

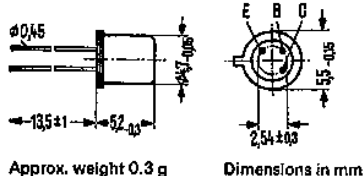
NPN Transistors for Switching Applications

BSY 17
BSY 18
BSY 62
BSY 63

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BSY 17, BSY 18, BSY 62, and BSY 63 are double-diffused epitaxial NPN silicon planar RF transistors in TO 18 case (18 A 3 DIN 41876). Their collectors are electrically connected to their cases. Transistor BSY 17 corresponds to type 2 N 743, BSY 18 to 2 N 744, BSY 62, group A, to type 2 N 708 A, and BSY 63 to type 2 N 708. The transistors are especially suitable for high-speed logic gate applications.

Type	Ordering code
BSY 17	Q60218-Y17
BSY 18	Q60218-Y18
BSY 62 A	Q60218-Y62-A
BSY 62 B	Q60218-Y62-B
BSY 63	Q60218-Y63



Maximum ratings

	BSY 17 BSY 18	BSY 62	BSY 63	
Collector-emitter voltage	V_{CE0} 12	15	15	V
Collector-base voltage	V_{CB0} 20	25	40	V
Emitter-base voltage	V_{EB0} 5	5	5	V
Collector current	I_C 200	200	200	mA
Junction temperature	T_J 200	200	200	°C
Storage temperature range	T_{stg}	-65 to +200		°C
Total power dissipation ($T_{case}=45^{\circ}\text{C}$)	P_{tot} 1	1	1	W

Thermal resistance

Junction to ambient air	R_{thJA}	≤ 500	≤ 500	≤ 500	K/W
Junction to case	R_{thJC}	≤ 150	≤ 150	≤ 150	K/W

Static characteristics

Collector cutoff current ($V_{CBO}=20\text{ V}$)	I_{CBO}	<100	<1*	μA
Collector-emitter breakdown voltage ($I_{CEO}=10\text{ mA}$)	$V_{(BR)CEO}$	—	>12	V
Emitter-base breakdown voltage ($I_{EBO}=10\text{ }\mu\text{A}$)	$V_{(BR)EBO}$	—	>5*	V
Collector-base breakdown voltage ($I_{CBO}=1\text{ }\mu\text{A}$)	$V_{(BR)CBO}$	—	>20	V

* AQL = 0.65%

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

BSY 17

V_{CE} V	I_B mA	I_C mA	h_{FE} I_C/I_B	$V_{BEsat}^{1)}$ V	$V_{CEsat}^{1)}$ V
0.25	<0.1	1	>10*	0.65	—
0.35	0.167 to 0.5	10	20 to 60*	0.7 (<0.85)	<0.28*
1.0	<10	100	>10*	<1.5	—

BSY 18

V_{CE} V	I_B mA	I_C mA	h_{FE} I_C/I_B	$V_{BEsat}^{1)}$ V	$V_{CEsat}^{1)}$ V
0.25	<0.05	1	>20*	0.66	—
0.35	0.083 to 0.25	10	40 to 120*	0.7 (<0.85)	<0.28*
1.0	<5.0	100	>20*	<1.5	—

BSY 62 The transistors are grouped according to the DC current gain h_{FE} and identified by the code letters "A" or "B".

h_{FE} group	V_{CE} V	I_B mA	I_C mA	h_{FE} I_C/I_B
A	1	0.17 to 0.5	10	20 to 60*
B	1	0.033 to 0.33	10	30 to 300*

Saturation voltage ($I_C = 10\text{ mA}$; $I_B = 10\text{ mA}$) $V_{BEsat}^{1)} = <0.9\text{ V}$
 $V_{CEsat}^{1)} = <0.6^*\text{ V}$

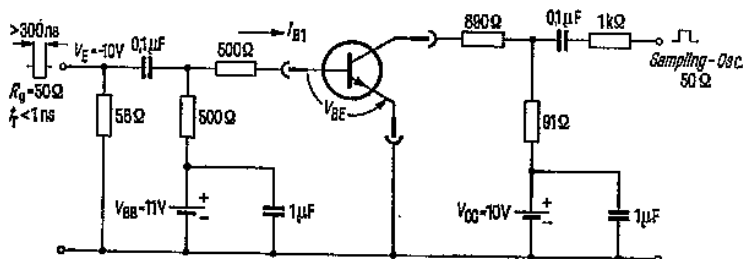
BSY 63

V_{CE} V	I_B mA	I_C mA	h_{FE} I_C/I_B
1	<0.033	0.5	>15*
1	0.083 to 0.33	10	30 to 120*

