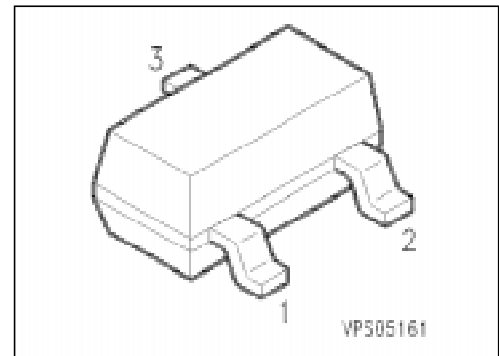


NPN Silicon Transistors for High Voltages

SMBTA 42
SMBTA 43

- High breakdown voltage
- Low collector-emitter saturation voltage
- Complementary types: SMBTA 92, SMBTA 93 (PNP)



| Type | Marking | Ordering Code (tape and reel) | Pin Configuration | | | Package ¹⁾ |
|----------------------|------------|----------------------------------|-------------------|---|---|-----------------------|
| | | | 1 | 2 | 3 | |
| SMBTA 42 SMBTA 43 | s1D s1E | Q68000-A6478 Q68000-A6482 | B | E | C | SOT-23 |

Maximum Ratings

| Parameter | Symbol | Values | | Unit |
|---|-----------|----------------|----------|------|
| | | SMBTA 42 | SMBTA 43 | |
| Collector-emitter voltage | V_{CE0} | 300 | 200 | V |
| Collector-base voltage | V_{CB0} | 300 | 200 | |
| Emitter-base voltage | V_{EB0} | 6 | | |
| Collector current | I_C | 500 | | mA |
| Base current | I_B | 100 | | |
| Total power dissipation, $T_s = 74\text{ °C}$ | P_{tot} | 360 | | mW |
| Junction temperature | T_j | 150 | | °C |
| Storage temperature range | T_{stg} | - 65 ... + 150 | | |

Thermal Resistance

| | | | |
|----------------------------------|--------------|-------|-----|
| Junction - ambient ²⁾ | $R_{th\ JA}$ | ≤ 280 | K/W |
| Junction - soldering point | $R_{th\ JS}$ | ≤ 210 | |

¹⁾ For detailed information see chapter Package Outlines.

²⁾ Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm² Cu.

Electrical Characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|-----------|--------|--------|------|------|------|
| | | min. | typ. | max. | |

DC characteristics

| | | | | | | |
|---|---------------|----------|----|-----|---------------|----|
| Collector-emitter breakdown voltage $I_C = 1\text{ mA}$ | $V_{(BR)CE0}$ | 300 | – | – | V | |
| SMBTA 42 | | 200 | – | – | | |
| SMBTA 43 | | | | | | |
| Collector-base breakdown voltage $I_C = 100\text{ }\mu\text{A}$ | $V_{(BR)CB0}$ | 300 | – | – | | |
| SMBTA 42 | | 200 | – | – | | |
| SMBTA 43 | | | | | | |
| Emitter-base breakdown voltage $I_E = 100\text{ }\mu\text{A}$ | $V_{(BR)EB0}$ | 6 | – | – | | |
| Collector-base cutoff current $V_{CB} = 200\text{ V}$ | I_{CB0} | – | – | 100 | nA | |
| SMBTA 42 | | | | | | |
| $V_{CB} = 160\text{ V}$ | | SMBTA 43 | – | – | 100 | nA |
| SMBTA 42 | | | | | | |
| $V_{CB} = 200\text{ V}, T_A = 150\text{ °C}$ | SMBTA 42 | – | – | 20 | μA | |
| $V_{CB} = 160\text{ V}, T_A = 150\text{ °C}$ | SMBTA 43 | – | – | 20 | μA | |
| Emitter-base cutoff current $V_{EB} = 3\text{ V}$ | I_{EB0} | – | – | 100 | nA | |
| DC current gain $I_C = 1\text{ mA}, V_{CE} = 10\text{ V}$ | h_{FE} | 25 | – | – | – | |
| $I_C = 10\text{ mA}, V_{CE} = 10\text{ V}^{1)}$ | | 40 | – | – | | |
| $I_C = 30\text{ mA}, V_{CE} = 10\text{ V}^{1)}$ | | SMBTA 42 | 40 | – | | – |
| SMBTA 43 | | | 40 | – | | – |
| Collector-emitter saturation voltage ¹⁾ $I_C = 20\text{ mA}, I_B = 2\text{ mA}$ | V_{CEsat} | – | – | 0.5 | V | |
| SMBTA 42 | | | | 0.4 | | |
| SMBTA 43 | | | | | | |
| Base-emitter saturation voltage ¹⁾ $I_C = 20\text{ mA}, I_B = 2\text{ mA}$ | V_{BEsat} | – | – | 0.9 | | |

