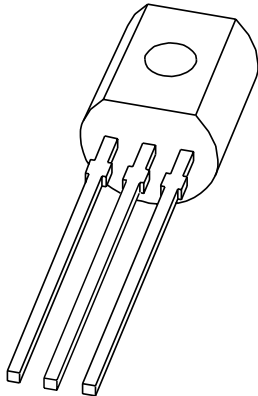


# DATA SHEET



## **PSS9013 series** 20 V NPN general purpose transistors

Product specification  
Supersedes data of 2003 May 15

2004 Aug 10

## 20 V NPN general purpose transistors

## PSS9013 series

### FEATURES

- High power dissipation: 710 mW
- Low collector capacitance
- Low collector-emitter saturation voltage
- High current capability.

### APPLICATIONS

- General purpose switching and amplification.

### DESCRIPTION

NPN general purpose transistor in a SOT54 (TO-92) leaded plastic package. PNP complement: PSS9012 series.

### MARKING

TYPE NUMBER	MARKING CODE
PSS9013G	S9013G
PSS9013H	S9013H

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	MAX.	UNIT
$V_{CEO}$	collector-emitter voltage	20	V
$I_C$	collector current (DC)	500	mA
$I_{CM}$	peak collector current	1	A

### PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter

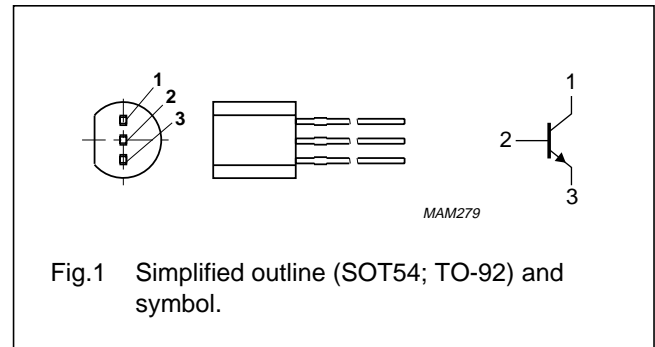


Fig.1 Simplified outline (SOT54; TO-92) and symbol.

### LIMITING VALUES

In accordance with the Absolute Maximum 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	–	20	V
$V_{EBO}$	emitter-base voltage	open collector	–	5	V
$I_C$	collector current (DC)		–	500	mA
$I_{CM}$	peak collector current		–	1	A
$I_{BM}$	peak base current		–	100	mA
$P_{tot}$	total power dissipation	$T_{amb} \leq 25\text{ }^\circ\text{C}$ ; note 1	–	710	mW
$T_{stg}$	storage temperature		–65	+150	$^\circ\text{C}$
$T_j$	junction temperature		–	150	$^\circ\text{C}$
$T_{amb}$	operating ambient temperature		–65	+150	$^\circ\text{C}$

### Note

1. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated and standard footprint.

## 20 V NPN general purpose transistors

## PSS9013 series

## THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j-a}$	thermal resistance from junction to ambient	in free air; note 1	175	K/W

