N-P-N SILICON PLANAR DARLINGTON TRANSISTORS

BDX42
BDX43
BDX44

TENTATIVE DATA

Silicon n-p-n planar Darlington transistors for industrial switching applications, e.g. print hammer, solenoid, relay and lamp driving. Encapsulated in a TO-126 plastic envelope with collector connected to the heatsink.

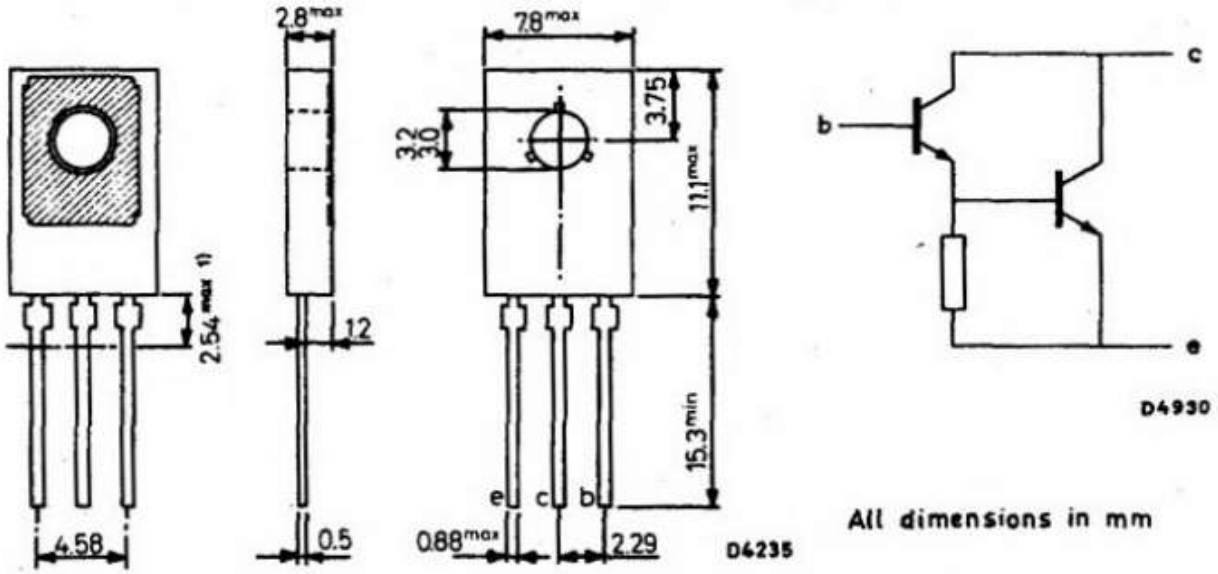
QUICK REFERENCE DATA

	BDX42	BDX43	BDX44	
V_{CBO} max.	60	80	100	V
V_{CE} max.	45	60	80	V
I_C max.	1.0	1.0	1.0	A
P_{tot} max. ($T_{amb} \leq 25^oC$)	1.25	1.25	1.25	W
P_{tot} max. ($T_{mb} \leq 100^oC$)	5.0	5.0	5.0	W
h_{FE} min. (I_C = 500mA, V_{CE} = 10V)	1500	1500	1500	
$V_{CE(sat)}$ max. (I_C = 1.0A, I_B = 1.0mA)	-	1.6	-	V
$V_{CE(sat)}$ max. (I_C = 1.0A, I_B = 4.0mA)	1.6	-	1.6	V
t_{off} typ. (I_C = 500mA, $I_{B(on)}$ = $-I_{B(off)}$ = 0.5mA)	1000	1000	1000	ns

Unless otherwise stated data are applicable to all types.

OUTLINE AND DIMENSIONS

Conforms to J.E.D.E.C. TO-126
Collector connected to the metal part of the mounting surface



All dimensions in mm

1) Within this region the cross-section of the leads is uncontrolled

RATINGS

Limiting values of operation according to the absolute maximum system.

Electrical

	BDX42	BDX43	BDX44	
V_{CBO} max.	60	80	100	V
V_{CE} max. (Max. external R_{BE} 100kΩ at $T_j = 150^oC$)	45	60	80	V
V_{EBO} max.	5.0	5.0	5.0	V
I_C max.	1.0	1.0	1.0	A
I_B max.	0.1	0.1	0.1	A
P_{tot} max. ($T_{amb} \leq 25^oC$)	1.25	1.25	1.25	W
P_{tot} max. ($T_{mb} \leq 100^oC$)	5.0	5.0	5.0	W

Temperature

T_{stg} range	-65 to +150	^oC
T_j max.	150	^oC

THERMAL CHARACTERISTICS

$R_{th(j-amb)}$	100	$^oC/W$
$R_{th(j-mb)}$	10	$^oC/W$

ELECTRICAL CHARACTERISTICS ($T_j = 25^oC$ unless otherwise stated)