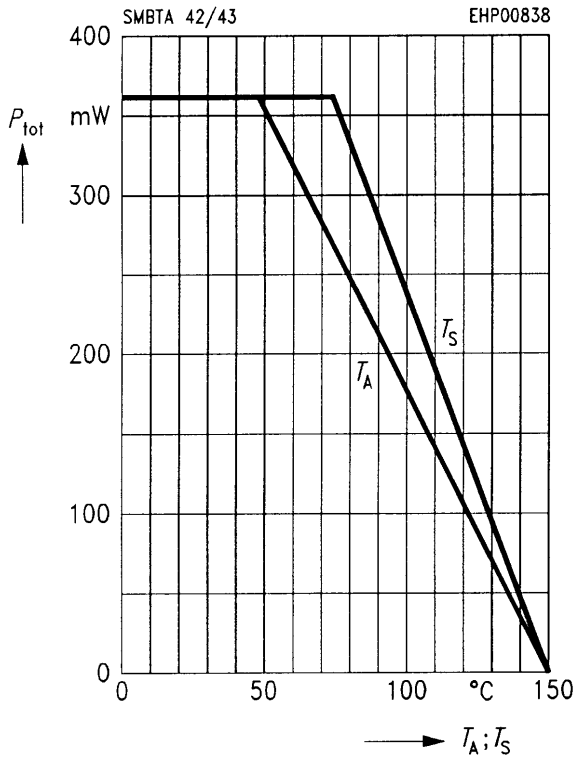
AC characteristics

| | | | | | |
|--|-----------|----|---|---|-----|
| Transition frequency $I_C = 10\text{ mA}, V_{CE} = 20\text{ V}, f = 100\text{ MHz}$ | f_t | 50 | – | – | MHz |
| Output capacitance $V_{CB} = 20\text{ V}, f = 1\text{ MHz}$ | C_{obo} | – | – | 3 | pF |
| SMBTA 42 | | | | 4 | |
| SMBTA 43 | | | | | |

¹⁾ Pulse test conditions: $t \leq 300\text{ }\mu\text{s}$, $D = 2\%$.

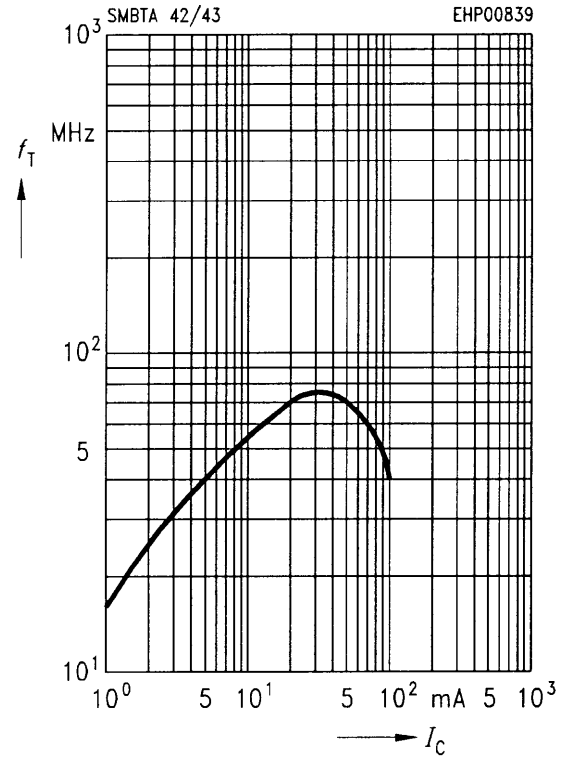
Total power dissipation $P_{tot} = f(T_A^*; T_S)$

