DATA SHEET

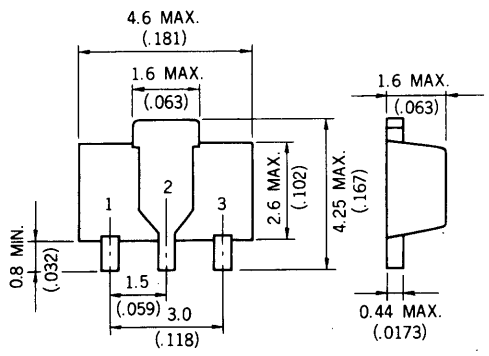
NEC

# SILICON TRANSISTOR
# 2SD1001

## NPN SILICON EPITAXIAL TRANSISTOR
## POWER MINI MOLD

### DESCRIPTION
The 2SD1001 is designed for audio frequency power amplifier application, especially in Hybrid Integrated Circuits.

**PACKAGE DIMENSIONS**
in millimeters (inches)




1. Emitter
2. Collector
3. Base

### FEATURES
- World Standard Miniature Package
  : SOT−89
- High Collector to Emitter Voltage
  : $V_{CEO} > 80$ V
- Complements to PNP type 2SB800

### ABSOLUTE MAXIMUM RATINGS (Ta = 25 °C)

| | | | |
|---|---|---|---|
| Maximum Voltages and Currents | | | |
| Collector to Base Voltage | $V_{CBO}$ | 80 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | 80 | V |
| Emitter to Base Voltage | $V_{EBO}$ | 5.0 | V |
| Collector Current (DC) | $I_C$ | 300 | mA |
| Collector Current (Pulse)* | $I_C$ | 500 | mA |
| Maximum Power Dissipation | | | |
| Total Power Dissipation at 25 °C Ambient Temperature** | $P_T$ | 2.0 | W |
| Maximum Temperatures | | | |
| Junction Temperature | $T_j$ | 150 | °C |
| Storage Temperature Range | $T_{stg}$ | −55 to +150 | °C |

*PW ≦ 10 ms, duty cycle ≦ 50 %
**When mounted on ceramic substrate of 16 cm² x 0.7 mm

### ELECTRICAL CHARACTERISTICS (Ta = 25 °C)

| CHARACTERISTIC | SYMBOL | MIN. | TYP. | MAX. | UNIT | TEST CONDITIONS |
|---|---|---|---|---|---|---|
| Collector Cutoff Current | $I_{CBO}$ | | | 100 | nA | $V_{CB}$=80 V, $I_E$=0 |
| Emitter Cutoff Current | $I_{EBO}$ | | | 100 | nA | $V_{EB}$=5.0 V, $I_C$=0 |
| DC Current Gain | $h_{FE1}$ | 90 | 200 | 400 | | $V_{CE}$=1.0 V, $I_C$=50 mA *** |
| DC Current Gain | $h_{FE2}$ | 30 | 80 | | | $V_{CE}$=2.0 V, $I_C$=300 mA *** |
| Collector Saturation Voltage | $V_{CE(sat)}$ | | 0.15 | 0.60 | V | $I_C$=300 mA, $I_B$=30 mA *** |
| Base Saturation Voltage | $V_{BE(sat)}$ | | 0.86 | 1.2 | V | $I_C$=300 mA, $I_B$=30 mA *** |
| Base to Emitter Voltage | $V_{BE}$ | 600 | 645 | 700 | mV | $V_{CE}$=6.0 V, $I_C$=10 mA *** |
| Gain Bandwidth Product | $f_T$ | | 140 | | MHz | $V_{CE}$=6.0 V, $I_E$=−10 mA |
| Output Capacitance | $C_{ob}$ | | 7.0 | | pF | $V_{CB}$=6.0 V, $I_E$=0, f=1.0 MHz |

