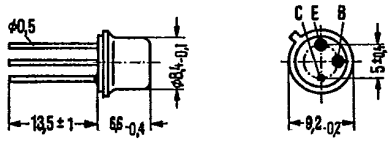
NPN Silicon Planar Transistors

BSY 34
BSY 58

SIEMENS AKTIENGESELLSCHAF

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 1.5 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 ($T_{case} \leq 45$ °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 °C; V_{CE} = 1 V)

Type	BSY 34			BSY 58		
I_C mA	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%

BSY 34
BSY 58

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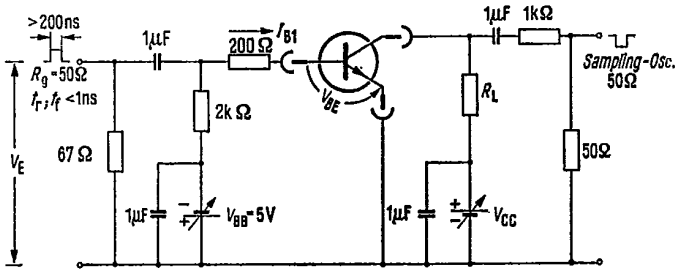
Static characteristics		**BSY 34**		**BSY 58**	
	T_{amb}	150	25	25	°C
Collector cutoff current (V_{CBO} = 50 V)	I_{CBO}	$<7 \cdot 10^4$	<70*	<120*	nA
Collector-emitter breakdown voltage (I_{CEO} = 10 mA)	$V_{(BR)CEO}$		>40	>25	V
Collector-emitter breakdown voltage (I_{CES} = 10 µA)	$V_{(BR)CES}$		>60	>50	V
Collector-base breakdown voltage (I_{CBO} = 100 µA)	$V_{(BR)CBO}$		>60	>50	V
Emitter-base breakdown voltage (I_{EBO} = 100 µA)	$V_{(BR)EBO}$		>5	>5	V
Dynamic characteristics (T_{amb} = 25°C)					
Transition frequency (I_C = 30 mA; V_{CE} = 10 V; f = 100 MHz)	f_T		400 (>250)	400 (>250)	MHz
Collector-base capacitance (V_{CBO} = 10 V)	C_{CBO}		4.5 (<6)	4.5 (<6)	pF
Emitter-base capacitance (V_{EBO} = 1 V)	C_{EBO}		22	22	pF
Switching times					
Operating point: I_C = 150 mA; I_{B1} = 15 mA	t_{on}		30	35	ns
$-I_{B2}$ = 15 mA; R_L = 150 Ω	t_{off}		50	60	ns
Operating point: I_C = 500 mA; I_{B1} = 50 mA; $-I_{B2}$ = 25 mA; V_E = 15 V					
R_L = 80 Ω for BSY 34 (V_{CC} = 40 V)	t_{on}		30 (<50)	35 (<65)	ns
R_L = 50 Ω for BSY 58 (V_{CC} = 25 V)	t_{off}		65 (<95)	65 (<110)	ns

* AQL = 0.65%

Test circuit for switching times



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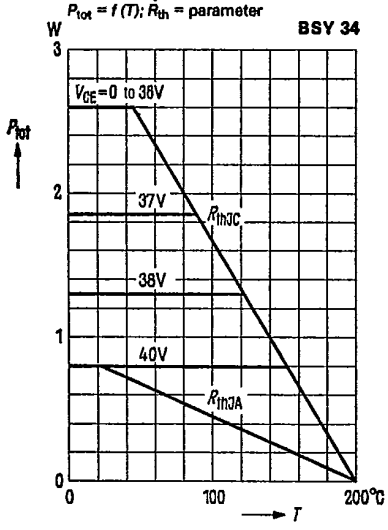
Total perm. power dissipation versus temperature
$P_{tot} = f(T)$; R_{th} = parameter



