

# MMBT2907AWT1

Preferred Device

## General Purpose Transistor

### PNP Silicon

These transistors are designed for general purpose amplifier applications. They are housed in the SC-70/SOT-323 package which is designed for low power surface mount applications.

#### Features

- Pb-Free Package is Available

#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value | Unit |
|--------------------------------|-----------|-------|------|
| Collector-Emitter Voltage      | $V_{CEO}$ | -60   | Vdc  |
| Collector-Base Voltage         | $V_{CBO}$ | -60   | Vdc  |
| Emitter-Base Voltage           | $V_{EBO}$ | -5.0  | Vdc  |
| Collector Current - Continuous | $I_C$     | -600  | mAdc |

#### THERMAL CHARACTERISTICS

| Characteristic   | Symbol          | Max         | Unit               |
|--|-----------------|-------------|--------------------|
| Total Device Dissipation FR-5 Board<br>(Note 1) $T_A = 25^\circ\text{C}$ | $P_D$           | 150         | mW                 |
| Thermal Resistance Junction-to-Ambient                                   | $R_{\theta JA}$ | 833         | $^\circ\text{C/W}$ |
| Junction and Storage Temperature   | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$   |

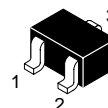
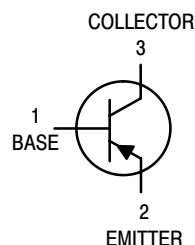
Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

- FR-5 = 1.0 x 0.75 x 0.062 in.



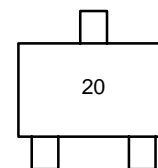
ON Semiconductor®

<http://onsemi.com>



SC-70/SOT-323  
CASE 419-04  
STYLE 3

#### MARKING DIAGRAM



20 = Specific Device Code

#### ORDERING INFORMATION

| Device        | Package            | Shipping†        |
|---------------|--------------------|------------------|
| MMBT2907AWT1  | SC-70              | 3000 Tape & Reel |
| MMBT2907AWT1G | SC-70<br>(Pb-Free) | 3000 Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

Preferred devices are recommended choices for future use and best overall value.

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

| Characteristic   | Symbol               | Min  | Max | Unit             |
|--|----------------------|------|-----|------------------|
| <b>OFF CHARACTERISTICS</b>   |                      |      |     |                  |
| Collector–Emitter Breakdown Voltage (Note 2)<br>(I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>B</sub> = 0)       | V <sub>(BR)CEO</sub> | –60  | –   | V <sub>dc</sub>  |
| Collector–Base Breakdown Voltage<br>(I <sub>C</sub> = –10 mA <sub>dc</sub> , I <sub>E</sub> = 0)                   | V <sub>(BR)CBO</sub> | –60  | –   | V <sub>dc</sub>  |
| Emitter–Base Breakdown Voltage<br>(I <sub>E</sub> = –10 μA <sub>dc</sub> , I <sub>C</sub> = 0)                     | V <sub>(BR)EBO</sub> | –5.0 | –   | V <sub>dc</sub>  |
| Base Cutoff Current<br>(V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB(off)</sub> = –0.5 V <sub>dc</sub> )      | I <sub>BL</sub>      | –    | –50 | nA <sub>dc</sub> |
| Collector Cutoff Current<br>(V <sub>CE</sub> = –30 V <sub>dc</sub> , V <sub>EB(off)</sub> = –0.5 V <sub>dc</sub> ) | I <sub>CEX</sub>     | –    | –50 | nA <sub>dc</sub> |

## ON CHARACTERISTICS<sup>(3)</sup>

|  |                      |                               |                       |                 |
|--|----------------------|-------------------------------|-----------------------|-----------------|
| DC Current Gain (Note 2)<br>(I <sub>C</sub> = –0.1 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> )<br>(I <sub>C</sub> = –1.0 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> )<br>(I <sub>C</sub> = –10 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> )<br>(I <sub>C</sub> = –150 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> )<br>(I <sub>C</sub> = –500 mA <sub>dc</sub> , V <sub>CE</sub> = –10 V <sub>dc</sub> ) | H <sub>FE</sub>      | 75<br>100<br>100<br>100<br>50 | –<br>–<br>–<br>–<br>– | –               |
| Collector–Emitter Saturation Voltage (Note 2)<br>(I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B</sub> = –15 mA <sub>dc</sub> )<br>(I <sub>C</sub> = –500 mA <sub>dc</sub> , I <sub>B</sub> = –50 mA <sub>dc</sub> )  | V <sub>CE(sat)</sub> | –<br>–                        | –0.4<br>–1.6          | V <sub>dc</sub> |
| Base–Emitter Saturation Voltage (Note 2)<br>(I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B</sub> = –15 mA <sub>dc</sub> )<br>(I <sub>C</sub> = –500 mA <sub>dc</sub> , I <sub>B</sub> = –50 mA <sub>dc</sub> )   | V <sub>BE(sat)</sub> | –<br>–                        | –1.3<br>–2.6          | V <sub>dc</sub> |

