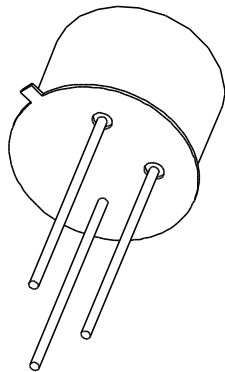


DATA SHEET



BSW66A; BSW67A; BSW68A NPN switching transistors

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

1997 May 05

NPN switching transistors

BSW66A; BSW67A; BSW68A

FEATURES

- High current (max. 1 A)
- High voltage (max. 150 V).

APPLICATIONS

- General purpose switching and amplification
- Industrial applications.

DESCRIPTION

NPN transistor in a TO-39 metal package.

PINNING

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

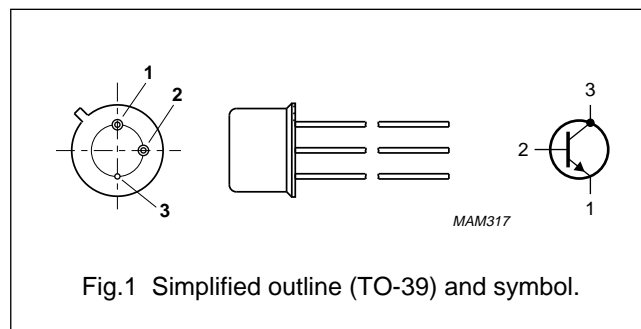


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter				
	BSW66A		–	–	100	V
	BSW67A		–	–	120	V
V_{CEO}	collector-emitter voltage	open base				
	BSW66A		–	–	100	V
	BSW67A		–	–	120	V
I_C	collector current (DC)		–	–	1	A
		P_{tot}	total power dissipation	$T_{case} \leq 25\text{ }^\circ\text{C}$	–	–
h_{FE}	DC current gain	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}$	30	–	–	
		$I_C = 500\text{ mA}; V_{CE} = 5\text{ V}$	30	–	–	
f_T	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$	–	130	–	MHz
t_{off}	turn-off time	$I_{Con} = 500\text{ mA}; I_{Bon} = 50\text{ mA}; I_{Boff} = -50\text{ mA}$	–	900	–	ns

NPN switching transistors

BSW66A; BSW67A; BSW68A

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			
	BSW66A		–	100	V
	BSW67A		–	120	V
	BSW68A		–	150	V
V _{CEO}	collector-emitter voltage	open base			
	BSW66A		–	100	V
	BSW67A		–	120	V
	BSW68A		–	150	V
V _{EBO}	emitter-base voltage	open collector	–	6	V
I _C	collector current (DC)		–	1	A
I _{CM}	peak collector current	t _p ≤ 20 ms	–	2	A
I _{BM}	peak base current		–	200	mA
P _{tot}	total power dissipation	T _{amb} ≤ 25 °C	–	800	mW
		T _{case} ≤ 25 °C	–	5	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-a}	thermal resistance from junction to ambient	free air	220	K/W
R _{th j-c}	thermal resistance from junction to case		35	K/W

NPN switching transistors

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CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current BSW66A	$I_E = 0; V_{CB} = 50\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 50\text{ V}; T_j = 150\text{ °C}$	–	–	50	μA
		$I_E = 0; V_{CB} = 100\text{ V}$	–	–	100	μA
I_{CBO}	collector cut-off current BSW67A	$I_E = 0; V_{CB} = 60\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 60\text{ V}; T_j = 150\text{ °C}$	–	–	50	μA
		$I_E = 0; V_{CB} = 120\text{ V}$	–	–	100	μA
I_{CBO}	collector cut-off current BSW68A	$I_E = 0; V_{CB} = 75\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 75\text{ V}; T_j = 150\text{ °C}$	–	–	50	μA
		$I_E = 0; V_{CB} = 150\text{ V}$	–	–	100	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 3\text{ V}$	–	–	100	nA
		$I_C = 0; V_{EB} = 6\text{ V}$	–	–	100	μA
h_{FE}	DC current gain	$V_{CE} = 5\text{ V}$				
		$I_C = 10\text{ mA}$	30	–	–	
		$I_C = 100\text{ mA}$	40	–	–	
		$I_C = 500\text{ mA}$	30	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	–	–	150	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	400	mV
		$I_C = 1\text{ A}; I_B = 150\text{ mA}$	–	–	1	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 100\text{ mA}; I_B = 10\text{ mA}$	–	–	900	mV
		$I_C = 500\text{ mA}; I_B = 50\text{ mA}$	–	–	1.1	V
		$I_C = 1\text{ A}; I_B = 150\text{ mA}$	–	–	1.4	V
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	20	pF
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = 0; f = 1\text{ MHz}$	–	–	300	pF
f_T	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$	–	130	–	MHz
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	$I_{Con} = 500\text{ mA}; I_{Bon} = 50\text{ mA};$ $I_{Boff} = -50\text{ mA}$	–	500	–	ns
t_{off}	turn-off time		–	900	–	ns

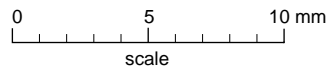
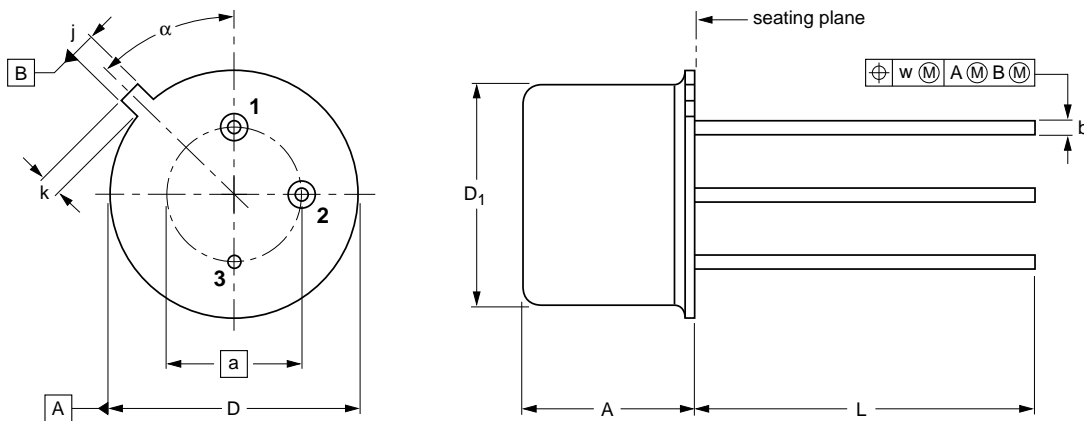
NPN switching transistors

BSW66A; BSW67A; BSW68A

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	0.48	9.39	8.33	0.85	0.95	14.2	0.2	45°	
	6.35	5.08	0.41	9.08	8.18	0.75	0.75	12.7		

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

NPN switching transistors

BSW66A; BSW67A; BSW68A

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.

NPN switching transistors

BSW66A; BSW67A; BSW68A

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Printed in The Netherlands

117047/00/02/pp8

Date of release: 1997 May 05

Document order number: 9397 750 01977

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