Total perm. power dissipation versus temperature
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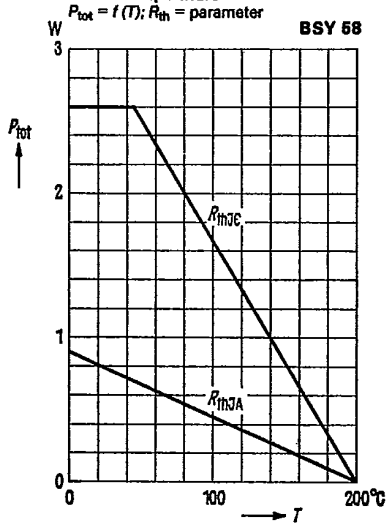
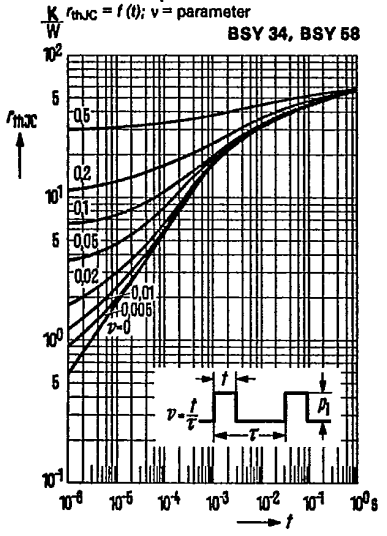
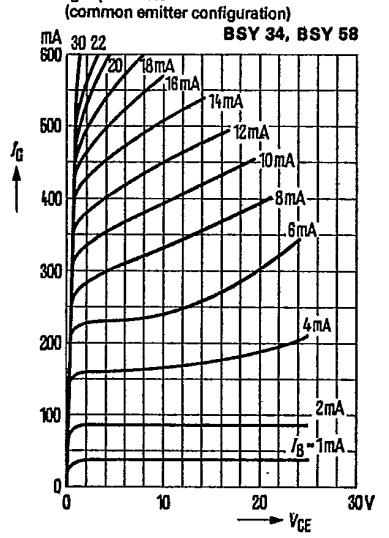


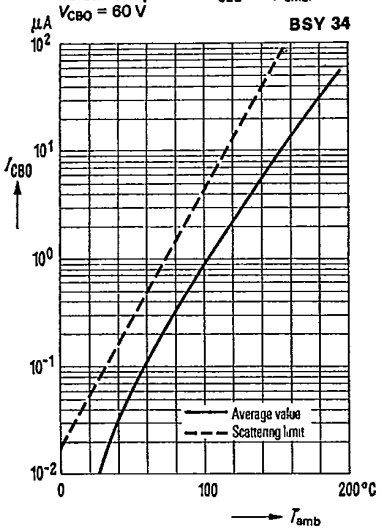
Permissible pulse load
$\frac{K}{W}$ $r_{thJC} = f(t)$; v = parameter



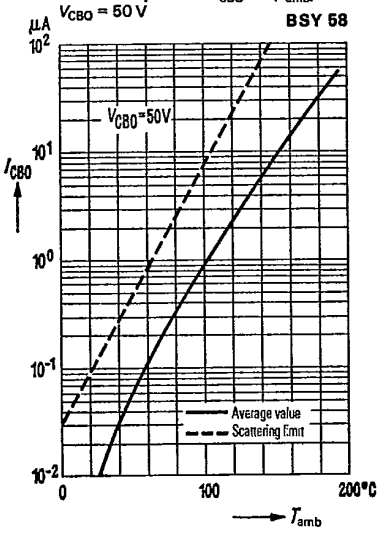
Output characteristics $I_C = f(V_{CE})$
I_B = parameter
(common emitter configuration)



Collector cutoff current
versus temperature $I_{CBO} = f(T_{amb})$
V_{CBO} = 60 V
BSY 34



Collector cutoff current
versus temperature $I_{CBO} = f(T_{amb})$
V_{CBO} = 50 V
BSY 58



