

Silicon epitaxial-base transistors

BD434/436/438/440/442

DESCRIPTION

PNP transistors in a TO-126 (SOT32) plastic envelope, intended for use in complementary output stages of audio amplifiers up to 15 W. The complementary pairs are BD433, BD435, BD437, BD439 and BD441 respectively.

PINNING - TO-126 (SOT32)

PIN	DESCRIPTION
1	emitter
2	collector
3	base

Collector connected to metal part of mounting surface.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{CES}$	collector-emitter voltage	$-V_{BE} = 0$			
	BD434		-	22	V
	BD436		-	32	V
	BD438		-	45	V
	BD440		-	60	V
	BD442		-	80	V
$-V_{CEO}$	collector-emitter voltage	open base			
	BD434		-	22	V
	BD436		-	32	V
	BD438		-	45	V
	BD440		-	60	V
	BD442		-	80	V
$-I_C$	collector current	average value	-	4	A
$-I_{CM}$	collector current	peak value	-	7	A
P_{tot}	total power dissipation	$T_{mb} = 25^\circ\text{C}$	-	36	W
h_{FE}	DC current gain	$-I_C = 2 \text{ A};$ $-V_{CE} = 1 \text{ V}$			
	BD434		50	-	
	BD436		50	-	
	BD438		40	-	
	BD440		25	-	
	BD442		15	-	
f_T	transition frequency	$-I_C = 250 \text{ mA};$ $-V_{CE} = 1 \text{ V}$	7	-	MHz

PIN CONFIGURATION

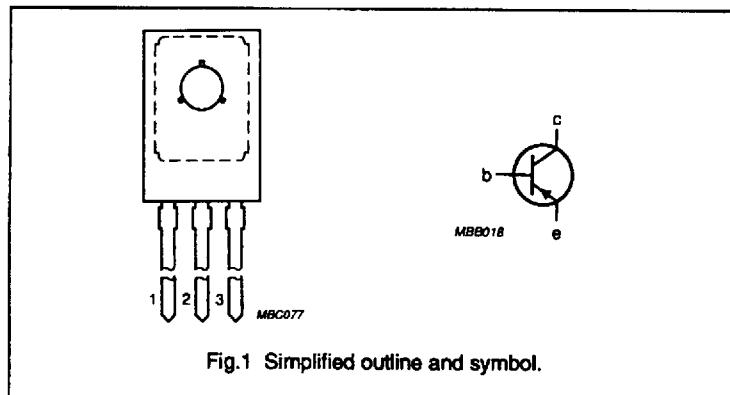


Fig.1 Simplified outline and symbol.

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LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-V_{CBO}$	collector-base voltage BD434 BD436 BD438 BD440 BD442	open emitter	-	22 32 45 60 80	V
$-V_{CES}$	collector-emitter voltage BD434 BD436 BD438 BD440 BD442	$-V_{BE} = 0$	-	22 32 45 60 80	V
$-V_{CEO}$	collector-emitter voltage BD434 BD436 BD438 BD440 BD442	open base	-	22 32 45 60 80	V
$-V_{ERO}$	emitter-base voltage	open collector	-	5	V
$-I_C$	collector current	average value	-	4	A
$-I_{CM}$	collector current	peak value	-	7	A
$-I_B$	base current	$T_{mb} = 25^\circ\text{C}$	-	1	A
P_{tot}	total power dissipation	$T_{mb} = 25^\circ\text{C}$	-	36	W
T_{sg}	storage temperature range		-65	+150	$^\circ\text{C}$
T_J	junction temperature		-	+150	$^\circ\text{C}$

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	NOM.	UNIT
$R_{th,j-mb}$	from junction to mounting base		3.5	K/W
$R_{th,j-a}$	from junction to ambient	in free air	100	K/W

