

6367254 MOTOROLA SC (XSTRS/R F)

96D 81676

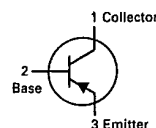
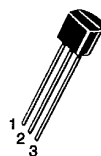
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MAXIMUM RATINGS

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			mAdc
Total Device Dissipation @ T _A = 25°C Derate above 25°C	P _D	350			mW mW/°C
Total Device Dissipation @ T _C = 25°C Derate above 25°C	P _D	1.0			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	
	BC251A/2A/6A BC251B/2B/6B BC251C/BC252C		120 180 380	170 290 500	220 460 800	
(I _C = 100 mA, V _{CE} = 5 V)	BC251A/2A/6A BC251B/2B/6B BC252C			120 180 300		
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)

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

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
DYNAMIC CHARACTERISTICS						
Current-Gain Bandwidth Product ($I_C = 10\text{ mA}$, $V_{CE} = 5\text{ V}$, $f = 50\text{ MHz}$)	BC256 BC251 BC252	f_T		280 320 360		MHz
Output Capacitance ($V_{CB} = 10\text{ V}$, $I_C = 0$, $f = 1\text{ MHz}$)		C_{ob}		3	6.0	pF
Noise Figure ($I_C = 0.2\text{ mA}$, $V_{CE} = 5\text{ V}$, $R_S = 2\text{ Kohms}$, $f = 1\text{ KHz}$, $\Delta f = 200\text{ Hz}$)	BC256 BC251 BC252	NF		2 2 2	10 10 10	dB

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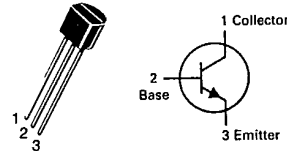
6367254 MOTOROLA SC (XSTRS/R F)

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T-29-21

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

CASE 29-04, 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 _{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	—	—	Vdc
Emitter-Base Breakdown Voltage (I _E = 1.0 μAdc, I _C = 0)	All V _{(BR)EBO}	7.0	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 nAdc μAdc 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	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	220 310 460 630	
(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	190 260 380 550	— 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	Vdc
Base-Emitter Saturation Voltage (I _C = 100 mA, I _B = 2.5 mAdc)	V _{BE(sat)}	—	—	1.0	Vdc
Base-Emitter On Voltage (I _C = 2.0 mAdc, V _{CE} = 5.0 Vdc)	V _{BE(on)}	0.55	—	0.7	Vdc

MOTOROLA SMALL-SIGNAL SEMICONDUCTORS

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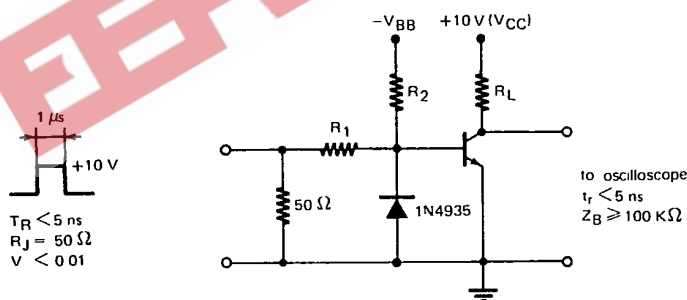
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BCX58,-7,-8,-9,-10, BCX59,-7,-8,-9,-10

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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
($I_C = 10\text{ mA}$, $I_{B1} = 1.0\text{ mA}$, $I_{B2} = 1.0\text{ mA}$) ($V_{BB} = 3.6\text{ V}$, $R_1 = R_2 = 5.0\text{ k}\Omega$) ($R_L = 999\text{ ohms}$) *See test circuit	T_d	—	16	—	ns
	T_r	—	29	—	
	T_{on}	—	45	150	
	T_s	—	475	—	
($I_C = 100\text{ mA}$, $I_{B1} = 10\text{ mA}$, $I_{B2} = 10\text{ mA}$) ($V_{BB} = 5.0\text{ V}$, $R_1 = 500\text{ }\Omega$, $R_2 = 700\text{ }\Omega$) ($R_L = 98\text{ ohms}$) *See test circuit	t_d	—	5.0	—	ns
	t_r	—	40	—	
	t_{on}	—	45	150	
	t_s	—	135	—	
	t_f	—	80	—	
	t_{off}	—	215	800	



