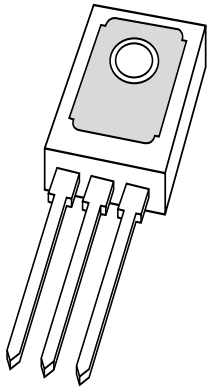


DATA SHEET



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

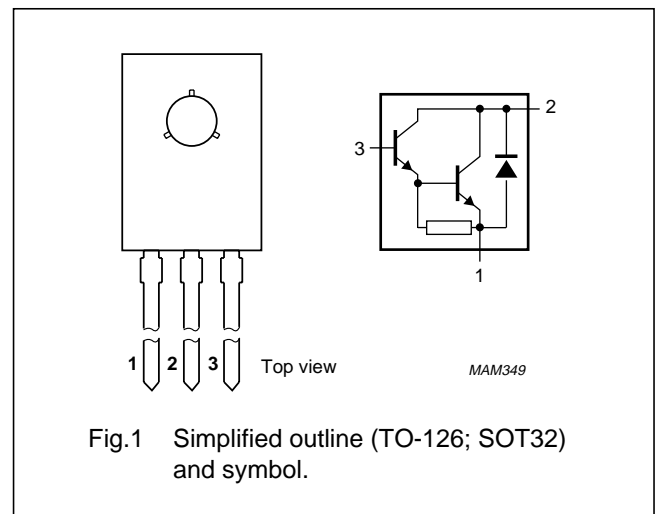
- Industrial switching applications such as:
 - print hammers
 - solenoids
 - relay and lamp drivers.

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 |
| | BDX44 | | – | – | 90 | V |
| V_{CES} | collector-emitter voltage | $V_{BE} = 0$ | | | | |
| | BDX42 | | – | – | 45 | V |
| | BDX43 | | – | – | 60 | V |
| | BDX44 | | – | – | 80 | V |
| I_C | collector current (DC) | | – | – | 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} ≤ 25 °C | – | 1.25 | W |
| | | T _{mb} ≤ 100 °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

