

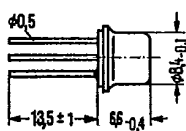
**NPN Silicon Planar Transistors**

**BSY 34**  
**BSY 58**

SIEMENS AKTIENGESELLSCHAFT

BSY 34 and BSY 58 are double diffused epitaxial NPN silicon planar transistors in TO 39 case (5 C 3 DIN 41873). The collectors are electrically connected to the cases. The transistors are intended for use as high-speed switches and in particular for driving magnetic cores.

Type	Ordering code
BSY 34	Q60218-Y34
BSY 58	Q60218-Y58



Approx. weight 1.6 g



Dimensions in mm

**Maximum ratings**

		BSY 34	BSY 58	
Collector-emitter voltage	$V_{CEO}$	40	25	V
Collector-emitter voltage	$V_{CES}$	60	50	V
Collector-base voltage	$V_{CBO}$	60	50	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 ( $T_{case} \leq 45^\circ C$ )	$P_{tot}$	2.6	2.6	W

**Thermal resistance**

Junction to ambient air	$R_{thJA}$	$\leq 220$	$\leq 220$	K/W
Junction to case	$R_{thJC}$	$\leq 60$	$\leq 60$	K/W

**Static characteristics ( $T_{amb} = 25^\circ C$ ;  $V_{CE} = 1 V$ )**

Type	BSY 34			BSY 58		
	$h_{FE}$ $I_C/I_B$	$V_{BEsat}^{1)}$ V	$V_{CEsat}^{1)}$ V	$h_{FE}$ $I_C/I_B$	$V_{BEsat}^{1)}$ V	$V_{CEsat}^{1)}$ V
1	23	0.62	-	23	0.62	-
10	37	0.7	-	37	0.7	-
100	42 (> 25)*	0.85	0.17	42 (> 17)*	0.85	0.17
500	25 (> 10)	1.2 (< 1.5)*	0.6 (< 1)*	25	1.2 (< 1.5)*	0.6 (< 1.5)*

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	$T_{amb}$	BSY 34		BSY 58	°C
		150	25	25	
Collector cutoff current ( $V_{CBO} = 50\text{ V}$ )	$I_{CBO}$	$< 7 \cdot 10^4$	$< 70^*$	$< 120^*$	nA
Collector-emitter breakdown voltage ( $I_{CEO} = 10\text{ mA}$ )	$V_{(BR)CEO}$		$> 40$	$> 25$	V
Collector-emitter breakdown voltage ( $I_{CES} = 10\text{ }\mu\text{A}$ )	$V_{(BR)CES}$		$> 60$	$> 50$	V
Collector-base breakdown voltage ( $I_{CBO} = 100\text{ }\mu\text{A}$ )	$V_{(BR)CBO}$		$> 60$	$> 50$	V
Emitter-base breakdown voltage ( $I_{EBO} = 100\text{ }\mu\text{A}$ )	$V_{(BR)EBO}$		$> 5$	$> 5$	V

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

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

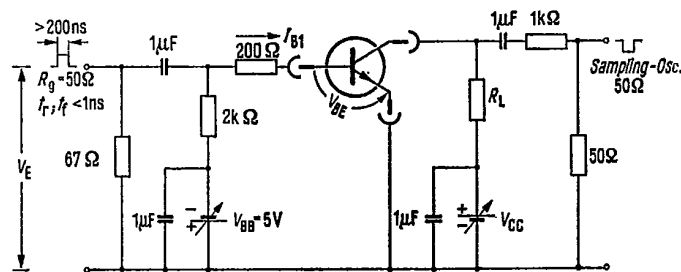
**Switching times**

Operating point: $I_C = 150\text{ mA}$ ; $I_{B1} = 15\text{ mA}$ $-I_{B2} = 15\text{ mA}$ ; $R_L = 150\text{ }\Omega$					
$t_{on}$			30	35	ns
$t_{off}$			50	60	ns

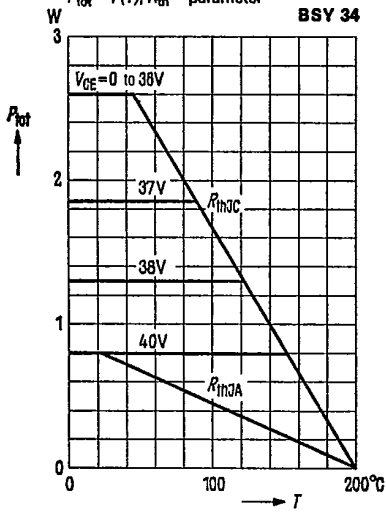
Operating point: $I_C = 500\text{ mA}$ ; $I_{B1} = 50\text{ mA}$ ; $-I_{B2} = 25\text{ mA}$ ; $V_E = 15\text{ V}$ $R_L = 80\text{ }\Omega$ for BSY 34 ( $V_{CC} = 40\text{ V}$ ) $R_L = 50\text{ }\Omega$ for BSY 58 ( $V_{CC} = 25\text{ V}$ )					
$t_{on}$			30 (<50)	35 (<65)	ns
$t_{off}$			65 (<95)	65 (<110)	ns

