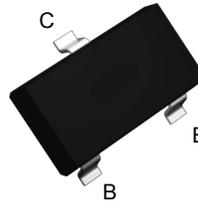
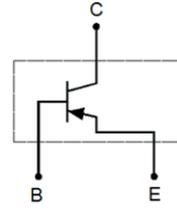


**Features**

- Epoxy meets UL 94 V-0 flammability rating
- Surface mount SOT-23 package
- RoHS compliant/green EMC



SOT-23



Schematic Diagram

**Applications**

- Switching application
- General purpose amplifier

**Absolute Maximum Ratings** ( $T_A=25^{\circ}\text{C}$  unless otherwise specified)

| Parameter                                   | Symbol          | Value       | Unit                        |
|---|-----------------|-------------|-----------------------------|
| Collector-Base Voltage                      | $V_{CB0}$       | -40         | V                           |
| Collector-Emitter Voltage                   | $V_{CEO}$       | -40         | V                           |
| Emitter-Base Voltage                        | $V_{EBO}$       | -5          | V                           |
| Collector Current                           | $I_C$           | -600        | mA                          |
| Collector Power Dissipation <sup>1</sup>    | $P_C$           | 300         | mW                          |
| Thermal Resistance from Junction to Ambient | $R_{\theta JA}$ | 417         | $^{\circ}\text{C}/\text{W}$ |
| Junction Temperature                        | $T_J$           | 150         | $^{\circ}\text{C}$          |
| Storage Temperature Range                   | $T_{stg}$       | -55 to +150 | $^{\circ}\text{C}$          |

Note:

1. Device mounted on an FR4 PCB, single-sided copper, tin-plated and standard footprint.

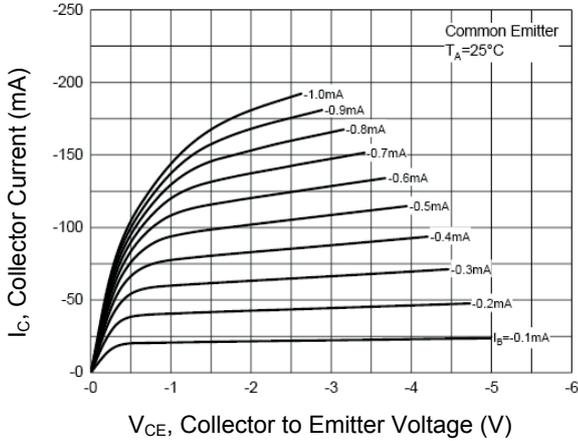
**Electrical Characteristics** ( $T_A=25^\circ\text{C}$  unless otherwise noted)

| Parameter                            | Symbol        | Test Conditions   | Min  | Max   | Units |
|--------------------------------------|---------------|---|------|-------|-------|
| Collector-Emitter Breakdown Voltage  | $V_{(BR)CEO}$ | $I_C=-1.0\text{mA}, I_B=0$                              | -40  | -     | V     |
| Collector-Base Breakdown Voltage     | $V_{(BR)CBO}$ | $I_C=-100\mu\text{A}, I_E=0$                            | -40  | -     | V     |
| Emitter-Base Breakdown Voltage       | $V_{(BR)EBO}$ | $I_E=-100\mu\text{A}, I_C=0$                            | -5.0 | -     | V     |
| Collector-Base Cutoff Current        | $I_{CBO}$     | $V_{CB}=-35\text{V}, I_E=0\text{V}$                     | -    | -100  | nA    |
| Collector Cutoff Current             | $I_{CEX}$     | $V_{CE}=-35\text{V}, V_{BE}=0.4\text{V}$                | -    | -100  | nA    |
| Emitter-Base Cutoff Current          | $I_{EBO}$     | $V_{EB}=-4\text{V}, I_C=0\text{V}$                      | -    | -100  | nA    |
| DC Current Gain                      | $h_{FE}$      | $I_C=-0.1\text{mA}, V_{CE}=-1.0\text{V}$                | 30   | -     | -     |
|                                      |               | $I_C=-1\text{mA}, V_{CE}=-1.0\text{V}$                  | 60   | -     |       |
|                                      |               | $I_C=-10\text{mA}, V_{CE}=-1.0\text{V}$                 | 100  | -     |       |
|                                      |               | $I_C=-150\text{mA}, V_{CE}=-2.0\text{V}$                | 100  | 300   |       |
|                                      |               | $I_C=-500\text{mA}, V_{CE}=-2.0\text{V}$                | 20   | -     |       |
| Collector-Emitter Saturation Voltage | $V_{CE(sat)}$ | $I_C=-150\text{mA}, I_B=-15\text{mA}$                   | -    | -0.4  | V     |
|                                      |               | $I_C=-500\text{mA}, I_B=-50\text{mA}$                   | -    | -0.75 |       |
| Base-Emitter Saturation Voltage      | $V_{BE(sat)}$ | $I_C=-150\text{mA}, I_B=-15\text{mA}$                   | -    | -0.95 | V     |
|                                      |               | $I_C=-500\text{mA}, I_B=-50\text{mA}$                   | -    | -1.3  |       |
| Transition Frequency                 | $f_T$         | $I_C=-20\text{mA}, V_{CE}=-10\text{V}, f=100\text{MHz}$ | 200  | -     | MHz   |
| Collector-Base Capacitance           | $C_{cb}$      | $V_{CB}=-10\text{V}, I_E=0, f=1.0\text{MHz}$            | -    | 8.5   | pF    |
| Emitter-Base Capacitance             | $C_{eb}$      | $V_{EB}=-0.5\text{V}, I_C=0, f=1.0\text{MHz}$           | -    | 30    | pF    |

