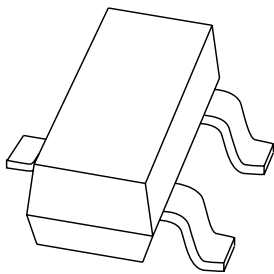


# DATA SHEET



## **PMMT491A** NPN BISS transistor

Product data sheet  
Supersedes data of 2001 Jun 11

2004 Jan 13

## NPN BISS transistor

## PMMT491A

## FEATURES

- High current (max. 1 A)
- Low collector-emitter saturation voltage ensures reduced power consumption.

## APPLICATIONS

- Battery powered units where high current and low power consumption are important.

## DESCRIPTION

NPN BISS (Breakthrough In Small Signal) transistor in a SOT23 plastic package. PNP complement: PMMT591A.

## MARKING

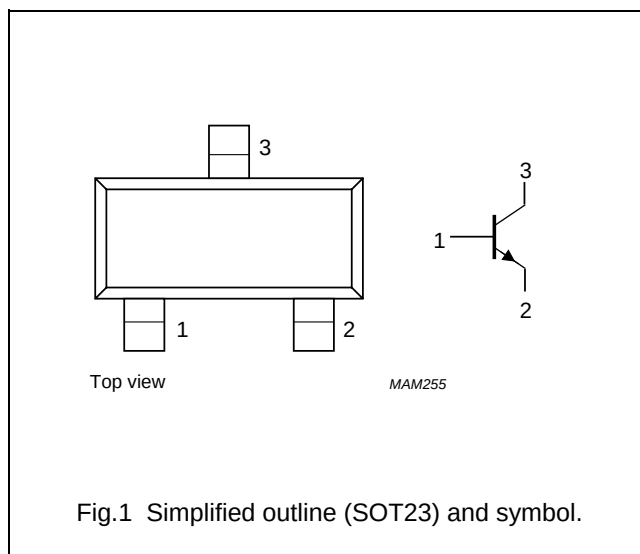
| TYPE NUMBER | MARKING CODE <sup>(1)</sup> |
|-------------|-----------------------------|
| PMMT491A    | 9A*                         |

## Note

- \* = p : Made in Hong Kong.  
 \* = t : Made in Malaysia.  
 \* = W : Made in China.

## PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | base        |
| 2   | emitter     |
| 3   | collector   |



## ORDERING INFORMATION

| TYPE NUMBER | PACKAGE |                                          |         |
|-------------|---------|------------------------------------------|---------|
|             | NAME    | DESCRIPTION                              | VERSION |
| PMMT491A    | –       | plastic surface mounted package; 3 leads | SOT23   |

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

| SYMBOL    | PARAMETER                     | CONDITIONS                           | MIN. | MAX. | UNIT |
|-----------|-------------------------------|--------------------------------------|------|------|------|
| $V_{CBO}$ | collector-base voltage        | open emitter                         | –    | 40   | V    |
| $V_{CEO}$ | collector-emitter voltage     | open base                            | –    | 40   | V    |
| $V_{EBO}$ | emitter-base voltage          | open collector                       | –    | 5    | V    |
| $I_C$     | collector current (DC)        |                                      | –    | 1    | A    |
| $I_{CM}$  | peak collector current        |                                      | –    | 2    | A    |
| $I_{BM}$  | peak base current             |                                      | –    | 1    | A    |
| $P_{tot}$ | total power dissipation       | $T_{amb} \leq 25\text{ °C}$ ; note 1 | –    | 250  | mW   |
| $T_{stg}$ | storage temperature           |                                      | –65  | +150 | °C   |
| $T_j$     | junction temperature          |                                      | –    | 150  | °C   |
| $T_{amb}$ | operating ambient temperature |                                      | –65  | +150 | °C   |

## Note

1. Transistor mounted on an FR4 printed-circuit board.

## NPN BISS transistor

## PMMT491A

## THERMAL CHARACTERISTICS

| SYMBOL        | PARAMETER                                   | CONDITIONS | VALUE | UNIT |
|---------------|---------------------------------------------|------------|-------|------|
| $R_{th(j-a)}$ | thermal resistance from junction to ambient | note 1     | 500   | K/W  |

