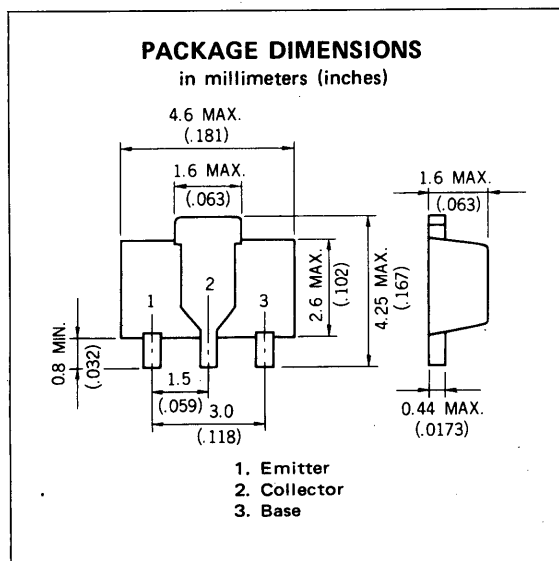


NPN SILICON EPITAXIAL TRANSISTOR
POWER MINI MOLD

DESCRIPTION

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



FEATURES

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

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

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 | $^\circ\text{C}$ |
| Storage Temperature Range | T_{stg} | -55 to +150 | $^\circ\text{C}$ |

* $PW \leq 10$ ms, duty cycle $\leq 50\%$

**When mounted on ceramic substrate of $16\text{ cm}^2 \times 0.7\text{ mm}$

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

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

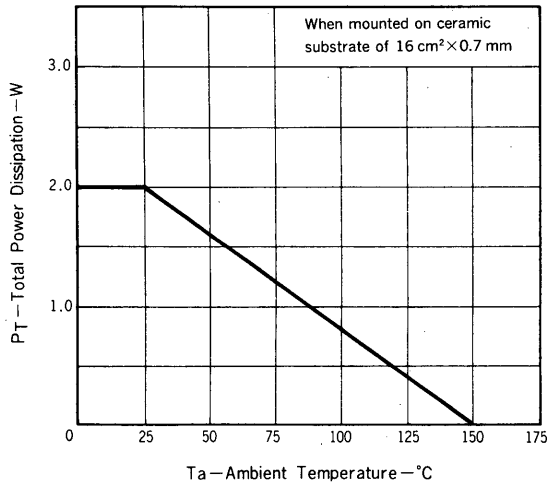
***Pulsed: $PW \leq 350\ \mu\text{s}$, duty cycle $\leq 2\%$

h_{FE} Classification

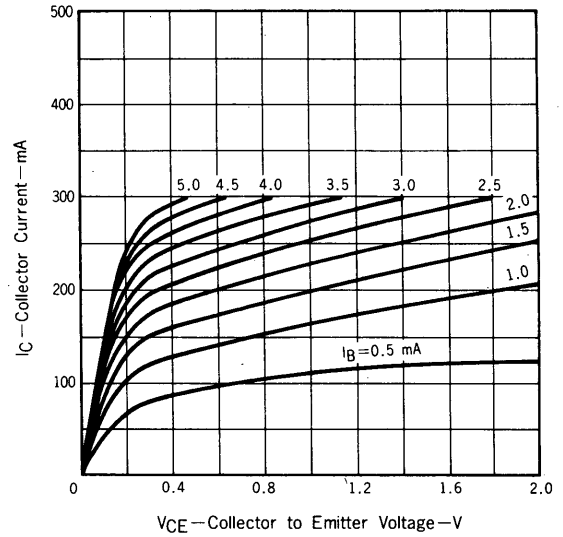
| MARKING | EM | EL | EK |
|-----------|----------|-----------|-----------|
| h_{FE1} | 90 - 180 | 135 - 270 | 200 - 400 |

TYPICAL CHARACTERISTICS (Ta=25 °C)

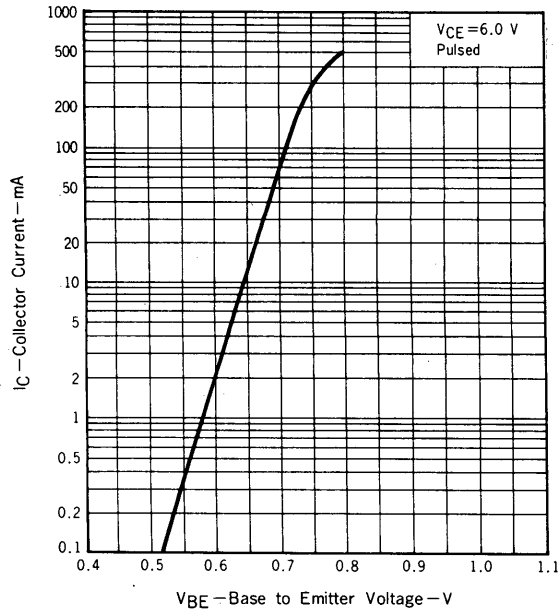
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



