DIGITRON™ Semiconductors

High-reliability discrete products
and engineering services since 1977

BCY77 - BCY79

PNP SILICON LOW POWER TRANSISTORS

FEATURES

- Available as "HR" (high reliability) screened per MIL-PRF-19500, JANTX level. Add "HR" suffix to base part number.
- Available as non-RoHS (Sn/Pb plating), standard, and as RoHS by adding "-PBF" suffix.

MAXIMUM RATINGS

Rating	Symbol	BCY77	BCY78	BCY79	Units
Collector-emitter voltage	V_{CEO}	60	32	45	V
Collector-emitter voltage	V_{CES}	60	32	45	V
Emitter-base voltage	V_{EBO}	5	5	5	V
Collector current continuous	I_C	100	200	200	mA
Base current	I_B	50	50	50	mA
Power dissipation $T_A \leq 25°C$	P_D	0.39			W
Power dissipation $T_C \leq 45°C$	P_D	1.00			W
Operating and storage junction temperature range	T_J, T_{stg}	-65 to +200			°C
Thermal resistance, junction to ambient, free air	R_{thj-a}	450			K/W
Thermal resistance, junction to case	R_{thj-c}	150			K/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Characteristic	Symbol	Test Condition	BCY77		BCY78		BCY79		Unit
			Min	Max	Min	Max	Min	Max	
Collector emitter voltage	V_{CEO}	I_C = 2mA, I_B = 0	60	-	32	-	45	-	V
Collector emitter voltage	V_{CES}	I_C = 10µA, V_{BE} = 0	60	-	32	-	45	-	V
Emitter base voltage	V_{EBO}	I_E = 1µA, I_C = 0	5	-	5	-	5		V
Collector cutoff current	I_{CES}	V_{CE} = V_{CE}max, V_{BE} = 0	-	100	-	100	-	100	nA
		V_{CE} = 50V, V_{BE} = 0	-	20	-	-	-	-	nA
		V_{CE} = 25V. V_{BE} = 0	-	-	-	20	-	-	nA
		V_{CE} = 35V, V_{BE} = 0	-	-	-	-	-	20	nA
		V_{CE} = 60V, V_{BE} = 0, T_A = 150°C	-	10	-	-	-	-	µA
		V_{CE} = 25V, V_{BE} = 0, T_A = 150°C	-	-	-	10	-	-	µA
		V_{CE} = 35V, V_{BE} = 0, T_A = 150°C	-	-	-	-	-	10	µA
Collector cutoff current	I_{CEX}	V_{CE} = V_{CE}max, V_{BE} = 0.2V, T_A = 100°C	-	20	-	20	-	20	µA
Emitter cutoff current	I_{EBO}	V_{EB} = 4V, I_C = 0	-	20	-	20	-	20	nA
Base emitter on voltage	$V_{BE(on)}$	I_C = 10µA, V_{CE} = 5V	0.55	-	0.55	-	0.55	-	V
		I_C = 2mA, V_{CE} = 5V	0.6	0.75	0.6	0.75	0.6	0.75	
		I_C = 10mA, V_{CE} = 1V	0.68	-	0.68	-	0.68	-	
		I_C = 50mA, V_{CE} = 1V (BCY77)	0.72	-	0.72	-	0.72	-	
		I_C = 100mA, V_{CE} = 1V (BCY78, BCY79)	0.75	-	0.75	-	0.75	-	

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Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Collector emitter saturation voltage	$V_{CEO(sat)}$	I_C = 10mA, I_B = 0.25mA I_C = 50mA, I_B = 1.25mA (BCY77) I_C = 100mA, I_B = 2.5mA (BCY78, BCY79)	- - -	- - -	0.25 0.80 0.80	V
Base emitter saturation voltage	$V_{BE(sat)}$	I_C = 10mA, I_B = 0.25mA I_C = 50mA, I_B = 1.25mA (BCY77) I_C = 100mA, I_B = 2.5mA (BCY78, BCY79)	0.60 0.70 0.70	- - -	0.85 1.20 1.20	V
DC current gain	h_{FE}	I_C = 10µA, V_{CE} = 5V Group 7 Group 8 Group 9 Group 10 only BCY78, BCY79	 - 30 40 100	 140 - - -	 - - - -	-
		I_C = 2mA, V_{CE} = 5V BCY77, BCY78, BCY79 Group 7 Group 8 Group 9 Group 10 only BCY78, BCY79	 120 120 180 250 380	 - - - - -	 630 220 310 460 630	-
		I_C = 10mA, V_{CE} = 1V BCY77, BCY78, BCY79 & Group 7 Group 8 Group 9 Group 10 only BCY78, BCY79	 80 120 160 240	 - - - -	 - 400 630 1000	-
		I_C = 100mA, V_{CE} = 1V BCY78, BCY79 BCY77, BCY78, BCY79 & Group 7 Group 8 Group 9 Group 10 only BCY78, BCY79	 40 45 60 60	 - - - -	 - - - -	-
		I_C = 50mA, V_{CE} = 1V BCY77 BCY77, BCY78, BCY79 & Group 7 Group 8 Group 9	 40 45 60	 - - -	 - - -	-
DYNAMIC CHARACTERISTICS						
Noise figure	NF	I_C = 0.2mA, V_{CE} = 5V, R_g = 2kΩ, f = 1kHz, B = 200Hz	-	-	6	dB
Transition frequency	f_T	I_C = 10mA, V_{CE} = 5V, f = 100MHz	-	180	-	MHz
Collector base capacitance	C_{cbo}	V_{CB} = 10V, I_E = 0, f = 1MHz	-	-	7	pF
Emitter base capacitance	C_{ebo}	V_{EB} = 0.5V, I_C = 0, f = 1MHz	-	-	15	pF

