$V_{CEO}$ = −150 V, $I_C$ = −10 A
Silicon PNP Epitaxial Planar Transistor

# 2SA1186

Data Sheet

## Description

The 2SA1186 is a PNP transistor of −150 V, −10 A. The product has constant $h_{FE}$ characteristics in a wide current range, providing high-quality audio sounds.

## Features

- Complementary to 2SC2837
- LAPT (Linear Amplifier Power Transistor)
- High Transition Frequency
- Bare Lead Frame: Pb-free (RoHS Compliant)

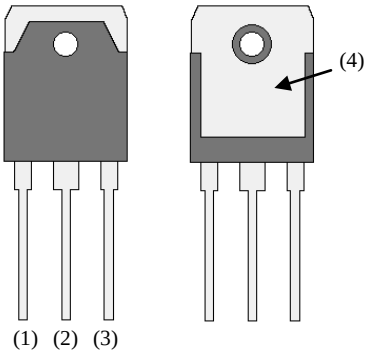
- $V_{CEO}$ ---------- −150 V
- $I_C$ ---------- −10 A
- $f_T$ ---------- 60 MHz
- $P_C$ ---------- 100 W

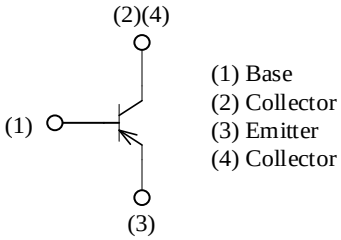
## Application

- Audio Power Amplifer

## Package

TO3P-3L




Not to scale

## Absolute Maximum Ratings

Unless otherwise specified, $T_A$ = 25 °C.

| Parameter | Symbol | Conditions | Rating | Unit |
|---|---|---|---|---|
| Collector to Base Voltage | $V_{CBO}$ | | −150 | V |
| Collector to Emitter Voltage | $V_{CEO}$ | | −150 | V |
| Emitter to Base Voltage | $V_{EBO}$ | | −5 | V |
| Collector Current | $I_C$ | | −10 | A |
| Base Current | $I_B$ | | −2 | A |
| Collector Power Dissipation | $P_C$ | $T_C$ = 25 °C | 100 | W |
| Operating Junction Temperature | $T_J$ | | 150 | °C |
| Storage Temperature | $T_{STG}$ | | −55 to 150 | °C |

## Thermal Characteristics

Unless otherwise specified, $T_A$ = 25 °C.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Thermal Resistance (Junction to Case) | $R_{\theta JC}$ | | — | — | 1.25 | °C/W |
| Thermal Resistance (Junction to Ambient) | $R_{\theta JA}$ | | — | — | 35.7 | °C/W |

## Electrical Characteristics

Unless otherwise specified, $T_A$ = 25 °C.

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Collector Cut-off Current | $I_{CBO}$ | $V_{CB}$ = −150 V, $I_E$ = 0 A | — | — | −100 | μA |
| Emitter Cut-off Current | $I_{EBO}$ | $V_{EB}$ = −5 V, $I_C$ = 0 A | — | — | −100 | μA |
| Collector to Emitter Breakdown Voltage | $V_{(BR)CEO}$ | $I_C$ = −25 mA | −150 | — | — | V |
| DC Current Gain | $h_{FE}$ | $V_{CE}$ = −4 V, $I_C$ = −3 A | 50 | — | 180 | — |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C$ = −5 A, $I_B$ = −0.5 A | — | — | −2.0 | V |
| Transition Frequency | $f_T$ | $V_{CE}$ = −12 V, $I_E$ = 1 A | — | 60 | — | MHz |
| Collector Output Capacitance | $C_{OB}$ | $V_{CB}$ = −80 V, $I_E$ = 0 A, f = 1 MHz | — | 110 | — | pF |

## $h_{FE}$ Rank

For the marking area of the rank, see the Marking Diagram.

| Rank | O | P | Y |
|---|---|---|---|
| $h_{FE}$ | 50 to 100 | 70 to 140 | 90 to 180 |

