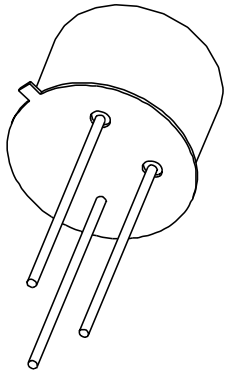
DATA SHEET



2N1893
NPN medium power transistor

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

1997 Apr 17

Philips
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NPN medium power transistor 2N1893

FEATURES

- Low current (max. 500 mA)
- Low voltage (max. 80 V).

APPLICATIONS

- High performance amplifiers
- Oscillator and switching applications.

DESCRIPTION

NPN medium power transistor in a TO-39 metal package.

PINNING

PIN	DESCRIPTION
1	emitter
2	base
3	collector, connected to case

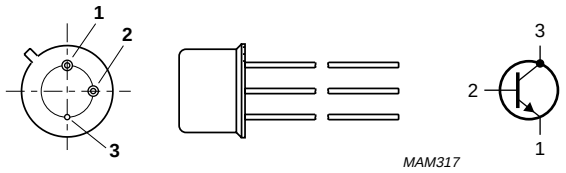


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter	–	120	V
V_{CEO}	collector-emitter voltage	open base	–	80	V
I_{CM}	peak collector current		–	1	A
P_{tot}	total power dissipation	$T_{case} \leq 25$ °C	–	3	W
h_{FE}	DC current gain	I_C = 150 mA; V_{CE} = 10 V	40	120	

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	–	120	V
V_{CEO}	collector-emitter voltage	open base	–	80	V
V_{EBO}	emitter-base voltage	open collector	–	7	V
I_C	collector current (DC)		–	500	mA
I_{CM}	peak collector current		–	1	A
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25$ °C	–	800	mW
		$T_{case} \leq 100$ °C	–	1.7	W
		$T_{case} \leq 25$ °C	–	3	W
T_{stg}	storage temperature		–65	+150	°C
T_j	junction temperature		–	200	°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	in free air	219	K/W
$R_{th\ j\text{-}c}$	thermal resistance from junction to case		58.3	K/W

CHARACTERISTICS

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

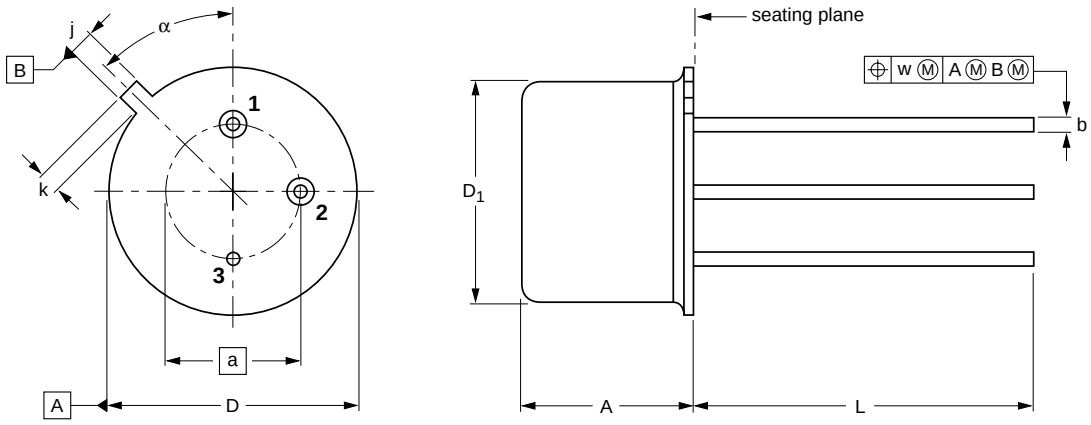
SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
I_{CBO}	collector cut-off current	$I_E = 0$; $V_{CB} = 90$ V	–	10	nA
		$I_E = 0$; $V_{CB} = 90$ V; $T_{amb} = 150$ °C	–	15	µA
I_{EBO}	emitter cut-off current	$I_C = 0$; $V_{EB} = 5$ V	–	10	nA
h_{FE}	DC current gain	$I_C = 0.1$ mA; $V_{CE} = 10$ V	20	–	
		$I_C = 10$ mA; $V_{CE} = 10$ V; $T_{amb} = –55$ °C	20	–	
		$I_C = 10$ mA; $V_{CE} = 10$ V; note 1	35	–	
		$I_C = 150$ mA; $V_{CE} = 10$ V; note 1	40	120	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 50$ mA; $I_B = 5$ mA; note 1	–	900	mV
		$I_C = 150$ mA; $I_B = 15$ mA; note 1	–	500	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 50$ mA; $I_B = 5$ mA; note 1	–	1.2	V
		$I_C = 150$ mA; $I_B = 15$ mA; note 1	–	1.3	V
C_c	collector capacitance	$I_E = i_e = 0$; $V_{CB} = 10$ V; f = 1 MHz	–	15	pF
C_e	emitter capacitance	$I_C = i_c = 0$; $V_{EB} = 0.5$ V; f = 1 MHz	–	85	pF

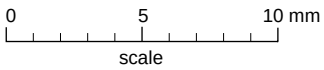
Note

1. Pulse test: $t_p \leq 300$ µs; $\delta = 0.02$.

PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads **SOT5/11**





DIMENSIONS (mm are the original dimensions)

UNIT	A	a	b	D	D_1	j	k	L	w	α
mm	6.60 6.35	5.08	0.48 0.41	9.39 9.08	8.33 8.18	0.85 0.75	0.95 0.75	14.2 12.7	0.2	45°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT5/11		TO-39				97-04-11

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.	

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 customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

NOTES

NOTES

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