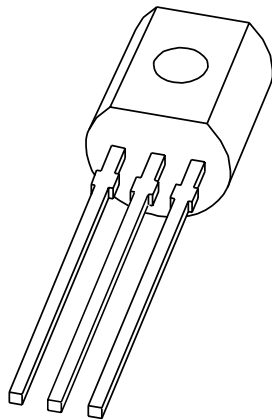


# DATA SHEET



## **2N3906** PNP switching transistor

Product specification  
Supersedes data of 1999 Apr 23

2004 Oct 11

## PNP switching transistor

2N3906

## FEATURES

- Low current (max. 200 mA)
- Low voltage (max. 40 V).

## APPLICATIONS

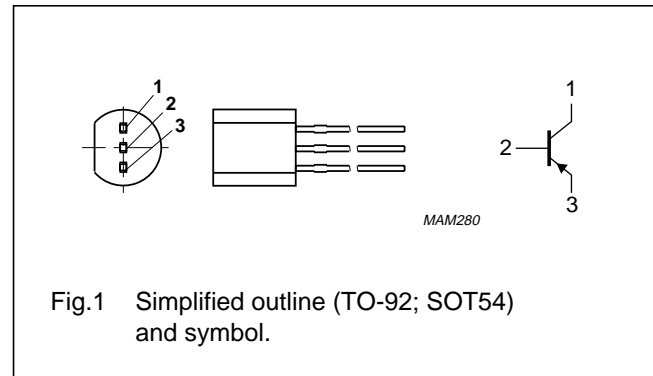
- High-speed switching in industrial applications.

## DESCRIPTION

PNP switching transistor in a TO-92; SOT54 plastic package. NPN complement: 2N3904.

## PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter



## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
2N3906	SC-43A	plastic single-ended leaded (through hole) package; 3 leads	SOT54

## LIMITING VALUES

In accordance with the Absolute Maximum Rating System (IEC 60134).

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$V_{CBO}$	collector-base voltage	open emitter	–	–40	V
$V_{CEO}$	collector-emitter voltage	open base	–	–40	V
$V_{EBO}$	emitter-base voltage	open collector	–	–6	V
$I_C$	collector current (DC)		–	–200	mA
$I_{CM}$	peak collector current		–	–300	mA
$I_{BM}$	peak base current		–	–100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ °C}$	–	500	mW
$T_{stg}$	storage temperature		–65	+150	°C
$T_j$	junction temperature		–	150	°C
$T_{amb}$	ambient temperature		–65	+150	°C

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th(j-a)}$	thermal resistance from junction to ambient	note 1	250	K/W

## Note

1. Transistor mounted on an FR4 printed-circuit board.

PNP switching transistor

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**CHARACTERISTICS**

T<sub>amb</sub> = 25 °C unless otherwise specified.