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CHARACTERISTICS

 $T_j = 25^\circ\text{C}$ unless otherwise specified

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$-I_{CEO}$	collector cut off current	$I_E = 0$; $-V_{CB} = -V_{CEO \text{ max}}$	-	-	50	μA
		$I_E = 0$; $-V_{CB} = 10 \text{ V}$; $T_j = 150^\circ\text{C}$	-	-	1	mA
		$I_E = 0$; $-V_{CB} = -V_{CEO \text{ max}}$ $T_j = 150^\circ\text{C}$	-	-	1	mA
$-I_{EBO}$	emitter cut off current	$I_C = 0$; $-V_{EB} = 5 \text{ V}$	-	-	0.2	mA
$-V_{CEK}$	knee voltage	$-I_C = 2 \text{ A}$; $-I_B = \text{value for which } -I_C = 2.2 \text{ A}$ at $-V_{CE} = 1 \text{ V}$	-	-	0.8	V
$-V_{BE}$	base-emitter voltage	$-I_C = 10 \text{ mA}$; $-V_{CE} = 5 \text{ V}$; note 1	-	580	-	mV
		$-I_C = 2 \text{ A}$; $-V_{CE} = 1 \text{ V}$; note 1	-	-	1.1	V
		$-I_C = 2 \text{ A}$; $-V_{CE} = 1 \text{ V}$; note 1	-	-	1.5	V
		$-I_C = 3 \text{ A}$; $-V_{CE} = 1 \text{ V}$; note 1	-	-	1.3	V
$-V_{CE \text{ sat}}$	collector-emitter saturation voltage	$-I_C = 2 \text{ A}$; $-I_B = 0.2 \text{ A}$	-	-	0.5	V
		$-I_C = 2 \text{ A}$; $-I_B = 0.2 \text{ A}$	-	-	0.8	V
		$-I_C = 3 \text{ A}$; $-I_B = 0.3 \text{ A}$	-	-	0.7	V
BD434, BD436 BD440, BD442 BD438						

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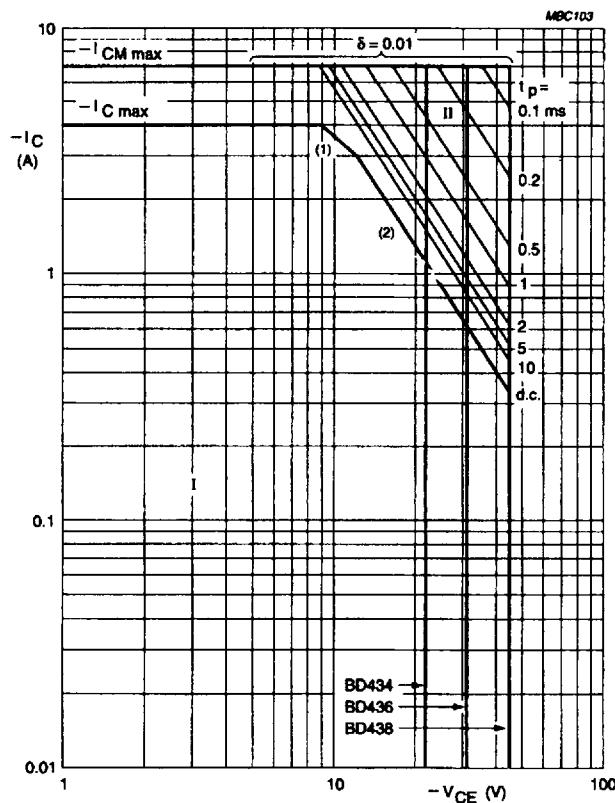
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
h_{FE}	DC current gain BD434 BD436 BD438 BD440 BD442	$-I_C = 10 \text{ mA};$ $-V_{CE} = 5 \text{ V}$	25	-	-	
			25	-	-	
			25	-	-	
			20	-	-	
			15	-	-	
	BD434 BD436 BD438 BD440 BD442	$-I_C = 500 \text{ mA};$ $-V_{CE} = 1 \text{ V}$	85	-	475	
			85	-	475	
			85	-	375	
			40	-	-	
			40	-	-	
f_T	transition frequency BD434 BD436 BD438 BD440 BD442	$-I_C = 2 \text{ A};$ $-V_{CE} = 1 \text{ V}$	50	-	-	
			50	-	-	
			40	-	-	
			25	-	-	
			15	-	-	
	BD438	$-I_C = 3 \text{ A};$ $-V_{CE} = 1 \text{ V}$	30	-	-	
h_{FE1} / h_{FE2}	DC current gain ratio of the complementary pairs BD433/BD434 BD435/BD436 BD437/BD438 BD439/BD440 BD441/BD442	$-I_C = 500 \text{ mA};$ $-V_{CE} = 1 \text{ V}$	7	-	-	MHz
			-	-	1.4	
			-	-	1.4	
			-	-	1.8	
			-	-	1.4	
			-	-	1.4	

Note

1. V_{BE} decreases by typ. 2.3 mV/K with increasing temperature.

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**BD434, BD436, BD438** $T_{mb} = 25^\circ\text{C}$

I Region of permissible DC operation.