## Note

1. Device mounted on a FR4 printed-circuit board, single-sided copper, tinplated and standard footprint.

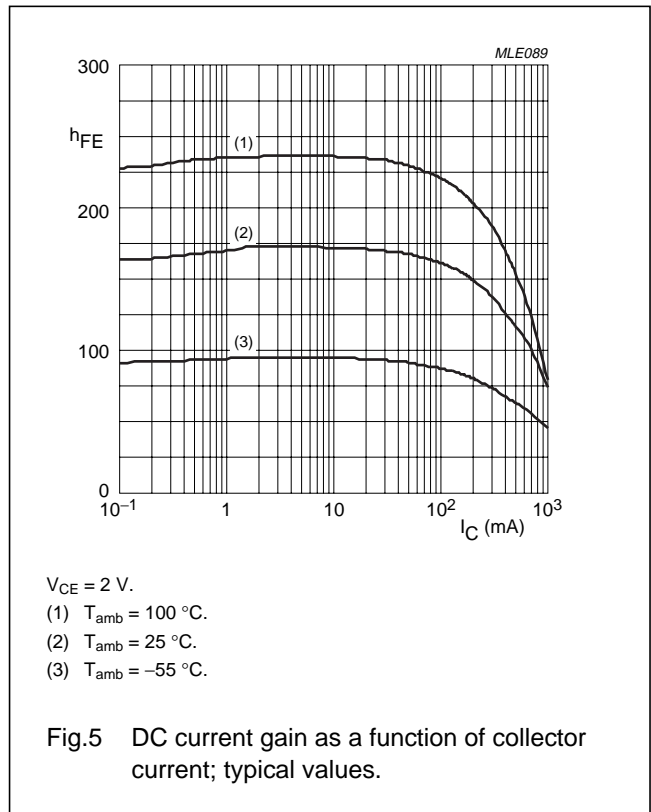
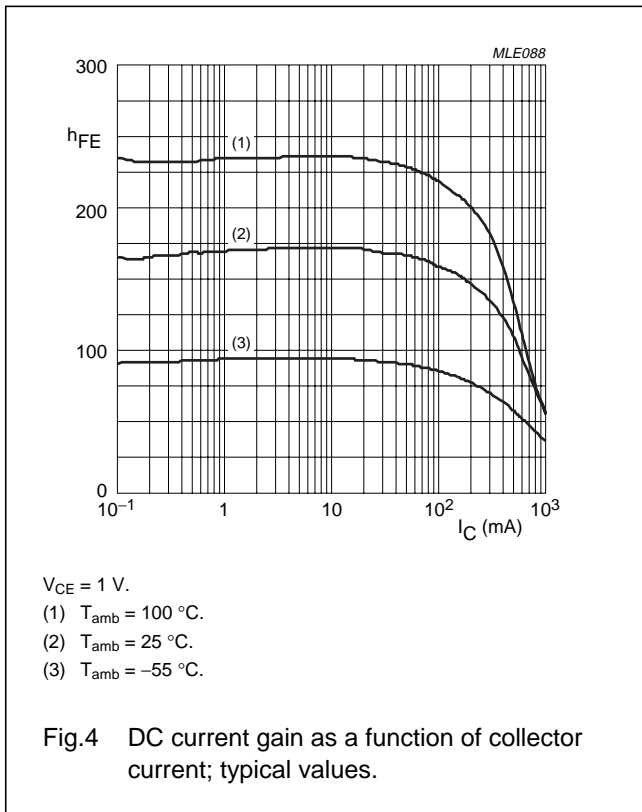
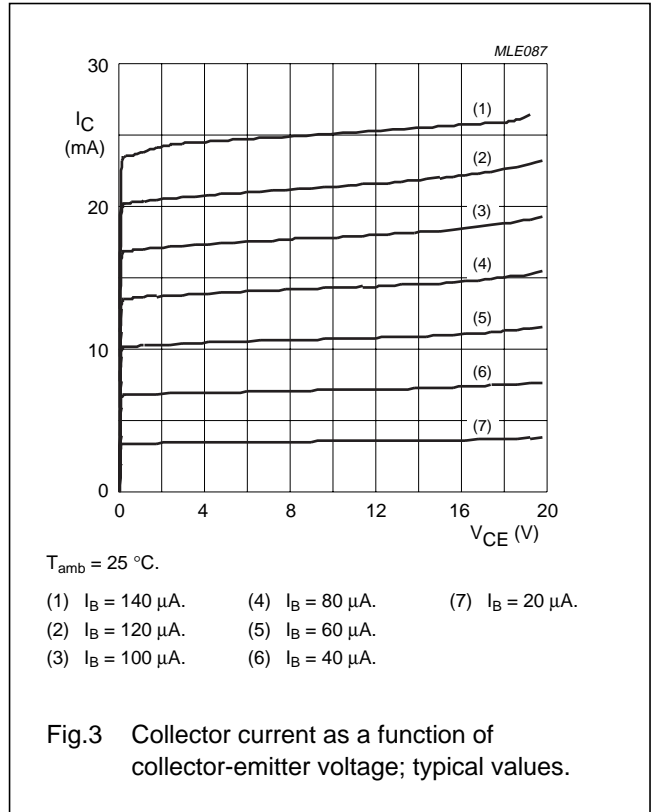
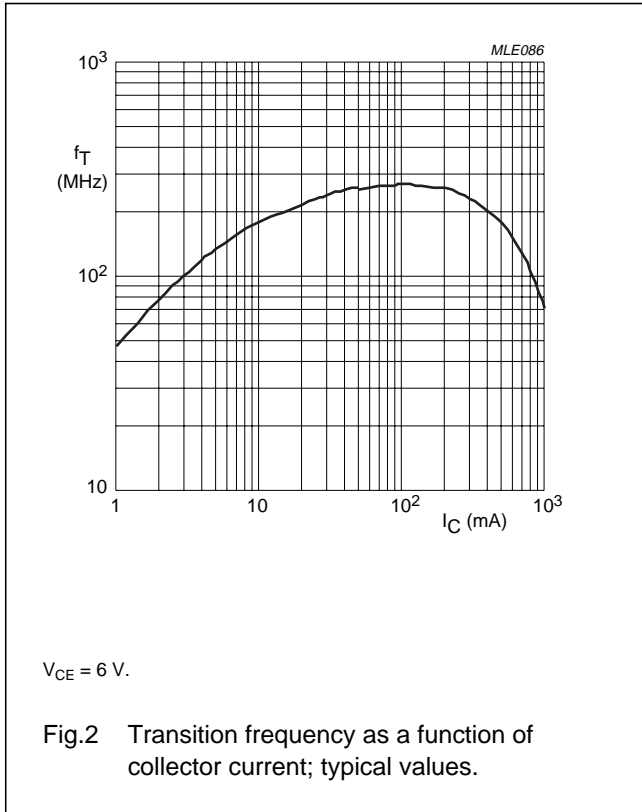
## CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector-base cut-off current	$V_{CB} = 35\text{ V}; I_E = 0$	–	–	100	nA
		$V_{CB} = 35\text{ V}; I_E = 0; T_j = 150\text{ °C}$	–	–	50	$\mu\text{A}$
$I_{EBO}$	emitter-base cut-off current	$V_{EB} = 5\text{ V}; I_C = 0$	–	–	100	nA
$h_{FE}$	DC current gain	$V_{CE} = 1\text{ V}; I_C = 500\text{ mA}$	40	–	–	
$h_{FE}$	DC current gain PSS9013G PSS9013H	$V_{CE} = 1\text{ V}; I_C = 50\text{ mA}$	112	–	166	
			144	–	202	
$V_{CEsat}$	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	–	60	250	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	250	600	mV
$V_{BEsat}$	base-emitter saturation voltage	$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	1	1.2	V
$V_{BEon}$	base-emitter turn on voltage	$V_{CE} = 1\text{ V}; I_C = 100\text{ mA}$	–	760	1000	mV
$C_c$	collector capacitance	$V_{CB} = 6\text{ V}; I_E = I_e = 0; f = 1\text{ MHz}$	–	5	–	pF

