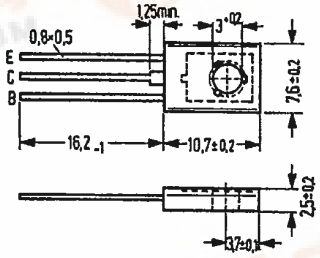
PNP Silicon Epibase Transistors

BD 434
BD 436
BD 438
BD 440
BD 442

Power transistors for complementary AF stages

The transistors BD 434, BD 436, BD 438, BD 440 and BD 442 are PNP silicon epibase power transistors in a TO 126 plastic package (12 A 3 DIN 41869, sheet 4). The collector is electrically connected to the metallic mounting area. The transistors are particularly suitable for use in push-pull output stages, driver stages and for general AF applications. Their complementary types are the NPN transistors BD 433, BD 435, BD 437, BD 439, and BD 441.

Type	Ordering code
BD 434	Q62702-D202
BD 434/BD 433 paired	Q62702-D217
BD 436	Q62702-D204
BD 436/BD 435 paired	Q62702-D218
BD 438	Q62702-D213
BD 4380BD 437 paired	Q62702-D219
BD 440	Q62702-D281
BD 440/BD 439 paired	Q62702-D284
Bd 442	Q62702-D283
BD 442/BD 441 paired	Q62702-D285
Mica washer	Q62902-B62
Spring washer A3 DIN137	Q62902-B63



Approx. weight 0.5 g Dimensions in mm

Transistor fixing with M 3 screw. Starting torque max. 0.8 Nm; washer or spring washer should be used.
1) If a 50 µ mica washer (ungreased) is used, the thermal resistance increases by 8 K/W and in case of a greased one by 4 K/W.

Maximum ratings		BD 434	BD 436	BD 438	BD 440	BD 442	
Collector-emitter voltage	$-V_{CEO}$	22	32	45	60	80	V
Collector-emitter voltage	$-V_{CES}$	22	32	45	60	80	V
Collector-base voltage	$-V_{CBO}$	22	32	45	60	80	V
Emitter-base voltage	$-V_{EBO}$	5	5	5	5	5	V
Collector current	$-I_C$	4	4	4	4	4	A
Collector peak current (t < 10 ms)	$-I_{CM}$	7	7	7	7	7	A
Emitter peak current (t < 10 ms)	$-I_{EM}$	7	7	7	7	7	A
Base current	$-I_B$	1	1	1	1	1	A
Junction temperature	T_j	150	150	150	150	150	°C
Storage temperature range	T_{stg}	−55 to +150					°C
Total power dissipation ($T_{case} \leq 25$ °C; $V_{CE} \leq 12$ V)	P_{tot}	36	36	36	36	36	W
Thermal resistance							
Junction to ambien air	R_{thJA}	≤100	≤100	≤100	≤100	≤100	K/W
Junction to mounting area	R_{thJC} 1)	≤3,5	≤3,5	≤3,5	≤3,5	≤3,5	K/W

BD 434
BD 436
BD 438
BD 440
BD 442

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

		BD 434	BD 436	BD 438	BD 440	BD 442	
Collector-emitter breakdown voltage ($-I_C$ = 100 mA)	$-V_{(BR)CEO}$	>22	>32	>45	>60	>80	V
Collector-emitter breakdown voltage ($-I_C$ = 100 µA)	$-V_{(BR)CES}$	>22	>32	>45	>60	>80	V
Collector-base breakdown voltage ($-I_C$ = 100 µA)	$-V_{(BR)CBO}$	>22	>32	>45	>60	>80	V
Emitter-base breakdown voltage (I_E = 1 mA)	$-V_{(BR)EBO}$	>5	>5	>5	>5	>5	
Collector cutoff current ($-V_{CB}$ = 22 V)	$-I_{CBO}$	<100	–	–	–	–	µA
Collector cutoff current ($-V_{CB}$ = 32 V)	$-I_{CBO}$	–	<100	–	–	–	µA
Collector cutoff current ($-V_{CB}$ = 45 V)	$-I_{CBO}$	–	–	<100	–	–	µA
Collector cutoff current ($-V_{CB}$ = 60 V)	$-I_{CBO}$	–	–	–	<100	–	µA
Collector cutoff current ($-V_{CB}$ = 80 V)	$-I_{CBO}$	–	–	–	–	<100	µA
Collector cutoff current ($-V_{CB}$ = 10 V; T_{amb} = 150 °C)	$-I_{CBO}$	<1	<1	<1	<1	<1	mA
Collector cutoff current ($-V_{CB}=V_{CBmax}$; T_{amb}=150 °C)	$-I_{CBO}$	<3	<3	<3	<3	<3	mA
Base-emitter forward voltage ($-I_C$ = 2 A; $-V_{CE}$ = 1 V)	$-V_{BE}$	<1.1	<1.1	<1.2	<1.5	<1.5	V
Base-emitter forward voltage ($-I_C$ = 3 A; $-V_{CE}$ = 1 V)	$-V_{BE}$	–	–	<1.3	<1.6	<1.6	V
Collector-emitter saturation voltage ($-I_C$ = 2 A)[1]	$-V_{CEsat}$	<0.8	<0.8	–	–	–	V
Collector-emitter saturation voltage ($-I_C$ = 2 A; $-I_B$ = 0.2 A)	$-V_{CEsat}$	<0.5	<0.5	<0.6	<0.8	<0.8	V
Collector-emitter saturation voltage ($-I_C$ = 3 A; $-I_B$ = 0.3 A)	$-V_{CEsat}$	–	–	<0.7	<0.9	<0.9	V
DC current gain ($-I_C$ = 10 mA; $-V_{CE}$ = 5 V)	h_{FE}	>40	>40	>30	>20	>15	–
($-I_C$=500 mA; $-V_{CE}$=1V)[2]	h_{FE}	>85	>85	>85	>40	>40	–
($-I_C$ = 2 A; $-V_{CE}$ = 1 V)	h_{FE}	>50	>50	>40	>25	>15	–