## Note

1. Transistor mounted on an FR4 printed-circuit board.

## CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified.

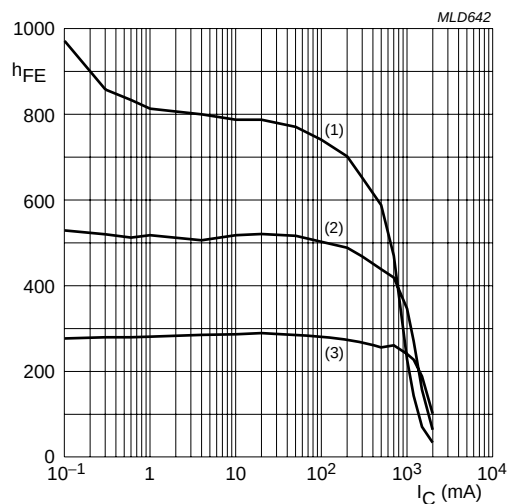
| SYMBOL      | PARAMETER                            | CONDITIONS                                                                                                                                          | MIN.              | MAX.              | UNIT           |
|-------------|--------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|-------------------|----------------|
| $I_{CBO}$   | collector cut-off current            | $I_E = 0$ ; $V_{CB} = 30\text{ V}$                                                                                                                  | –                 | 100               | nA             |
| $I_{CEO}$   | collector cut-off current            | $I_B = 0$ ; $V_{CE} = 30\text{ V}$                                                                                                                  | –                 | 100               | nA             |
| $I_{EBO}$   | emitter cut-off current              | $I_C = 0$ ; $V_{EB} = 5\text{ V}$                                                                                                                   | –                 | 100               | nA             |
| $h_{FE}$    | DC current gain                      | $V_{CE} = 5\text{ V}$ ; note 1<br>$I_C = 1\text{ mA}$<br>$I_C = 500\text{ mA}$<br>$I_C = 1\text{ A}$                                                | 300<br>300<br>200 | –<br>900<br>–     |                |
| $V_{CEsat}$ | collector-emitter saturation voltage | note 1<br>$I_C = 100\text{ mA}$ ; $I_B = 1\text{ mA}$<br>$I_C = 500\text{ mA}$ ; $I_B = 50\text{ mA}$<br>$I_C = 1\text{ A}$ ; $I_B = 100\text{ mA}$ | –<br>–<br>–       | 200<br>300<br>500 | mV<br>mV<br>mV |
| $V_{BEsat}$ | base-emitter saturation voltage      | $I_C = 1\text{ A}$ ; $I_B = 100\text{ mA}$ ; note 1                                                                                                 | –                 | 1.2               | V              |
| $V_{BE}$    | base-emitter voltage                 | $V_{CE} = 5\text{ V}$ ; $I_C = 1\text{ A}$ ; note 1                                                                                                 | –                 | 1.1               | V              |
| $C_c$       | collector capacitance                | $I_E = I_e = 0$ ; $V_{CB} = 10\text{ V}$ ; $f = 1\text{ MHz}$                                                                                       | –                 | 10                | pF             |
| $f_T$       | transition frequency                 | $I_C = 50\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; $f = 100\text{ MHz}$                                                                                | 150               | –                 | MHz            |

## Note

1. Pulse test:  $t_p \leq 300\text{ }\mu\text{s}$ ;  $\delta \leq 0.02$ .

## NPN BISS transistor

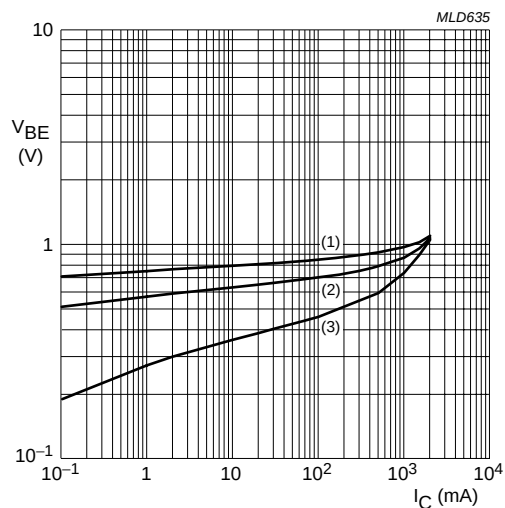
## PMMT491A



$V_{CE} = 5 \text{ V.}$

- (1)  $T_{amb} = 150 \text{ }^{\circ}\text{C.}$
- (2)  $T_{amb} = 25 \text{ }^{\circ}\text{C.}$
- (3)  $T_{amb} = -55 \text{ }^{\circ}\text{C.}$