## Rating and Characteristic Curves

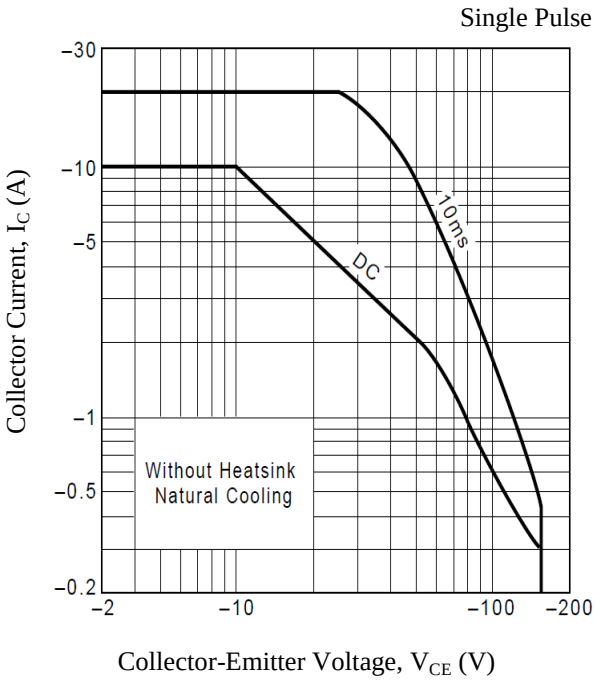



Figure 1. Safe Operating Area

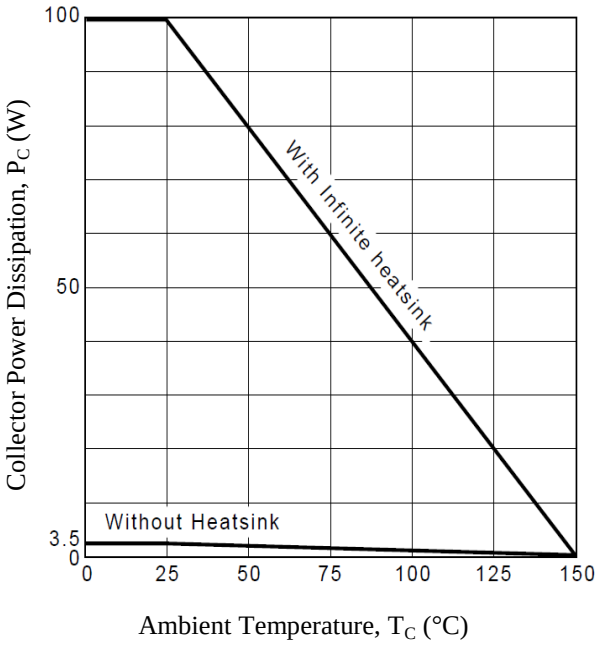



Figure 2. Power Dissipation vs. Ambient Temperature

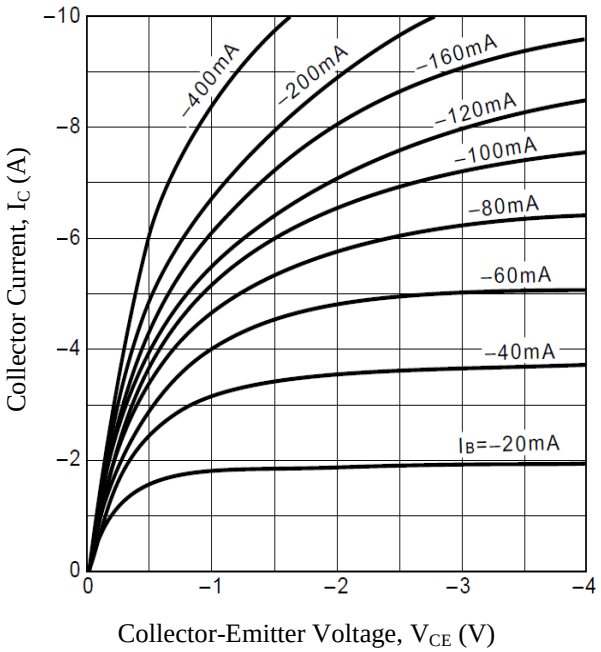



Figure 3. Collector Current vs. Collector-Emitter Voltage

