

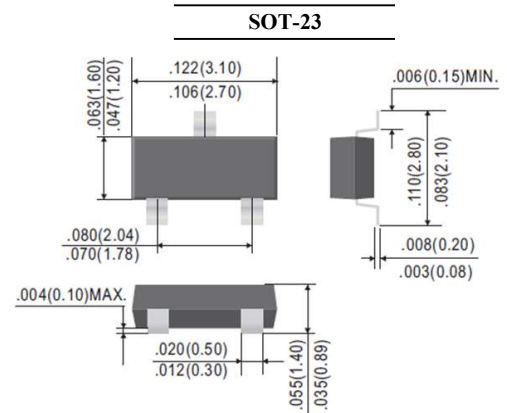
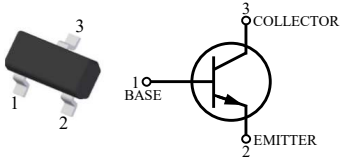


# MMBT2222AH

## NPN TRANSISTOR

### FEATURES

· Suffix "H" indicates Halogen-free parts, ex. MMBT2222AH



Dimensions in inches and (millimeter)

### Maximum Ratings ( $T_A = 25^\circ\text{C}$ unless otherwise noted)

| Parameter                 | Symbol    | Value         | Unit             |
|---------------------------|-----------|---------------|------------------|
| Collector Base Voltage    | $V_{CBO}$ | 75            | V                |
| Collector Emitter Voltage | $V_{CEO}$ | 40            | V                |
| Emitter Base Voltage      | $V_{EBO}$ | 6             | V                |
| Collector Current         | $I_C$     | 600           | mA               |
| Power Dissipation         | $P_D$     | 350           | mW               |
| Junction Temperature      | $T_J$     | 150           | $^\circ\text{C}$ |
| Storage Temperature Range | $T_{STG}$ | - 55 to + 150 | $^\circ\text{C}$ |



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**Electrical Characteristics** ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise specified)

