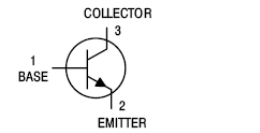
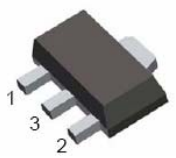
# NPN Silicon Epitaxial Transistor 2SD999

## FEATURES

- Low Collector Saturation Voltage:
  $V_{CE(sat)}$<0.4V( $I_C$=1.0A,$I_B$ =100mA)
- Excellent DC Current Gain Linearity:
  $h_{FE}$=140Typ.( $V_{CE}$=1.0V, $I_C$=1.0A)
- Complements to PNP type 2SB798

Pb
Lead-free




**SOT-89**

## ORDERING INFORMATION

| Type No. | Marking | Package Code |
|---|---|---|
| 2SD999 | CM/CL/CK | SOT-89 |

## MAXIMUM RATING @ Ta=25℃ unless otherwise specified

| **Symbol** | **Parameter** | **Value** | **Unit** |
|---|---|---|---|
| $V_{CBO}$ | Collector-Base Voltage | 30 | V |
| $V_{CEO}$ | Collector-Emitter Voltage | 25 | V |
| $V_{EBO}$ | Emitter-Base Voltage | 5.0 | V |
| $I_C$ | Collector Current | 1.0 | A |
| $P_C$ | Collector power dissipation | 2.0 | W |
| $T_j$ | Junction Temperature | -55 to +150 | ℃ |
| $T_{stg}$ | Storage Temperature | -55 to +150 | ℃ |

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## ELECTRICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

| Parameter | Symbol | Test conditions | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| Collector-base breakdown voltage | $V_{(BR)CBO}$ | $I_C$=10μA, $I_E$=0 | 30 | | | V |
| Collector-emitter breakdown voltage | $V_{(BR)CEO}$ | $I_C$=2mA ,$I_B$=0 | 25 | | | V |
| Emitter-base breakdown voltage | $V_{(BR)EBO}$ | $I_E$=10μA, $I_C$=0 | 5.0 | | | V |
| Collector cut-off current | $I_{CBO}$ | $V_{CB}$=30V, $I_E$=0 | | | 0.1 | uA |
| Emitter cut-off current | $I_{EBO}$ | $V_{EB}$=5.0V,$I_C$=0 | | | 0.1 | uA |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C$=1.0A,$I_B$ =0.1A | | 0.21 | 0.4 | V |
| Base-emitter saturation voltage | $V_{BE(sat)}$ | $I_C$=1.0A,$I_B$ =0.1A | | 1.0 | 1.2 | V |
| Base to emitter voltage | $V_{BE}$ | $V_{CE}$=6.0V, $I_C$=10mA | 600 | 630 | 700 | mV |
| DC current gain(note) | $h_{FE}$ | $V_{CE}$=1.0V, $I_C$=100mA | 90 | 200 | 400 | |
| | | $V_{CE}$=1.0V, $I_C$=1.0A | 50 | 140 | | |
| Current gain bandwidth product | $f_T$ | $V_{CE}$=6V,$I_E$=-10mA | | 130 | | MHz |
| Output Capacitance | $C_{ob}$ | $V_{CB}$=20V, f=1MHz ,$I_E$=0A | | 22 | | pF |

**CLASSIFICATION OF $h_{FE}$**

| RANK | M | L | K |
|---|---|---|---|
| RANGE | 90-180 | 135-270 | 200-400 |

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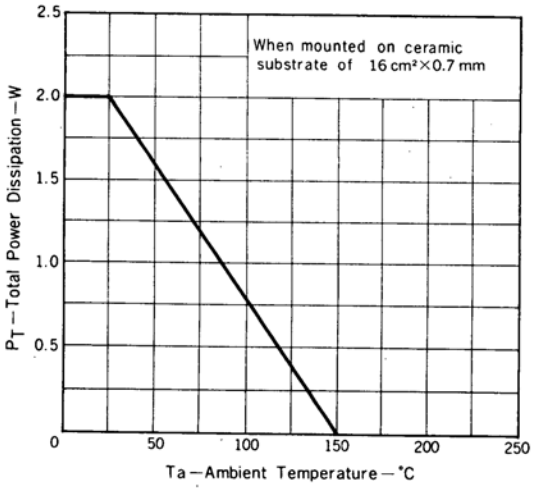
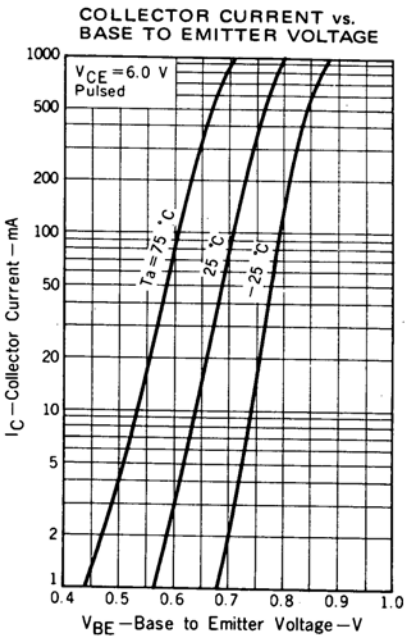
## TYPICAL CHARACTERISTICS @ Ta=25℃ unless otherwise specified

