

BD643 – 645 – 647 – 649 – 651

SILICON DARLINGTON POWER TRANSISTORS

NPN epitaxial-base transistors in a monolithic Darlington circuit and housed in a TO-220 envelope.

They are intended for output stages in audio equipment, general amplifiers, and analogue switching application.

PNP complements are BD644, BD646, BD648, BD650 and BD652

Compliance to RoHS.

ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings	Value	Unit	
V_{CBO}	Collector-Base Voltage	BD643	60	V
		BD645	80	
		BD647	100	
		BD649	120	
		BD651	140	
V_{CEO}	Collector-Emitter Voltage	BD643	45	V
		BD645	60	
		BD647	80	
		BD649	100	
		BD651	120	
V_{EBO}	Emitter-Base Voltage	BD643	5	V
		BD645		
		BD647		
		BD649		
		BD651		
I_C	Collector Current	BD643	8	A
		BD645		
		BD647		
		BD649		
		BD651		
I_{CM}	Collector Peak Current	BD643	12	A
		BD645		
		BD647		
		BD649		
		BD651		

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ABSOLUTE MAXIMUM RATINGS

Symbol	Ratings		Value	Unit
I_B	Base Current	BD643	300	mA
		BD645		
		BD647		
		BD649		
		BD651		
P_T	Power Dissipation	@ $T_{mb} < 25^\circ$	62.5	Watts
		BD643		
		BD645		
		BD647		
		BD649		
T_J	Junction Temperature	BD643	150	$^\circ\text{C}$
		BD645		
		BD647		
		BD649		
		BD651		
T_s	Storage Temperature range	BD643	-65 to +150	$^\circ\text{C}$
		BD645		
		BD647		
		BD649		
		BD651		

Limiting values in accordance with the Absolute Maximum System (IEC 134)

THERMAL CHARACTERISTICS

Symbol	Ratings	Value	Unit
R_{thJ-MB}	From junction to mounting base	2	K/W
R_{thJ-A}	From junction to ambient in free air	62.5	K/W

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit	
I_{CBO}	Collector Cutoff Current	$I_E=0, V_{CB}=V_{CEO\text{Max}}$	BD643	-	-	0.2	mA
			BD645				
			BD647				
			BD649				
			BD651				
		$I_E=0, V_{CB}=1/2 V_{CBO\text{Max}}$ $T_J=150^\circ\text{C}$	BD643	-	-	2	mA
			BD645				
			BD647				
BD649							
I_{CEO}	Collector Cutoff Current	$I_E=0, V_{CE}=1/2 V_{CEO\text{Max}}$	BD643	-	-	0.5	mA
			BD645				
			BD647				
			BD649				
			BD651				
I_{EBO}	Emitter Cutoff Current	$V_{EB}=5\text{ V}, I_C=0$	BD643	-	-	5.0	mA
			BD645				
			BD647				
			BD649				
			BD651				
V_{CEO}	Collector-Emitter Breakdown Voltage	$I_C=30\text{ mA}, I_B=0$	BD643	45	-	-	V
			BD645	60	-	-	
			BD647	80	-	-	
			BD649	100	-	-	
			BD651	120	-	-	
$V_{CE(SAT)}$	Collector-Emitter saturation Voltage (*)	$I_C=4\text{ A}, I_B=16\text{ mA}$	BD643	-	-	2	V
			BD645				
			BD647				
			BD649				
		$I_C=3\text{ A}, I_B=12\text{ mA}$	BD643	-	-	2	
			BD645				
			BD647				
			BD649				
		$I_C=5\text{ A}, I_B=50\text{ mA}$	BD643	-	-	2.5	
			BD645				
			BD647				
			BD649				
$V_{BE(SAT)}$	Base-Emitter Saturation Voltage (*)	$I_C=5\text{ A}, I_B=50\text{ mA}$	BD643	-	-	3	V
			BD645				
			BD647				
			BD649				
			BD651				

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ELECTRICAL CHARACTERISTICS

TC=25°C unless otherwise noted

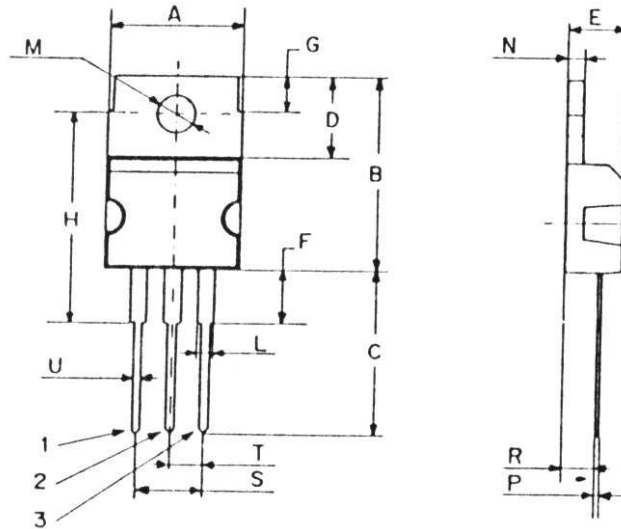
Symbol	Ratings	Test Condition(s)	Min	Typ	Max	Unit	
V_{BE}	Base-Emitter Voltage (*)	$I_C=4\text{ A}, V_{CE}=3\text{ V}$	BD643	-	-	2.5	V
		$I_C=3\text{ A}, V_{CE}=3\text{ V}$	BD645	-	-	2.5	
			BD647				
			BD649				
			BD651				
h_{FE}	DC Current Gain (*)	$V_{CE}=3.0\text{ V}, I_C=0.5\text{ A}$	BD643	-	1900	-	
			BD645				
			BD647				
			BD649				
			BD651				
		$V_{CE}=3.0\text{ V}, I_C=4\text{ A}$	BD643	750	-	-	
			$V_{CE}=3.0\text{ V}, I_C=3\text{ A}$	BD645	750	-	-
				BD647			
		BD649					
		$V_{CE}=3.0\text{ V}, I_C=8\text{ A}$	BD643	-	1800	-	
			BD645				
			BD647				
BD649							
h_{fe}	Small Signal Current Gain	$V_{CE}=3.0\text{ V}, I_C=4\text{ A}$ $f=1\text{ MHz}$	BD643	10	-	-	-
			BD645	10	-	-	
		$V_{CE}=3.0\text{ V}, I_C=3\text{ A}$ $f=1\text{ MHz}$	BD647	10	-	-	
			BD649	10	-	-	
			BD651	10	-	-	

(*) Pulse Width $\approx 300\ \mu\text{s}$, Duty Cycle $\angle 2.0\%$

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MECHANICAL DATA CASE TO-220

DIMENSIONS (mm)		
	Min.	Max.
A	9,90	10,30
B	15,65	15,90
C	13,20	13,40
D	6,45	6,65
E	4,30	4,50
F	2,70	3,15
G	2,60	3,00
H	15,75	17,15
L	1,15	1,40
M	3,50	3,70
N	-	1,37
P	0,46	0,55
R	2,50	2,70
S	4,98	5,08
T	2,49	2,54
U	0,70	0,90



Pin 1 :	Base
Pin 2 :	Collector
Pin 3 :	Emitter
Case :	Collector

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