

T-35-15

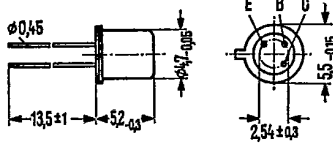
**NPN Silicon Planar Transistors**

**BSX 48**  
**BSX 49**

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BSX 48 and BSX 49 are double diffused epitaxial silicon planar transistors in TO 18 case (18 A 3 DIN 41876). Their collectors are electrically connected to the case. The transistors are designed for use as high-speed switches and are particularly suitable for driving magnetic cores. For data on the switching behavior of the transistors refer to the characteristics of the corresponding types BSY 34 and BSY 58.

Type	Ordering code
BSX 48	Q60218-X48
BSX 49	Q60218-X49



Approx. weight 0.3 g Dimensions in mm

Maximum ratings		BSX 48	BSX 49	
Collector-emitter voltage	$V_{CEO}$	25	40	V
Collector-emitter voltage	$V_{CES}$	50	60	V
Collector-base voltage	$V_{CBO}$	50	60	V
Emitter-base voltage	$V_{EBO}$	5	5	V
Collector current	$I_C$	600	600	mA
Base current	$I_B$	200	200	mA
Junction temperature	$T_j$	200	200	°C
Storage temperature range	$T_{stg}$	-65 to +200	-65 to +200	°C
Total power dissipation ( $T_{case} \leq 45^\circ C$ )	$P_{tot}$	1	1	W

**Thermal resistance**

Junction to ambient air	$R_{thJA}$	$\leq 500$	$\leq 500$	K/W
Junction to case	$R_{thJC}$	$\leq 150$	$\leq 150$	K/W

**Static characteristics ( $T_{amb} = 25^\circ C$ )**

At a collector emitter-voltage of  $V_{CE} = 1V$  and the following collector currents, the following values apply:

Type	BSX 48			BSX 49		
$I_C$ mA	$h_{FE} = I_C/I_B$	$V_{BEsat} V^{1)}$	$V_{CEsat} V^{1)}$	$h_{FE} = I_C/I_B$	$V_{BEsat} V^{1)}$	$V_{CEsat}^{1)}$
1	23	0.62	-	23	0.62	-
10	37	0.70	-	37	0.70	-
100	42 (>17)*	0.85	0.17	42 (>25)*	0.85	0.17
500	25	1.2 (<1.5)*	0.6 (<1.5)*	25 (>10)	1.2 (<1.5)*	0.6 (<1.0)*

1) The transistor is saturated to such an extent that the DC current gain decreases to  $h_{FE} = 10$ .  
\* AQL = 0.65%

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**Static characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

		BSX 48	BSX 49	
Collector cutoff current ( $V_{CBO} = 50\text{ V}$ )	$I_{CBO}$	<120*	<70*	nA
Collector-emitter breakdown voltage ( $I_{CEO} = 10\text{ mA}$ )	$V_{(BR)CEO}$	>25	>40	V
Collector-base breakdown voltage ( $I_{CBO} = 100\text{ }\mu\text{A}$ )	$V_{(BR)CBO}$	>50	>60	V
Emitter-base breakdown voltage ( $I_{EBO} = 100\text{ }\mu\text{A}$ )	$V_{(BR)EBO}$	>5	>5	V

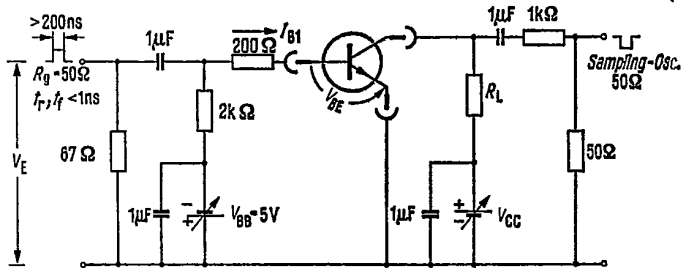
**Dynamic characteristics** ( $T_{amb} = 25^{\circ}\text{C}$ )

		BSX 48	BSX 49	
Transition frequency ( $I_C = 30\text{ mA}$ ; $V_{CE} = 10\text{ V}$ ; $f = 100\text{ MHz}$ )	$f_T$	400 (>250)	400 (>250)	MHz
Collector-base capacitance ( $V_{CBO} = 10\text{ V}$ )	$C_{CBO}$	4.5 (<6)	4.5 (<6)	pF
Emitter-base capacitance ( $V_{EBO} = 1\text{ V}$ )	$C_{EBO}$	22	22	pF

**Switching times:**

Operating point:				
$I_C = 150\text{ mA}$ ; $I_{B1} = 15\text{ mA}$ ; $-I_{B2} = 15\text{ mA}$ ; $R_L = 150\text{ }\Omega$	$t_{on}$	35	30	ns
	$t_{off}$	60	50	ns
Operating point: $I_C = 500\text{ mA}$ ; $I_{B1} = 50\text{ mA}$ ; $-I_{B2} = 25\text{ mA}$ ; $V_E = 15\text{ V}$ $R_L = 80\text{ }\Omega$ for BSX 49 ( $V_{CC} = 40\text{ V}$ ) $R_L = 50\text{ }\Omega$ for BSX 48 ( $V_{CC} = 25\text{ V}$ )	$t_{on}$	35 (<65)	30 (<50)	ns
	$t_{off}$	65 (<110)	65 (<95)	ns

