

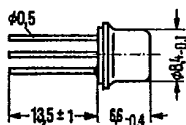
NPN Silicon Planar Transistors

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}	≤ 220	≤ 220	K/W
Junction to case	R_{thJC}	≤ 60	≤ 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:
 $I_C = 150\text{ mA}$; $I_{B1} = 15\text{ mA}$
 $-I_{B2} = 15\text{ mA}$; $R_L = 150\text{ }\Omega$

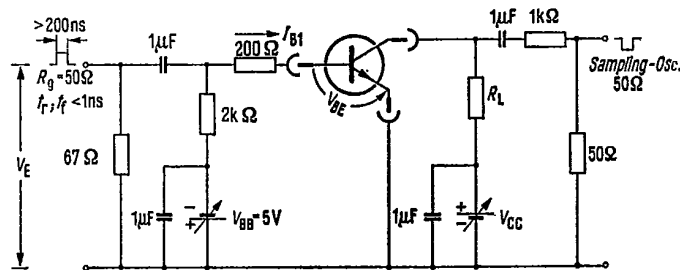
t_{on}		30	35	ns
t_{off}		50	60	ns

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 ($V_{CC} = 40\text{ V}$) t_{on}
 $R_L = 50\text{ }\Omega$ for BSY 58 ($V_{CC} = 25\text{ V}$) t_{off}

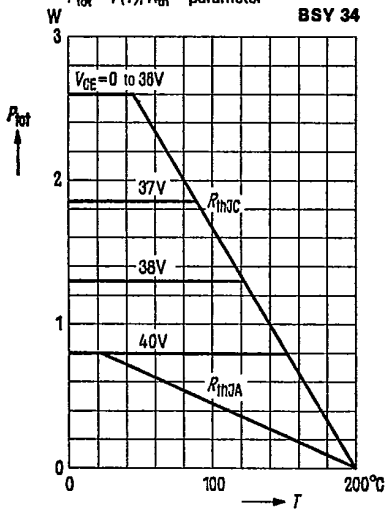
t_{on}		30 (<50)	35 (<65)	ns
t_{off}		65 (<95)	65 (<110)	ns

* AQL = 0.65%

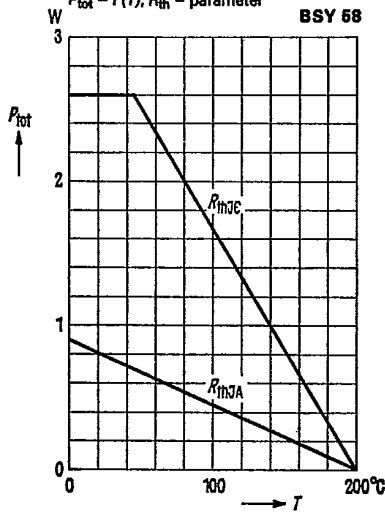
Test circuit for switching times



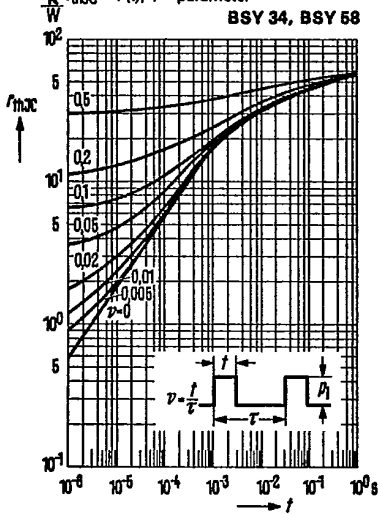
Total perm. power dissipation
 versus temperature
 $P_{tot} = f(T); R_{th} = \text{parameter}$



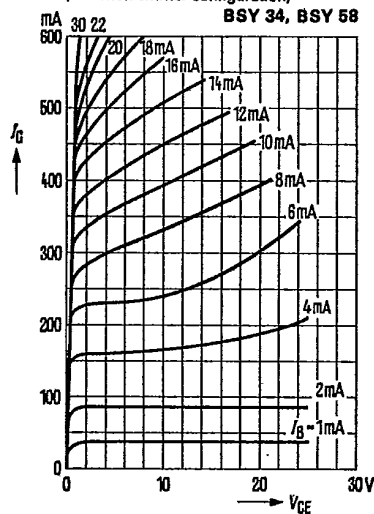
Total perm. power dissipation
 versus temperature
 $P_{tot} = f(T); R_{th} = \text{parameter}$