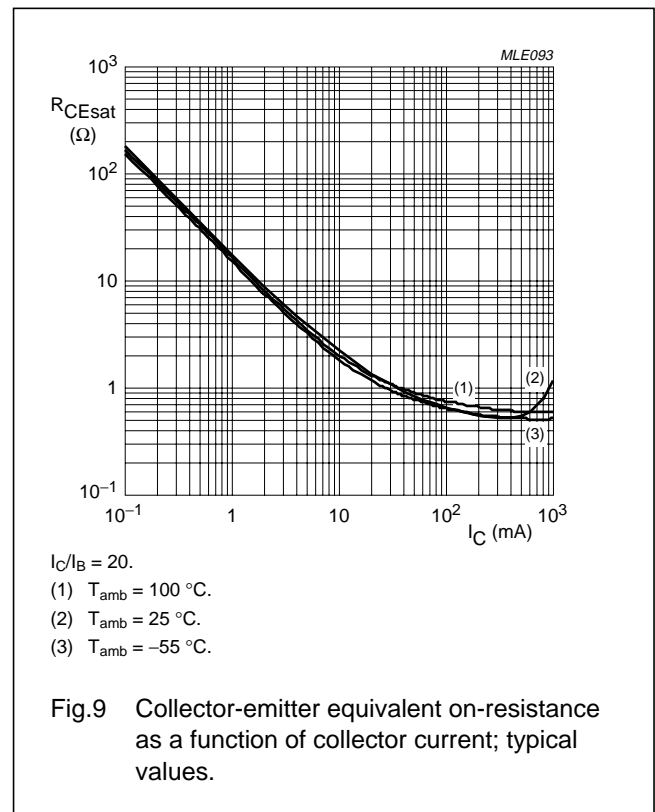
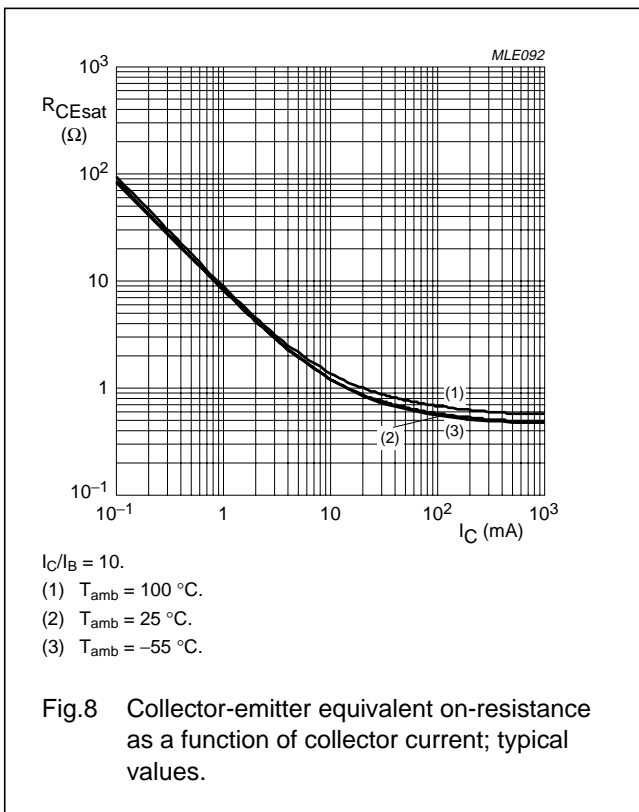