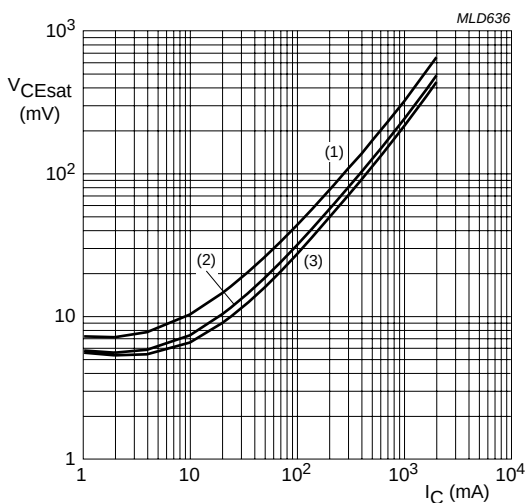
Fig.2 DC current gain as a function of collector current; typical values.



$V_{CE} = 5 \text{ V.}$

- (1)  $T_{amb} = -55 \text{ }^{\circ}\text{C.}$
- (2)  $T_{amb} = 25 \text{ }^{\circ}\text{C.}$
- (3)  $T_{amb} = 150 \text{ }^{\circ}\text{C.}$

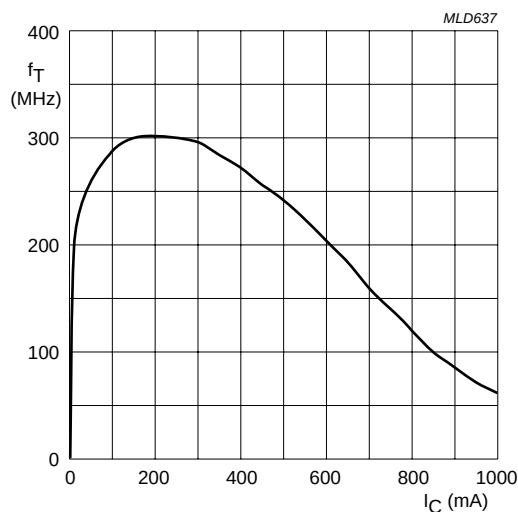
Fig.3 Base-emitter voltage as a function of collector current; typical values.



$I_C/I_B = 10.$

- (1)  $T_{amb} = 150 \text{ }^{\circ}\text{C.}$
- (2)  $T_{amb} = 25 \text{ }^{\circ}\text{C.}$
- (3)  $T_{amb} = -55 \text{ }^{\circ}\text{C.}$

Fig.4 Collector-emitter saturation voltage as a function of collector current; typical values.



$V_{CE} = 10 \text{ V.}$

Fig.5 Transition frequency as a function of collector current; typical values.

