

BCY58 BCY59

CASE 22-03, STYLE 1
TO-18 (TO-206AA)

TRANSISTOR

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	BCY 58	BCY 59	Unit
Collector-Emitter Voltage	V _{CEO}	32	45	V _{dc}
Collector-Emitter Voltage (R _{BE} = 10 Ohms)	V _{CES}	32	45	V _{dc}
Emitter-Base Voltage	V _{EBO}	7		V _{dc}
Collector Current - Continuous	I _C	0.2		Amp
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	0.6 2.2B		Watt mW/°C
Total Device Dissipation @ T _C = 25°C T _C = 100°C Derate above 25°C	P _D	1 6.67		Watt mW/°C
Operating and Storage Junction Temperature Range	T _J , T _{stg}	-65 to +200		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	150	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	450	°C/W

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted.)

Characteristic	Type	Symbol	Min	Typ	Max	Unit
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OFF CHARACTERISTICS

Collector-Emitter Breakdown Voltage (I _C = 10 mAdc, I _C = 0)	BCY5B BCY59	V _{(BR)CEO}	32 45			V _{dc}
Emitter-Base Breakdown Voltage (I _E = 1μAdc, I _C = 0)	all	V _{(BR)EBO}	7			V _{dc}
Collector Cutoff Current (V _{CE} = 32 V) (V _{CE} = 45 V) (V _{CE} = 32 V, T _A = 100°C, V _{BE} = 0.2 V) (V _{CE} = 45 V, T _A = 100°C, V _{BE} = 0.2 V) (V _{CE} = 32 V, T _A = 150°C) (V _{CE} = 45 V, T _A = 150°C)	BCY5B BCY59 BCY5B BCY5B BCY59 BCY5B BCY59	I _{CES} I _{CEX} I _{CES}	 	0.2 0.2 0.2 0.5	10 10 20 20 10 10	nAdc μAdc μAdc
Emitter Base Cutoff Current (V _{EB} = 5 V)	all	I _{EBO}			10	nAdc

ON CHARACTERISTICS

DC Current Gain (I _C = 10 μAdc, V _{CE} = 5 Vdc)	BCY59-VII, BCY58-VII BCY59-VIII, BCY58-VIII BCY59-IX, BCY58-IX BCY59-X, BCY58-X	h _{FE}	20 40 100	145 220 300		
(I _C = 2 mAdc, V _{CE} = 5 Vdc)	BCY59-VII, BCY58-VII BCY59-VIII, BCY58-VIII BCY59-IX, BCY58-IX BCY59-X, BCY58-X		120 180 250 380	170 250 350 500	220 310 460 630	
(I _C = 10 mAdc, V _{CE} = 1 Vdc)	BCY59-VII, BCY58-VII BCY59-VIII, BCY58-VIII BCY59-IX, BCY58-IX BCY59-X, BCY58-X		80 120 160 240	190 260 380 550	400 630 1000	
(I _C = 100 mAdc, V _{CE} = 1 Vdc)	BCY59-VII, BCY58-VII BCY59-VIII, BCY58-VIII BCY59-IX, BCY58-IX BCY59-X, BCY58-X		40 45 60 60			
Collector-Emitter Saturation Voltage (I _C = 100 mAdc, I _B = 2.5 mAdc) (I _C = 10 mAdc, I _B = 0.25 mA)	all	V _{CE(sat)}	0.15 0.05	0.30 0.12	0.70 0.35	V _{dc}
Base-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.25 mA) (I _C = 100 mA, I _B = 2.5 mA)	all	V _{BE(sat)}	0.6 0.75	0.70 0.90	0.85 1.2	V _{dc}
Base-Emitter on Voltage (I _C = 2 mAdc, V _{CE} = 5 Vdc)	all	V _{BE(on)}	0.55	0.62	0.70	V _{dc}

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ELECTRICAL CHARACTERISTICS (continued) (T_A = 25°C unless otherwise noted.)