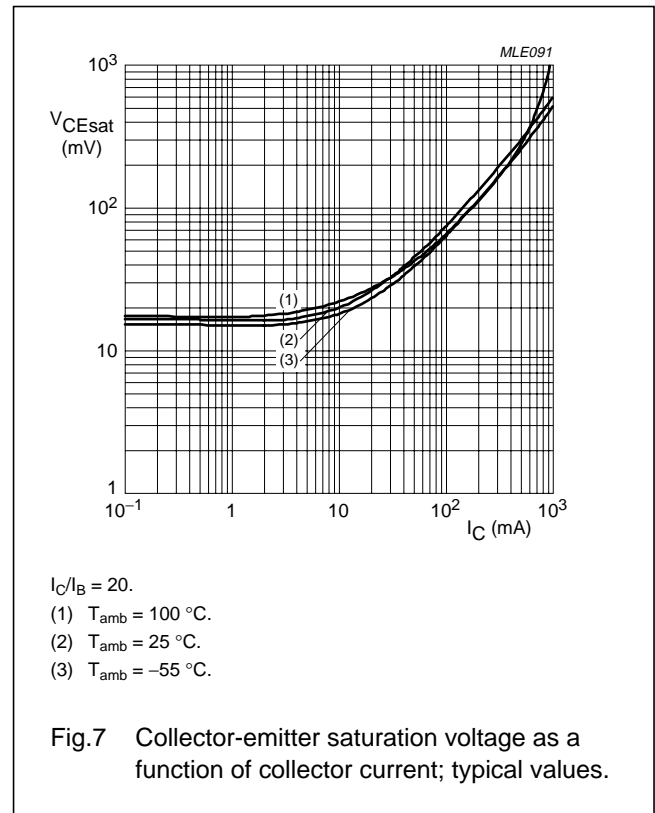
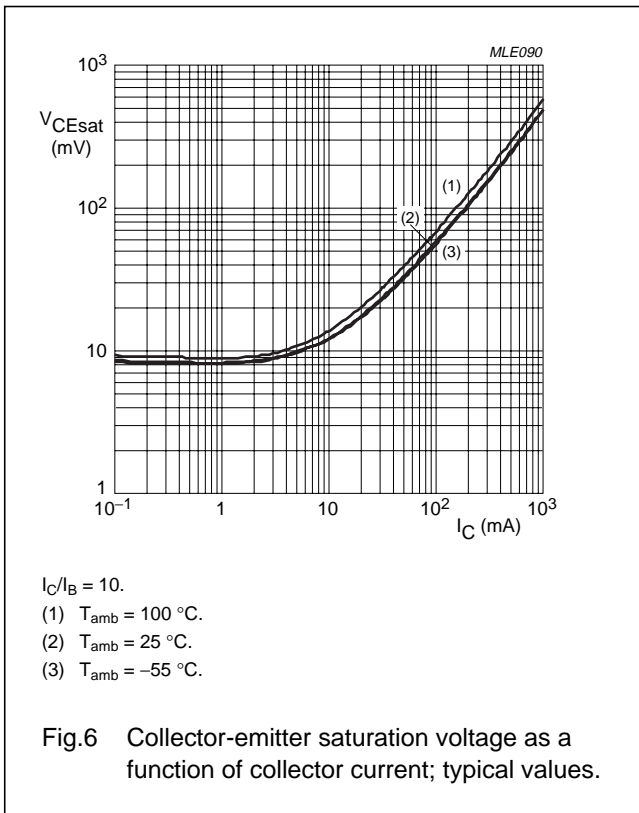
20 V NPN general purpose transistors

