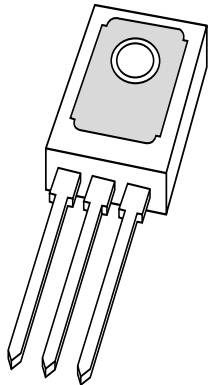


DATA SHEET



BDX42; BDX43; BDX44 NPN Darlington transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 Jul 02

NPN Darlington transistors

BDX42; BDX43; BDX44

FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V)
- Integrated diode and resistor.

APPLICATIONS

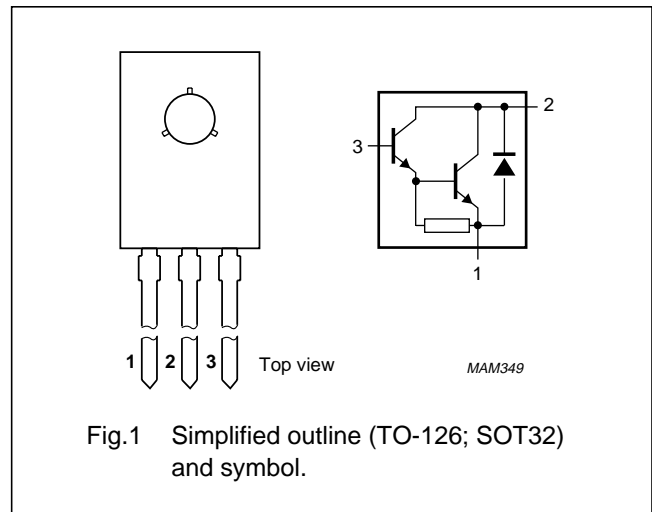
- Industrial switching applications such as:
 - print hammers
 - solenoids
 - relay and lamp drivers.

DESCRIPTION

NPN Darlington transistor in a TO-126; SOT32 plastic package. PNP complements: BDX45 and BDX47.

PINNING

PIN	DESCRIPTION
1	emitter
2	collector, connected to metal part of mounting surface
3	base



QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter				
	BDX42		–	–	60	V
	BDX43		–	–	80	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$				
	BDX42		–	–	45	V
	BDX43		–	–	60	V
I_C	collector current (DC)		–	–	1	A
			–	–	1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	–	1.25	W
		$T_{mb} \leq 100\text{ }^\circ\text{C}$	–	–	5	W
h_{FE}	DC current gain	$I_C = 150\text{ mA}; V_{CE} = 10\text{ V}$	1000	–	–	
		$I_C = 500\text{ mA}; V_{CE} = 10\text{ V}$	2000	–	–	
f_T	transition frequency	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	200	–	MHz

NPN Darlington transistors

BDX42; BDX43; BDX44

LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	BDX42		–	60	V
	BDX43		–	80	V
	BDX44		–	90	V
V_{CES}	collector-emitter voltage	$V_{BE} = 0$			
	BDX42		–	45	V
	BDX43		–	60	V
	BDX44		–	80	V
V_{EBO}	emitter-base voltage	open collector	–	5	V
I_C	collector current (DC)		–	1	A
I_{CM}	peak collector current		–	2	A
I_B	base current (DC)		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	1.25	W
		$T_{mb} \leq 100\text{ °C}$	–	5	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air	100	K/W
$R_{th\ j-mb}$	thermal resistance from junction to mounting base		10	K/W

