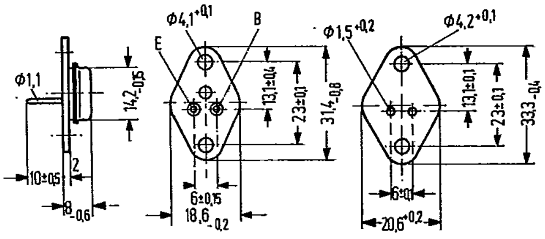
NPN Silicon Planar Transistors

BDW 25
BDY 12
BDY 13

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 K/W
greased: R_{th} = 1 K/W

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 °C; V_{CE} < 13 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] $v \geq 10\ t_p$; $t_p \leq 10$ ns

Static characteristics (T_{case} = 25°C)

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

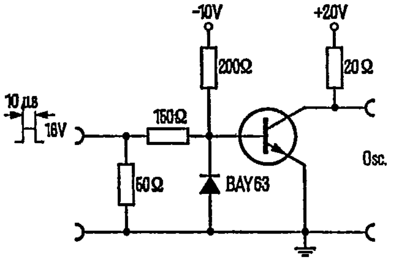
Type		BDW 25	BDW 25 BDY 12, BDY 13		BDY 12, BDY 13	BDW 25 BDY 12 BDY 13
h_{FE} group		4	6	10	16	
V_{CE} V	I_C A	h_{FE} I_C/I_B	h_{FE} I_C/I_B	h_{FE} I_C/I_B	h_{FE} I_C/I_B	V_{BE} V
1	0.01	35 (>15)	55	75	120	
1	1	40 (25 to 60)	63 (40 to 100)	100 (63 to 160)	160 (100 to 250)	<1.2*
2	3	25 (>10)	40	70	120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

Static characteristics (T_{case} = 25°C)		**BDW 25**	**BDY 12**	**BDY 13**	
Collector-emitter saturation voltage (I_C = 3 A; I_B = 0.3 A)	V_{CEsat}	<1	<1	<1	V
Base-emitter saturation voltage (I_C = 3 A; I_B = 0.3 A)	V_{BEsat}	1 (<1.4)	1 (<1.3)	1 (<1.3)	V
Collector cutoff current (V_{CE} = 80 V)	I_{CES}	<1	–	–	µA
Collector cutoff current (V_{CE} = 80 V, T_{amb} = 125°C)	I_{CES}	<400	–	–	µA
Collector cutoff current (V_{CES} = 40 V)	I_{CES}	–	<1	–	µA
Collector cutoff current (V_{CES} = 40 V; T_{amb} = 125°C)	I_{CES}	–	<400	–	µA
Collector cutoff current (V_{CES} = 60 V)	I_{CES}	–	–	<1	µA
Collector cutoff current (V_{CES} = 60 V; T_{amb} = 125°C)	I_{CES}	–	–	<400	µA
Emitter cutoff current (V_{EBO} = 4 V)	I_{EBO}	<1	<1	<1	µA

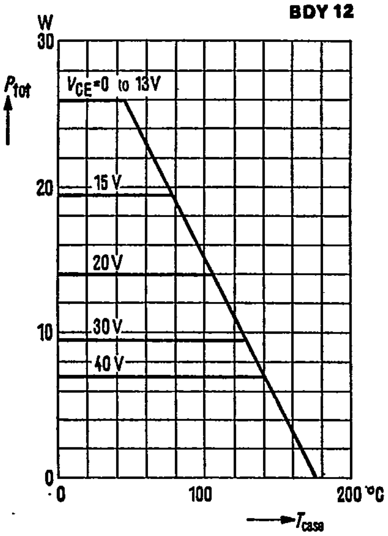
* AQL = 0.65%

Static characteristics (T_{case} = 25 °C)		BDW 25	BDY 12	BDY 13	
Collector emitter breakdown voltage (I_C = 50 mA) (Pulse width 200 µs, duty cycle 1%)	$V_{(BR)CEO}$	>125	>40	>60	V
Collector base breakdown voltage (I_C = 100 µA)	$V_{(BR)CBO}$	>130	>60	>80	V
Emitter base breakdown voltage (I_C = 10 µA)	$V_{(BR)EBO}$	>5	>5	>5	V
Dynamic characteristics (T_{amb} = 25 °C)					
Transition frequency (I_C = 200 mA; V_{CE} = 10 V; f = 20 MHz)	f_T	>30	70 (>30)	70 (>30)	MHz
Collector base capacitance (V_{CB} = 10 V; I_E = 0; f = 1 MHz)	C_{CBO}	<70	35 (<70)	35 (<70)	pF
Switching times (I_C = 1 A; I_{B1} approx. $-I_{B2}$ approx. 50 mA)	t_{on}	<0,3	<0,3	<0,3	µs
	t_{off}	<1,5	<1,5	<1,5	µs
(I_C = 2 A; I_{B1} approx. $-I_{B2}$ approx. 200 mA)	t_{on}	<0,5	–	–	µs
	t_{off}	<2	–	–	µs
	t_s	<1	–	–	µs