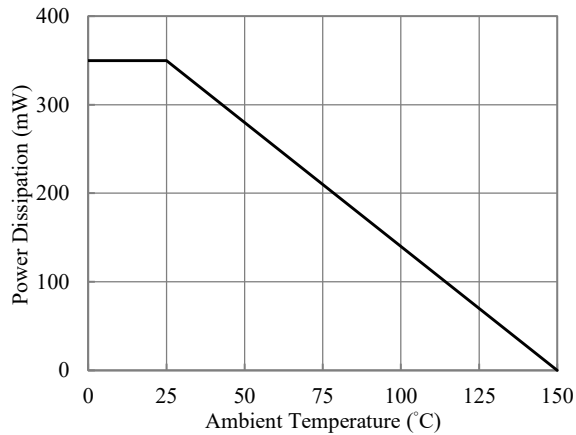
| Parameter                            | Conditions   | Symbol        | Min. | Max. | Unit |
|--------------------------------------|--|---------------|------|------|------|
| DC Current Gain                      | $I_C=0.1\text{mA}, V_{CE}=10\text{V}$                  | $h_{FE}$      | 35   | -    | -    |
|                                      | $I_C=1\text{mA}, V_{CE}=10\text{V}$                    |               | 50   | -    |      |
|                                      | $I_C=10\text{mA}, V_{CE}=10\text{V}$                   |               | 75   | -    |      |
|                                      | $I_C=150\text{mA}, V_{CE}=1\text{V}$                   |               | 50   | -    |      |
|                                      | $I_C=150\text{mA}, V_{CE}=10\text{V}$                  |               | 100  | 300  |      |
|                                      | $I_C=500\text{mA}, V_{CE}=10\text{V}$                  |               | 40   | -    |      |
| Collector Base Cutoff Current        | $V_{CB}=60\text{V}$                                    | $I_{CBO}$     | -    | 10   | nA   |
| Emitter Base Cutoff Current          | $V_{EB}=3\text{V}$                                     | $I_{EBO}$     | -    | 100  | nA   |
| Collector Base Breakdown Voltage     | $I_C=10\mu\text{A}$                                    | $V_{(BR)CBO}$ | 75   | -    | V    |
| Collector Emitter Breakdown Voltage  | $I_C=10\text{mA}$                                      | $V_{(BR)CEO}$ | 40   | -    | V    |
| Emitter Base Breakdown Voltage       | $I_E=10\mu\text{A}$                                    | $V_{(BR)EBO}$ | 6    | -    | V    |
| Collector Emitter Saturation Voltage | $I_C=150\text{mA}, I_B=15\text{mA}$                    | $V_{CE(sat)}$ | -    | 0.3  | V    |
|                                      | $I_C=500\text{mA}, I_B=50\text{mA}$                    |               | -    | 1.0  |      |
| Base Emitter Saturation Voltage      | $I_C=150\text{mA}, I_B=15\text{mA}$                    | $V_{BE(sat)}$ | 0.6  | 1.2  | V    |
|                                      | $I_C=500\text{mA}, I_B=50\text{mA}$                    |               | -    | 2.0  |      |
| Transition Frequency                 | $-I_E=20\text{mA}, V_{CE}=20\text{V}, f=100\text{MHz}$ | $f_T$         | 300  | -    | MHz  |
| Collector Output Capacitance         | $V_{CB}=10\text{V}, f=100\text{KHz}$                   | $C_{ob}$      | -    | 8    | pF   |
| Delay Time                           | $V_{CC}=30\text{V}, V_{BE(OFF)}=0.5\text{V},$          | $t_d$         | -    | 10   | ns   |
| Rise Time                            | $I_C=150\text{mA}, I_{B1}=15\text{mA}$                 | $t_r$         | -    | 25   |      |
| Storage Time                         | $V_{CC}=30\text{V}, I_C=150\text{mA},$                 | $t_s$         | -    | 225  |      |
| Fall Time                            | $I_{B1}=-I_{B2}=15\text{mA}$                           | $t_f$         | -    | 60   |      |