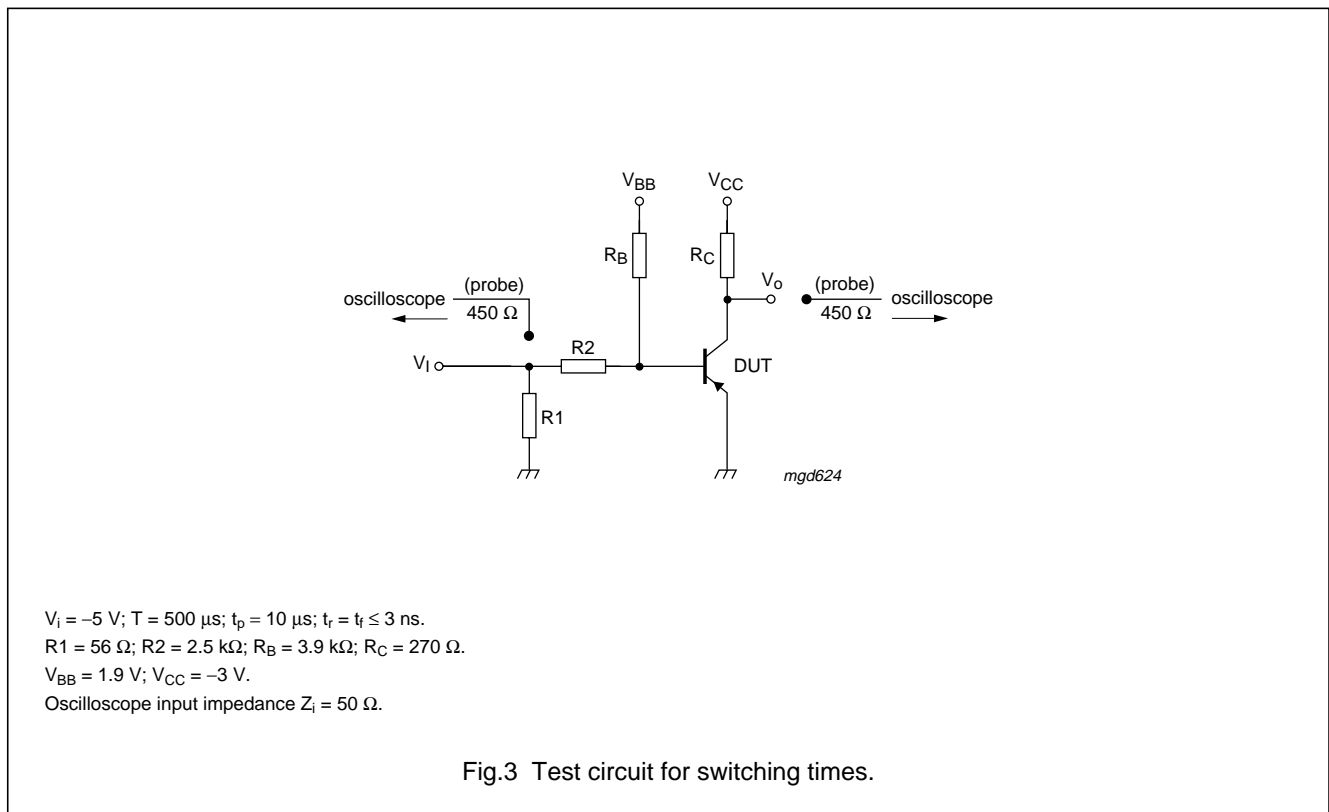
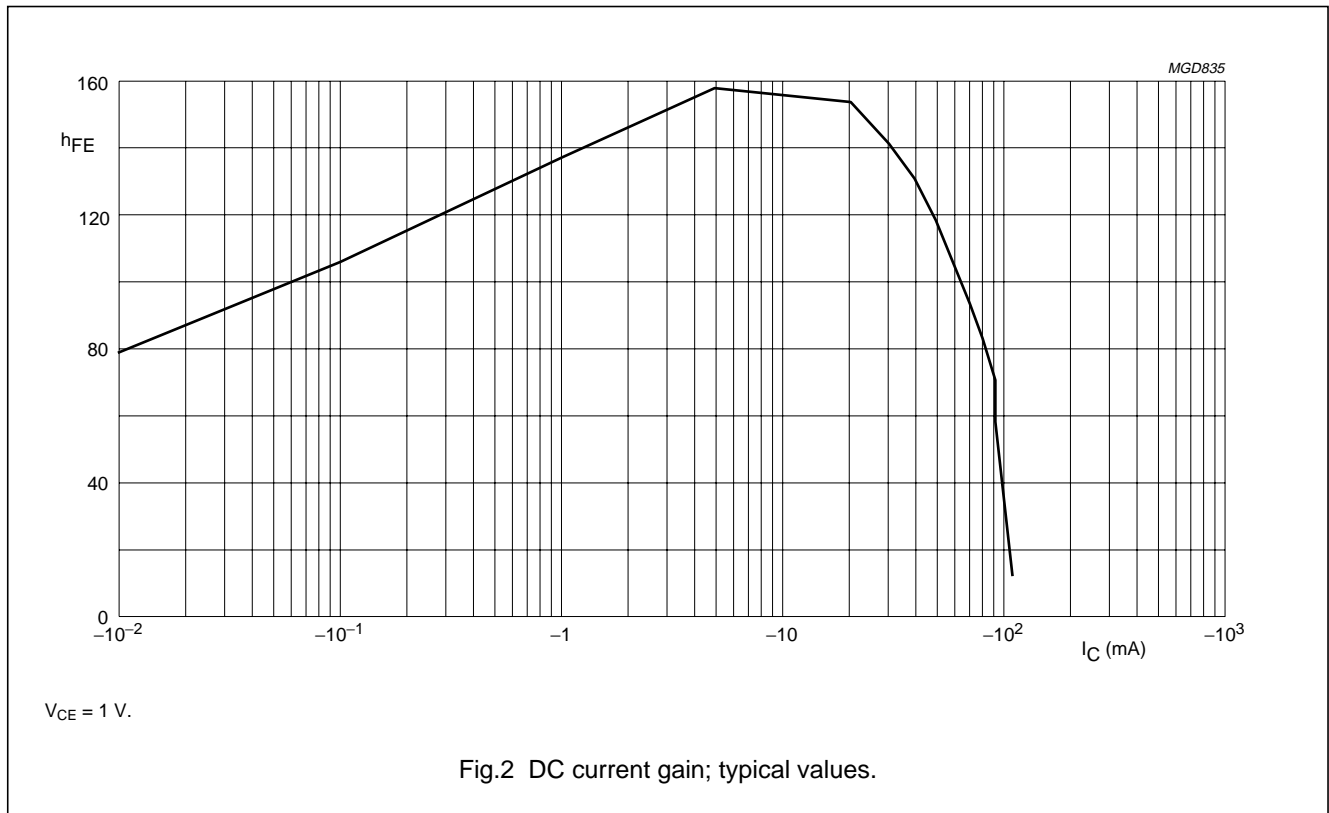
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I <sub>CBO</sub>	collector-base cut-off current	V <sub>CB</sub> = -30 V; I <sub>E</sub> = 0 A	-	-50	nA
I <sub>EBO</sub>	emitter-base cut-off current	V <sub>EB</sub> = -6 V; I <sub>C</sub> = 0 A	-	-50	nA
h <sub>FE</sub>	DC current gain	V <sub>CE</sub> = -1 V; note 1; see Fig.2 I <sub>C</sub> = -0.1 mA I <sub>C</sub> = -1 mA I <sub>C</sub> = -10 mA I <sub>C</sub> = -50 mA I <sub>C</sub> = -100 mA	60 80 100 60 30	- - 300 - -	
V <sub>CEsat</sub>	collector-emitter saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -1 mA; note 1	-	-200	mV
		I <sub>C</sub> = -50 mA; I <sub>B</sub> = -5 mA; note 1	-	-200	mV
V <sub>BEsat</sub>	base-emitter saturation voltage	I <sub>C</sub> = -10 mA; I <sub>B</sub> = -1 mA; note 1	-	-850	mV
