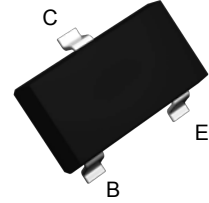


**Features**

- High current low voltage
- Complementary PNP MMBT2907A
- SOT-23 small surface mount package



**SOT-23**

**Applications**

- General purpose amplifier
- Switching

**Absolute 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                    | $V_{EBO}$       | 6.0         | V                           |
| Collector Current-Continuous            | $I_C$           | 600         | mA                          |
| Collector Power Dissipation             | $P_C$           | 300         | mW                          |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 417         | $^{\circ}\text{C}/\text{W}$ |
| Operating Temperature                   | $T_J$           | -55 to +150 | $^{\circ}\text{C}$          |
| Storage Temperature Range               | $T_{STG}$       | -55 to +150 | $^{\circ}\text{C}$          |

**Classification Of  $h_{FE(1)}$**

| $h_{FE}$ | 100-300 |         |
|----------|---------|---------|
| Rank     | L       | H       |
| Range    | 100-200 | 200-300 |



## MMBT2222A NPN Transistor

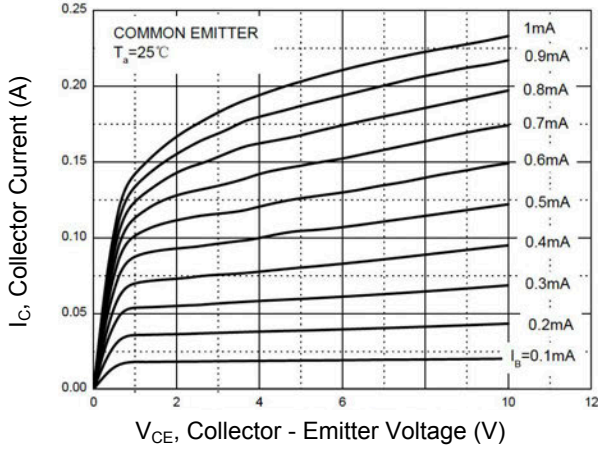
### Electrical Characteristics ( $T_A=25^\circ\text{C}$ unless otherwise noted)

| Parameters                           | Symbol          | Test Conditions                                       | Min | Max  | Unit          |
|--------------------------------------|-----------------|---|-----|------|---------------|
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$   | $I_C=10\mu\text{A}, I_E=0$                            | 75  | -    | V             |
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}^1$ | $I_C=10\text{mA}, I_B=0$                              | 40  | -    | V             |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$   | $I_E=10\mu\text{A}, I_C=0$                            | 6   | -    | V             |
| Collector Cut-off Current            | $I_{CBO}$       | $V_{CB}=60\text{V}, I_E=0$                            | -   | 0.01 | $\mu\text{A}$ |
| Collector Cut-off Current            | $I_{CEX}$       | $V_{CE}=30\text{V}, V_{BE(off)}=3\text{V}$            | -   | 0.01 | $\mu\text{A}$ |
| Emitter Cut-off Current              | $I_{EBO}$       | $V_{EB}=3\text{V}, I_C=0$                             | -   | 0.1  | $\mu\text{A}$ |
| DC Current Gain                      | $h_{FE(1)}^1$   | $V_{CE}=10\text{V}, I_C=150\text{mA}$                 | 100 | 300  | -             |
|                                      | $h_{FE(2)}$     | $V_{CE}=10\text{V}, I_C=0.1\text{mA}$                 | 40  | -    |               |
|                                      | $h_{FE(3)}^1$   | $V_{CE}=10\text{V}, I_C=500\text{mA}$                 | 42  | -    |               |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}^1$ | $I_C=500\text{mA}, I_B=50\text{mA}$                   | -   | 1    | V             |
|                                      |                 | $I_C=150\text{mA}, I_B=15\text{mA}$                   | -   | 0.3  |               |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}^1$ | $I_C=500\text{mA}, I_B=50\text{mA}$                   | -   | 2.0  | V             |
|                                      |                 | $I_C=150\text{mA}, I_B=15\text{mA}$                   | -   | 1.2  |               |
| Transition Frequency                 | $f_T$           | $V_{CE}=20\text{V}, I_C=20\text{mA}, f=100\text{MHz}$ | 300 | -    | MHz           |
| Delay Time                           | $t_d$           | $V_{CC}=30\text{V}, V_{BE(off)}=-0.5\text{V}$         | -   | 10   | nS            |
| Rise Time                            | $t_r$           | $I_C=150\text{mA}, I_{B1}=15\text{mA}$                | -   | 25   | nS            |
| Storage Time                         | $t_s$           | $V_{CC}=30\text{V}, I_C=150\text{mA}$                 | -   | 225  | nS            |
| Fall Time                            | $t_f$           | $I_{B1}=I_{B2}=15\text{mA}$                           | -   | 60   | nS            |

