

## SOT-23 Plastic-Encapsulate Transistor (NPN)

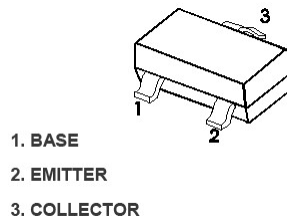
### Feature

- Complementary to MMBT5401
- Power Dissipation of 300mW
- High Stability and High Reliability

### Mechanical Data

- SOT-23 Small Outline Plastic Package
- Epoxy UL: 94V-0
- Mounting Position: Any

### SOT-23



Marking: G1

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

| Parameter                                   | Symbol          | Value    | Unit                 |
|---------------------------------------------|-----------------|----------|----------------------|
| Collector-Base Voltage                      | $V_{CBO}$       | 180      | V                    |
| Collector-Emitter Voltage                   | $V_{CEO}$       | 160      | V                    |
| Emitter -Base Voltage                       | $V_{EBO}$       | 6        | V                    |
| Collector Current-Continuous                | $I_C$           | 600      | mA                   |
| Collector Power Dissipation                 | $P_C$           | 300      | mW                   |
| Junction Temperature                        | $T_j$           | 150      | $^{\circ}\text{C}$   |
| Storage Temperature                         | $T_{stg}$       | -55-+150 | $^{\circ}\text{C}$   |
| Thermal resistance From junction to ambient | $R_{\theta JA}$ | 416      | $^{\circ}\text{C/W}$ |

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

| Parameter                            | Symbol           | Test Condition                                              | Limit |      | Unit |
|--------------------------------------|------------------|-------------------------------------------------------------|-------|------|------|
|                                      |                  |                                                             | Min   | Max  |      |
| Collector-base breakdown voltage     | $V_{(BR)CBO}$    | $I_C=100\mu\text{A}$ , $I_E=0$                              | 180   |      | V    |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}^*$  | $I_C=1\text{mA}$ , $I_B=0$                                  | 160   |      | V    |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$    | $I_E=10\mu\text{A}$ , $I_C=0$                               | 6     |      | V    |
| Collector cut-off current            | $I_{CBO}$        | $V_{CB}=120\text{V}$ , $I_E=0$                              |       | 50   | nA   |
| Emitter cut-off current              | $I_{EBO}$        | $V_{EB}=4\text{V}$ , $I_C=0$                                |       | 50   | nA   |
| DC current gain                      | $h_{FE(1)}^*$    | $V_{CE}=5\text{V}$ , $I_C=1\text{mA}$                       | 80    |      |      |
|                                      | $h_{FE(2)}^*$    | $V_{CE}=5\text{V}$ , $I_C=10\text{mA}$                      | 100   | 300  |      |
|                                      | $h_{FE(3)}^*$    | $V_{CE}=5\text{V}$ , $I_C=50\text{mA}$                      | 30    |      |      |
| Collector-emitter saturation voltage | $V_{CE(sat)1}^*$ | $I_C=10\text{mA}$ , $I_B=1\text{mA}$                        |       | 0.15 | V    |
|                                      | $V_{CE(sat)2}^*$ | $I_C=50\text{mA}$ , $I_B=5\text{mA}$                        |       | 0.20 | V    |
| Base -emitter saturation voltage     | $V_{BE(sat)1}^*$ | $I_C=10\text{mA}$ , $I_B=1\text{mA}$                        |       | 1.00 | V    |
|                                      | $V_{BE(sat)2}^*$ | $I_C=50\text{mA}$ , $I_B=5\text{mA}$                        |       | 1.00 | V    |
| Transition frequency                 | $f_T$            | $V_{CE}=10\text{V}$ , $I_C=10\text{mA}$ , $f=100\text{MHz}$ | 100   | 300  | MHz  |
| Collector output capacitance         | $C_{ob}$         | $V_{CB}=10\text{V}$ , $I_E=0$ , $f=1\text{MHz}$             |       | 6    | pF   |