		I <sub>C</sub> = -50 mA; I <sub>B</sub> = -5 mA; note 1	-	-950	mV
C <sub>c</sub>	collector capacitance	V <sub>CB</sub> = -5 V; I <sub>E</sub> = i <sub>e</sub> = 0 A; f = 1 MHz	-	4.5	pF
C <sub>e</sub>	emitter capacitance	I <sub>C</sub> = i <sub>c</sub> = 0; V <sub>EB</sub> = -500 mV; f = 1 MHz	-	10	pF
f <sub>T</sub>	transition frequency	V <sub>CE</sub> = -20 V; I <sub>C</sub> = -10 mA; f = 100 MHz	250	-	MHz
F	noise figure	V <sub>CE</sub> = -5 V; I <sub>C</sub> = -100 μA; R <sub>S</sub> = 1 kΩ; f = 10 Hz to 15.7 kHz	-	4	dB
<b>Switching times (between 10 % and 90 % levels); see Fig.3</b>					
t <sub>on</sub>	turn-on time	I <sub>Con</sub> = -10 mA; I <sub>Bon</sub> = -1 mA; I <sub>Boff</sub> = 1 mA	-	65	ns
t <sub>d</sub>	delay time		-	35	ns
t <sub>r</sub>	rise time		-	35	ns
t <sub>off</sub>	turn-off time		-	300	ns
t <sub>s</sub>	storage time		-	225	ns
t <sub>f</sub>	fall time		-	75	ns

