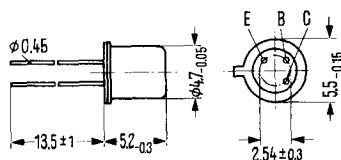


BSY 17, BSY 18, BSY 62, BSY 63

NPN RF Transistors for switching applications

BSY 17, BSY 18, BSY 62 and BSY 63 are double-diffused epitaxial NPN silicon planar RF transistors in a case 18A3 DIN 41876 (TO-18). Their collectors are electrically connected to their cases. Transistor BSY 17 corresponds to type 2N743, BSY 18 to 2N744, BSY 62 group A to type 2N706A and BSY 63 to type 2N708. The transistors are especially suitable for high-speed logic gate applications.

Type	Order number
BSY 17	Q60218-Y17
BSY 18	Q60218-Y18
BSY 62 A	Q60218-Y62-A
BSY 62 B	Q60218-Y62-B
BSY 63	Q60218-Y63



Weight approx. 0.3 g Dimensions in mm

Maximum ratings		BSY 18 BSY 17	BSY 62	BSY 63	
Collector-emitter voltage	V_{CEO}	12	15	15	V
Collector-base voltage	V_{CBO}	20	25	40	V
Emitter-base voltage	V_{EBO}	5	5	5	V
Collector current	I_C	200	200	200	mA
Junction temperature	T_J	200	200	200	°C
Storage temperature	T_S	-65 to +200	-65 to +200	-65 to +200	°C
Total power dissipation ($T_{case} = 45\text{ °C}$)	P_{tot}	1	1	1	W
Thermal resistance					
Junction to ambient air	R_{thJamb}	≤ 500	≤ 500	≤ 500	K/W
Junction to case	$R_{thJcase}$	≤ 150	≤ 150	≤ 150	K/W

Static characteristics

Collector-base cutoff current
($V_{CBO} = 20\text{ V}$)
Collector-emitter breakdown voltage
($I_{CEO} = 10\text{ mA}$)
Emitter-base breakdown voltage
($I_{EBO} = 10\text{ }\mu\text{A}$)
Collector-base breakdown voltage
($I_{CBO} = 1\text{ }\mu\text{A}$)

T_{amb}	BSY 17		°C
	170	25	
I_{CBO}	< 100	< 1*	μA
$V_{(BR)CEO}$	—	> 12	V
$V_{(BR)EBO}$	—	> 5*	V
$V_{(BR)CBO}$	—	> 20	V

* AQL = 0.65%

BSY 17, BSY 18, BSY 62, BSY 63

Static characteristics

Collector-base cutoff current
($V_{CBO} = 20\text{ V}$)
Collector-emitter breakdown voltage
($I_{CEO} = 10\text{ mA}$)
Emitter-base breakdown voltage
($I_{EBO} = 10\text{ }\mu\text{A}$)

		BSY 18		
T_{amb}		170	25	$^{\circ}\text{C}$
I_{CBO}		< 100	< 1*	μA
$V_{(BR)CEO}$		—	> 12	V
$V_{(BR)EBO}$		—	> 5*	V

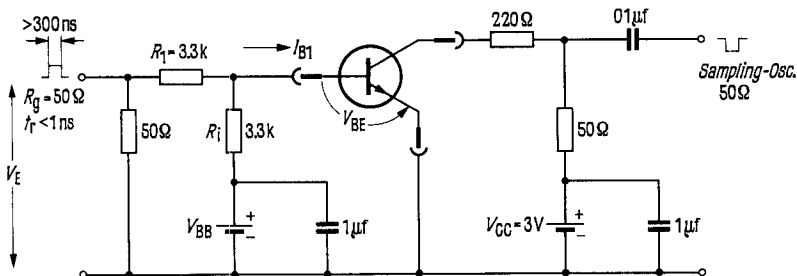
Collector-base cutoff current
($V_{CBO} = 15\text{ V}$)
Collector-emitter breakdown voltage
($I_{CEO} = 10\text{ mA}$)
Emitter-base breakdown voltage
($I_{EBO} = 10\text{ }\mu\text{A}$)
Collector-base breakdown voltage
($I_{CBO} = 1\text{ }\mu\text{A}$)

