

# MMBT2222AW

Rev.F Aug.-2018

## / Descriptions

SOT-323          NPN          Silicon NPN transistor in a SOT-323 Plastic Package.

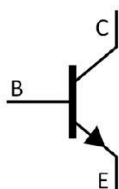
## / Features

Low power surface mount applications.

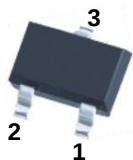
## / Applications

General purpose amplifier.

## / Equivalent Circuit



## / Pinning



PIN1   Emitter          PIN 2   Base          PIN 3   Collector

## / Marking

|                |         |
|----------------|---------|
| $h_{FE}$ Range | 100~300 |
| Marking        | H1P     |

## / Absolute Maximum Ratings(Ta=25 – )

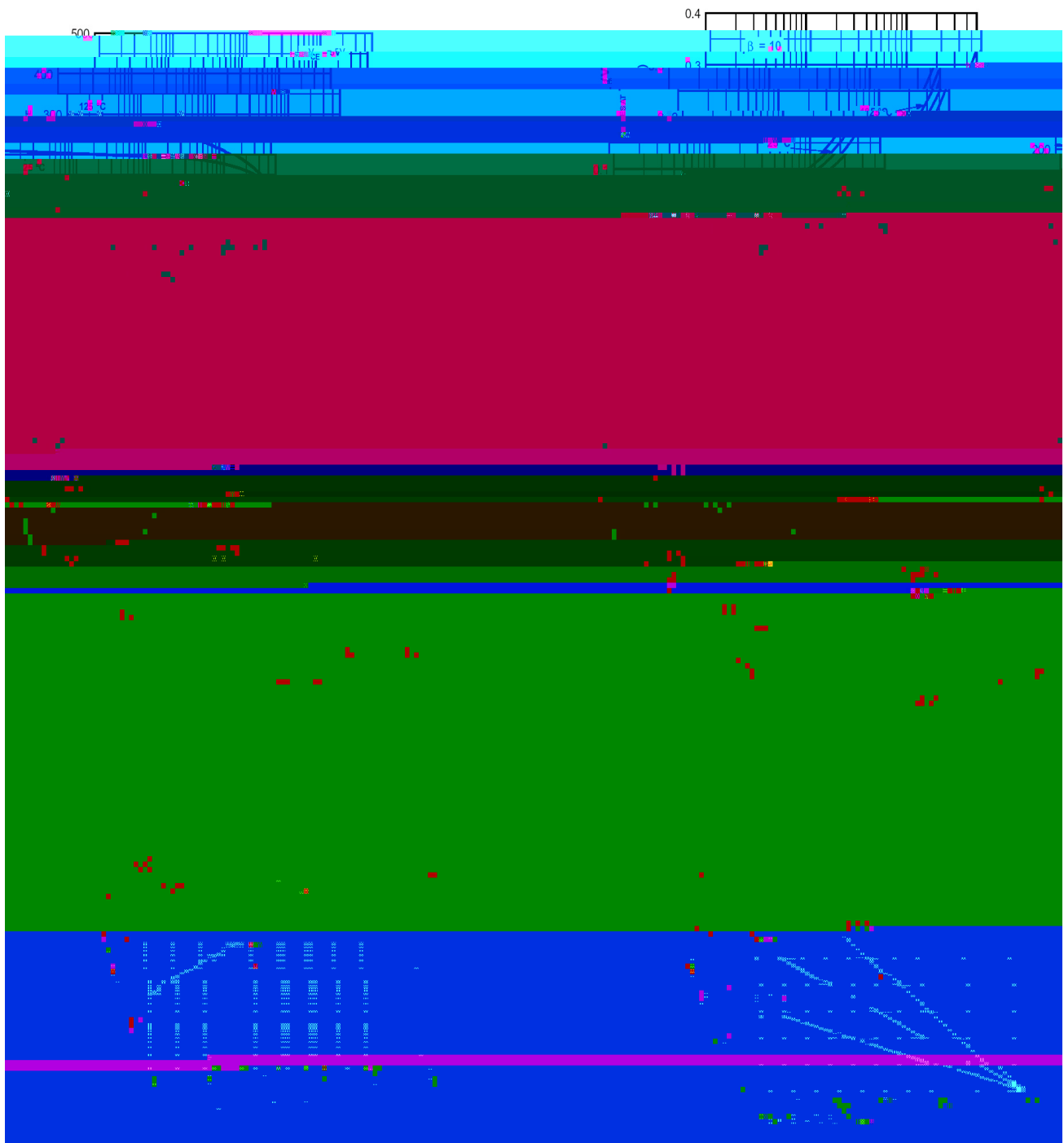
| Parameter                      | Symbol    | Rating  | Unit |
|--------------------------------|-----------|---------|------|
| Collector to Base Voltage      | $V_{CBO}$ | 75      | V    |
| Collector to Emitter Voltage   | $V_{CEO}$ | 40      | V    |
| Emitter to Base Voltage        | $V_{EBO}$ | 6.0     | V    |
| Collector Current - Continuous | $I_C$     | 600     | mA   |
| Collector Power Dissipation    | $P_C$     | 200     | mW   |
| Junction Temperature           | $T_j$     | 150     |      |
| Storage Temperature Range      | $T_{stg}$ | -55 150 |      |

