

6367254 MOTOROLA SC (XSTRS/R F)

96D 81676

D
T-29-19

MAXIMUM RATINGS

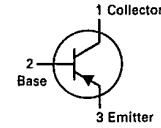
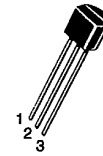
Rating	Symbol	BC 256	BC 251	BC 252	Unit
Collector-Emitter Voltage	V _{CEO}	65	45	25	V _{dc}
Collector-Base Voltage	V _{CBO}	80	50	30	V _{dc}
Emitter-Base Voltage	V _{EBO}	5.0			V _{dc}
Collector Current - Continuous	I _C	100			mA _{dc}
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	350	2.8		mW mW/°C
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	1.0	8.0		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 _{θJC}	125	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	357	°C/W

**BC251,A,B,C
BC252,A,B,C
BC256,A,B**

CASE 29-04, STYLE 17
TO-92 (TO-226AA)



AMPLIFIER TRANSISTORS

PNP SILICON

Refer to BC556 for graphs.

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage (I _C = 2.0 mA, I _B = 0)	BC256 BC251 BC252	V _{(BR)CEO}	65 45 25			V
Emitter-Base Breakdown Voltage (I _E = 100 μA, I _C = 0)	BC256 BC251 BC252	V _{(BR)EBO}	5 5 5			V
Collector-Emitter Leakage Current (V _{CE} = 40 V) (V _{CE} = 20 V)	BC256 BC251 BC252	I _{CES}		2 2 2	100 100 100	nA
(V _{CE} = 20 V, T _A = 125°C)	BC256 BC251 BC252				4 4 4	μA

ON CHARACTERISTICS

DC Current Gain (I _C = 10 μA, V _{CE} = 5 V)	BC251A/2A/6A BC251B/2B/6B BC252C	h _{FE}		90 150 270		
(I _C = 2 mA, V _{CE} = 5 V)	BC256 BC251 BC252		125 120 120		500 800 800	
(I _C = 100 mA, V _{CE} = 5 V)	BC251A/2A/6A BC251B/2B/6B BC251C/BC252C		120 180 380	170 290 500	220 460 800	
Collector-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5 mA)		V _{CE(sat)}		0.075 0.25	0.3 0.65	V
Base-Emitter Saturation Voltage (I _C = 10 mA, I _B = 0.5 mA) (I _C = 100 mA, I _B = 5 mA)		V _{BE(sat)}		0.70 1.00		V
Base-Emitter on Voltage (I _C = 2 mA, V _{CE} = 5 V)		V _{BE(on)}	0.55	0.62	0.70	V

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

6367254 MOTOROLA SC (XSTRS/R F)

96D 81677 D

BC251,A,B,C, BC252,A,B,C, BC256,A,B

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
DYNAMIC CHARACTERISTICS						
Current-Gain Bandwidth Product (I _C = 10 mA, V _{CE} = 5 V, f = 50 MHz)	BC256 BC251 BC252	f _T		280 320 360		MHz
Output Capacitance (V _{CB} = 10 V, I _C = 0, f = 1 MHz)		C _{ob}		3	6.0	pF
Noise Figure (I _C = 0.2 mA, V _{CE} = 5 V, R _S = 2 Kohms, f = 1 KHz, Δf = 200 Hz)	BC256 BC251 BC252	NF		2 2 2	10 10 10	dB

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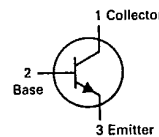
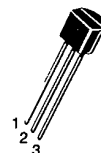
BCX58,-7,-8,-9,-10
BCX59,-7,-8,-9,-10

CASE 29-04, STYLE 17
TO-92 (TO-226AA)



MAXIMUM RATINGS

Rating	Symbol	BCX 58	BCX 59	Unit
Collector-Emitter Voltage	V _{CEO}	32	45	V _{dc}
Collector-Base Voltage	V _{CBO}	32	45	V _{dc}
Emitter-Base Voltage	V _{EBO}	7.0		V _{dc}
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



AMPLIFIER TRANSISTORS

NPN SILICON

THERMAL CHARACTERISTICS

Characteristic	Symbol	Max	Unit
Thermal Resistance, Junction to Case	R _{θJC}	83.3	°C/W
Thermal Resistance, Junction to Ambient	R _{θJA}	200	°C/W