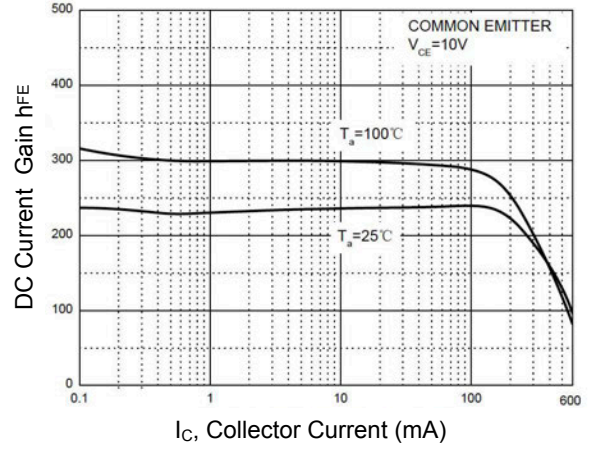
Note:

1. pulse test: pulse width  $\leq 300\mu\text{S}$ , duty cycle  $\leq 2.0\%$ .

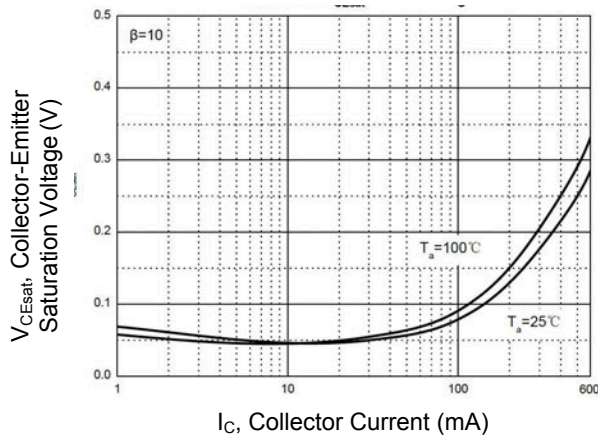
**Electrical Characteristic Curves**



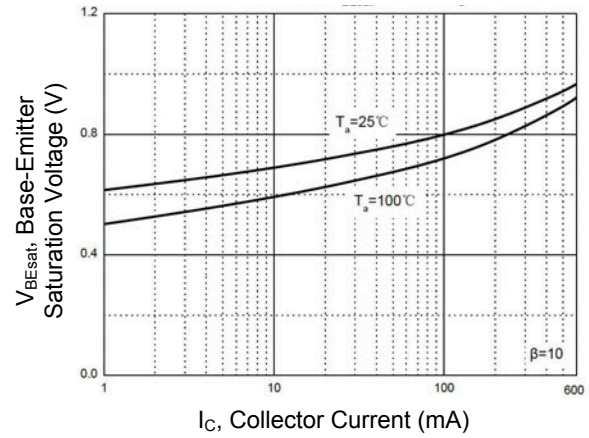
**Figure 1. Static Characteristic**



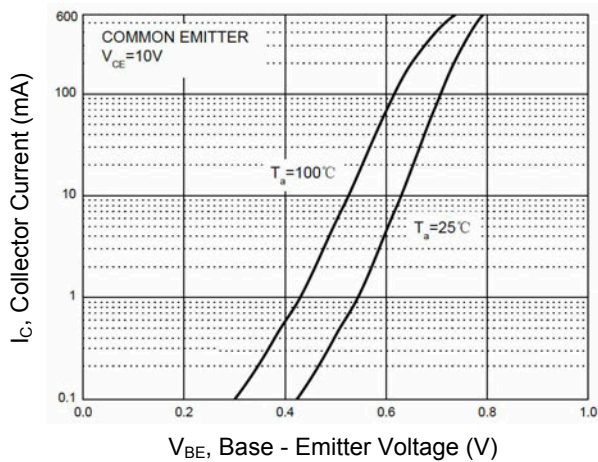
**Figure 2. DC Current Gain vs Collector Current**



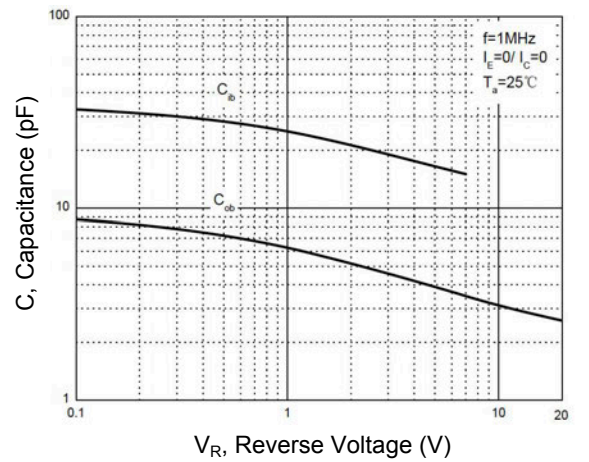
**Figure 3. Collector - Emitter Saturation Voltage vs. Collector Current**



