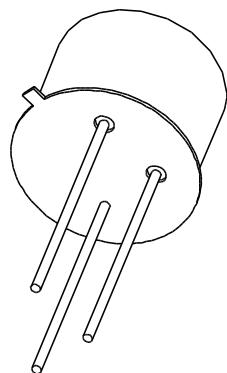


DATA SHEET



BFY50; BFY51; BFY52 NPN medium power transistors

Product specification

1997 Apr 22

Supersedes data of September 1994

File under Discrete Semiconductors, SC04

NPN medium power transistors**BFY50; BFY51; BFY52****FEATURES**

- High current (max. 1 A)
- Low voltage (max. 35 V).

APPLICATIONS

- General purpose 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

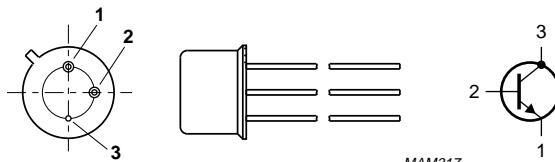


Fig.1 Simplified outline (TO-39) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage BFY50	open emitter	–	–	80	V
	BFY51				60	V
	BFY52				40	V
	V_{CEO}				35	V
V_{CEO}	BFY51	open base	–	–	30	V
	BFY52				20	V
	I_{CM}				1	A
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	–	–	800	mW
		$T_{case} \leq 100^\circ\text{C}$			2.86	W
h_{FE}	DC current gain BFY50	$I_C = 150 \text{ mA}; V_{CE} = 10 \text{ V}$	30 40 60	112	–	
	BFY51			123	–	
	BFY52			142	–	
	f_T					
f_T	transition frequency BFY50	$I_C = 50 \text{ mA}; V_{CE} = 10 \text{ V}; f = 100 \text{ MHz}$	60	–	–	MHz
	BFY51; BFY52			50	–	MHz

NPN medium power transistors

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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 BFY50 BFY51 BFY52	open emitter	– – –	80 60 40	V
V_{CEO}	collector-emitter voltage BFY50 BFY51 BFY52	open base	– – –	35 30 20	V
V_{EBO}	emitter-base voltage	open collector	–	6	V
I_C	collector current (DC)		–	1	A
I_{CM}	peak collector current		–	1	A
I_{BM}	peak base current		–	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 25^\circ\text{C}$	–	800	mW
		$T_{case} \leq 25^\circ\text{C}$	–	5	W
		$25^\circ\text{C} < T_{case} < 100^\circ\text{C}$	–	2.86	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	220	K/W
$R_{th\ j-c}$	thermal resistance from junction to case		35	K/W

NPN medium power transistors

BFY50; BFY51; BFY52

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current BFY50	$I_E = 0; V_{CB} = 60 \text{ V}$	—	—	50	nA
		$I_E = 0; V_{CB} = 60 \text{ V}; T_j = 100^\circ\text{C}$	—	—	2.5	μA
		$I_E = 0; V_{CB} = 80 \text{ V}$	—	—	500	nA
		$I_E = 0; V_{CB} = 80 \text{ V}; T_j = 100^\circ\text{C}$	—	—	30	μA
I_{CBO}	collector cut-off current BFY51	$I_E = 0; V_{CB} = 40 \text{ V}$	—	—	50	nA
		$I_E = 0; V_{CB} = 40 \text{ V}; T_j = 100^\circ\text{C}$	—	—	2.5	μA
		$I_E = 0; V_{CB} = 60 \text{ V}$	—	—	500	nA
		$I_E = 0; V_{CB} = 60 \text{ V}; T_j = 100^\circ\text{C}$	—	—	30	μA
I_{CBO}	collector cut-off current BFY52	$I_E = 0; V_{CB} = 30 \text{ V}$	—	—	50	nA
		$I_E = 0; V_{CB} = 30 \text{ V}; T_j = 100^\circ\text{C}$	—	—	2.5	μA
		$I_E = 0; V_{CB} = 40 \text{ V}$	—	—	500	nA
		$I_E = 0; V_{CB} = 40 \text{ V}; T_j = 100^\circ\text{C}$	—	—	30	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5 \text{ V}$	—	—	50	nA
		$I_C = 0; V_{EB} = 5 \text{ V}; T_j = 100^\circ\text{C}$	—	—	2.5	μA
		$I_C = 0; V_{EB} = 6 \text{ V}$	—	—	500	nA
h_{FE}	DC current gain BFY50	$I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V}$	20	—	—	
		$I_C = 150 \text{ mA}; V_{CE} = 10 \text{ V}$	30	—	—	
		$I_C = 500 \text{ mA}; V_{CE} = 10 \text{ V}$	20	—	—	
		$I_C = 1 \text{ A}; V_{CE} = 10 \text{ V}$	15	—	—	
h_{FE}	DC current gain BFY51	$I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V}$	30	—	—	
		$I_C = 150 \text{ mA}; V_{CE} = 10 \text{ V}$	40	—	—	
		$I_C = 500 \text{ mA}; V_{CE} = 10 \text{ V}$	25	—	—	
		$I_C = 1 \text{ A}; V_{CE} = 10 \text{ V}$	15	—	—	
h_{FE}	DC current gain BFY52	$I_C = 10 \text{ mA}; V_{CE} = 10 \text{ V}$	30	—	—	
		$I_C = 150 \text{ mA}; V_{CE} = 10 \text{ V}$	60	—	—	
		$I_C = 500 \text{ mA}; V_{CE} = 10 \text{ V}$	30	—	—	
		$I_C = 1 \text{ A}; V_{CE} = 10 \text{ V}$	15	—	—	

