

Silicon epitaxial-base transistors

BD434/436/438/440/442

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56E D ■ 7110826 0042916 8T2 ■ PHIN

T-33-19

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

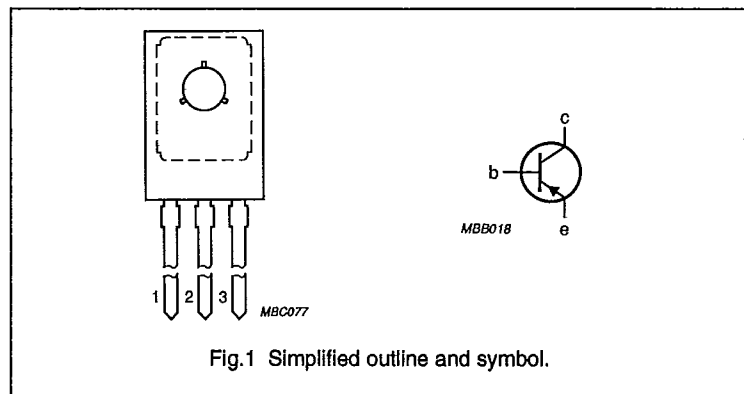


Fig.1 Simplified outline and symbol.

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LIMITING VALUES

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

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

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

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$-I_{CBO}$	collector cut off current	$I_E = 0$; $-V_{CB} = -V_{CBO\text{ max}}$	-	-	50	μA
		$I_E = 0$; $-V_{CB} = 10\text{ V}$; $T_J = 150\text{ }^\circ\text{C}$	-	-	1	mA
		$I_E = 0$; $-V_{CB} = -V_{CBO\text{ max}}$; $T_J = 150\text{ }^\circ\text{C}$	-	-	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 $-V_{CE} = 1\text{ V}$	-	-	-	-
	BD434, BD436, BD438		-	-	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
			-	-	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
			-	-	0.8	V
		$-I_C = 3\text{ A}$; $-I_B = 0.3\text{ A}$	-	-	0.7	V

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
h_{FE}	DC current gain	$-I_C = 10 \text{ mA};$ $-V_{CB} = 5 \text{ V}$					
	BD434		25	-	-		
	BD436		25	-	-		
	BD438		25	-	-		
	BD440		20	-	-		
	BD442		15	-	-		
			$-I_C = 500 \text{ mA};$ $-V_{CB} = 1 \text{ V}$				
	BD434		85	-	475		
	BD436		85	-	475		
	BD438		85	-	375		
	BD440		40	-	-		
	BD442		40	-	-		
			$-I_C = 2 \text{ A};$ $-V_{CB} = 1 \text{ V}$				
	BD434		50	-	-		
	BD436		50	-	-		
	BD438		40	-	-		
	BD440		25	-	-		
	BD442		15	-	-		
			$-I_C = 3 \text{ A};$ $-V_{CB} = 1 \text{ V}$				
BD438		30	-	-			
f_T	transition frequency	at $f = 1 \text{ MHz};$ $-I_C = 250 \text{ mA};$ $-V_{CE} = 1 \text{ V}$	7	-	-	MHz	
h_{FE1} / h_{FE2}	DC current gain ratio of the complementary pairs	$-I_C = 500 \text{ mA};$ $-V_{CB} = 1 \text{ V}$					
	BD433/BD434		-	-	1.4		
	BD435/BD436		-	-	1.4		
	BD437/BD438		-	-	1.8		
	BD439/BD440		-	-	1.4		
	BD441/BD442		-	-	1.4		

