

Data sheet	
status	Product specification
date of issue	April 1991

# BDS201/203/77

## NPN silicon epitaxial base power transistors

### DESCRIPTION

NPN silicon epitaxial base transistors in a miniature SMD envelope (SOT223) intended for general purpose and switching applications. PNP complements are BDS202/204/78.

### QUICK REFERENCE DATA

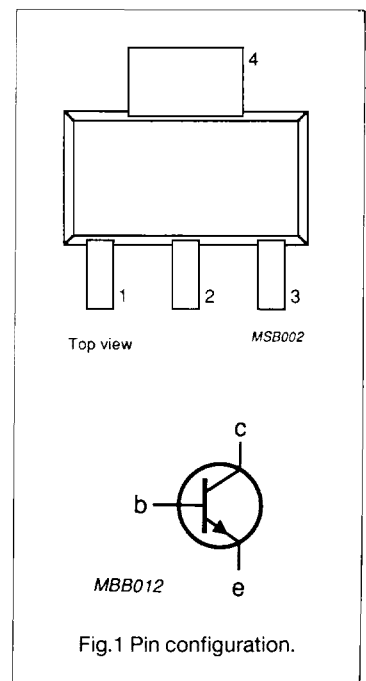
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	-	60	V
	BDS201		-	60	V
	BDS203 BDS77		-	100	V
$V_{CEO}$	collector-emitter voltage	open base	-	45	V
	BDS201		-	60	V
	BDS203 BDS77		-	80	V
$I_C$	collector current	average value	-	3	A
$I_{CM}$	collector current	peak value	-	7	A
$P_{tot}$	total power dissipation	$T_{tab} = 25\text{ }^\circ\text{C}$	-	8	W
		note 1	-	1.5	W
$T_j$	junction temperature		-	150	$^\circ\text{C}$
$f_{hfe}$	cut-off frequency	$I_C = 0.3\text{ V}$ $V_{CE} = 3\text{ V};$	25	-	kHz

### Note

1. Mounted on PCB

### PINNING - SOT223

PIN	DESCRIPTION
1	base
2	collector
3	emitter
4	collector



**NPN silicon epitaxial base power transistors****BDS201/203/77****LIMITING VALUES**

In accordance with the Absolute Maximum System (IEC 134)

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter	-	60	V
	BDS201		-	60	V
	BDS203		-	60	V
	BDS77		-	100	V
V <sub>CEO</sub>	collector-emitter voltage	open base	-	45	V
	BDS201		-	60	V
	BDS203		-	60	V
	BDS77		-	80	V
V <sub>EBO</sub>	emitter-base voltage	open collector	-	5	V
I <sub>C</sub>	collector current	average value	-	3	A
I <sub>CM</sub>	collector current	peak value	-	7	A
I <sub>B</sub>	base current		-	1	A
P <sub>tot</sub>	total power dissipation	T <sub>tab</sub> = 25 °C	-	8	W
T <sub>stg</sub>	storage temperature range		-65	+150	°C
T <sub>j</sub>	junction temperature		-	150	°C

**THERMAL RESISTANCE**

SYMBOL	PARAMETER	CONDITIONS	NOM.	UNIT
R <sub>th j-t</sub>	from junction to tab		15.5	K/W
R <sub>th j-a</sub>	from junction to ambient	on PCB	83.3	K/W

