

## SOT-323 Plastic-Encapsulate Transistors

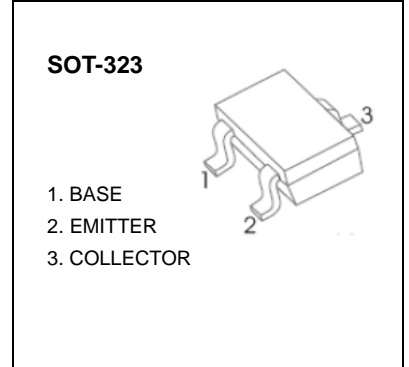
### FEATURES

- Epitaxial planar die construction
- Complementary PNP Type available(MMBT2222AW)

MARKING:2F

MAXIMUM RATINGS( $T_a=25^\circ\text{C}$  unless otherwise noted)

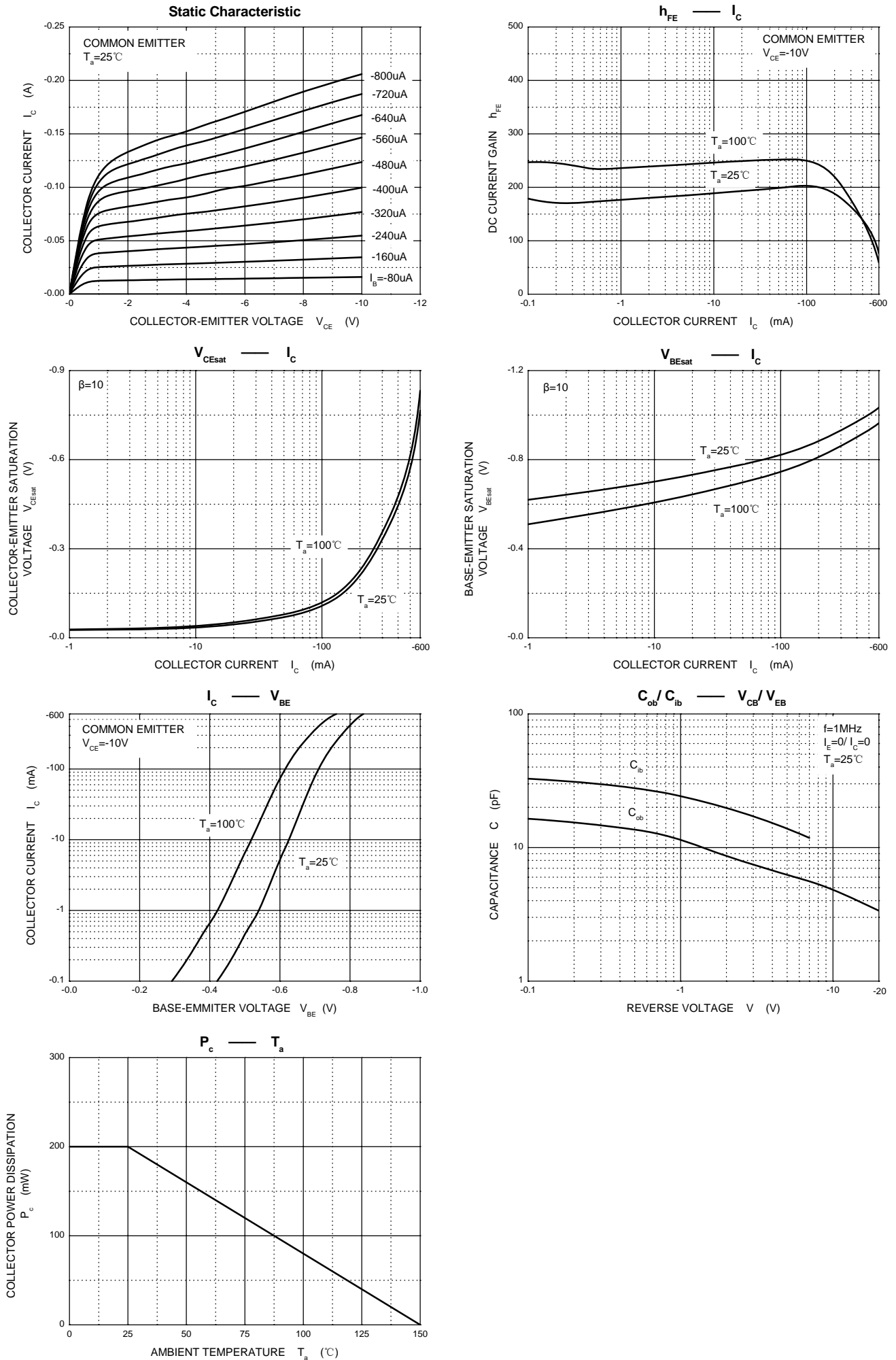
| Symbol         | Parameter  | Value       | Unit             |
|----------------|--|-------------|------------------|
| $V_{CBO}$      | Collector-Base Voltage                           | -60         | V                |
| $V_{CEO}$      | Collector-Emitter Voltage                        | -60         | V                |
| $V_{EBO}$      | Emitter-Base Voltage                             | -5          | V                |
| $I_C$          | Collector Current -Continuous                    | -0.6        | A                |
| $P_C$          | Collector Dissipation                            | 0.2         | W                |
| $T_J, T_{stg}$ | Operation Junction and Storage Temperature Range | -55 to +150 | $^\circ\text{C}$ |

