

## NPN Silicon Darlington Transistors

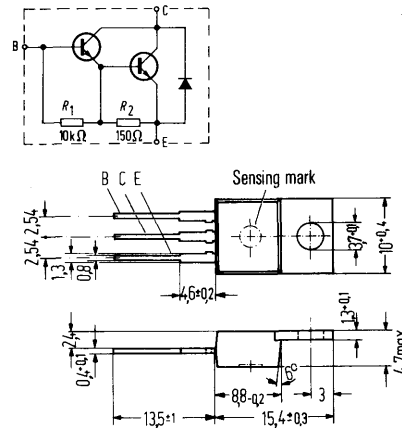
**BD 643**  
**BD 645**  
**BD 647**  
**BD 649**

### Epibase power darlington transistors (62.5W)

BD 643, BD 645, BD 647, and BD 649 are monolithic NPN silicon epibase power darlington transistors with diode and resistors in a TO 220 AB plastic package (TOP-66). 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 644, BD 646, BD 648, and BD 650, they are particularly suitable for use as complementary AF push-pull output stages.

Type	Ordering code
BD 643	Q62702-D229
BD 643/BD 644	Q62702-D235
BD 645	Q62702-D231
BD 645/BD 646	Q62702-D236
BD 647	Q62702-D233
BD 647/BD 648	Q62702-D237
BD 649	Q62702-D374
BD 649/BD 650	Q62702-D376
Insulating nipple	Q62901-B55
Mica washer	Q62901-B52
Spring washer	
A 3 DIN 137	Q62902-B63

Change in dimensional drawings in preparation.



Approx. weight 18 g. Dimensions in mm

### Maximum ratings

	BD 643	BD 645	BD 647	BD 649		
Collector-emitter voltage	$V_{CEO}$	45	60	80	100	V
Collector-base voltage	$V_{CBO}$	45	60	80	100	V
Base-emitter voltage	$V_{EBO}$	5	5	5	5	V
Collector current	$I_C$	8	8	8	8	A
Collector-peak current (t < 10 ms)	$I_{CM}$	12	12	12	12	A
Base current	$I_B$	150	150	150	150	mA
Storage temperature range	$T_{stg}$	-55 to +150			°C	
Junction temperature	$T_j$	150	150	150	150	°C
Total power dissipation ( $T_{case} \leq 25^\circ\text{C}$ , $V_{CE} \leq 10\text{ V}$ )	$P_{tot}$	62,5	62,5	62,5	62,5	W

### Thermal resistance

Junction to ambient air	$R_{thJA}$	$\leq 80$	$\leq 80$	$\leq 80$	$\leq 80$	K/W
Junction to case <sup>1)</sup>	$R_{thJC}$	$\leq 2$	$\leq 2$	$\leq 2$	$\leq 2$	K/W

1) For insulated mounting: If the mica washer Q62901-B 52 (50 to 90  $\mu\text{m}$ ) and the insulating nipple Q62901-B 55 are used this value increases by 4 K/W and with grease by 2 K/W.

**BD 643**  
**BD 645**  
**BD 647**  
**BD 649**

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

		<b>BD 643</b>	<b>BD 645</b>	<b>BD 647</b>	<b>BD 649</b>	
Collector cutoff current ( $V_{CB} = V_{CBmax}$ )	$I_{CBO}$	<0.2	<0.2	<0.2	<0.2	mA
( $V_{CB} = V_{CBmax}; T_{amb} = 100^{\circ}\text{C}$ )	$I_{CBO}$	<2	<2	<2	<2	mA
Collector cutoff current ( $V_{CE} = 0.5 V_{CEmax}$ )	$I_{CEO}$	<0.5	<0.5	<0.5	<0.5	mA
Emitter cutoff current ( $V_{EB} = 5\text{ V}$ )	$I_{EBO}$	<5	<5	<5	<5	mA
Collector-emitter breakdown voltage ( $I_C = 100\text{ mA}$ ) <sup>1)</sup>	$V_{(BR)CEO}$	>45	>60	<80	>100	V
Collector-base breakdown voltage ( $I_E = 5\text{ mA}$ )	$V_{(BR)CBO}$	>45	>60	>80	>100	V
Emitter-base breakdown voltage ( $I_E = 2\text{ mA}$ )	$V_{(BR)EBO}$	>5	>5	>5	>5	V
DC current gain ( $I_C = 0.5\text{ A}, V_{CE} = 3\text{ V}$ )	$h_{FE}$	1500	1500	1500	1500	–
( $I_C = 3\text{ A}, V_{CE} = 3\text{ V}$ )	$h_{FE}$	>750	>750	>750	>750	–
( $I_C = 6\text{ A}, V_{CE} = 3\text{ V}$ )	$h_{FE}$	750	750	750	750	–
Base-emitter forward voltage ( $I_C = 3\text{ A}, V_{CE} = 3\text{ V}$ )	$V_{BE}$	<2.5	<2.5	<2.5	<2.5	V
Collector-emitter saturation voltage ( $I_C = 3\text{ A}, I_B = 12\text{ mA}$ )	$V_{CEsat}$	<2	<2	<2	<2	V
Forward voltage of the protective diode at $I_F = 3\text{ A}$	$V_F$	1.8	1.8	1.8	1.8	V