		BSY 62		
T_{amb}		150	25	$^{\circ}\text{C}$
I_{CBO}		< 30	< 0.5*	μA
$V_{(BR)CEO}$		—	> 15	V
$V_{(BR)EBO}$		—	> 5*	V
$V_{(BR)CBO}$		—	> 25	V

Collector-base cutoff current
($V_{CBO} = 20\text{ V}$)
Collector-emitter cutoff current
($V_{CE} = 20\text{ V}$; $V_{BE} = 0.25\text{ V}$;
 $T_{amb} = 125\text{ }^{\circ}\text{C}$)
Collector-emitter breakdown voltage
($I_{CEO} = 10\text{ mA}$)
Emitter-base breakdown voltage
($I_{EBO} = 10\text{ }\mu\text{A}$)
Collector-base breakdown voltage
($I_{CBO} = 1\text{ }\mu\text{A}$)

		BSY 63		
T_{amb}		150	25	$^{\circ}\text{C}$
I_{CBO}		< 15	0.003 (< 0.025)*	μA
I_{CEV}		< 10	—	μA
$V_{(BR)CEO}$		—	> 15	V
$V_{(BR)EBO}$		—	> 5*	V
$V_{(BR)CBO}$		—	> 40	V

Circuit for measuring on and off-switching times (t_{on} ; t_{off}), keying ratio < 2%



BSY 17, BSY 18, BSY 62, BSY 63

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

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*	0.65	—
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 static forward current transfer ratio 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*

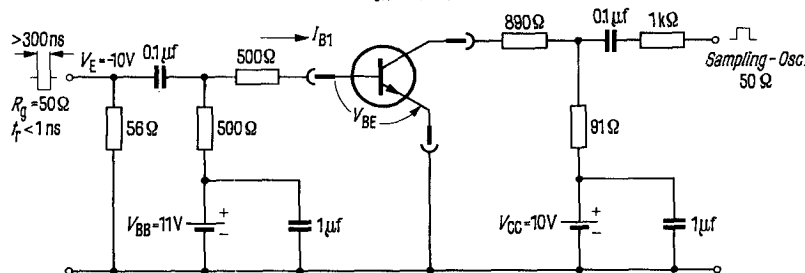
Saturation voltage ($I_C = 10\text{ mA}$; $I_B = 10\text{ mA}$) $V_{BEsat}^1) = < 0.9\text{ V}$
 $V_{CEsat}^1) = < 0.6\text{ V}$

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

Circuit for measuring storage time (t_s), keying ratio < 2%



¹⁾ The transistor has been overdriven to such an extent that the DC forward current transfer ratio has decreased to a value $h_{FE} = 10$.
 • AQL = 0.65%.

BSY 17, BSY 18, BSY 62, BSY 63

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

Current-gain bandwidth product ($I_C = 10\text{ mA}$;
 $V_{CE} = 10\text{ V}$; $f = 100\text{ MHz}$)
 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:

Test condition

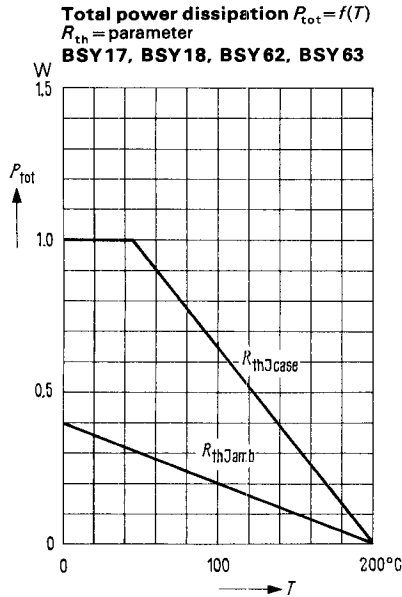
$I_C = 10\text{ mA}$; $I_{B1} = 3\text{ mA}$;
 $-I_{B2} = 1.5\text{ mA}$; $R_L = 270\text{ }\Omega$