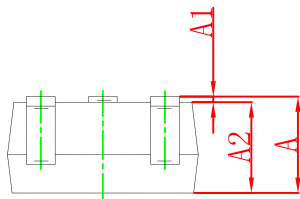
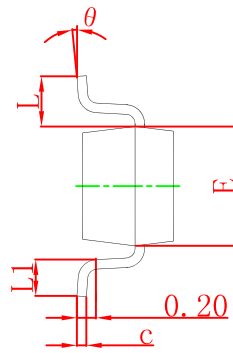
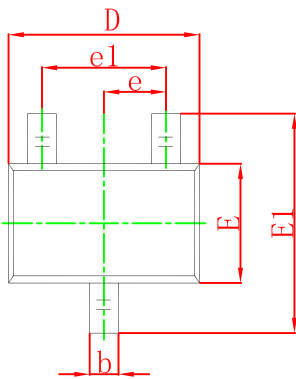


### ELECTRICAL CHARACTERISTICS ( $T_a=25^\circ\text{C}$ unless otherwise specified)

| Parameter                            | Symbol        | Test conditions  | Min  | Typ | Max  | Unit |
|--------------------------------------|---------------|--|------|-----|------|------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=-10\mu\text{A}, I_E=0$  | -60  |     |      | V    |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=-10\text{mA}, I_B=0$  | -60  |     |      | V    |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=-10\mu\text{A}, I_C=0$  | -5   |     |      | V    |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=-50\text{V}, I_E=0$  |      |     | -100 | nA   |
| Collector cut-off current            | $I_{CES}$     | $V_{CB}=-30\text{V}, I_B=0$  |      |     | -100 | nA   |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=-3\text{V}, I_C=0$   |      |     | -100 | nA   |
| DC current gain                      | $h_{FE(1)}$   | $V_{CE}=-10\text{V}, I_C=-0.1\text{mA}$                              | 75   |     |      |      |
|                                      | $h_{FE(2)}$   | $V_{CE}=-10\text{V}, I_C=-1\text{mA}$                                | 100  |     |      |      |
|                                      | $h_{FE(3)}$   | $V_{CE}=-10\text{V}, I_C=-10\text{mA}$                               | 100  |     |      |      |
|                                      | $h_{FE(4)}$   | $V_{CE}=-10\text{V}, I_C=-150\text{mA}$                              | 100  |     | 300  |      |
|                                      | $h_{FE(5)}$   | $V_{CE}=-10\text{V}, I_C=-500\text{mA}$                              | 50   |     |      |      |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=-150\text{mA}, I_B=-15\text{mA}$                                |      |     | -0.4 | V    |
|                                      | $V_{CE(sat)}$ | $I_C=-500\text{mA}, I_B=-50\text{mA}$                                |      |     | -1.6 | V    |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C=-150\text{mA}, I_B=-15\text{mA}$                                | -0.6 |     | -1.3 | V    |
|                                      | $V_{BE(sat)}$ | $I_C=-500\text{mA}, I_B=-50\text{mA}$                                |      |     | -2.6 | V    |
| Transition frequency                 | $f_T$         | $V_{CE}=-20\text{V}, I_C=-50\text{mA}, f=100\text{MHz}$              | 200  |     |      | MHz  |
| Output capacitance                   | $C_{ob}$      | $V_{CB}=-10\text{V}, I_E=0, f=0.1\text{MHz}$                         |      |     | 8    | pF   |
| Input capacitance                    | $C_{ib}$      | $V_{EB}=-2\text{V}, I_C=0, f=0.1\text{MHz}$                          |      |     | 30   | pF   |
| Delay time                           | $t_d$         | $V_{CC}=-30\text{V}, V_{BE(off)}=-1.5\text{V}, I_C=-150\text{mA}$    |      |     | 10   | ns   |
| Rise time                            | $t_r$         | $I_{B1}=-15\text{mA}$  |      |     | 40   | ns   |
| Storage time                         | $t_s$         | $V_{CC}=-30\text{V}, I_C=-150\text{mA}, I_{B1}=-I_{B2}=-15\text{mA}$ |      |     | 80   | ns   |
| Fall time                            | $t_f$         |  |      |     | 30   | ns   |

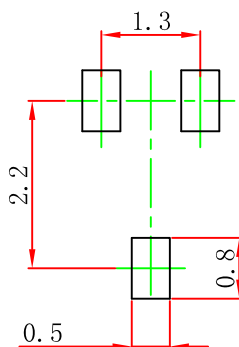
## Typical Characteristics





| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 0.900                     | 1.100 | 0.035                | 0.043 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 0.900                     | 1.000 | 0.035                | 0.039 |
| b        | 0.200                     | 0.400 | 0.008                | 0.016 |
| c        | 0.080                     | 0.150 | 0.003                | 0.006 |
| D        | 2.000                     | 2.200 | 0.079                | 0.087 |
| E        | 1.150                     | 1.350 | 0.045                | 0.053 |
| E1       | 2.150                     | 2.450 | 0.085                | 0.096 |
| e        | 0.650 TYP                 |       | 0.026 TYP            |       |
| e1       | 1.200                     | 1.400 | 0.047                | 0.055 |
| L        | 0.525 REF                 |       | 0.021 REF            |       |
| L1       | 0.260                     | 0.460 | 0.010                | 0.018 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

### SOT-323 Suggested Pad Layout



**Note:**

1. Controlling dimension: in millimeters.
2. General tolerance:  $\pm 0.05$ mm.
3. The pad layout is for reference purposes only.