



# NPN Transistor Bare Die, MPSA05

Rev 1.0

02/09/17

General purpose medium power amplifier or saturated switch in bare die form

Complement to PNP MPSA55

## Features:

- Minimum gain of 100 @ 100mA
- 80 Volt  $V_{CE0}$
- Characterized at temperature extremes
- High Reliability Gold Back Metal
- High Reliability tested grades for Military + Space

## Ordering Information:

The following part suffixes apply:

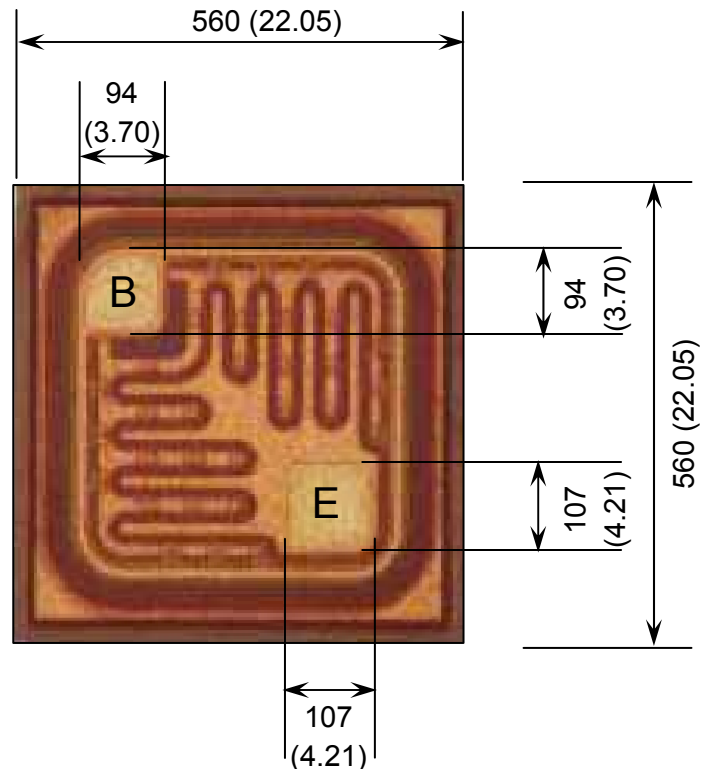
- No suffix - MIL-STD-750 /2072 Visual Inspection
- "H" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class H LAT
- "K" - MIL-STD-750 /2072 Visual Inspection + MIL-PRF-38534 Class K LAT

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 (Excluding Saw Street)	560 x 560 22.05 x 22.05	$\mu\text{m}$ mils
Base Pad Size	94 x 94 3.70 x 3.70	$\mu\text{m}$ mils
Emitter Pad Size	107 x 107 4.21 x 4.21	$\mu\text{m}$ mils
Die Thickness	230 ( $\pm 20$ ) 9.06 ( $\pm 0.79$ )	$\mu\text{m}$ mils
Top Metal Composition	Al - 1.3 $\mu\text{m}$	
Back Metal Composition	AuAs - 0.9 $\mu\text{m}$	





# NPN Transistor Bare Die, MPSA05

Rev 1.0  
07/07/17

## 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	$V_{(BR)EBO}$	$I_E = 100\mu\text{A}$	4	-	-	V
Collector Cut-off Current	$I_{CEO}$	$V_{CE} = 60\text{V}$	-	-	100	nA
Emitter Cut-off Current	$I_{EBO}$	$V_{EB} = 5\text{V}$	-	-	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	-	330	-
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	$I_C = 100\text{mA}, I_B = 10\text{mA}$	-	-	0.25	V
Base-Emitter On Voltage	$V_{BE(on)}$	$I_C = 100\text{mA}, V_{CE} = 1\text{V}$	-	-	1.2	V
<b>SMALL SIGNAL CHARACTERISTICS<sup>1</sup></b>						
Transition Frequency	$f_T$	$V_{CE} = 2\text{V}, I_E = -10\text{mA}$	100	-	-	MHz
Output Capacitance	$C_{obo}$	$V_{CB} = 10\text{V}, I_E = 0, f = 1\text{MHz}$	-	4.5	-	pF

