

ANTREX Electronics

Electronic Components Sourcing Information

Product Reference Information

Part Number:	MPS3904,126
Manufacturer:	NXP USA Inc.
Package:	TO-226-3, TO-92-3 (TO-226AA) Formed Leads
Availability:	Please confirm with sales

Product Page:

<https://antrexco.com/product/details/nxp-usa-inc/mps3904-126.html>

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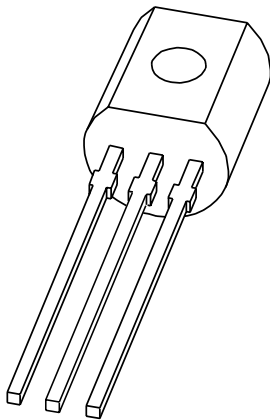
Secure sourcing support for OEM / EMS projects

Note:

This PDF includes an ANTREX product reference cover page.

The original manufacturer datasheet follows from the next page.

DATA SHEET



MPS3904 NPN switching transistor

Product specification
Supersedes data of 1999 Apr 12

2004 Oct 11

NPN switching transistor

MPS3904

FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 40 V).

APPLICATIONS

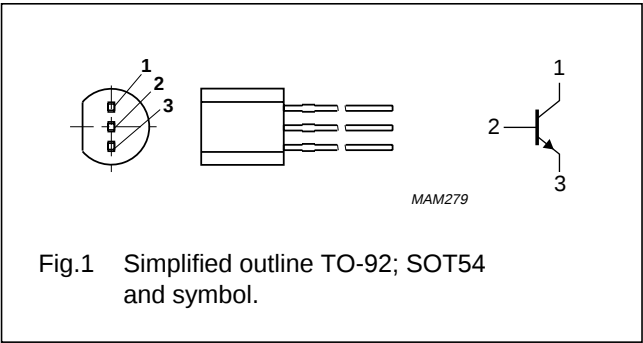
- General purpose switching and amplification.

DESCRIPTION

NPN transistor in a TO-92; SOT54 plastic package.
PNP complement: MPS3906.

PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter



ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
MPS3904	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	–	60	V
V_{CEO}	collector-emitter voltage	open base	–	40	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	100	mA
I_{CM}	peak collector current		–	200	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25\text{ }^{\circ}\text{C}$	–	500	mW
T_{stg}	storage temperature		–65	+150	$^{\circ}\text{C}$
T_j	junction temperature		–	150	$^{\circ}\text{C}$
T_{amb}	ambient temperature		–65	+150	$^{\circ}\text{C}$

NPN switching transistor

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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.

CHARACTERISTICS

$T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector-base cut-off current	$V_{CB} = 30\text{ V}; I_E = 0\text{ A}$	–	50	nA
I_{EBO}	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0\text{ A}$	–	50	nA
h_{FE}	DC current gain	$V_{CE} = 1\text{ V}$; note 1 $I_C = 0.1\text{ mA}$ $I_C = 1\text{ mA}$ $I_C = 10\text{ mA}$ $I_C = 50\text{ mA}$ $I_C = 100\text{ mA}$	40 70 100 60 30	– – 300 – –	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$; note 1	–	200	mV
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$; note 1	–	300	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$; note 1	650	850	mV
		$I_C = 50\text{ mA}; I_B = 5\text{ mA}$; note 1	–	950	mV
C_c	collector capacitance	$V_{CB} = 5\text{ V}; I_E = I_C = 0\text{ A}$; $f = 100\text{ kHz}$ to 1 MHz	–	5	pF
C_e	emitter capacitance	$V_{EB} = 0.5\text{ V}; I_C = I_E = 0\text{ A}$; $f = 100\text{ kHz}$ to 1 MHz	–	15	pF
f_T	transition frequency	$V_{CE} = 20\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	180	–	MHz
F	noise figure	$V_{CE} = 5\text{ V}; I_C = 100\text{ }\mu\text{A}; R_S = 1\text{ k}\Omega$; $f = 10\text{ Hz}$ to 15.7 kHz	–	5	dB

Switching times (between 10 % and 90 % levels); (see Fig.2)

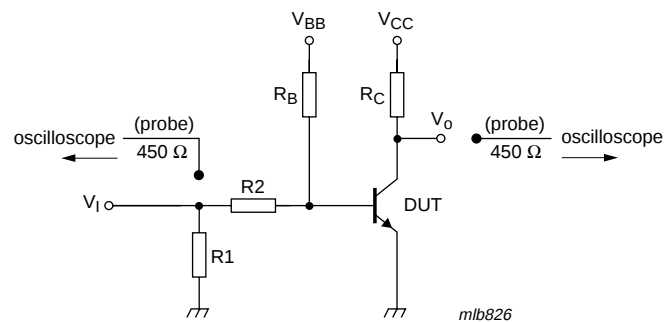
t_{on}	turn-on time	$I_{Con} = 10\text{ mA}; I_{Bon} = 1\text{ mA}; I_{Boff} = -1\text{ mA};$ $V_{CC} = 3\text{ V}; V_{BB} = -1.9\text{ V}$	–	110	ns
t_d	delay time		–	50	ns
t_r	rise time		–	60	ns
t_{off}	turn-off time		–	1200	ns
t_s	storage time		–	1000	ns
t_f	fall time		–	200	ns

