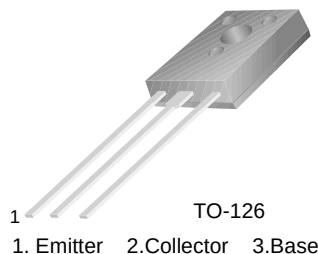


# KSE170/171/172

**Low Power Audio Amplifier**  
**Low Current, High Speed Switching Applications**



## PNP Epitaxial Silicon Transistor

**Absolute Maximum Ratings**  $T_C=25^\circ\text{C}$  unless otherwise noted

| Symbol    | Parameter                                        | Value      | Units            |
|-----------|--------------------------------------------------|------------|------------------|
| $V_{CBO}$ | Collector-Base Voltage : KSE170                  | - 60       | V                |
|           | : KSE171                                         | - 80       | V                |
|           | : KSE172                                         | - 100      | V                |
| $V_{CEO}$ | Collector-Emitter Voltage : KSE170               | - 40       | V                |
|           | : KSE171                                         | - 60       | V                |
|           | : KSE172                                         | - 80       | V                |
| $V_{EBO}$ | Emitter-Base Voltage                             | - 7        | V                |
| $I_C$     | Collector Current (DC)                           | - 3        | A                |
| $I_{CP}$  | Collector Current (Pulse)                        | - 6        | A                |
| $I_B$     | Base Current                                     | - 1        | A                |
| $P_C$     | Collector Dissipation ( $T_C=25^\circ\text{C}$ ) | 12.5       | W                |
|           | Collector Dissipation ( $T_a=25^\circ\text{C}$ ) | 1.5        | W                |
| $T_J$     | Junction Temperature                             | 150        | $^\circ\text{C}$ |
| $T_{STG}$ | Storage Temperature                              | - 65 ~ 150 | $^\circ\text{C}$ |

**Electrical Characteristics**  $T_C=25^\circ\text{C}$  unless otherwise noted

| Symbol        | Parameter                                                                                      | Test Condition                                             | Min. | Max. | Units         |
|---------------|------------------------------------------------------------------------------------------------|------------------------------------------------------------|------|------|---------------|
| $BV_{CEO}$    | Collector-Emitter Breaksown Voltage : KSE170                                                   | $I_C = 10\text{mA}, I_B = 0$                               | -40  |      | V             |
|               | : KSE171                                                                                       |                                                            | -60  |      | V             |
|               | : KSE172                                                                                       |                                                            | -80  |      | V             |
| $I_{CBO}$     | Collector Cut-off Current : KSE170<br>: KSE171<br>: KSE172<br>: KSE170<br>: KSE171<br>: KSE172 | $V_{CB} = - 60\text{V}, I_B = 0$                           |      | -0.1 | $\mu\text{A}$ |
|               |                                                                                                | $V_{CB} = - 80\text{V}, I_E = 0$                           |      | -0.1 | $\mu\text{A}$ |
|               |                                                                                                | $V_{CB} = - 100\text{V}, I_E = 0$                          |      | -0.1 | $\mu\text{A}$ |
|               |                                                                                                | $V_{CB} = - 60\text{V}, I_E = 0, T_C = 150^\circ\text{C}$  |      | -0.1 | mA            |
|               |                                                                                                | $V_{CB} = - 80\text{V}, I_E = 0, T_C = 150^\circ\text{C}$  |      | -0.1 | mA            |
|               |                                                                                                | $V_{CB} = - 100\text{V}, I_E = 0, T_C = 150^\circ\text{C}$ |      | -0.1 | mA            |
| $I_{EBO}$     | Emitter Cut-off Current                                                                        | $V_{BE} = - 7\text{V}, I_C = 0$                            |      | -0.1 | $\mu\text{A}$ |
| $h_{FE}$      | DC Current Gain                                                                                | $V_{CE} = - 1\text{V}, I_C = - 100\text{mA}$               | 50   | 250  |               |
|               |                                                                                                | $V_{CE} = - 1\text{V}, I_C = - 500\text{mA}$               | 30   |      |               |
|               |                                                                                                | $V_{CE} = - 1\text{V}, I_C = - 1.5\text{A}$                | 12   |      |               |
| $V_{CE(sat)}$ | Collector-Emitter Saturation Voltage                                                           | $I_C = - 500\text{mA}, I_B = - 50\text{mA}$                |      | -0.3 | V             |
|               |                                                                                                | $I_C = - 1.5\text{A}, I_B = - 150\text{mA}$                |      | -0.9 | V             |
|               |                                                                                                | $I_C = - 3\text{A}, I_B = - 600\text{mA}$                  |      | -1.7 | V             |
| $V_{BE(sat)}$ | Base-Emitter Saturation Voltage                                                                | $I_C = - 1.5\text{A}, I_B = - 150\text{mA}$                |      | -1.5 | V             |
|               |                                                                                                | $I_C = - 3\text{A}, I_B = - 600\text{mA}$                  |      | -2.0 | V             |
| $V_{BE(on)}$  | Base-Emitter On Voltage                                                                        | $V_{CE} = - 1\text{V}, I_C = - 500\text{mA}$               |      | -1.2 | V             |
| $f_T$         | Current Gain Bandwidth Product                                                                 | $V_{CE} = - 10\text{V}, I_C = - 100\text{mA}$              | 50   |      | MHz           |
| $C_{ob}$      | Output Capacitance                                                                             | $V_{CB} = - 10\text{V}, I_E = 0, f = 0.1\text{MHz}$        |      | 50   | pF            |