Note

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

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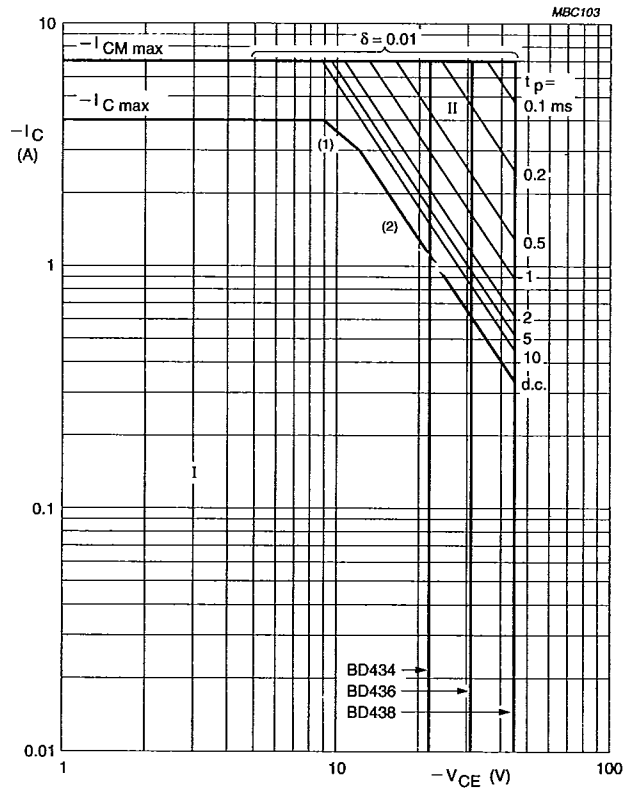
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BD434, BD436, BD438

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

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.

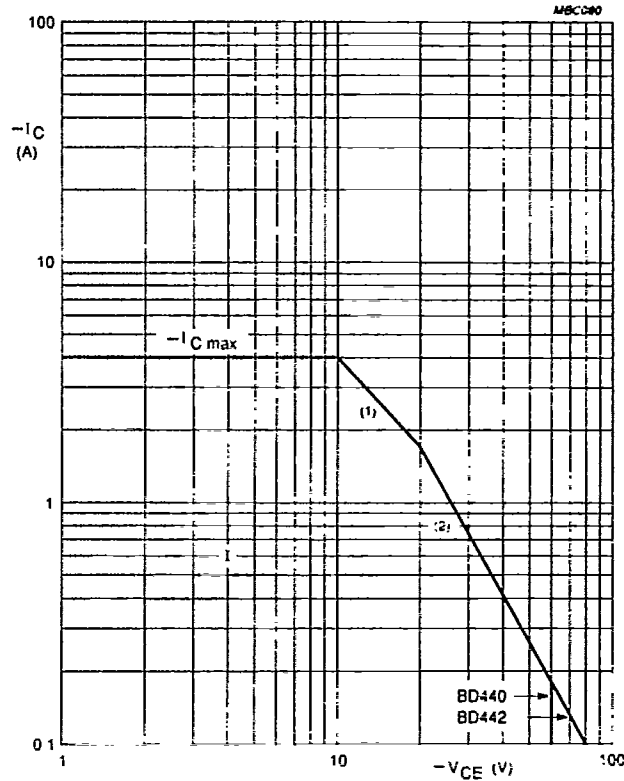
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BD440, BD442

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

I Region of permissible DC operation.

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

(2) Second breakdown limits.