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

Characteristic	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	—	V _{dc}	
Emitter-Base Breakdown Voltage (I _E = 1.0 μAdc, I _C = 0)	All	V _{(BR)EBO}	7.0	8.7	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 = 125°C) (V _{CE} = 45 V, T _A = 125°C)	BCX58 BCX59 BCX58 BCX59 BCX58 BCX59	I _{CES}	—	—	10 10 20 20 2.5 2.5	nAdc μAdc
Emitter-Cutoff Current (V _{EBO} = 4.0 V, I _C = 0)		I _{EBO}	—	—	20	nAdc
ON CHARACTERISTICS						
DC Current Gain (I _C = 10 μAdc, V _{CE} = 5.0 Vdc)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10	h _{FE}	20 40 75 100	80 145 220 300	—	
(I _C = 2.0 mAdc, V _{CE} = 5.0 Vdc)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10		120 180 250 380	170 250 350 500	220 310 480 630	
(I _C = 10 mAdc, V _{CE} = 1.0 Vdc)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10		80 120 160 240	180 260 380 550	— 400 630 1000	
(I _C = 100 mAdc, V _{CE} = 2.0 Vdc)	BCX58-7, BCX59-7 BCX58-8, BCX59-8 BCX58-9, BCX59-9 BCX58-10, BCX59-10		40 45 60 60	— — — —	— — — —	
Collector-Emitter Saturation Voltage (I _C = 100 mAdc, I _B = 5.0 mAdc)		V _{CE(sat)}	—	—	0.5	V _{dc}
Base-Emitter Saturation Voltage (I _C = 100 mA, I _B = 2.5 mAdc)		V _{BE(sat)}	—	—	1.0	V _{dc}
Base-Emitter On Voltage (I _C = 2.0 mAdc, V _{CE} = 5.0 Vdc)		V _{BE(on)}	0.55	—	0.7	V _{dc}

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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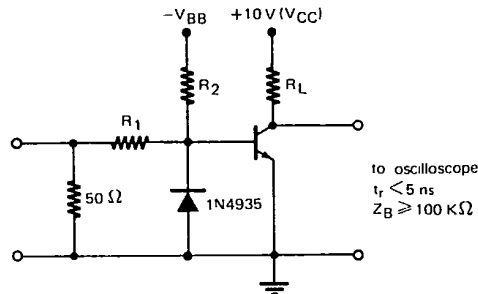
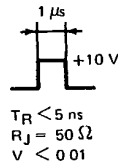
BCX58,-7,-8,-9,-10, BCX59,-7,-8,-9,-10

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ELECTRICAL CHARACTERISTICS (continued) ($T_A = 25^\circ\text{C}$ unless otherwise noted.)

Characteristic	Symbol	Min	Typ	Max	Unit
SMALL-SIGNAL CHARACTERISTICS					
Current-Gain Bandwidth Product ($I_C = 10\text{ mAdc}$, $V_{CE} = 5.0\text{ V}$, $f = 100\text{ MHz}$)	f_T	125	250	—	MHz
Output Capacitance ($V_{CE} = 10\text{ Vdc}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ob}	—	1.8	4.5	pF
Input Capacitance ($V_{BE} = 0.5\text{ V}$, $I_C = 0$, $f = 1.0\text{ MHz}$)	C_{ib}	—	5.2	15	pF
Small-Signal Current Gain ($I_C = 2.0\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$, $f = 1.0\text{ kHz}$)	h_{fe}	125 175 250 350	— — — —	250 350 500 700	—
Noise Figure ($I_C = 0.2\text{ mAdc}$, $V_{CE} = 5.0\text{ Vdc}$, $R_S = 2.0\text{ kohms}$, $f = 1.0\text{ kHz}$)	NF	—	1.0	6.0	dB
(I _C = 10 mA, I _{B1} = 1.0 mA, I _{B2} = 1.0 mA) (V _{BB} = 3.6 V, R ₁ = R ₂ = 5.0 kΩ) (R _L = 999 ohms) *See test circuit	T_d	—	16	—	ns
	T_r	—	29	—	ns
	T_{on}	—	45	150	ns
	T_s	—	475	—	ns
	T_f	—	40	—	ns
	T_{off}	—	515	800	ns
(I _C = 100 mA, I _{B1} = 10 mA, I _{B2} = 10 mA) (V _{BB} = 5.0 V, R ₁ = 500 Ω, R ₂ = 700 Ω) (R _L = 98 ohms) *See test circuit	t_d	—	5.0	—	ns
	t_r	—	40	—	ns
	t_{on}	—	45	150	ns
	t_s	—	135	—	ns
	t_f	—	80	—	ns
	t_{off}	—	215	800	ns



