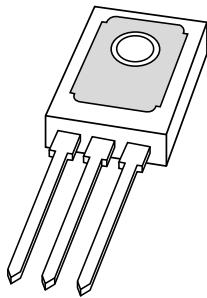


# DATA SHEET



## **BDX35; BDX36; BDX37** NPN switching transistors

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

1997 Apr 16

## NPN switching transistors

## BDX35; BDX36; BDX37

## FEATURES

- High current (max. 5 A)
- Low voltage (max. 75 V).

## APPLICATIONS

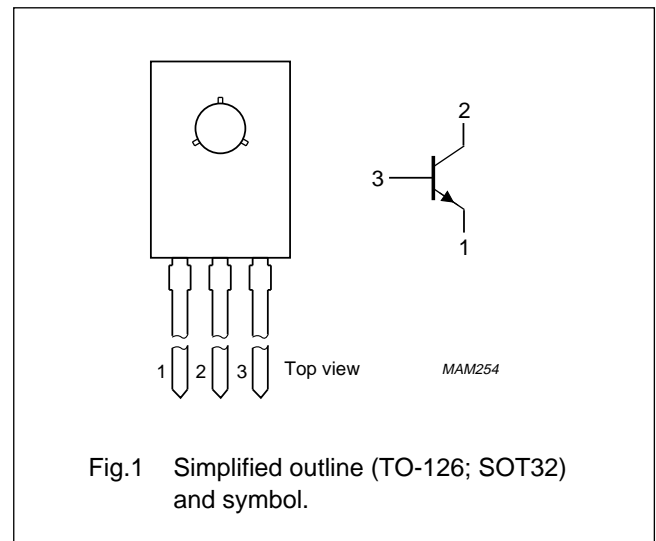
- High-current switching in power applications.

## DESCRIPTION

NPN switching transistor in a TO-126; SOT32 plastic package.

## PINNING

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



## QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter				
	BDX35		–	–	100	V
	BDX36; BDX37		–	–	120	V
$V_{CEO}$	collector-emitter voltage	open base				
	BDX35; BDX36		–	–	60	V
	BDX37		–	–	75	V
$I_C$	collector current (DC)		–	–	5	A
$P_{tot}$	total power dissipation	$T_{mb} \leq 75\text{ °C}$	–	–	15	W
$h_{FE}$	DC current gain	$I_C = 0.5\text{ A}; V_{CE} = 10\text{ V}$	45	–	450	
$f_T$	transition frequency	$I_C = 0.5\text{ A}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	100	–	MHz
$t_{off}$	turn-off time	$I_{Con} = 5\text{ A}; I_{Bon} = 0.5\text{ A}; I_{Boff} = -0.5\text{ A}$	–	350	500	ns

## NPN switching transistors

## BDX35; BDX36; BDX37

**LIMITING VALUES**

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage BDX35 BDX36; BDX37	open emitter	–	100	V
			–	120	V
V <sub>CEO</sub>	collector-emitter voltage BDX35; BDX36 BDX37	open base	–	60	V
			–	75	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	5	V
I <sub>C</sub>	collector current (DC)		–	5	A
I <sub>CM</sub>	peak collector current		–	10	A
I <sub>BM</sub>	peak base current		–	2	A
P <sub>tot</sub>	total power dissipation	T <sub>mb</sub> ≤ 75 °C	–	15	W
		T <sub>amb</sub> ≤ 25 °C	–	1.25	W
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	150	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

**THERMAL CHARACTERISTICS**

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>th j-a</sub>	thermal resistance from junction to ambient	in free air	100	K/W
R <sub>th j-mb</sub>	thermal resistance from junction to mounting base		5	K/W