			Min.	Typ.	Max.	
I_{CBO}	Collector cut-off current					
	$V_{CB} = 45V$, $I_E = 0$	BDX42	-	-	100	nA
	$V_{CB} = 60V$, $I_E = 0$	BDX43	-	-	100	nA
	$V_{CB} = 80V$, $I_E = 0$	BDX44	-	-	100	nA
I_{EBO}	Emitter cut-off current					
	$V_{EB} = 4.0V$, $I_C = 0$		-	-	100	nA
h_{FE}	Static forward current transfer ratio					
	$I_C = 150mA$, $V_{CE} = 10V$		1000	-	-	
	$I_C = 500mA$, $V_{CE} = 10V$		1500	-	-	
$V_{CE(sat)}$	Collector-emitter saturation voltage					
	$I_C = 500mA$, $I_B = 0.5mA$		-	-	1.3	V
	$I_C = 1.0A$, $I_B = 1.0mA$	BDX43	-	-	1.6	V
	$I_C = 1.0A$, $I_B = 4.0mA$	BDX42	-	-	1.6	V
		BDX44	-	-	1.6	V

ELECTRICAL CHARACTERISTICS (Contd.)

			Min.	Typ.	Max.	
	I_C = 500mA, I_B = 0.5mA, T_j = 150°C		-	-	1.3	V
	I_C = 1.0A, I_B = 1.0mA, T_j = 150°C	BDX43	-	-	1.8	V
	I_C = 1.0A, I_B = 4.0mA, T_j = 150°C	BDX42	-	-	1.6	V
		BDX44	-	-	1.6	V
$V_{BE(sat)}$	Base-emitter saturation voltage					
	I_C = 500mA, I_B = 0.5mA		-	-	1.9	V
	I_C = 1.0A, I_B = 1.0mA	BDX43	-	-	2.2	V
	I_C = 1.0A, I_B = 4.0mA	BDX42	-	-	2.2	V
		BDX44	-	-	2.2	V
h_{fe}	Small signal forward current transfer ratio					
	I_C = 0.5A, V_{CE} = 5.0V, f = 35MHz		7.5	10	-	

Switching times (see also page 4):

	I_C = 500mA, $I_{B(on)} = -I_{B(off)}$ = 0.5mA				
t_{on}	Turn-on time	-	-	400	ns
t_{off}	Turn-off time	-	1000	2000	ns
	I_C = 1.0A, $I_{B(on)} = -I_{B(off)}$ = 1.0mA				
t_{on}	Turn-on time	-	-	400	ns
t_{off}	Turn-off time	-	1000	2000	ns

MECHANICAL DATA

Maximum torque on nut	4.0	kg cm
	0.4	Nm
Minimum torque on nut for good thermal contact	3.0	kg cm
	0.3	N m

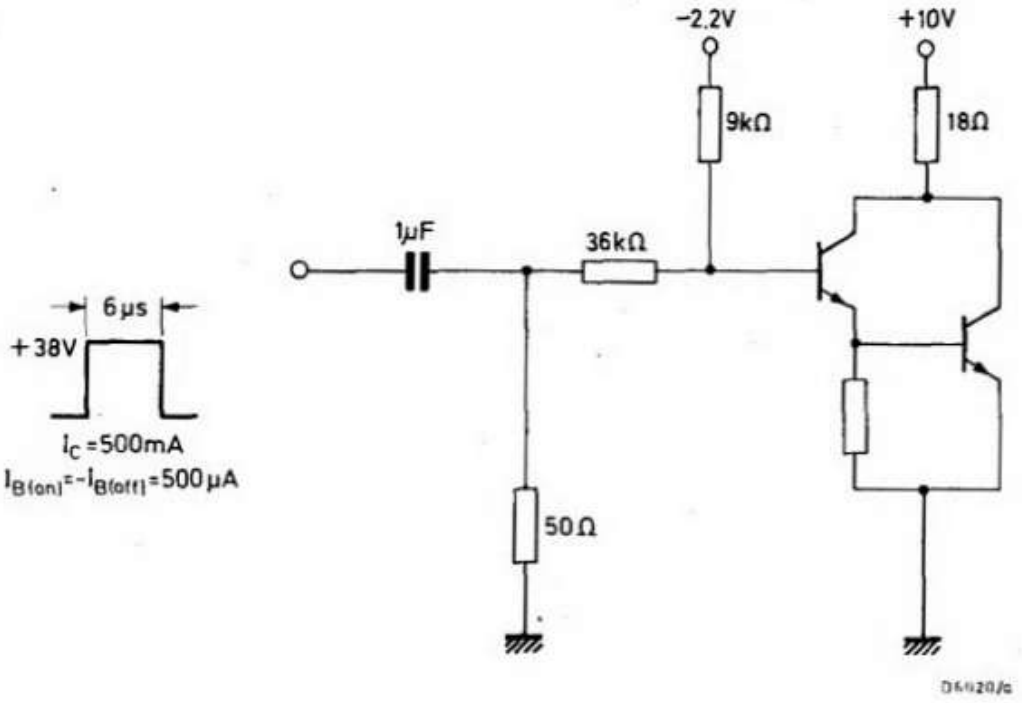
ACCESSORIES

Accessory	Code No.	Note
1 Mica washer	56301B	Supplied on request
1 Plain washer	56326	

