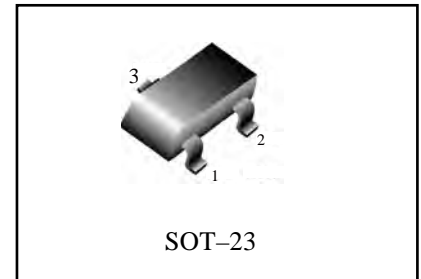


### High Voltage Transistors

- We declare that the material of product compliance with RoHS requirements.

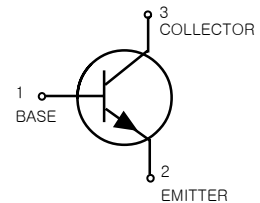
#### DEVICE MARKING AND ORDERING INFORMATION

| Device  | Marking | Package | Shipping       |
|---------|---------|---------|----------------|
| MMBTA42 | 1D      | SOT-23  | 3000/Tape&Reel |
| MMBTA43 | M1E     | SOT-23  | 3000/Tape&Reel |



#### MAXIMUM RATINGS

| Rating                         | Symbol    | Value   |         | Unit |
|--------------------------------|-----------|---------|---------|------|
|                                |           | MMBTA42 | MMBTA43 |      |
| Collector–Emitter Voltage      | $V_{CEO}$ | 300     | 200     | Vdc  |
| Collector–Base Voltage         | $V_{CBO}$ | 300     | 200     | Vdc  |
| Emitter–Base Voltage           | $V_{EBO}$ | 6.0     | 6.0     | Vdc  |
| Collector Current — Continuous | $I_C$     | 500     |         | mAdc |



#### THERMAL CHARACTERISTICS

| Characteristic  | Symbol          | Max         | Unit                      |
|---|-----------------|-------------|---------------------------|
| Total Device Dissipation FR– 5 Board, (1)<br>$T_A = 25^\circ\text{C}$       | $P_D$           | 225         | mW                        |
| Derate above $25^\circ\text{C}$   |                 | 1.8         | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction to Ambient                                     | $R_{\theta JA}$ | 556         | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation<br>Alumina Substrate, (2) $T_A = 25^\circ\text{C}$ | $P_D$           | 300         | mW                        |
| Derate above $25^\circ\text{C}$   |                 | 2.4         | mW/ $^\circ\text{C}$      |
| Thermal Resistance, Junction to Ambient                                     | $R_{\theta JA}$ | 417         | $^\circ\text{C}/\text{W}$ |
| Junction and Storage Temperature  | $T_J, T_{stg}$  | -55 to +150 | $^\circ\text{C}$          |

#### ELECTRICAL CHARACTERISTICS ( $T_A = 25^\circ\text{C}$ unless otherwise noted.)

| Characteristic | Symbol | Min | Max | Unit |
|----------------|--------|-----|-----|------|
|----------------|--------|-----|-----|------|

#### OFF CHARACTERISTICS

|   |               |     |     |                 |
|---|---------------|-----|-----|-----------------|
| Collector–Emitter Breakdown Voltage(3)<br>( $I_C = 1.0 \text{ mAdc}, I_B = 0$ ) | $V_{(BR)CEO}$ |     |     | Vdc             |
|   | MMBTA42       | 300 | —   |                 |
|   | MMBTA43       | 200 | —   |                 |
| Collector–Base Breakdown Voltage<br>( $I_C = 100 \mu\text{Adc}, I_E = 0$ )      | $V_{(BR)CBO}$ |     |     | Vdc             |
|   | MMBTA42       | 300 | —   |                 |
|   | MMBTA43       | 200 | —   |                 |
| Emitter–Base Breakdown Voltage<br>( $I_E = 100 \mu\text{Adc}, I_C = 0$ )        | $V_{(BR)EBO}$ | 6.0 | —   | Vdc             |
| Collector Cutoff Current<br>( $V_{CB} = 200\text{Vdc}, I_E = 0$ )               | $I_{CBO}$     |     |     | $\mu\text{Adc}$ |
|   | MMBTA42       | —   | 0.1 |                 |
|   | MMBTA43       | —   | 0.1 |                 |
| Emitter Cutoff Current<br>( $V_{EB} = 6.0\text{Vdc}, I_C = 0$ )                 | $I_{EBO}$     |     |     | $\mu\text{Adc}$ |
|   | MMBTA42       | —   | 0.1 |                 |
|   | MMBTA43       | —   | 0.1 |                 |

- FR–5 =  $1.0 \times 0.75 \times 0.062$  in.
- Alumina =  $0.4 \times 0.3 \times 0.024$  in. 99.5% alumina.
- Pulse Test: Pulse Width  $\leq 300 \mu\text{s}$ , Duty Cycle  $\leq 2.0\%$ .