Characteristic	Type	Symbol	Min	Typ	Max	Unit
DYNAMIC CHARACTERISTICS SMALL SIGNAL CHARACTERISTICS						
Current Gain-Bandwidth Product (I _C = 10 mAdc, V _{CE} = 5 V, f = 100 MHz)	all	f _T	125	200		MHz
Output Capacitance (V _{CE} = 10 Vdc, I _C = 0, f = 1 MHz)	all	C _{ob}		3.5	6	pF
Input Capacitance (V _{BE} = 0.5 V, I _C = 0, f = 1 MHz)	all	C _{ib}		8	15	pF
Small Signal Current Gain (I _C = 2 mAdc, V _{CE} = 5 Vdc, f = 1 kHz)	BCY58-VII, BCY59-VII BCY58-VIII, BCY59-VIII BCY58-IX, BCY59-IX BCY58-X, BCY59-X	h _{fe} (h _{21e})	125 175 250 350	200 260 330 520	250 350 500 700	
Output Admittance (I _C = 2 mAdc, V _{CE} = 5 Vdc, f = 1 kHz)	BCY58-VII, BCY59-VII BCY58-VIII, BCY59-VIII BCY58-IX, BCY59-IX BCY58-X, BCY59-X	h _{oe} (h _{22e})			30 50 60 100	μmhos
Input Impedance (I _C = 2 mAdc, V _{CE} = 5 Vdc, f = 1 kHz)	BCY58-VII, BCY59-VII BCY58-VIII, BCY59-VIII BCY58-IX, BCY59-IX BCY58-X, BCY59-X	h _{ie} (h _{11e})	1.6 2.5 3.2 4.5		4.5 6 8.5 12	Kohms
Voltage Feedback Ratio (I _C = 2 mAdc, V _{CE} = 5 Vdc, f = kHz)	BCY58-VII, BCY59-VII BCY58-VIII, BCY59-VIII BCY58-IX, BCY59-IX BCY58-X, BCY59-X	h _{re} (h _{12e})		1.5 2 2 3		× 10 ⁻⁴
Noise Figure (I _C = 0.2 mAdc, V _{CE} = 5 Vdc, R _S = 2 Kohms; f = 1 kHz)	all	N _F		2	6	dB

SWITCHING CHARACTERISTICS

I _C = 10 mA, I _{B1} = 1 mA, I _{B2} = 1 mA V _{BB} = 3.6 V, R ₁ = R ₂ = 5 KΩ R _L = 990 ohms * See test circuit.		t _d	35			nS
		t _r	50			
		t _{on}	85		150	
		t _s	400			
I _C = 100 mA, I _{B1} = 10 mA, I _{B2} = 10 mA V _{BB} = 5 V, R ₁ = 500 Ω, R ₂ = 700 Ω R _L = 98 ohms * See test circuit.		t _f	80			nS
		t _{off}	480		800	
		t _d	5			
		t _r	50			
		t _{on}	55		150	
		t _s	250			
		t _f	200			
		t _{off}	450		800	

TEST CIRCUIT

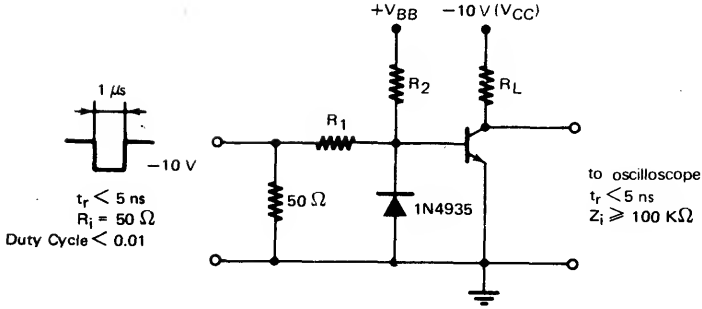


FIGURE 1 – CURRENT GAIN
(BCY58-VII/BCY59-VII)

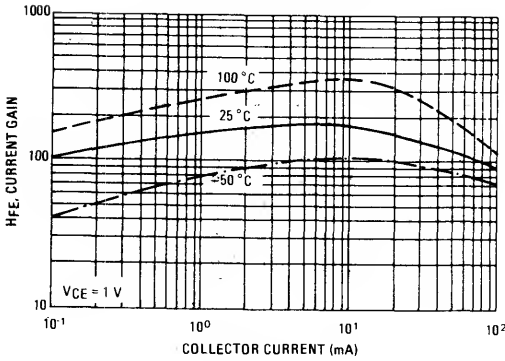


FIGURE 2 – CURRENT GAIN
(BCY58-VIII/BCY59-VIII)