PSS9013 series



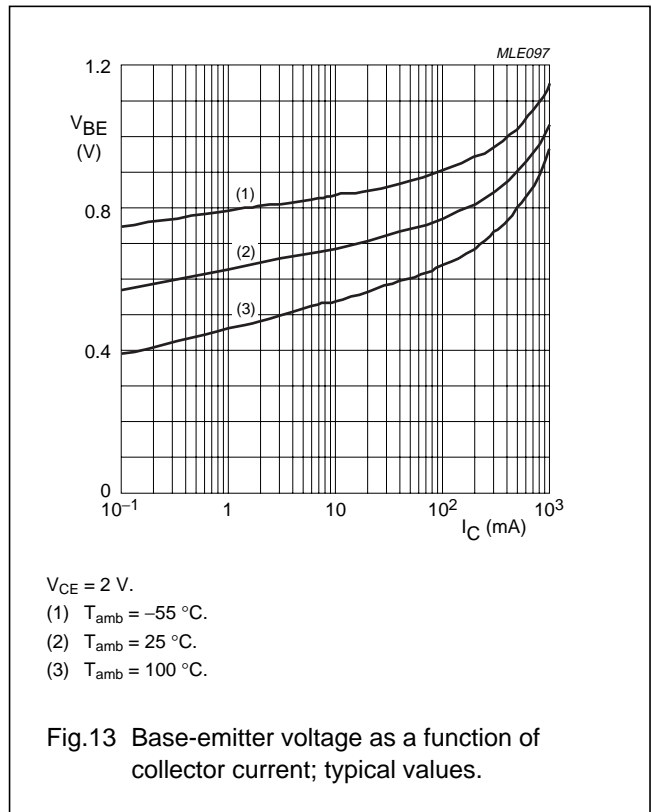
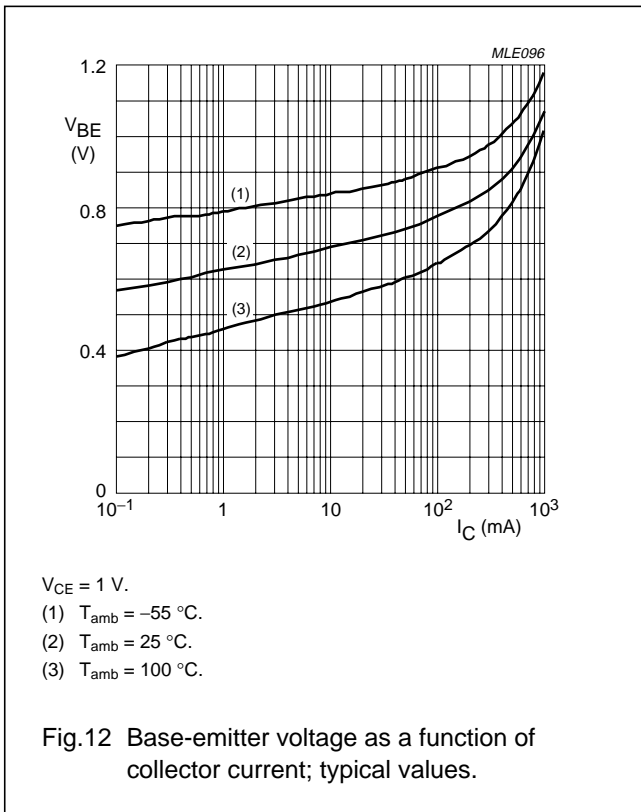
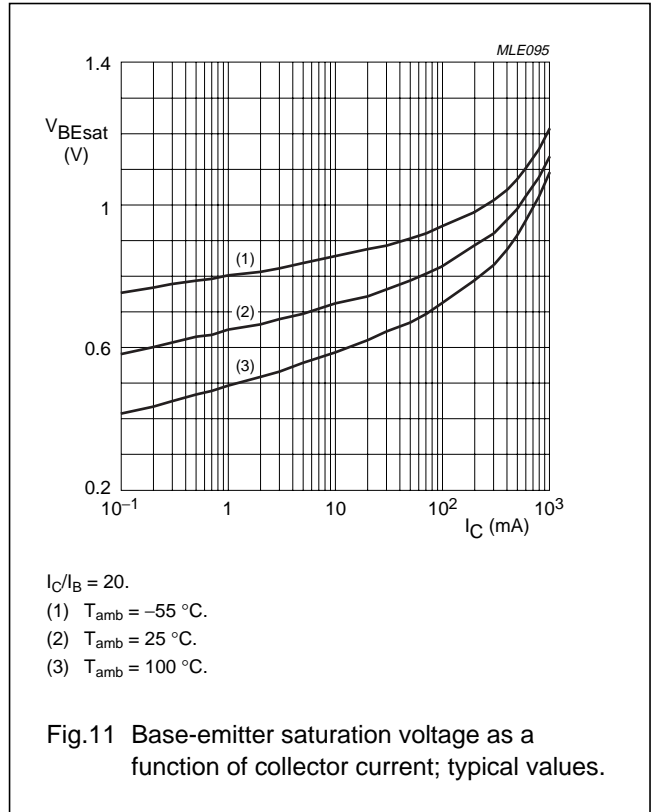
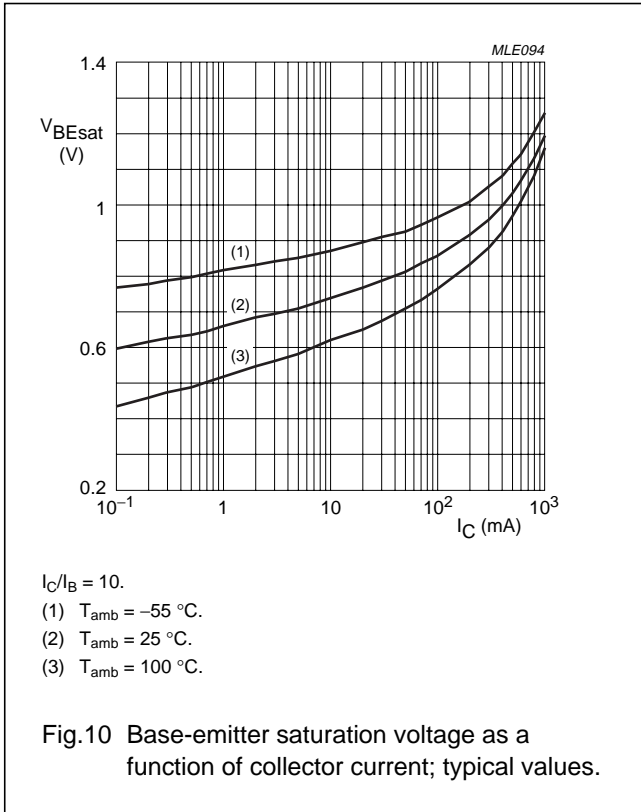
20 V NPN general purpose transistors

