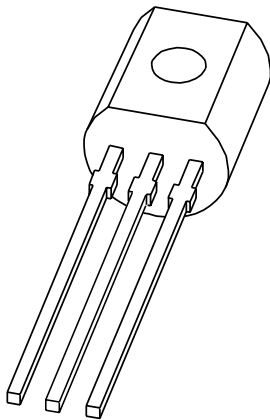


# DATA SHEET



## **PN2369A** NPN switching transistor

Product specification  
Supersedes data of 1999 Apr 14

2004 Dec 08

## NPN switching transistor

PN2369A

## FEATURES

- Low current (max. 200 mA)
- Low voltage (max. 15 V).

## APPLICATIONS

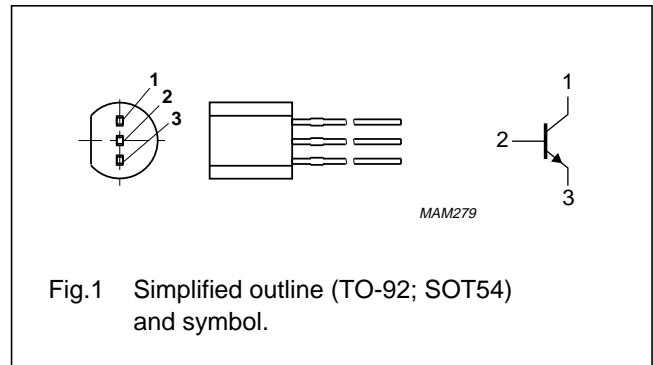
- High-speed switching applications.

## DESCRIPTION

NPN switching transistor in a TO-92; SOT54 plastic package.

## PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter



## ORDERING INFORMATION

TYPE NUMBER	PACKAGE		
	NAME	DESCRIPTION	VERSION
PN2369A	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	–	15	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	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	$T_{amb} \leq 25\text{ }^\circ\text{C}$	–	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	$^\circ\text{C}$

## 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.

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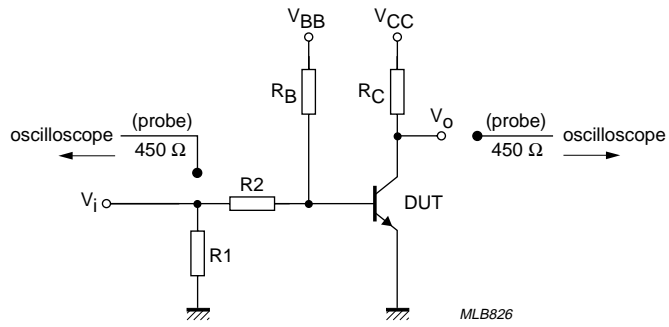
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 20\text{ V}; I_E = 0\text{ A}$	–	–	400	nA
		$V_{CB} = 20\text{ V}; I_E = 0\text{ A}; T_{amb} = 125\text{ °C}$	–	–	30	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 4\text{ V}; I_C = 0\text{ A}$	–	–	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 350\text{ mV}; I_C = 10\text{ mA}$	40	–	120	
		$V_{CE} = 350\text{ mV}; I_C = 10\text{ mA}; T_{amb} = -55\text{ °C}$	20	–	–	
		$V_{CE} = 400\text{ mV}; I_C = 30\text{ mA}$	30	–	–	
		$V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$	20	–	–	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	–	–	200	mV
		$I_C = 10\text{ mA}; I_B = 10\text{ mA}$	–	–	300	mV
		$I_C = 30\text{ mA}; I_B = 3\text{ mA}$	–	–	250	mV
		$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	–	–	500	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 10\text{ mA}; I_B = 1\text{ mA}$	700	–	850	mV
$C_c$	collector capacitance	$V_{CB} = 5\text{ V}; I_E = i_e = 0\text{ A}; f = 1\text{ MHz}$	–	–	4	pF
$f_T$	transition frequency	$V_{CE} = 10\text{ V}; I_C = 10\text{ mA}; f = 100\text{ MHz}$	500	–	–	MHz
<b>Switching times (between 10% and 90% levels); see Fig.2</b>						
$t_{on}$	turn-on time	$I_{Con} = 10\text{ mA}; I_{Bon} = 3\text{ mA}; I_{Boff} = -1.5\text{ mA}$	–	8	10	ns
$t_d$	delay time		–	–	4	ns
$t_r$	rise time		–	–	6	ns
$t_{off}$	turn-off time		–	10	20	ns
$t_s$	storage time		–	–	10	ns
$t_f$	fall time		–	–	10	ns

