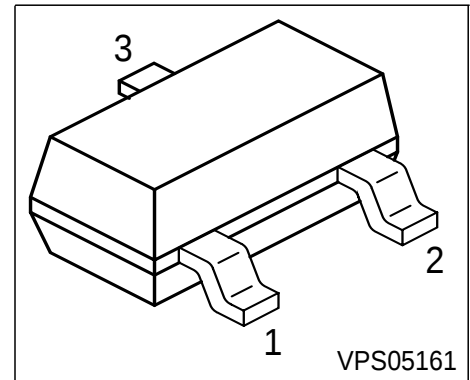


**NPN Silicon AF and Switching Transistors**

- For general AF applications
- High breakdown voltage
- Low collector-emitter saturation voltage
- Complementary types: BCX42, BSS63 (PNP)



| Type  | Marking | Pin Configuration |       |       | Package |
|-------|---------|-------------------|-------|-------|---------|
| BCX41 | EKs     | 1 = B             | 2 = E | 3 = C | SOT23   |
| BSS64 | AMs     | 1 = B             | 2 = E | 3 = C | SOT23   |

**Maximum Ratings**

| Parameter                                     | Symbol    | BSS64       | BCX41 | Unit |
|-----------------------------------------------|-----------|-------------|-------|------|
| Collector-emitter voltage                     | $V_{CEO}$ | 80          | 125   | V    |
| Collector-base voltage                        | $V_{CBO}$ | 120         | 125   |      |
| Emitter-base voltage                          | $V_{EBO}$ | 5           | 5     |      |
| DC collector current                          | $I_C$     | 800         |       | mA   |
| Peak collector current                        | $I_{CM}$  | 1           |       | A    |
| Base current                                  | $I_B$     | 100         |       | mA   |
| Peak base current                             | $I_{BM}$  | 200         |       |      |
| Total power dissipation, $T_S = 79\text{ °C}$ | $P_{tot}$ | 330         |       | mW   |
| Junction temperature                          | $T_j$     | 150         |       | °C   |
| Storage temperature                           | $T_{sta}$ | -65 ... 150 |       |      |

**Thermal Resistance**

|                                          |            |      |     |
|------------------------------------------|------------|------|-----|
| Junction - soldering point <sup>1)</sup> | $R_{thJS}$ | ≤215 | K/W |
|------------------------------------------|------------|------|-----|

<sup>1)</sup>For calculation of  $R_{thJA}$  please refer to Application Note Thermal Resistance