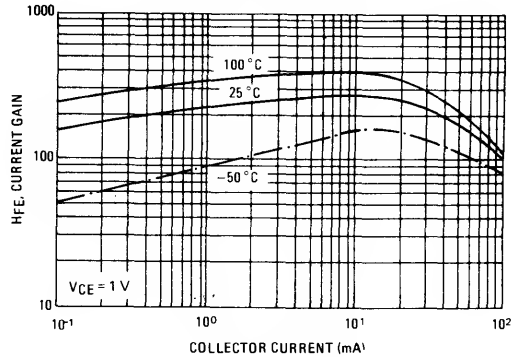


FIGURE 3 – CURRENT GAIN
(BCY58-IX/BCY59-IX)

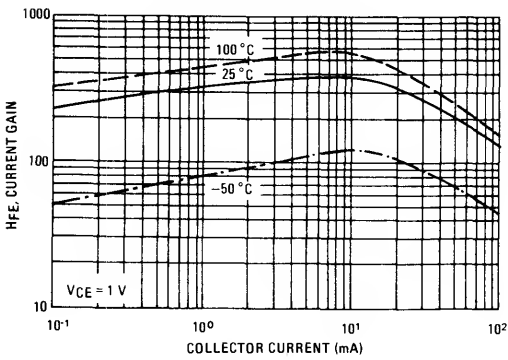


FIGURE 4 – CURRENT GAIN
(BCY58-X/BCY59-X)

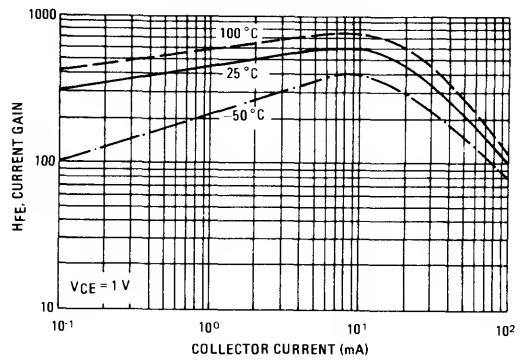


FIGURE 5 – SATURATION VOLTAGE

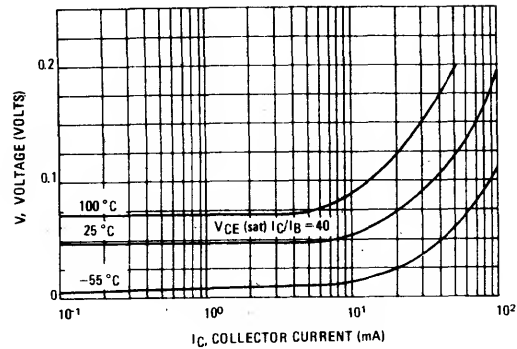


FIGURE 6 – SATURATION VOLTAGE

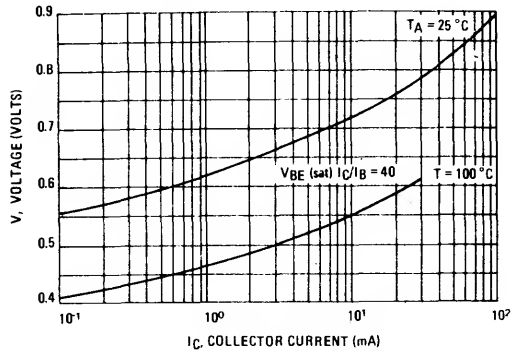


FIGURE 7 – INPUT CHARACTERISTIC
(COMMON EMITTER CIRCUIT)

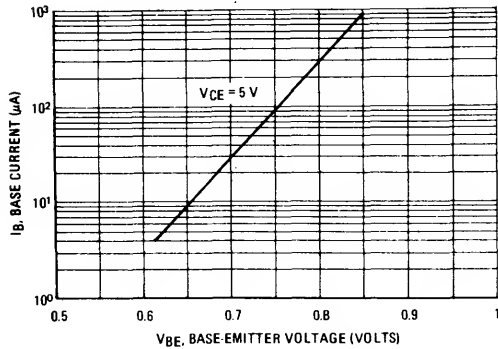


FIGURE 8 – OUTPUT CHARACTERISTIC
(COMMON EMITTER CIRCUIT)