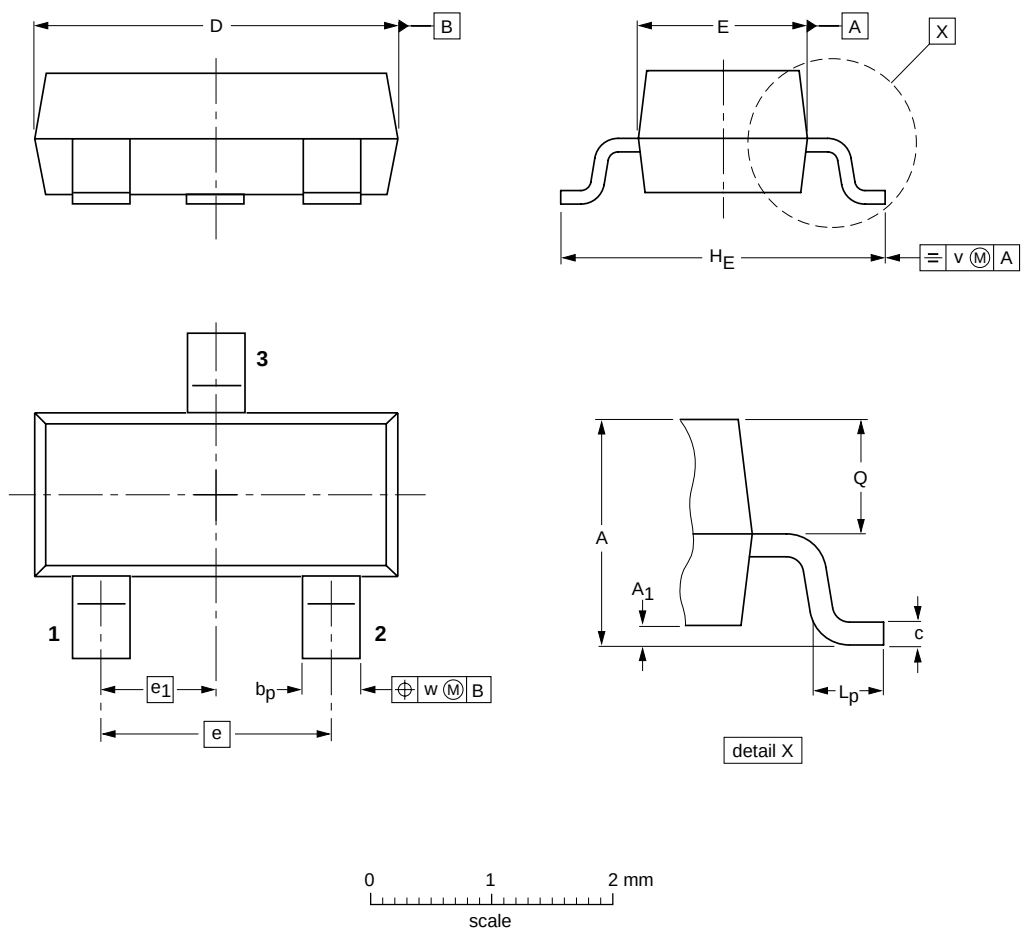
NPN BISS transistor

PMMT491A

PACKAGE OUTLINE

Plastic surface-mounted package; 3 leads

SOT23



DIMENSIONS (mm are the original dimensions)

| UNIT | A          | A <sub>1</sub><br>max. | b <sub>p</sub> | c            | D          | E          | e   | e <sub>1</sub> | H <sub>E</sub> | L <sub>p</sub> | Q            | v   | w   |
|------|------------|------------------------|----------------|--------------|------------|------------|-----|----------------|----------------|----------------|--------------|-----|-----|
| mm   | 1.1<br>0.9 | 0.1                    | 0.48<br>0.38   | 0.15<br>0.09 | 3.0<br>2.8 | 1.4<br>1.2 | 1.9 | 0.95           | 2.5<br>2.1     | 0.45<br>0.15   | 0.55<br>0.45 | 0.2 | 0.1 |

| OUTLINE<br>VERSION | REFERENCES |          |       |  | EUROPEAN<br>PROJECTION | ISSUE DATE           |
|--------------------|------------|----------|-------|--|------------------------|----------------------|
|                    | IEC        | JEDEC    | JEITA |  |                        |                      |
| SOT23              |            | TO-236AB |       |  |                        | 04-11-04<br>06-03-16 |

## NPN BISS transistor

## PMMT491A

## DATA SHEET STATUS

| DOCUMENT STATUS <sup>(1)</sup> | PRODUCT STATUS <sup>(2)</sup> | DEFINITION                                                                            |
|--------------------------------|-------------------------------|---------------------------------------------------------------------------------------|
| Objective data sheet           | Development                   | This document contains data from the objective specification for product development. |
| Preliminary data sheet         | Qualification                 | This document contains data from the preliminary specification.                       |
| Product data sheet             | Production                    | This document contains the product specification.                                     |

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