Test condition

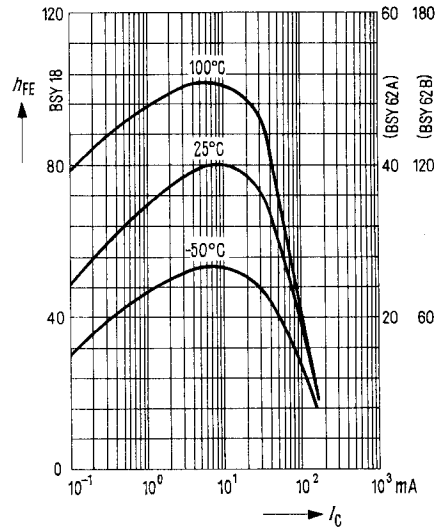
$I_C = 100\text{ mA}$; $I_{B1} = 40\text{ mA}$;
 $-I_{B2} = 20\text{ mA}$; $R_L = 50\text{ }\Omega$

$I_C = I_{B1} = -I_{B2} = 10\text{ mA}$;
 $R_L = 1\text{ k}\Omega$

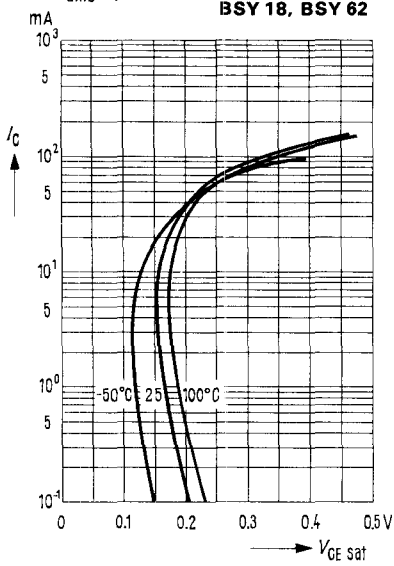
t_{on}	< 16	< 16	< 40	< 40	ns
t_{off}	< 24	< 24	< 75	< 75	ns
t_{on}	7	7	—	—	ns
t_{off}	25	25	—	—	ns
t_s	< 14	< 18	< 25	< 25	ns



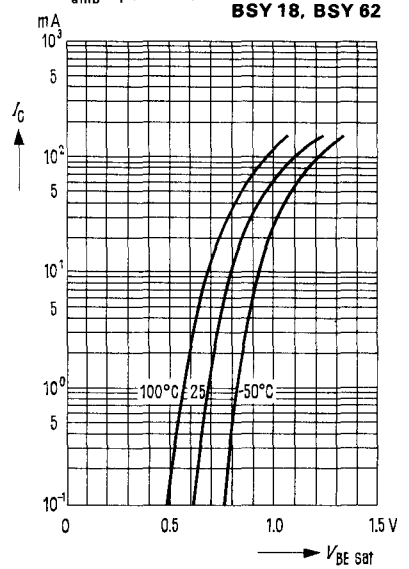
Static forward current transfer ratio $h_{FE} = f(I_C)$; $V_{CE} = 1\text{ V}$; T_{amb} = parameter (common emitter circuit) **BSY 18, BSY 62A, BSY 62B**