## / Electrical Characteristics(Ta=25 – )

| Parameter                               | Symbol            | Test Conditions                                          | Min | Typ | Max  | Unit    |
|-----------------------------------------|-------------------|----------------------------------------------------------|-----|-----|------|---------|
| Collector to Base Breakdown Voltage     | $V_{CBO}$         | $I_C=10\mu A$ $I_E=0$                                    | 75  |     |      | V       |
| Collector to Emitter Breakdown Voltage  | $V_{CEO}$         | $I_C=10mA$ $I_B=0$                                       | 40  |     |      | V       |
| Emitter to Base Breakdown Voltage       | $V_{EBO}$         | $I_E=10\mu A$ $I_C=0$                                    | 6.0 |     |      | V       |
| Collector Cut-Off Current               | $I_{CBO}$         | $V_{CB}=60V$ $I_E=0$                                     |     |     | 0.01 | $\mu A$ |
| Emitter Base Cut-Off Current            | $I_{EBO}$         | $V_{EB}=5.0V$ $I_C=0$                                    |     |     | 0.1  | $\mu A$ |
| DC Current Gain                         | $h_{FE}$          | $V_{CE}=10V$ $I_C=150mA$ *                               | 100 |     | 300  |         |
| Collector to Emitter Saturation Voltage | $V_{CE(sat)} (1)$ | $I_C=150mA$ $I_B=15mA$                                   |     |     | 0.3  | V       |
|                                         | $V_{CE(sat)} (2)$ | $I_C=500mA$ $I_B=50mA$                                   |     |     | 1.0  | V       |
| Base to Emitter Saturation Voltage      | $V_{BE(sat)} (1)$ | $I_C=150mA$ $I_B=15mA$                                   | 0.6 |     | 1.2  | V       |
|                                         | $V_{BE(sat)} (2)$ | $I_C=500mA$ $I_B=50mA$                                   |     |     | 2.0  | V       |
| Collector output capacitance            | $C_{ob}$          | $V_{CB}=10V$ $I_E=0$<br>$f=1.0MHz$                       |     |     | 8.0  | pF      |
| Transition Frequency                    | $f_T$             | $I_C=20mA$ $V_{CE}=20V$<br>$f=100MHz$                    | 300 |     |      | MHz     |
| Turn-On Time                            | $t_{on}$          | $V_{CC}=30V$ $V_{BE}=-0.5V$<br>$I_C=150mA$ $I_{B1}=15mA$ |     |     | 35   | ns      |
| Turn-Off Time                           | $t_{off}$         | $V_{CC}=30V$ $I_C=150mA$<br>$I_{B1}=I_{B2}=15mA$         |     |     | 285  | ns      |

