

NPN medium power transistors

BSX45; BSX46; BSX47

FEATURES

- High current (max. 1 A)
- Low voltage (max. 80 V).

APPLICATIONS

- General industrial applications.

DESCRIPTION

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

PINNING

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

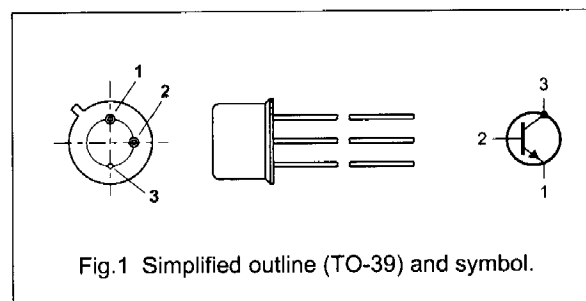
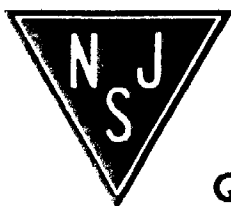


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage	open emitter				
	BSX45		—	—	80	V
	BSX46		—	—	100	V
	BSX47		—	—	120	V
V_{CEO}	collector-emitter voltage	open base				
	BSX45		—	—	40	V
	BSX46		—	—	60	V
	BSX47		—	—	80	V
I_{CM}	peak collector current		—	—	1.5	A
P_{tot}	total power dissipation	$T_{case} \leq 25^\circ C$	—	—	6.25	W
h_{FE}	DC current gain	$I_C = 100 \text{ mA}; V_{CE} = 1 \text{ V}$				
	BSX45-10; BSX46-10; BSX47-10		63	100	160	
	BSX45-16; BSX46-16; BSX47-16		100	160	250	
f_T	transition frequency	$I_C = 50 \text{ mA}; V_{CE} = 10 \text{ V}; f = 100 \text{ MHz}$	50	—	—	MHz



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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			
	BSX45		—	80	V
	BSX46		—	100	V
	BSX47		—	120	V
V_{CEO}	collector-emitter voltage	open base			
	BSX45		—	40	V
	BSX46		—	60	V
	BSX47		—	80	V
V_{EBO}	emitter-base voltage	open collector	—	7	V
I_C	collector current (DC)		—	1	A
I_{CM}	peak collector current		—	1.5	A
I_{BM}	peak base current		—	200	mA
P_{tot}	total power dissipation	$T_{case} \leq 25\text{ °C}$	—	6.25	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	in free air	200	K/W
$R_{th\ j-c}$	thermal resistance from junction to case		28	K/W

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CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current BSX45; BSX46	$I_E = 0; V_{CB} = 60\text{ V}$	–	–	30	nA
		$I_E = 0; V_{CB} = 60\text{ V}; T_{amb} = 150\text{ }^{\circ}\text{C}$	–	–	10	μA
I_{CBO}	collector cut-off current BSX47	$I_E = 0; V_{CB} = 80\text{ V}$	–	–	30	nA
		$I_E = 0; V_{CB} = 80\text{ V}; T_{amb} = 150\text{ }^{\circ}$	–	–	10	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	10	nA
h_{FE}	DC current gain BSX45-10; BSX46-10; BSX47-10 BSX45-16; BSX46-16	$I_C = 100\text{ }\mu\text{A}; V_{CE} = 1\text{ V}$	15	40	–	
			25	90	–	
h_{FE}	DC current gain BSX45-10; BSX46-10; BSX47-10 BSX45-16; BSX46-16; BSX47-16	$I_C = 100\text{ mA}; V_{CE} = 1\text{ V}$	63	100	160	
			100	160	250	
h_{FE}	DC current gain BSX45-10; BSX46-10; BSX47-10 BSX45-16; BSX46-16	$I_C = 500\text{ mA}; V_{CE} = 1\text{ V}$	25	40	–	
			35	60	–	
h_{FE}	DC current gain BSX45-10; BSX46-10; BSX47-10 BSX45-16; BSX46-16	$I_C = 1\text{ A}; V_{CE} = 1\text{ V}$	–	20	–	
			–	30	–	
V_{CEsat}	collector-emitter saturation voltage BSX45; BSX46	$I_C = 1\text{ A}; I_B = 100\text{ mA}$	–	–	1	V
V_{CEsat}	collector-emitter saturation voltage BSX47	$I_C = 500\text{ mA}; I_B = 25\text{ mA}$	–	–	900	mV
V_{BE}	base-emitter voltage	$I_C = 100\text{ mA}; V_{CE} = 1\text{ V}$	–	–	1	V
		$I_C = 500\text{ mA}; V_{CE} = 1\text{ V}$	0.75	–	1.5	V
		$I_C = 1\text{ A}; V_{CE} = 1\text{ V}$	–	–	2	V
C_c	collector capacitance BSX45 BSX46 BSX47	$I_E = I_C = 0; V_{CB} = 10\text{ V}; f = 1\text{ MHz}$	–	–	25	pF
			–	–	20	pF
			–	–	15	pF
C_e	emitter capacitance	$I_C = I_E = 0; V_{EB} = 0.5\text{ V}; f = 1\text{ MHz}$	–	–	80	pF
f_T	transition frequency	$I_C = 50\text{ mA}; V_{CE} = 10\text{ V}; f = 100\text{ MHz}$	50	–	–	MHz
F	noise figure	$I_C = 100\text{ }\mu\text{A}; V_{CE} = 5\text{ V}; R_S = 1\text{ k}\Omega;$ $f = 1\text{ kHz}; B = 200\text{ Hz}$	–	3.5	–	dB
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	$I_{Con} = 100\text{ mA}; I_{Bon} = 5\text{ mA};$	–	–	200	ns
t_{off}	turn-off time	$I_{Boff} = -5\text{ mA}$	–	–	850	ns

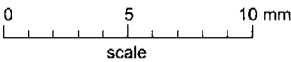
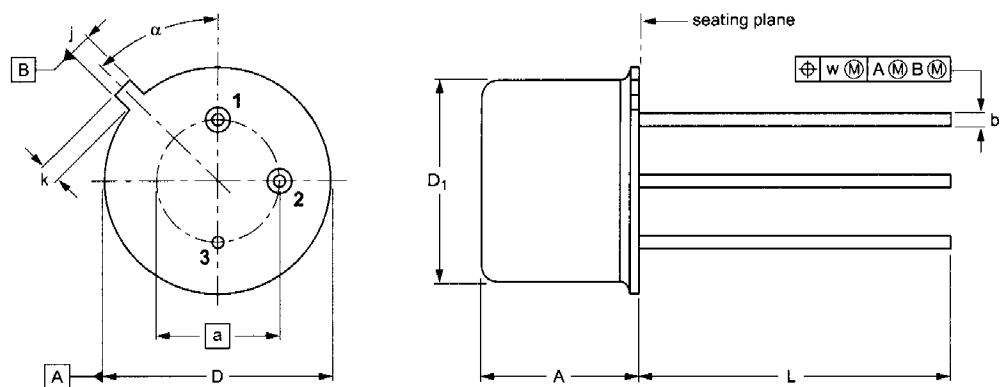
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PACKAGE OUTLINE

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				