II Permissible extension for repetitive pulse operation.

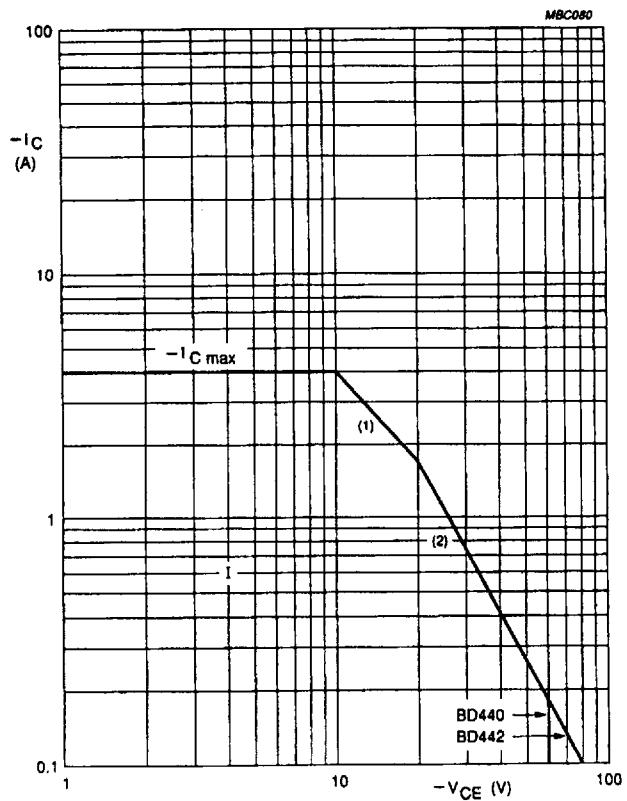
(1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.

(2) Second breakdown limits.

Fig.2 Safe operating area.

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BD440, BD442

 $T_{mb} = 25^\circ\text{C}$

I Region of permissible DC operation.

