

## Features

- High Current
- Complement to BSR33
- Halogen Free. "Green" Device (Note 1)
- Moisture Sensitivity Level 1
- Epoxy Meets UL 94 V-0 Flammability Rating
- Lead Free Finish/RoHS Compliant ("P" Suffix Designates RoHS Compliant. See Ordering Information)

## Maximum Ratings @ 25°C Unless Otherwise Specified

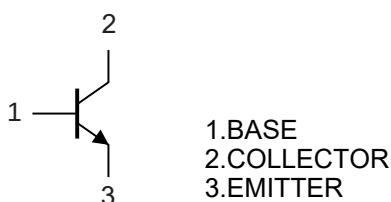
- Operating Junction Temperature Range: -55°C to +150°C
- Storage Temperature Range: -55°C to +150°C
- Thermal Resistance: 250°C/W Junction to Ambient

| Parameter                    | Symbol    | Rating | Unit |
|------------------------------|-----------|--------|------|
| Collector-Base Voltage       | $V_{CBO}$ | 90     | V    |
| Collector-Emitter Voltage    | $V_{CEO}$ | 80     | V    |
| Emitter-Base Voltage         | $V_{EBO}$ | 5      | V    |
| Continuous Collector Current | $I_C$     | 1      | A    |
| Power Dissipation            | $P_D$     | 0.5    | W    |

Note: 1. Halogen free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

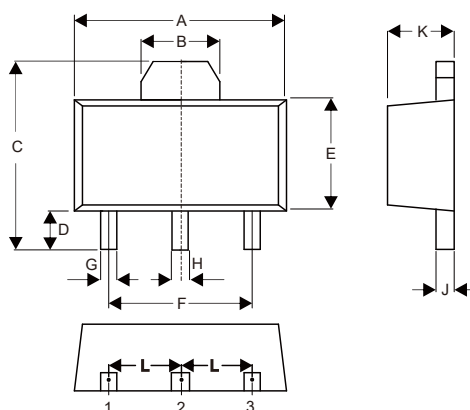
## Marking: AR4

## Internal Structure



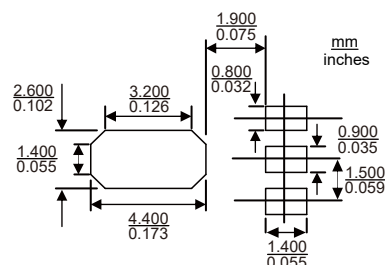
# Silicon NPN epitaxial planer Transistors

## SOT-89



| DIM | INCHES |       | MM   |      | NOTE |
|-----|--------|-------|------|------|------|
|     | MIN    | MAX   | MIN  | MAX  |      |
| A   | 0.169  | 0.185 | 4.30 | 4.70 |      |
| B   |        | 0.061 |      | 1.55 | TYP. |
| C   | 0.154  | 0.171 | 3.91 | 4.35 |      |
| D   | 0.031  | 0.047 | 0.80 | 1.20 |      |
| E   | 0.089  | 0.104 | 2.25 | 2.65 |      |
| F   |        | 0.118 |      | 3.00 | TYP. |
| G   | 0.013  | 0.020 | 0.33 | 0.52 |      |
| H   | 0.015  | 0.021 | 0.38 | 0.53 |      |
| J   | 0.014  | 0.017 | 0.35 | 0.44 |      |
| K   | 0.055  | 0.063 | 1.40 | 1.60 |      |
| L   |        | 0.059 |      | 1.50 | TYP. |