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

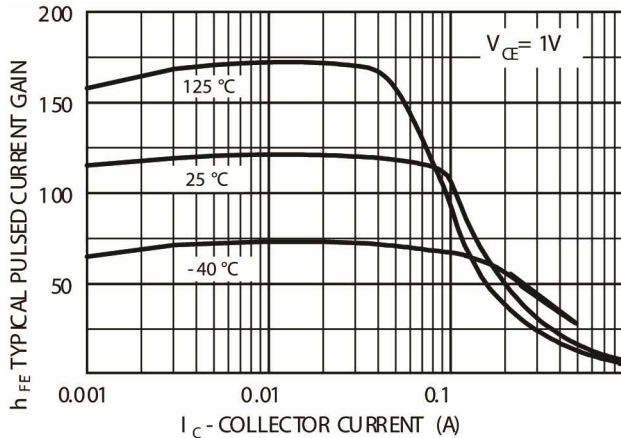




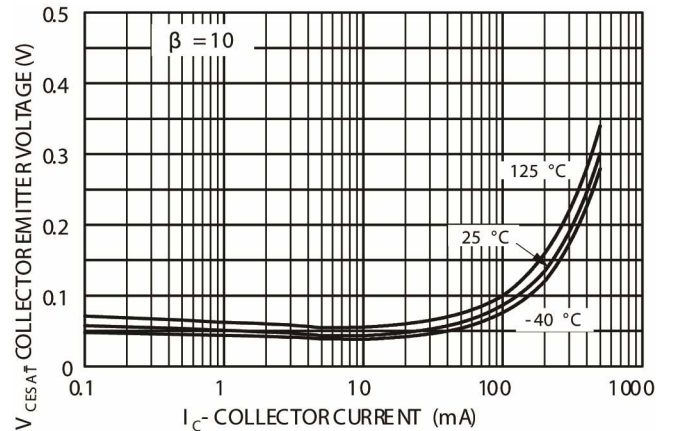
# NPN Transistor Bare Die, MPSA05

Rev 1.0  
07/07/17

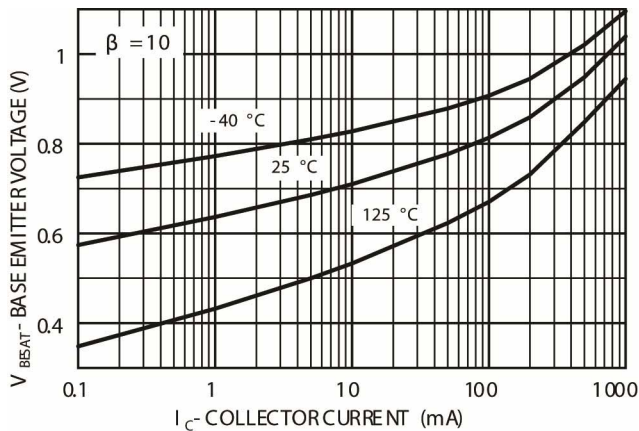
## Typical Electrical Characteristics



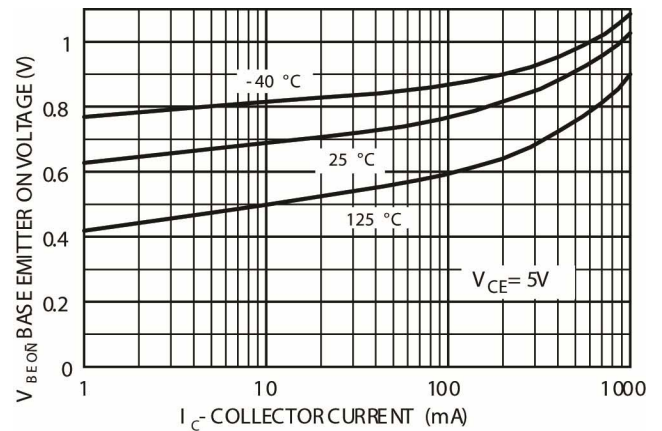
**Fig 1 - Typical Pulsed Current Gain versus Collector Current**



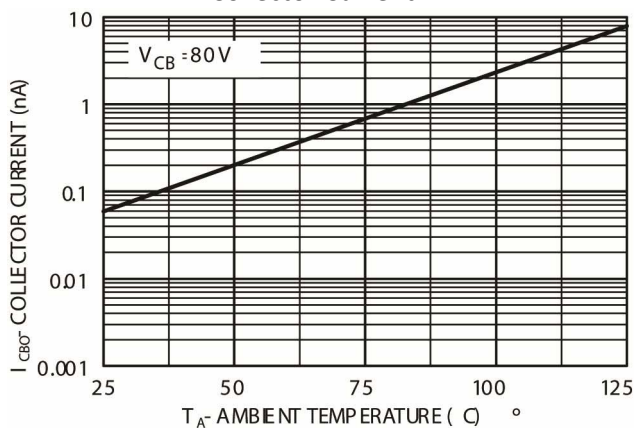
**Fig 2 - Collector-Emitter Saturation Voltage versus Collector Current**



