

Silicon Darlington power transistors

BD676A/678A/680A

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56E D ■ 7110826 0042988 T99 ■ PHIN

T-33-31

DESCRIPTION

PNP epitaxial base transistors in a monolithic Darlington circuit in a TO-126 (SOT32) plastic envelope intended for audio and video applications. NPN complements are BD675A, BD677A and BD679A respectively.

PINNING - TO-126 (SOT32)

PIN	DESCRIPTION
1	emitter
2	collector
3	base

Collector connected to mounting base.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$-V_{CBO}$	collector-base voltage BD676A BD678A BD680A	open emitter	-	-	45 60 80	V V V
$-V_{CEO}$	collector-emitter voltage BD676A BD678A BD680A	open base	-	-	45 60 80	V V V
$-I_C$	collector current	average value	-	-	4	A
P_{tot}	total power dissipation	$T_{mb} = 25\text{ }^\circ\text{C}$	-	-	40	W
T_J	junction temperature		-	-	150	$^\circ\text{C}$
h_{FE}	DC current gain	$-I_C = 2\text{ A};$ $-V_{CE} = 3\text{ V}$	750	-	-	
f_{He}	cut-off frequency	$-I_C = 1.5\text{ A};$ $-V_{CE} = 3\text{ V}$	-	60	-	kHz

PIN CONFIGURATION

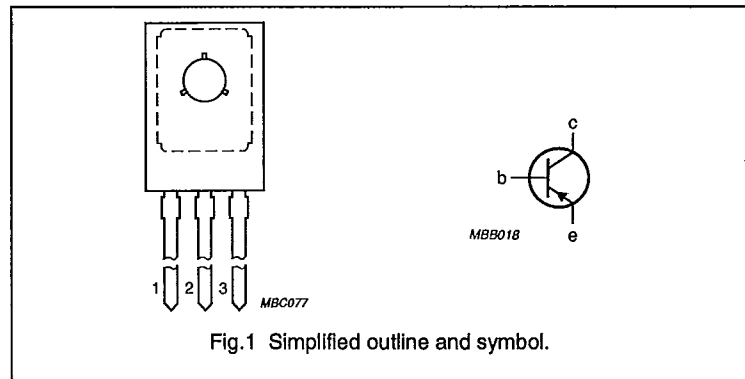


Fig.1 Simplified outline and symbol.

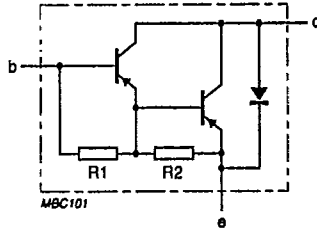
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R1 typ. 3 kΩ

R2 typ. 80 Ω

Fig.2 Darlington circuit diagram.

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
-V _{CBO}	collector-base voltage	open emitter			
	BD676A		-	45	V
	BD678A		-	60	V
-V _{CEO}	collector-emitter voltage	open base			
	BD676A		-	45	V
	BD678A		-	60	V
-V _{EBO}	emitter-base voltage	open collector			
	BD676A		-	5	V
	BD678A		-	5	V
-I _C	collector current	average value			
	BD676A		-	4	A
	BD678A		-	4	A
-I _{CM}	collector current	peak value			
	BD676A		-	6	A
	BD678A		-	6	A
-I _B	base current				
	BD676A		-	100	mA
	BD678A		-	100	mA
P _{tot}	total power dissipation	T _{mb} = 25 °C			
T _{stg}	storage temperature range		-65	+150	°C
T _j	junction temperature			+150	°C

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THERMAL CHARACTERISTICS

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SYMBOL	PARAMETER	CONDITIONS	NOM.	UNIT
$R_{th\ j-mb}$	from junction to mounting base		3.12	K/W
$R_{th\ j-a}$	from junction to ambient	in free air	100	K/W