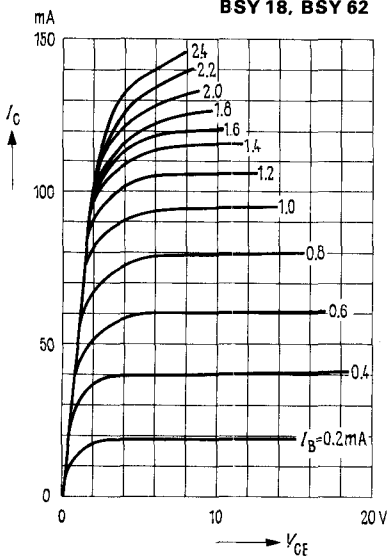
Collector-emitter saturation voltage
 $V_{CEsat} = f(I_C); h_{FE} = 10$
 $T_{amb} = \text{parameter}$



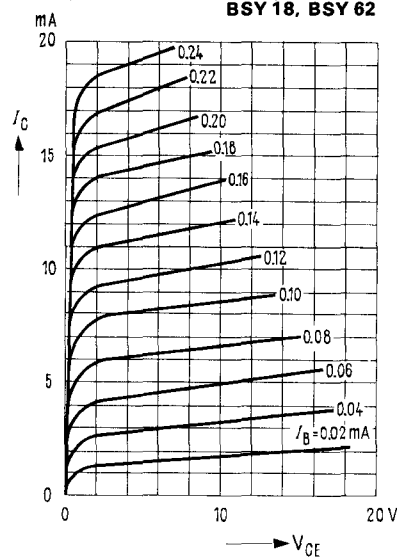
Base-emitter saturation voltage
 $V_{BEsat} = f(I_C); h_{FE} = 10$
 $T_{amb} = \text{parameter}$



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

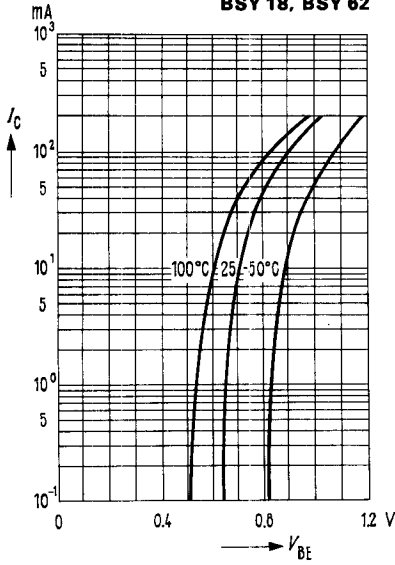


Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
 (common emitter circuit)

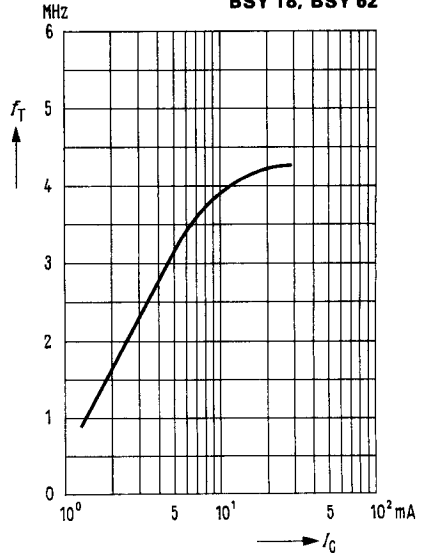


BSY 17, BSY 18, BSY 62

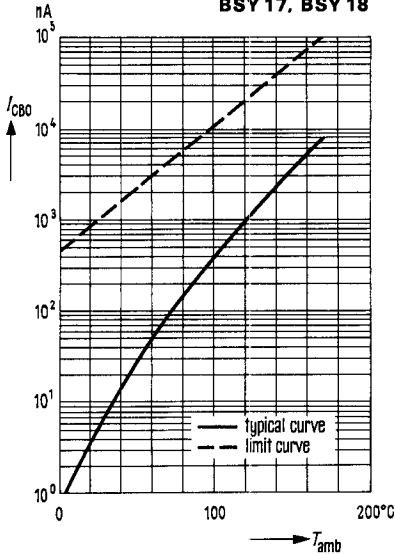
Collector current $I_C = f(V_{BE})$
 $V_{CE} = 1 \text{ V}$ (common emitter circuit)
BSY 18, BSY 62