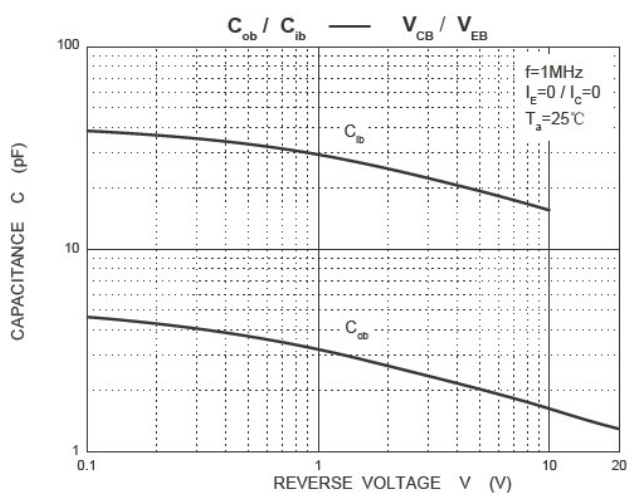
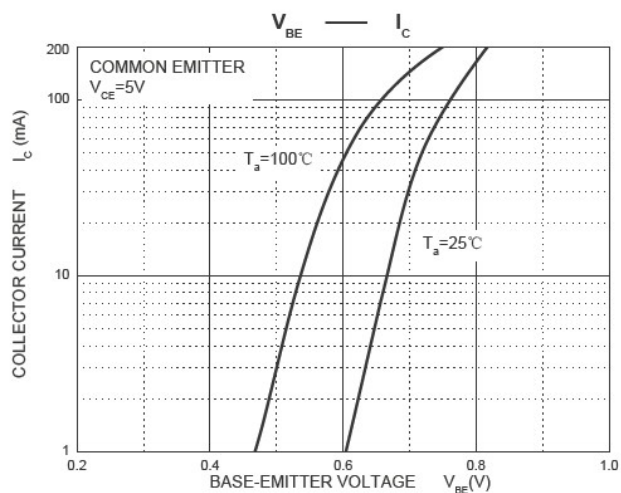
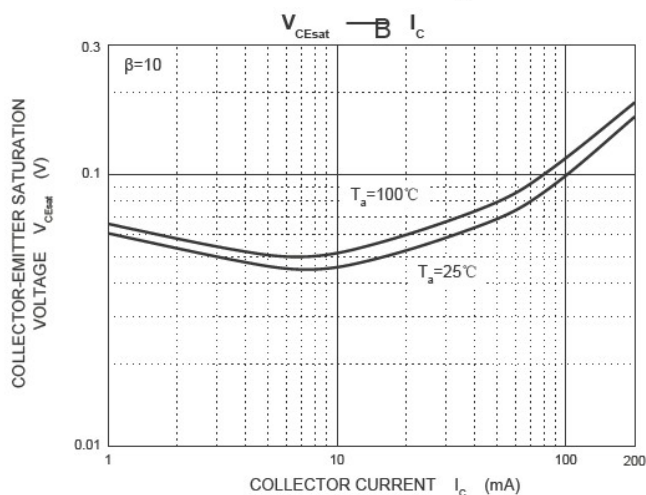
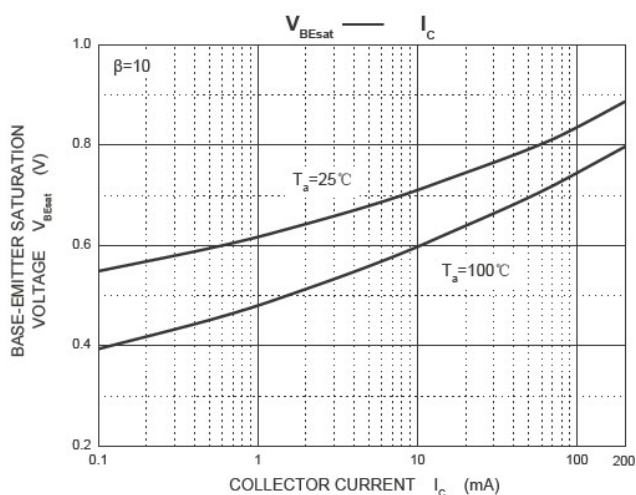
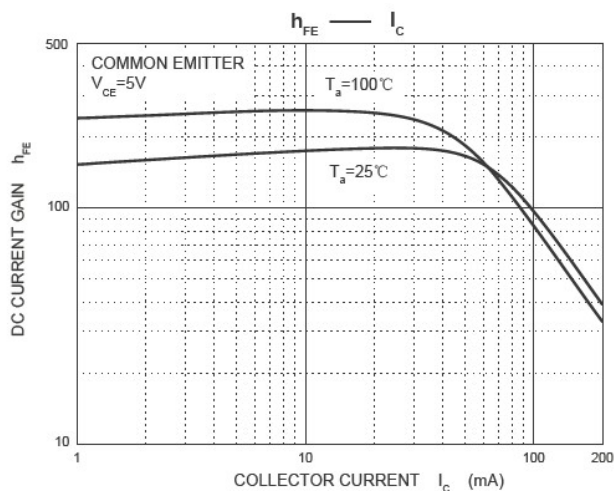
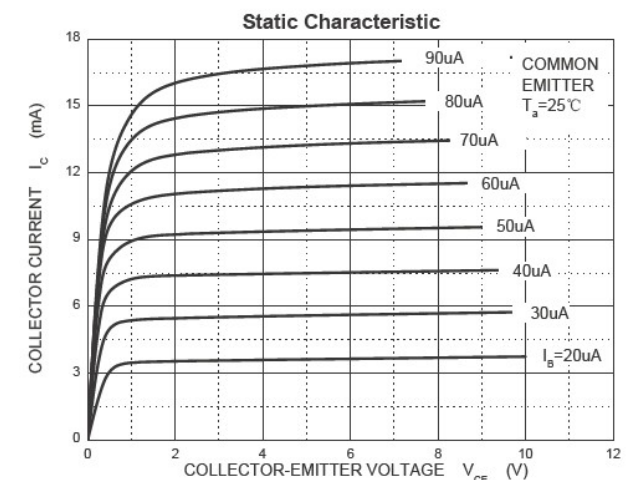
\*Pulse test: pulse width $\leq 300\mu\text{s}$ , duty cycles $\leq 2.0\%$