NPN medium power transistors

BFY50; BFY51; BFY52

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CEsat}	collector-emitter saturation voltage BFY50	$I_C = 10 \text{ mA}; I_B = 1 \text{ mA}$	—	—	200	mV
		$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}$	—	—	200	mV
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$	—	—	700	mV
		$I_C = 1 \text{ A}; I_B = 100 \text{ mA}$	—	—	1	V
V_{CEsat}	collector-emitter saturation voltage BFY51; BFY52	$I_C = 10 \text{ mA}; I_B = 1 \text{ mA}$	—	—	200	mV
		$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}$	—	—	350	mV
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$	—	—	1	V
		$I_C = 1 \text{ A}; I_B = 100 \text{ mA}$	—	—	1.6	V
V_{BEsat}	base-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 1 \text{ mA}$	—	—	1.2	V
		$I_C = 150 \text{ mA}; I_B = 15 \text{ mA}$	—	—	1.3	V
		$I_C = 500 \text{ mA}; I_B = 50 \text{ mA}$	—	—	1.5	V
		$I_C = 1 \text{ A}; I_B = 100 \text{ mA}$	—	—	2	V
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	—	7	12	pF
f_T	transition frequency BFY50 BFY51; BFY52	$I_C = 50 \text{ mA}; V_{CE} = 10 \text{ V}; f = 100 \text{ MHz}; T_{amb} = 25^\circ\text{C}$	60	140	—	MHz
			50	—	—	MHz

Switching times (between 10% and 90% levels)

t_{on}	turn-on time	$I_{Con} = 150 \text{ mA}; I_{Bon} = 15 \text{ mA}; I_{Boff} = -15 \text{ mA}$	—	55	—	ns
t_d	delay time		—	15	—	ns
t_r	rise time		—	40	—	ns
t_{off}	turn-off time		—	360	—	ns
t_s	storage time		—	300	—	ns
t_f	fall time		—	60	—	ns

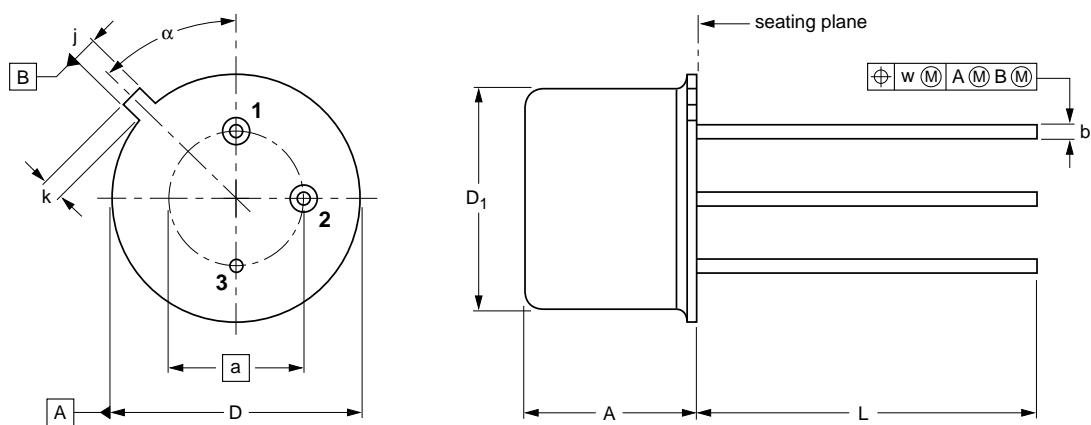
NPN medium power transistors

BFY50; BFY51; BFY52

PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads

SOT5/11



0 5 10 mm
scale

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 0.41	0.48 9.08	9.39 8.18	8.33 0.75	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

NPN medium power transistors**BFY50; BFY51; BFY52**

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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Printed in The Netherlands

117047/00/02/pp8

Date of release: 1997 Apr 22

Document order number: 9397 750 02081

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