

NPN Silicon Planar Transistors

BDW 25

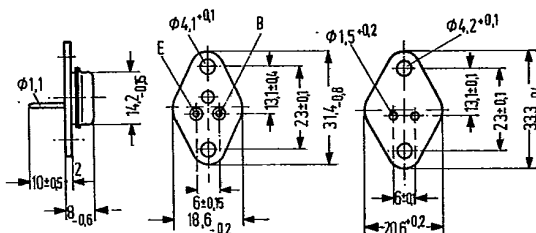
BDY 12

BDY 13

SIEMENS AKTIENGESELLSCHAFT 433 D

BDW 25, BDY 12, and BDY 13 are epitaxial NPN silicon planar power transistors in SOT 9 case (9 A 2 DIN 41875). The collector is electrically connected to the case. In order to ensure insulated fixing of the transistors on the chassis, a mica washer, each, and two insulating nipples are provided for. These have to be ordered separately. The transistors are particularly suitable for use in high Q AF output stages and as switches.

Type	Ordering code
BDW 25	Q62702-D378
BDW 25-4	Q62702-D378-V4
BDW 25-6	Q62702-D378-V2
BDW 25-10	Q62702-D378-V1
BDY 12	Q60204-Y12
BDY 12-6	Q60204-Y12-B
BDY 12-10	Q60204-Y12-C
BDY 12-16	Q60204-Y12-D
BDY 13	Q60204-Y13
BDY 13-6	Q60204-Y13-B
BDY 13-10	Q60204-Y13-C
BDY 13-16	Q60204-Y13-D
Mica washer	Q62901-B16-A
Insulating nipple	Q62901-B13-C



Approx. weight 8.3 g Dimensions in mm Mica washer
dry: $R_{th} = 2.5 \text{ K/W}$
greased: $R_{th} = 1 \text{ K/W}$

Maximum ratings

Maximum ratings		BDW 25	BDY 12	BDY 13	
Collector emitter voltage	V_{CEO}	125	40	60	V
Collector-base voltage	V_{CBO}	130	60	80	V
Emitter-base voltage	V_{EBO}	5	5	5	V
Collector current	I_C	5	5	5	A
Emitter current	I_E	3.5	—	—	A
Emitter peak current ¹⁾	I_{EM}	6	—	—	A
Base current	I_B	0.5	0.3	0.3	A
Base peak current ¹⁾	I_{BM}	1	—	—	A
Junction temperature	T_j	175	175	175	°C
Storage temperature range	T_{stg}	-65 to +125			°C
Total power dissipation ($T_{case} = 45\text{ °C}$; $V_{CE} < 13\text{ V}$)	P_{tot}	26	26	26	W
Thermal resistance					
Junction to ambient air	R_{thJA}	≤85	≤85	≤85	K/W
Junction to case	R_{thJC}	≤5	≤5	≤5	K/W

$$1) v \geq 10 t_p; t_p \leq 10 \text{ ns}$$

25C D ■ 8235605 0004434 1 ■ SIEG

25C 04434 D

BDW 25

BDY 12

BDY 13

SIEMENS AKTIENGESELLSCHAFT T-33-09

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

The transistors BDW 25, BDY 12, and BDY 13 are grouped according to the DC current gain h_{FE} at $I_{\text{C}} = 1 \text{ A}$, $V_{\text{CE}} = 1 \text{ V}$, and marked by numerals of the German DIN-R-5 standard. For the conditions stated below, the following data applies:

Type		BDW 25	BDW 25 BDY 12, BDY 13		BDY 12, BDY 13	BDW 25 BDY 12 BDY 13
h_{FE} group		4	6	10	16	
V_{CE} V	I_{C} A	h_{FE} $I_{\text{C}}/I_{\text{B}}$	h_{FE} $I_{\text{C}}/I_{\text{B}}$	h_{FE} $I_{\text{C}}/I_{\text{B}}$	h_{FE} $I_{\text{C}}/I_{\text{B}}$	V_{BE} V
1	0.01	35 (> 15)	55	75	120	
1	1	40 (25 to 60)	63 (40 to 100)	100 (63 to 160)	160 (100 to 250)	<1.2*
2	3	25 (> 10)	40	70	120	<1.4