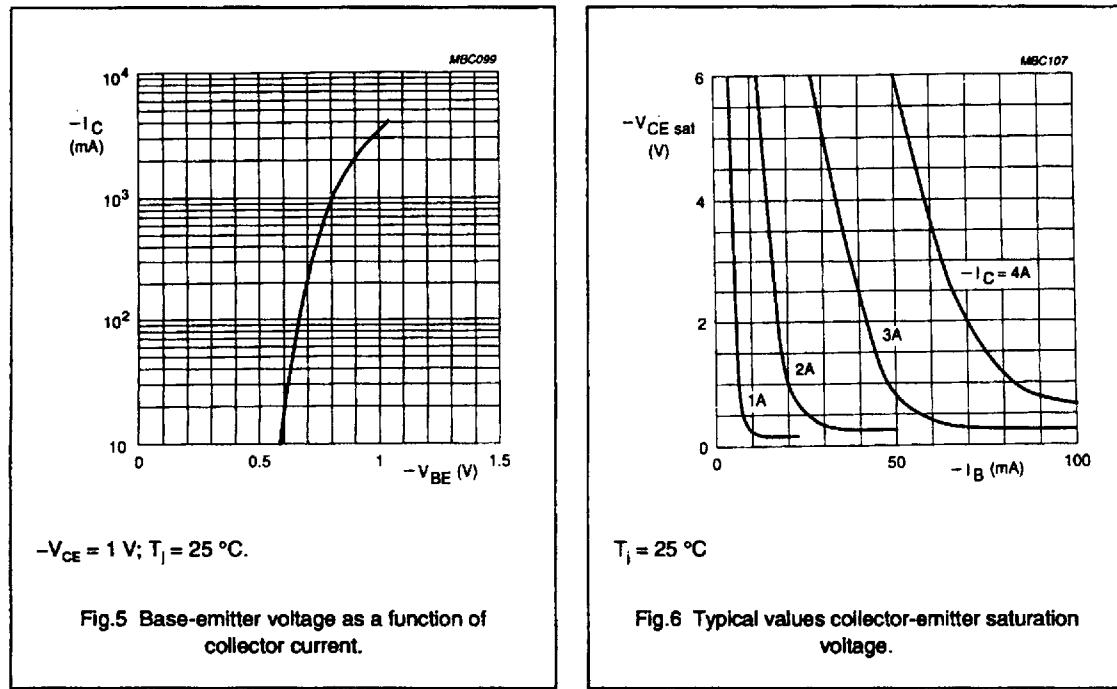
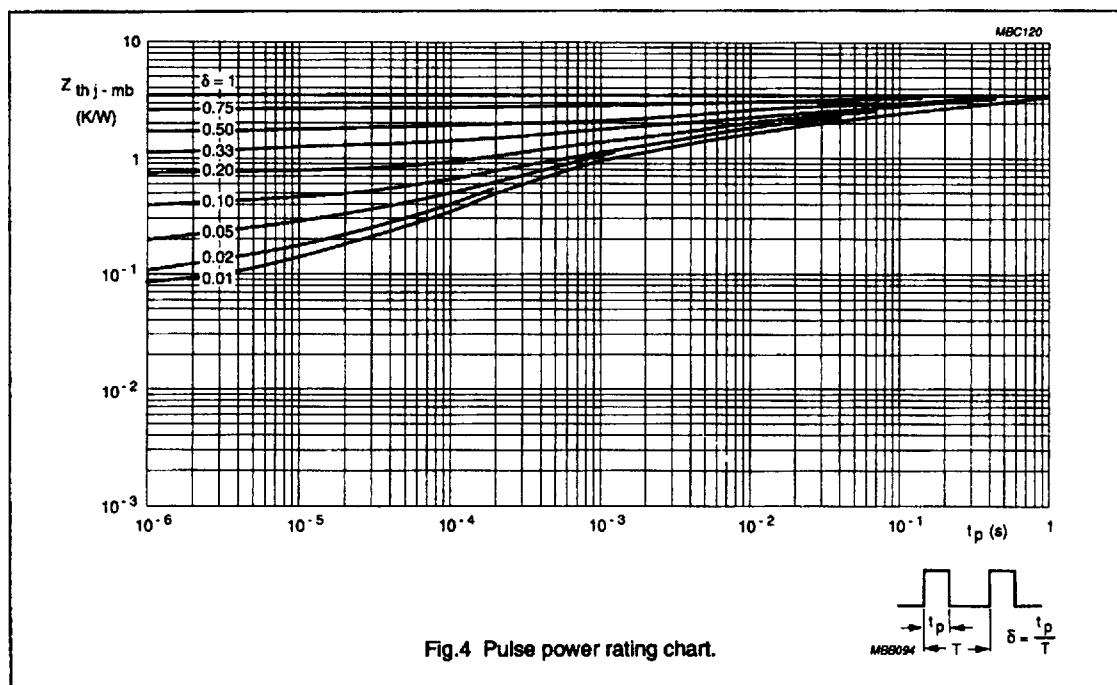
(1) $P_{tot\ max}$ and $P_{peak\ max}$ lines.

(2) Second breakdown limits.

Fig.3 Safe operating area.

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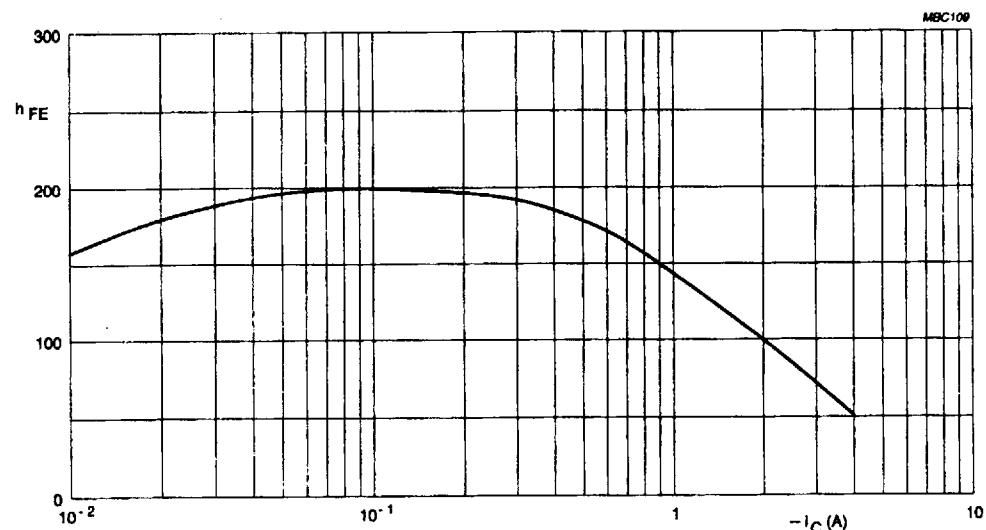
 $-V_{CE} = 1$ V; $T_J = 25$ °C.

