ V}, I_E = -20\text{ mA}$         |
| Output Capacitance           | $C_{ob}$      |      | 3.5  | 8.0  | pF   | $V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$ |
| Turn-on Time                 | $t_{on}$      |      | 30   |      | ns   | $V_{CC} = 30\text{ V}$                              |
| Storage Time                 | $t_{stg}$     |      | 150  |      | ns   | $I_C = 150\text{ mA}$                               |
| Turn-off Time                | $t_{off}$     |      | 180  |      | ns   | $I_{B1} = -I_{B2} = 15\text{ mA}$                   |

\* Pulsed: PW  $\leq 350 \mu\text{s}$ , Duty Cycle  $\leq 2\%$

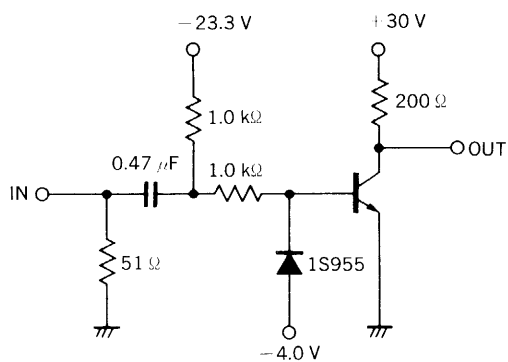
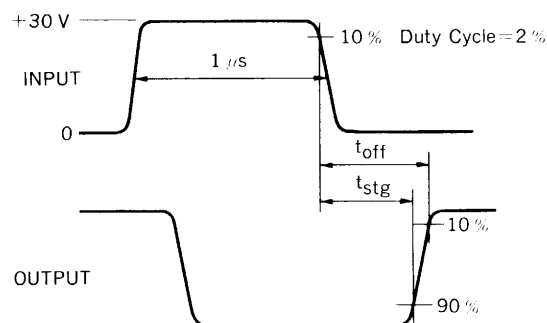
### $h_{FE}$ Classification

| Marking | B12       | B13        | B14        |
|---------|-----------|------------|------------|
| hFE1    | 75 to 150 | 100 to 200 | 150 to 300 |

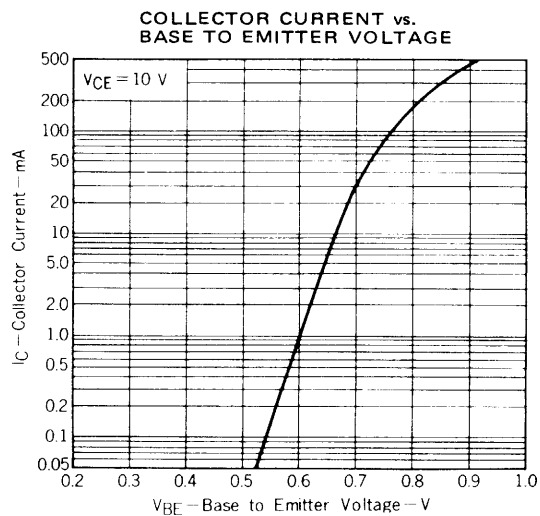
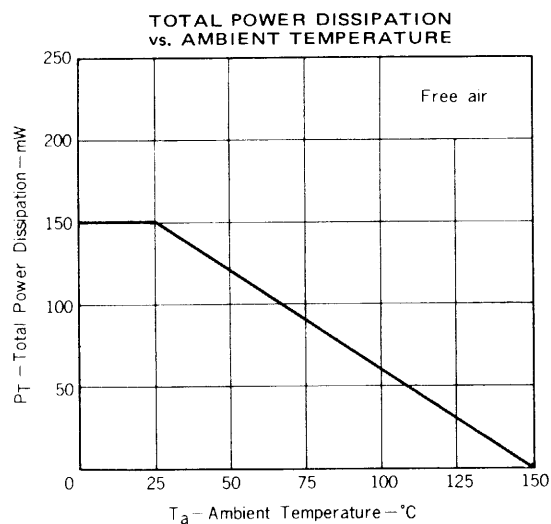
## SWITCHING TIME TEST CIRCUIT