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Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Small signal current gain	h_{fe}	I_C = 2mA, V_{CE} = 5V, f = 1kHz				-
		BCY77, BCY78, BCY79	125	-	700	
		Group 7	125	-	250	
		Group 8	175	-	350	
		Group 9	250	-	500	
		Group 10 only BCY78, BCY79	350	-	700	
Input impedance	h_{ie}	I_C = 2mA, V_{CE} = 5V, f = 1kHz				kΩ
		Group 7	1.6	-	4.5	
		Group 8	2.5	-	6.0	
		Group 9	3.2	-	8.5	
		Group 10 only BCY78, BCY79	-	7.5	-	
Voltage feedback ratio	h_{re}	I_C = 2mA, V_{CE} = 5V, f = 1kHz				$x10^{-4}$
		Group 7	-	1.5	-	
		Group 8	-	2.0	-	
		Group 9	-	2.0	-	
		Group 10 only BCY78, BCY79	-	3.0	-	
Output admittance	h_{oe}	I_C = 2mA, V_{CE} = 5V, f = 1kHz				µS
		Group 7	-	-	30	
		Group 8	-	-	50	
		Group 9	-	-	60	
		Group 10 only BCY78, BCY79	-	-	100	
SWITCHING TIMES						
Delay time	t_d	BCY77, BCY78, BCY79 I_C = 10mA, I_{B1} = I_{B2} = 1mA, V_{BB} = 3.6V, R_1 = R_2 = 5kΩ, R_L = 990Ω	-	35	-	ns
Rise time	t_r		-	50	-	
Turn on time	t_{on}		-	-	150	
Storage time	t_s		-	400	-	
Fall time	t_f		-	80	-	
Turn off time	t_{off}		-	-	800	
Delay time	t_d	BCY78, BCY79 I_C = 100mA, I_{B1} = I_{B2} = 10mA, V_{BB} = 5V, R_1 = 500Ω, R_2 = 700Ω, R_L = 98Ω	-	5.0	-	ns
Rise time	t_r		-	50	-	
Turn on time	t_{on}		-	-	150	
Storage time	t_s		-	250	-	
Fall time	t_f		-	200	-	
Turn off time	t_{off}		-	-	800	

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ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise specified)

Characteristic	Symbol	Test Condition	Min	Typ	Max	Unit
Delay time	t_d	BCY77 I_C = 50mA, I_{B1} = I_{B2} = 5mA, V_{BB} = 4.7V, R_1 = 1kΩ, R_2 = 1.3kΩ, R_L = 195Ω	-	15	-	ns
Rise time	t_r		-	50	-	
Turn on time	t_{on}		-	-	150	
Storage time	t_s		-	300	-	
Fall time	t_f		-	150	-	
Turn off time	t_{off}		-	-	800	

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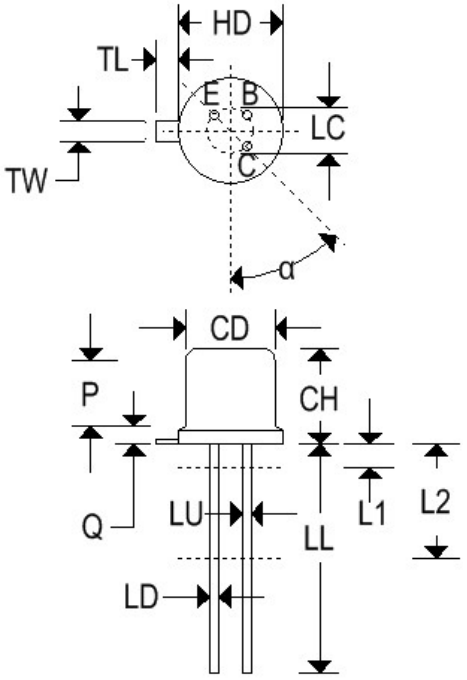
MECHANICAL CHARACTERISTICS

Case	TO-18
Marking	Alpha-numeric
Pin out	See below



TO-18				
Dim	**Inches**		**Millimeters**	
	Min	**Max**	**Min**	**Max**
CD	0.178	0.195	4.520	4.950
CH	0.170	0.210	4.320	5.330
HD	0.209	0.230	5.310	5.840
LC	0.100 TP		2.540 TP	
LD	0.016	0.021	0.410	0.530
LL	0.500	0.750	12.700	19.050
LU	0.016	0.019	0.410	0.480
L1	-	0.050	-	1.270
L2	0.250	-	6.350	-
P	0.100	-	2.540	-
Q	-	0.040	-	1.020
TL	0.028	0.048	0.710	1.220
TW	0.036	0.046	0.910	1.170
r	-	0.010	-	0.025
α	45°TP		45°TP	