PSS9013 series



20 V NPN general purpose transistors

PSS9013 series



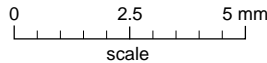
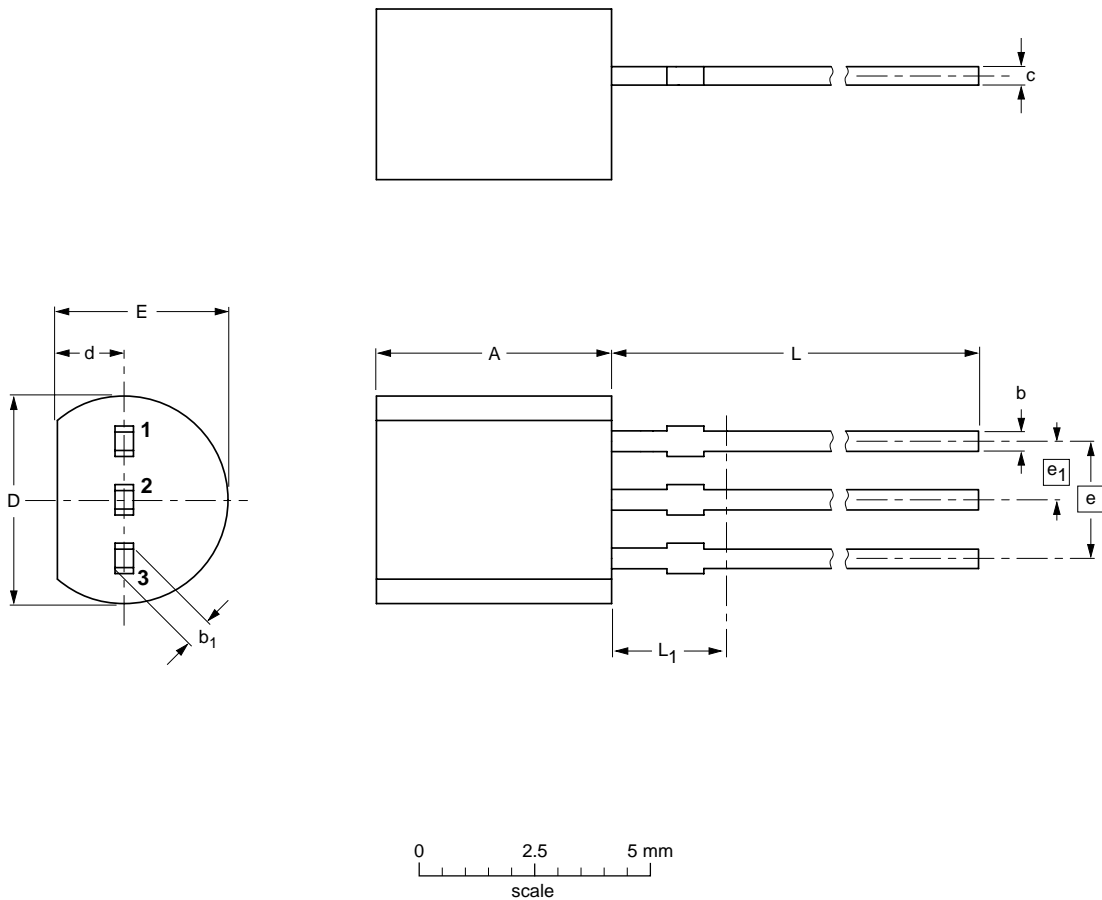
20 V NPN general purpose transistors