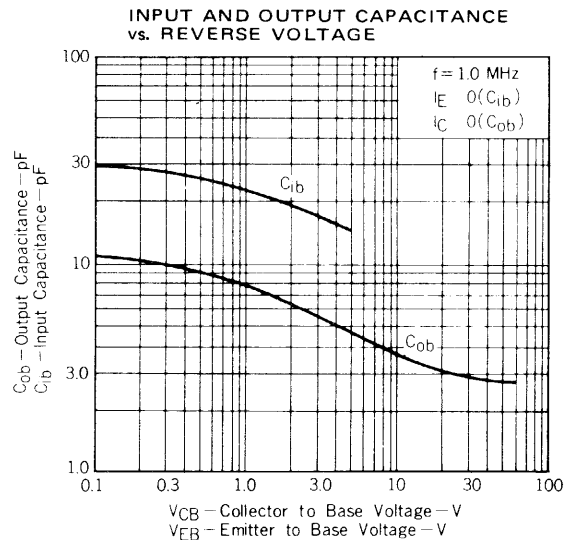
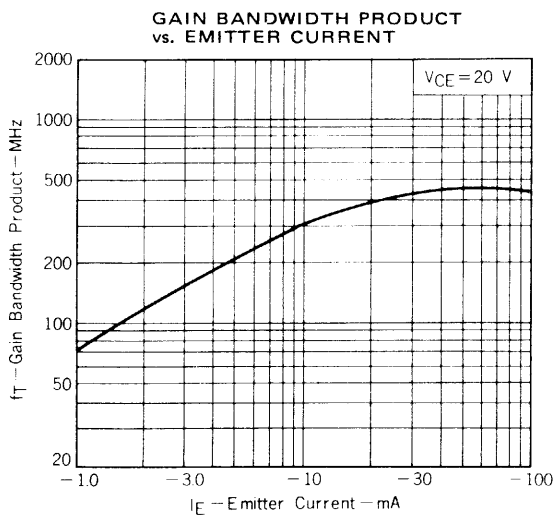
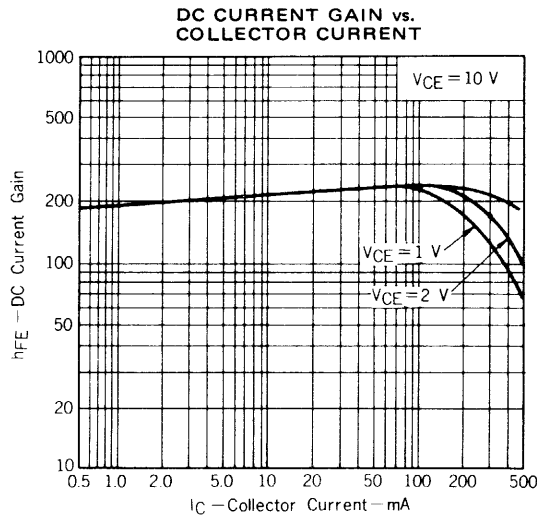
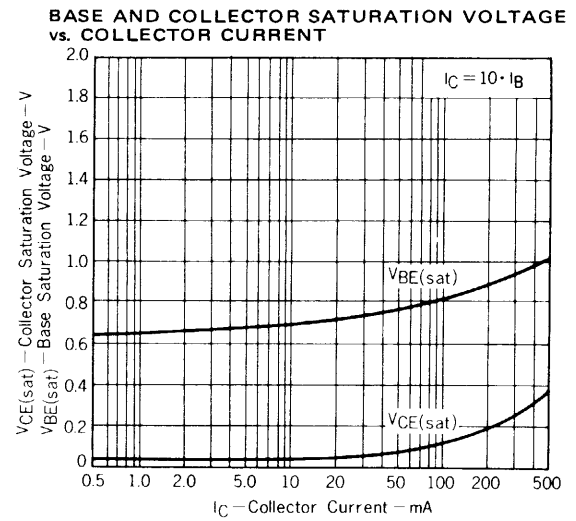
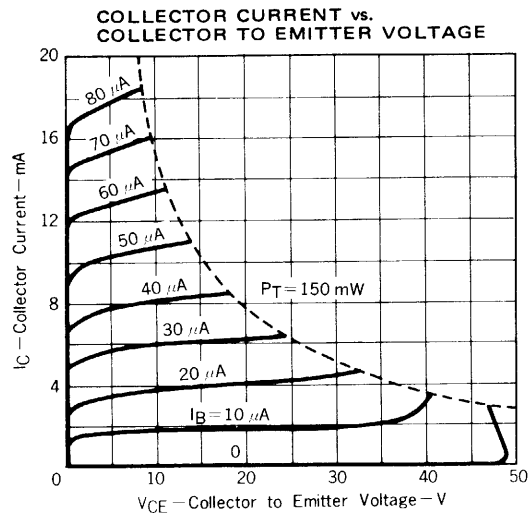
 $t_{on}$  SWITCHING