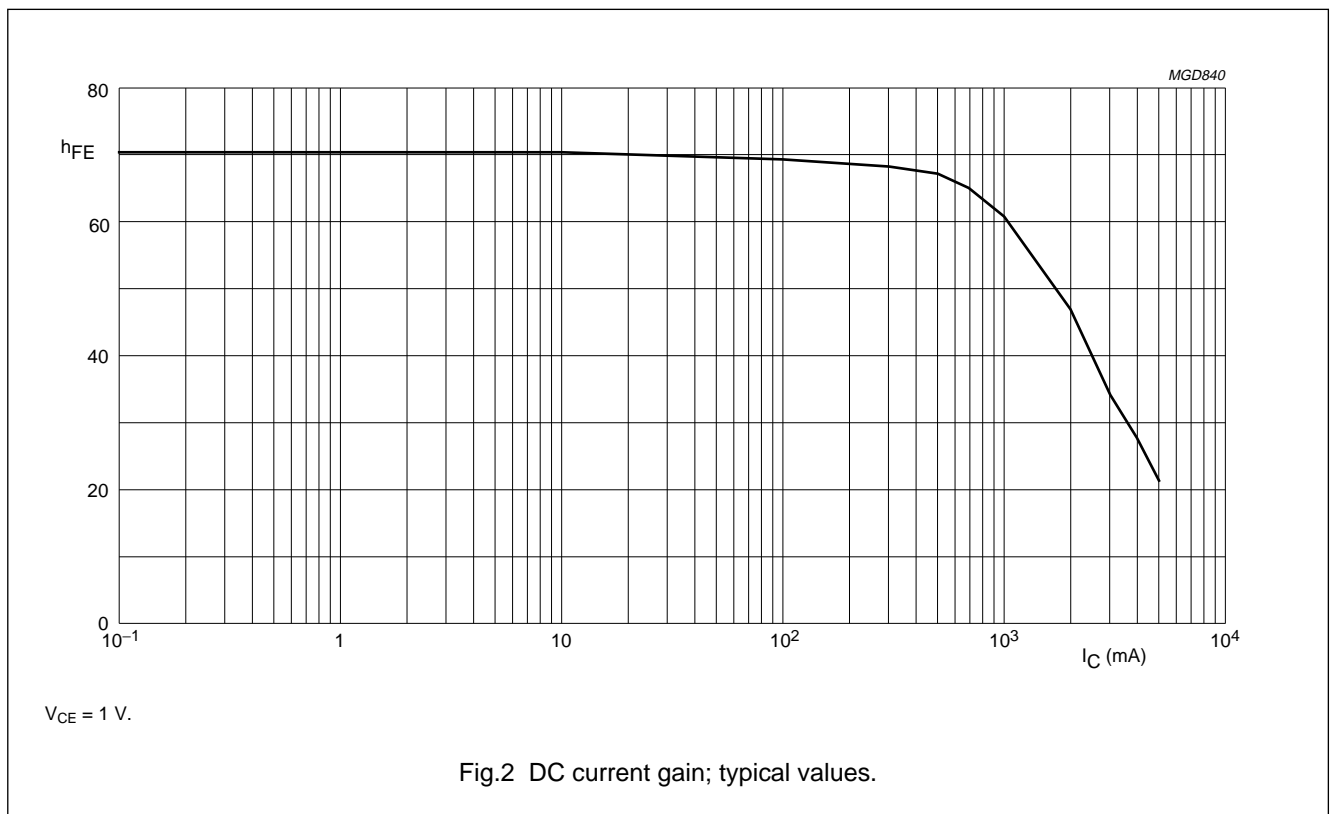
**CHARACTERISTICS**T<sub>j</sub> = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I <sub>CBO</sub>	collector cut-off current BDX35	I <sub>E</sub> = 0; V <sub>CB</sub> = 80 V	–	–	100	nA
		I <sub>E</sub> = 0; V <sub>CB</sub> = 80 V; T <sub>j</sub> = 100 °C	–	–	10	μA
I <sub>CBO</sub>	collector cut-off current BDX36; BDX37	I <sub>E</sub> = 0; V <sub>CB</sub> = 100 V	–	–	100	nA
		I <sub>E</sub> = 0; V <sub>CB</sub> = 100 V; T <sub>j</sub> = 100 °C	–	–	10	μA
I <sub>EBO</sub>	emitter cut-off current	I <sub>C</sub> = 0; V <sub>EB</sub> = 5 V	–	–	100	nA
h <sub>FE</sub>	DC current gain BDX35; BDX36 BDX37	I <sub>C</sub> = 0.5 A; V <sub>CE</sub> = 10 V; see Fig.2	45	130	450	
			45	80	450	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = 5 A; I <sub>B</sub> = 0.5 A	–	–	900	mV
V <sub>CEsat</sub>	collector-emitter saturation voltage BDX35; BDX37 BDX36	I <sub>C</sub> = 7 A; I <sub>B</sub> = 0.7 A	–	–	1.2	V
		I <sub>C</sub> = 10 A; I <sub>B</sub> = 1 A	–	–	2	V

NPN switching transistors

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 5\text{ A}; I_B = 0.5\text{ A}$	–	–	1.7	V
$V_{BEsat}$	base-emitter saturation voltage BDX35; BDX37	$I_C = 7\text{ A}; I_B = 0.7\text{ A}$	–	–	2	V
		BDX36 $I_C = 10\text{ A}; I_B = 1\text{ A}$	–	–	2.5	V
$C_c$	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	40	60	pF
$f_T$	transition frequency	$I_C = 0.5\text{ A}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	–	100	–	MHz
<b>Switching times (between 10% and 90% levels)</b>						
$t_{on}$	turn-on time	$I_{Con} = 1\text{ A}; I_{Bon} = 0.1\text{ A}; I_{Boff} = -0.1\text{ A}$	–	60	100	ns
		$I_{Con} = 2\text{ A}; I_{Bon} = 0.2\text{ A}; I_{Boff} = -0.2\text{ A}$	–	–	80	ns
		$I_{Con} = 5\text{ A}; I_{Bon} = 0.5\text{ A}; I_{Boff} = -0.5\text{ A}$	–	180	300	ns
$t_{off}$	turn-off time	$I_{Con} = 1\text{ A}; I_{Bon} = 0.1\text{ A}; I_{Boff} = -0.1\text{ A}$	–	600	800	ns
		$I_{Con} = 2\text{ A}; I_{Bon} = 0.2\text{ A}; I_{Boff} = -0.2\text{ A}$	–	450	700	ns
		$I_{Con} = 5\text{ A}; I_{Bon} = 0.5\text{ A}; I_{Boff} = -0.5\text{ A}$	–	350	500	ns