## Suggested Solder Pad Layout



**Electrical Characteristics @  $T_A=25^\circ\text{C}$  Unless Otherwise Specified**

| Parameter                            | Symbol        | Min | Typ | Max  | Units         | Conditions                                                  |
|--------------------------------------|---------------|-----|-----|------|---------------|-------------------------------------------------------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | 90  |     |      | V             | $I_C=100\mu\text{A}$ , $I_E=0$                              |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | 80  |     |      | V             | $I_C=1\text{mA}$ , $I_B=0$                                  |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | 5   |     |      | V             | $I_E=100\mu\text{A}$ , $I_C=0$                              |
| Collector Cutoff Current             | $I_{CBO}$     |     |     | 0.1  | $\mu\text{A}$ | $V_{CB}=60\text{V}$ , $I_E=0$                               |
| Emitter Cutoff Current               | $I_{EBO}$     |     |     | 0.1  | $\mu\text{A}$ | $V_{EB}=5\text{V}$ , $I_C=0$                                |
| DC Current Gain                      | $h_{FE(1)}$   | 30  |     |      |               | $V_{CE}=5\text{V}$ , $I_C=0.1\text{mA}$                     |
|                                      | $h_{FE(2)}$   | 100 |     | 300  |               | $V_{CE}=5\text{V}$ , $I_C=100\text{mA}$                     |
|                                      | $h_{FE(3)}$   | 50  |     |      |               | $V_{CE}=5\text{V}$ , $I_C=0.5\text{A}$                      |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ |     |     | 0.25 | V             | $I_C=150\text{mA}$ , $I_B=15\text{mA}$                      |
|                                      |               |     |     | 0.5  | V             | $I_C=500\text{mA}$ , $I_B=50\text{mA}$                      |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ |     |     | 1.0  | V             | $I_C=150\text{mA}$ , $I_B=15\text{mA}$                      |
|                                      |               |     |     | 1.2  | V             | $I_C=500\text{mA}$ , $I_B=50\text{mA}$                      |
| Transition Frequency                 | $f_T$         | 100 |     |      | MHz           | $V_{CE}=10\text{V}$ , $I_C=50\text{mA}$ , $f=100\text{MHz}$ |
| Collector output capacitance         | $C_{ob}$      |     |     | 12   | pF            | $V_{CB}=10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$             |
| Emitter input capacitance            | $C_{ib}$      |     |     | 90   | pF            | $V_{BE}=0.5\text{V}$ , $I_C=0$ , $f=1\text{MHz}$            |

