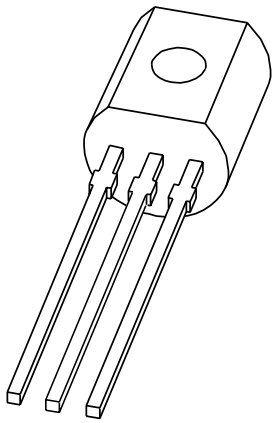
DATA SHEET



2N5400; 2N5401
PNP high-voltage transistors

Product specification
Supersedes data of September 1994
File under Discrete Semiconductors, SC04

1997 May 22

Philips
Semiconductors

PHILIPS

PNP high-voltage transistors 2N5400; 2N5401

FEATURES

- Low current (max. 300 mA)
- High voltage (max. 150 V).

APPLICATIONS

- General purpose switching and amplification
- Telephony applications.

DESCRIPTION

PNP high-voltage transistor in a TO-92; SOT54 plastic package. NPN complements: 2N5550 and 2N5551.

PINNING

PIN	DESCRIPTION
1	collector
2	base
3	emitter

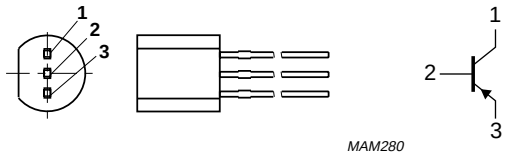


Fig.1 Simplified outline (TO-92; SOT54) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	2N5400		–	–130	V
	2N5401		–	–160	V
V_{CEO}	collector-emitter voltage	open base			
	2N5400		–	–120	V
	2N5401		–	–150	V
I_{CM}	peak collector current		–	–600	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	630	mW
h_{FE}	DC current gain	I_C = 10 mA; V_{CE} = –5 V			
	2N5400		40	–	
	2N5401		60	–	
f_T	transition frequency	I_C = –10 mA; V_{CE} = –10 V; f = 100 MHz			
	2N5400		100	400	MHz
	2N5401		100	300	MHz

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter			
	2N5400		–	–130	V
	2N5401		–	–160	V
V_{CEO}	collector-emitter voltage	open base			
	2N5400		–	–120	V
	2N5401		–	–150	V
V_{EBO}	emitter-base voltage	open collector	–	–5	V
I_C	collector current (DC)		–	–300	mA
I_{CM}	peak collector current		–	–600	mA
I_{BM}	peak base current		–	–100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	630	mW
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	150	°C
T_{amb}	operating ambient temperature		–65	+150	°C

THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
$R_{th\ j\text{-}a}$	thermal resistance from junction to ambient	note 1	200	K/W

Note

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

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current				
	2N5400	I_E = 0; V_{CB} = –100 V	–	–100	nA
		I_E = 0; V_{CB} = –100 V; T_{amb} = 100 °C	–	–100	µA
I_{CBO}	collector cut-off current				
	2N5401	I_E = 0; V_{CB} = –120 V	–	–50	nA
		I_E = 0; V_{CB} = –120 V; T_{amb} = 100 °C	–	–50	µA
I_{EBO}	emitter cut-off current	I_C = 0; V_{EB} = –4 V	–	–50	nA
h_{FE}	DC current gain	I_C = –1 mA; V_{CE} = –5 V; see Fig.2			
	2N5400		30	–	
	2N5401		50	–	
h_{FE}	DC current gain	I_C = –10 mA; V_{CE} = –5 V; see Fig.2			
	2N5400		40	180	
	2N5401		60	240	
h_{FE}	DC current gain	I_C = –50 mA; V_{CE} = –5 V; see Fig.2			
	2N5400		40	–	
	2N5401		50	–	
V_{CEsat}	collector-emitter saturation voltage	I_C = –10 mA; I_B = –1 mA	–	–200	mV
		I_C = –50 mA; I_B = –5 mA	–	–500	mV
C_c	collector capacitance	I_E = i_e = 0; V_{CB} = –10 V; f = 1 MHz	–	6	pF
f_T	transition frequency	I_C = –10 mA; V_{CE} = –10 V; f = 100 MHz			
	2N5400		100	400	MHz
	2N5401		100	300	MHz
F	noise figure	I_C = –200 µA; V_{CE} = –5 V; R_S = 2 kΩ; f = 10 Hz to 15.7 kHz	–	8	pF