Saturation voltage ($I_C = 10\text{ mA}$; $I_B = 1\text{ mA}$) $V_{BEsat}^{1)} = 0.72 (<0.8)\text{ V}$
 $V_{CEsat}^{1)} = <0.4^*\text{ V}$

Test circuit for storage time (t_s)

Duty cycle <2%



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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Dynamic characteristics $(T_{amb} = 25^{\circ}\text{C})$ **Transition frequency** $(I_C = 10\text{ mA}; V_{CE} = 10\text{ V};$ $f = 100\text{ MHz})$ **Collector-base capacitance** $(V_{CBO} = 5\text{ V})$

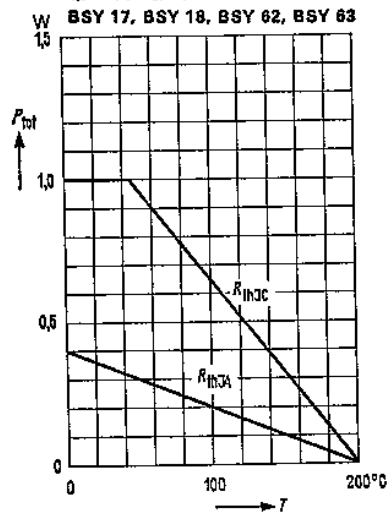
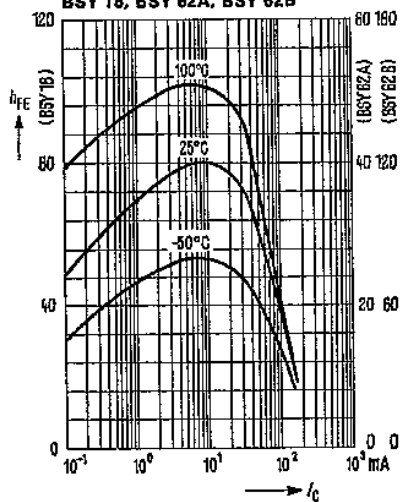
	BSY 17	BSY 18	BSY 62	BSY 63	
f_T	>280	>280	>280	>300	MHz
C_{CBO}	2.7 (<5)	2.7 (<5)	2.7 (<5)	2.7 (<6)	pF

Switching times:**Operating point:** $I_C = 10\text{ mA}; I_{B1} = 3\text{ mA};$ $-I_{B2} = 1.5\text{ mA}; R_L = 270\ \Omega$

t_{on}	<16	<16	<40	<40	ns
t_{off}	<24	<24	<75	<75	ns

Operating point: $I_C = 100\text{ mA}; I_{B1} = 40\text{ mA};$ $-I_{B2} = 20\text{ mA}; R_L = 50\ \Omega$ $I_C = I_{B1} = -I_{B2} = 10\text{ mA};$ $R_L = 1\text{ k}\Omega$

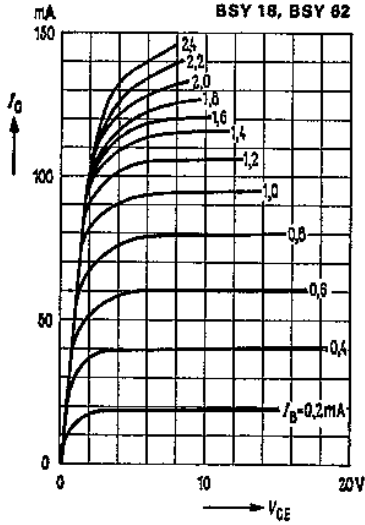
t_{on}	7	7	-	-	ns
t_{off}	25	25	-	-	ns
t_{stg}	<14	<18	<25	<25	ns