## Curve Characteristics

Fig. 1 - Static Characteristics

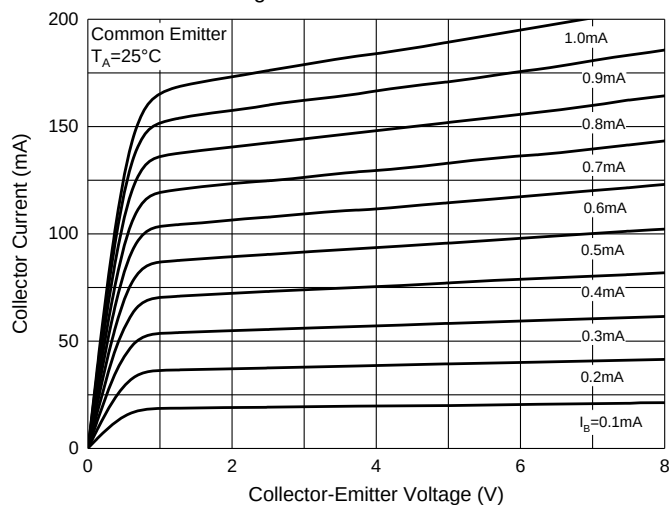


Fig. 2 - DC Current Gain Characteristics

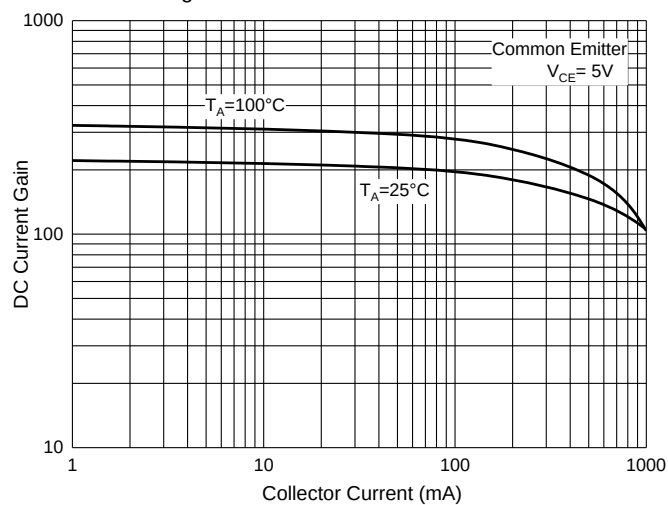


Fig. 3 - Base-Emitter Saturation Voltage Characteristics

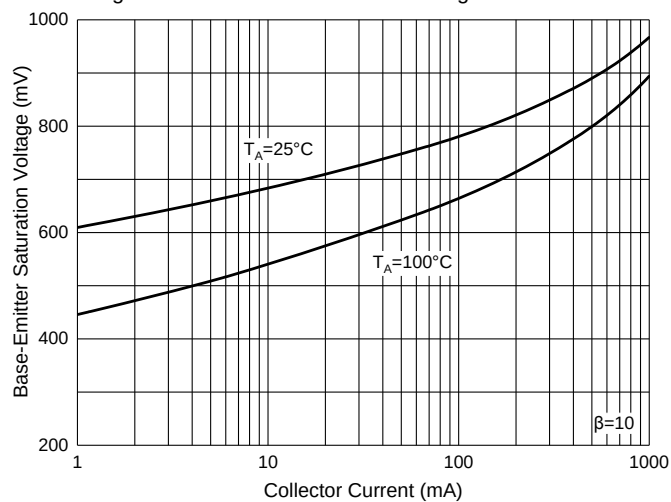


Fig. 4 - Collector-Emitter Saturation Voltage Characteristics

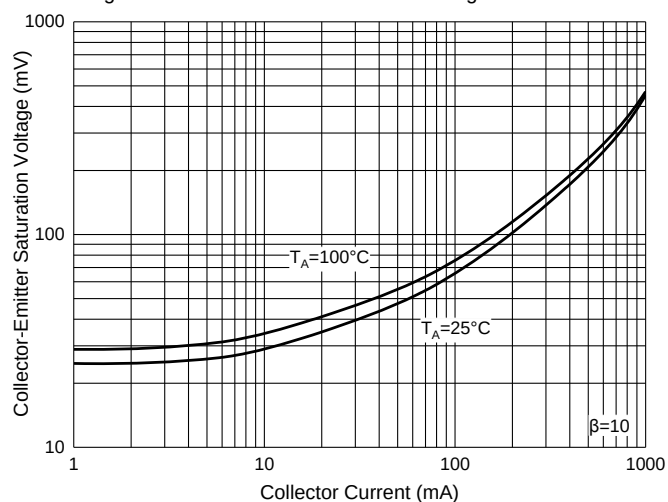


Fig. 5 - Base-Emitter Voltage Characteristics

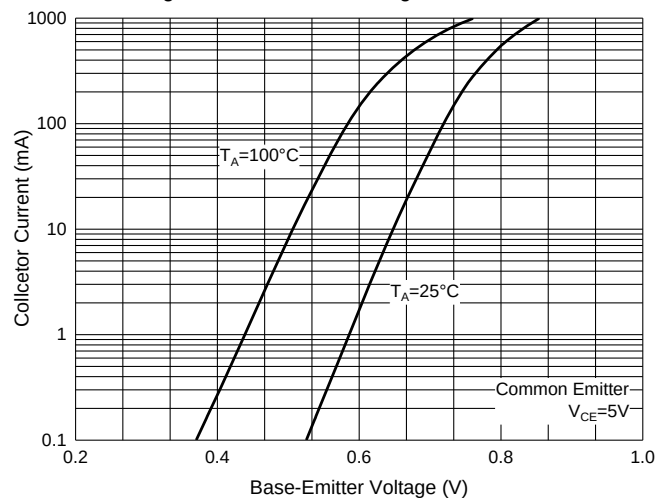
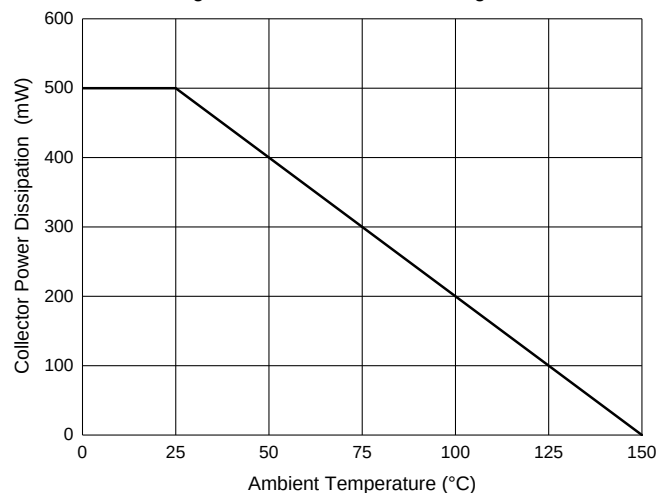


Fig. 6 - Collector Power Derating Curve



## Ordering Information

| Device         | Packing               |
|----------------|-----------------------|
| Part Number-TP | Tape&Reel: 1Kpcs/Reel |

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