\* AQL = 0.65%

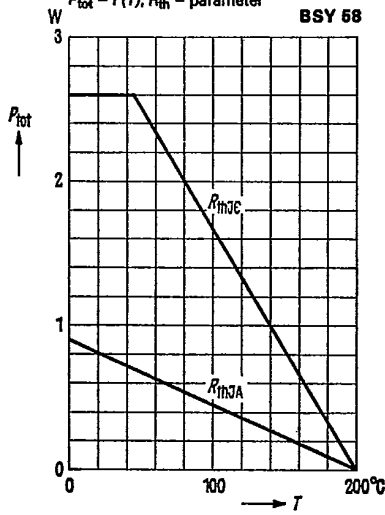
**Test circuit for switching times**



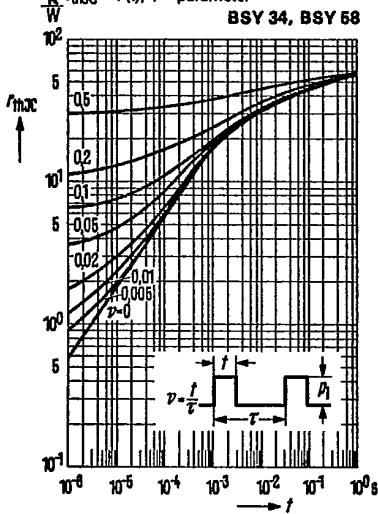
Total perm. power dissipation  
 versus temperature  
 $P_{tot} = f(T); R_{th} = \text{parameter}$



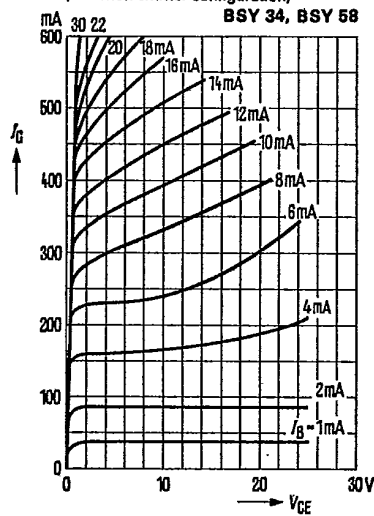
Total perm. power dissipation  
 versus temperature  
 $P_{tot} = f(T); R_{th} = \text{parameter}$

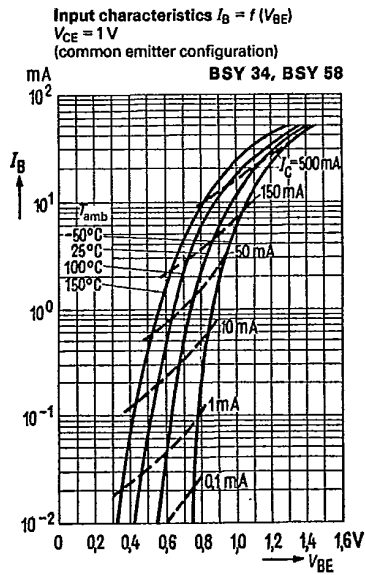
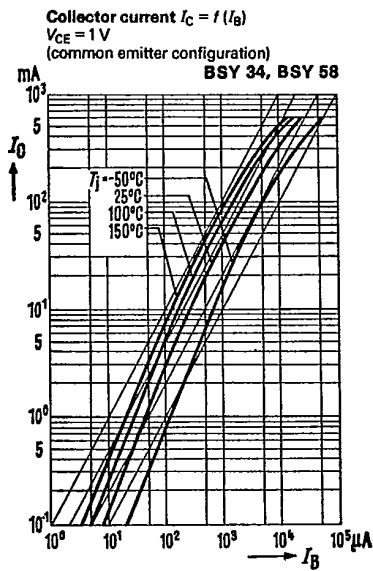
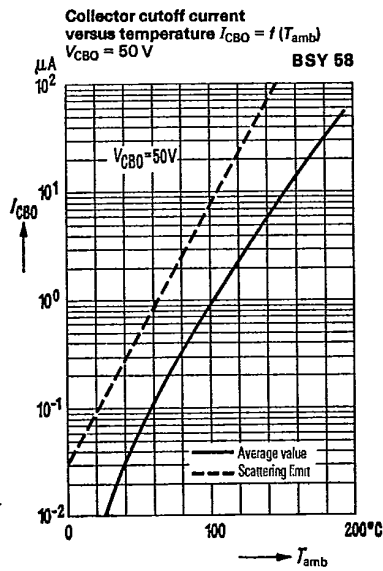
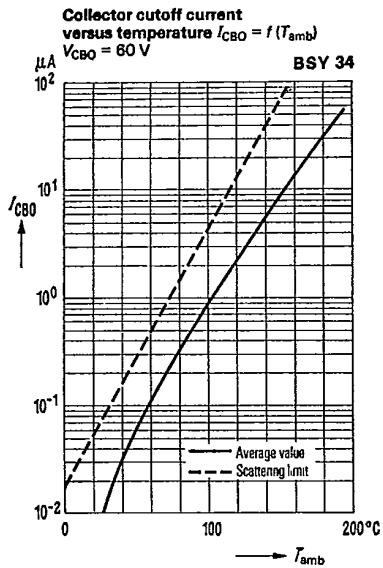