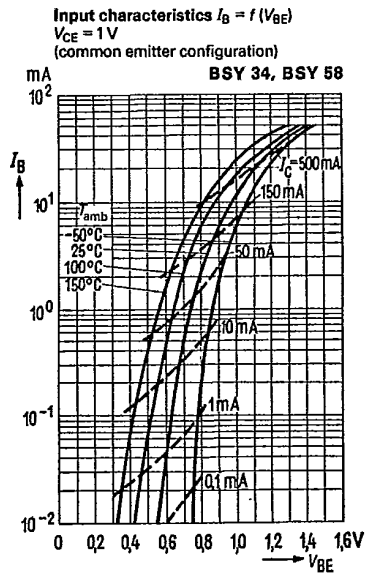
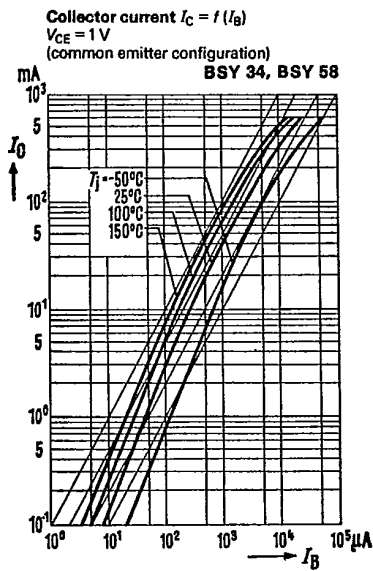
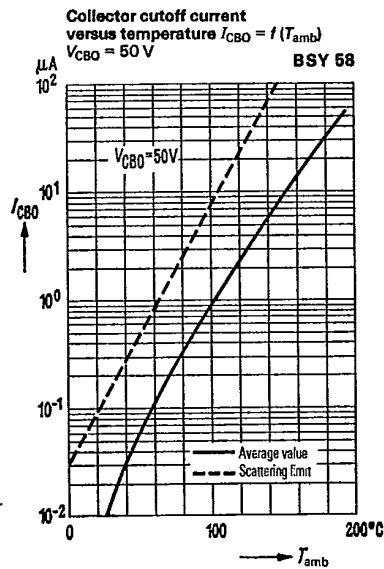
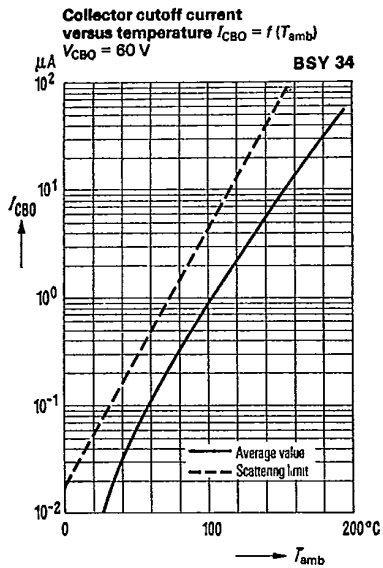


Permissible pulse load
 $r_{thJC} = f(t); v = \text{parameter}$



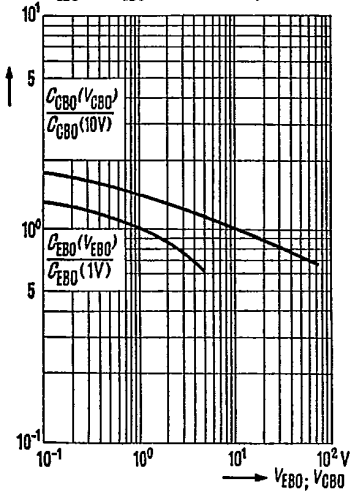
Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
 (common emitter configuration)



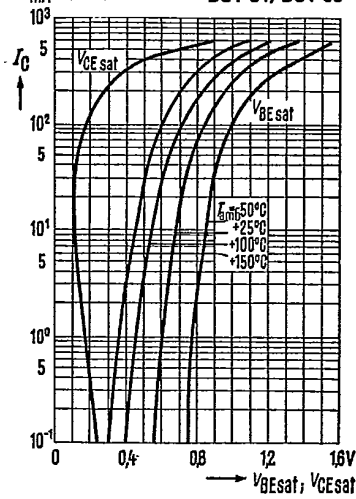


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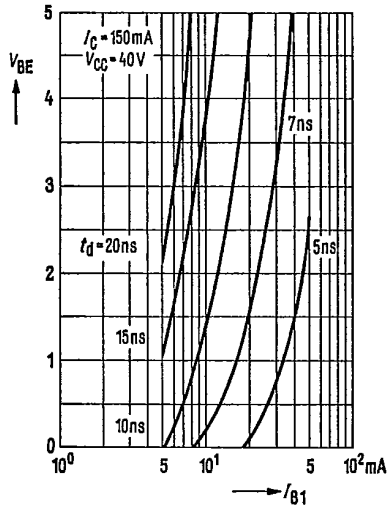
Collector-base capacitance
 $C_{CB0} = f(V_{CB0})$
Emitter-base capacitance
 $C_{EB0} = f(V_{EB0})$ BSY 34, BSY 58



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