1) For the characteristics which passes through the point I_C = 2.2 mA and V_{CE} = 1 V at constant base current.
2) Available as matching pairs with BD 433, BD 435, BD 437, BD 439, and BD 441. Condition for matching pairs $h_{FE1}/h_{FE2} \leq 1.41$.

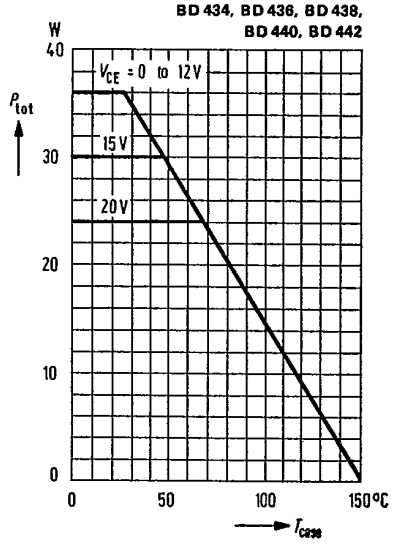
SIEMENS AKTIENGESELLSCHAF

BD 434
BD 436
BD 438
BD 440
BD 442

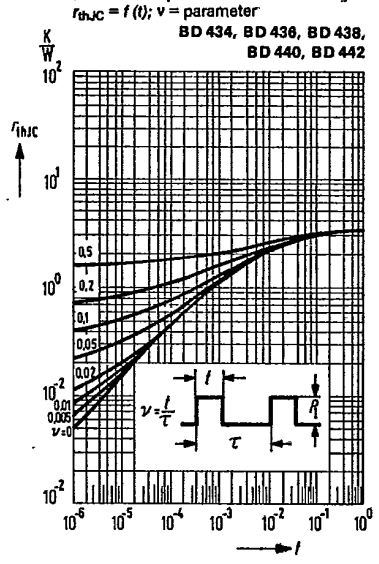
Dynamic characteristics (T_{case} = 25 °C)

		BD 434	BD 436	BD 438	BD 440	BD 442	
Transition frequency ($-I_C$ = 0,25 A; $-V_{CE}$ = 1 V; f = 1 MHz)	f_T	>3	>3	>3	>3	>3	MHz
Cutoff frequency in common emitter configuration ($-I_C$ = 0.25 A; $-V_{CE}$ = 1 V)	f_{hfe}	>20	>20	>20	>20	>20	kHz

Total perm. power dissipation versus temperature
$P_{tot} = f(T_{case})$; V_{CE} = 0 to 12 V
BD 434, BD 436, BD 438, BD 440, BD 442



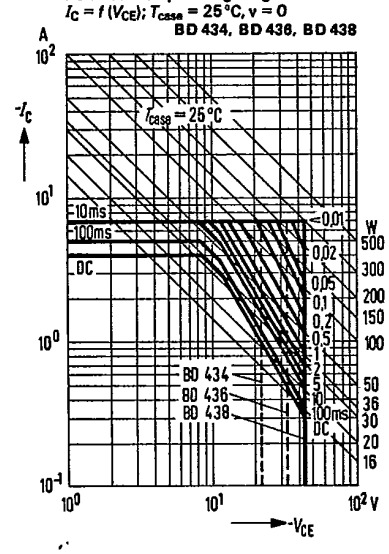
Permissible pulse load
$r_{thJC} = f(t)$; v = parameter
BD 434, BD 436, BD 438, BD 440, BD 442



