



# MMBT2907A

## SMALL SIGNAL PNP TRANSISTOR

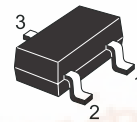
### PRELIMINARY DATA

| Type      | Marking |
|-----------|---------|
| MMBT2907A | M29     |

- SILICON EPITAXIAL PLANAR PNP TRANSISTOR
- MINIATURE SOT-23 PLASTIC PACKAGE FOR SURFACE MOUNTING CIRCUITS
- TAPE & REEL PACKING
- THE NPN COMPLEMENTARY TYPE IS MMBT2222A

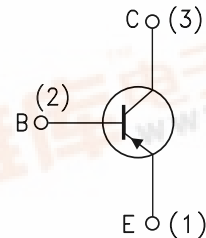
### APPLICATIONS

- WELL SUITABLE FOR PORTABLE EQUIPMENT
- SMALL LOAD SWITCH TRANSISTOR WITH HIGH GAIN AND LOW SATURATION VOLTAGE



SOT-23

### INTERNAL SCHEMATIC DIAGRAM



### ABSOLUTE MAXIMUM RATINGS

| Symbol    | Parameter                               | Value      | Unit |
|-----------|-----------------------------------------|------------|------|
| $V_{CBO}$ | Collector-Emitter Voltage ( $I_E = 0$ ) | -60        | V    |
| $V_{CEO}$ | Collector-Emitter Voltage ( $I_B = 0$ ) | -60        | V    |
| $V_{EBO}$ | Emitter-Base Voltage ( $I_C = 0$ )      | -5         | V    |
| $I_C$     | Collector Current                       | -0.6       | A    |
| $I_{CM}$  | Collector Peak Current ( $t_p < 5$ ms)  | -0.8       | A    |
| $P_{tot}$ | Total Dissipation at $T_{amb} = 25$ °C  | 350        | mW   |
| $T_{stg}$ | Storage Temperature                     | -65 to 150 | °C   |
| $T_j$     | Max. Operating Junction Temperature     | 150        | °C   |

## MMBT2907A

### THERMAL DATA

|                 |                                     |     |       |      |
|-----------------|-------------------------------------|-----|-------|------|
| $R_{thj-amb}$ • | Thermal Resistance Junction-Ambient | Max | 357.1 | °C/W |
|-----------------|-------------------------------------|-----|-------|------|

• Device mounted on a PCB area of 1 cm<sup>2</sup>

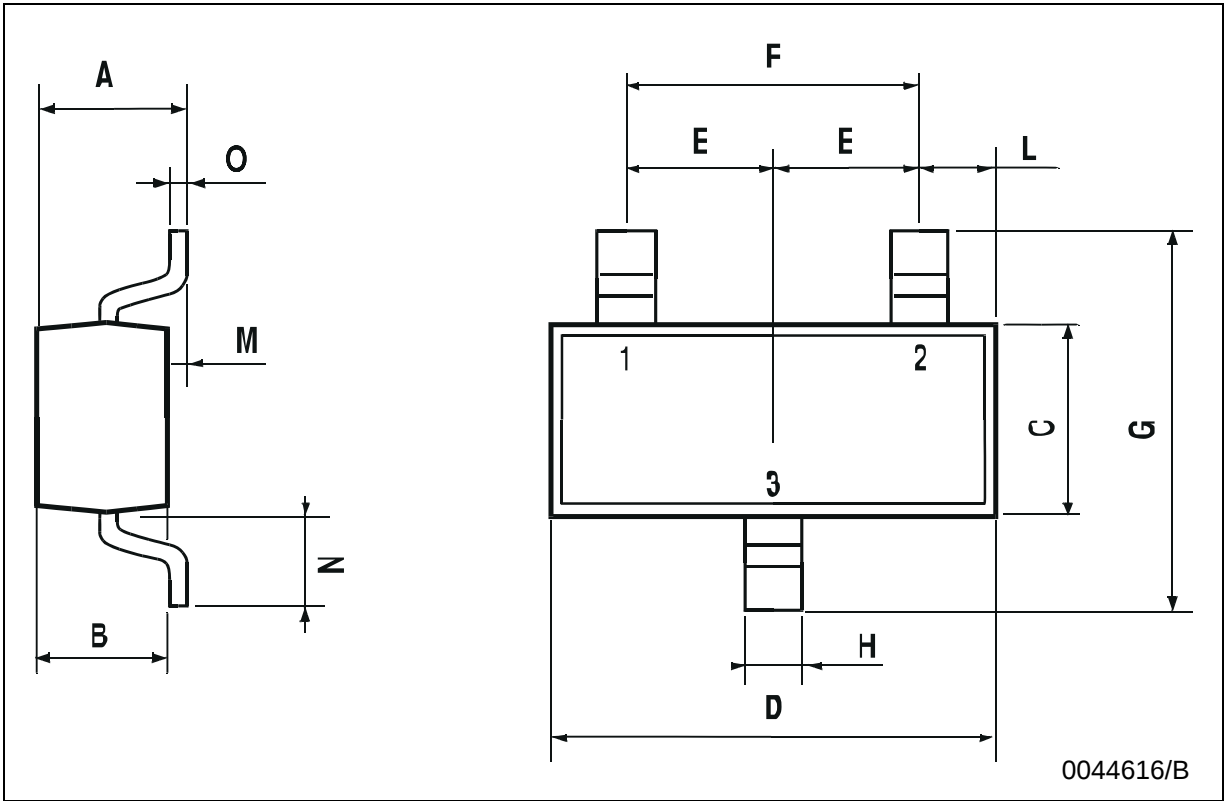
### ELECTRICAL CHARACTERISTICS (T<sub>case</sub> = 25 °C unless otherwise specified)