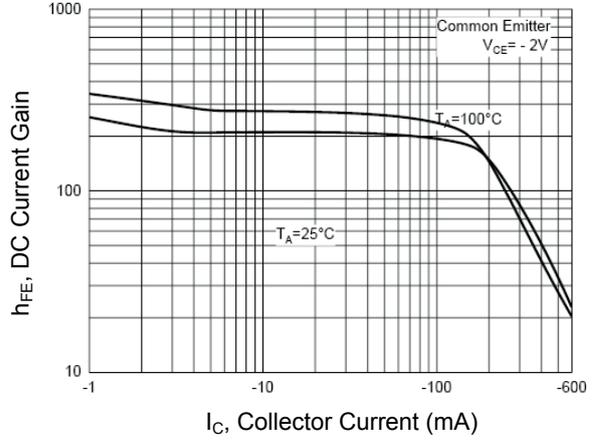
**Switching Characteristics**

| Parameter    | Symbol | Test Conditions  | Min | Max | Units |
|--------------|--------|--|-----|-----|-------|
| Delay Time   | $t_d$  | $V_{CC}=-3.0\text{V}, V_{BE}=-0.5\text{V}, I_C=-150\text{mA}, I_{B1}=-15\text{mA}$ | -   | 15  | nS    |
| Rise Time    | $t_r$  |  | -   | 20  | nS    |
| Storage Time | $t_s$  | $V_{CC}=-3.0\text{V}, I_C=-150\text{mA}, I_{B1}=I_{B2}=-15\text{mA}$               | -   | 225 | nS    |
| Fall Time    | $t_f$  |  | -   | 30  | nS    |

