

## NPN General Purpose Amplifier

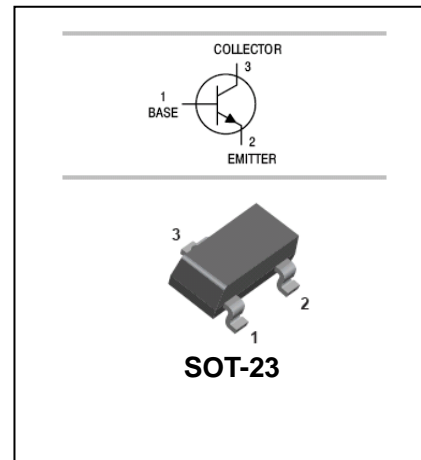
## MMBT2222

### FEATURES

- Epitaxial planar die construction.
- Ultra-small surface mount package.



Lead-free



### APPLICATIONS

- Use as a medium power amplifier.
- Switching requiring collector currents up to 500mA.

### ORDERING INFORMATION

| Type No. | Marking | Package Code |
|----------|---------|--------------|
| MMBT2222 | M1B     | SOT-23       |

### MAXIMUM RATING @ Ta=25°C unless otherwise specified

| Symbol          | Parameter                              | Value      | Unit |
|-----------------|--|------------|------|
| $V_{CBO}$       | Collector-Base Voltage                 | 60         | V    |
| $V_{CEO}$       | Collector-Emitter Voltage              | 30         | V    |
| $V_{EBO}$       | Emitter-Base Voltage                   | 5          | V    |
| $I_C$           | Collector Current -Continuous          | 600        | mA   |
| $P_C$           | Collector Dissipation                  | 300        | mW   |
| $R_{\theta JA}$ | Thermal resistance Junction to ambient | 417        | °C/W |
| $T_j, T_{stg}$  | Junction and Storage Temperature       | -55 to+150 | °C   |

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### ELECTRICAL CHARACTERISTICS @ Ta=25°C unless otherwise specified

| Parameter                            | Symbol        | Test conditions  | MIN | TYP | MAX        | UNIT    |
|--------------------------------------|---------------|--|-----|-----|------------|---------|
| Collector-base breakdown voltage     | $V_{(BR)CBO}$ | $I_C=10\mu A$ $I_E=0$  | 60  |     |            | V       |
| Collector-emitter breakdown voltage  | $V_{(BR)CEO}$ | $I_C=10mA$ $I_B=0$   | 30  |     |            | V       |
| Emitter-base breakdown voltage       | $V_{(BR)EBO}$ | $I_E=10\mu A$ $I_C=0$  | 5   |     |            | V       |
| Collector cut-off current            | $I_{CBO}$     | $V_{CB}=50V$ $I_E=0$   |     |     | 0.01       | $\mu A$ |
| Emitter cut-off current              | $I_{EBO}$     | $V_{EB}=3V$ $I_C=0$  |     |     | 0.01       | $\mu A$ |
| DC current gain                      | $h_{FE}$      | $V_{CE}=10V$ $I_C=150mA$   | 100 |     | 300        |         |
|                                      |               | $V_{CE}=10V$ $I_C=0.1mA$   | 35  |     |            |         |
|                                      |               | $V_{CE}=10V$ $I_C=1.0mA$   | 50  |     |            |         |
|                                      |               | $V_{CE}=10V$ $I_C=10mA$  | 75  |     |            |         |
|                                      |               | $V_{CE}=10V$ $I_C=500mA$   | 30  |     |            |         |
|                                      |               | $V_{CE}=1V$ $I_C=150mA$  | 50  |     |            |         |
| Collector-emitter saturation voltage | $V_{CE(sat)}$ | $I_C=500mA$ $I_B=50mA$<br>$I_C=150mA$ $I_B=15mA$                 |     |     | 1.6<br>0.4 | V       |
| Base-emitter saturation voltage      | $V_{BE(sat)}$ | $I_C=500mA$ $I_B=50mA$<br>$I_C=150mA$ $I_B=15mA$                 |     |     | 2.6<br>1.3 | V       |
| Transition frequency                 | $f_T$         | $V_{CE}=20V$ $I_C=20mA$<br>$f=100MHz$                            | 250 |     |            | MHz     |
| Output capacitance                   | $C_{obo}$     | $V_{CB}=10V$ , $I_E=0$ , $f=1MHz$                                |     |     | 8.0        | pF      |
| Input capacitance                    | $C_{ibo}$     | $V_{EB}=0.5V$ , $I_C=0$ , $f=1MHz$                               |     |     | 30         | pF      |
| Delay time                           | $t_d$         | $V_{CC}=30V$ , $V_{BE(off)}=0.5V$<br>$I_C=150mA$ , $I_{B1}=15mA$ |     |     | 10         | ns      |
| Rise time                            | $t_r$         |  |     |     | 25         | ns      |
| Storage time                         | $t_s$         | $V_{CC}=30V$ , $I_C=150mA$<br>$I_{B1}=I_{B2}=15mA$               |     |     | 225        | ns      |
| Fall time                            | $t_f$         |  |     |     | 60         | ns      |

