



## MMBT2907A

### SMALL SIGNAL PNP TRANSISTOR

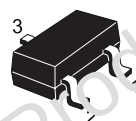
#### PRELIMINARY DATA

| 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

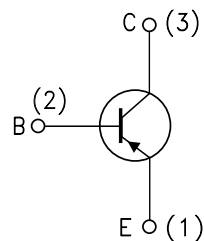
#### APPLICATIONS

- 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 | $^{\circ}\text{C}/\text{W}$ |
|---------------|-------------------------------------|-----|-------|-----------------------------|

• Device mounted on a PCB area of  $1\text{ cm}^2$

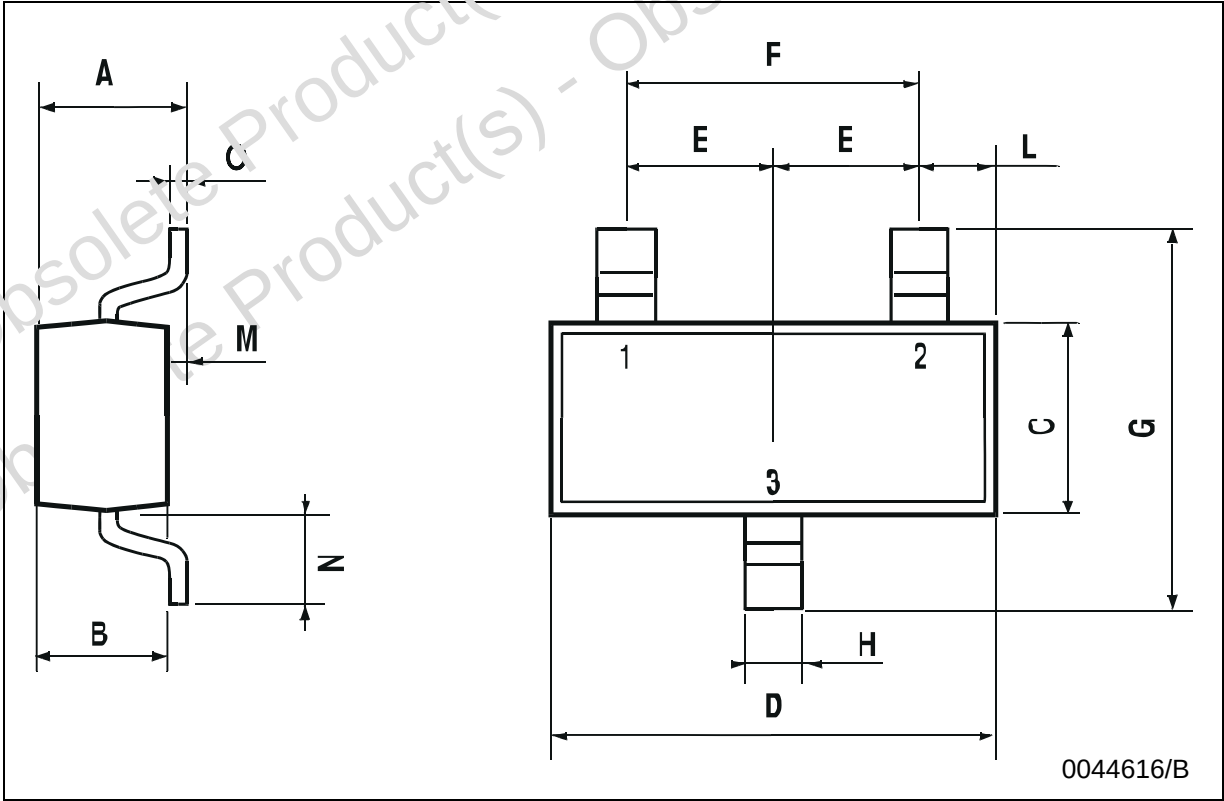
### ELECTRICAL CHARACTERISTICS ( $T_{\text{case}} = 25^{\circ}\text{C}$ unless otherwise specified)

