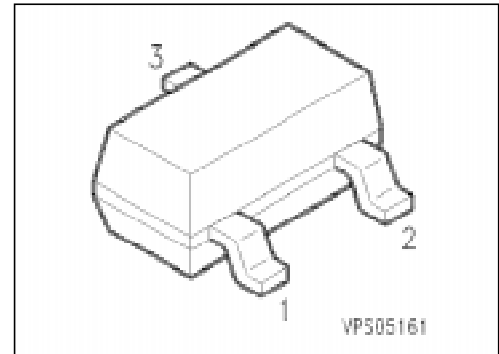


## NPN Silicon Transistors for High Voltages

**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 <sup>1)</sup>
			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 <sup>2)</sup>	$R_{th\ JA}$	≤ 280	K/W
Junction - soldering point	$R_{th\ JS}$	≤ 210	

<sup>1)</sup> For detailed information see chapter Package Outlines.

<sup>2)</sup> Package mounted on epoxy pcb 40 mm × 40 mm × 1.5 mm/6 cm<sup>2</sup> 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	$\mu\text{A}$	
$V_{CB} = 160\text{ V}, T_A = 150\text{ °C}$	SMBTA 43	–	–	20	$\mu\text{A}$	
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 <sup>1)</sup> $I_C = 20\text{ mA}, I_B = 2\text{ mA}$	$V_{CEsat}$	–	–	0.5	V	
SMBTA 42				0.4		
SMBTA 43						
Base-emitter saturation voltage <sup>1)</sup> $I_C = 20\text{ mA}, I_B = 2\text{ mA}$	$V_{BEsat}$	–	–	0.9		

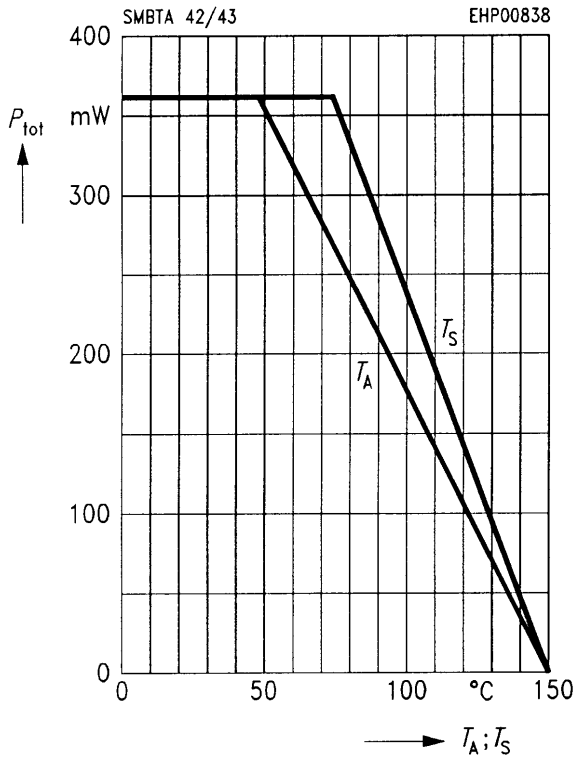
### AC characteristics

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					

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

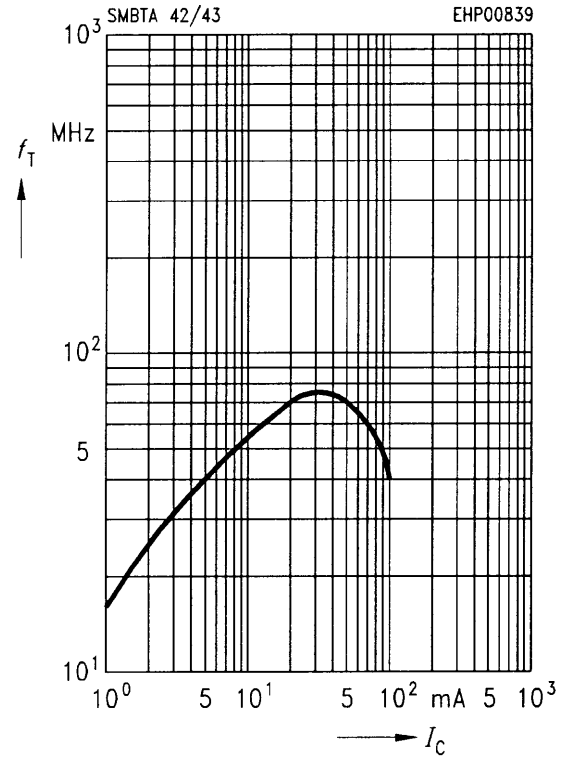
### Total power dissipation $P_{tot} = f(T_A^*; T_S)$