***Pulsed: PW ≦ 350 μs, duty cycle ≦ 2 %

$h_{FE}$ Classification

| MARKING | EM | EL | EK |
|---|---|---|---|
| $h_{FE1}$ | 90 − 180 | 135 − 270 | 200 − 400 |

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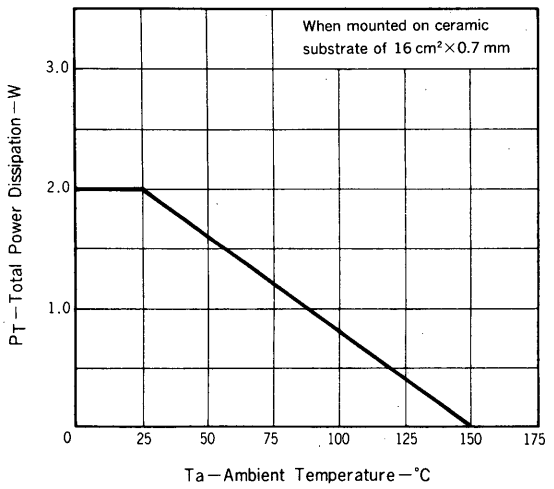
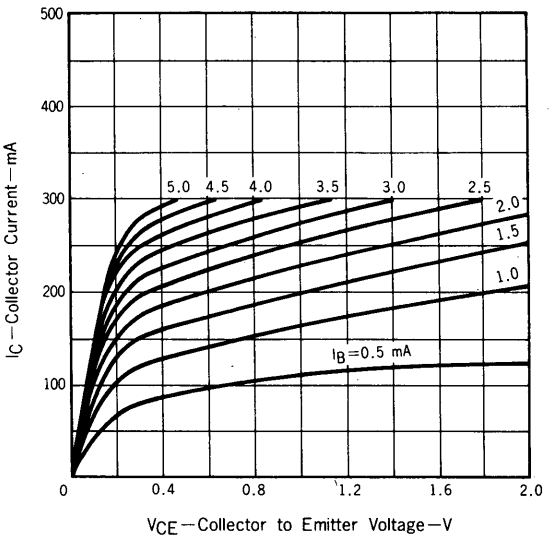
## TYPICAL CHARACTERISTICS ($T_a$ = 25 °C)

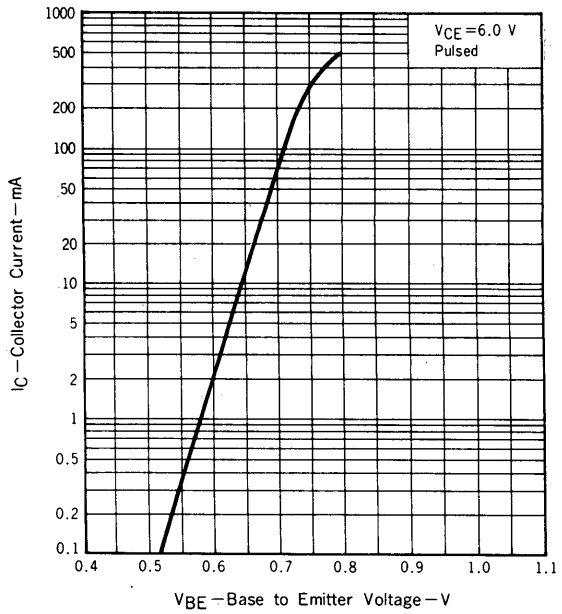
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