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TYPICAL CHARACTERISTICS @  $T_a=25^\circ\text{C}$  unless otherwise specified

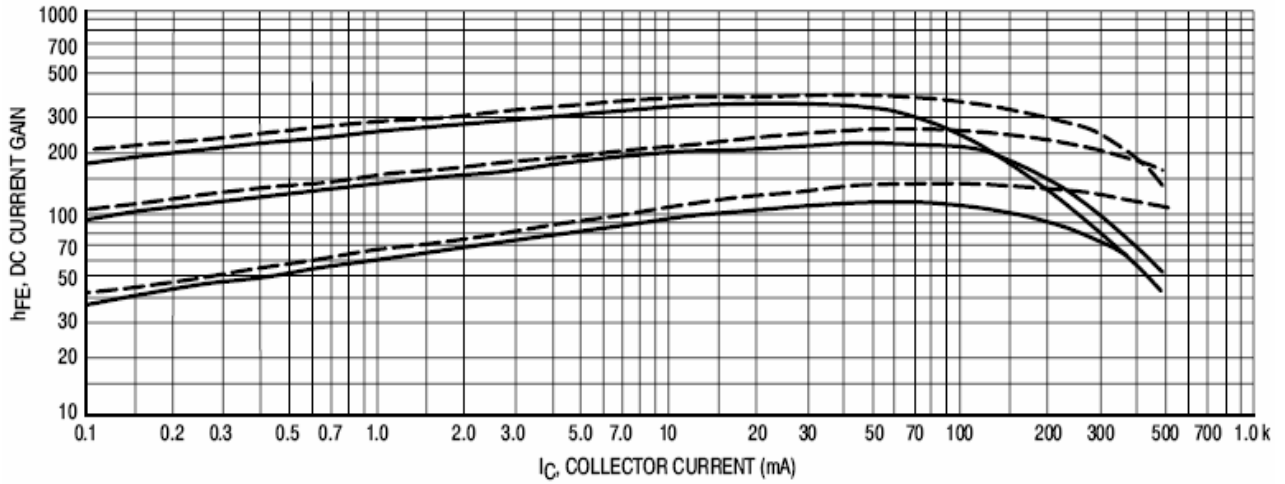


Figure 1. DC Current Gain

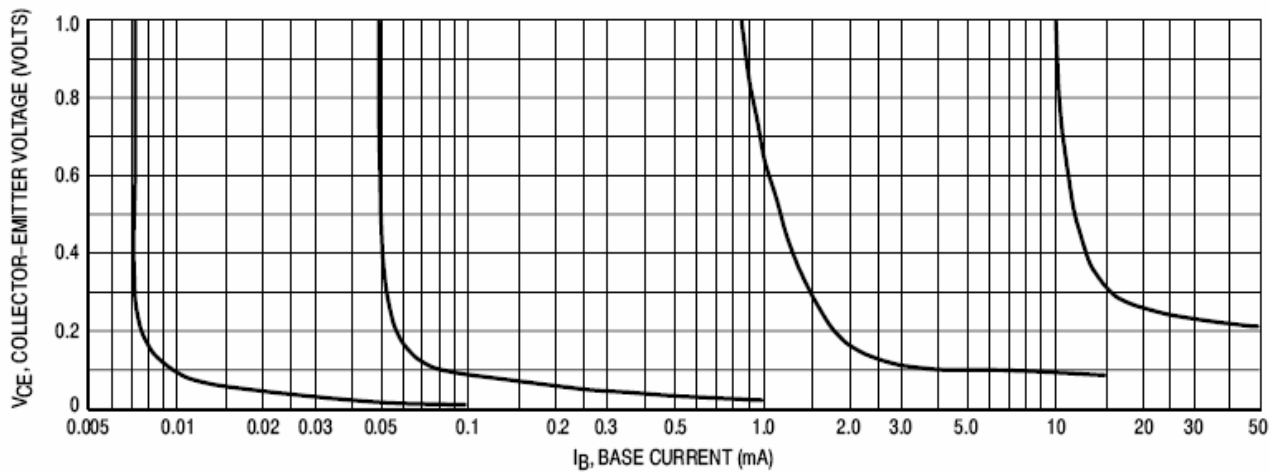


Figure 2. Collector Saturation Region

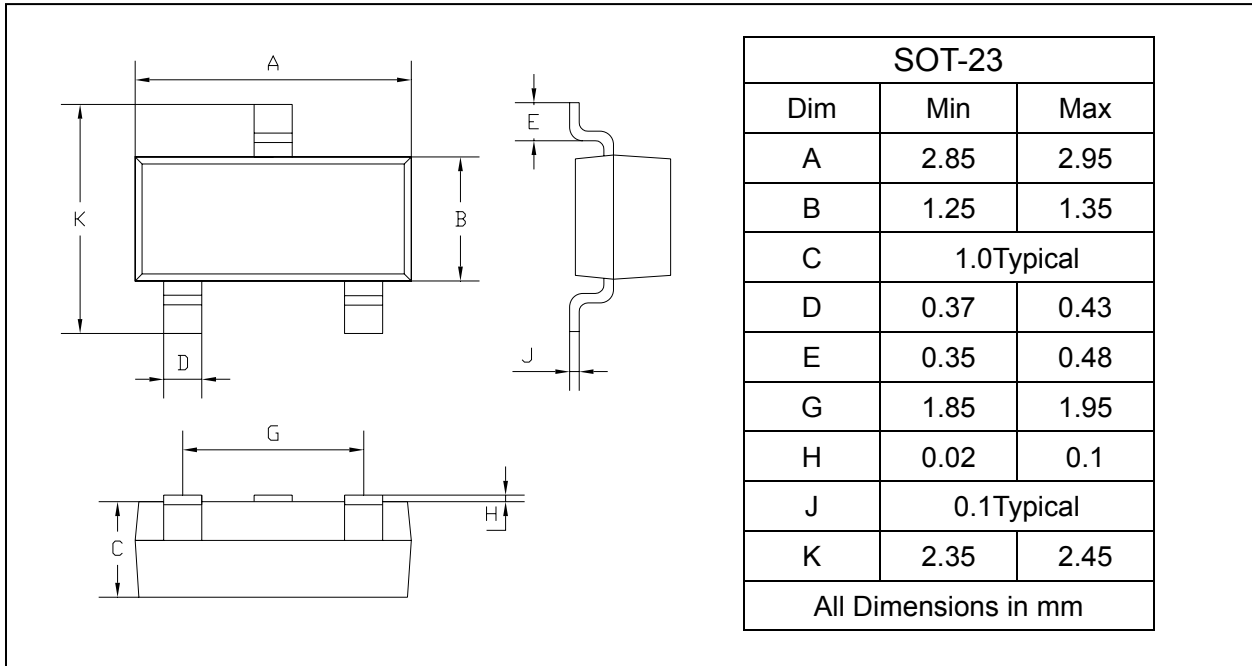
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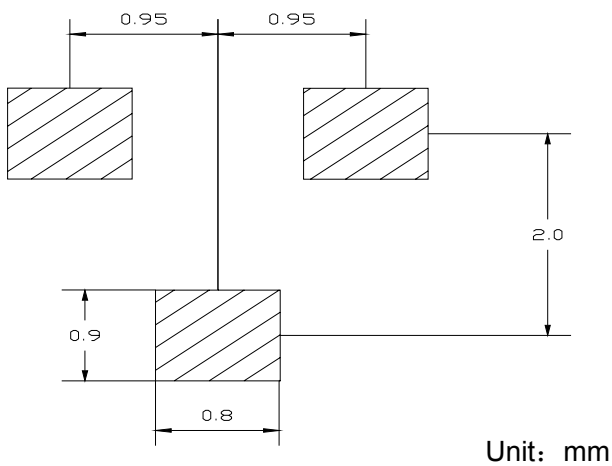
### PACKAGE OUTLINE

Plastic surface mounted package

SOT-23



### SOLDERING FOOTPRINT



### PACKAGE INFORMATION

| Device   | Package | Shipping       |
|----------|---------|----------------|
| MMBT2222 | SOT-23  | 3000/Tape&Reel |

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