



# PNP Transistor Bare Die, MPSA55

Rev 1.1  
27/03/21

**General purpose high voltage amplifier in bare die form**  
Complement to NPN MPSA05

## Features:

- 60 Volt  $V_{CE0}$
- Low  $V_{CE(sat)}$
- Characterized at temperature extremes
- High Reliability Gold Back Metal
- High Reliability tested grades for Military + Space

## Ordering Information:

The following part suffixes apply:

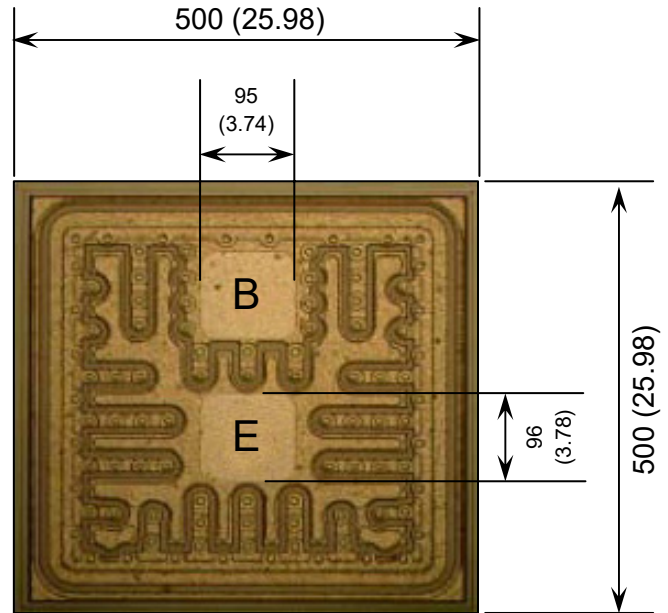
- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection  
+ MIL-STD-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection  
+ MIL-STD-38534 Class K LAT

LAT = Lot Acceptance Test.

For further information on LAT process flows see below.

[www.siliconsupplies.com/quality/bare-die-lot-qualification](http://www.siliconsupplies.com/quality/bare-die-lot-qualification)

## Die Dimensions in $\mu\text{m}$ (mils)



**E = EMITTER B = BASE**

**DIE BACK = COLLECTOR**

## Supply Formats:

- Default – Die in Waffle Pack (400 per tray capacity)
- Sawn Wafer on Tape – Specific request
- Unsawn Wafer – Specific request
- With additional electrical selection – Specific request
- Sawn as pairs or adjacent pair pick – Specific request

## Mechanical Specification

|                                    |   |                       |
|------------------------------------|---|-----------------------|
| Die Size<br>(Excluding Saw Street) | 500 x 500<br>19.69 x 19.69              | $\mu\text{m}$<br>mils |
| Base & Emitter Pad Size            | 95 x 96<br>3.74 x 3.78                  | $\mu\text{m}$<br>mils |
| Die Thickness                      | 180 ( $\pm 20$ )<br>7.09 ( $\pm 0.79$ ) | $\mu\text{m}$<br>mils |
| Top Metal Composition              | Al - 2.6 $\mu\text{m}$                  |                       |
| Back Metal Composition             | AuAs - 0.9 $\mu\text{m}$                |                       |





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## Absolute Maximum Ratings $T_A = 25^\circ\text{C}$ unless otherwise stated

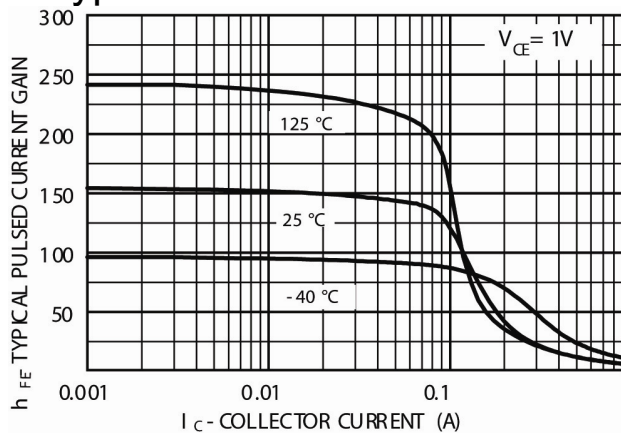
| PARAMETER                 | SYMBOL    | VALUE      | UNIT             |
|---------------------------|-----------|------------|------------------|
| Collector-Base Voltage    | $V_{CBO}$ | -60        | V                |
| Collector-Emitter Voltage | $V_{CEO}$ | -60        | V                |
| Emitter-Base Voltage      | $V_{EBO}$ | -4         | V                |
| Collector Current         | $I_C$     | -500       | mA               |
| Junction Temperature      | $T_J$     | 150        | $^\circ\text{C}$ |
| Storage Temperature       | $T_{stg}$ | -55 to 150 | $^\circ\text{C}$ |