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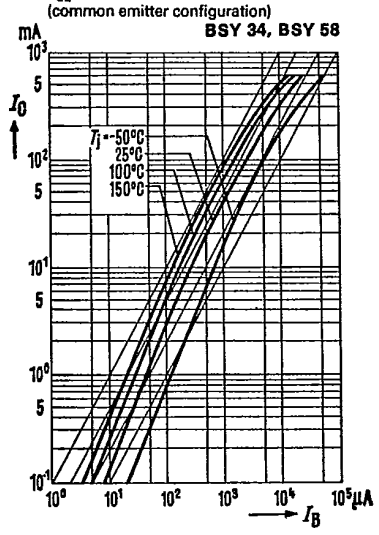

Input characteristics $I_B = f(V_{BE})$
V_{CE} = 1 V
(common emitter configuration)
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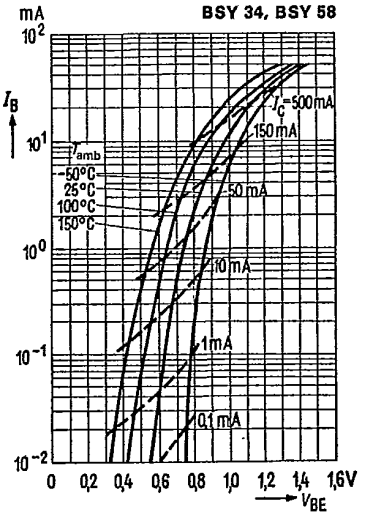
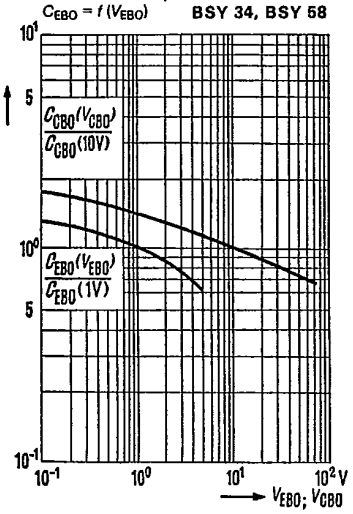
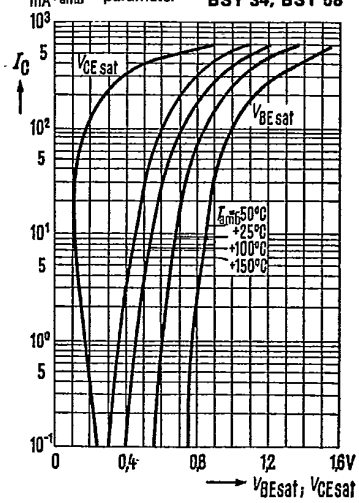


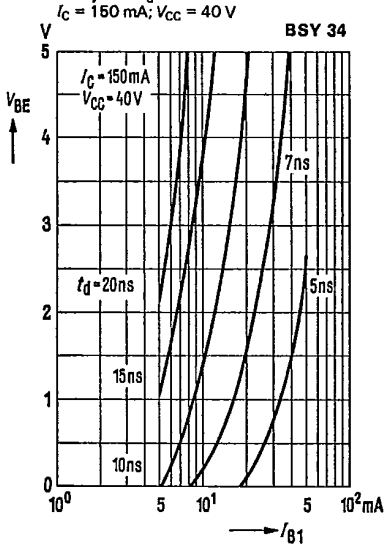
Collector-base capacitance
$C_{CBO} = f(V_{CBO})$
Emitter-base capacitance
$C_{EBO} = f(V_{EBO})$ **BSY 34, BSY 58**



Saturation voltages
$V_{CEsat} = f(I_C); h_{FE} = 10$
$V_{BEsat} = f(I_C); h_{FE} = 10$
mA T_{amb} = parameter **BSY 34, BSY 58**



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



Rise time t_r
V_{CC} = 40 V **BSY 34**