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

		BDW 25	BDY 12	BDY 13	
Collector-emitter saturation voltage ($I_{\text{C}} = 3 \text{ A}$; $I_{\text{B}} = 0.3 \text{ A}$)					
V_{CEsat}		<1	<1	<1	V
Base-emitter saturation voltage ($I_{\text{C}} = 3 \text{ A}$; $I_{\text{B}} = 0.3 \text{ A}$)					
V_{BEsat}		1 (<1.4)	1 (<1.3)	1 (<1.3)	V
Collector cutoff current ($V_{\text{CE}} = 80 \text{ V}$)					
I_{CES}		<1	—	—	μA
Collector cutoff current ($V_{\text{CE}} = 80 \text{ V}$; $T_{\text{amb}} = 125^{\circ}\text{C}$)					
I_{CES}		<400	—	—	μA
Collector cutoff current ($V_{\text{CES}} = 40 \text{ V}$)					
I_{CES}		—	<1	—	μA
Collector cutoff current ($V_{\text{CES}} = 40 \text{ V}$; $T_{\text{amb}} = 125^{\circ}\text{C}$)					
I_{CES}		—	<400	—	μA
Collector cutoff current ($V_{\text{CES}} = 60 \text{ V}$)					
I_{CES}		—	—	<1	μA
Collector cutoff current ($V_{\text{CES}} = 60 \text{ V}$; $T_{\text{amb}} = 125^{\circ}\text{C}$)					
I_{CES}		—	—	<400	μA
Emitter cutoff current ($V_{\text{EBO}} = 4 \text{ V}$)					
I_{EBO}		<1	<1	<1	μA

* AQL = 0.65%

480

1857

G-04

25C D 8235605 0004435 3 SIEG
25C 04435 D

SIEMENS AKTIENGESELLSCHAFT — T-33-09 — BDW 25
BDY 12
BDY 13

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

Collector emitter breakdown voltage
($I_C = 50\text{ mA}$)

	BDW 25	BDY 12	BDY 13	
$V_{(\text{BR})\text{CEO}}$	> 125	> 40	> 60	V

(Pulse width 200 μs , duty cycle 1%)

Collector base breakdown voltage
($I_C = 100\text{ }\mu\text{A}$)

$V_{(\text{BR})\text{CBO}}$	> 130	> 60	> 80	V
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Emitter base breakdown voltage
($I_C = 10\text{ }\mu\text{A}$)

$V_{(\text{BR})\text{EBO}}$	> 5	> 5	> 5	V
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Dynamic characteristics ($T_{\text{amb}} = 25^\circ\text{C}$)

Transition frequency

($I_C = 200\text{ mA}$; $V_{\text{CE}} = 10\text{ V}$; $f = 20\text{ MHz}$)

f_T	> 30	70 (> 30)	70 (> 30)	MHz
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Collector base capacitance

($V_{\text{CB}} = 10\text{ V}$; $I_E = 0$; $f = 1\text{ MHz}$)

C_{CBO}	< 70	35 (< 70)	35 (< 70)	pF
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Switching times

($I_C = 1\text{ A}$; I_{B1} approx. $-I_{\text{B2}}$ approx. 50 mA)

t_{on}	< 0,3	< 0,3	< 0,3	μs
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($I_C = 2\text{ A}$; I_{B1} approx. $-I_{\text{B2}}$ approx. 200 mA)

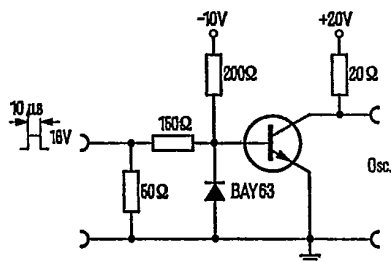
t_{off}	< 1,5	< 1,5	< 1,5	μs
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t_{on}	< 0,5	—	—	μs
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t_{off}	< 2	—	—	μs
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t_s	< 1	—	—	μs
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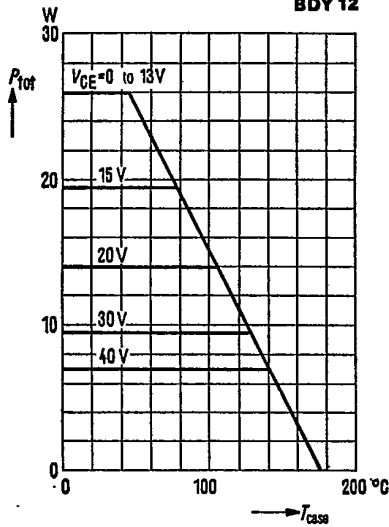
Test circuit for switching times



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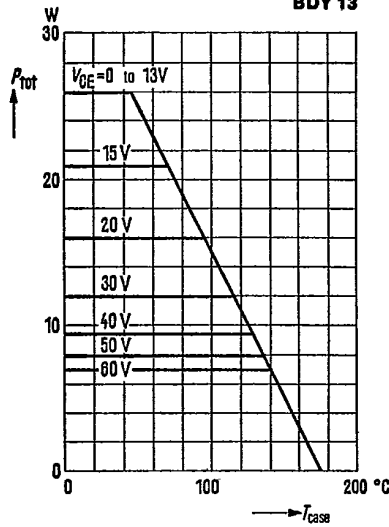
Total perm. power dissipation
versus temperature
 $P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$