## Typical Characteristics

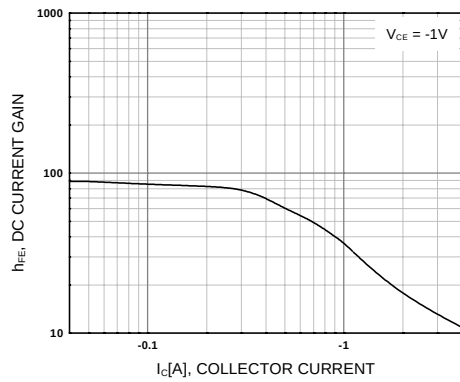


Figure 1. DC current Gain

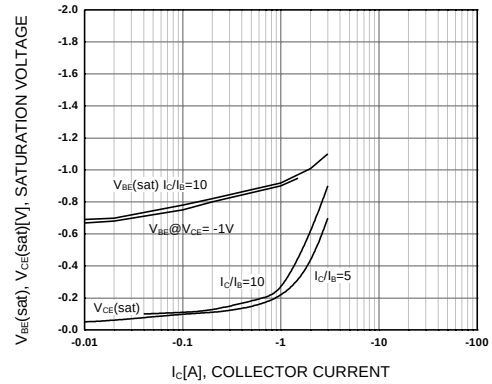


Figure 2. Base-Emitter Saturation Voltage  
Collector-Emitter Saturation Voltage

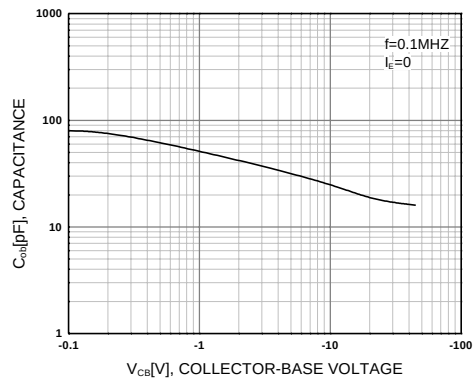


Figure 3. Collector Output Capacitance

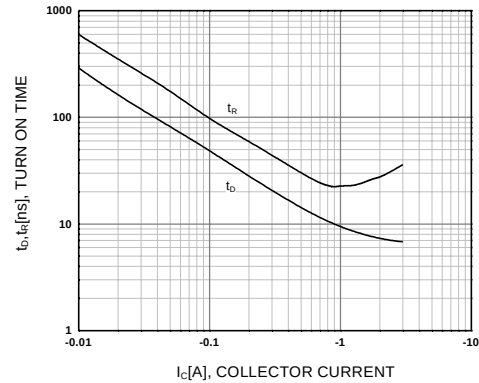


Figure 4. Turn On Time

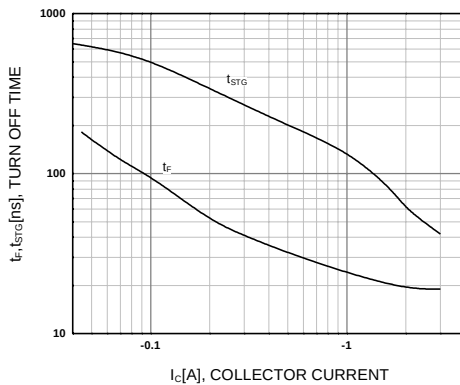


Figure 5. Turn Off Time

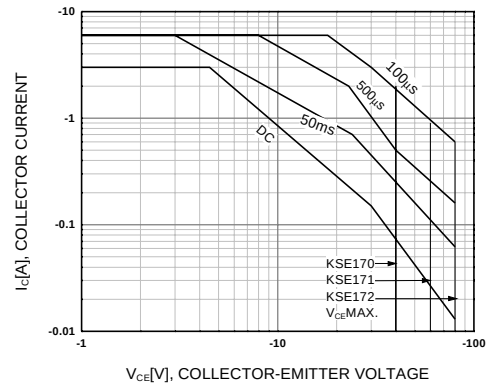


Figure 6. Safe Operating Area