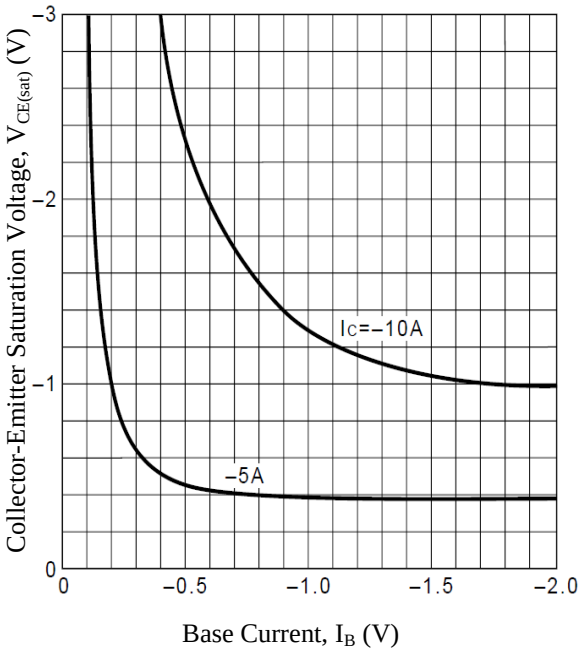



Figure 4. Collector-Emitter Saturation Voltage vs. Base Current

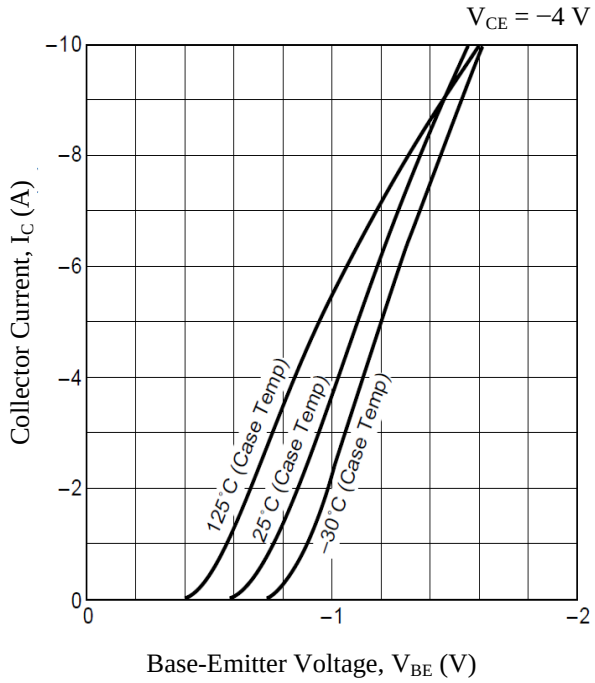



Figure 5. Collector Current vs. Base-Emitter Voltage

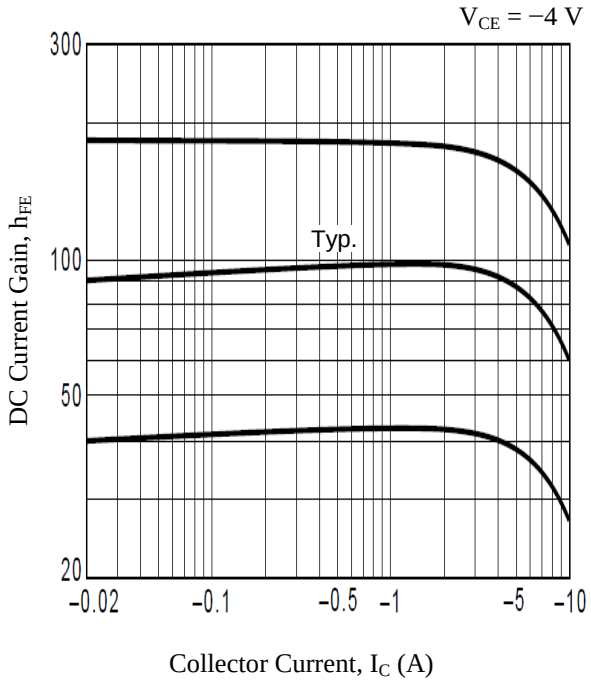



Figure 6. DC Current Gain Variation vs. Collector Current

