BCX58
BCX59

CASE 29-02, STYLE 17
TO-92 (TO-226AA)

AMPLIFIER TRANSISTORS

NPN SILICON

MAXIMUM RATINGS

Rating	Symbol	BCX 58	BCX 59	Unit
Collector-Emitter Voltage	V_{CEO}	32	45	Vdc
Collector-Base Voltage	V_{CBO}	32	45	Vdc
Emitter-Base Voltage	V_{EBO}	7.0		Vdc
Collector Current – Continuous	I_C	100		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	625 5.0		mW mW/°C
Total Device Dissipation @ T_C = 25°C Derate above 25°C	P_D	1.5 12		Watt mW/°C
Operating and Storage Junction Temperature Range	T_J, T_{stg}	−55 to +150		°C

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	$R_{\theta JC}$	83.3	°C/W
Thermal Resistance, Junction to Ambient	$R_{\theta JC}$	200	°C/W

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I_C = 10 mAdc, I_B = 0)	BCX58 BCX59	$V_{(BR)CEO}$	32 45			Vdc
Emitter-Base Breakdown Voltage (I_E = 1 μAdc, I_C = 0)	all	$V_{(BR)EBO}$	7	8.7		Vdc
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 = 125 °C) (V_{CE} = 45 V, T_A = 125 °C)	 BCX58 BCX59 BCX58 BCX59 BCX58 BCX59	 I_{CES} I_{CES} I_{CEX} I_{CEX} I_{CES} I_{CES}			 10 10 20 20 2.5 2.5	 nAdc μAdc
ON CHARACTERISTICS						
DC Current Gain (I_C = 10 μAdc, V_{CE} = 5 Vdc) (I_C = 2 mAdc, V_{CE} = 5 Vdc) (I_C = 10 mAdc, V_{CE} = 1 Vdc) (I_C = 100 mAdc, V_{CE} = 2 Vdc) 	 BCX59-7, BCX58-7 BCX59-8, BCX58-8 BCX59-9, BCX58-9 BCX59-10, BCX58-10 BCX59-7, BCX58-7 BCX59-8, BCX58-8 BCX59-9, BCX58-9 BCX59-10, BCX58-10 BCX59-7, BCX58-7 BCX59-8, BCX58-8 BCX59-9, BCX58-9 BCX59-10, BCX58-10 BCX59-7, BCX58-7 BCX59-8, BCX58-8 BCX59-9, BCX58-9 BCX59-10, BCX58-10	h_{FE}	 20 40 75 100 120 180 250 380 80 120 160 240 40 45 60 60	 80 145 220 300 170 250 350 500 190 260 380 550	 220 310 460 630 400 630 1000	
Collector-Emitter Saturation Voltage (I_C = 100 mAdc, I_B = 5 mAdc) (I_C = 10 mAdc, I_B = see note 1)		$V_{CE(sat)}$			0.5 0.6	Vdc
Base-Emitter Saturation Voltage (I_C = 100 mA, I_B = 5 mA)		$V_{BE(sat)}$			1.3	Vdc
Base-Emitter On Voltage (I_C = 2 mAdc, V_{CE} = 5 Vdc)		$V_{BE(on)}$	0.55	0.62	0.70	Vdc

Note 1: I_C = 10 mA on the constant base current characteristic which yield the point I_C = 11 mA, V_{CE} = 5 V

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
SMALL SIGNAL CHARACTERISTICS						
Current Gain–Bandwidth Product (I_C = 10 mAdc, V_{CE} = 5 V, f = 100 MHz)		f_T	200	350		MHz
Output Capacitance (V_{CE} = 10 Vdc, I_C = 0, f = 1 MHz)		C_{ob}		1.8	4	pF
Input Capacitance (V_{BE} = 0.5 V, I_C = 0, f = 1 MHz)		C_{ib}		5.2	9	pF
Small Signal Current Gain (I_C = 2 mAdc, V_{CE} = 5 Vdc, f = 1 KHz)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10	h_{fe}	125 175 250 350		250 350 500 700	
Output Admittance (I_C = 2 mAdc, V_{CE} = 5 Vdc, f = 1 KHz)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10	h_{oe}			30 50 60 100	μmhos
Input Impedance (I_C = 2 mAdc, V_{CE} = 5 Vdc, f = 1 KHz)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10	h_{ie}	1.6 2.5 3.2	2.7 3.6 4.5 7.5	4.5 6 8.5	Kohms
Voltage Feedback Ratio (I_C = 2 mAdc, V_{CE} = 5 Vdc, f = 1 KHz)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10	h_{re}		1.5 2 2 3		$X10^4$
Noise Figure (I_C = 0.2 mAdc, V_{CE} = 5 Vdc, R_S = 2 KOhms, f = 1 KHz)		N_F		1	4	dB
(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 = 999 ohms) *See test circuit		T_d T_r T_{on} T_s T_f T_{off}		16 29 45 475 40 515	 100 750	nS
(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_d t_r t_{on} t_s t_f t_{off}		5 40 45 135 80 215	 100 650	ns

