SILICON PLANAR EPITAXIAL TRANSISTOR

N-P-N transistor in TO-18 metal package with the collector connected to the case and designed for use in amplifier and switching applications.

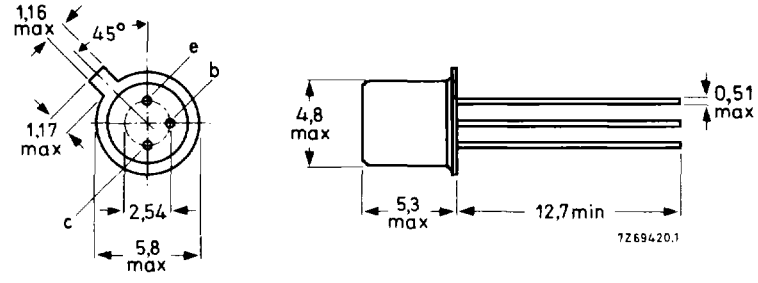
QUICK REFERENCE DATA

Collector-emitter voltage (open base)	V_{CEO}	max.		60	V
Collector current (d.c.)	I_C	max.		200	mA
Total power dissipation					
up to T_{case} = 45 °C	P_{tot}	max.		1000	mW
up to T_{amb} = 45 °C	P_{tot}	max.		330	mW
Junction temperature	T_j	max.		200	°C
		BCY65-	VII	VIII	IX
Small-signal current gain at f = 1 kHz		⩾	120	175	250
I_C = 2 mA; V_{CE} = 5 V	h_{fe}	typ.	200	260	330
		⩾	250	350	500
Transition frequency at f = 100 MHz					
I_C = 10 mA; V_{CE} = 5 V	f_T	⩾		125	MHz
Noise figure at R_S = 2 kΩ					
I_C = 200 μA; V_{CE} = 5 V;					
f = 1 kHz; B = 200 Hz	F	⩽		6	dB

MECHANICAL DATA

Dimensions in mm

Fig. 1 TO-18.



Collector connected to case.

RATINGS (up to $T_{j\,max}$)

Limiting values in accordance with the Absolute Maximum System (IEC 134)

Collector-emitter voltage			
$V_{BE} = 0$	V_{CES}	max.	60 V
open base	V_{CEO}	max.	60 V
Emitter-base voltage (open collector)	V_{EBO}	max.	7 V
Collector current (d.c.)	I_C	max.	200 mA
Base current (d.c.)	I_B	max.	50 mA
Total power dissipation			
up to $T_{case} = 45\ ^oC$	P_{tot}	max.	1000 mW
up to $T_{amb} = 45\ ^oC$	P_{tot}	max.	330 mW
Junction temperature	T_j	max.	200 °C
Storage temperature range	T_{stg}	−65 to + 150	°C

THERMAL RESISTANCE

From junction to ambient	$R_{th\,j\text{-}a}$	max.	0,45 K/W
From junction to case	$R_{th\,j\text{-}c}$	max.	0,15 K/W