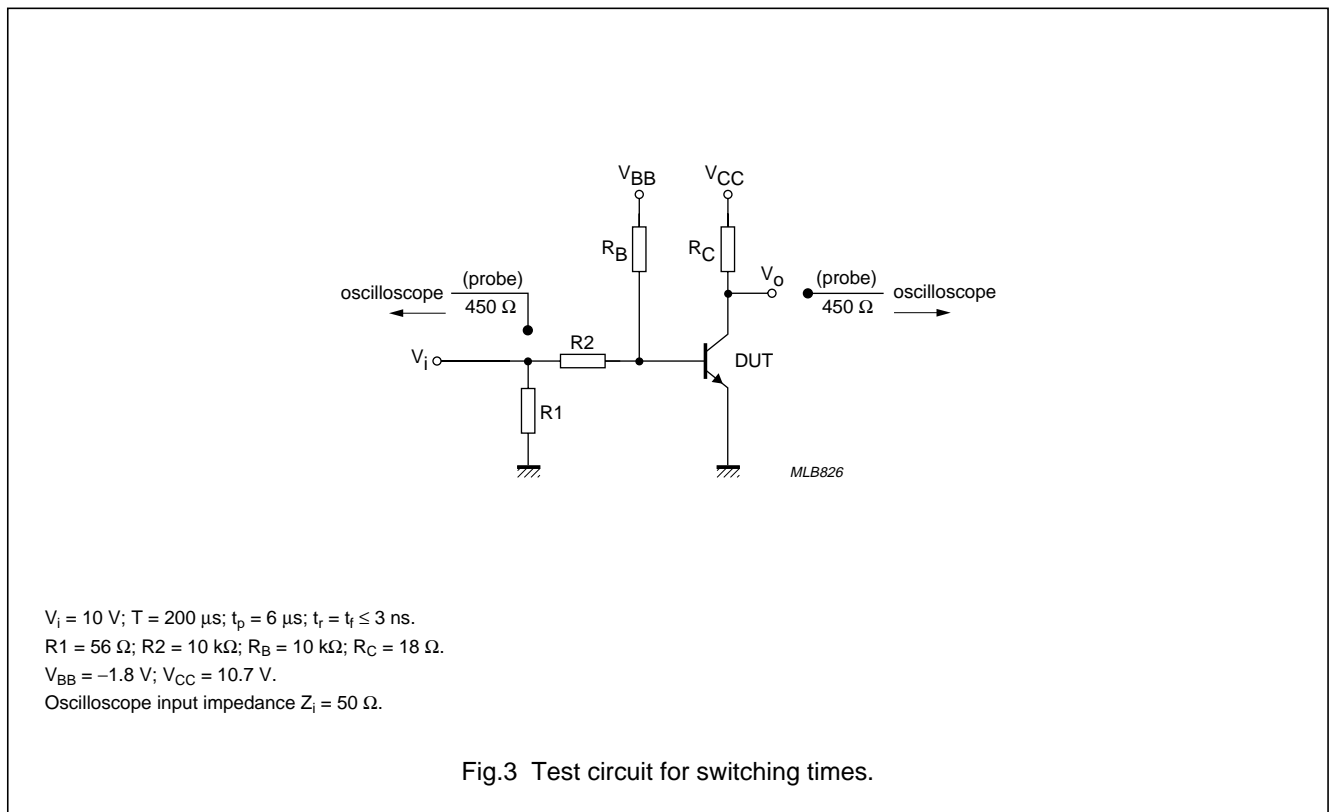
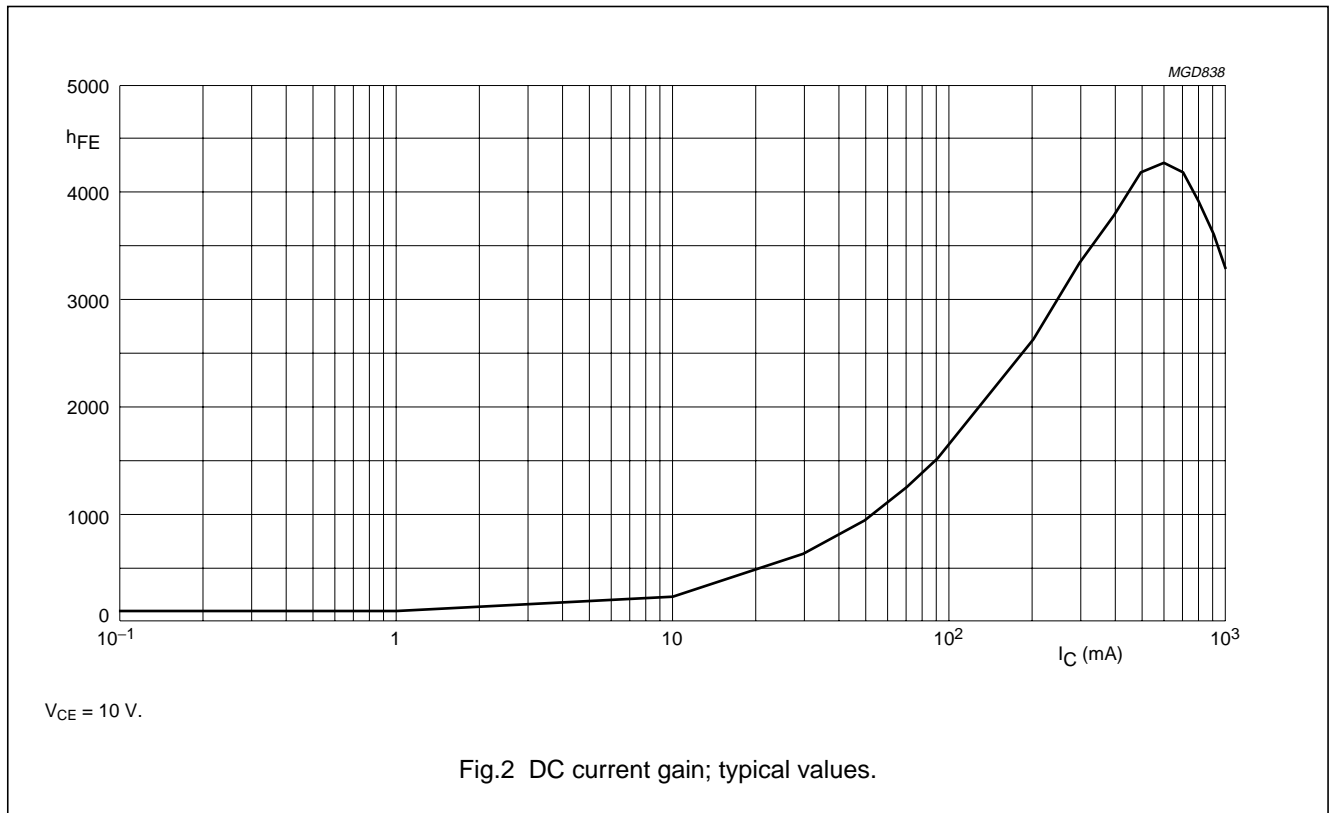
BDX42; BDX43; BDX44