\* Package mounted on epoxy



### Transition frequency $f_T = f(I_C)$

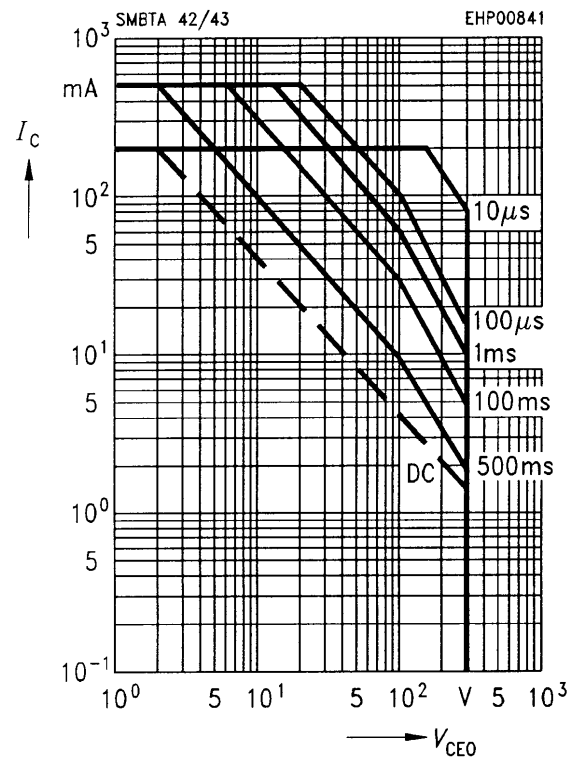
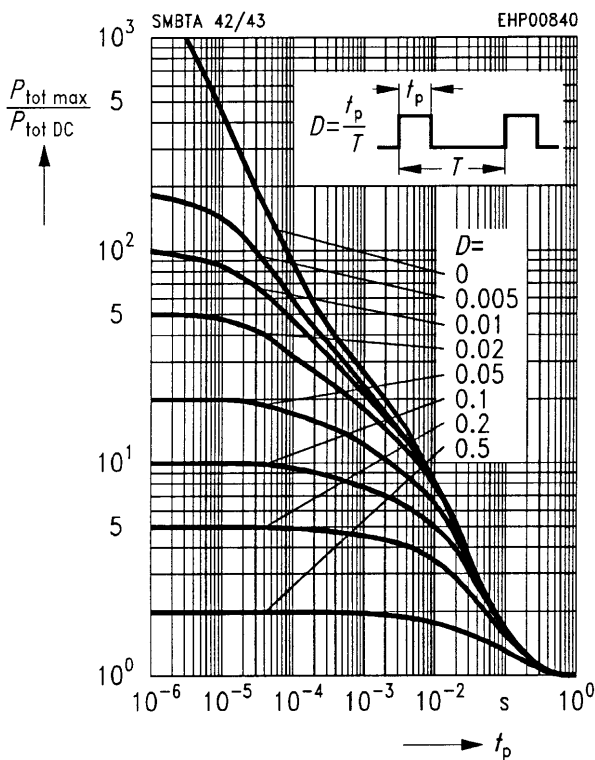
$V_{CE} = 10\text{ V}, f = 100\text{ MHz}$



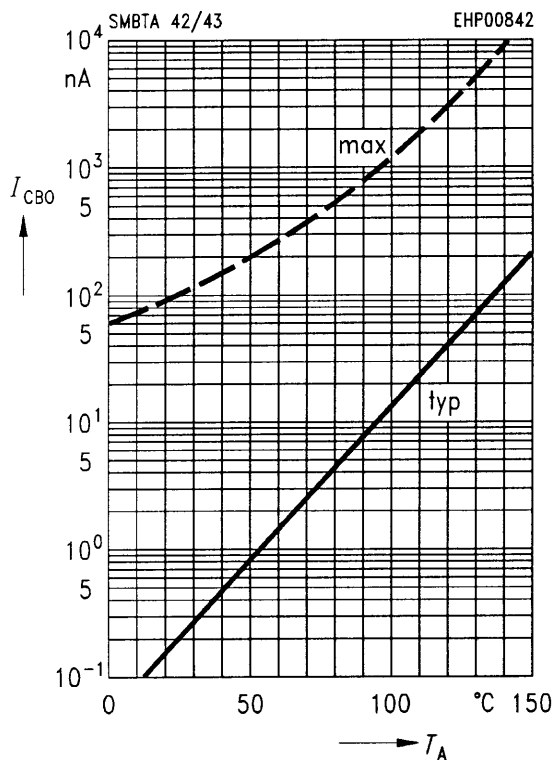
### Permissible pulse load $P_{tot\ max}/P_{tot\ DC} = f(t_p)$

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

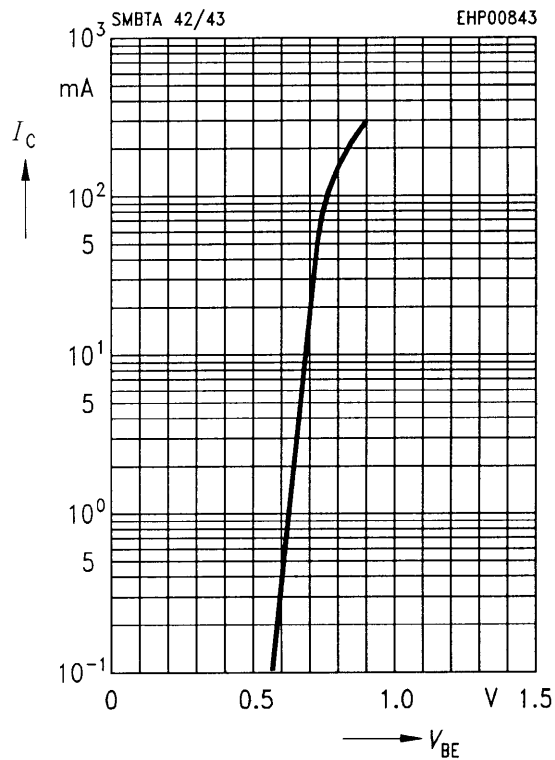
$T_A = 25\text{ }^\circ\text{C}, D = 0$



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