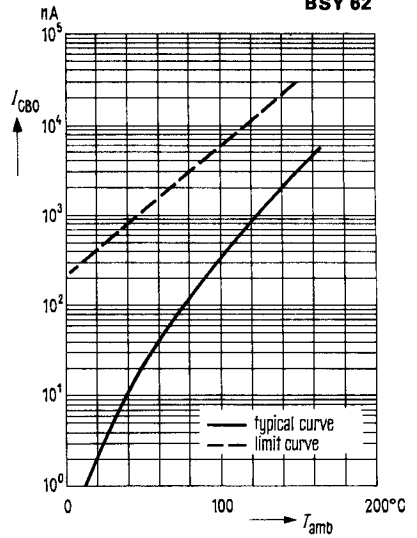
Current-gain bandwidth product $f_T = f(I_C)$
 $V_{CE} = 10 \text{ V}$;
 $T_{amb} = 25^\circ\text{C}$; $f = 100 \text{ MHz}$
BSY 18, BSY 62



Collector-base cutoff current $I_{CBO} = f(T_{amb})$
 $V_{CBO} = 20 \text{ V}$
BSY 17, BSY 18

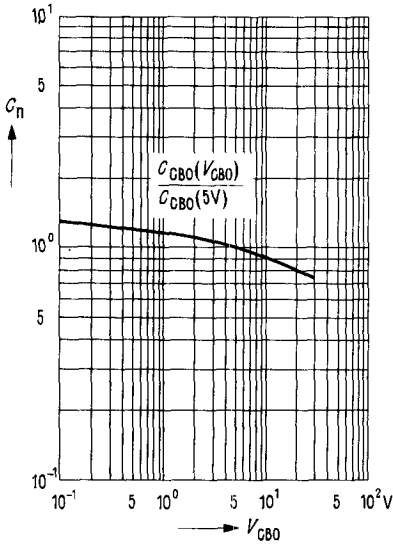


Collector-base cutoff current $I_{CBO} = f(T_{amb})$
 $V_{CBO} = 15 \text{ V}$
BSY 62



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

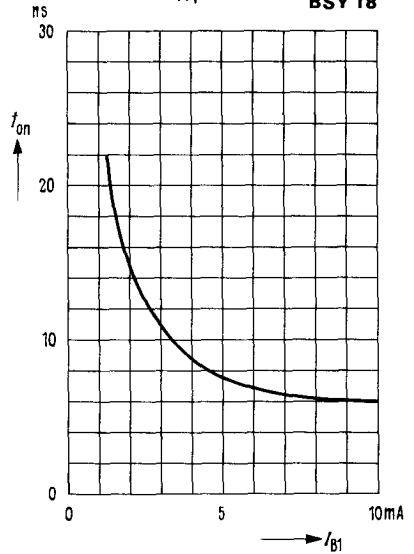
BSY 18, BSY 62



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

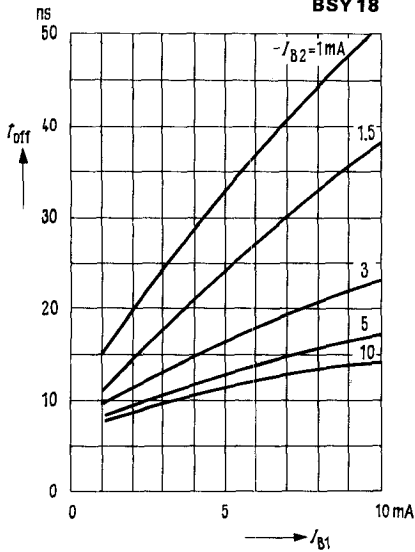
$V_{BB} = -3 \text{ V}; \frac{R_2}{R_1} = 1$

BSY 18



Switch-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