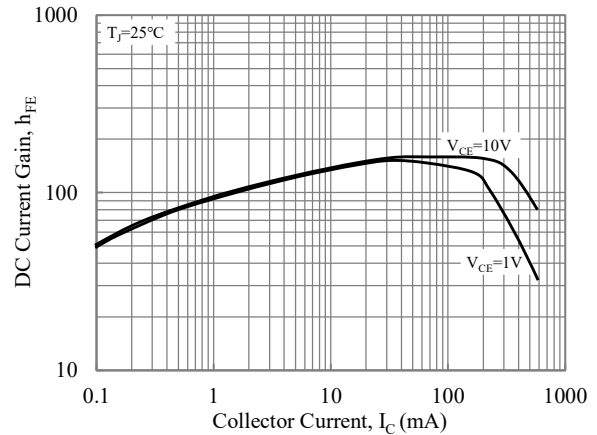
# MMBT2222AH

## NPN TRANSISTOR

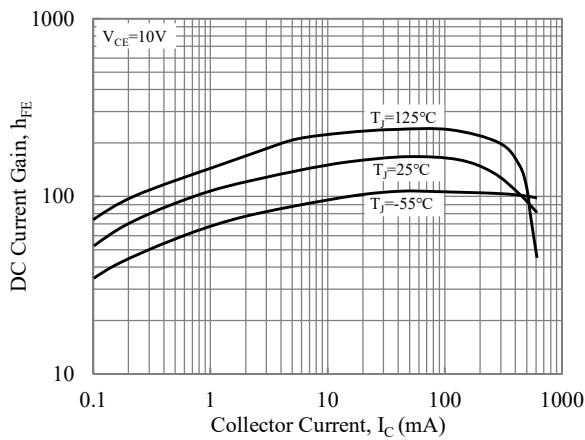
### RATINGS AND CHARACTERISTIC CURVES



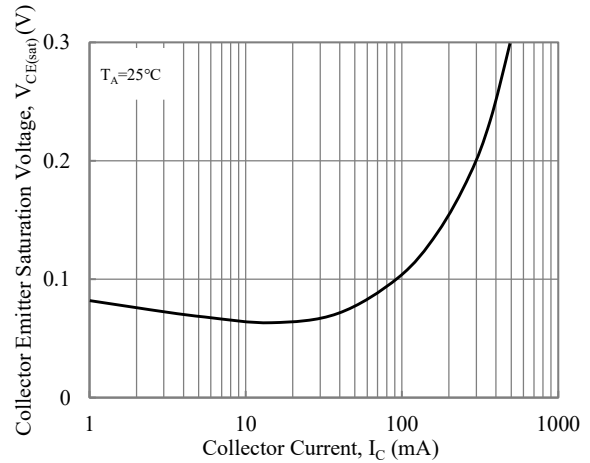
**Fig. 1-Power Derating Curves**



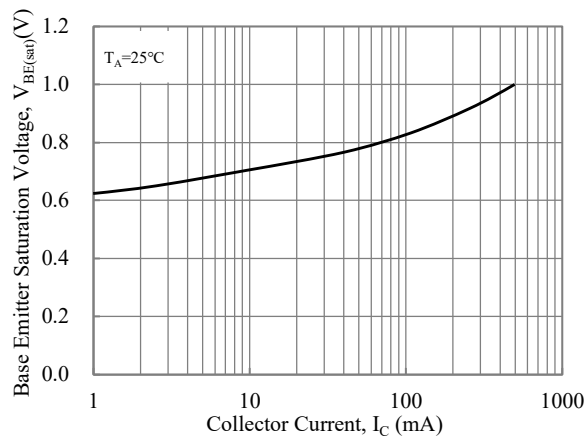
**Fig. 2-Current Gain vs Collector Current**



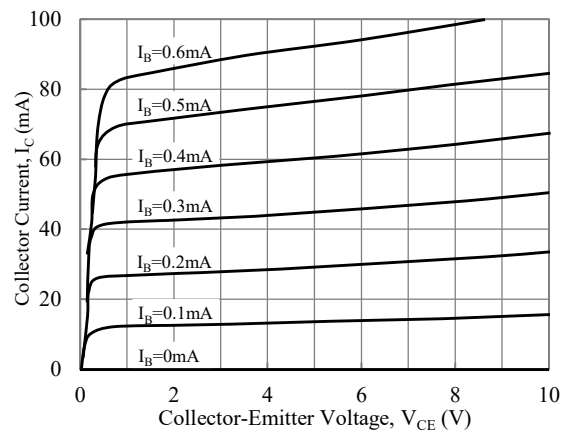
**Fig. 3-Current Gain vs Collector Current**