# Typical Characteristics (Continued)

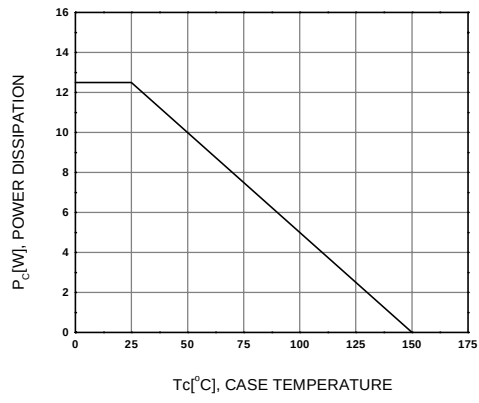
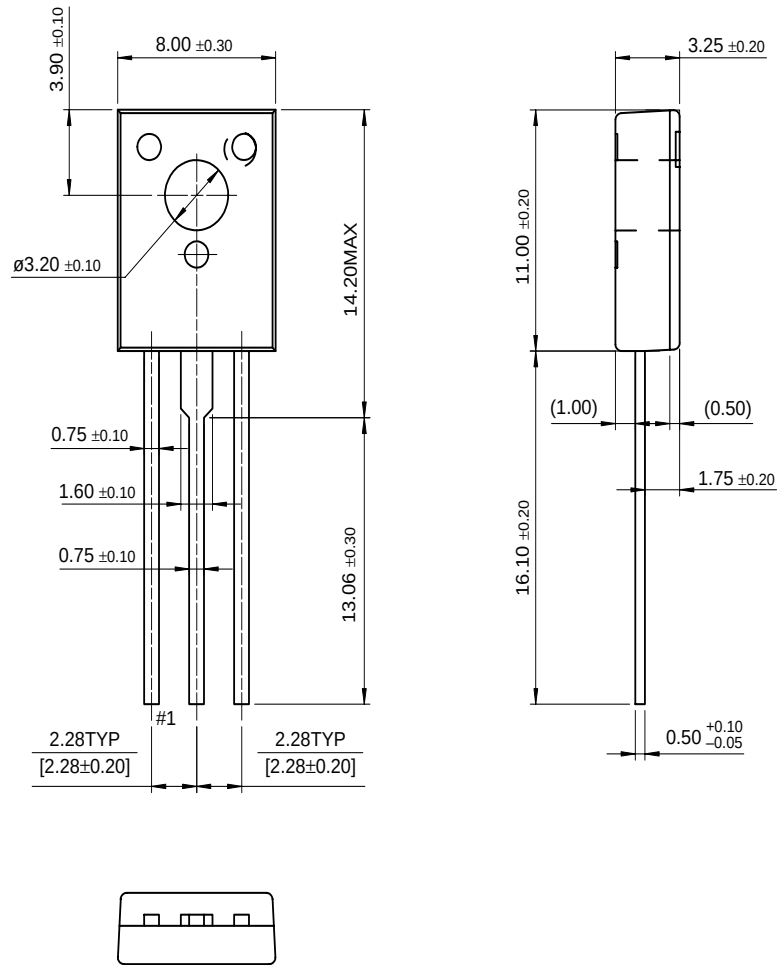


Figure 7. DC current Gain

# Package Dimensions

## TO-126



Dimensions in Millimeters

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| EnSigna <sup>™</sup>             | MicroFET <sup>™</sup>           | SLIENT SWITCHER <sup>®</sup>    |                          |
| FACT <sup>™</sup>                | MICROWIRE <sup>™</sup>          | SMART START <sup>™</sup>        |                          |
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