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BCX58,-7,-8,-9,-10, BCX59,-7,-8,-9,-10

FIGURE 1 - NORMALIZED DC CURRENT GAIN

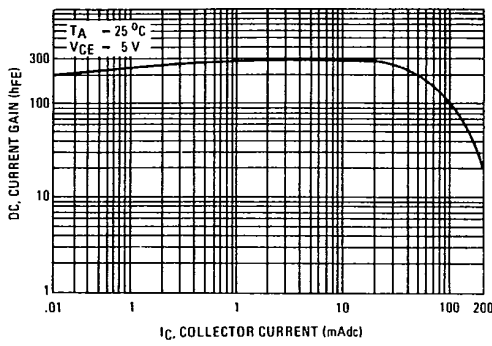


FIGURE 2 - "SATURATION" AND "ON" VOLTAGES

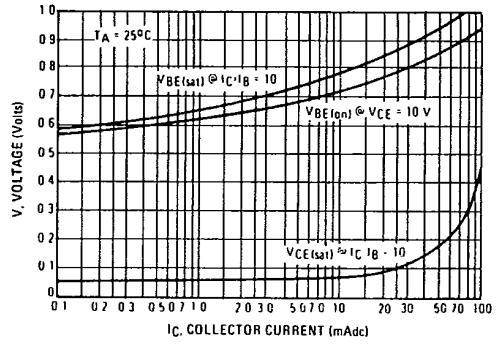


FIGURE 3 - COLLECTOR SATURATION REGION

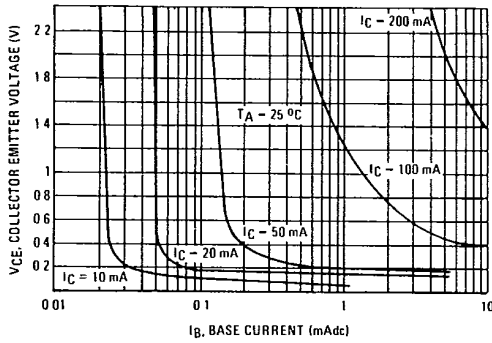


FIGURE 4 - BASE-EMITTER TEMPERATURE COEFFICIENT

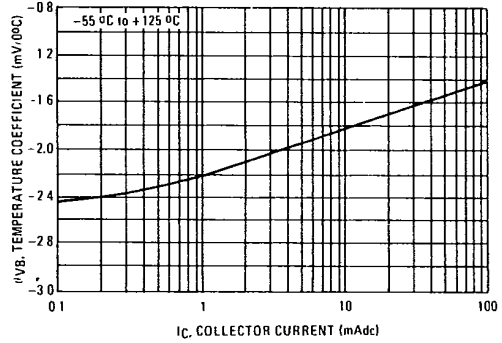


FIGURE 5 - CAPACITANCES

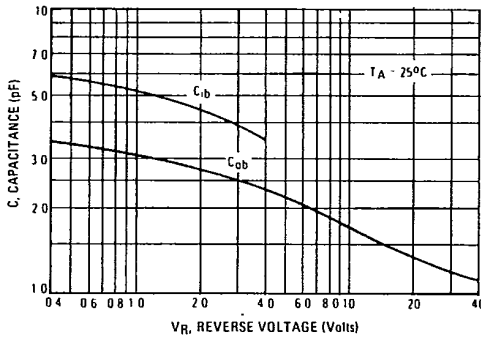


FIGURE 6 - CURRENT-GAIN-BANDWIDTH PRODUCT

