

PNP Silicon Darlington Transistors

BD 676

BD 678

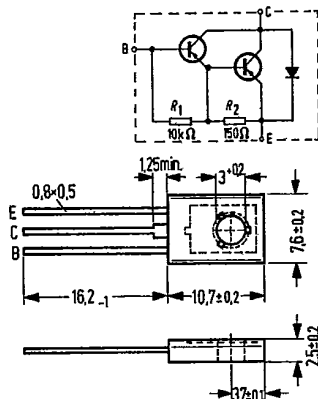
BD 680

SIEMENS AKTIENGESELLSCHAFT 14399 D

Epibase power darlington transistors (40 W)

BD 676, BD 678, and BD 680 are monolithic PNP silicon epibase power darlington transistors with diode and resistors in a TO 126 plastic package (12 A 3 DIN 41869, sheet 4). The collectors of the two transistors are electrically connected to the metallic mounting area. These darlington transistors for AF applications are outstanding for particularly high current gain. Together with BD 675, BD 677, and BD 679 they are especially suitable for complementary AF push-pull output stages and color TV correction stages.

Type	Ordering code
BD 676	Q62702-D239
BD 678	Q62702-D241
BD 680	Q62702-D243
Bd 676/BD 675 paired	Q62702-D244
BD 678/BD 677 paired	Q62702-D245
BD 680/BD 679 paired	Q62702-D246
Mica washer	Q62902-B62
Spring washer	Q62902-B63
A 3 DIN 137	



Approx. weight 0.5 g. Dimensions in mm

Maximum ratings

Maximum ratings		BD 676	BD 678	BD 680	
Collector-emitter voltage	$-V_{\text{CEO}}$	45	60	80	V
Collector-base voltage	$-V_{\text{CBO}}$	45	60	80	V
Base-emitter voltage	$-V_{\text{EBO}}$	5	5	5	V
Collector current	$-I_{\text{C}}$	4	4	4	A
Collector-peak current ($t \leq 1 \text{ ms}$)	$-I_{\text{CM}}$	7	7	7	A
Base current	$-I_{\text{B}}$	0.1	0.1	0.1	A
Storage temperature range	T_{stg}	-55 to +150			°C
Junction temperature	T_{j}	150	150	150	°C
Total power dissipation ($T_{\text{case}} \leq 25^{\circ}\text{C}$; $-V_{\text{CE}} \leq 20 \text{ V}$)	P_{tot}	40	40	40	W

Thermal resistance

Junction to ambient air	R_{thJA}	<100	<100	<100	K/W
Junction to case	$R_{thJC}^{1)}$	<3.12	<3.12	<3.12	K/W

1) Transistor fixing with M 3 screw, starting torque $M_A \leq 0.5$ to 0.8 Nm. If a 50μ mica washer (ungreased) is used, the thermal resistance increases by 8 K/W and in case of a greased one by 4 K/W. Below the screw head, a washer or a spring washer should be used.

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

		BD 676	BD 678	BD 680	
Collector cutoff current ($-V_{CB} = V_{CBmax}$)	$-I_{CBO}$	<0.2	<0.2	<0.2	mA
($-V_{BC} = V_{CBmax}$, $T_{amb} = 100^{\circ}\text{C}$)	$-I_{CBO}$	<2	<2	<2	mA
Collector cutoff current ($-V_{CE} = 0.5 V_{CEmax}$)	$-I_{CEO}$	<0.5	<0.5	<0.5	mA
Emitter cutoff current ($-V_{EB} = 5 \text{ V}$)	$-I_{EBO}$	<5	<5	<5	mA
Collector-emitter breakdown voltage ($-I_C = 100 \text{ mA}$) ¹⁾	$-V_{(BR)CEO}$	>45	>60	>80	V
Collector-base breakdown voltage ($-I_C = 1 \text{ mA}$)	$-V_{(BR)CBO}$	>45	>60	>80	V
Emitter-base breakdown voltage ($I_E = 5 \text{ mA}$)	$-V_{(BR)EBO}$	>5	>5	>5	V
DC current gain ($-I_C = 50 \text{ mA}$; $-V_{CE} = 3 \text{ V}$)	h_{FE}	750	750	750	—
($-I_C = 1.5 \text{ A}$; $-V_{CE} = 3 \text{ V}$)	h_{FE}	>750	>750(3000)	>750(3000)	—
($-I_C = 4 \text{ A}$; $-V_{CE} = 3 \text{ V}$)	h_{FE}	1000	1000	1000	—
Base-emitter forward voltage ($-I_C = 1.5 \text{ A}$; $-V_{CE} = 3 \text{ V}$)	$-V_{BE}$	<2.5	<2.5	<2.5	V
Collector-emitter saturation voltage ($-I_C = 1.5 \text{ A}$; $-I_B = 30 \text{ mA}$)	$-V_{CEsat}$	<2.5	<2.5	<2.5	V
Forward voltage of the protective diode at $I_F = 3 \text{ A}$	V_F	1.8	1.8	1.8	V

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

Transition frequency ($-I_C = 2 \text{ A}$; $-V_{CE} = 3 \text{ V}$; $f = 1 \text{ MHz}$)	f_T	>1	>1	>1	MHz
Cutoff frequency in common emitter configuration ($-I_C = 1.5 \text{ A}$; $-V_{CE} = 3 \text{ V}$)	f_{hfe}	60	60	60	kHz

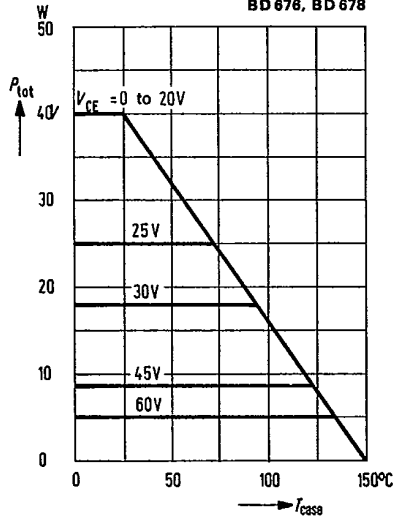
1) $t = 200 \mu\text{s}$, duty cycle 1%.