# MMBTA42/43

## ELECTRICAL CHARACTERISTICS (T<sub>A</sub> = 25°C unless otherwise noted) (Continued)

| Characteristic  | Symbol               | Min        | Max | Unit |
|---|----------------------|------------|-----|------|
| <b>ON CHARACTERISTICS (3)</b>   |                      |            |     |      |
| DC Current Gain<br>(I <sub>C</sub> = 1.0 mA, V <sub>CE</sub> = 10 Vdc)                    | h <sub>FE</sub>      | Both Types | 25  | —    |
| (I <sub>C</sub> = 10 mA, V <sub>CE</sub> = 10 Vdc)  |                      | Both Types | 40  | —    |
|   |                      | MMBTA42    | 40  | —    |
| (I <sub>C</sub> = 30 mA, V <sub>CE</sub> = 10 Vdc)  |                      | MMBTA43    | 40  | —    |
| Collector–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA) | V <sub>CE(sat)</sub> | —          | 0.5 | Vdc  |
|   |                      | —          | 0.5 |      |
| Base–Emitter Saturation Voltage<br>(I <sub>C</sub> = 20 mA, I <sub>B</sub> = 2.0 mA)      | V <sub>BE(sat)</sub> | —          | 0.9 | Vdc  |

## SMALL–SIGNAL CHARACTERISTICS

|  |                 |    |     |     |
|--|-----------------|----|-----|-----|
| Current–Gain–Bandwidth Product<br>(V <sub>CE</sub> = 20 Vdc, I <sub>C</sub> = 10mA, f = 100 MHz) | f <sub>T</sub>  | 50 | —   | MHz |
| Collector – Base Capacitance<br>(V <sub>CB</sub> = 20 Vdc, I <sub>E</sub> = 0, f = 1.0 MHz)      | C <sub>cb</sub> | —  | 3.0 | pF  |
|  |                 | —  | 4.0 |     |