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$-I_{CBO}$	collector cut off current	$I_E = 0;$ $-V_{CB} = -V_{CBO\ max}$	-	0.2	mA
		$I_E = 0;$ $-V_{CB} = -0.5 V_{CBO\ max}$ $T_{mb} = 150\text{ °C}$	-	1	mA
$-I_{EBO}$	emitter cut off current	$I_C = 0;$ $-V_{EB} = 5\text{ V}$	-	5	mA
h_{FE}	DC current gain	$-I_C = 2\text{ A};$ $-V_{CE} = 3\text{ V}$	750	-	
$-V_{BE}$	base-emitter voltage	$-I_C = 2\text{ A};$ $-V_{CE} = 3\text{ V};$ note 1 note 2	-	2.5	V
$-V_{CE\ sat}$	collector-emitter saturation voltage	$-I_C = 2\text{ A};$ $-I_B = 40\text{ mA}$ note 1	-	2.8	V
h_{fe}	small signal current gain	$-I_C = 1.5\text{ A};$ $-V_{CE} = 3\text{ V};$ $f = 1\text{ MHz}$	10	-	

Notes

1. Measured under pulse conditions; $t_p < 300$, $\delta < 2\%$.
2. V_{BE} decreases by typ. 2.3 mV/K with increasing temperature.

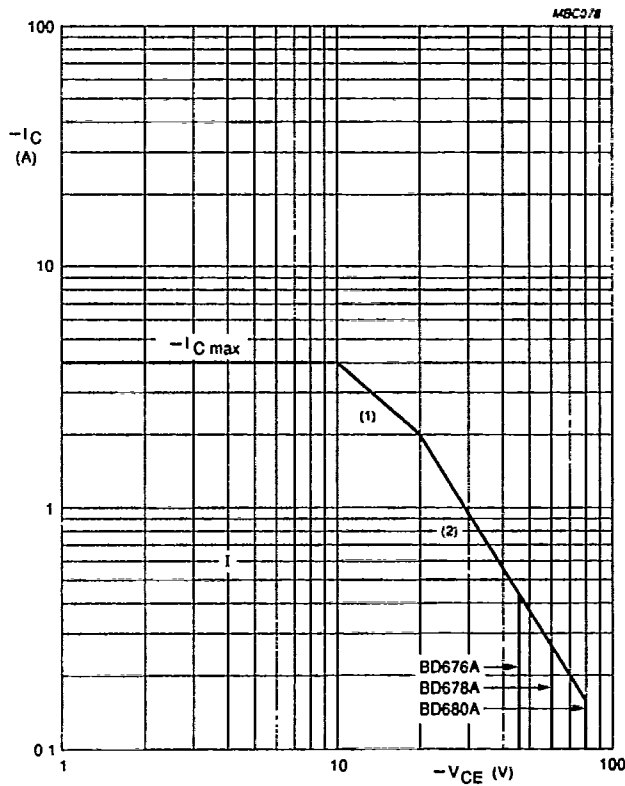
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$T_{mb} = 25^\circ\text{C}$

I Region of permissible DC operation.

(1) $P_{tot \text{ max}}$ line.

(2) Second breakdown limits.

Fig.3 Safe operating area.