Fig.7 Typical values DC current gain.

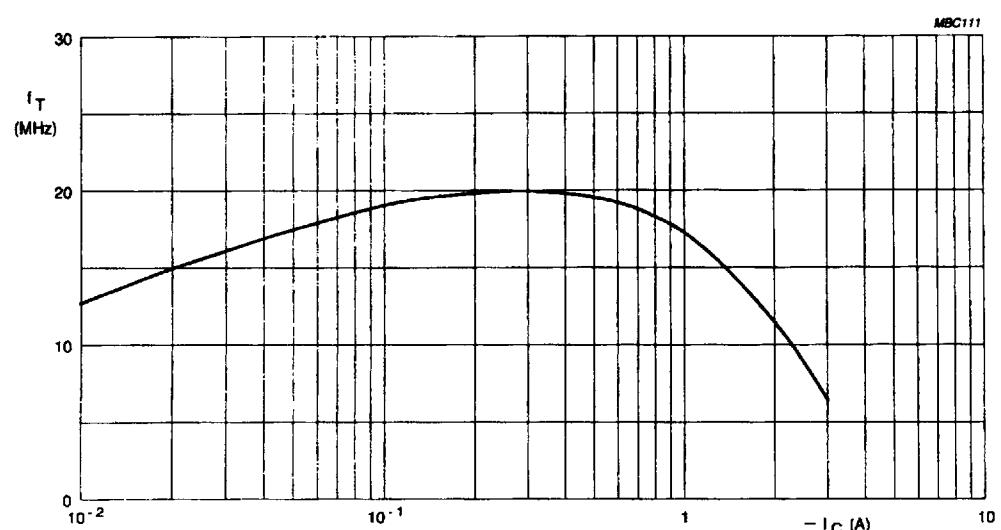
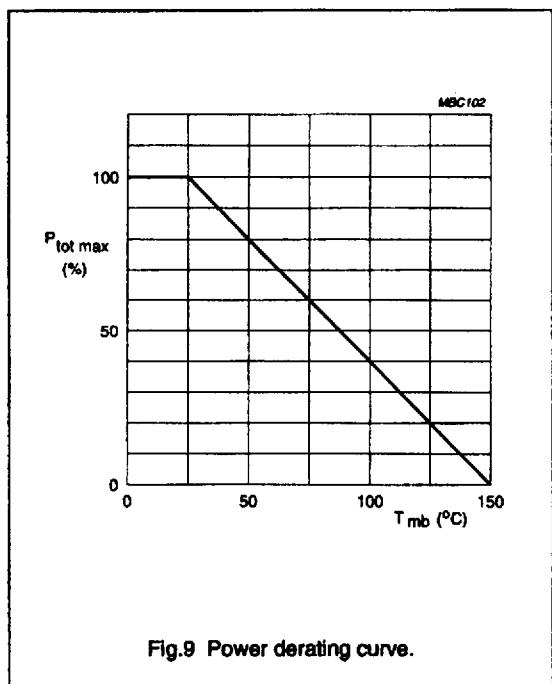
 $f = 1$ MHz; $-V_{CE} = 1$ V; $T_J = 25$ °C.

Fig.8 Transition frequency.

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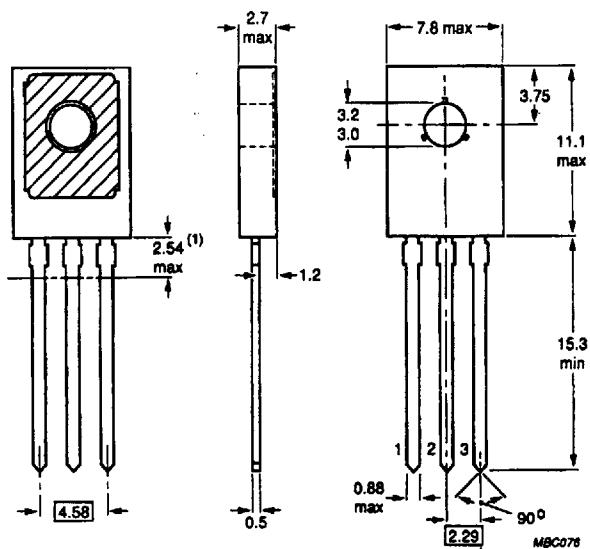
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PACKAGE OUTLINE



Dimensions in mm

Collector connected to metal part of mounting surface

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

Fig.10 TO-126 (SOT32).