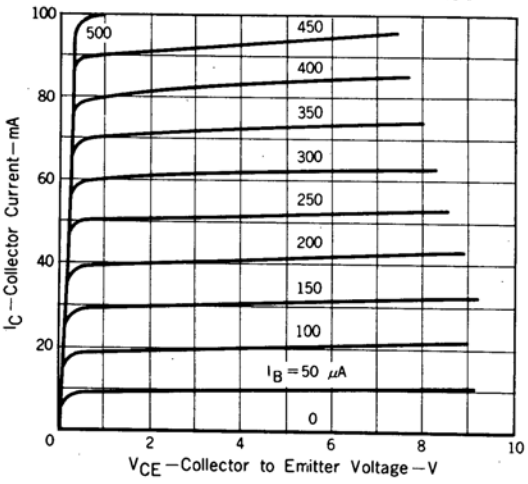
TOTAL POWER DISSIPATION vs. AMBIENT TEMPERATURE



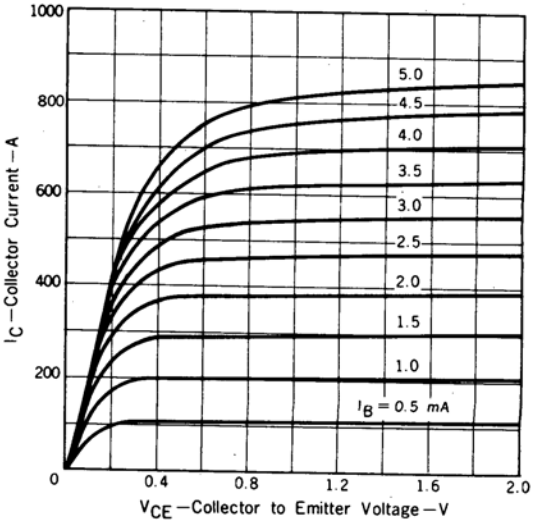

COLLECTOR CURRENT vs. BASE TO EMITTER VOLTAGE




COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE




COLLECTOR CURRENT vs. COLLECTOR TO EMITTER VOLTAGE



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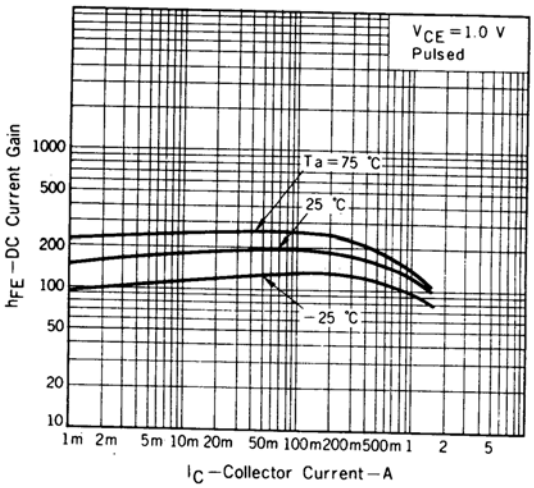
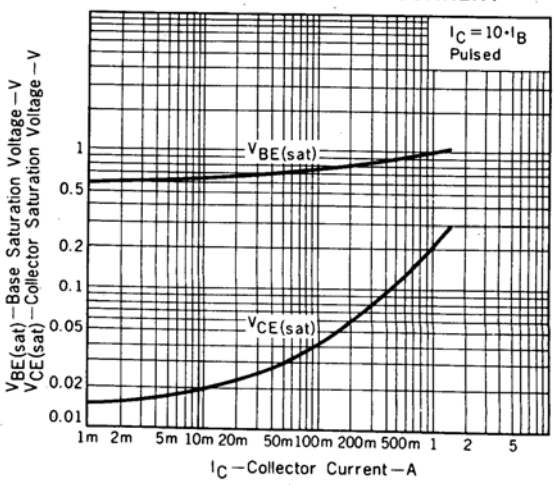
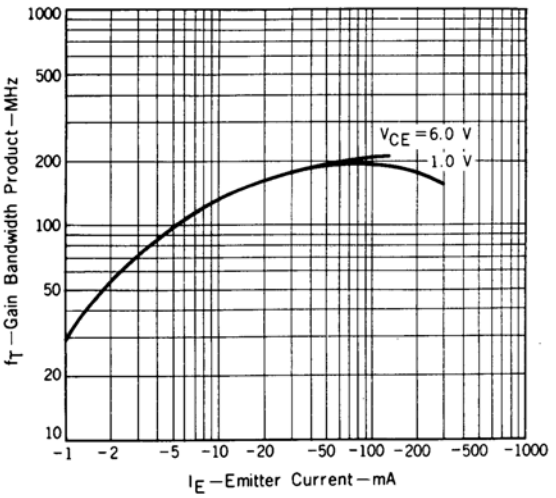
DC CURRENT GAIN vs. COLLECTOR CURRENT