Permissible pulse load  
 $r_{thJC} = f(t); v = \text{parameter}$



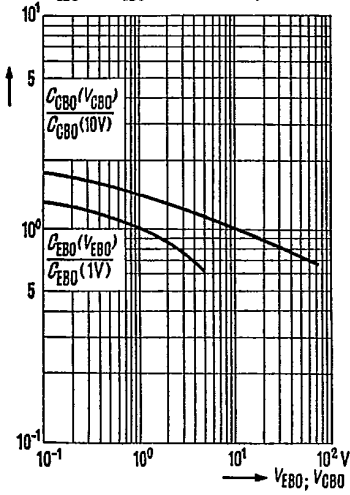
Output characteristics  $I_C = f(V_{CE})$   
 $I_B = \text{parameter}$   
 (common emitter configuration)



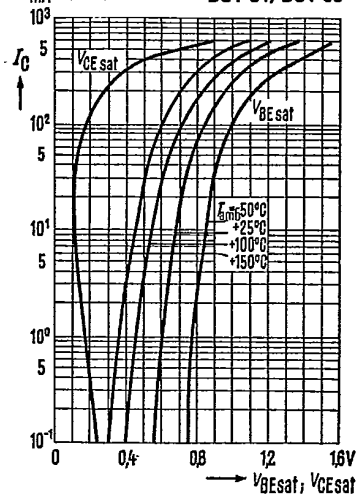


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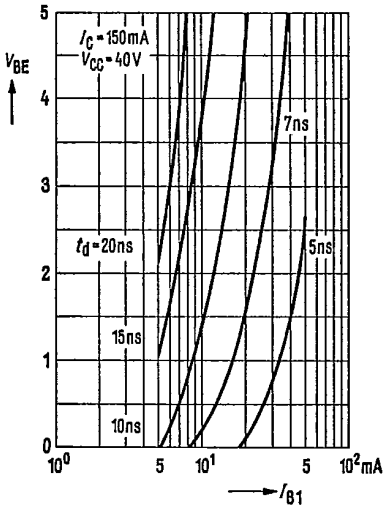
Collector-base capacitance  
 $C_{CB0} = f(V_{CB0})$   
 Emitter-base capacitance  
 $C_{EB0} = f(V_{EB0})$  BSY 34, BSY 58



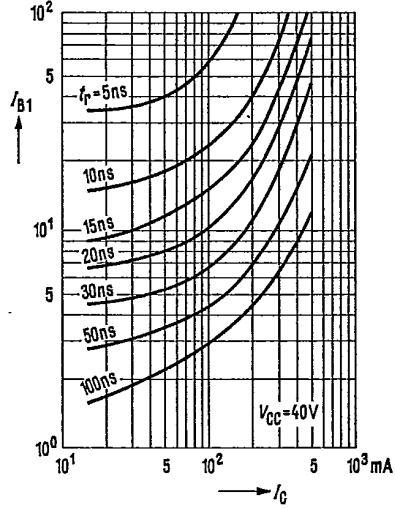
Saturation voltages  
 $V_{CEsat} = f(I_C); \eta_{FE} = 10$   
 $V_{BEsat} = f(I_C); \eta_{FE} = 10$   
 $I_{C, Tamb} = \text{parameter}$  BSY 34, BSY 58



Delay time  $t_d$   
 $I_C = 150 \text{ mA}; V_{CC} = 40 \text{ V}$  BSY 34



Rise time  $t_r$   
 $V_{CC} = 40 \text{ V}$  BSY 34





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