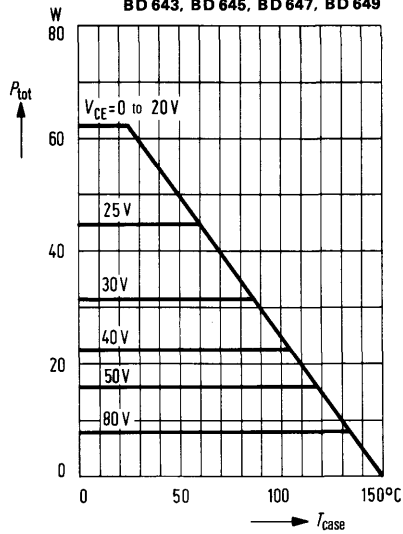
**Dynamic characteristics ( $T_{amb} = 25^{\circ}\text{C}$ )**

Transition frequency ( $I_C = 3\text{ A}, V_{CE} = 3\text{ V}, f = 1\text{ MHz}$ )	$f_T$	7 (>1)	7 (>1)	7 (>1)	7 (>1)	MHz
Cutoff frequency in common emitter configuration ( $I_C = 3\text{ A}; V_{CE} = 3\text{ V}$ )	$f_{hfe}$	60	60	60	60	kHz

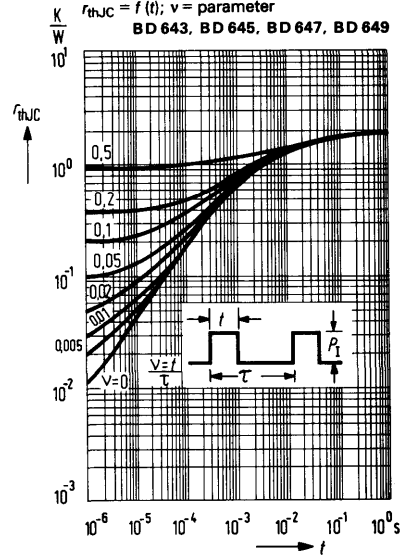
1)  $t = 200\text{ }\mu\text{s}$ , duty cycle 1%.

**BD 643**  
**BD 645**  
**BD 647**  
**BD 649**

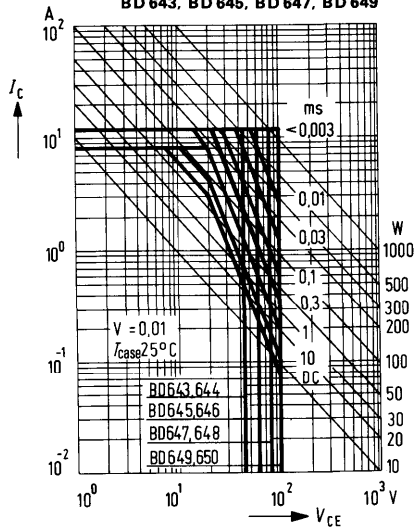
**Total perm. power dissipation versus temperature**  
 $P_{tot} = f(T_{case}); V_{CE} = \text{parameter}$   
**BD 643, BD 645, BD 647, BD 649**



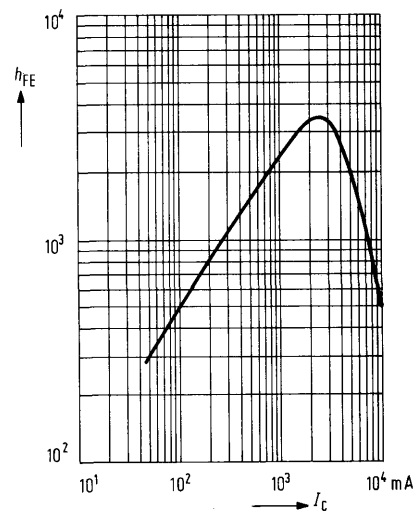
**Permissible pulse load**  
 $r_{thJC} = f(t); v = \text{parameter}$   
**BD 643, BD 645, BD 647, BD 649**



**Permissible operating range**  
 $I_C = f(V_{CE})$   $T_{case} = 25^{\circ}C, v = 0.01$   
**BD 643, BD 645, BD 647, BD 649**



**DC current gain  $h_{FE} = f(I_C)$**   
 $V_{CE} = 3 V; T_{case} = 25^{\circ}C$   
**BD 643, BD 645, BD 647, BD 649**



**BD 643**  
**BD 645**  
**BD 647**  
**BD 649**

