

NPN switching transistors

BCY58; BCY59

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

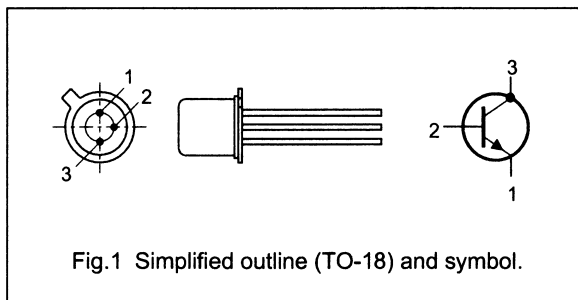


Fig.1 Simplified outline (TO-18) and symbol.

QUICK REFERENCE DATA

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT	
V _{CBO}	collector-base voltage	open emitter					
	BCY58		–	–	32	V	
	BCY59		–	–	45	V	
V _{CEO}	collector-emitter voltage	open base					
	BCY58		–	–	32	V	
	BCY59		–	–	45	V	
I _C	collector current (DC)		–	–	100	mA	
P _{tot}	total power dissipation	T _{amb} ≤ 45 °C	–	–	340	mW	
		T _{case} ≤ 45 °C	–	–	1	W	
h _{FE}	DC current gain	I _C = 2 mA; V _{CE} = 5 V					
			BCY58/VII; BCY59/VII	120	170	220	
			BCY58/VIII; BCY59/VIII	180	250	310	
			BCY58/IX; BCY59/IX	250	350	460	
	BCY58/X; BCY59/X	380	500	630			
f _T	transition frequency	I _C = 10 mA; V _{CE} = 5 V; f = 100 MHz	150	–	–	MHz	
t _{off}	turn-off time	I _{Con} = 10 mA; I _{Bon} = 1 mA; I _{Boff} = –1 mA	–	480	800	ns	
		I _{Con} = 100 mA; I _{Bon} = 10 mA; I _{Boff} = –10 mA	–	450	800	ns	

LIMITING VALUES

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

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
V _{CB0}	collector-base voltage	open emitter	-	32	V
	BCY58			45	V
V _{CE0}	collector-emitter voltage	open base	-	32	V
	BCY58			45	V
V _{EB0}	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} ≤ 45 °C	-	340	mW
		T _{case} ≤ 45 °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

CHARACTERISTICST_j = 25 °C unless otherwise specified.

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
I _{CBO}	collector cut-off current BCY58	I _E = 0; V _{CB} = 32 V	-	-	10	nA
		I _E = 0; V _{CB} = 32 V; T _j = 150 °C	-	-	10	μA
I _{CBO}	collector cut-off current BCY59	I _E = 0; V _{CB} = 45 V	-	-	10	nA
		I _E = 0; V _{CB} = 45 V; T _j = 150 °C	-	-	10	μA
I _{EBO}	emitter cut-off current	I _C = 0; V _{EB} = 5 V	-	-	10	nA
h _{FE}	DC current gain	I _C = 10 μA; V _{CE} = 5 V	-	20	-	
	BCY58/VII; BCY59/VII		20	95	-	
	BCY58/VIII; BCY59/VIII		40	190	-	
	BCY58/IX; BCY59/IX		100	300	-	
	BCY58/X; BCY59/X					

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h _{FE}	DC current gain BCY58/VII; BCY59/VII BCY58/VIII; BCY59/VIII BCY58/IX; BCY59/IX BCY58/X; BCY59/X	I _C = 2 mA; V _{CE} = 5 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 mA; V _{CE} = 1 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 mA; V _{CE} = 1 V	40	–	–	
			45	–	–	
			60	–	–	
			60	–	–	
V _{CEsat}	collector-emitter saturation voltage	I _C = 10 mA; I _B = 0.25 mA	50	100	350	mV
		I _C = 100 mA; I _B = 2.5 mA	150	250	700	mV
V _{BEsat}	base-emitter saturation voltage	I _C = 10 mA; I _B = 0.25 mA	600	700	850	mV
		I _C = 100 mA; I _B = 2.5 mA	750	875	1200	mV
C _c	collector capacitance	I _E = I _e = 0; V _{CB} = 10 V; f = 1 MHz	–	–	5	pF
C _e	emitter capacitance	I _C = I _c = 0; V _{EB} = 500 mV; f = 1 MHz	–	–	15	pF
f _T	transition frequency	I _C = 10 mA; V _{CE} = 5 V; f = 100 MHz	150	–	–	MHz
F	noise figure	I _C = 200 μA; V _{CE} = 5 V; R _S = 2 kΩ; f = 1 kHz; B = 200 Hz	–	–	10	dB
Switching times (between 10% and 90% levels)						
t _{on}	turn-on time	I _{Con} = 10 mA; I _{Bon} = 1 mA; I _{Boff} = –1 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 mA; I _{Bon} = 10 mA; I _{Boff} = –10 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