**Test circuit for switching times**

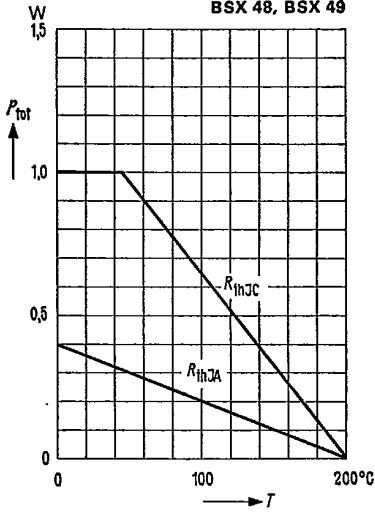


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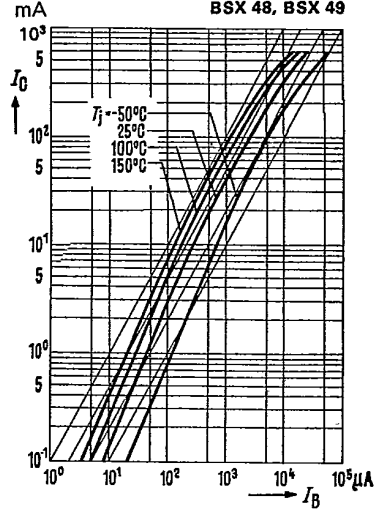
Total perm. power dissipation  
versus temperature  
 $P_{tot} = f(T)$ ;  $R_{th}$  = parameter

BSX 48, BSX 49



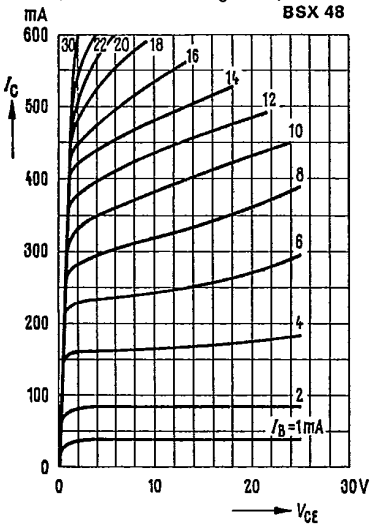
Collector current  $I_C = f(I_B)$   
 $V_{CE} = 1V$   
(common emitter configuration)

BSX 48, BSX 49



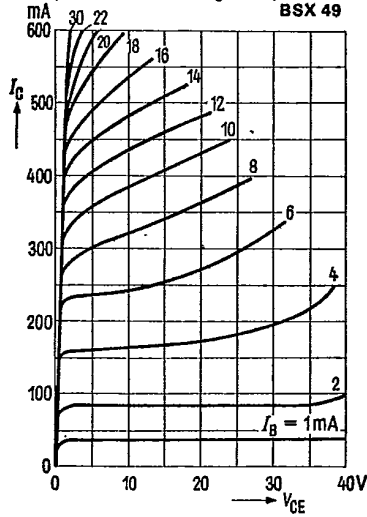
Output characteristics  $I_C = f(V_{CE})$   
 $I_B = \text{parameter}$   
(common emitter configuration)

BSX 48



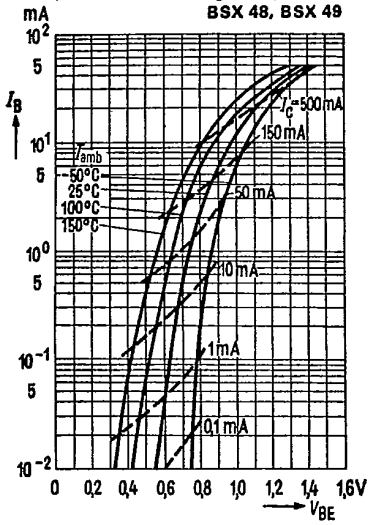
Output characteristics  $I_C = f(V_{CE})$   
 $I_B = \text{parameter}$   
(common emitter configuration)

BSX 49

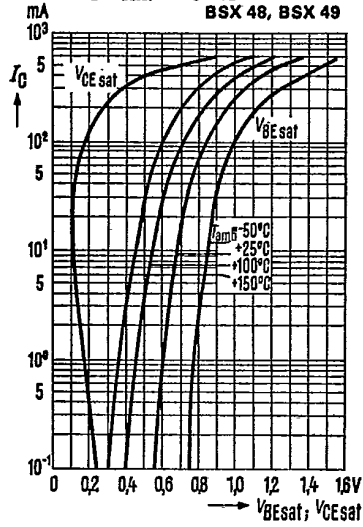


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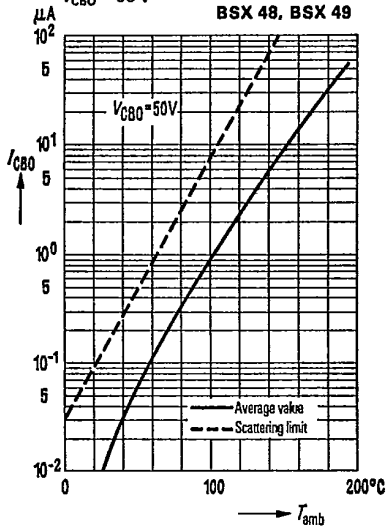
Input characteristics  $I_B = f(V_{BE})$   
 $V_{CE} = 1V$   
(common emitter configuration)



Collector-emitter saturation voltage  $V_{CEsat} = f(I_C); h_{FE} = 10$   
Base-emitter saturation voltage  $V_{BEsat} = f(I_C); h_{FE} = 10$



Collector cutoff current versus temperature  $I_{CBO} = f(T_{amb})$   
 $V_{CBO} = 50V$



Collector-base capacitance  $C_{CBO} = f(V_{CBO})$   
Emitter-base capacitance  $C_{EBO} = f(V_{EBO})$