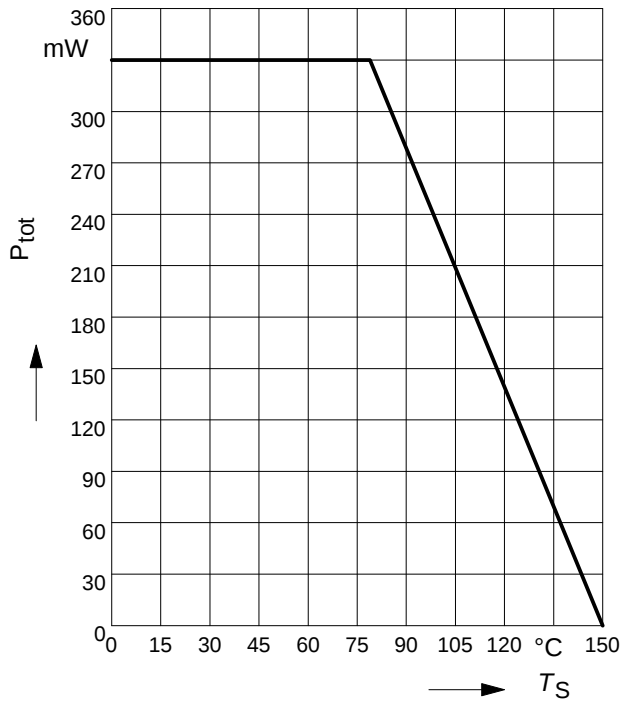
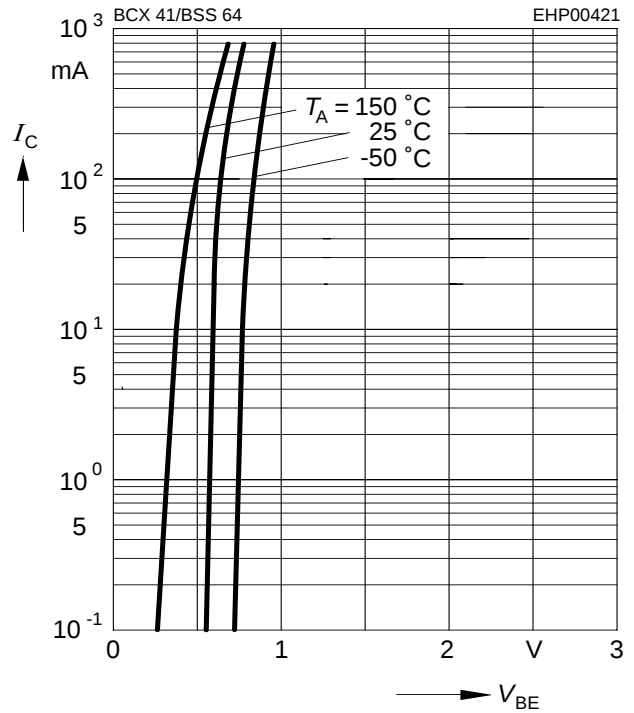
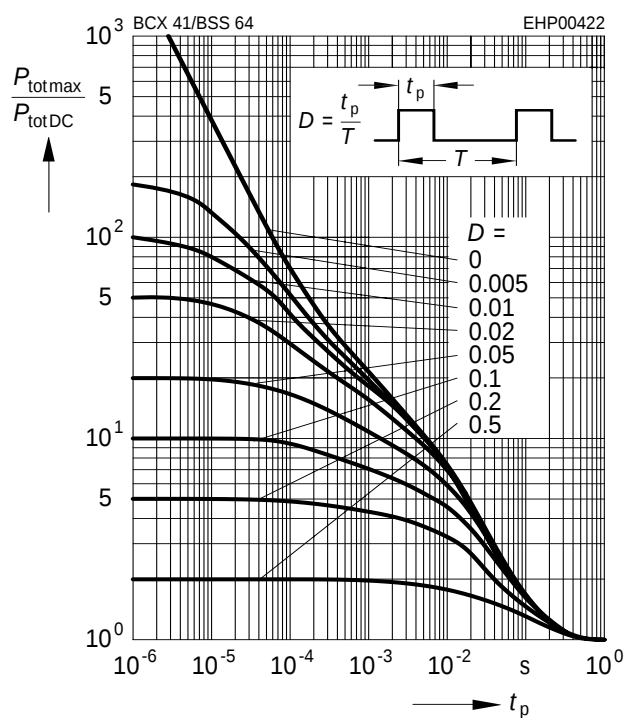
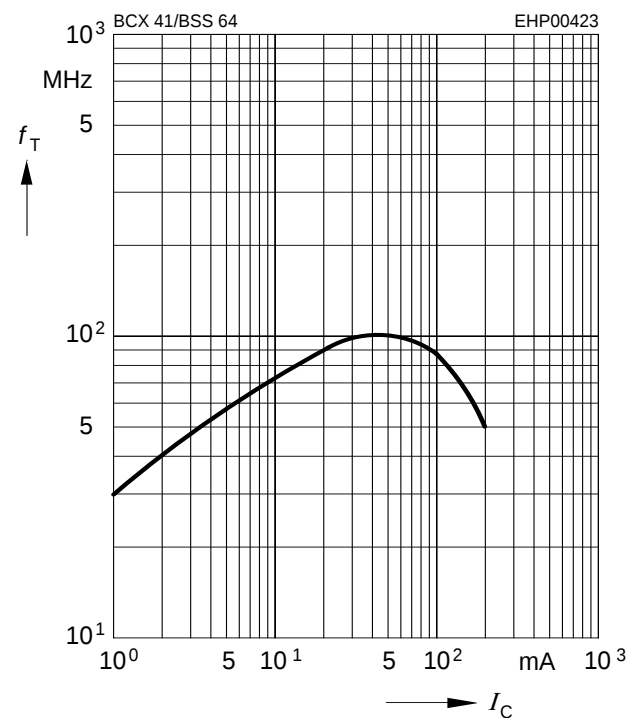
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

