

BCY58; BCY59

NPN switching transistors

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FEATURES

- Low current (max. 100 mA)
- Low voltage (max. 45 V).

APPLICATIONS

- Switching and amplification.

DESCRIPTION

NPN switching transistor in a TO-18 metal package.
PNP complements: BCY78 and BCY79.

PINNING

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

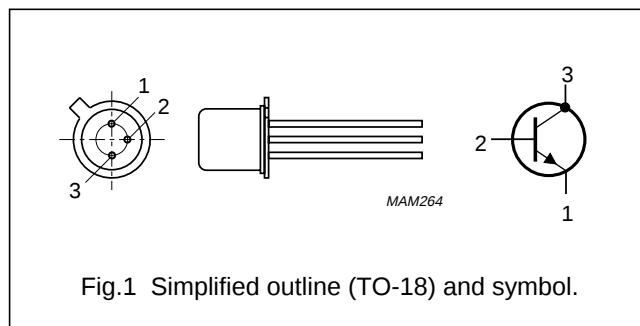


Fig.1 Simplified outline (TO-18) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_{CBO}	collector-base voltage BCY58 BCY59	open emitter	—	—	32	V
			—	—	45	V
V_{CEO}	collector-emitter voltage BCY58 BCY59	open base	—	—	32	V
			—	—	45	V
I_C	collector current (DC)		—	—	100	mA
P_{tot}	total power dissipation	$T_{amb} \leq 45\text{ }^{\circ}\text{C}$	—	—	340	mW
		$T_{case} \leq 45\text{ }^{\circ}\text{C}$	—	—	1	W
h_{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	$I_C = 2\text{ mA}; V_{CE} = 5\text{ V}$	120	170	220	
			180	250	310	
			250	350	460	
			380	500	630	
f_T	transition frequency	$I_C = 10\text{ mA}; V_{CE} = 5\text{ V}; f = 100\text{ MHz}$	150	—	—	MHz
t_{off}	turn-off time	$I_{Con} = 10\text{ mA}; I_{Bon} = 1\text{ mA}; I_{Boff} = -1\text{ mA}$	—	480	800	ns
		$I_{Con} = 100\text{ mA}; I_{Bon} = 10\text{ mA}; I_{Boff} = -10\text{ mA}$	—	450	800	ns

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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			
	BCY58		–	32	V
	BCY59		–	45	V
V_{CEO}	collector-emitter voltage	open base			
	BCY58		–	32	V
	BCY59		–	45	V
V_{EBO}	emitter-base voltage	open collector	–	7	V
I_C	collector current (DC)		–	100	mA
I_{CM}	peak collector current		–	200	mA
I_{BM}	peak base current		–	200	mA
P_{tot}	total power dissipation	$T_{amb} \leq 45\text{ °C}$	–	340	mW
		$T_{case} \leq 45\text{ °C}$	–	1	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	450	K/W
$R_{th\ j-c}$	thermal resistance from junction to case		150	K/W

CHARACTERISTICS

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I_{CBO}	collector cut-off current BCY58	$I_E = 0; V_{CB} = 32\text{ V}$	–	–	10	nA
		$I_E = 0; V_{CB} = 32\text{ V}; T_j = 150\text{ °C}$	–	–	10	μA
I_{CBO}	collector cut-off current BCY59	$I_E = 0; V_{CB} = 45\text{ V}$	–	–	10	nA
		$I_E = 0; V_{CB} = 45\text{ V}; T_j = 150\text{ °C}$	–	–	10	μA
I_{EBO}	emitter cut-off current	$I_C = 0; V_{EB} = 5\text{ V}$	–	–	10	nA
h_{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	$I_C = 10\text{ μA}; V_{CE} = 5\text{ V}$				
			–	20	–	
			20	95	–	
			40	190	–	
			100	300	–	