Note

1. Pulse test: $t_p \leq 300\text{ }\mu\text{s}$; $\delta = 0.02$.

NPN switching transistor

MPS3904



$V_I = 5\text{ V}$; $t_p \geq 4\ \mu\text{s}$; $t_r = t_f \leq 3\text{ ns}$.

$R_1 = 56\ \Omega$; $R_2 = 2.5\text{ k}\Omega$; $R_B = 3.9\text{ k}\Omega$; $R_C = 270\ \Omega$.

Oscilloscope: input impedance $Z_i = 50\ \Omega$.

Fig.2 Test circuit for switching times.

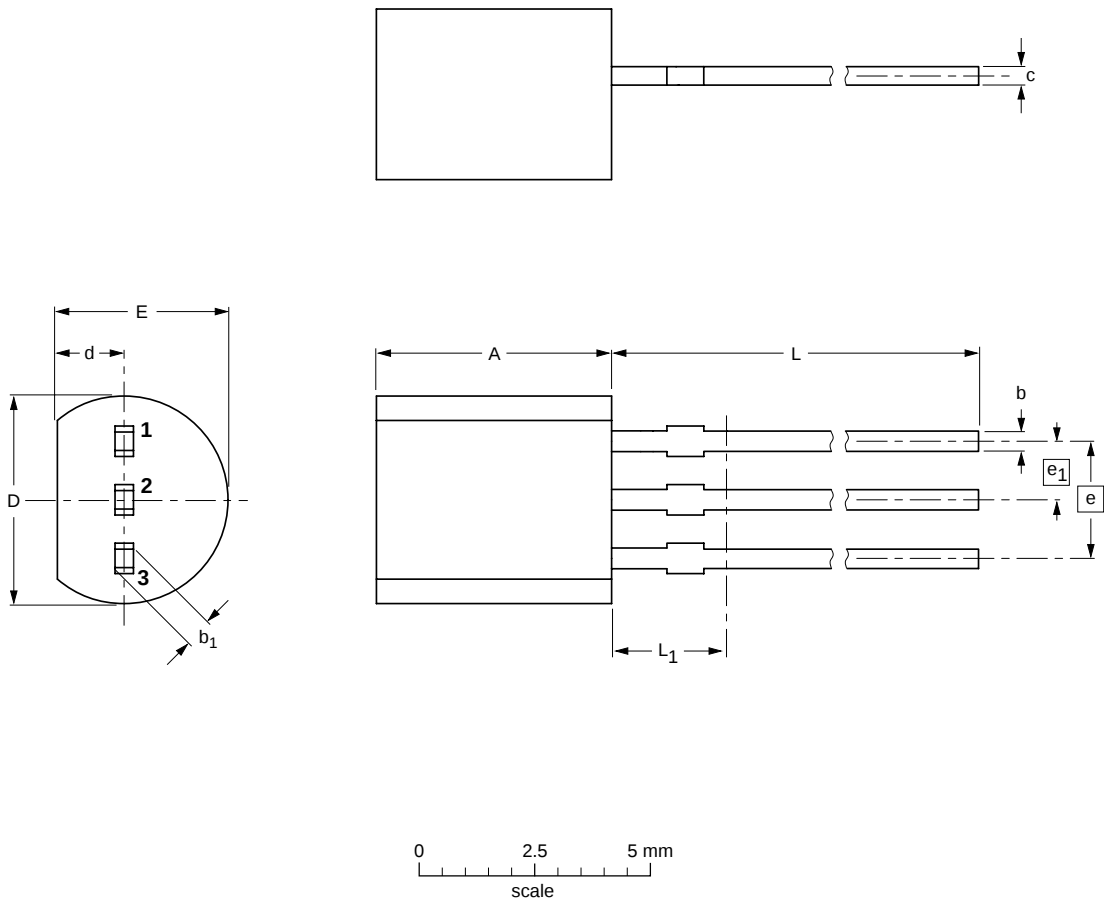
NPN switching transistor

MPS3904

PACKAGE OUTLINE

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

SOT54



DIMENSIONS (mm are the original dimensions)

UNIT	A	b	b ₁	c	D	d	E	e	e ₁	L	L ₁ ⁽¹⁾ 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

NPN switching transistor

MPS3904

DATA SHEET STATUS

LEVEL	DATA SHEET STATUS ⁽¹⁾	PRODUCT STATUS ⁽²⁾⁽³⁾	DEFINITION
I	Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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