NPN Darlington transistors

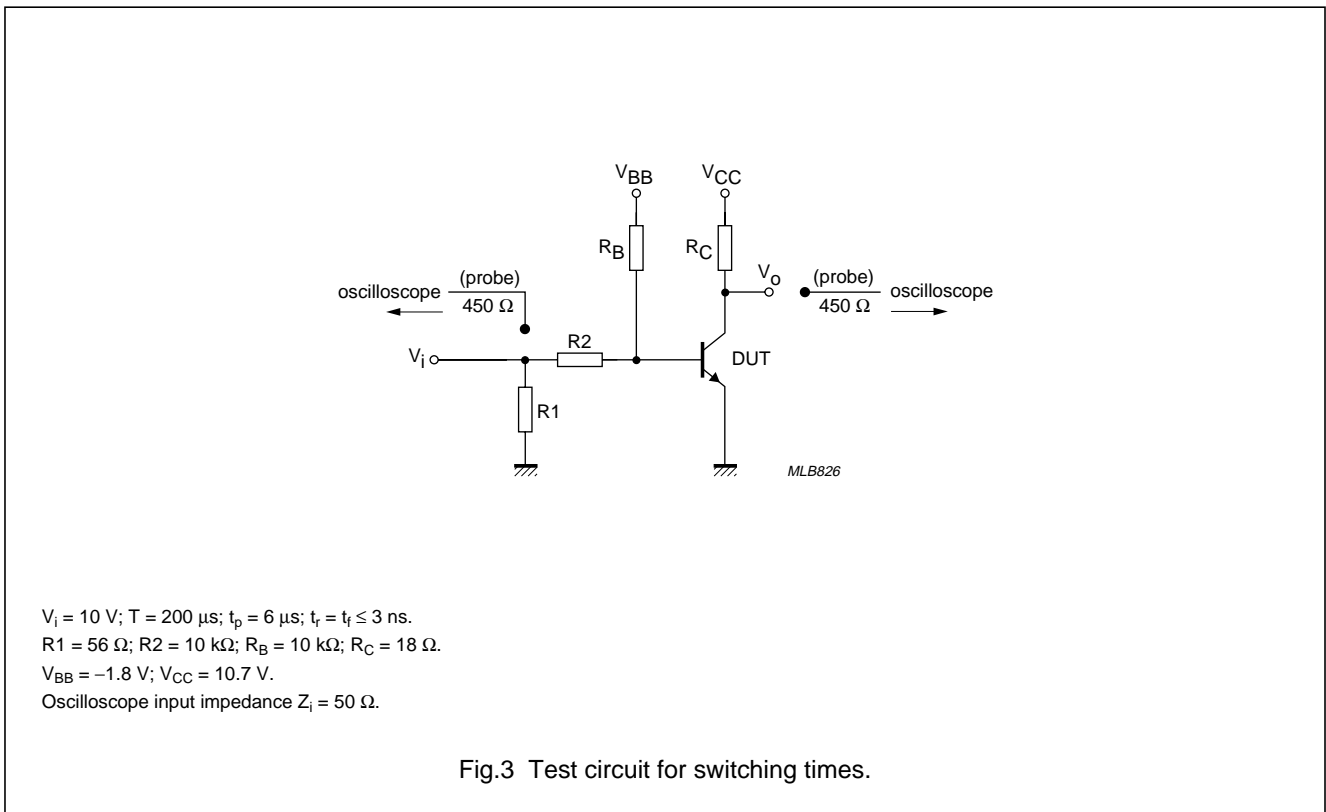
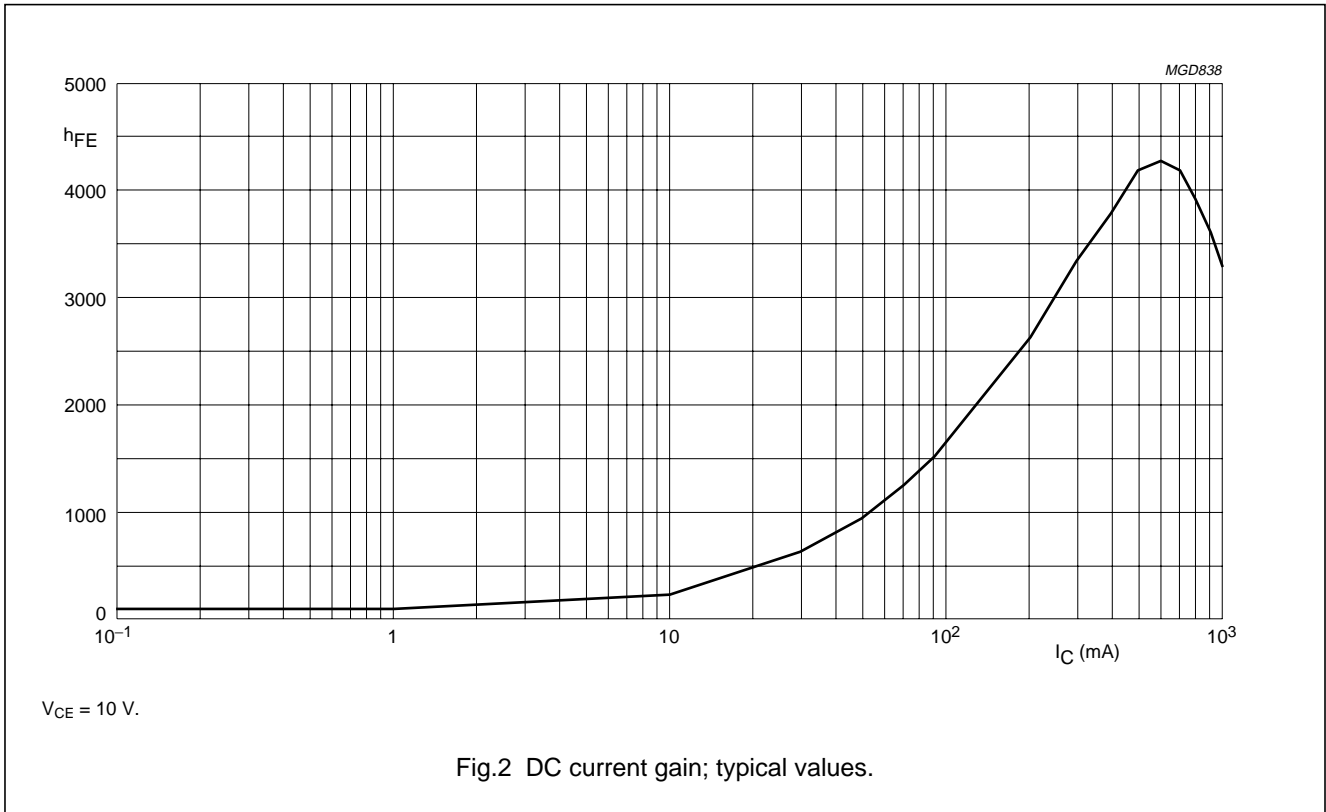
BDX42; BDX43; BDX44