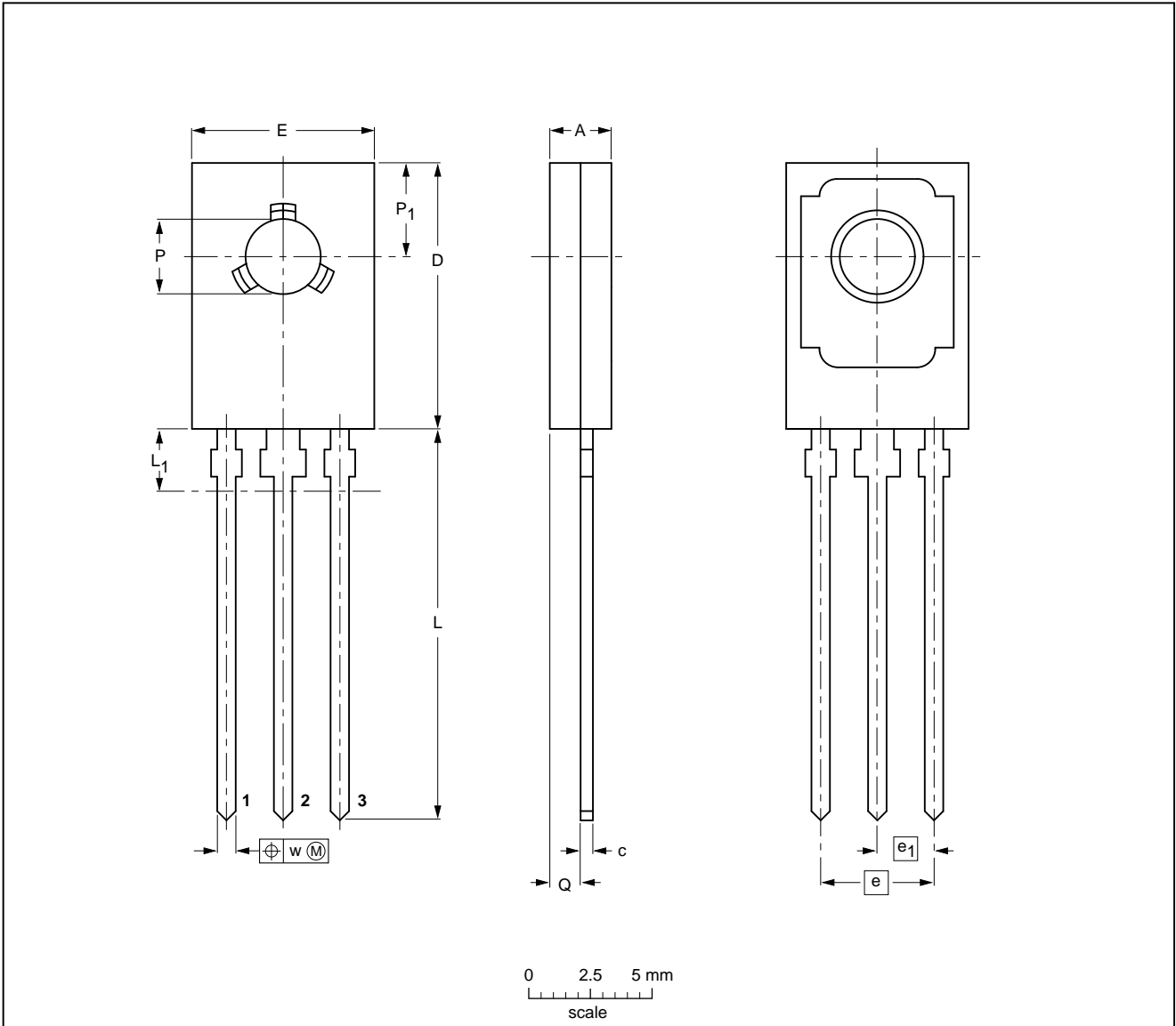


NPN switching transistors

BDX35; BDX36; BDX37

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 <sub>p</sub>	c	D	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max	Q	P	P <sub>1</sub>	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 switching transistors

## BDX35; BDX36; BDX37

**DEFINITIONS**

<b>Data sheet status</b>	
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.
<b>Limiting values</b>	
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.	
<b>Application information</b>	
Where application information is given, it is advisory and does not form part of the specification.	

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NPN switching transistors

BDX35; BDX36; BDX37

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