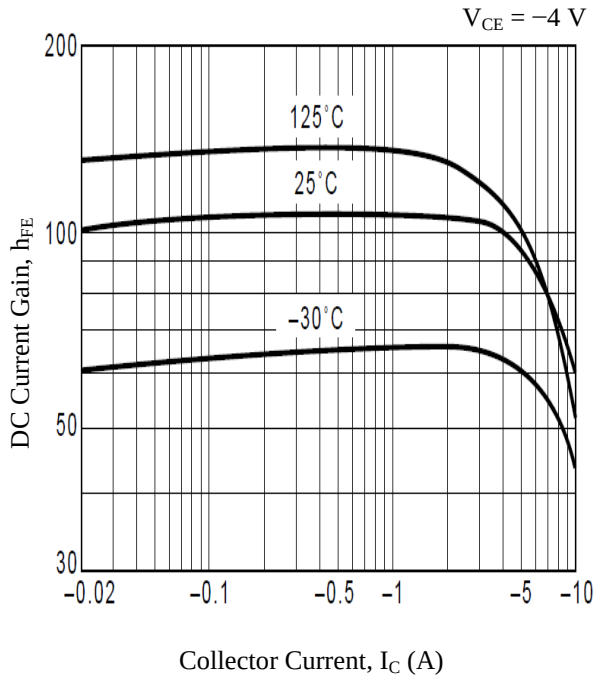



Figure 7. DC Current Gain vs. Collector Current

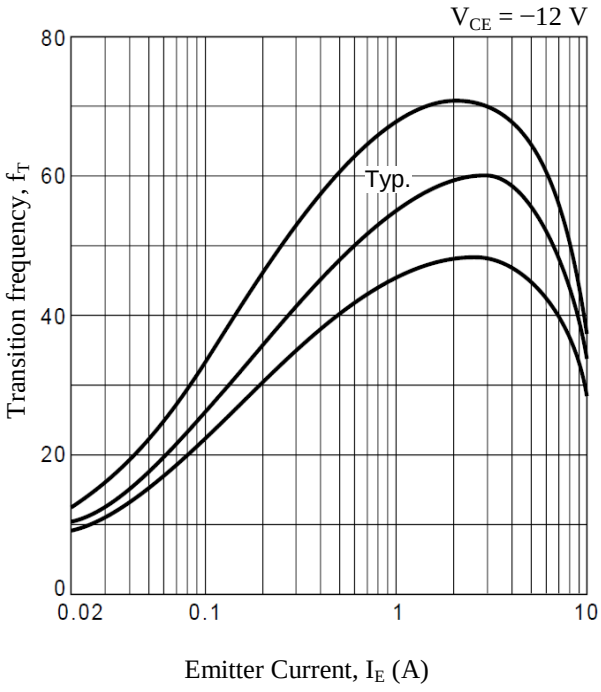



Figure 8. Transition Frequency vs. Emitter Current

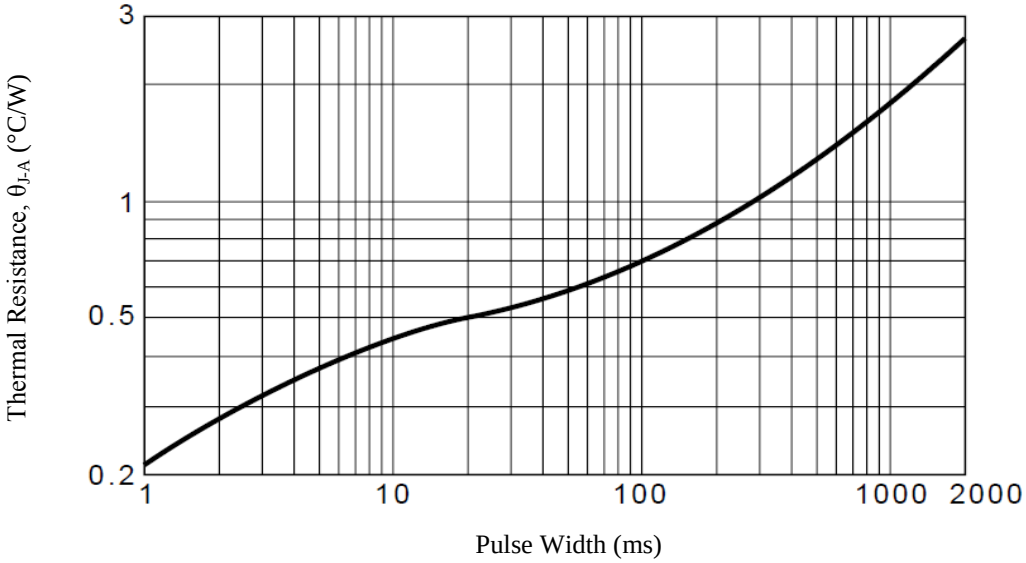
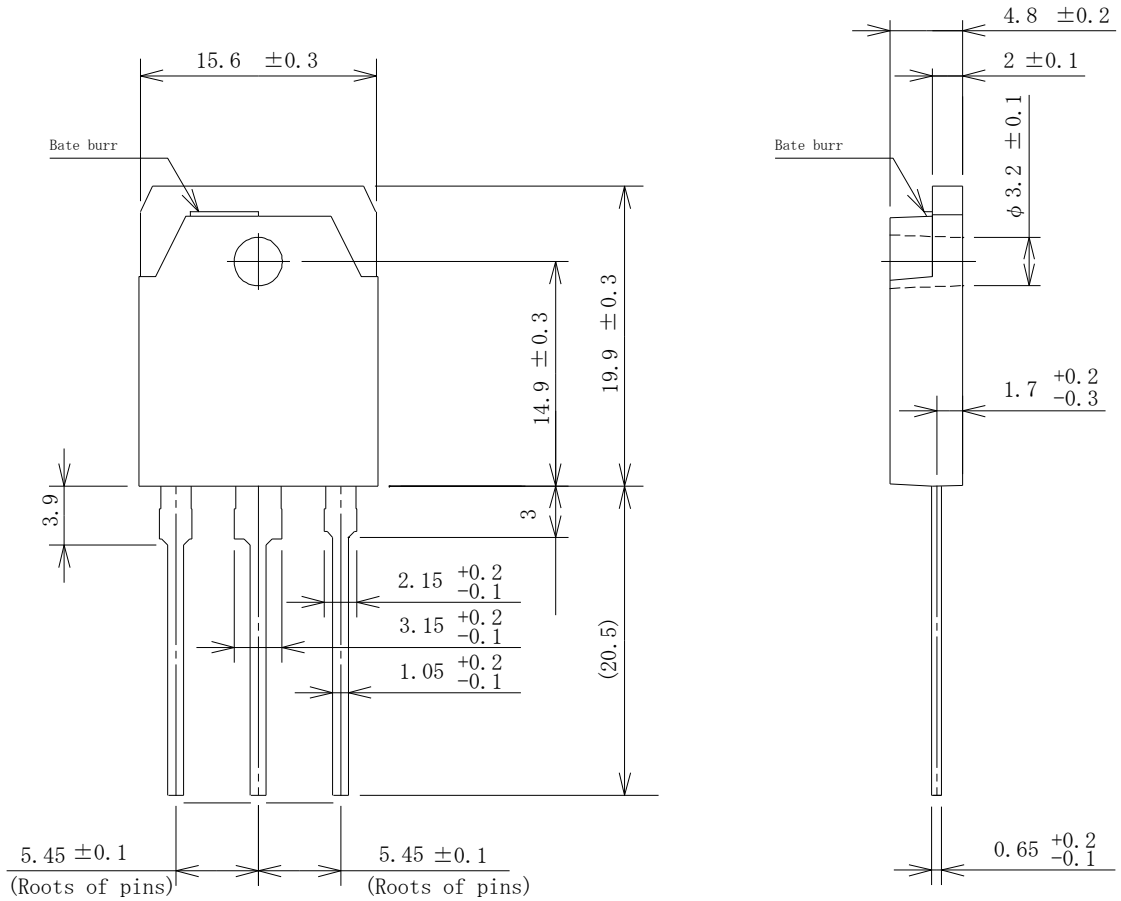
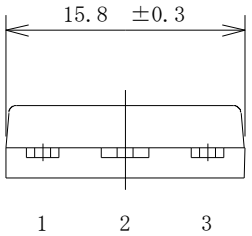