CHARACTERISTICS $T_j = 25\text{ °C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current					
	BDX42	$I_E = 0; V_{CB} = 60\text{ V}$	–	–	100	nA
	BDX43	$I_E = 0; V_{CB} = 80\text{ V}$	–	–	100	nA
	BDX44	$I_E = 0; V_{CB} = 100\text{ V}$	–	–	100	nA
I_{CES}	collector cut-off current					
	BDX42	$V_{BE} = 0; V_{CE} = 45\text{ V}$	–	–	50	nA
	BDX43	$V_{BE} = 0; V_{CE} = 60\text{ V}$	–	–	50	nA
	BDX44	$V_{BE} = 0; V_{CE} = 80\text{ V}$	–	–	50	nA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 4\text{ V}$	–	–	50	nA
h_{FE}	DC current gain	$V_{CE} = 10\text{ V}$; see Fig. 2				
		$I_C = 150\text{ mA}$	1000	–	–	
		$I_C = 500\text{ mA}$	2000	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}$	–	–	1.3	V
		$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}; T_j = 150\text{ °C}$	–	–	1.3	V
V_{CEsat}	collector-emitter saturation voltage	BDX42; BDX44				
		$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 4\text{ mA}; T_j = 150\text{ °C}$	–	–	1.6	V
V_{CEsat}	collector-emitter saturation voltage	BDX43				
		$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	1.6	V
		$I_C = 1\text{ A}; I_B = 1\text{ mA}; T_j = 150\text{ °C}$	–	–	1.8	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 0.5\text{ mA}$	–	–	1.9	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 4\text{ mA}$	–	–	2.2	V
	BDX42; BDX44					
V_{BEsat}	base-emitter saturation voltage	$I_C = 1\text{ A}; I_B = 1\text{ mA}$	–	–	2.2	V
	BDX43					
f_T	transition frequency	$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	200	–	MHz
Switching times (between 10% and 90% levels); see Fig.3						
t_{on}	turn-on time	$I_{Con} = 500\text{ mA}; I_{Bon} = 0.5\text{ mA};$ $I_{Boff} = -0.5\text{ mA}$	–	–	500	ns
t_d	delay time		–	–	200	ns
t_r	rise time		–	–	300	ns
t_{off}	turn-off time		–	–	1300	ns
t_s	storage time		–	–	950	ns
t_f	fall time		–	–	350	ns