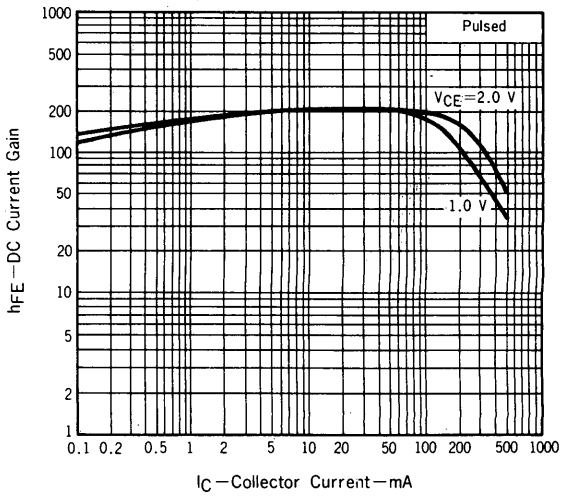

COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



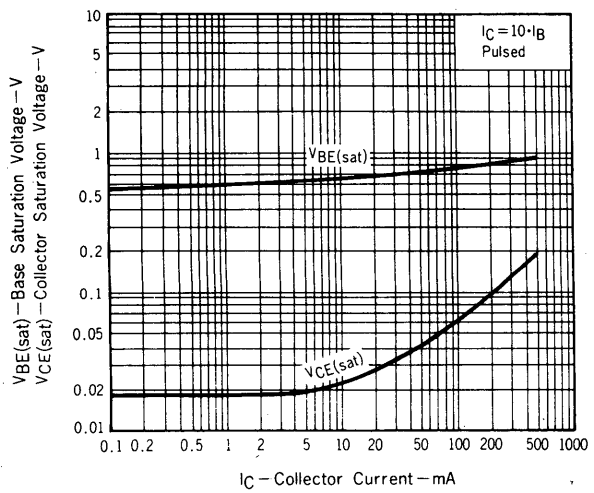

COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



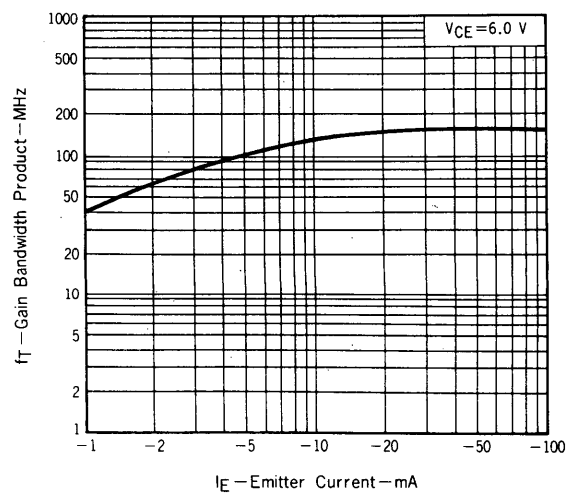

DC CURRENT GAIN vs. COLLECTOR CURRENT



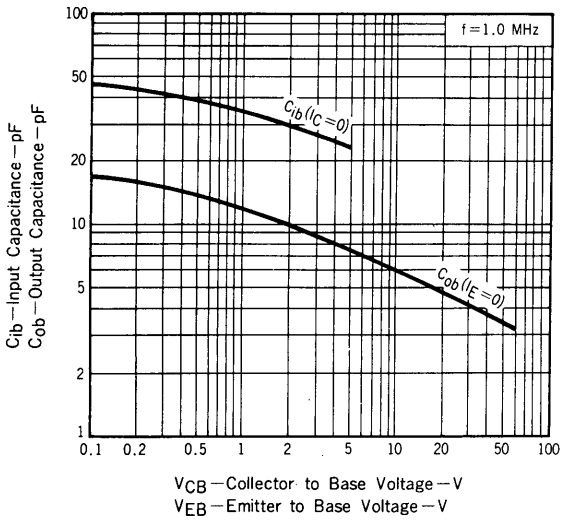

BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT




GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT



INPUT AND OUTPUT CAPACITANCE
vs. REVERSE VOLTAGE




## REFERENCE

| Document Name | Document No. |
|---|---|
| NEC semiconductor device reliability/quality control system. | TEI-1202 |
| Quality grade on NEC semiconductor devices. | IEI-1209 |
| Semiconductor device mounting technology manual. | IEI-1207 |
| Semiconductor device package manual. | IEI-1213 |
| Guide to quality assurance for semiconductor devices. | MEI-1202 |
| Semiconductor selection guide. | MF-1134 |

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