**Figure 4. Base - Emitter Saturation Voltage vs. Collector Current**

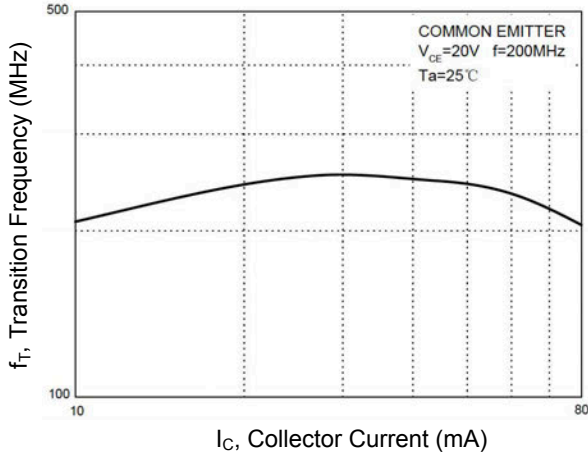


**Figure 5. Collector Current vs. Base - Emitter Voltage**

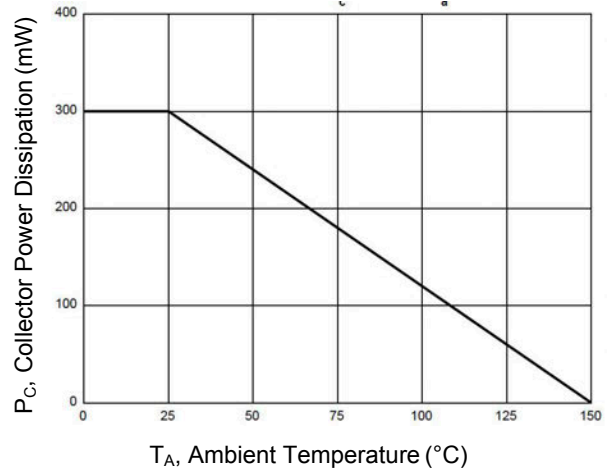


**Figure 6. Capacitance Characteristics**

**Electrical Characteristic Curves**

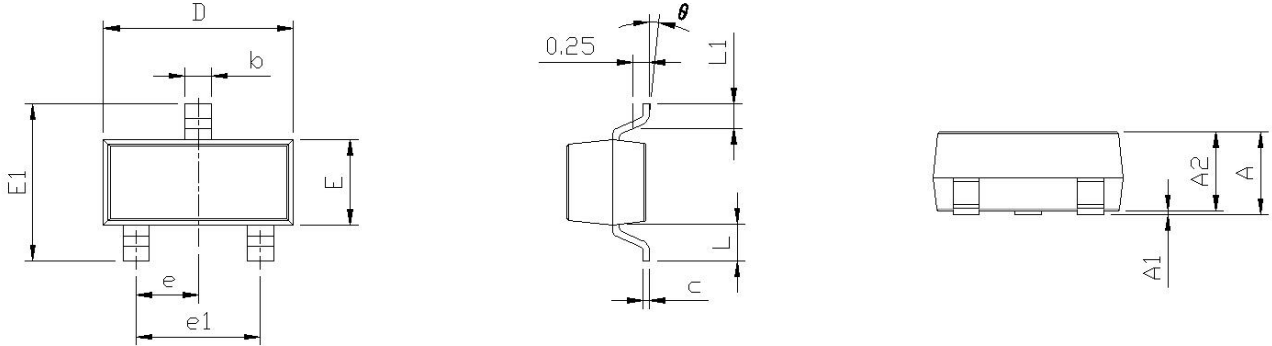


**Figure 7. Transition Frequency vs. Collector Current**



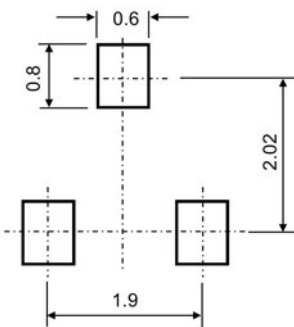
**Figure 8. Power Dissipation vs Ambient Temperature**

**Package Outline Dimensions (SOT-23)**



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min                       | Max   | Min                  | Max   |
| A      | 0.900                     | 1.150 | 0.035                | 0.045 |
| A1     | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                     | 1.050 | 0.035                | 0.041 |
| b      | 0.300                     | 0.500 | 0.012                | 0.020 |
| c      | 0.080                     | 0.150 | 0.003                | 0.006 |
| D      | 2.800                     | 3.000 | 0.110                | 0.118 |
| E      | 1.200                     | 1.400 | 0.047                | 0.055 |
| E1     | 2.250                     | 2.550 | 0.089                | 0.100 |
| e      | 0.950 TYP                 |       | 0.037 TYP            |       |
| e1     | 1.800                     | 2.000 | 0.071                | 0.079 |
| L      | 0.550 REF                 |       | 0.022 REF            |       |
| L1     | 0.300                     | 0.500 | 0.012                | 0.020 |
| θ      | 0°                        | 8°    | 0°                   | 8°    |

**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.

**Order Information**

| Device    | Package | Marking | Carrier     | Quantity         |
|-----------|---------|---------|-------------|------------------|
| MMBT2222A | SOT-23  | 1P      | Tape & Reel | 3,000 pcs / Reel |