NPN switching transistor

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$V_i = 0.5\text{ V to }4.2\text{ V}$ ;  $T = 500\ \mu\text{s}$ ;  $t_p = 10\ \mu\text{s}$ ;  $t_r = t_f \leq 1\ \text{ns}$ .  
 $R_1 = 56\ \Omega$ ;  $R_2 = 1\ \text{k}\Omega$ ;  $R_B = 1\ \text{k}\Omega$ ;  $R_C = 270\ \Omega$ .  
 $V_{BB} = 0.2\text{ V}$ ;  $V_{CC} = 2.7\text{ V}$ .  
 Oscilloscope: input impedance  $Z_i = 50\ \Omega$ .

Fig.2 Test circuit for switching times.

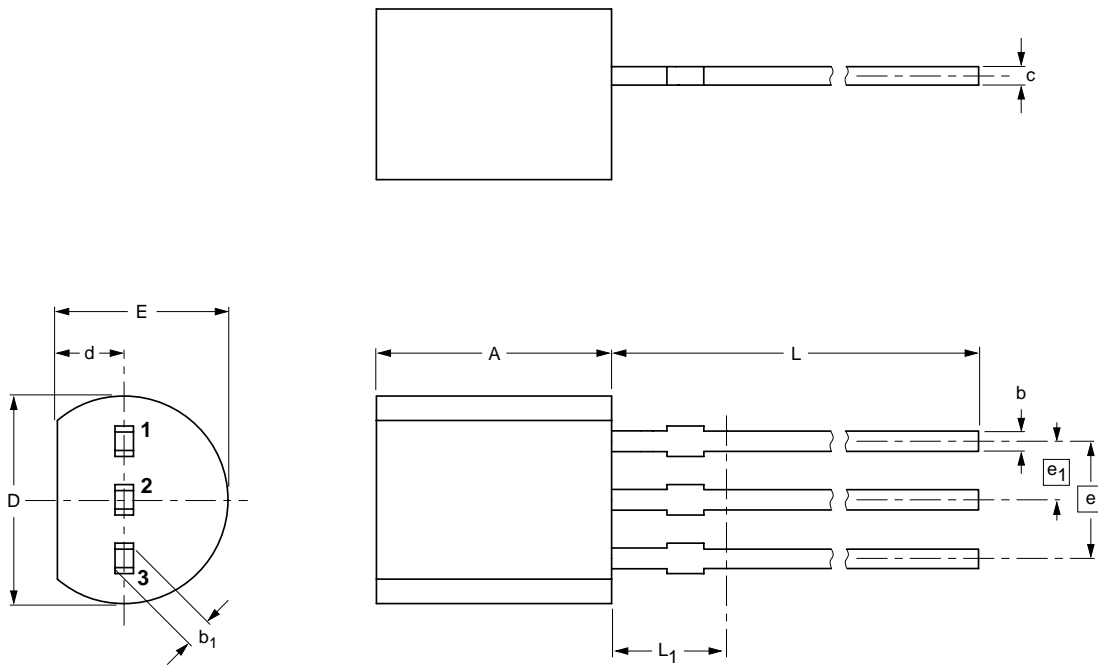
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PACKAGE OUTLINE

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		<del>04-06-28</del> 04-11-16

## NPN switching transistor

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## DATA SHEET STATUS

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