6367254 MOTOROLA SC (XSTRS/R F)

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

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FIGURE 1 - NORMALIZED DC CURRENT GAIN

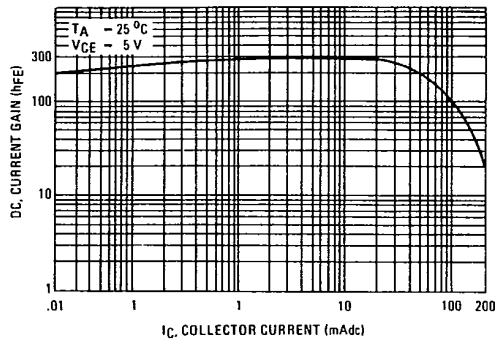


FIGURE 2 - "SATURATION" AND "ON" VOLTAGES

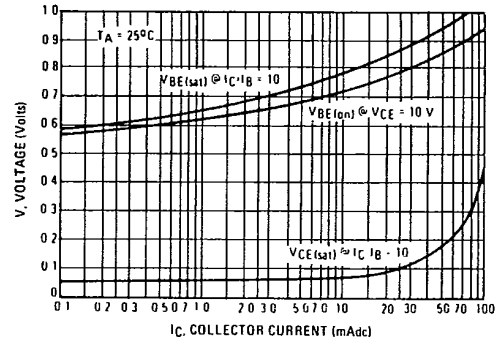


FIGURE 3 - COLLECTOR SATURATION REGION

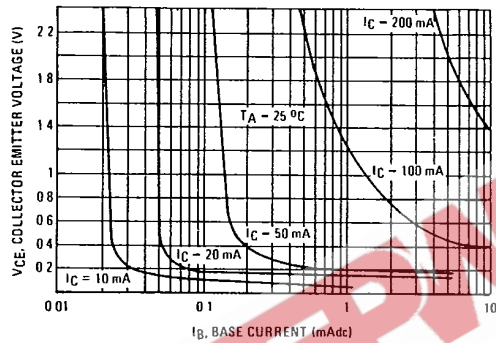


FIGURE 4 - BASE-EMITTER TEMPERATURE COEFFICIENT

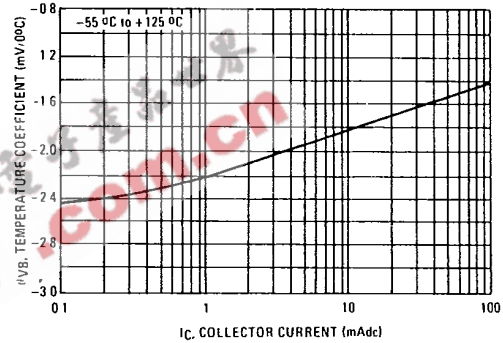


FIGURE 5 - CAPACITANCES

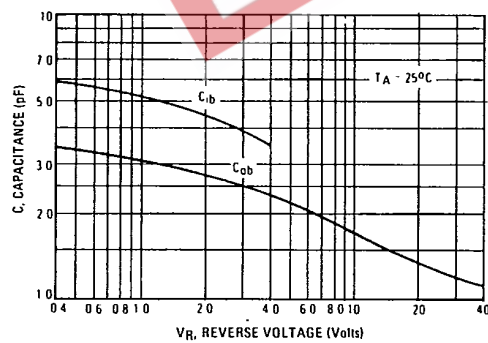


FIGURE 6 - CURRENT-GAIN-BANDWIDTH PRODUCT