**Note**

1. Pulse test: t<sub>p</sub> ≤ 300 μs; δ ≤ 0.02.

PNP switching transistor

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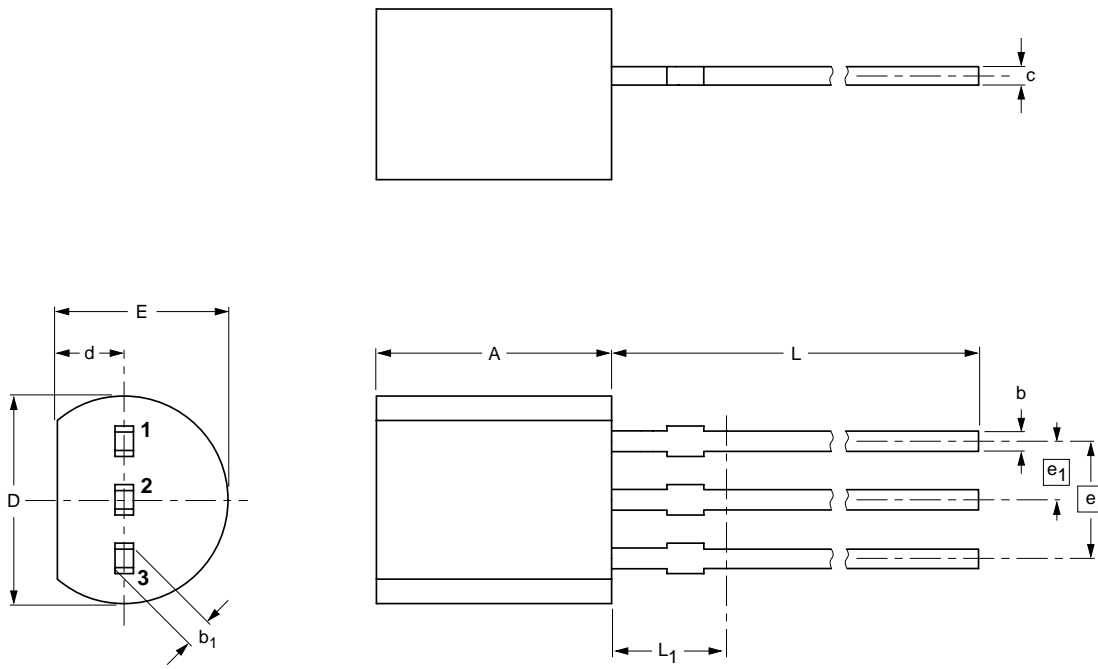
PNP switching transistor

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PACKAGE OUTLINE

Plastic single-ended leaded (through hole) package; 3 leads

SOT54



**DIMENSIONS (mm are the original dimensions)**

UNIT	A	b	b <sub>1</sub>	c	D	d	E	e	e <sub>1</sub>	L	L <sub>1</sub> <sup>(1)</sup> max.
mm	5.2 5.0	0.48 0.40	0.66 0.55	0.45 0.38	4.8 4.4	1.7 1.4	4.2 3.6	2.54	1.27	14.5 12.7	2.5

**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	JEITA		
SOT54		TO-92	SC-43A		-97-02-28 04-06-28

## PNP switching transistor

2N3906

## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	DEFINITION
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