3. Pulse Test: Pulse Width ≤300 μs, Duty Cycle ≤2.0%.

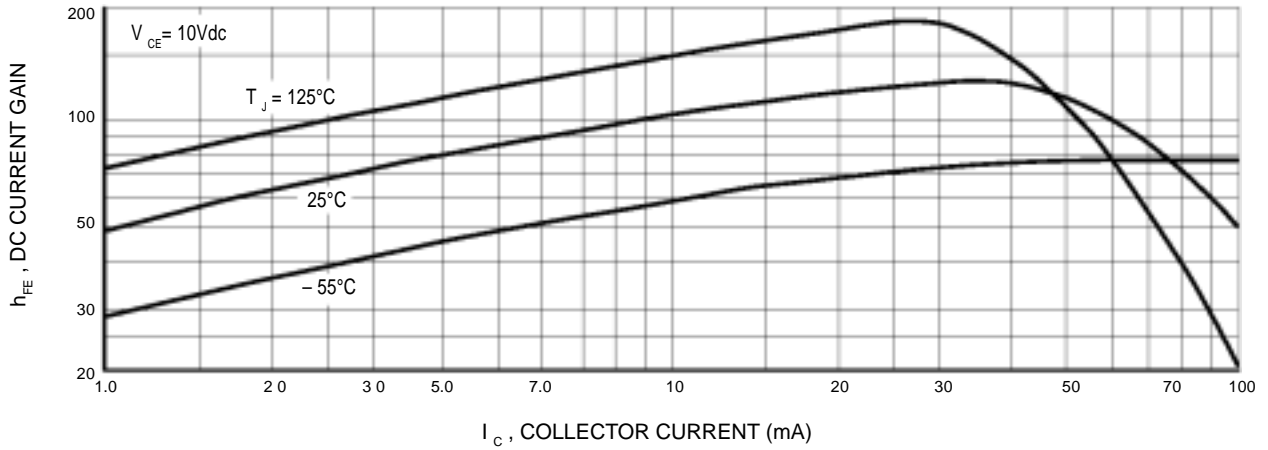


Figure 8. DC Current Gain

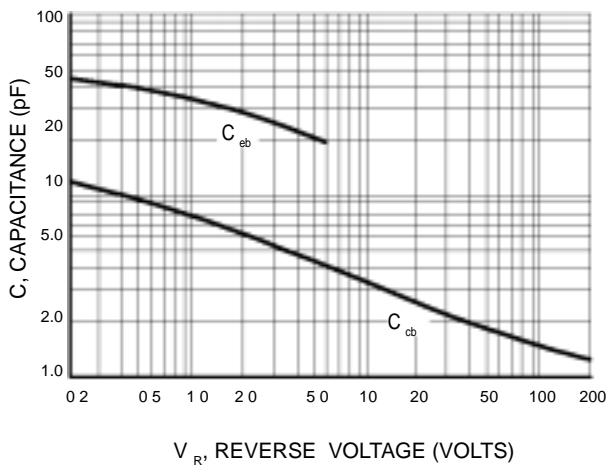


Figure 2. Capacitance

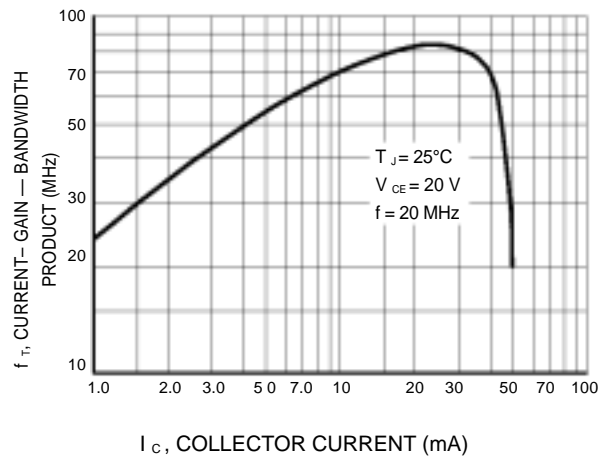


Figure 3. Current-Gain — Bandwidth Product

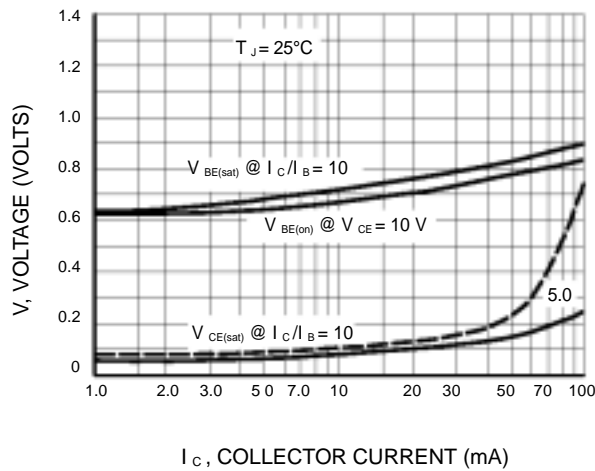
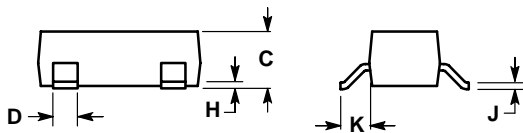
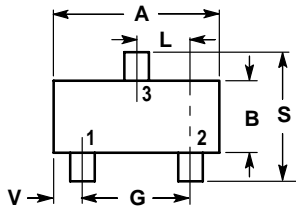


Figure 4. "On" Voltages

## SOT-23



### NOTES:

1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| DIM | INCHES |        | MILLIMETERS |       |
|-----|--------|--------|-------------|-------|
|     | MIN    | MAX    | MIN         | MAX   |
| A   | 0.1102 | 0.1197 | 2.80        | 3.04  |
| B   | 0.0472 | 0.0551 | 1.20        | 1.40  |
| C   | 0.0350 | 0.0440 | 0.89        | 1.11  |
| D   | 0.0150 | 0.0200 | 0.37        | 0.50  |
| G   | 0.0701 | 0.0807 | 1.78        | 2.04  |
| H   | 0.0005 | 0.0040 | 0.013       | 0.100 |
| J   | 0.0034 | 0.0070 | 0.085       | 0.177 |
| K   | 0.0140 | 0.0285 | 0.35        | 0.69  |
| L   | 0.0350 | 0.0401 | 0.89        | 1.02  |
| S   | 0.0830 | 0.1039 | 2.10        | 2.64  |
| V   | 0.0177 | 0.0236 | 0.45        | 0.60  |