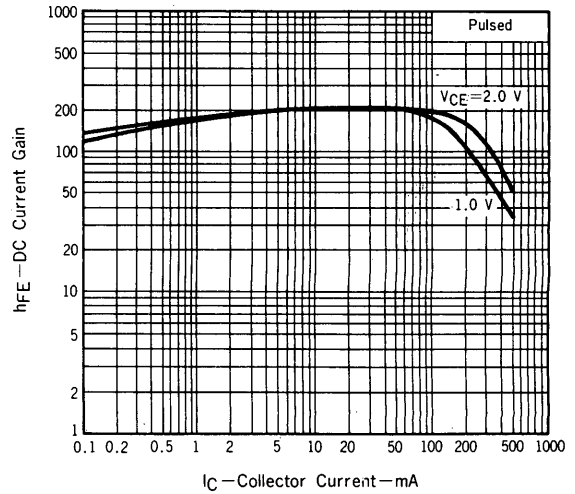
COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



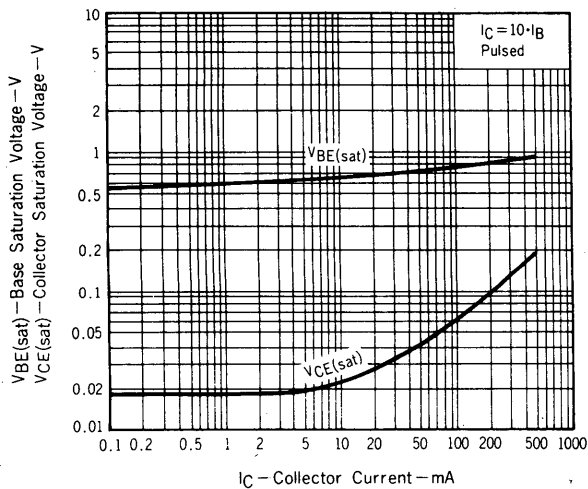
COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE



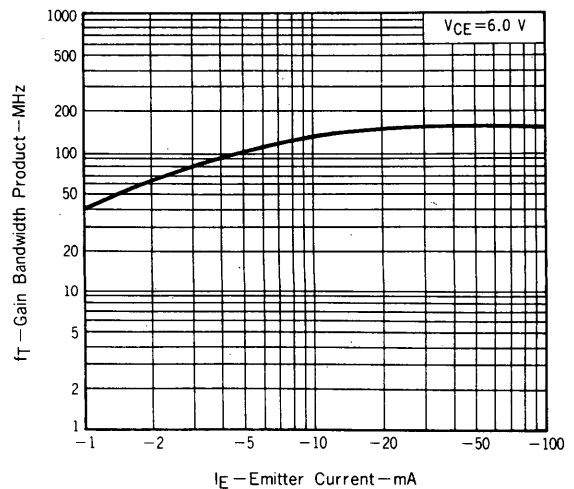
DC CURRENT GAIN vs. COLLECTOR CURRENT

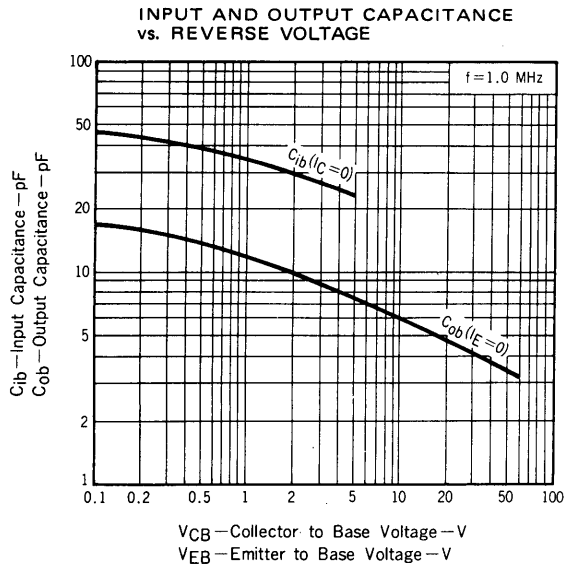


BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT



GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT





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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