## Electrical Characteristics $T_A = 25^\circ\text{C}$ unless otherwise stated

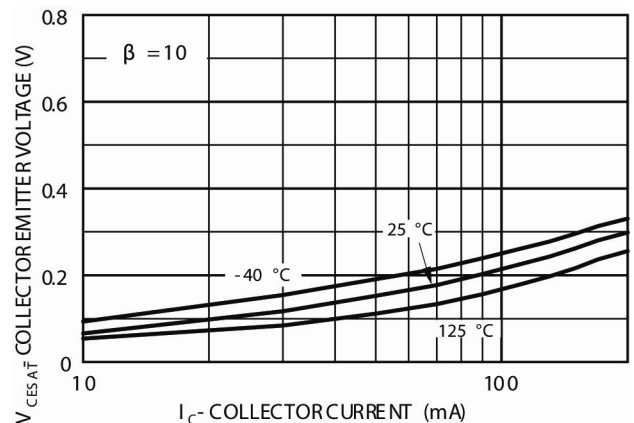
| PARAMETER                                       | SYMBOL        | CONDITIONS  | MIN | TYP | MAX   | UNIT |
|---|---------------|---|-----|-----|-------|------|
| <b>OFF CHARACTERISTICS</b>                      |               |   |     |     |       |      |
| Collector-Base Breakdown Voltage                | $V_{(BR)CBO}$ | $I_C = -100\mu\text{A}$                                       | -60 | -   | -     | V    |
| Collector-Emitter Breakdown Voltage             | $V_{(BR)CEO}$ | $I_C = -1\text{mA}$   | -60 | -   | -     | V    |
| Emitter-Base Breakdown Voltage                  | $V_{(BR)EBO}$ | $I_E = -100\mu\text{A}$                                       | -5  | -   | -     | V    |
| Collector Cut-off Current                       | $I_{CBO}$     | $V_{CB} = -60\text{V}$  | -   | -   | -100  | nA   |
| Emitter Cut-off Current                         | $I_{CEO}$     | $V_{EB} = -60\text{V}$  | -   | -   | -100  | nA   |
| <b>ON CHARACTERISTICS</b>                       |               |   |     |     |       |      |
| Forward-Current Transfer Ratio                  | $h_{FE}$      | $V_{CE} = -1\text{V}, I_C = -10\text{mA}$                     | 100 | -   | -     | -    |
|   |               | $V_{CE} = -1\text{V}, I_C = -100\text{mA}$                    | 100 | -   | -     | -    |
| Collector-Emitter Saturation Voltage            | $V_{CE(sat)}$ | $I_C = -100\text{mA}, I_B = -10\text{mA}$                     | -   | -   | -0.25 | V    |
| Base Saturation Voltage                         | $V_{BE(sat)}$ | $I_C = -100\text{mA}, V_{CE} = -1\text{V}$                    | -   | -   | -1.2  | V    |
| <b>SMALL SIGNAL CHARACTERISTICS<sup>1</sup></b> |               |   |     |     |       |      |
| Transition Frequency                            | $f_T$         | $V_{CE} = -1\text{V}, I_C = -100\text{mA}, f = 100\text{MHz}$ | 50  | 70  | -     | MHz  |
| Output Capacitance                              | $C_{obo}$     | $V_{CB} = -20\text{V}, I_E = 0, f = 1\text{MHz}$              | -   | 3.5 | -     | pF   |

Note 1: Not production testing in die form. Characterized by chip design and tested in package LAT.