## NPN silicon epitaxial base power transistors

BDS201/203/77

## CHARACTERISTICS

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

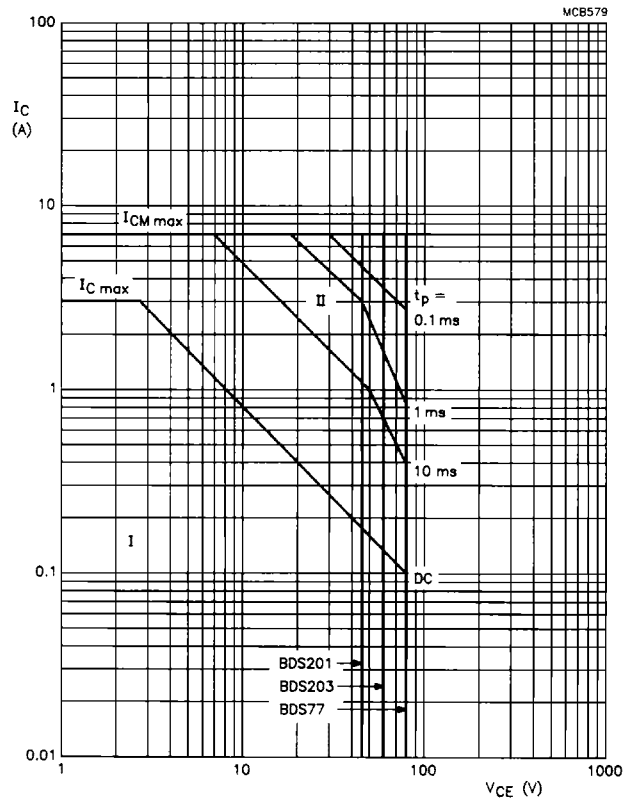
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$V_{(BR)CEO}$	collector-emitter breakdown voltage BDS201 BDS203 BDS77	$I_B = 0$ ; $I_C = 200\text{ mA}$	-	-	45 60 80	V V V
$I_{CEO}$	collector cut-off current	$I_B = 0$ ; $V_{CE} = 30\text{ V}$	-	-	0.2	mA
$I_{CBO}$	collector cut-off current	$I_E = 0$ ; $V_{CE} = 40\text{ V}$ ; $T_j = 150\text{ °C}$	-	-	1	mA
$I_{EBO}$	emitter cut-off current	$I_C = 0$ ; $V_{EB} = 5\text{ V}$	-	-	0.5	mA
$V_{BE}$	base-emitter voltage	$I_C = 3\text{ A}$ ; $-V_{CE} = 2\text{ V}$ ; note 1	-	-	1.5	V
$V_{CE\text{ sat}}$	collector-emitter saturation voltage	$I_C = 3\text{ A}$ ; $I_B = 0.3\text{ A}$ ; note 1	-	-	0.55	V
$V_{CE\text{ sat}}$	collector-emitter saturation voltage	$I_C = 6\text{ A}$ ; $I_B = 0.6\text{ A}$ ; note 1	-	-	1.8	V
$V_{BE\text{ sat}}$	collector-emitter saturation voltage	$I_C = 6\text{ A}$ ; $I_B = 0.6\text{ A}$ ; note 1	-	-	2.1	V
$h_{FE}$	DC current gain	$I_C = 3\text{ A}$ ; $V_{CE} = 2\text{ V}$ ; note 1 (BDS201)	40	-	-	
$h_{FE}$	DC current gain	$I_C = 2\text{ A}$ ; $V_{CE} = 2\text{ V}$ ; note 1 (BDS203/77)	30	-	-	
$f_T$	transition frequency	$f = 1\text{ MHz}$ ; $I_C = 0.3\text{ A}$ ; $-V_{CE} = 3\text{ V}$	7	-	-	MHz
$f_{hfe}$	cut-off frequency	$I_C = 0.3\text{ A}$ ; $-V_{CE} = 3\text{ V}$	25	-	-	kHz
$t_{on}$	switching times turn-on time	$I_{C\text{ on}} = 2\text{ A}$ ; $I_{B\text{ on}} = -I_{B\text{ off}} = 0.2\text{ A}$ ; $V_{CC} = 20\text{ V}$	-	-	1	$\mu\text{s}$
$t_{off}$	switching times turn-off time		-	-	3	$\mu\text{s}$

## Note

1. Measured under pulse conditions:  $t_p < 300\text{ }\mu\text{s}$ , duty cycle  $< 2\%$ .

## NPN silicon epitaxial base power transistors

BDS201/203/77



- I. Region of permissible DC operation.
- II. Permissible extension for repetitive pulse operation.

Fig.2 Safe operating area;  $T_{1ab} = 25$  °C.

NPN silicon epitaxial base power transistors

BDS201/203/77