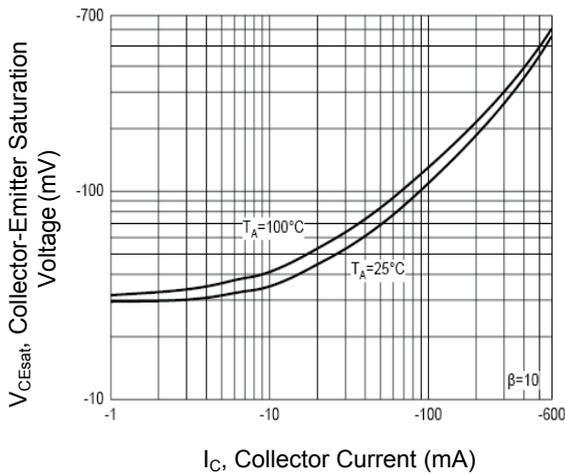
**Ratings and Characteristic Curves**



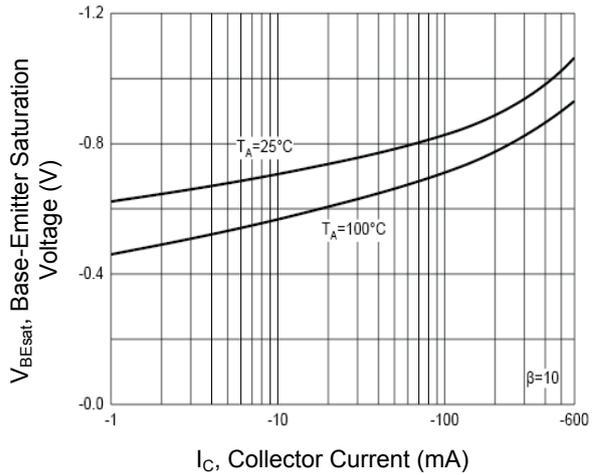
**Figure 1. Static Characteristics**



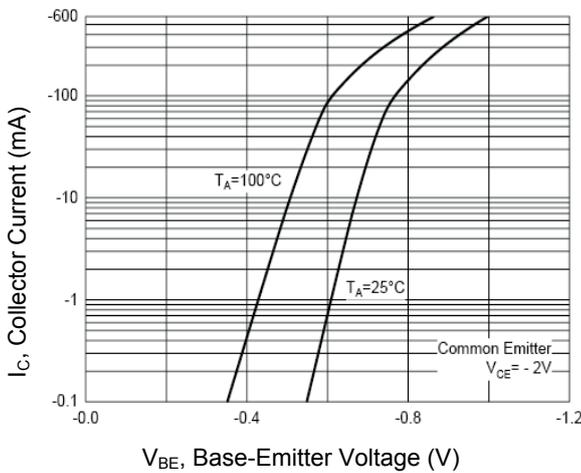
**Figure 2. DC Current Gain Characteristics**



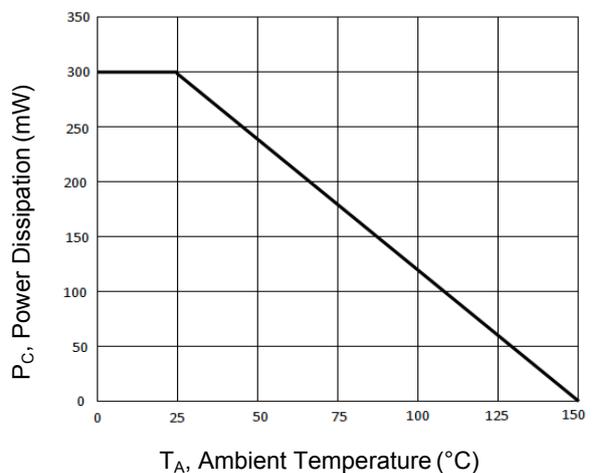
**Figure 3. Collector-Emitter Saturation Voltage Characteristics**



**Figure 4. Base-Emitter Saturation Voltage Characteristics**

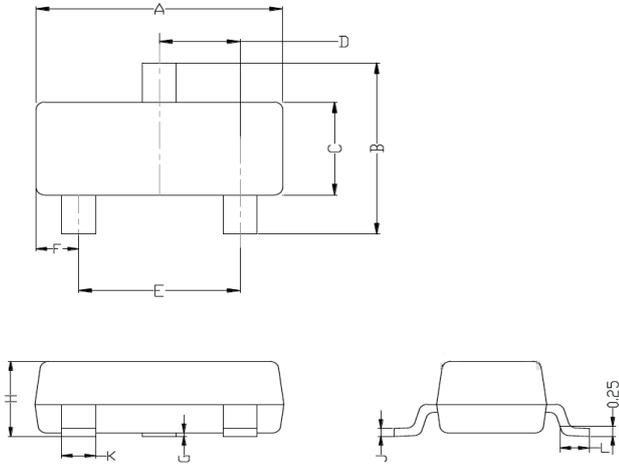


**Figure 5. Base-Emitter Voltage Characteristics**



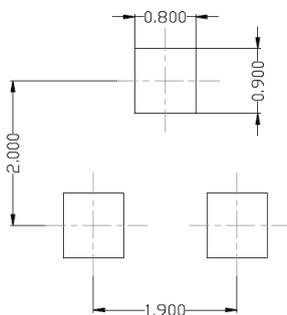
**Figure 6. Collector Power Derating Curve**

### Package Outline Dimensions (SOT-23)



| Symbol | Dimensions In Millimeters |       | Dimensions In Inches |       |
|--------|---------------------------|-------|----------------------|-------|
|        | Min.                      | Max.  | Min.                 | Max.  |
| A      | 2.800                     | 3.040 | 0.110                | 0.120 |
| B      | 2.100                     | 2.640 | 0.083                | 0.104 |
| C      | 1.200                     | 1.400 | 0.047                | 0.055 |
| D      | 0.890                     | 1.030 | 0.035                | 0.041 |
| E      | 1.780                     | 2.050 | 0.070                | 0.081 |
| F      | 0.450                     | 0.600 | 0.018                | 0.024 |
| G      | 0.013                     | 0.100 | 0.001                | 0.004 |
| H      | 0.900                     | 1.110 | 0.035                | 0.044 |
| J      | 0.085                     | 0.180 | 0.003                | 0.007 |
| K      | 0.370                     | 0.510 | 0.015                | 0.020 |
| L      | 0.300                     | 0.500 | 0.012                | 0.020 |

### Recommended Pad Layout



**Note:**

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

### Order Information

| Device   | Package | Marking | Carrier     | Quantity        |
|----------|---------|---------|-------------|-----------------|
| MMBT4403 | SOT-23  | 2T      | Tape & Reel | 3,000pcs / Reel |

For more information, please contact us at: [inquiry@goodarksemi.com](mailto:inquiry@goodarksemi.com)