| Parameter                                                                                                                                                                                                                                                                                                                                                                    |                                                             | Symbol        | Values                              |                                     |                                 | Unit          |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|---------------|-------------------------------------|-------------------------------------|---------------------------------|---------------|
|                                                                                                                                                                                                                                                                                                                                                                              |                                                             |               | min.                                | typ.                                | max.                            |               |
| DC Characteristics                                                                                                                                                                                                                                                                                                                                                           |                                                             |               |                                     |                                     |                                 |               |
| Collector-emitter breakdown voltage<br>$I_C = 10\text{ mA}$ , $I_B = 0$                                                                                                                                                                                                                                                                                                      | BSS64<br>BCX41                                              | $V_{(BR)CEO}$ | 80<br>125                           | -<br>-                              | -<br>-                          | V             |
| Collector-base breakdown voltage<br>$I_C = 100\text{ }\mu\text{A}$ , $I_B = 0$                                                                                                                                                                                                                                                                                               | BSS64<br>BCX41                                              | $V_{(BR)CBO}$ | 120<br>125                          | -<br>-                              | -<br>-                          |               |
| Emitter-base breakdown voltage<br>$I_E = 10\text{ }\mu\text{A}$ , $I_C = 0$                                                                                                                                                                                                                                                                                                  |                                                             | $V_{(BR)EBO}$ | 5                                   | -                                   | -                               |               |
| Collector cutoff current<br>$V_{CB} = 80\text{ V}$ , $I_E = 0$<br>$V_{CB} = 100\text{ V}$ , $I_E = 0$                                                                                                                                                                                                                                                                        | BSS64<br>BCX41                                              | $I_{CBO}$     | -<br>-                              | -<br>-                              | 100<br>100                      | nA            |
| Collector cutoff current<br>$V_{CB} = 80\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^\circ\text{C}$<br>$V_{CB} = 100\text{ V}$ , $I_E = 0$ , $T_A = 150\text{ }^\circ\text{C}$                                                                                                                                                                                                | BSS64<br>BCX41                                              | $I_{CBO}$     | -<br>-                              | -<br>-                              | 20<br>20                        | $\mu\text{A}$ |
| Emitter cutoff current<br>$V_{EB} = 4\text{ V}$ , $I_C = 0$                                                                                                                                                                                                                                                                                                                  |                                                             | $I_{EBO}$     | -                                   | -                                   | 100                             | nA            |
| Collector cutoff current<br>$V_{CE} = 100\text{ V}$ , $T_A = 85\text{ }^\circ\text{C}$<br>$V_{CE} = 100\text{ V}$ , $T_A = 125\text{ }^\circ\text{C}$                                                                                                                                                                                                                        | BCX41<br>BCX41                                              | $I_{CEO}$     | -<br>-                              | -<br>-                              | 10<br>75                        | $\mu\text{A}$ |
| DC current gain 1)<br>$I_C = 100\text{ }\mu\text{A}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 1\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 4\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 10\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 20\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 100\text{ mA}$ , $V_{CE} = 1\text{ V}$<br>$I_C = 200\text{ mA}$ , $V_{CE} = 1\text{ V}$ | BCX41<br>BSS64<br>BSS64<br>BSS64<br>BSS64<br>BCX41<br>BCX41 | $h_{FE}$      | 25<br>-<br>20<br>-<br>-<br>63<br>40 | -<br>60<br>80<br>80<br>55<br>-<br>- | -<br>-<br>-<br>-<br>-<br>-<br>- | -             |

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

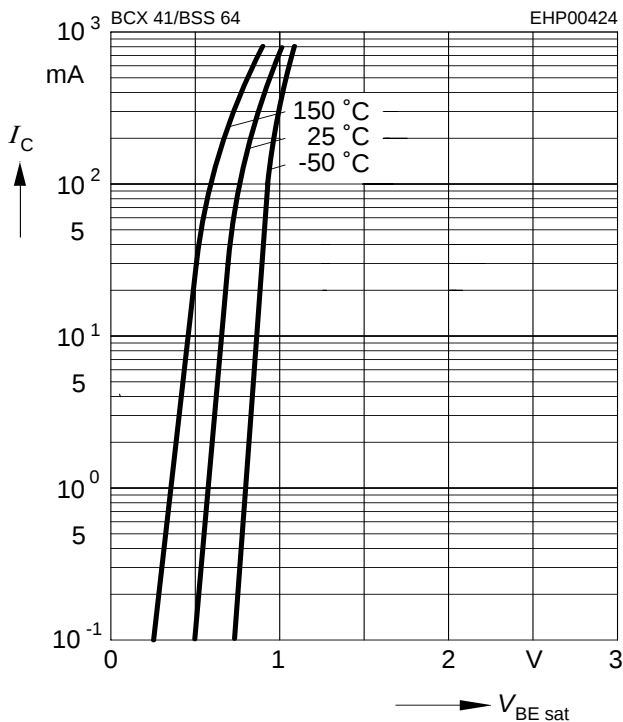
**Electrical Characteristics** at  $T_A = 25^\circ\text{C}$ , unless otherwise specified.