Total perm. power dissipation**versus temperature** $P_{tot} = f(T); R_{th} = \text{parameter}$ **BSY 17, BSY 18, BSY 62, BSY 63****DC current gain $h_{FE} = f(I_C)$** $V_{CE} = 1\text{ V}; T_{amb} = \text{parameter}$ **(common emitter configuration)****BSY 18, BSY 62A, BSY 62B**

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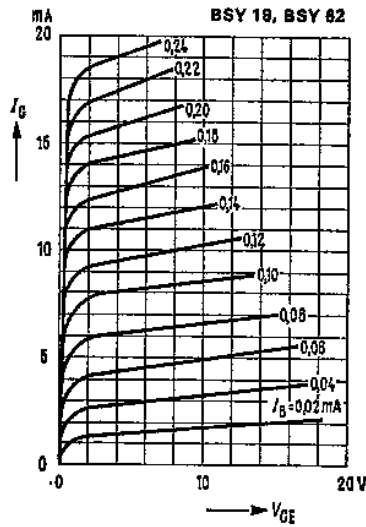
Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
(common emitter configuration)

BSY 18, BSY 62



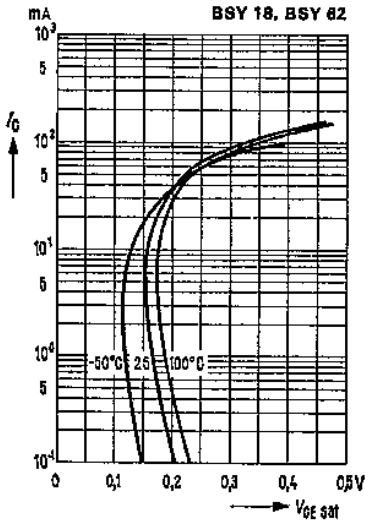
Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
(common emitter configuration)

BSY 18, BSY 62



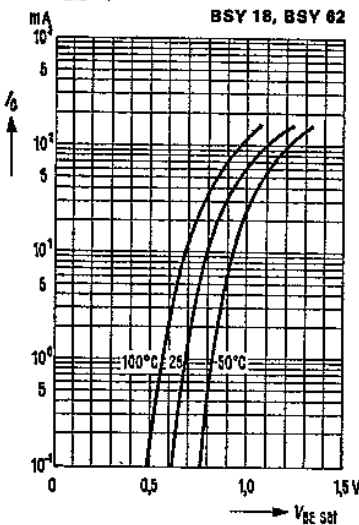
Collector-emitter saturation voltage
 $V_{CEsat} = f(I_C); h_{FE} = 10$
 $T_{amb} = \text{parameter}$

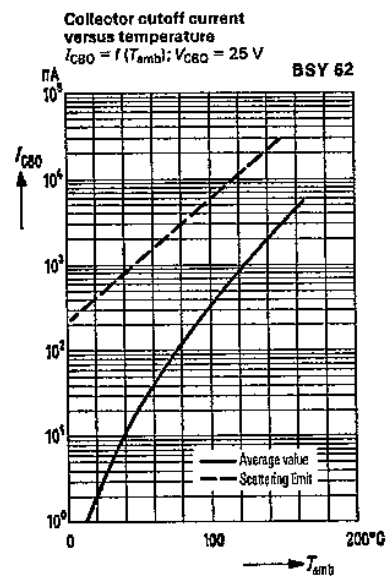
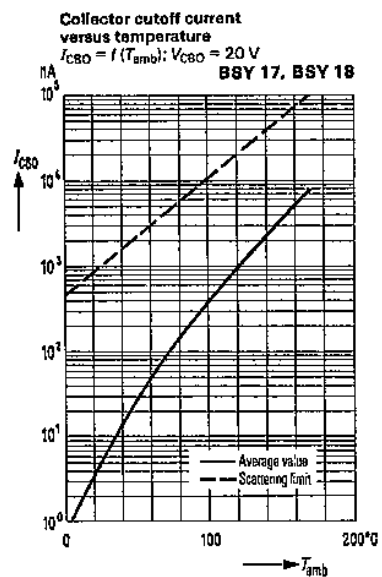
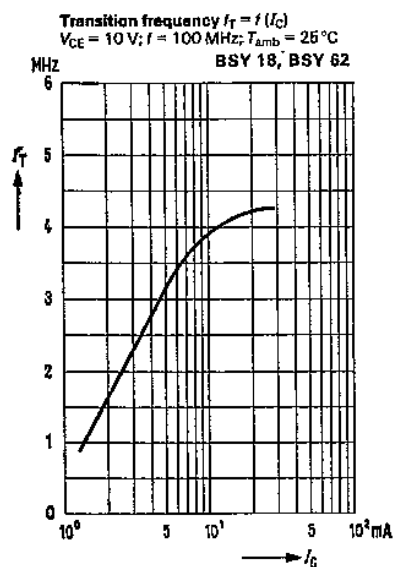
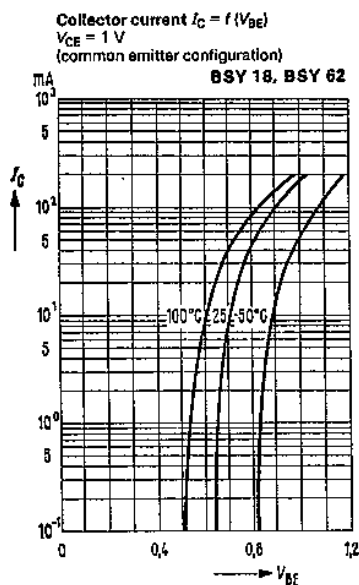
BSY 18, BSY 62