## Typical Electrical Characteristics



**Fig 1** - Typical Pulsed Current Gain versus Collector Current



**Fig 2** - Collector-Emitter Saturation Voltage versus Collector Current

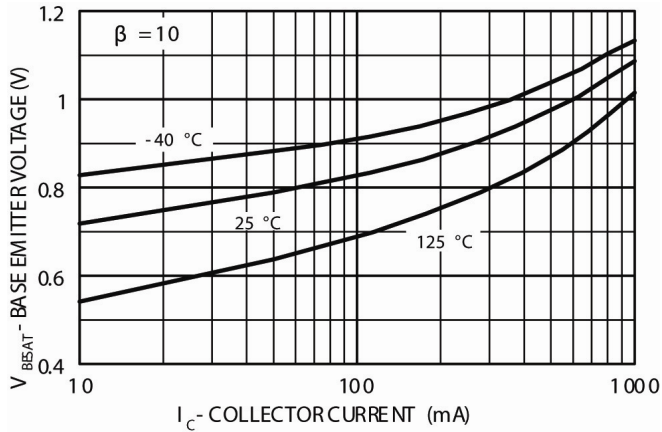




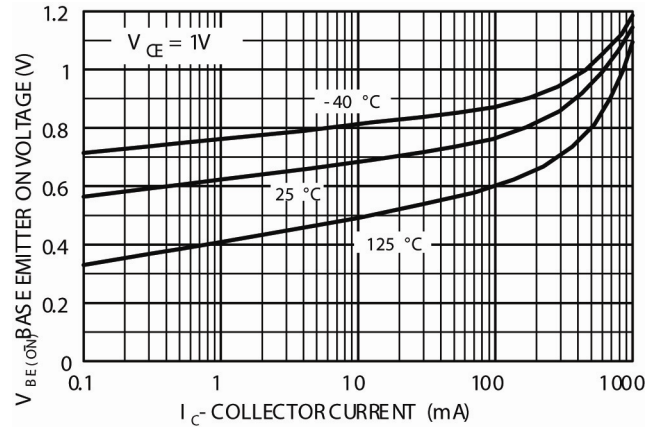
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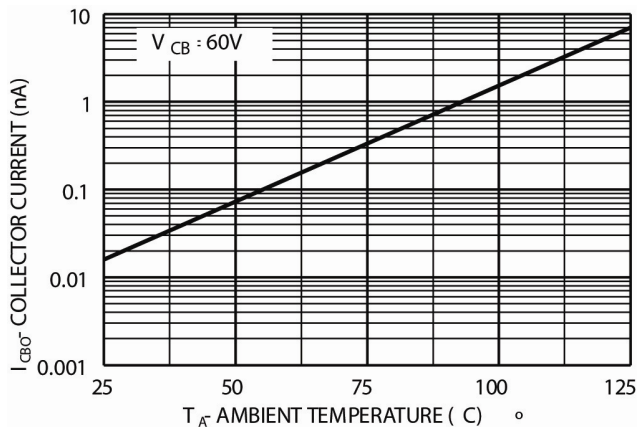
## Typical Electrical Characteristics (Continued)



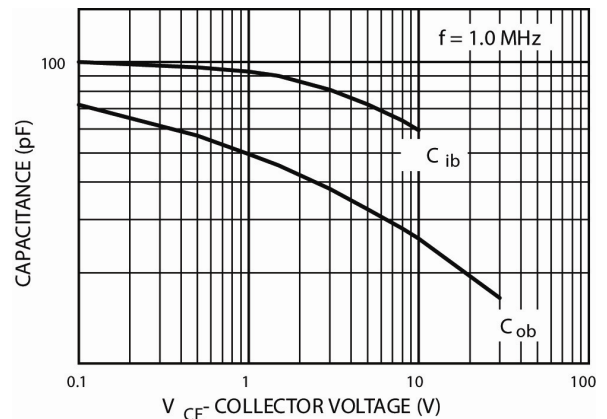
**Fig 3** - Base-Emitter Saturation Voltage versus Collector Current



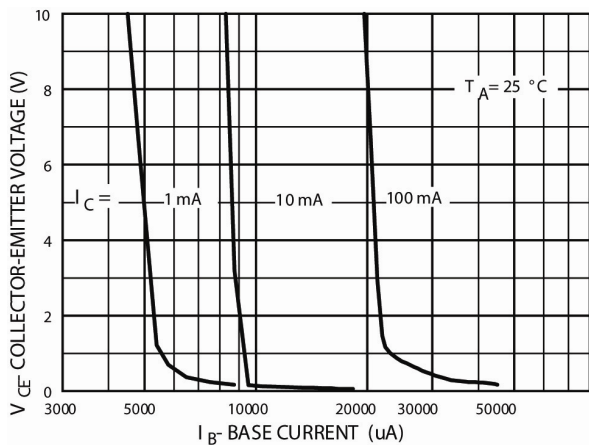
**Fig 4** - Base-Emitter ON Voltage versus Collector Current



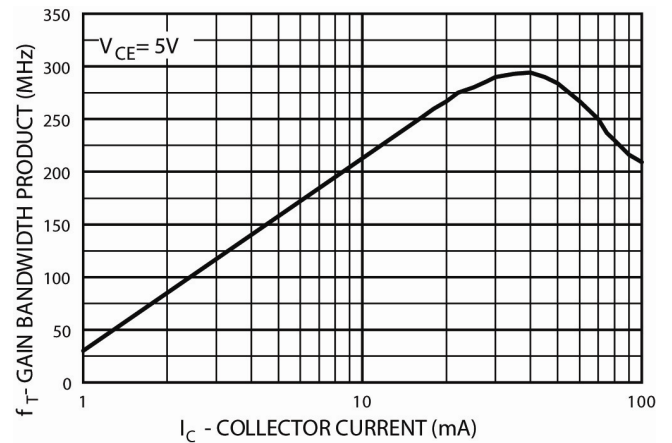
**Fig 5** - Collector-Cut-off Current versus Ambient Temperature



**Fig 6** - Input and Output Capacitance versus Reverse Voltage



**Fig 7** - Collector Saturation region



**Fig 8** - Gain Bandwidth Product versus Collector Current





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