| Symbol                 | Parameter                                                | Test Conditions                                                                                                                                                                                                                                                              | Min.                          | Typ. | Max.         | Unit   |
|------------------------|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------|--------------|--------|
| I <sub>CEX</sub>       | Collector Cut-off Current (V <sub>BE</sub> = -3 V)       | V <sub>CE</sub> = -30 V                                                                                                                                                                                                                                                      |                               |      | -50          | nA     |
| I <sub>BEX</sub>       | Base Cut-off Current (V <sub>BE</sub> = -3 V)            | V <sub>CE</sub> = -30 V                                                                                                                                                                                                                                                      |                               |      | -50          | nA     |
| I <sub>CBO</sub>       | Collector Cut-off Current (I <sub>E</sub> = 0)           | V <sub>CB</sub> = -50 V                                                                                                                                                                                                                                                      |                               |      | -10          | nA     |
| V <sub>(BR)CEO</sub> * | Collector-Emitter Breakdown Voltage (I <sub>B</sub> = 0) | I <sub>C</sub> = -10 mA                                                                                                                                                                                                                                                      | -60                           |      |              | V      |
| V <sub>(BR)CBO</sub>   | Collector-Base Breakdown Voltage (I <sub>E</sub> = 0)    | I <sub>C</sub> = -10 μA                                                                                                                                                                                                                                                      | -60                           |      |              | V      |
| V <sub>(BR)EBO</sub>   | Emitter-Base Breakdown Voltage (I <sub>C</sub> = 0)      | I <sub>E</sub> = -10 μA                                                                                                                                                                                                                                                      | -5                            |      |              | V      |
| V <sub>CE(sat)</sub> * | Collector-Emitter Saturation Voltage                     | I <sub>C</sub> = -150 mA    I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA    I <sub>B</sub> = -50 mA                                                                                                                                                                   |                               |      | -0.4<br>-1.6 | V<br>V |
| V <sub>BE(sat)</sub> * | Collector-Base Saturation Voltage                        | I <sub>C</sub> = -150 mA    I <sub>B</sub> = -15 mA<br>I <sub>C</sub> = -500 mA    I <sub>B</sub> = -50 mA                                                                                                                                                                   |                               |      | -1.3<br>-2.6 | V<br>V |
| h <sub>FE</sub> *      | DC Current Gain                                          | I <sub>C</sub> = -0.1 mA    V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -1 mA    V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -10 mA    V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -150 mA    V <sub>CE</sub> = -10 V<br>I <sub>C</sub> = -500 mA    V <sub>CE</sub> = -10 V | 75<br>100<br>100<br>100<br>50 |      | 300          |        |
| f <sub>T</sub>         | Transition Frequency                                     | I <sub>C</sub> = -50 mA    V <sub>CE</sub> = -20V    f = 100MHz                                                                                                                                                                                                              | 200                           |      |              | MHz    |
| C <sub>CBO</sub>       | Collector-Base Capacitance                               | I <sub>E</sub> = 0    V <sub>CB</sub> = -10 V    f = 1 MHz                                                                                                                                                                                                                   |                               |      | 8            | pF     |
| C <sub>EBO</sub>       | Emitter-Base Capacitance                                 | I <sub>C</sub> = 0    V <sub>EB</sub> = -2 V    f = 1 MHz                                                                                                                                                                                                                    |                               |      | 30           | pF     |
| t <sub>d</sub>         | Delay Time                                               | I <sub>C</sub> = -150 mA    I <sub>B</sub> = -15 mA<br>V <sub>CC</sub> = -30V                                                                                                                                                                                                |                               |      | 10           | ns     |
| t <sub>r</sub>         | Rise Time                                                |                                                                                                                                                                                                                                                                              |                               |      | 40           | ns     |
| t <sub>on</sub>        | Switching On Time                                        |                                                                                                                                                                                                                                                                              |                               |      | 45           | ns     |
| t <sub>s</sub>         | Storage Time                                             |                                                                                                                                                                                                                                                                              |                               | 190  |              | ns     |
| t <sub>f</sub>         | Fall Time                                                | I <sub>C</sub> = -150 mA    I <sub>B1</sub> = -I <sub>B2</sub> = -15mA<br>V <sub>CC</sub> = -30V                                                                                                                                                                             |                               |      | 30           | ns     |
| t <sub>off</sub>       | Switching Off Time                                       |                                                                                                                                                                                                                                                                              |                               | 220  |              | ns     |

\* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 2 %

SOT-23 MECHANICAL DATA

| DIM. | mm   |      |      | mils  |      |      |
|------|------|------|------|-------|------|------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP. | MAX. |
| A    | 0.85 |      | 1.1  | 33.4  |      | 43.3 |
| B    | 0.65 |      | 0.95 | 25.6  |      | 37.4 |
| C    | 1.20 |      | 1.4  | 47.2  |      | 55.1 |
| D    | 2.80 |      | 3    | 110.2 |      | 118  |
| E    | 0.95 |      | 1.05 | 37.4  |      | 41.3 |
| F    | 1.9  |      | 2.05 | 74.8  |      | 80.7 |
| G    | 2.1  |      | 2.5  | 82.6  |      | 98.4 |
| H    | 0.38 |      | 0.48 | 14.9  |      | 18.8 |
| L    | 0.3  |      | 0.6  | 11.8  |      | 23.6 |
| M    | 0    |      | 0.1  | 0     |      | 3.9  |
| N    | 0.3  |      | 0.65 | 11.8  |      | 25.6 |
| O    | 0.09 |      | 0.17 | 3.5   |      | 6.7  |



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