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SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
h_{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	$I_C = 2 \text{ mA}; V_{CE} = 5 \text{ V}$	120	170	220	
			180	250	310	
			250	350	460	
			380	500	630	
h_{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	$I_C = 10 \text{ mA}; V_{CE} = 1 \text{ V}$	80	250	–	
			120	300	400	
			160	390	630	
			240	550	1000	
h_{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	$I_C = 100 \text{ mA}; V_{CE} = 1 \text{ V}$	40	–	–	
			45	–	–	
			60	–	–	
			60	–	–	
V_{CEsat}	collector-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.25 \text{ mA}$	50	100	350	mV
		$I_C = 100 \text{ mA}; I_B = 2.5 \text{ mA}$	150	250	700	mV
V_{BEsat}	base-emitter saturation voltage	$I_C = 10 \text{ mA}; I_B = 0.25 \text{ mA}$	600	700	850	mV
		$I_C = 100 \text{ mA}; I_B = 2.5 \text{ mA}$	750	875	1200	mV
C_c	collector capacitance	$I_E = i_e = 0; V_{CB} = 10 \text{ V}; f = 1 \text{ MHz}$	–	–	5	pF
C_e	emitter capacitance	$I_C = i_c = 0; V_{EB} = 500 \text{ mV}; f = 1 \text{ MHz}$	–	–	15	pF
f_T	transition frequency	$I_C = 10 \text{ mA}; V_{CE} = 5 \text{ V}; f = 100 \text{ MHz}$	150	–	–	MHz
F	noise figure	$I_C = 200 \mu\text{A}; V_{CE} = 5 \text{ V}; R_S = 2 \text{ k}\Omega; f = 1 \text{ kHz}; B = 200 \text{ Hz}$	–	–	10	dB
Switching times (between 10% and 90% levels)						
t_{on}	turn-on time	$I_{Con} = 10 \text{ mA}; I_{Bon} = 1 \text{ mA}; I_{Boff} = -1 \text{ mA}$	–	85	150	ns
t_d	delay time		–	35	–	ns
t_r	rise time		–	50	–	ns
t_{off}	turn-off time		–	480	800	ns
t_s	storage time		–	400	–	ns
t_f	fall time		–	80	–	ns
t_{on}	turn-on time	$I_{Con} = 100 \text{ mA}; I_{Bon} = 10 \text{ mA}; I_{Boff} = -10 \text{ mA}$	–	55	150	ns
t_d	delay time		–	5	–	ns
t_r	rise time		–	50	–	ns
t_{off}	turn-off time		–	450	800	ns
t_s	storage time		–	250	–	ns
t_f	fall time		–	200	–	ns

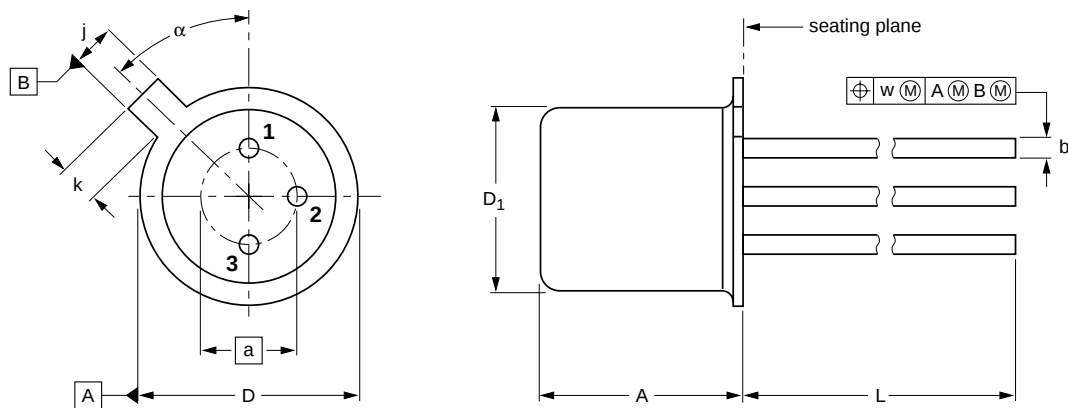
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PACKAGE OUTLINE

Metal-can cylindrical single-ended package; 3 leads

SOT18/13



DIMENSIONS (millimetre dimensions are derived from the original inch dimensions)

UNIT	A	a	b	D	D ₁	j	k	L	w	α
mm	5.31 4.74	2.54	0.47 0.41	5.45 5.30	4.70 4.55	1.03 0.94	1.1 0.9	15.0 12.7	0.40	45°

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT18/13	B11/C7 type 3	TO-18				97-04-18