BDY 12



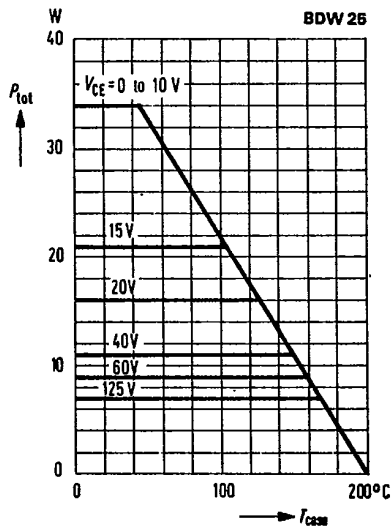
Total perm. power dissipation
versus temperature
 $P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$

BDY 13



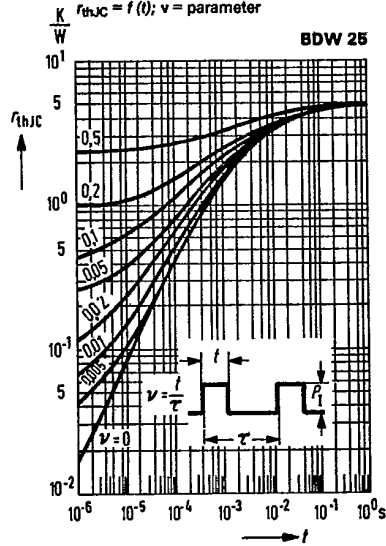
Total perm. power dissipation
versus temperature
 $P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$

BDW 25

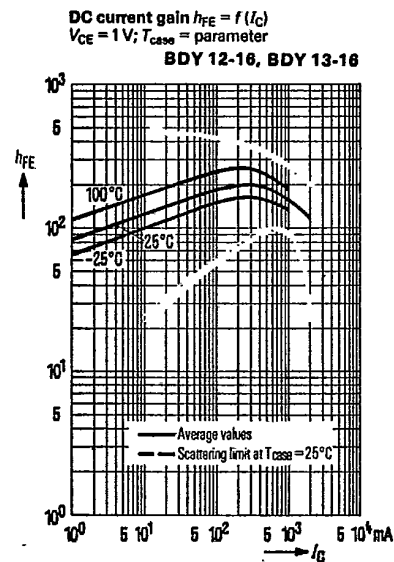
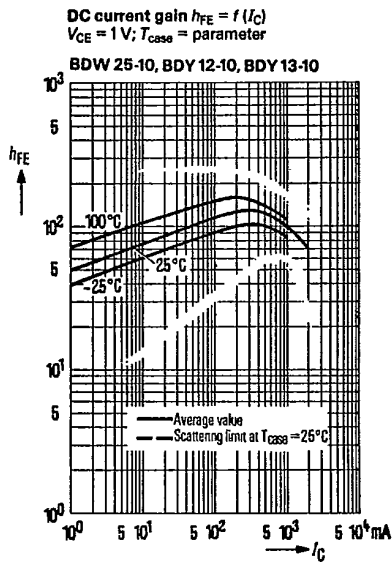
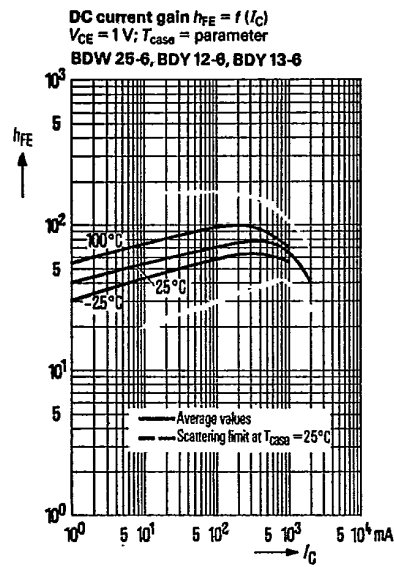
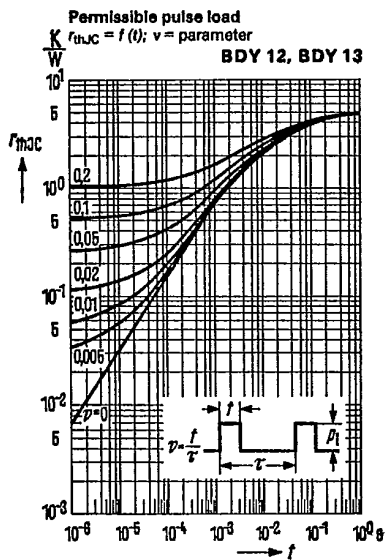