| Parameter                                                                                                                                                                                                                                                                                                   | Symbol      | Values |      |                 | Unit |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|--------|------|-----------------|------|
|                                                                                                                                                                                                                                                                                                             |             | min.   | typ. | max.            |      |
| DC Characteristics                                                                                                                                                                                                                                                                                          |             |        |      |                 |      |
| Collector-emitter saturation voltage1)<br><div><div><div><math>I_C = 300\text{ mA}, I_B = 30\text{ mA}</math></div><div>BCX41</div></div><div><math>I_C = 4\text{ mA}, I_B = 0.4\text{ mA}</math></div><div>BSS64</div><div><math>I_C = 50\text{ mA}, I_B = 15\text{ mA}</math></div><div>BSS64</div></div> | $V_{CEsat}$ | -      | -    | 0.9<br>0.7<br>3 | V    |
| Base-emitter saturation voltage 1)<br><div><div><math>I_C = 300\text{ mA}, I_B = 30\text{ mA}</math></div><div>BCX41</div></div>                                                                                                                                                                            | $V_{BEsat}$ | -      | -    | 1.4             |      |
| AC Characteristics                                                                                                                                                                                                                                                                                          |             |        |      |                 |      |
| Transition frequency<br><div><math>I_C = 20\text{ mA}, V_{CE} = 5\text{ V}, f = 20\text{ MHz}</math></div>                                                                                                                                                                                                  | $f_T$       | -      | 100  | -               | MHz  |
| Collector-base capacitance<br><div><math>V_{CB} = 10\text{ V}, f = 1\text{ MHz}</math></div>                                                                                                                                                                                                                | $C_{cb}$    | -      | 12   | -               | pF   |

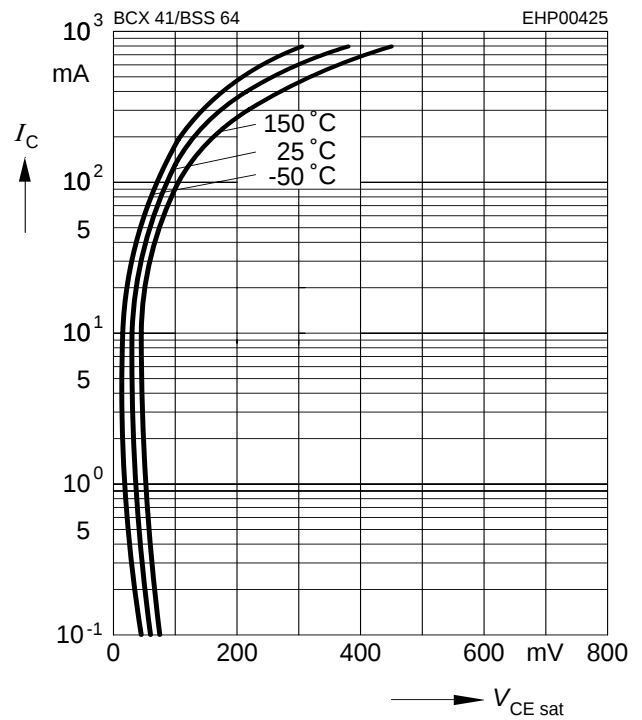
**Total power dissipation  $P_{\text{tot}} = f(T_S)$** 

**Collector current  $I_C = f(V_{\text{BE}})$** 
 $V_{\text{CE}} = 1\text{V}$ 

**Permissible pulse load**
 $P_{\text{totmax}} / P_{\text{totDC}} = f(t_p)$ 

**Transition frequency  $f_T = f(I_C)$** 
 $V_{\text{CE}} = 5\text{V}$ 


**Base-emitter saturation voltage**

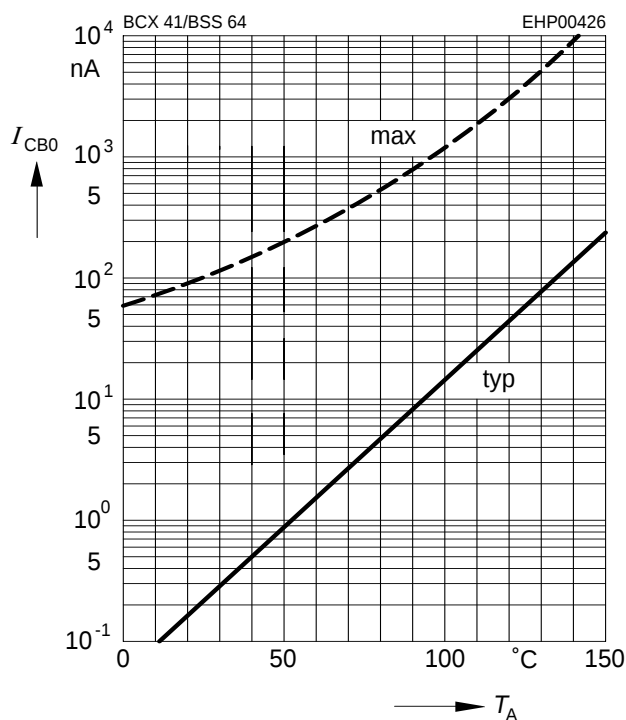
$$I_C = f(V_{BEsat}), h_{FE} = 10$$


**Collector-emitter saturation voltage**

$$I_C = f(V_{CEsat}), h_{FE} = 10$$


**Collector cutoff current  $I_{CBO} = f(T_A)$** 

$$V_{CB} = 80V$$


**DC current gain  $h_{FE} = f(I_C)$** 

$$V_{CE} = 1V$$

