

## BSW66A; BSW67A; BSW68A NPN switching transistors

### 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

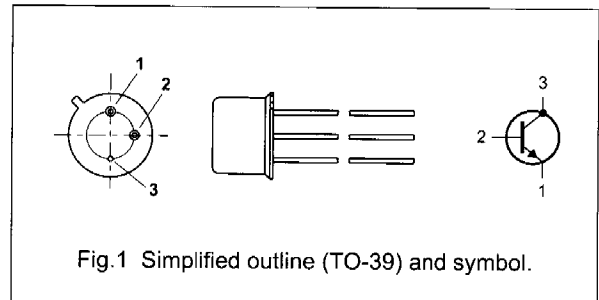


Fig. 1 Simplified outline (TO-39) and symbol.

### QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>CB0</sub>	collector-base voltage	open emitter				
	BSW66A		—	—	100	V
	BSW67A		—	—	120	V
V <sub>CE0</sub>	collector-emitter voltage	open base				
	BSW66A		—	—	100	V
	BSW67A		—	—	120	V
	BSW68A		—	—	150	V
I <sub>C</sub>	collector current (DC)		—	—	1	A
P <sub>tot</sub>	total power dissipation	T <sub>case</sub> ≤ 25 °C	—	—	5	W
h <sub>FE</sub>	DC current gain	I <sub>C</sub> = 10 mA; V <sub>CE</sub> = 5 V	30	—	—	
		I <sub>C</sub> = 500 mA; V <sub>CE</sub> = 5 V	30	—	—	
f <sub>T</sub>	transition frequency	I <sub>C</sub> = 100 mA; V <sub>CE</sub> = 20 V; f = 100 MHz	—	130	—	MHz
t <sub>off</sub>	turn-off time	I <sub>Con</sub> = 500 mA; I <sub>Bon</sub> = 50 mA; I <sub>Boff</sub> = -50 mA	—	900	—	ns



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## NPN switching transistors

### LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V <sub>CBO</sub>	collector-base voltage	open emitter			
	BSW66A		–	100	V
	BSW67A		–	120	V
	BSW68A		–	150	V
V <sub>CEO</sub>	collector-emitter voltage	open base			
	BSW66A		–	100	V
	BSW67A		–	120	V
	BSW68A		–	150	V
V <sub>EBO</sub>	emitter-base voltage	open collector	–	6	V
I <sub>C</sub>	collector current (DC)		–	1	A
I <sub>CM</sub>	peak collector current	t <sub>p</sub> ≤ 20 ms	–	2	A
I <sub>BM</sub>	peak base current		–	200	mA
P <sub>tot</sub>	total power dissipation	T <sub>amb</sub> ≤ 25 °C	–	800	mW
		T <sub>case</sub> ≤ 25 °C	–	5	W
T <sub>stg</sub>	storage temperature		–65	+150	°C
T <sub>j</sub>	junction temperature		–	200	°C
T <sub>amb</sub>	operating ambient temperature		–65	+150	°C

### THERMAL CHARACTERISTICS

SYMBOL	PARAMETER	CONDITIONS	VALUE	UNIT
R <sub>thj-a</sub>	thermal resistance from junction to ambient	free air	220	K/W
R <sub>thj-c</sub>	thermal resistance from junction to case		35	K/W

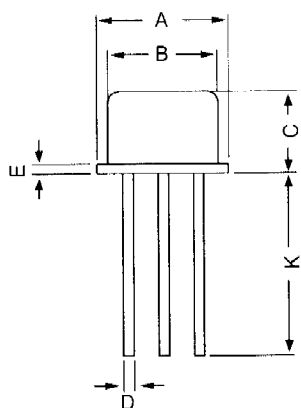
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### CHARACTERISTICS

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

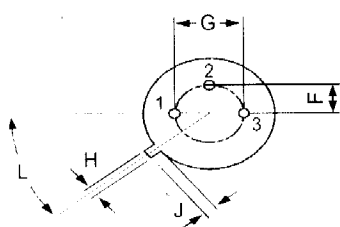
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
$I_{CBO}$	collector cut-off current BSW66A	$I_E = 0; V_{CB} = 50\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 50\text{ V}; T_j = 150\text{ }^\circ\text{C}$	–	–	50	$\mu\text{A}$
		$I_E = 0; V_{CB} = 100\text{ V}$	–	–	100	$\mu\text{A}$
$I_{CBO}$	collector cut-off current BSW67A	$I_E = 0; V_{CB} = 60\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 60\text{ V}; T_j = 150\text{ }^\circ\text{C}$	–	–	50	$\mu\text{A}$
		$I_E = 0; V_{CB} = 120\text{ V}$	–	–	100	$\mu\text{A}$
$I_{CBO}$	collector cut-off current BSW68A	$I_E = 0; V_{CB} = 75\text{ V}$	–	–	100	nA
		$I_E = 0; V_{CB} = 75\text{ V}; T_j = 150\text{ }^\circ\text{C}$	–	–	50	$\mu\text{A}$
		$I_E = 0; V_{CB} = 150\text{ V}$	–	–	100	$\mu\text{A}$
$I_{EBO}$	emitter cut-off current	$I_C = 0; V_{EB} = 3\text{ V}$	–	–	100	nA
		$I_C = 0; V_{EB} = 6\text{ V}$	–	–	100	$\mu\text{A}$
$h_{FE}$	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	–	–	
		$I_C = 1\text{ A}$	10	–	–	
$V_{CEsat}$	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	$I_E = I_C = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	20	pF
$C_e$	emitter capacitance	$I_C = I_E = 0; V_{EB} = 0; f = 1\text{ MHz}$	–	–	300	pF
$f_T$	transition frequency	$I_C = 100\text{ mA}; V_{CE} = 20\text{ V}; f = 100\text{ MHz}$	–	130	–	MHz
<b>Switching times (between 10% and 90% levels)</b>						
$t_{on}$	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

### TO-39 Metal Can Package



DIM	MIN	MAX
A	8.50	9.39
B	7.74	8.50
C	6.09	6.60
D	0.40	0.53
E	—	0.88
F	2.41	2.66
G	4.82	5.33
H	0.71	0.86
J	0.73	1.02
K	12.70	—
L	42 DEG	48 DEG

All dimensions are in mm



#### PIN CONFIGURATION

1. EMITTER
2. BASE
3. COLLECTOR

#### Packing Detail

PACKAGE	STANDARD PACK		INNER CARTON BOX		OUTER CARTON BOX		
	Details	Net Weight/Qty	Size	Qty	Size	Qty	Gr Wt
TO-39	500 pcs/polybag	540 gm/500 pcs	3" x 7.5" x 7.5"	20K	17" x 15" x 13.5"	32K	40 kgs