Base-emitter saturation voltage
 $V_{BEsat} = f(I_C); h_{FE} = 10$
 $T_{amb} = \text{parameter}$

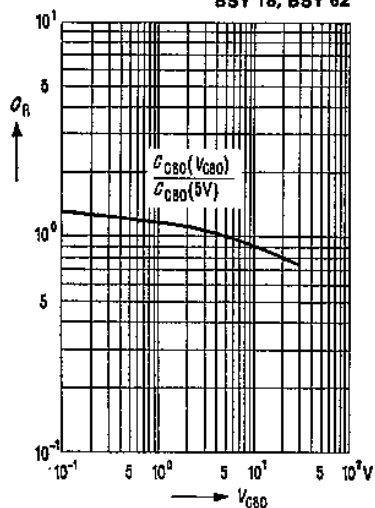
BSY 18, BSY 62





Collector-base capacitance
 $C_R = f(V_{CB0})$

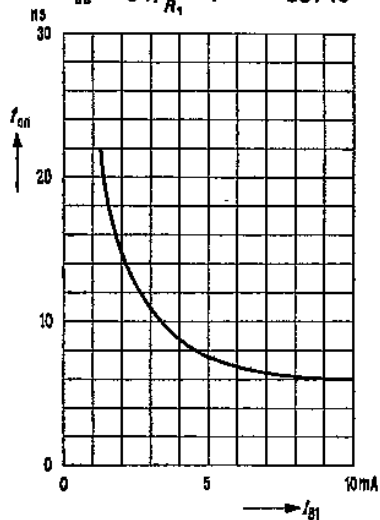
BSY 18, BSY 62



Turn-on time $t_{on} = f(I_{B1})$
 $I_C = 10 \text{ mA}; T_{amb} = 25^\circ\text{C}$

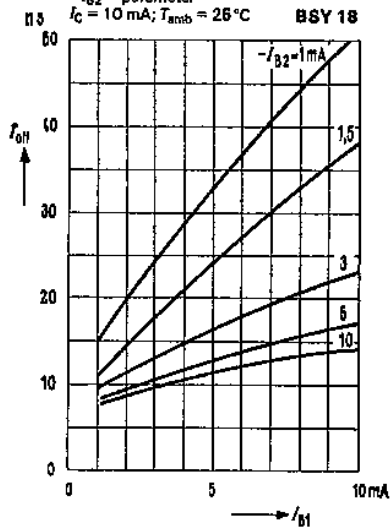
$V_{BB} = -3 \text{ V}; \frac{R_2}{R_1} = 1$

BSY 18



Turn-off time $t_{off} = f(I_{B1})$
 $-I_{B2} = \text{parameter}$
 $I_C = 10 \text{ mA}; T_{amb} = 25^\circ\text{C}$

BSY 18



Storage time $t_s = f(I_{B1})$
 $-I_{B2} = \text{parameter}$
 $I_C = 10 \text{ mA}; T_{amb} = 25^\circ\text{C}$

BSY 18