## SMALL–SIGNAL CHARACTERISTICS

|  |                  |     |     |     |
|--|------------------|-----|-----|-----|
| Current–Gain – Bandwidth Product<br>(I <sub>C</sub> = –50 mA <sub>dc</sub> , V <sub>CE</sub> = 20 V <sub>dc</sub> , f = 100 MHz) | f <sub>T</sub>   | 200 | –   | MHz |
| Output Capacitance<br>(V <sub>CB</sub> = –10 V <sub>dc</sub> , I <sub>E</sub> = 0, f = 1.0 MHz)                                  | C <sub>obo</sub> | –   | 8.0 | pF  |
| Input Capacitance<br>(V <sub>EB</sub> = –2.0 V <sub>dc</sub> , I <sub>C</sub> = 0, f = 1.0 MHz)                                  | C <sub>ibo</sub> | –   | 30  | pF  |

## SWITCHING CHARACTERISTICS

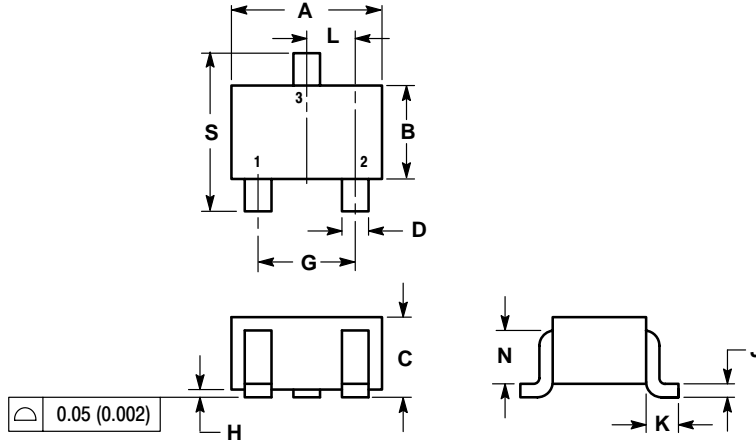
|               |   |                  |   |     |    |
|---------------|---|------------------|---|-----|----|
| Turn–On Time  | (V <sub>CC</sub> = –30 V <sub>dc</sub> ,<br>I <sub>C</sub> = –150 mA <sub>dc</sub> , I <sub>B1</sub> = –15 mA <sub>dc</sub> )                   | t <sub>on</sub>  | – | 45  | ns |
| Delay Time    |   | t <sub>d</sub>   | – | 10  |    |
| Rise Time     |   | t <sub>r</sub>   | – | 40  |    |
| Storage Time  | (V <sub>CC</sub> = –6.0 V <sub>dc</sub> , I <sub>C</sub> = –150 mA <sub>dc</sub> ,<br>I <sub>B1</sub> = I <sub>B2</sub> = 15 mA <sub>dc</sub> ) | t <sub>s</sub>   | – | 80  |    |
| Fall Time     |   | t <sub>f</sub>   | – | 30  |    |
| Turn–Off Time |   | t <sub>off</sub> | – | 100 |    |

2. Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%.

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## PACKAGE DIMENSIONS

SC-70/SOT-323  
CASE 419-04  
ISSUE L



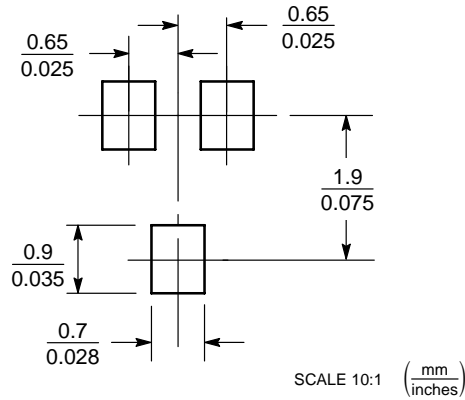
NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES    |       | MILLIMETERS |      |
|-----|-----------|-------|-------------|------|
|     | MIN       | MAX   | MIN         | MAX  |
| A   | 0.071     | 0.087 | 1.80        | 2.20 |
| B   | 0.045     | 0.053 | 1.15        | 1.35 |
| C   | 0.032     | 0.040 | 0.80        | 1.00 |
| D   | 0.012     | 0.016 | 0.30        | 0.40 |
| G   | 0.047     | 0.055 | 1.20        | 1.40 |
| H   | 0.000     | 0.004 | 0.00        | 0.10 |
| J   | 0.004     | 0.010 | 0.10        | 0.25 |
| K   | 0.017 REF |       | 0.425 REF   |      |
| L   | 0.026 BSC |       | 0.650 BSC   |      |
| N   | 0.028 REF |       | 0.700 REF   |      |
| S   | 0.079     | 0.095 | 2.00        | 2.40 |

STYLE 3:  
PIN 1. BASE  
2. EMITTER  
3. COLLECTOR

### SOLDERING FOOTPRINT\*



\*For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

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