\*Pulse Test: Pulse Width  $\leq 300 \mu s$ , Duty Cycle  $\leq 2.0\%$

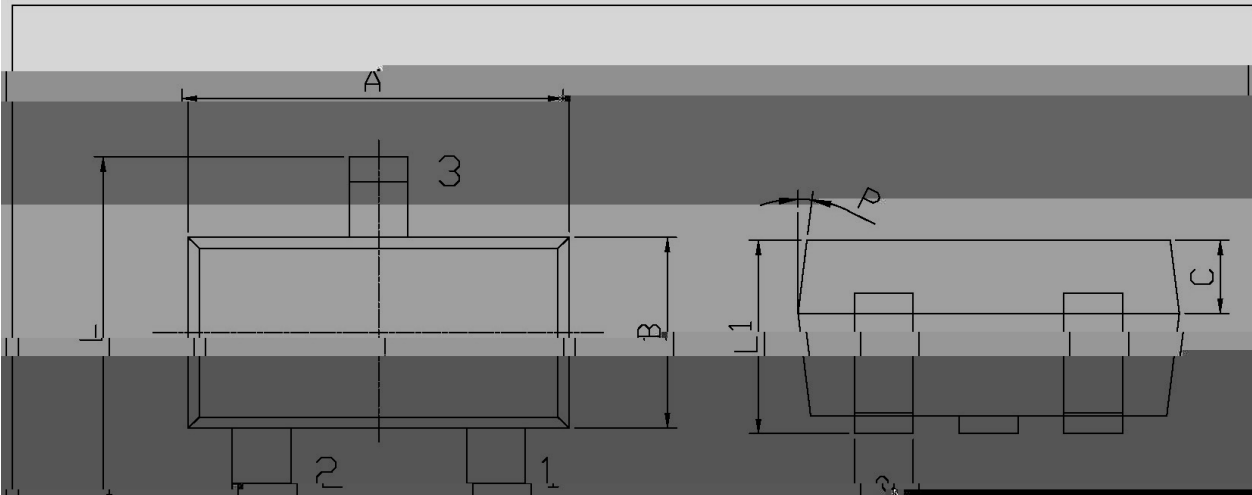
/ Electrical Characteristic Curve



/ Package Dimensions

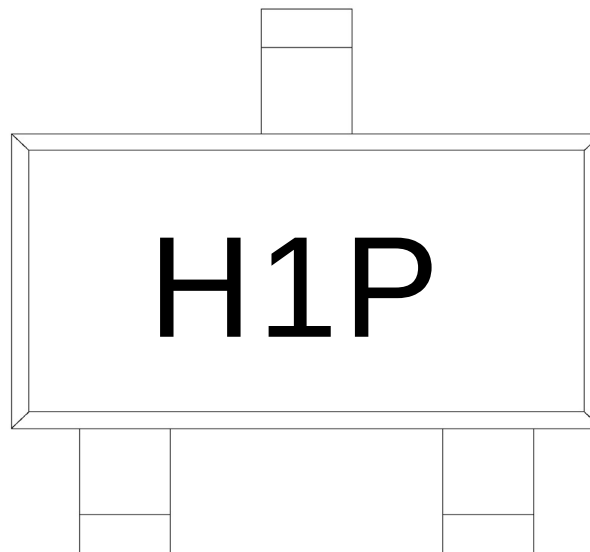
SOT-323

单位; mm



|   | Min  | Max  |    | Min  | Max  |
|---|------|------|----|------|------|
| A | 1.75 | 2.35 | C  | 0.30 | 0.50 |
| L | 2.00 | 2.2  | L1 | 0.85 | 1.15 |
| E | 1.20 | 1.40 | 0  | 0.20 | 0.40 |

/ Marking Instructions



H

1P

Note:

H: Company Code.

1P: Product Type.

( ) / Wh p shudwxuh Suriloh i ru LU Uhior z Vroghulqj +Se0luhh,

Note:

- |   |         |           |                                         |
|---|---------|-----------|-----------------------------------------|
| 1 | 150 180 | 60 90sec; | 1.Preheating:150~180 , Time:60~90sec.   |
| 2 | 245±5   | 5±0.5sec; | 2.Peak Temp.:245±5 , Duration:5±0.5sec. |
| 3 | 2 10    | /sec.     | 3. Cooling Speed: 2~10 /sec.            |

### / Resistance to Soldering Heat Test Conditions

260±5      10±1 sec.      Temp.:260±5      Time:10±1 sec

### / Packaging SPEC.

/ REEL

| Package Type | Units           |                      |                      |                            |                      | Dimension (unit mm <sup>3</sup> ) |             |             |
|--------------|-----------------|----------------------|----------------------|----------------------------|----------------------|-----------------------------------|-------------|-------------|
|              | Units/Reel<br>/ | Reels/Inner Box<br>/ | Units/Inner Box<br>/ | Inner Boxes/Outer Box<br>/ | Units/Outer Box<br>/ | Reel                              | Inner Box   | Outer Box   |
| SOT-323      | 3,000           | 10                   | 30,000               | 6                          | 180,000              | 7 ×8                              | 180×120×180 | 390×385×205 |

### / Notices