VOLTAGE WAVEFORMS

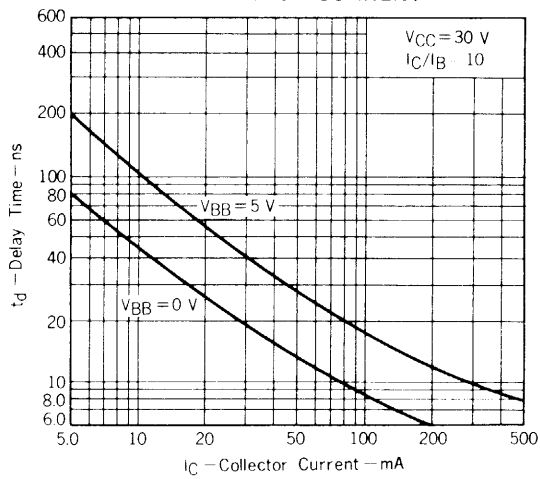
 $t_{off}$  SWITCHING

VOLTAGE WAVEFORMS

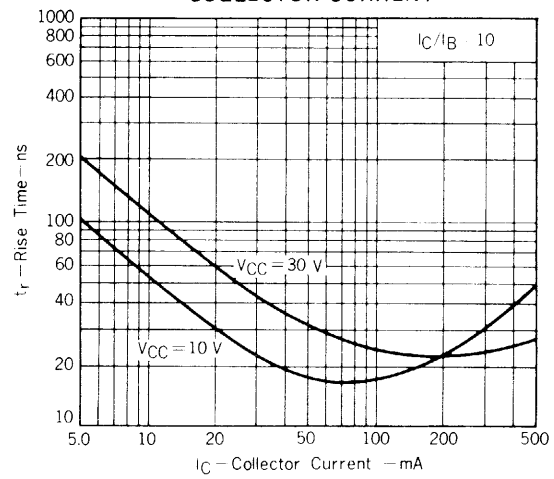
TYPICAL CHARACTERISTICS ( $T_a = 25^\circ\text{C}$ )



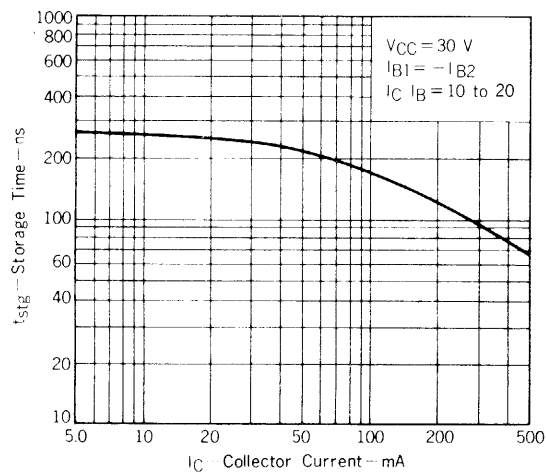
DELAY TIME vs.  
COLLECTOR CURRENT



RISE TIME vs.  
COLLECTOR CURRENT



STORAGE TIME vs.  
COLLECTOR CURRENT



FALL TIME vs.  
COLLECTOR CURRENT