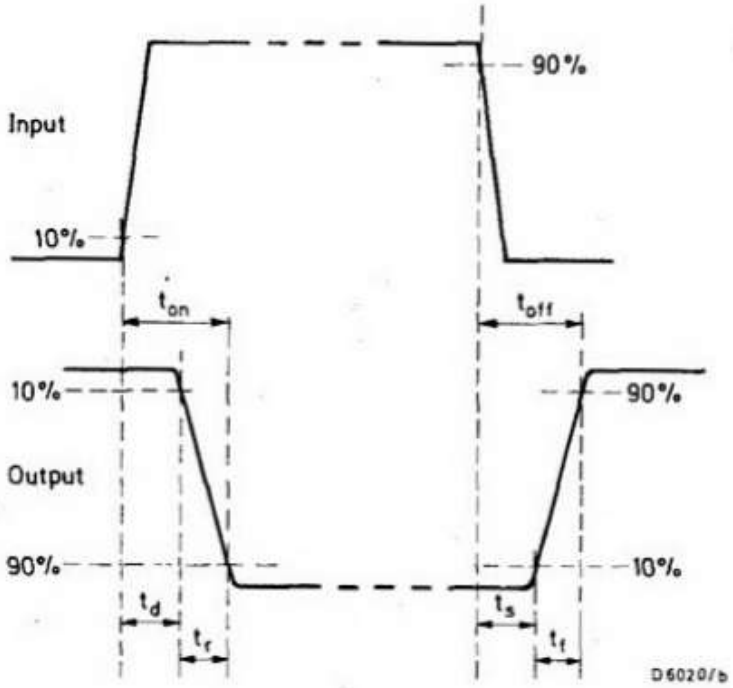
When mounted on a heatsink it is essential that a plain washer be used to prevent damage to the devices while tightening the mounting screw.

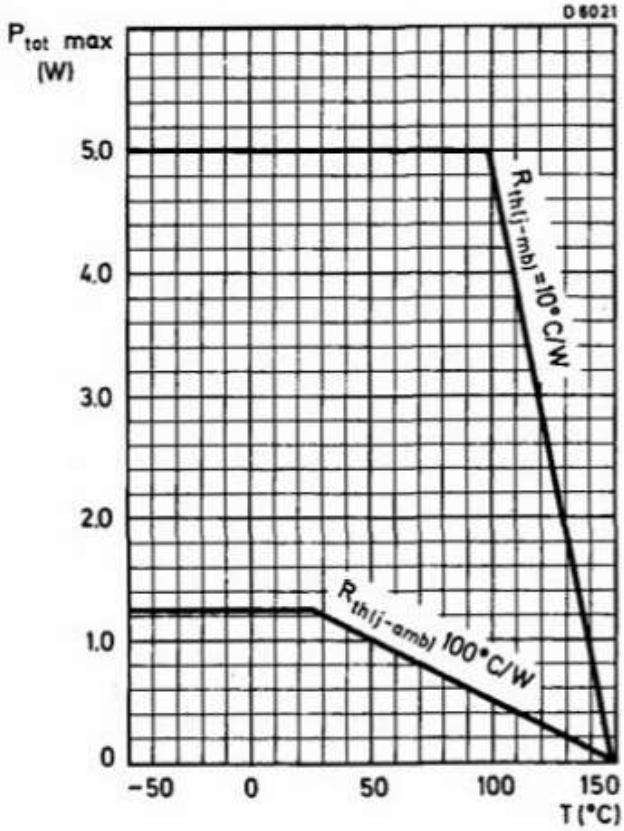
MEASUREMENT OF SATURATED SWITCHING TIMES