NPN Darlington transistors

BDX42; BDX43; BDX44

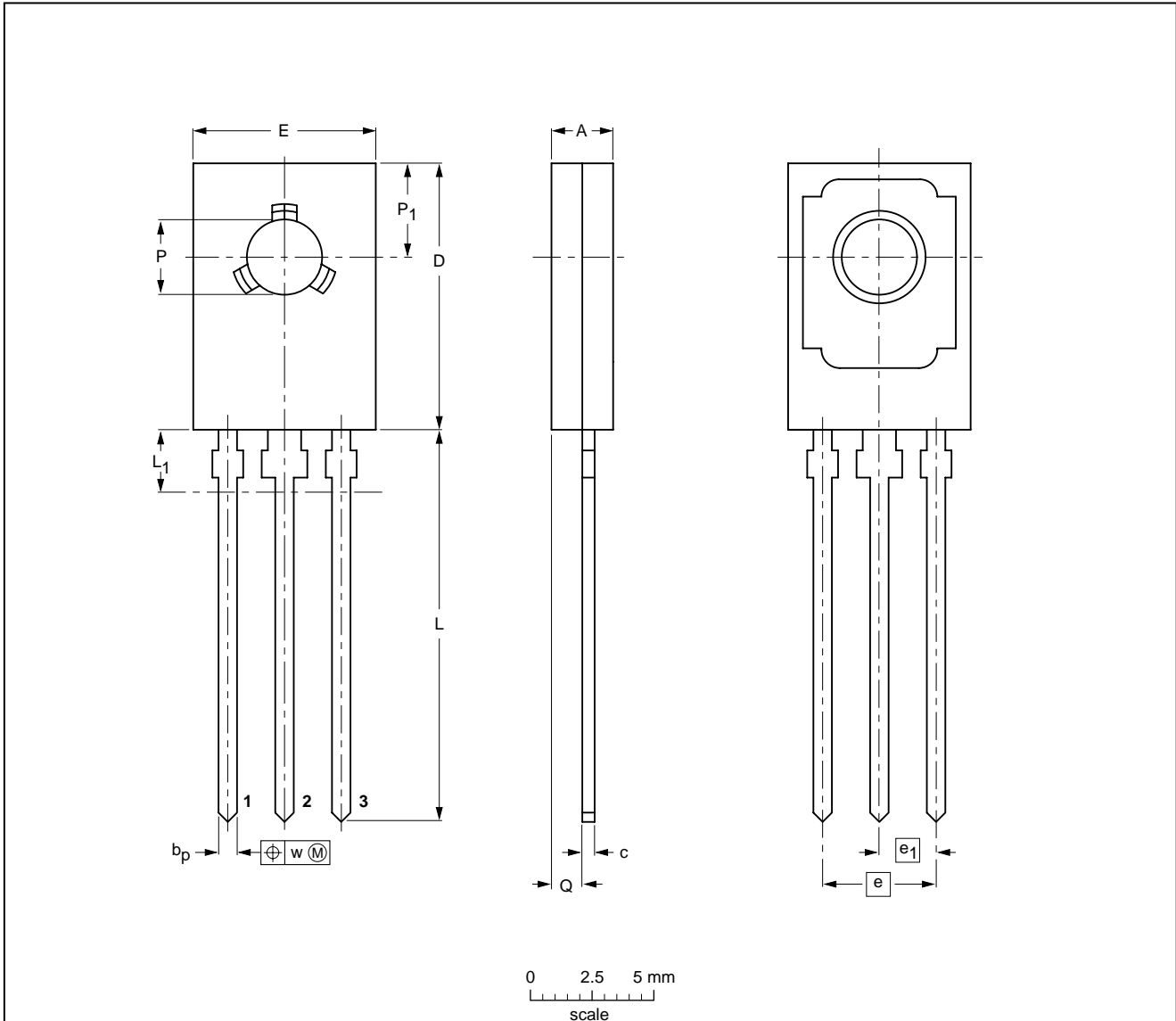


NPN Darlington transistors

BDX42; BDX43; BDX44

PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; mountable to heatsink, 1 mounting hole; 3 leads SOT32



DIMENSIONS (mm are the original dimensions)

UNIT	A	b _p	c	D	E	e	e ₁	L	L ₁ ⁽¹⁾ max	Q	P	P ₁	w
mm	2.7 2.3	0.88 0.65	0.60 0.45	11.1 10.5	7.8 7.2	4.58	2.29	16.5 15.3	2.54	1.5 0.9	3.2 3.0	3.9 3.6	0.254

Note

1. Terminal dimensions within this zone are uncontrolled to allow for flow of plastic and terminal irregularities.

OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT32		TO-126			97-03-04

NPN Darlington transistors

BDX42; BDX43; BDX44

DEFINITIONS

Data Sheet Status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

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