**Fig. 4-Collector Emitter Saturation Voltage vs. Collector Current**



**Fig. 5-Base Emitter Saturation Voltage vs. Collector Current**



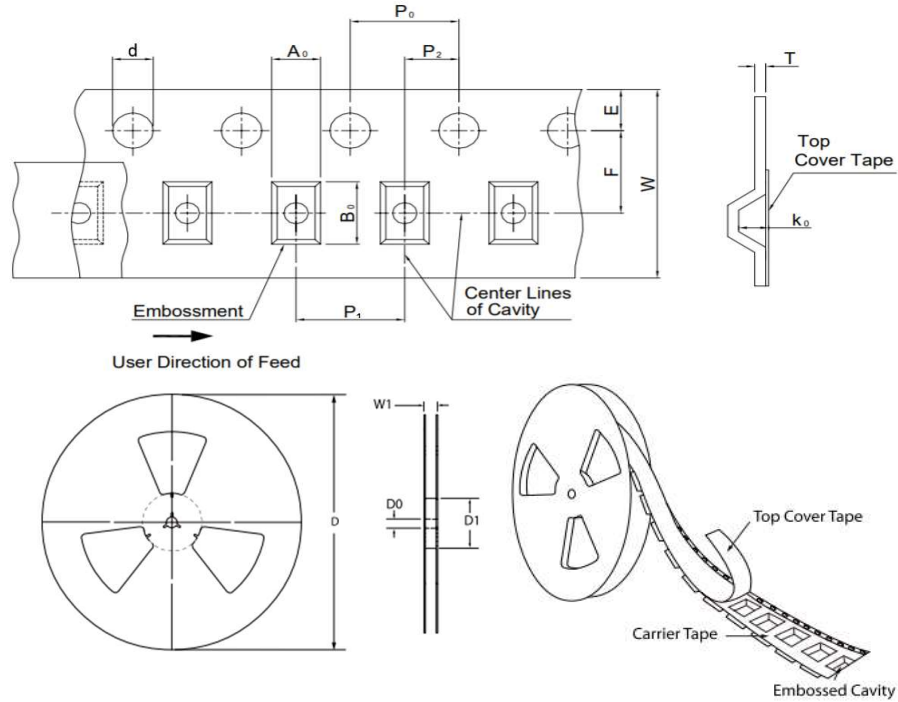
**Fig. 6 Output Characteristics**



# MMBT2222AH

## NPN TRANSISTOR

### TAPE & REEL SPECIFICATION



| Item                   | Symbol         | SOT-23        |
|------------------------|----------------|---------------|
| Carrier width          | A <sub>0</sub> | 3.30 ± 0.10   |
| Carrier length         | B <sub>0</sub> | 3.00 ± 0.10   |
| Carrier depth          | K <sub>0</sub> | 1.70 ± 0.10   |
| Sprocket hole          | d              | 1.50 ± 0.10   |
| Reel outside diameter  | D              | 178.00 ± 2.00 |
| Feed hole width        | D <sub>0</sub> | 13.00 ± 0.50  |
| Reel inner diameter    | D <sub>1</sub> | MIN. 50.00    |
| Sprocket hole position | E              | 1.75 ± 0.10   |
| Punch hole position    | F              | 3.50 ± 0.10   |
| Sprocket hole pitch    | P <sub>0</sub> | 4.00 ± 0.10   |
| Punch hole pitch       | P <sub>1</sub> | 4.00 ± 0.10   |
| Embossment center      | P <sub>2</sub> | 2.00 ± 0.10   |
| Overall tape thickness | T              | 0.20 ± 0.05   |
| Tape width             | W              | 8.00 ± 0.20   |
| Reel width             | W <sub>1</sub> | MAX. 14.50    |

### ORDER INFORMATION

| Package | Reel Size | Quantity |
|---------|-----------|----------|
| SOT-23  | 7"        | 3,000    |

### MARKING CODE

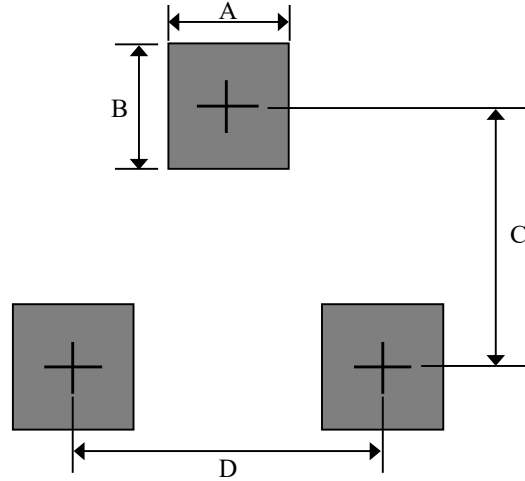
| Part Number | Marking Code |
|-------------|--------------|
| MMBT2222AH  | 1P           |



# MMBT2222AH

## NPN TRANSISTOR

### SUGGESTED SOLDER PAD LAYOUT



Unit : mm

| PACKAGE | A    | B    | C    | D    |
|---------|------|------|------|------|
| SOT-23  | 0.80 | 1.00 | 2.40 | 1.90 |