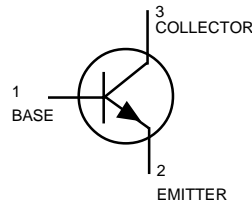
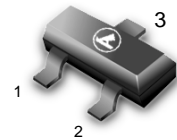


High Voltage Transistors

NPN Silicon



MMBTA42LT1
MMBTA43LT1



CASE 318-08, STYLE 6
SOT-23 (TO-236AB)

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) $T_A = 25^\circ\text{C}$ | P_D | 225 | mW |
| Derate above 25°C | | 1.8 | mW/ $^\circ\text{C}$ |
| Thermal Resistance, Junction to Ambient | $R_{\theta JA}$ | 556 | $^\circ\text{C}/\text{W}$ |
| Total Device Dissipation Alumina Substrate, (2) $T_A = 25^\circ\text{C}$ | P_D | 300 | mW |
| Derate above 25°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 | $^\circ\text{C}$ |

DEVICE MARKING

MMBTA42LT1 = 1D; MMBTA43LT1 = M1E

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

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

OFF CHARACTERISTICS

| | | | | |
|---|---------------|-----|-----|-----------------|
| Collector-Emitter Breakdown Voltage(3) ($I_C = 1.0 \text{ mAdc}, I_B = 0$) | $V_{(BR)CEO}$ | | | Vdc |
| MMBTA42 | | 300 | — | |
| MMBTA43 | | 200 | — | |
| Emitter-Base Breakdown Voltage ($I_C = 100 \mu\text{Adc}, I_E = 0$) | $V_{(BR)CBO}$ | | | Vdc |
| MMBTA42 | | 300 | — | |
| MMBTA43 | | 200 | — | |
| Emitter-Base Breakdown Voltage ($I_E = 100 \mu\text{Adc}, I_C = 0$) | $V_{(BR)EBO}$ | | | Vdc |
| | | 6.0 | — | |
| Collector Cutoff Current ($V_{CB} = 200\text{Vdc}, I_E = 0$) | I_{CBO} | | | μAdc |
| MMBTA42 | | — | 0.1 | |
| ($V_{CB} = 160\text{Vdc}, I_E = 0$) | MMBTA43 | | 0.1 | |
| Emitter Cutoff Current ($V_{EB} = 6.0\text{Vdc}, I_C = 0$) | I_{EBO} | | | μAdc |
| MMBTA42 | | — | 0.1 | |
| ($V_{EB} = 4.0\text{Vdc}, I_C = 0$) | MMBTA43 | | 0.1 | |

1. FR-5 = $1.0 \times 0.75 \times 0.062$ in.

2. Alumina = $0.4 \times 0.3 \times 0.024$ in. 99.5% alumina.

3. Pulse Test: Pulse Width $\leq 300 \mu\text{s}$, Duty Cycle $\leq 2.0\%$.

MMBTA42LT1 MMBTA43LT1

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted) (Continued)

| Characteristic | Symbol | Min | Max | Unit |
|---|----------------------|-----|-----|------|
| ON CHARACTERISTICS (3) | | | | |
| DC Current Gain (I _C = 1.0 mA, V _{CE} = 10 Vdc) | h _{FE} | 25 | — | — |
| (I _C = 10 mA, V _{CE} = 10 Vdc) | | 40 | — | — |
| (I _C = 30 mA, V _{CE} = 10 Vdc) | | 40 | — | — |
| | | 40 | — | — |
| Collector–Emitter Saturation Voltage (I _C = 20 mA, I _B = 2.0 mA) | V _{CE(sat)} | — | 0.5 | Vdc |
| | | — | 0.5 | |
| Base–Emitter Saturation Voltage (I _C = 20 mA, I _B = 2.0 mA) | V _{BE(sat)} | — | 0.9 | Vdc |

SMALL–SIGNAL CHARACTERISTICS

| | | | | |
|---|-----------------|----|-----|-----|
| Current –Gain–Bandwidth Product (V _{CE} = 20 Vdc, I _C = 10mA, f = 100 MHz) | f _T | 50 | — | MHz |
| Collector – Base Capacitance (V _{CB} = 20 Vdc, I _E = 0, f = 1.0 MHz) | C _{cb} | — | 3.0 | pF |
| | | — | 4.0 | |