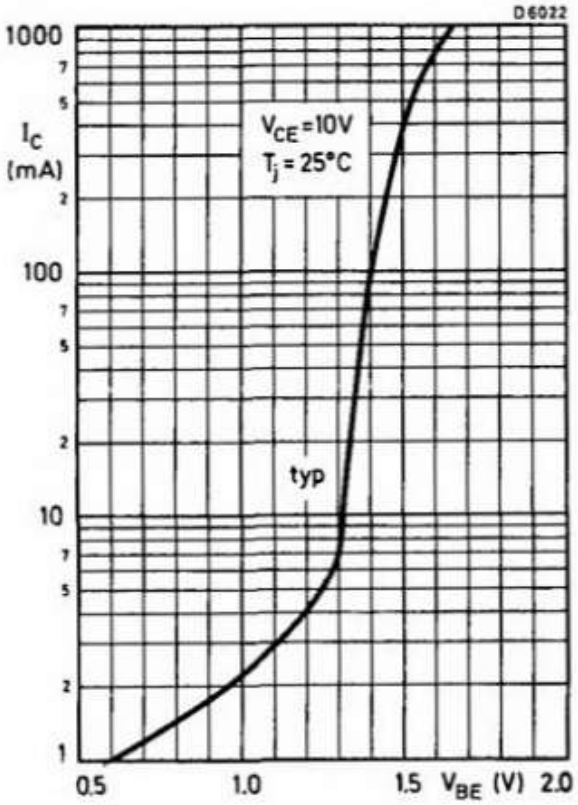
Test circuit for 500mA switching.

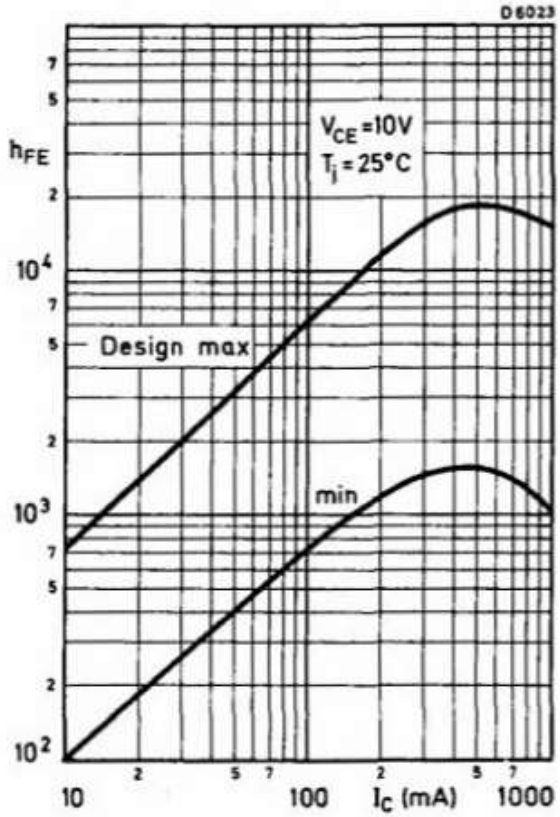


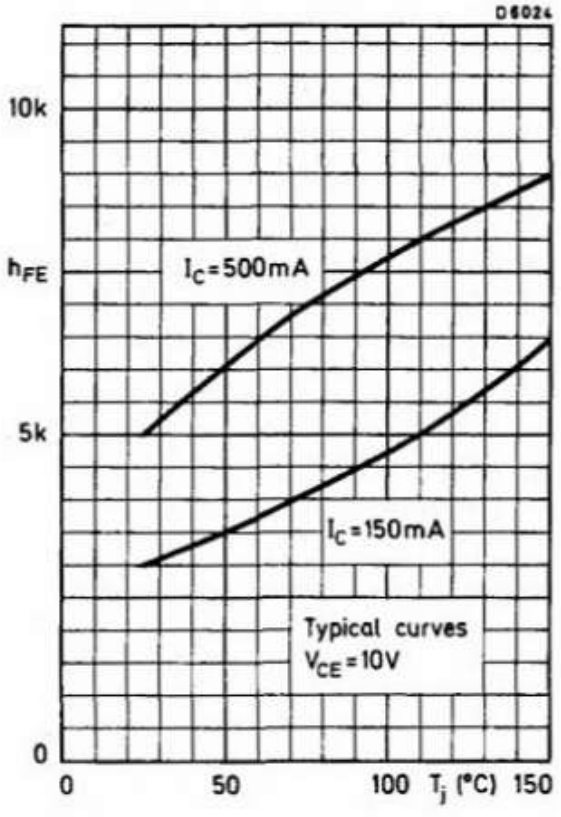
Switching waveforms




D6021
P_{tot} max (W)
5.0
4.0
3.0
2.0
1.0
0
$R_{th(j-mb)}$ = 10°C/W
$R_{th(j-amb)}$ 100°C/W
−50
0
50
100
150
T (°C)


D6022
1000
100
10
1
I_C (mA)
V_{CE} = 10V
T_j = 25°C
typ
0.5
1.0
1.5
V_{BE} (V)
2.0


D6023
h_{FE}
10^4
10^3
10^2
V_{CE} = 10V
T_j = 25°C
Design max
min
10
100
I_C (mA)
1000


D6024
10k
5k
0
h_{FE}
I_C = 500mA
I_C = 150mA
Typical curves
V_{CE} = 10V
0
50
100
T_j (°C)
150