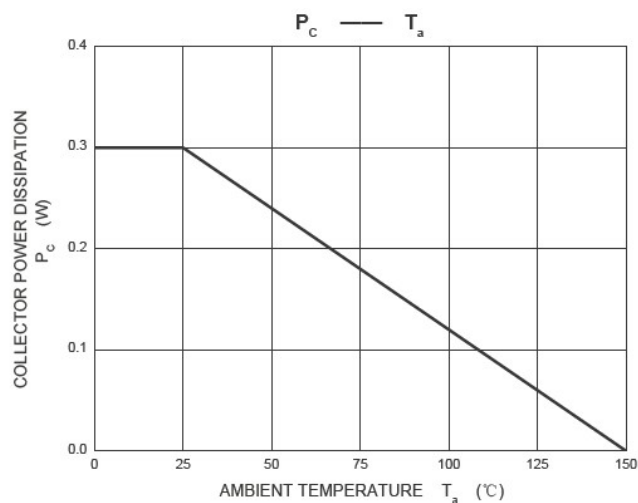
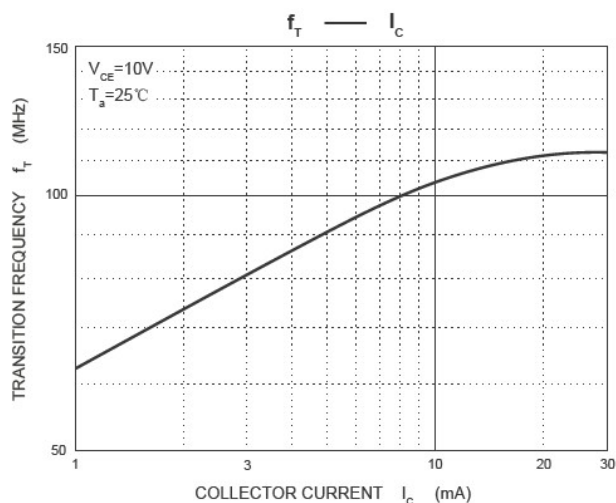
### Classification of $H_{FE}$

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

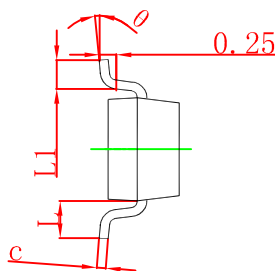
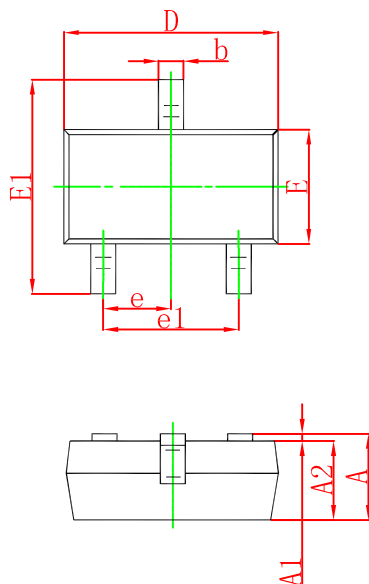


Typical Characteristics



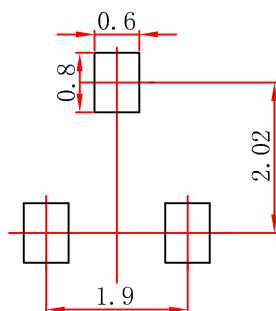


### SOT-23 Package Dimension



| 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 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

### SOT-23 Suggested Pad Layout



#### Notes:

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