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

MMBTA42LT1 MMBTA43LT1

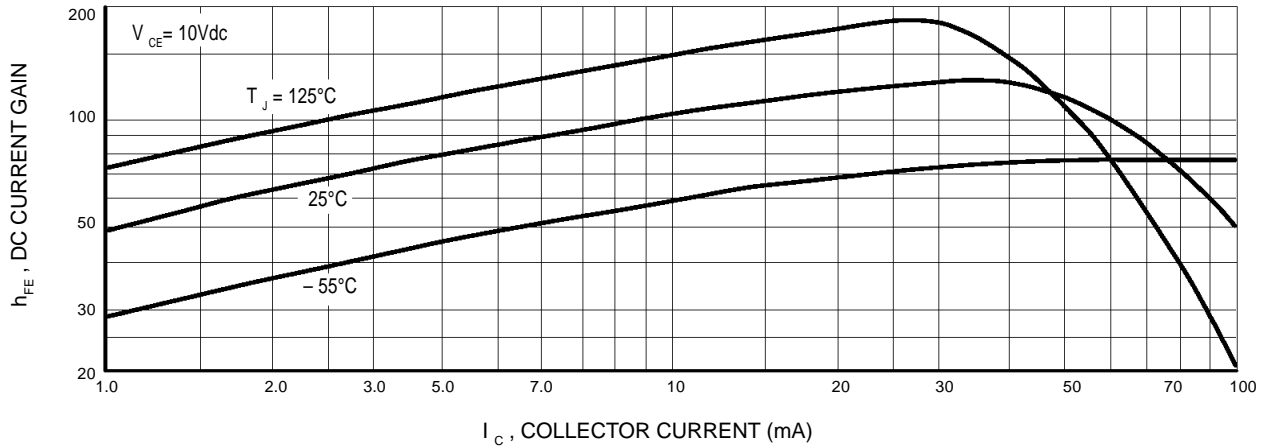


Figure 8. DC Current Gain

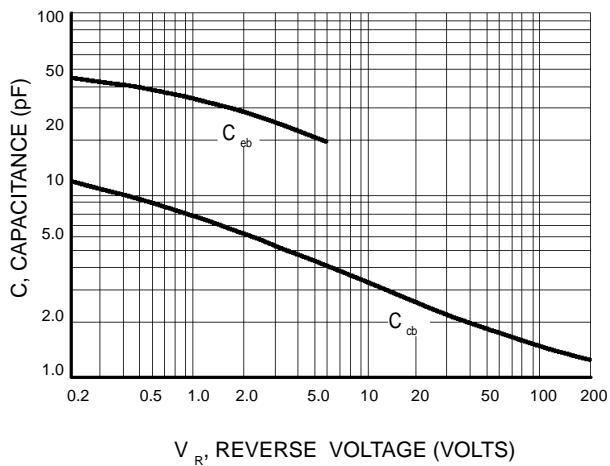


Figure 2. Capacitance

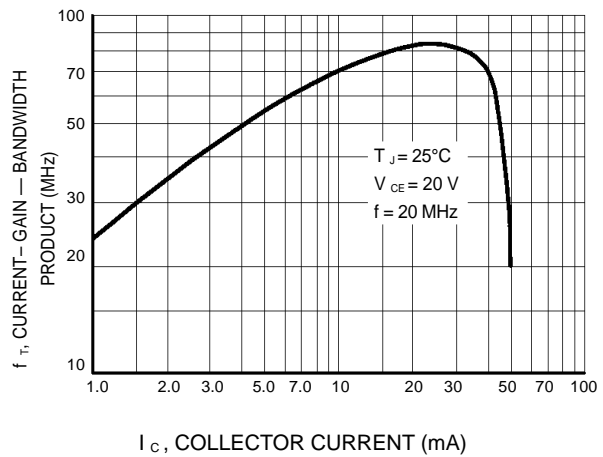


Figure 3. Current-Gain — Bandwidth Product

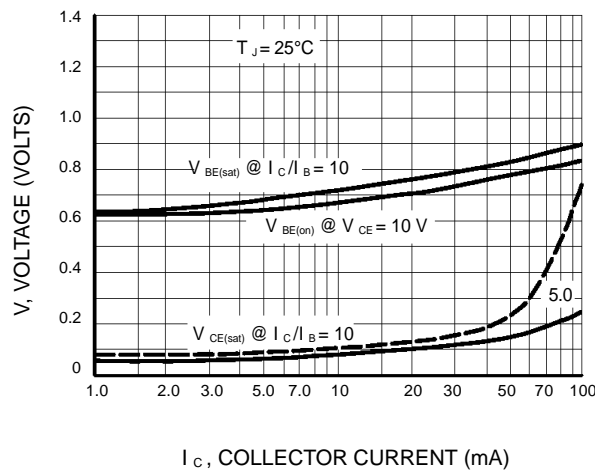


Figure 4. "On" Voltages