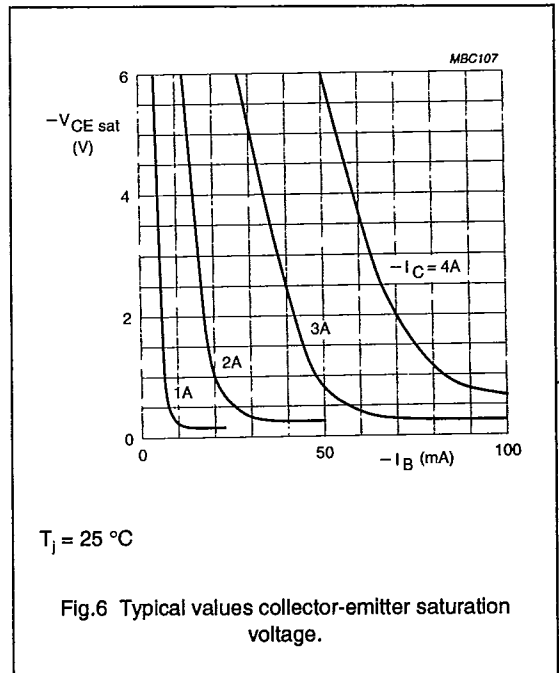
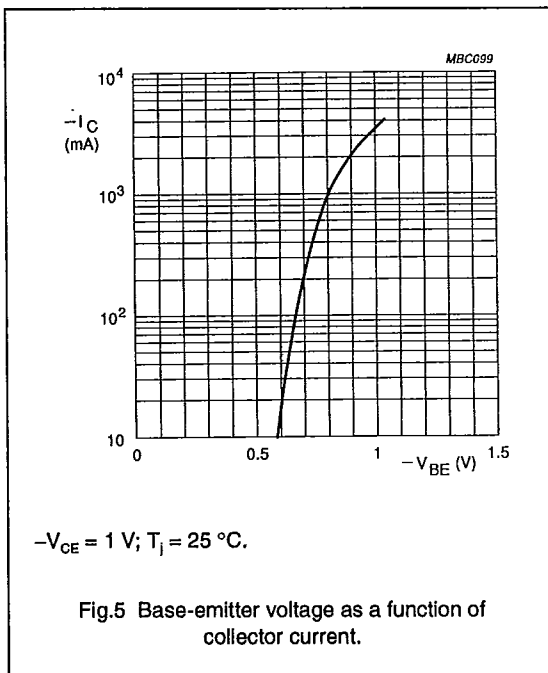
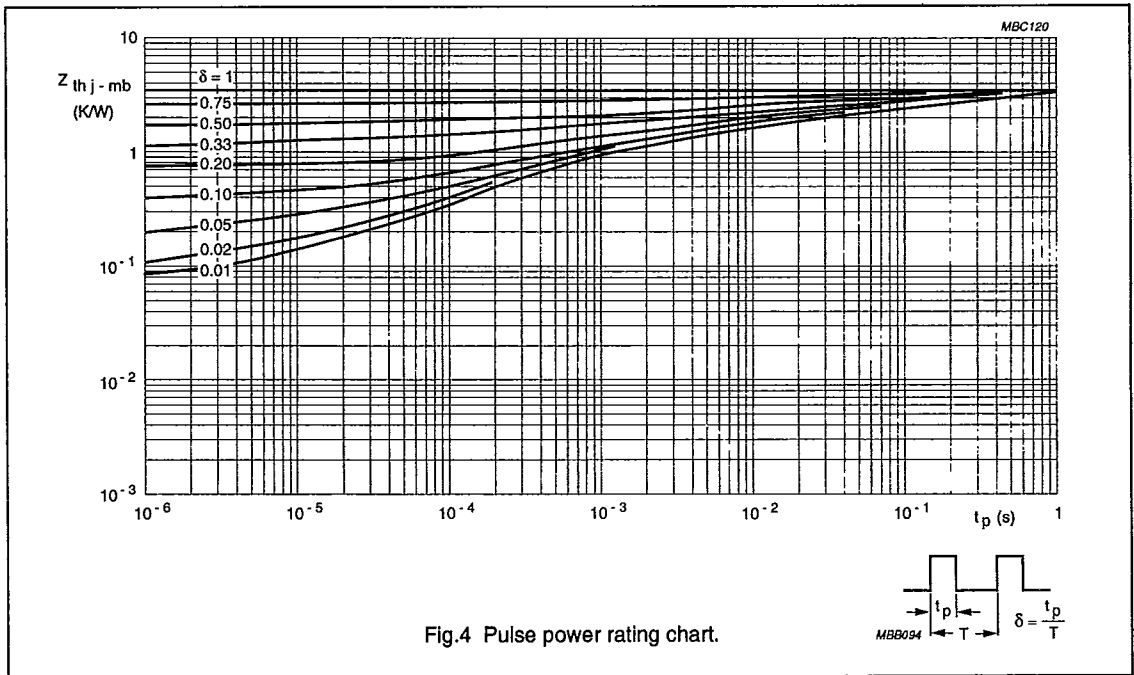
Fig.3 Safe operating area.