PSS9013 series

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

## 20 V NPN general purpose transistors

## PSS9013 series

## DATA SHEET STATUS

LEVEL	DATA SHEET STATUS <sup>(1)</sup>	PRODUCT STATUS <sup>(2)(3)</sup>	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.
II	Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
III	Product data	Production	This data sheet contains data from the product specification. Philips Semiconductors reserves the right to make changes at any time in order to improve the design, manufacturing and supply. Relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN).

## Notes

1. Please consult the most recently issued data sheet before initiating or completing a design.
2. The product status of the device(s) described in this data sheet may have changed since this data sheet was published. The latest information is available on the Internet at URL <http://www.semiconductors.philips.com>.
3. For data sheets describing multiple type numbers, the highest-level product status determines the data sheet status.

## DEFINITIONS

**Short-form specification** — The data in a short-form specification is extracted from a full data sheet with the same type number and title. For detailed information see the relevant data sheet or data handbook.

**Limiting values definition** — Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 60134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics sections of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.

**Application information** — Applications that are described herein for any of these products are for illustrative purposes only. Philips Semiconductors make no representation or warranty that such applications will be suitable for the specified use without further testing or modification.

## DISCLAIMERS

**Life support applications** — These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips Semiconductors customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips Semiconductors for any damages resulting from such application.

**Right to make changes** — Philips Semiconductors reserves the right to make changes in the products - including circuits, standard cells, and/or software - described or contained herein in order to improve design and/or performance. When the product is in full production (status 'Production'), relevant changes will be communicated via a Customer Product/Process Change Notification (CPCN). Philips Semiconductors assumes no responsibility or liability for the use of any of these products, conveys no licence or title under any patent, copyright, or mask work right to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified.



# *Philips Semiconductors – a worldwide company*

## **Contact information**

For additional information please visit <http://www.semiconductors.philips.com>. Fax: +31 40 27 24825

For sales offices addresses send e-mail to: [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com).

© Koninklijke Philips Electronics N.V. 2004

SCA76

All rights are reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner.

The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.

Printed in The Netherlands

R75/02/pp9

Date of release: 2004 Aug 10

Document order number: 9397 750 13685

*Let's make things better.*

**Philips  
Semiconductors**



**PHILIPS**