Permissible pulse load
 $r_{thJC} = f(t); v = \text{parameter}$

BDW 25

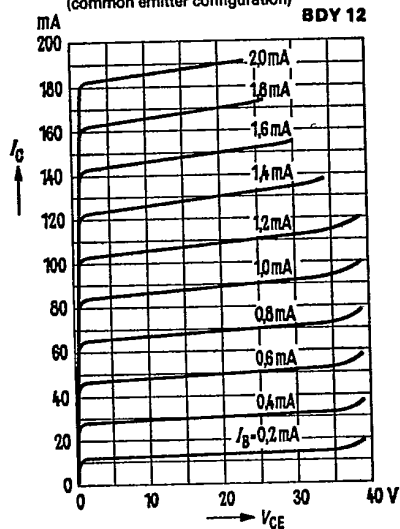


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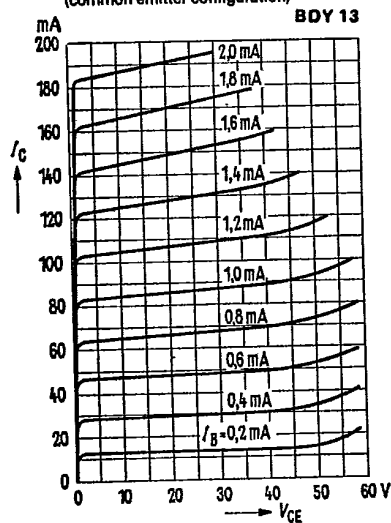


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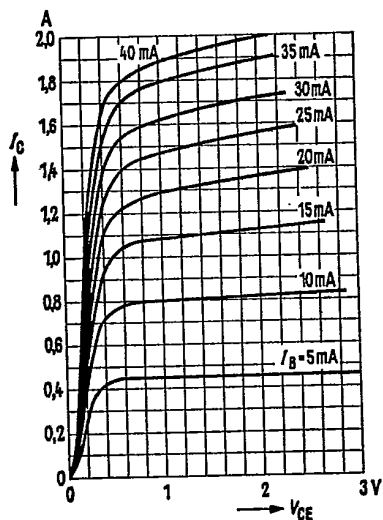
Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
(common emitter configuration)



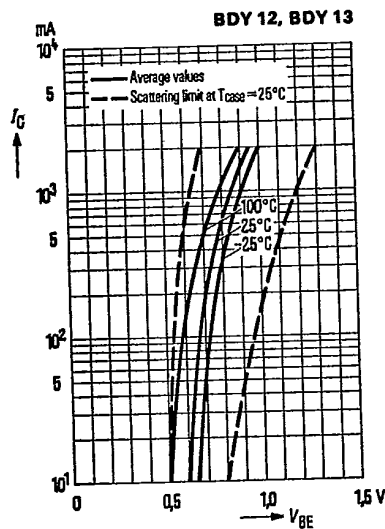
Output characteristics $I_C = f(V_{CE})$
 $I_B = \text{parameter}$
(common emitter configuration)



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



Collector current $I_C = f(V_{BE})$
 $V_{CE} = 1V$



T-33-09

BDW 25
BDY 12
BDY 13

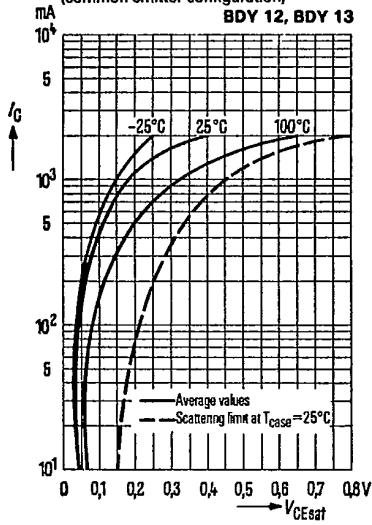
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Collector-emitter saturation voltage

$V_{CEsat} = f(I_C)$

 $h_{FE} = 10$; $T_{case} = \text{parameter}$
(common emitter configuration)

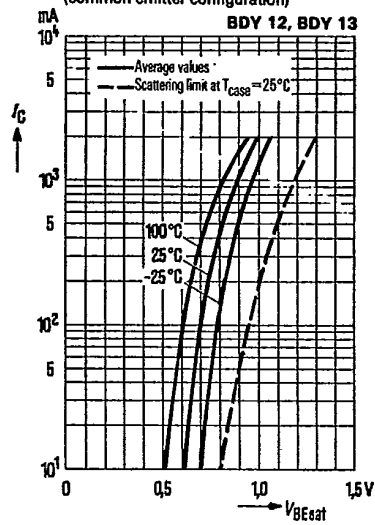
BDY 12, BDY 13

**Base-emitter saturation voltage**

$V_{BEsat} = f(I_C)$

 $h_{FE} = 10$; $T_{case} = \text{parameter}$
(common emitter configuration)

BDY 12, BDY 13

**Collector cutoff current versus temperature** $I_{CBO} = f(T_{case})$ for maximum
permissible reverse voltage.

BDY 12, BDY 13