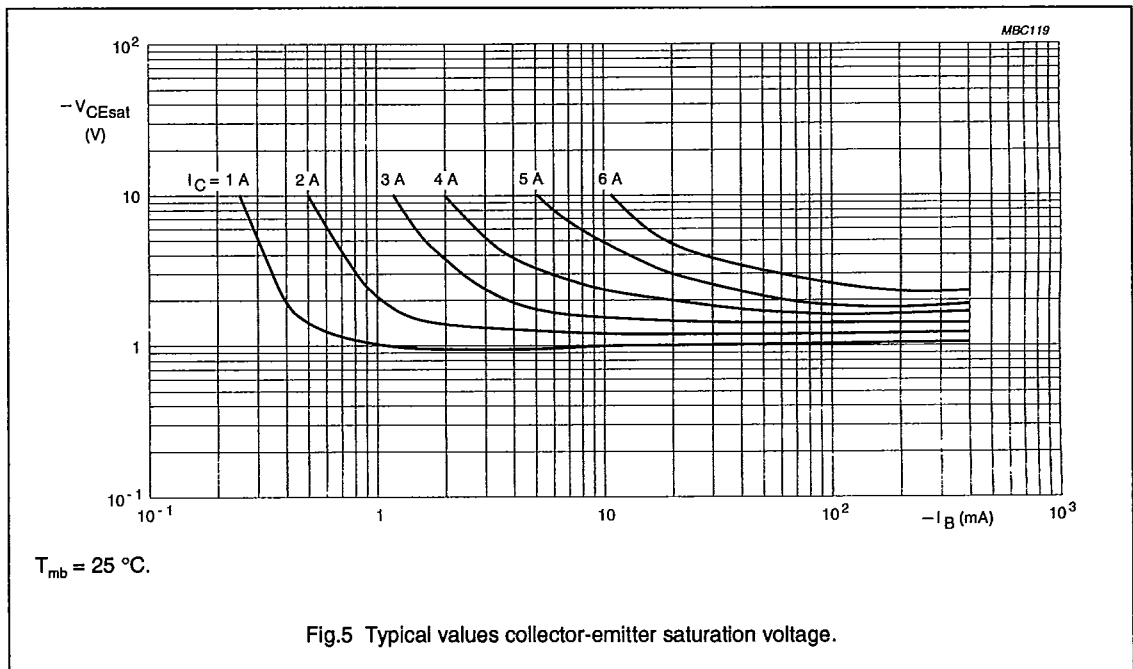
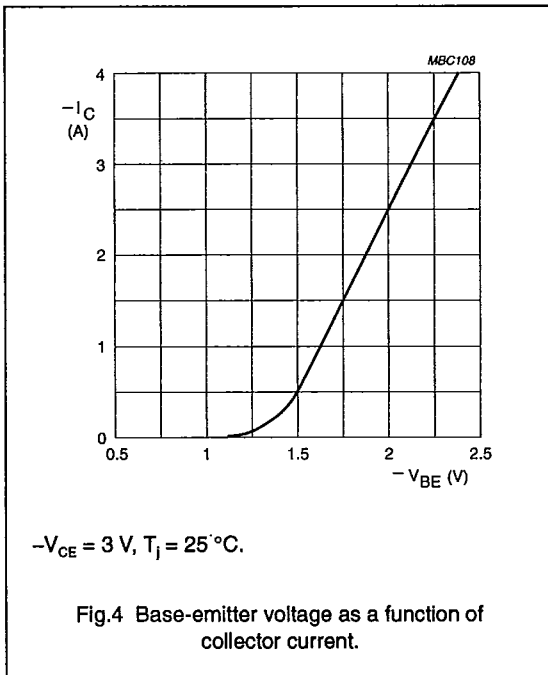
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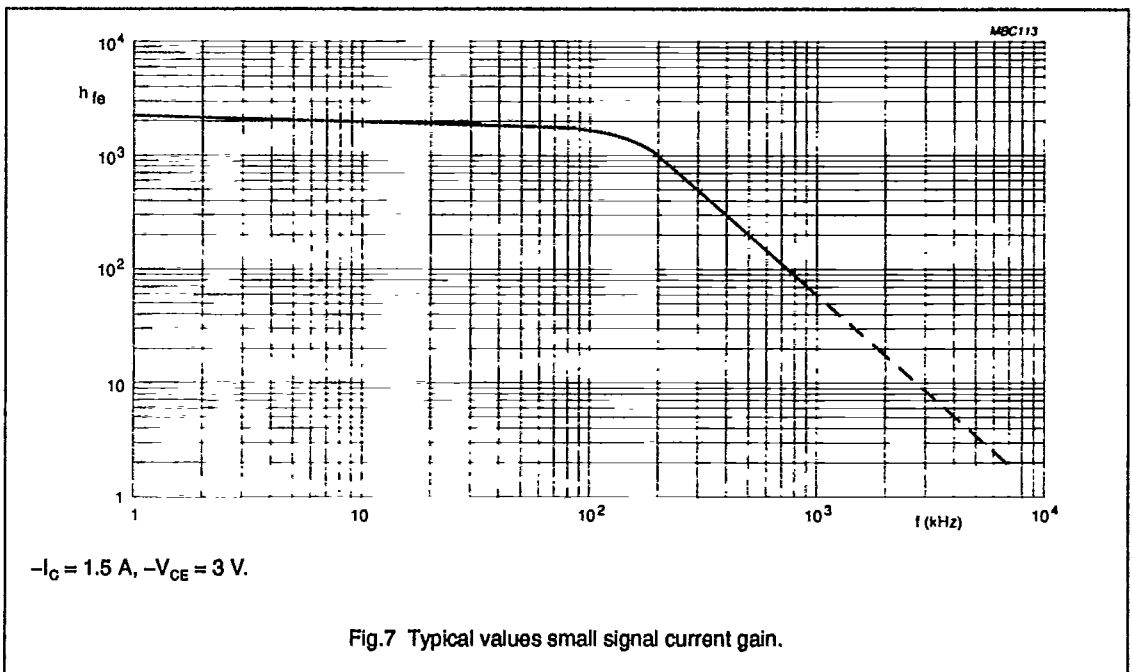
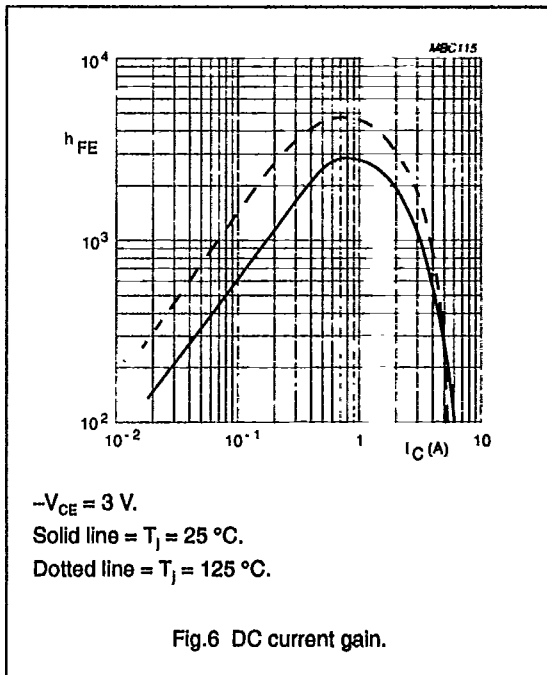
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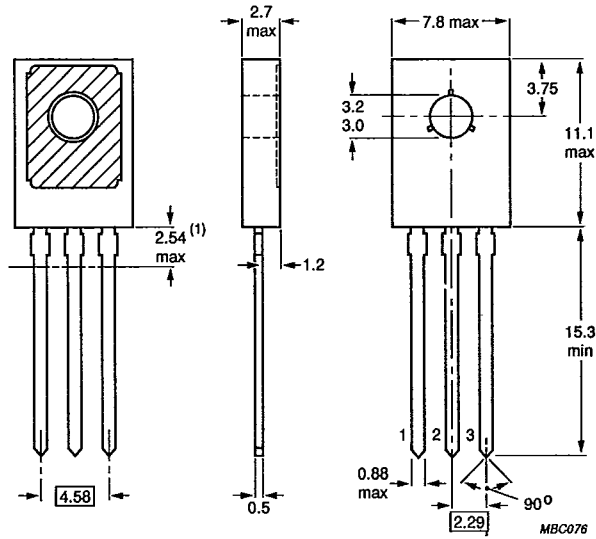
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PACKAGE OUTLINE

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Dimensions in mm

Collector connected to mounting base.

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

Fig.8 TO-126 (SOT32).