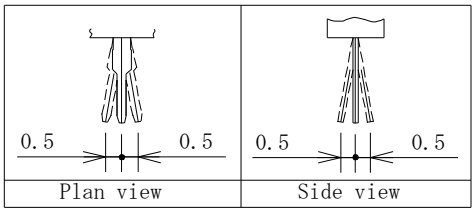

Figure 9. Transient Thermal Resistance

## Physical Dimensions

● **TO3P-3L**



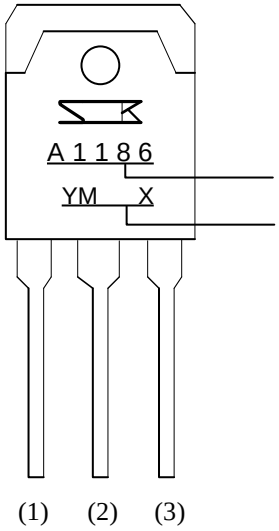

**NOTES:**

- Gate burr: 0.3 mm (max.)
- All dimensions in millimeters
- Bare lead frame: Pb-free (RoHS compliant)
- When soldering the product, be sure to minimize the working time within the following limits:

  260 ± 5 °C  10 ± 1 s, 2 times (flow)
  380 ± 10 °C  3.5 ± 0.5 s, 1 time (soldering iron)

- Soldering should be at a distance of at least 1.5 mm from the body of the product.
- The recommended screw torque for TO3P: 0.686 N·m to 0.882 N·m (7 kgf·cm to 9 kgf·cm)

## Marking Diagram




Specific Device Code (See Table 1)

Lot Number

Y is the last digit of the year of manufacture (0 to 9)

M is the month of the year (1 to 9, O, N, or D)

X is the $h_{FE}$ rank

Table 1. Specific Device Code

| Specific Device Code | Part Number |
|---|---|
| A1186 | 2SA1186 |

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