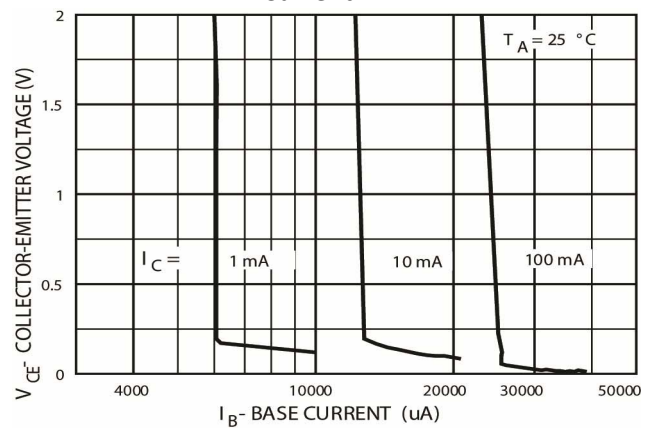
**Fig 3 - Base-Emitter Saturation Voltage versus Collector Current**



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



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



**Fig 6 - Collector Saturation Region**

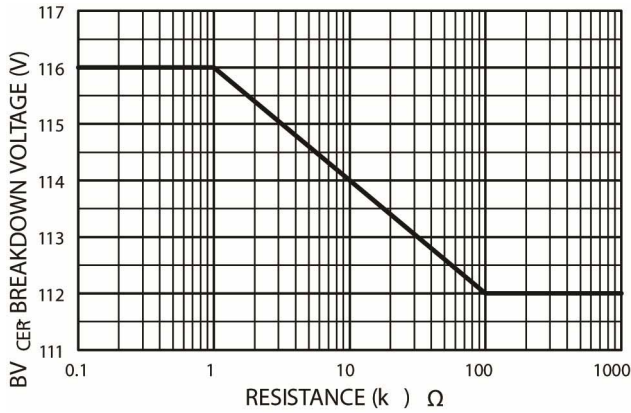




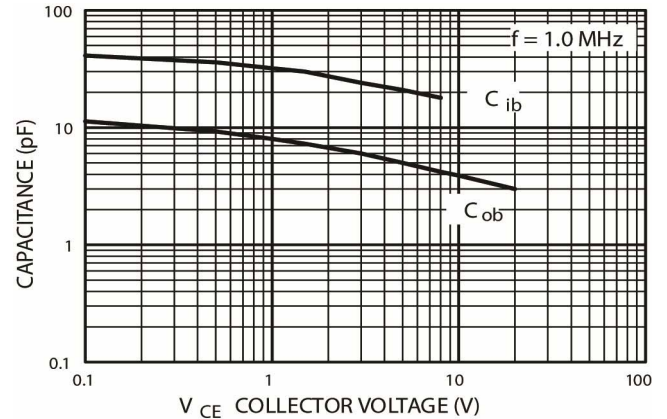
# NPN Transistor Bare Die, MPSA05

Rev 1.0  
07/07/17

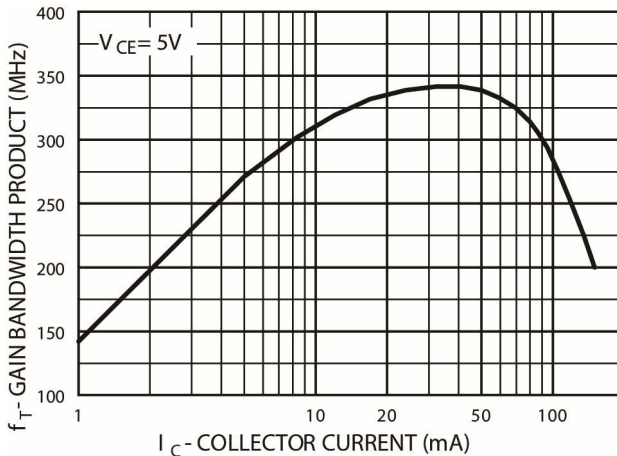
## Typical Electrical Characteristics (Continued)



**Fig 7** – Collector-Emitter Breakdown Voltage with Resistance Between Emitter-Base



**Fig 8** - Noise Figure versus Source Resistance



**Fig 9** – Gain Bandwidth Product versus Collector Current

**DISCLAIMER:** The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Silicon Supplies Ltd hereby disclaims any and all warranties and liabilities of any kind.

**LIFE SUPPORT POLICY:** Silicon Supplies Ltd components may be used in life support devices or systems only with the express written approval of Silicon Supplies Ltd, if a failure of such components can reasonably be expected to cause the failure of that life support device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