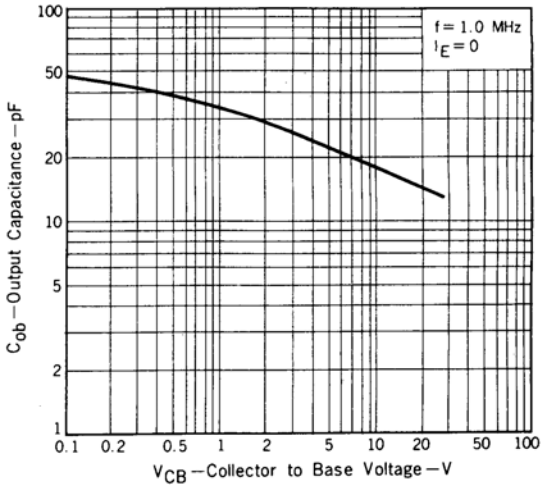

BASE AND COLLECTOR SATURATION VOLTAGE vs. COLLECTOR CURRENT




GAIN BANDWIDTH PRODUCT vs. EMITTER CURRENT




OUTPUT CAPACITANCE vs. COLLECTOR TO BASE VOLTAGE



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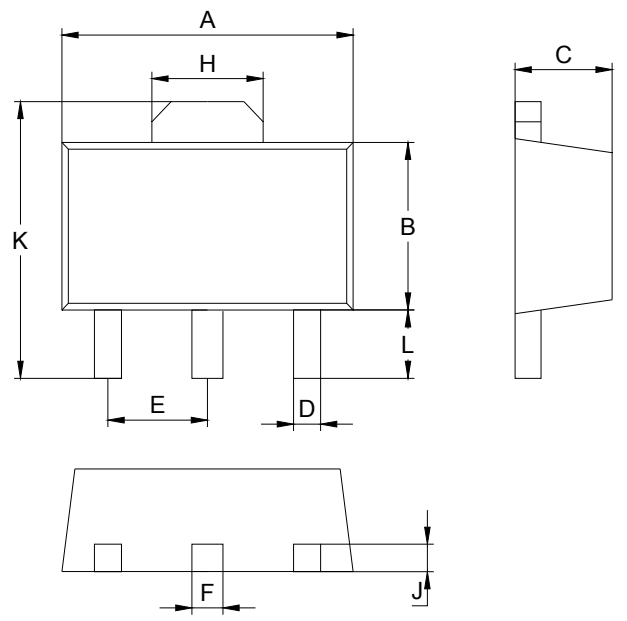
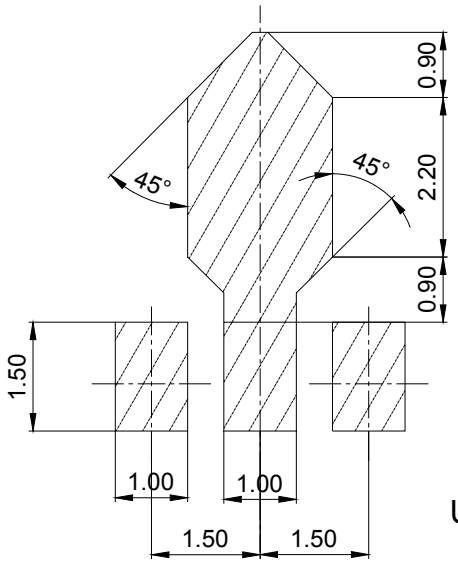
## PACKAGE OUTLINE

Plastic surface mounted package SOT-89




| SOT-89 | | |
|---|---|---|
| Dim | Min | Max |
| A | 4.30 | 4.70 |
| B | 2.25 | 2.65 |
| C | 1.50 Typical | |
| D | 0.40 Typical | |
| E | 1.40 | 1.60 |
| F | 0.48 Typical | |
| H | 1.60 | 1.80 |
| J | 0.40 Typical | |
| L | 0.90 | 1.10 |
| K | 3.95 | 4.35 |
| All Dimensions in mm | | |

## SOLDERING FOOTPRINT




Unit:mm

## PACKAGE INFORMATION

| Device | Package | Shipping |
|---|---|---|
| 2SD999 | SOT-89 | 1000/Tape&Reel |