Test circuit for switching times



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



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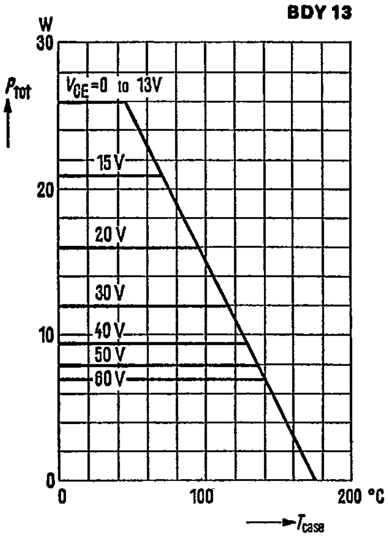

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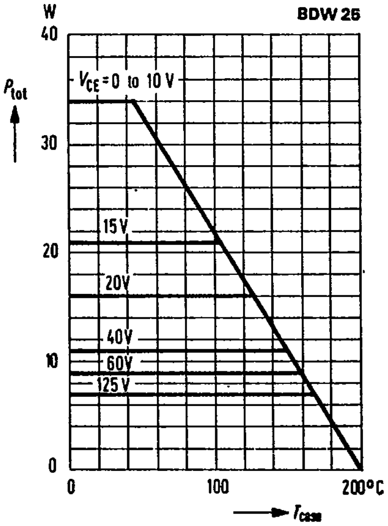
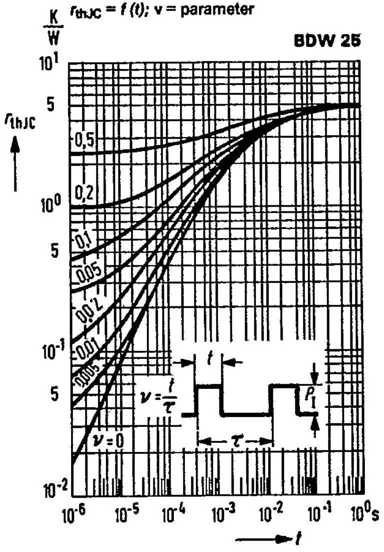
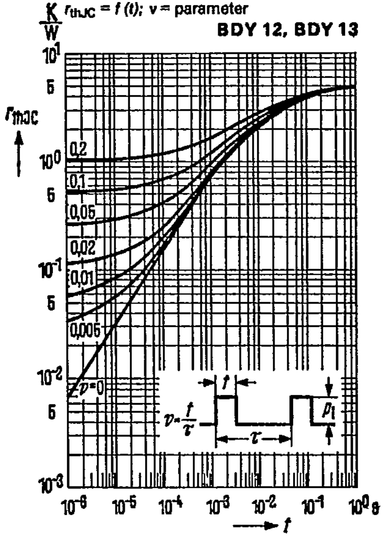


Permissible pulse load
$r_{thJC} = f(t)$; v = parameter

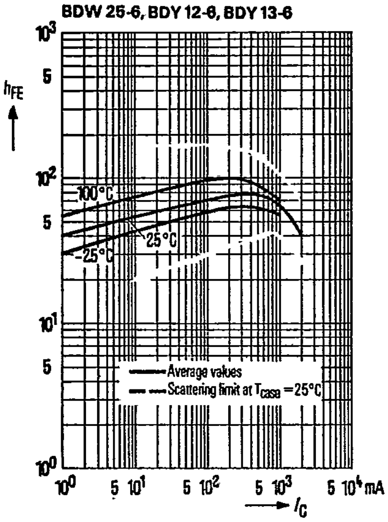


BDW 25
BDY 12
BDY 13

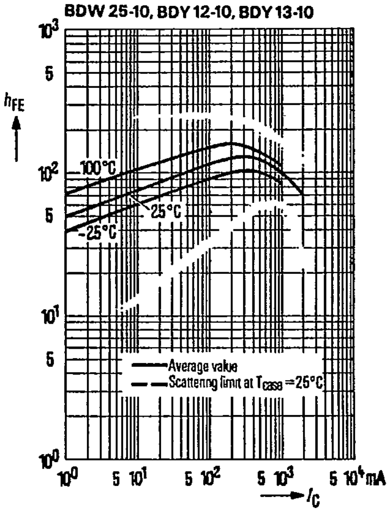
Permissible pulse load
$r_{thJC} = f(t)$; v = parameter
BDY 12, BDY 13



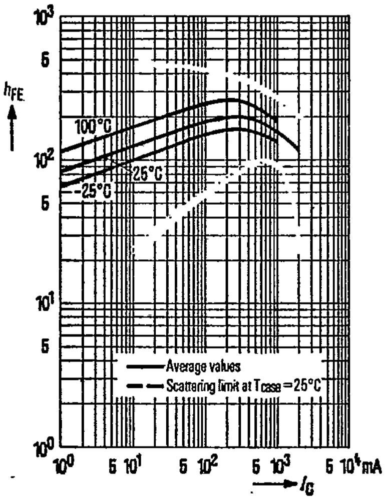
DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 1$ V; T_{case} = parameter
BDW 25-6, BDY 12-6, BDY 13-6



DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 1$ V; T_{case} = parameter
BDW 25-10, BDY 12-10, BDY 13-10

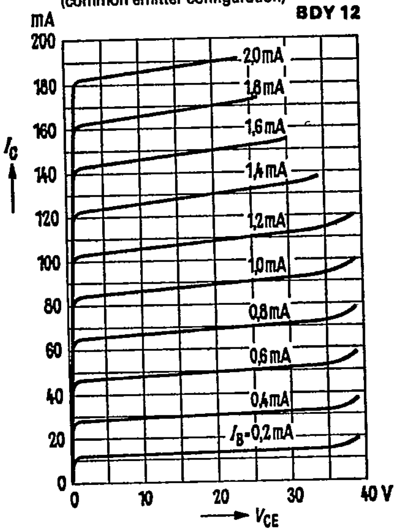


DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 1$ V; T_{case} = parameter
BDY 12-16, BDY 13-16



BDW 25
BDY 12
BDY 13

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



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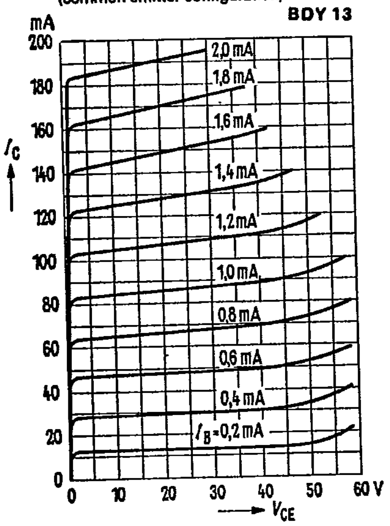
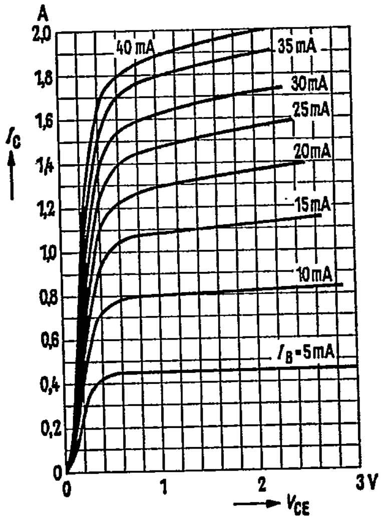
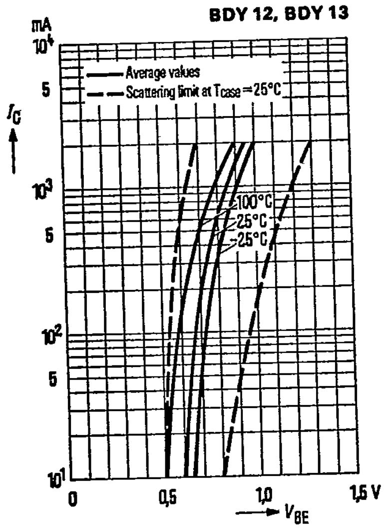


Output characteristics $I_C = f(V_{CE})$
I_B = parameter
(common emitter configuration)



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



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BDW 25
BDY 12
BDY 13

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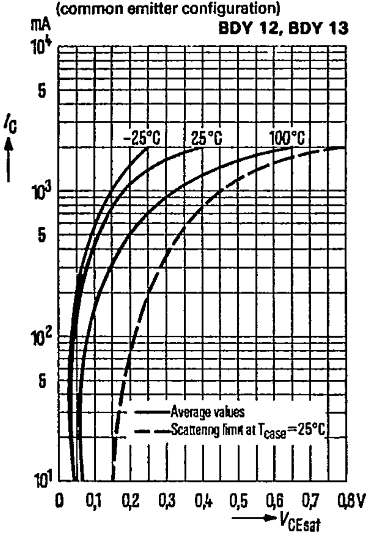
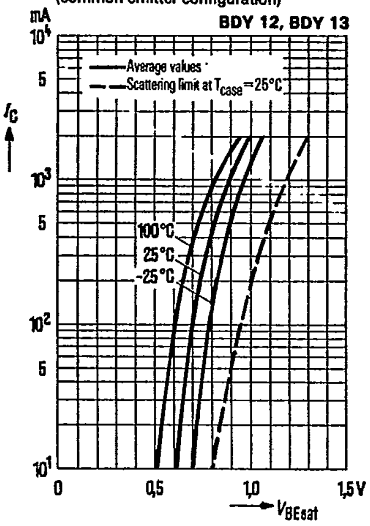
Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$
$h_{FE} = 10$; T_{case} = parameter
(common emitter configuration)



Base-emitter saturation voltage
$V_{BEsat} = f(I_C)$
$h_{FE} = 10$; T_{case} = parameter
(common emitter configuration)



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