* Package mounted on epoxy



Transition frequency $f_T = f(I_C)$

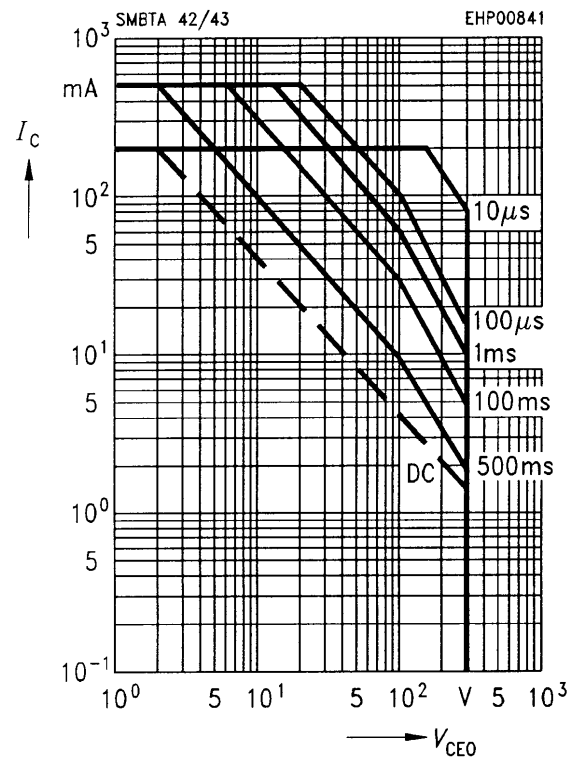
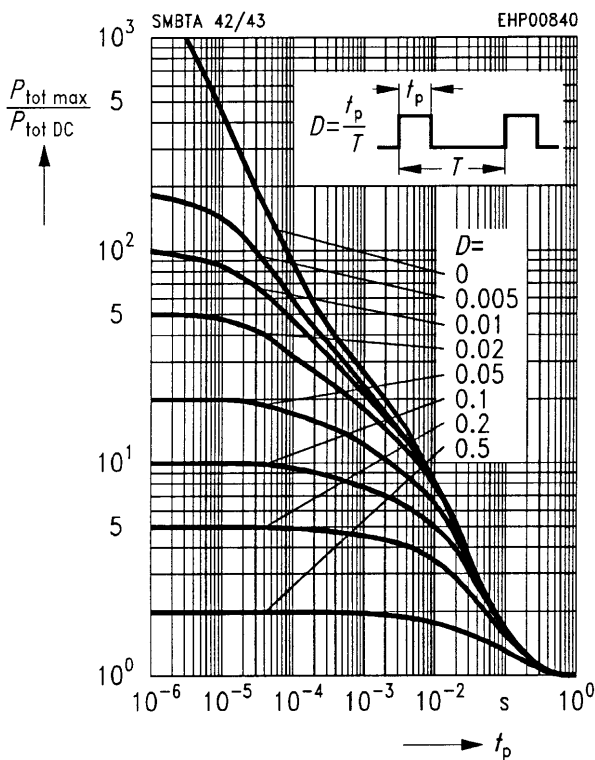
$V_{CE} = 10\text{ V}, f = 100\text{ MHz}$



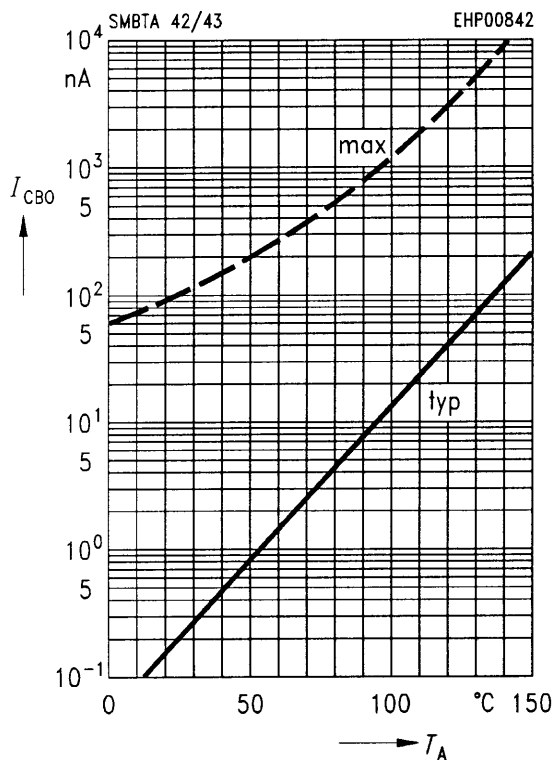
Permissible pulse load $P_{tot\ max}/P_{tot\ DC} = f(t_p)$

Operating range $I_C = f(V_{CE0})$

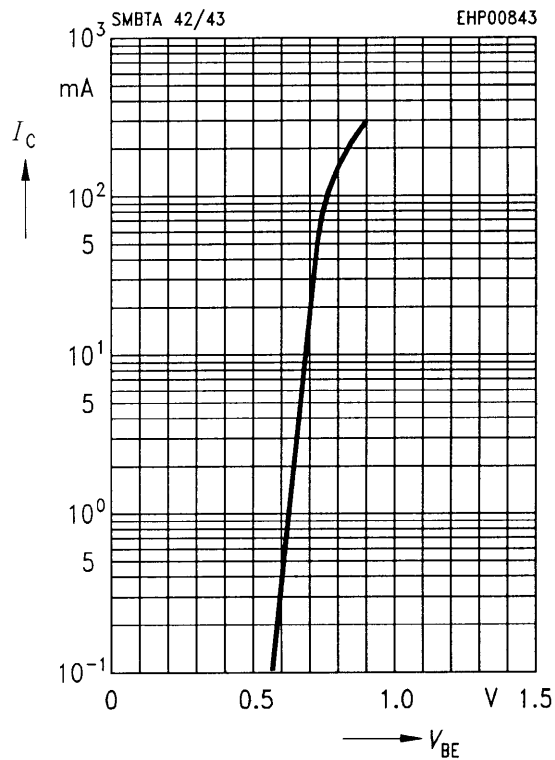
$T_A = 25\text{ }^\circ\text{C}, D = 0$



Collector cutoff current $I_{CB0} = f(T_A)$
 $V_{CB} = 160 \text{ V}$



Collector current $I_C = f(V_{BE})$
 $V_{CE} = 10 \text{ V}$



DC current gain $h_{FE} = f(I_C)$
 $V_{CE} = 10 \text{ V}$