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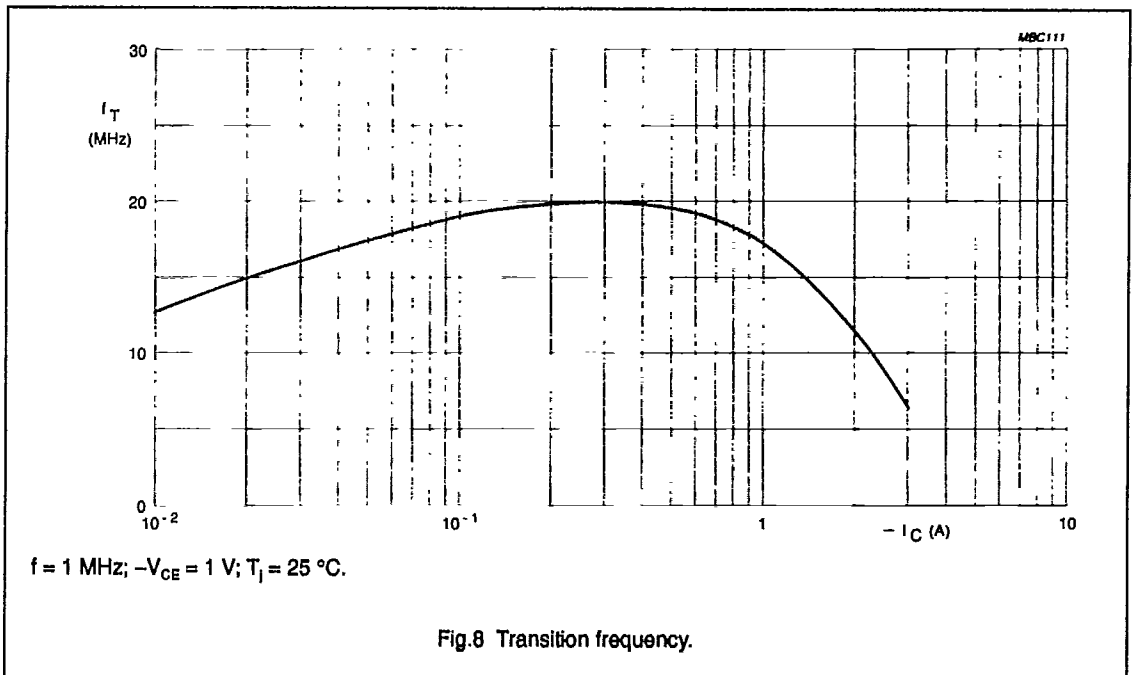
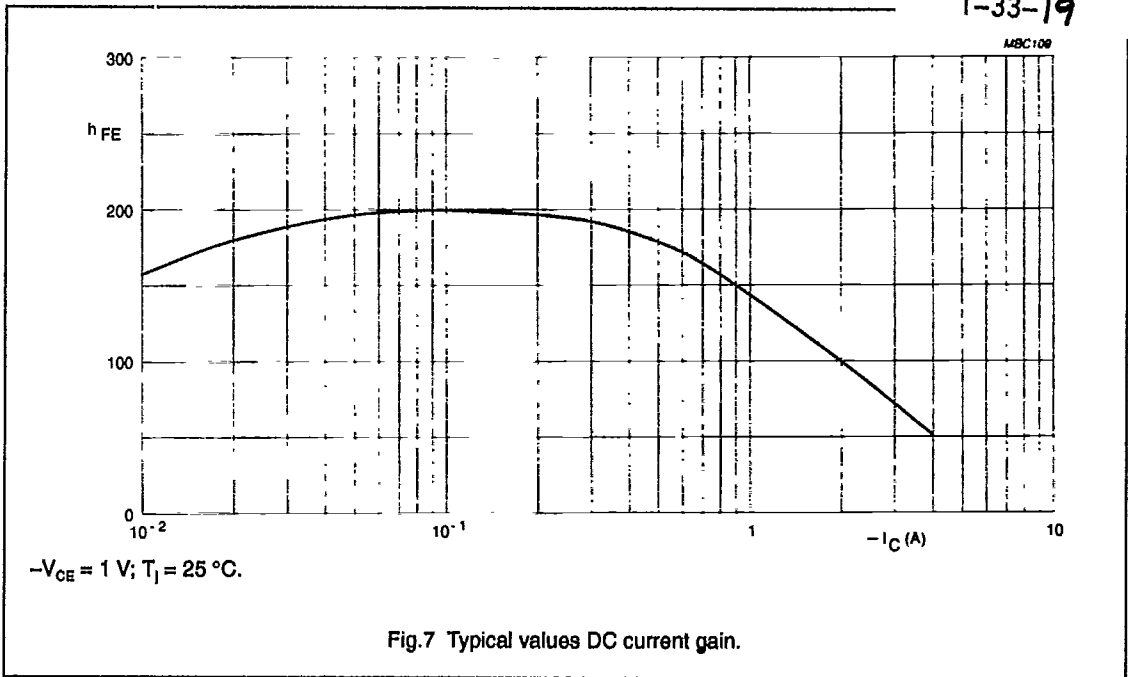
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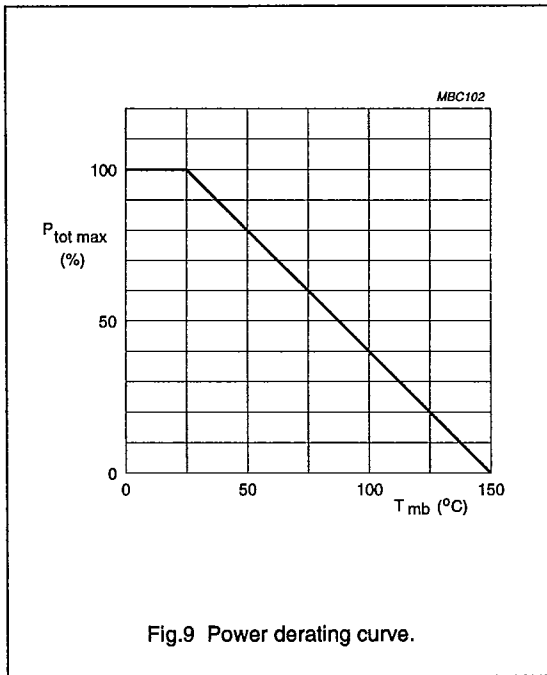
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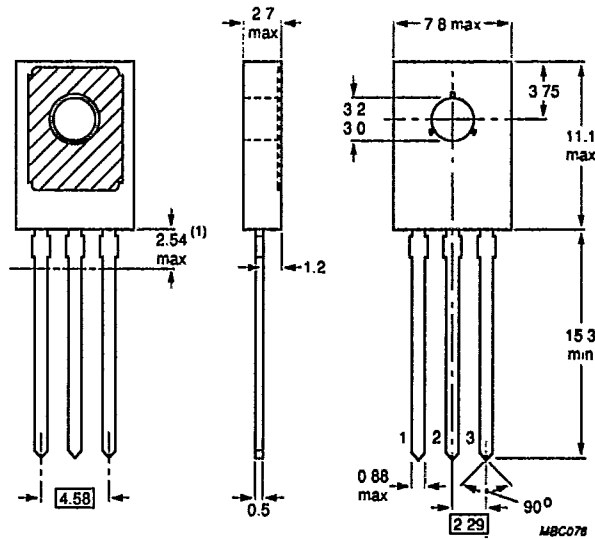
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PACKAGE OUTLINE

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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).