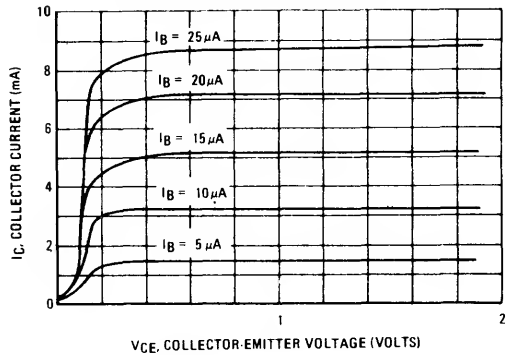


FIGURE 9 – OUTPUT CHARACTERISTIC
(COMMON EMITTER CIRCUIT)

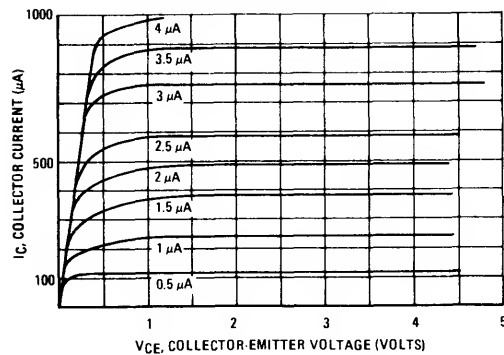
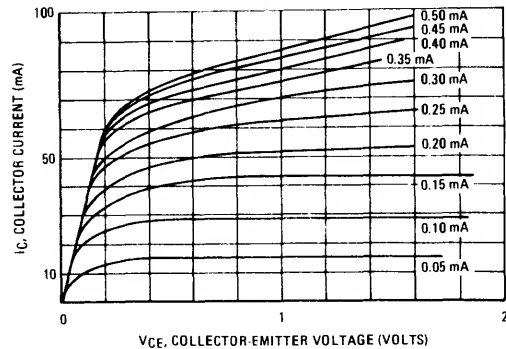
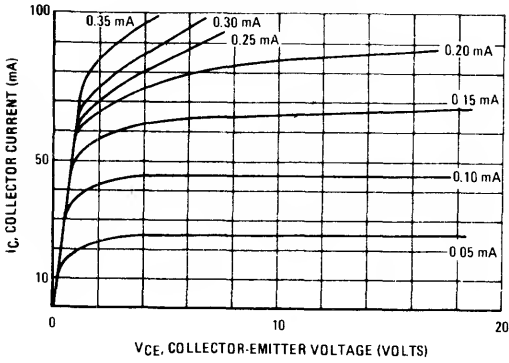


FIGURE 10 – OUTPUT CHARACTERISTIC
(COMMON EMITTER CIRCUIT)



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**FIGURE 11 – OUTPUT CHARACTERISTIC
(COMMON EMITTER CIRCUIT)**



**FIGURE 12 – EMITTER-BASE CAPACITANCE
COLLECTOR-BASE CAPACITANCE**

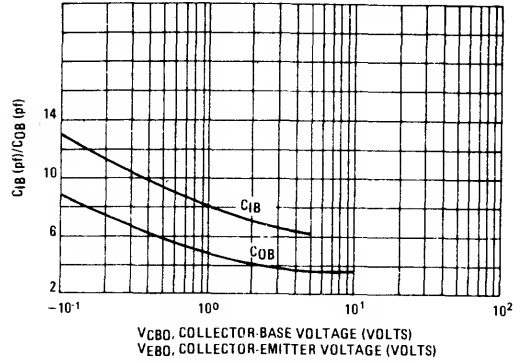
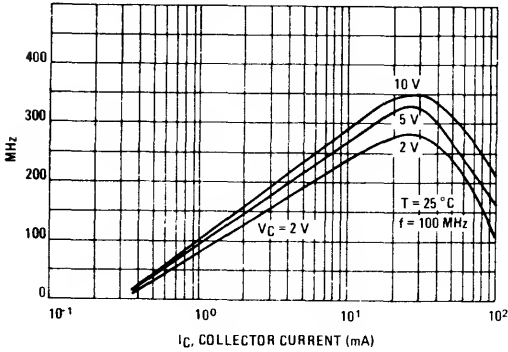


FIGURE 13 – CURRENT GAIN – BANDWIDTH PRODUCT



**FIGURE 14 – TOTAL PERMISSIBLE POWER
DISSIPATION (BCY58/BCY59)**