| Symbol          | Parameter                                            | Test Conditions                                                                                                                                                                                                                                     | Min.                          | Typ. | Max.         | Unit   |
|-----------------|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------|--------------|--------|
| $I_{CEX}$       | Collector Cut-off Current ( $V_{BE} = -3\text{ V}$ ) | $V_{CE} = -30\text{ V}$                                                                                                                                                                                                                             |                               |      | -50          | nA     |
| $I_{BEX}$       | Base Cut-off Current ( $V_{BE} = -3\text{ V}$ )      | $V_{CE} = -30\text{ V}$                                                                                                                                                                                                                             |                               |      | -50          | nA     |
| $I_{CBO}$       | Collector Cut-off Current ( $I_E = 0$ )              | $V_{CB} = -50\text{ V}$                                                                                                                                                                                                                             |                               |      | -10          | nA     |
| $V_{(BR)CEO}^*$ | Collector-Emitter Breakdown Voltage ( $I_B = 0$ )    | $I_C = -10\text{ mA}$                                                                                                                                                                                                                               | -60                           |      |              | V      |
| $V_{(BR)CBO}$   | Collector-Base Breakdown Voltage ( $I_E = 0$ )       | $I_C = -10\text{ }\mu\text{A}$                                                                                                                                                                                                                      | -60                           |      |              | V      |
| $V_{(BR)EBO}$   | Emitter-Base Breakdown Voltage ( $I_C = 0$ )         | $I_E = -10\text{ }\mu\text{A}$                                                                                                                                                                                                                      | -5                            |      |              | V      |
| $V_{CE(sat)}^*$ | Collector-Emitter Saturation Voltage                 | $I_C = -150\text{ mA}$ $I_B = -15\text{ mA}$<br>$I_C = -500\text{ mA}$ $I_B = -50\text{ mA}$                                                                                                                                                        |                               |      | -0.4<br>-1.6 | V<br>V |
| $V_{BE(sat)}^*$ | Collector-Base Saturation Voltage                    | $I_C = -150\text{ mA}$ $I_B = -15\text{ mA}$<br>$I_C = -500\text{ mA}$ $I_B = -50\text{ mA}$                                                                                                                                                        |                               |      | -1.3<br>-2.6 | V<br>V |
| $h_{FE}^*$      | DC Current Gain                                      | $I_C = -0.1\text{ mA}$ $V_{CE} = -10\text{ V}$<br>$I_C = -1\text{ mA}$ $V_{CE} = -10\text{ V}$<br>$I_C = -10\text{ mA}$ $V_{CE} = -10\text{ V}$<br>$I_C = -150\text{ mA}$ $V_{CE} = -10\text{ V}$<br>$I_C = -500\text{ mA}$ $V_{CE} = -10\text{ V}$ | 75<br>100<br>100<br>100<br>50 |      | 300          |        |
| $f_T$           | Transition Frequency                                 | $I_C = -50\text{ mA}$ $V_{CE} = -20\text{ V}$ $f = 100\text{ MHz}$                                                                                                                                                                                  | 200                           |      |              | MHz    |
| $C_{CBO}$       | Collector-Base Capacitance                           | $I_E = 0$ $V_{CB} = -10\text{ V}$ $f = 1\text{ MHz}$                                                                                                                                                                                                |                               |      | 8            | pF     |
| $C_{EBO}$       | Emitter-Base Capacitance                             | $I_C = 0$ $V_{EB} = -2\text{ V}$ $f = 1\text{ MHz}$                                                                                                                                                                                                 |                               |      | 30           | pF     |
| $t_d$           | Delay Time                                           | $I_C = -150\text{ mA}$ $I_B = -15\text{ mA}$<br>$V_{CC} = -30\text{ V}$                                                                                                                                                                             |                               |      | 10           | ns     |
| $t_r$           | Rise Time                                            |                                                                                                                                                                                                                                                     |                               |      | 40           | ns     |
| $t_{on}$        | Switching On Time                                    |                                                                                                                                                                                                                                                     |                               |      | 45           | ns     |
| $t_s$           | Storage Time                                         |                                                                                                                                                                                                                                                     |                               | 190  |              | ns     |
| $t_f$           | Fall Time                                            | $I_{B1} = -I_{B2} = -15\text{ mA}$<br>$V_{CC} = -30\text{ V}$                                                                                                                                                                                       |                               |      | 30           | ns     |
| $t_{off}$       | Switching Off Time                                   |                                                                                                                                                                                                                                                     |                               | 220  |              | ns     |

\* Pulsed: Pulse duration =  $300\text{ }\mu\text{s}$ , duty cycle  $\leq 2\%$

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 |      | 119  |
| 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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