CHARACTERISTICS

T_{amb} = 25 °C unless indicated otherwise

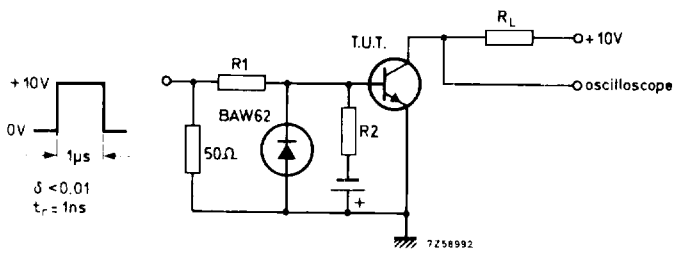
Collector cut-off currents			
V_{CE} = 60 V; V_{BE} = 0	I_{CES}	⩽	10 nA
V_{CE} = 60 V; V_{BE} = 0; T_{amb} = 150 °C	I_{CES}	⩽	10 μA
V_{CE} = 60 V; V_{BE} = 0,2 V; T_{amb} = 100 °C	I_{CEX}	⩽	20 μA
Emitter cut-off current			
V_{EB} = 5 V; I_C = 0	I_{BEO}	⩽	10 nA
Collector-emitter breakdown voltage			
I_B = 0; I_C = 2 mA	$V_{(BR)CEO}$	⩾	60 V
Emitter-base breakdown voltage			
I_C = 0; I_E = 1 μA	$V_{(BR)EBO}$	⩾	7 V
Base-emitter voltage			
V_{CE} = 5 V; I_C = 10 μA	V_{BE}	typ.	500 mV
V_{CE} = 5 V; I_C = 2 mA	V_{BE}		550 to 700 mV
V_{CE} = 1 V; I_C = 10 mA	V_{BE}	typ.	700 mV
V_{CE} = 1 V; I_C = 50 mA	V_{BE}	typ.	760 mV
Saturation voltages			
I_C = 10 mA; I_B = 0,25 mA	V_{CEsat}	⩽	350 mV
	V_{BEsat}		600 to 850 mV
I_C = 50 mA; I_B = 1,25 mA	V_{CEsat}	⩽	700 mV
	V_{BEsat}	⩽	1200 mV
Transition frequency at f = 100 MHz			
I_C = 10 mA; V_{CE} = 5 V	f_T	⩾	125 MHz
Noise figure at R_S = 2 kΩ			
I_C = 200 μA; V_{CE} = 5 V; f = 1 kHz; B = 200 Hz	F	⩽	6 dB
Collector capacitance at f = 1 MHz			
V_{CB} = 10 V; I_E = 0	C_c	⩽	6 pF
Emitter capacitance at f = 1 MHz			
V_{EB} = 0,5 V; I_C = 0	C_e	⩽	15 pF

			BCY65-VII	BCY65-VIII	BCY65-IX
D.C. current gain					
V_{CE} = 5 V; I_C = 10 μA	h_{FE}	⩾	–	20	40
		typ.	20	95	190
		⩾	120	180	250
V_{CE} = 5 V; I_C = 2 mA	h_{FE}	typ.	170	250	350
		⩽	220	310	460
		⩾	80	120	160
V_{CE} = 1 V; I_C = 10 mA	h_{FE}	typ.	250	300	390
		⩽	–	400	630
V_{CE} = 1 V; I_C = 50 mA	h_{FE}	⩾	40	45	60

			BCY65-VII	BCY65-VIII	BCY65-IX
h-parameters $f = 1$ kHz; $T_{amb} = 25$ °C; $V_{CE} = 5$ V; $I_C = 2$ mA					
small-signal current gain	h_{fe}	⩾	120	175	250
		typ.	200	260	330
		⩽	250	350	500

Switching times (see Fig. 2)

$I_C = 10$ mA; $I_B = -I_{BM} = 1$ mA $R_1 = R_2 = 5$ kΩ; $R_L = 990$ Ω; $V_{BB} = 5$ V				
delay time	t_d	typ.	35	ns
rise time	t_r	typ.	50	ns
turn-on time	t_{on}	typ.	85	ns
		⩽	150	ns
storage time	t_s	typ.	400	ns
fall time	t_f	typ.	80	ns
turn-off time	t_{off}	typ.	480	ns
		⩽	800	ns
$I_C = 50$ mA; $I_B = -I_{BM} = 5$ mA $R_1 = 1$ kΩ; $R_2 = 1{,}3$ kΩ; $R_L = 195$ Ω; $V_{BB} = 4{,}7$ V				
delay time	t_d	typ.	15	ns
rise time	t_r	typ.	50	ns
turn-on time	t_{on}	typ.	65	ns
		⩽	150	ns
storage time	t_s	typ.	300	ns
fall time	t_f	typ.	150	ns
turn-off time	t_{off}	typ.	450	ns
		⩽	800	ns



Oscilloscope:
$R_i > 100$ kΩ
$t_r < 15$ ns

Fig. 2 Test circuit.