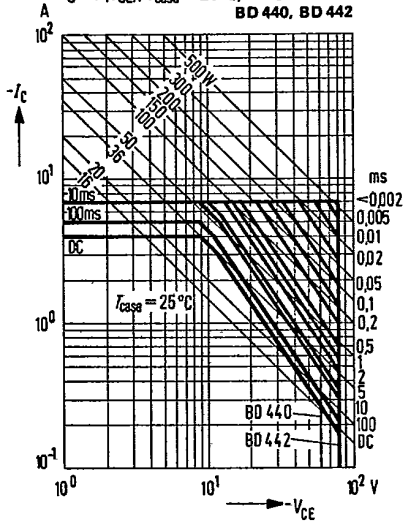
Permissible operating range

BD 434
BD 436
BD 438
BD 440
BD 442

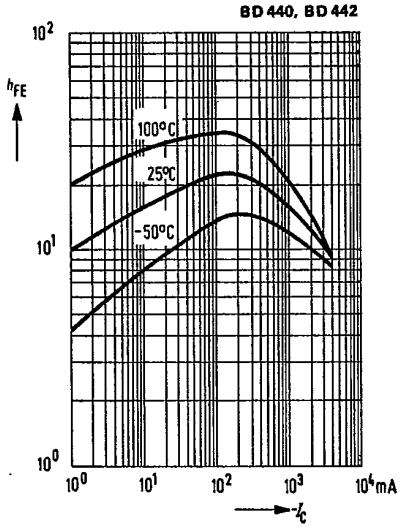
Permissible operating range
$I_C = f(V_{CE})$; $T_{case} = 25\,°C$, v = 0
BD 434, BD 436, BD 438



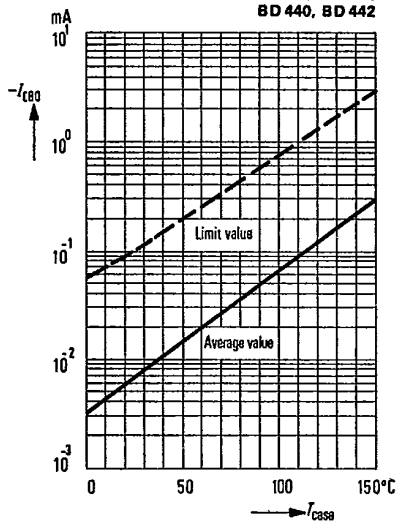
Permissible operating range
$I_C = f(V_{CE})$; $T_{case} = 25\,°C$, v = 0
BD 440, BD 442



DC current gain $h_{FE} = f(I_C)$
$V_{CE} = 1\,V$; T_{case} = parameter
BD 434, BD 436, BD 438, BD 440, BD 442



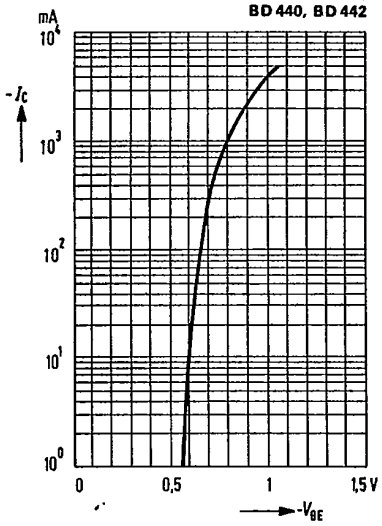
Collector cutoff current versus temperature $-I_{CBO} = f(T_{case})$
$-V_{CB} = -V_{CBmax}$
BD 434, BD 436, BD 438, BD 440, BD 442



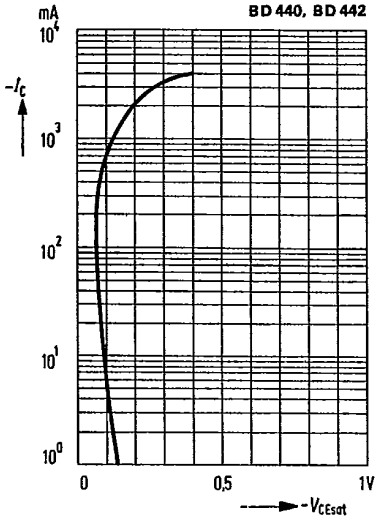
SIEMENS AKTIENGESELLSCHAF

BD 434
BD 436
BD 438
BD 440
BD 442

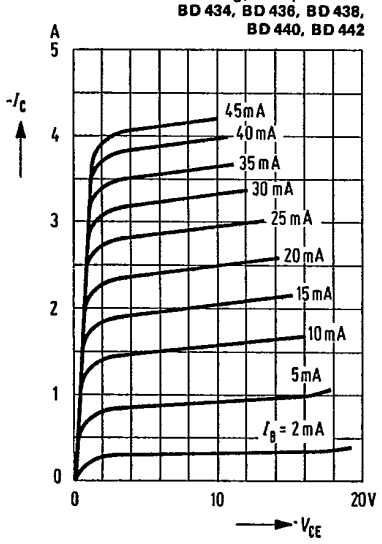
Collector current $I_C = f(V_{BE})$
$-V_{CE} = 2$ V; $T_{case} = 25$ °C
BD 434, BD 436, BD 438, BD 440, BD 442



Collector-emitter saturation voltage
$V_{CEsat} = f(I_C)$; $h_{FE} = 10$
BD 434, BD 436, BD 438, BD 440, BD 442



Output characteristics $I_C = f(V_{CE})$
I_B = parameter
(common emitter configuration)
BD 434, BD 436, BD 438, BD 440, BD 442



Transition frequency $f_T = f(I_C)$
$T_{case} = 25$ °C
BD 434, BD 436, BD 438, BD 440, BD 442