TEST CIRCUIT

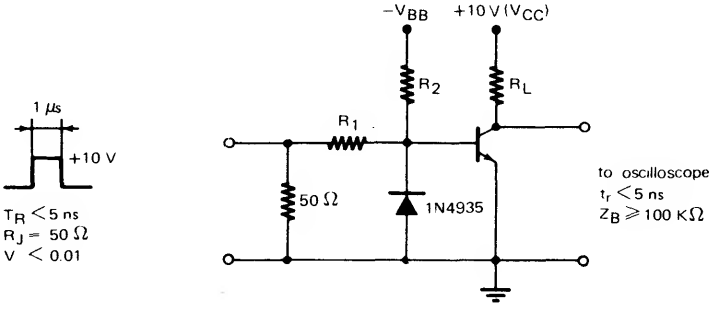

FIGURE 1 – NORMALIZED DC CURRENT GAIN

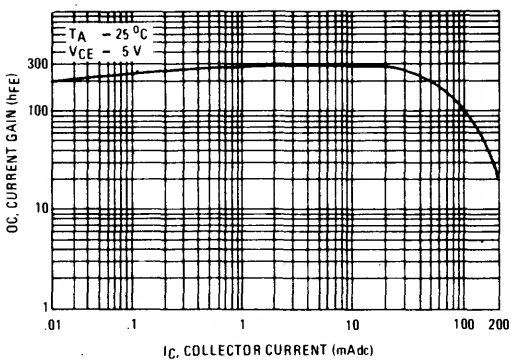

FIGURE 2 – "SATURATION" AND "ON" VOLTAGES

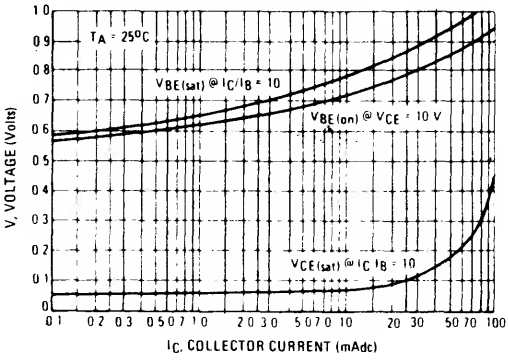

FIGURE 3 – COLLECTOR SATURATION REGION

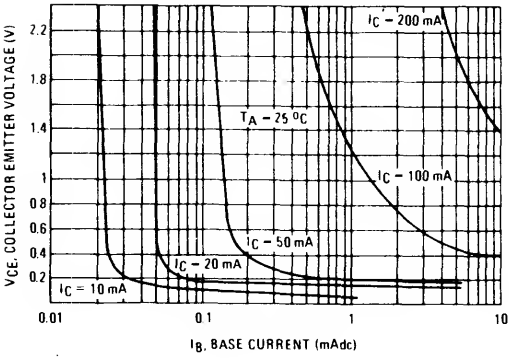

FIGURE 4 – BASE-EMITTER TEMPERATURE COEFFICIENT

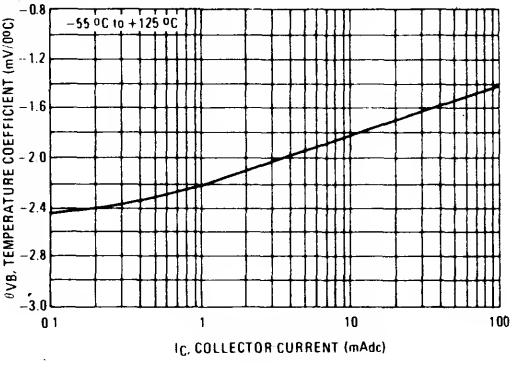

FIGURE 5 – CAPACITANCES

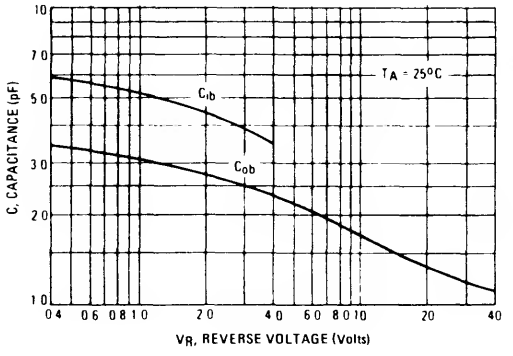

FIGURE 6 – CURRENT-GAIN-BANDWIDTH PRODUCT