CHARACTERISTICST_j = 25 °C unless otherwise specified.

| SYMBOL | PARAMETER | CONDITIONS | MIN. | TYP. | MAX. | UNIT |
|--|--|--|--------------|--------|--------|------|
| I _{CBO} | collector cut-off current | | | | | |
| | BDX42 | I _E = 0; V _{CB} = 60 V | – | – | 100 | nA |
| | BDX43 | I _E = 0; V _{CB} = 80 V | – | – | 100 | nA |
| | BDX44 | I _E = 0; V _{CB} = 100 V | – | – | 100 | nA |
| I _{CES} | collector cut-off current | | | | | |
| | BDX42 | V _{BE} = 0; V _{CE} = 45 V | – | – | 50 | nA |
| | BDX43 | V _{BE} = 0; V _{CE} = 60 V | – | – | 50 | nA |
| | BDX44 | V _{BE} = 0; V _{CE} = 80 V | – | – | 50 | nA |
| I _{EBO} | emitter cut-off current | I _C = 0; V _{EB} = 4 V | – | – | 50 | nA |
| h _{FE} | DC current gain | V _{CE} = 10 V; see Fig. 2 I _C = 150 mA I _C = 500 mA | 1000 2000 | – – | – – | |
| V _{CEsat} | collector-emitter saturation voltage | I _C = 500 mA; I _B = 0.5 mA | – | – | 1.3 | V |
| | | I _C = 500 mA; I _B = 0.5 mA; T _j = 150 °C | – | – | 1.3 | V |
| V _{CEsat} | collector-emitter saturation voltage BDX42; BDX44 | I _C = 1 A; I _B = 4 mA | – | – | 1.6 | V |
| | | I _C = 1 A; I _B = 4 mA; T _j = 150 °C | – | – | 1.6 | V |
| V _{CEsat} | collector-emitter saturation voltage BDX43 | I _C = 1 A; I _B = 1 mA | – | – | 1.6 | V |
| | | I _C = 1 A; I _B = 1 mA; T _j = 150 °C | – | – | 1.8 | V |
| V _{BEsat} | base-emitter saturation voltage | I _C = 500 mA; I _B = 0.5 mA | – | – | 1.9 | V |
| V _{BEsat} | base-emitter saturation voltage BDX42; BDX44 | I _C = 1 A; I _B = 4 mA | – | – | 2.2 | V |
| V _{BEsat} | base-emitter saturation voltage BDX43 | I _C = 1 A; I _B = 1 mA | – | – | 2.2 | V |
| f _T | transition frequency | I _C = 500 mA; V _{CE} = 5 V; f = 100 MHz | – | 200 | – | MHz |
| Switching times (between 10% and 90% levels); see Fig.3 | | | | | | |
| t _{on} | turn-on time | I _{Con} = 500 mA; I _{Bon} = 0.5 mA; I _{Boff} = –0.5 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