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Total perm. power dissipation
versus temperature

$P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$

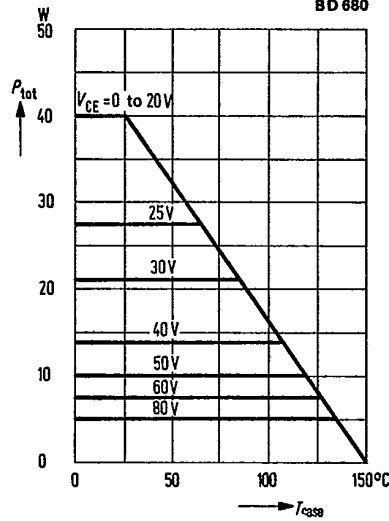
BD 676, BD 678



Total perm. power dissipation
versus temperature

$P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$

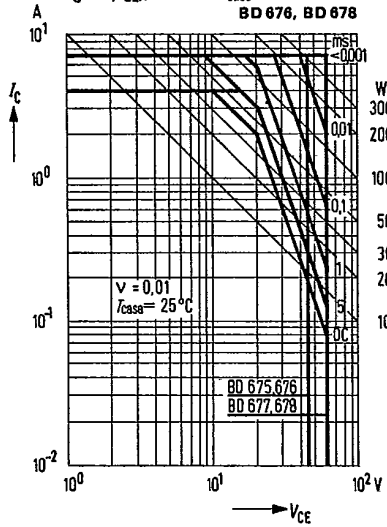
BD 680



Permissible operating range

$I_C = f(V_{CE}); v = 0.01; T_{case} = 25^\circ\text{C}$

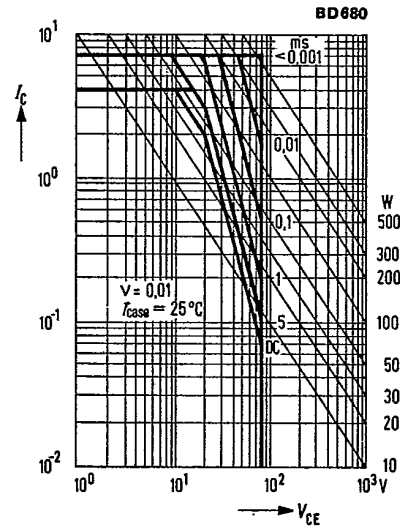
BD 676, BD 678



Permissible operating range

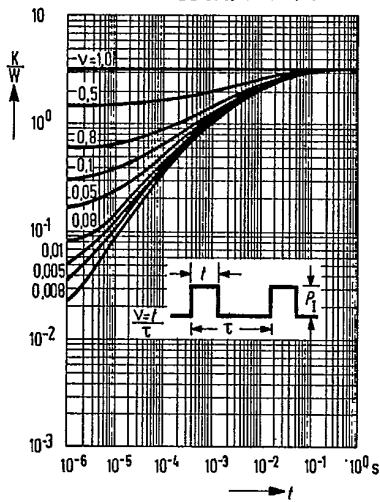
$I_C = f(V_{CE}); v = 0.01; T_{case} = 25^\circ\text{C}$

BD 680

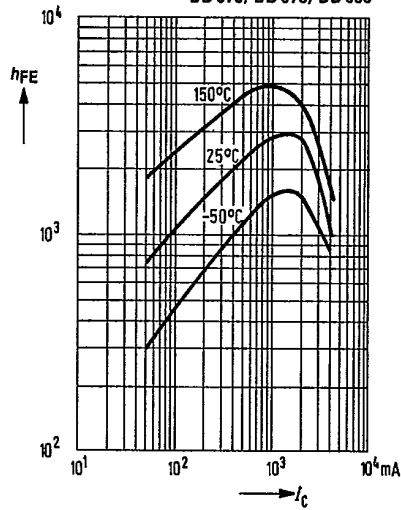


Permissible pulse load
 $r_{thJC} = f(t)$; $v =$ parameter

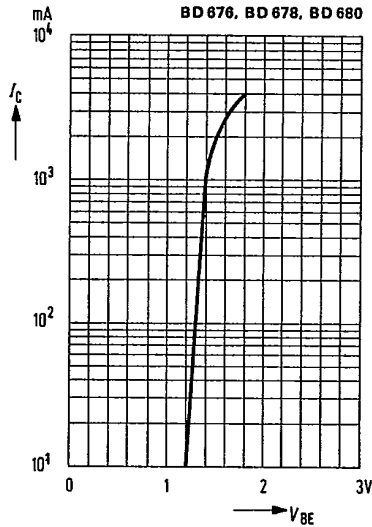
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DC current gain $h_{FE} = f(I_C)$
 $-V_{CE} = 3$ V

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Collector current $I_C = f(V_{BE})$
 $-V_{CE} = 3$ V; $T_{case} = 25^\circ\text{C}$

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Collector-emitter saturation voltage
 $V_{CEsat} = f(I_C)$; $h_{FE} = 100$; $T_{case} = 25^\circ\text{C}$

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