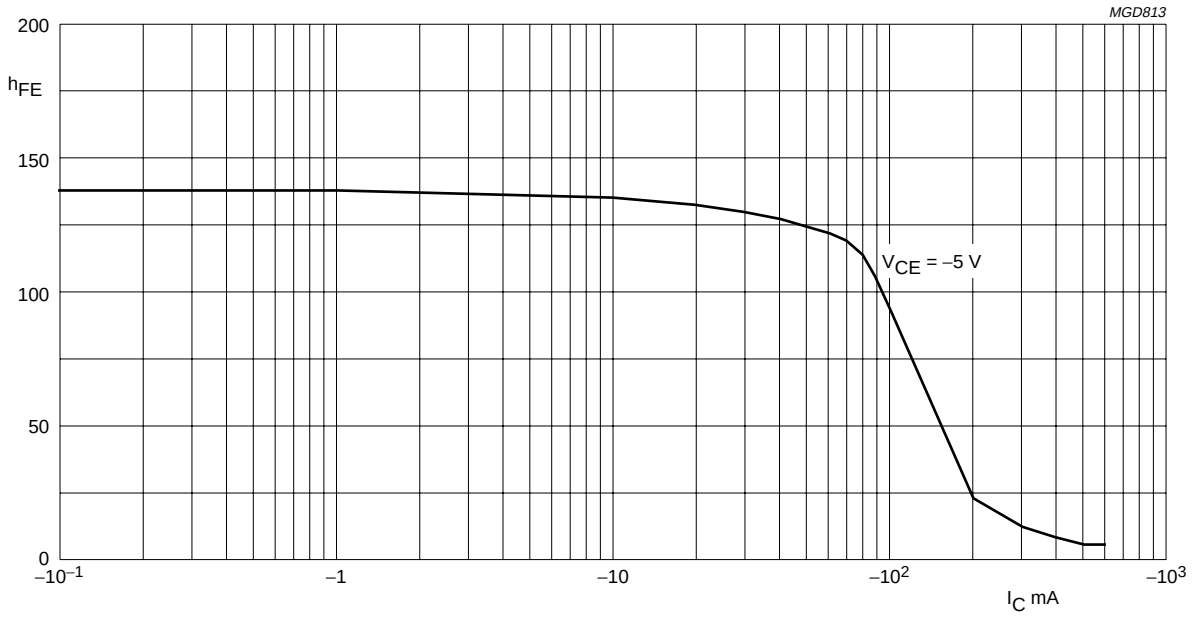
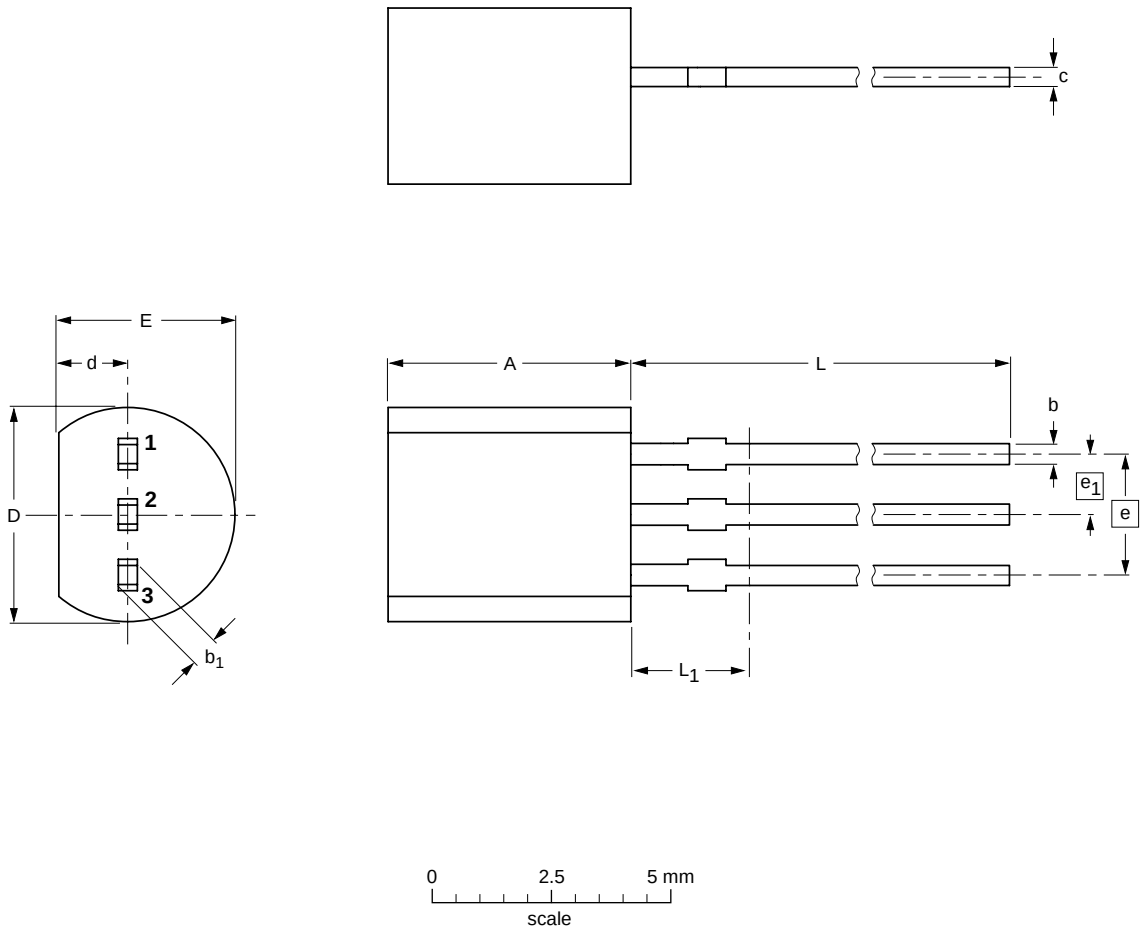


Fig.2 DC current gain; typical values.

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)
mm	5.2 5.0	0.48 0.40	0.66 0.56	0.45 0.40	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	EIAJ			
SOT54		TO-92	SC-43			97-02-28

DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). 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	
Where application information is given, it is advisory and does not form part of the specification.	

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