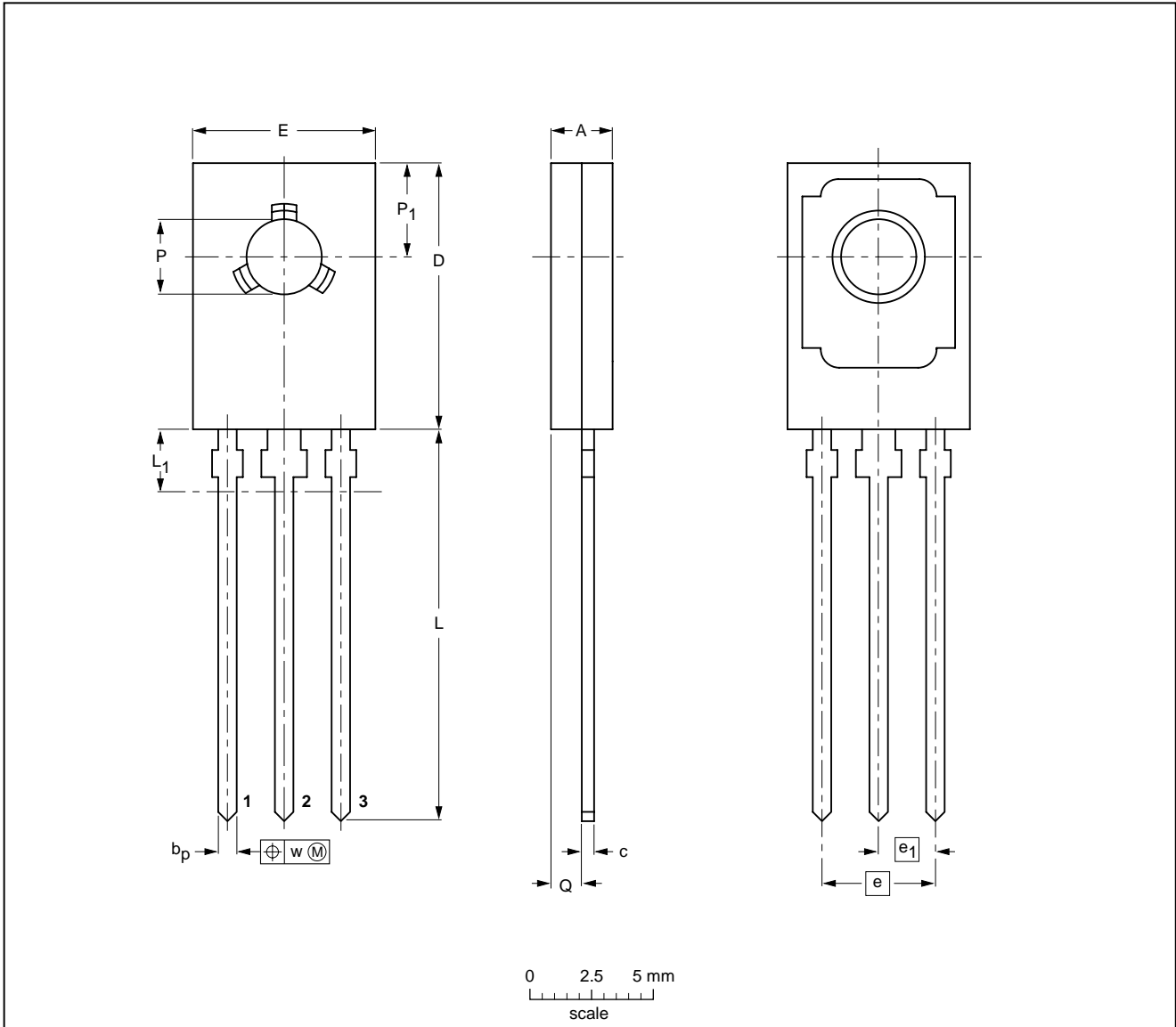


NPN Darlington transistors

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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