

BC320, A, B BC321, A, B BC322, B

CASE 29-02, STYLE 1
TO-92 (TO-226AA)

AMPLIFIER TRANSISTORS

PNP SILICON

MAXIMUM RATINGS

Rating	Symbol	BC 320	BC 321	BC 322	Unit
Collector-Emitter Voltage	V_{CE0}	45	30	20	Vdc
Collector-Base Voltage	V_{CBO}	50	40	30	Vdc
Emitter-Base Voltage	V_{EBO}	6.0	5.0	5.0	Vdc
Collector Current – Continuous	I_C	150			mAdc
Total Device Dissipation @ $T_A = 25^\circ\text{C}$ Derate above 25°C	P_D	625 5.0			mW mW/ $^\circ\text{C}$
Total Device Dissipation @ $T_C = 25^\circ\text{C}$ Derate above 25°C	P_D	1.5 12			Watt mW/ $^\circ\text{C}$
Operating and Storage Junction Temperature Range	T_J, T_{stg}	-55 to +150			$^\circ\text{C}$

THERMAL CHARACTERISTICS

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

Refer to BC559 for graphs.

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
OFF CHARACTERISTICS						
Collector-Emitter Breakdown Voltage $I_C = 1 \text{ mA}, I_B = 0$	BC320 BC321 BC322	$V_{(BR)CEO}$	45 30 20			Vdc
Collector-Emitter Breakdown Voltage $I_C = 100 \mu\text{A}, V_{BE} = 0$	BC320 BC321 BC322	$V_{(BR)CES}$	50 40 30			Vdc
Collector-Base Breakdown Voltage $I_C = 100 \mu\text{A}, I_E = 0$	BC320 BC321 BC322	$V_{(BR)CBO}$	50 40 30			Vdc
Emitter-Base Breakdown Voltage $I_E = 100 \mu\text{A}, I_C = 0$	BC320 BC321 BC322	$V_{(BR)EBO}$	6 5 5			Vdc
Collector Cutoff Current $V_{CB} = 20 \text{ V}, I_E = 0$		I_{CBO}			30	nAdc
ON CHARACTERISTICS						
Base-Emitter on Voltage $I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}$ $I_C = 10 \text{ mA}, V_{CE} = 5 \text{ V}$		$V_{BE(on)}$	0.57	0.68	0.72 0.77	Vdc
Collector-Emitter Saturation Voltage $I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$		$V_{CE(sat)}$		0.35	0.50	Vdc
Base-Emitter Saturation Voltage $I_C = 10 \text{ mA}, I_B = 0.5 \text{ mA}$ $I_C = 100 \text{ mA}, I_B = 5 \text{ mA}$		$V_{BE(sat)}$		0.77 0.99		Vdc
DC Current Gain $I_C = 10 \mu\text{A}, V_{CE} = 5 \text{ V}$	BC320A BC321A BC320B BC321B BC322B	h_{FE}	— — 40 40 40	50 50 100 100 100	— — — — —	
$I_C = 2 \text{ mA}, V_{CE} = 5 \text{ V}$	BC320A BC321A BC320B BC321B BC322B		110 110 200 200 200	180 180 290 290 290	220 220 450 450 450	

BC320,A,B, BC321,A,B, BC322,B

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

Characteristic	Type	Symbol	Min.	Typ.	Max.	Unit
SMALL SIGNAL CHARACTERISTICS						
Spot Noise Figure $I_C = 200 \mu\text{A}$, $V_{CE} = 5 \text{ V}$ $R_S = 2 \text{ K}\Omega$, $f = 1 \text{ KHz}$, B.W. = 200 Hz	BC320	NF		2	6	dB
	BC321			2	6	
	BC322			1.5	4	
Wide Band Noise Figure $I_C = 200 \mu\text{A}$, $V_{CE} = 5 \text{ V}$ $R_S = 2 \text{ K}\Omega$, B.W. = 30 Hz to 15 KHz	BC322	NF		1.8	4	dB
Output Capacitance $V_{CB} = 10 \text{ V}$, $I_E = 0$ $f = 1 \text{ MHz}$		C_{ob}		3	4	pF
Input Capacitance $V_{EB} = 0.5 \text{ V}$, $I_C = 0$ $f = 1 \text{ MHz}$		C_{ib}		16		pF
Current-Gain-Bandwidth Product $I_C = 10 \text{ mA}$, $V_{CE} = 5 \text{ V}$		f_T		250		MHz
Voltage Feedback Ratio $I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$ $f = 1 \text{ KHz}$		h_{re}		2.0		$\times 10^{-4}$
Input Impedance $I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$ $f = 1 \text{ KHz}$		h_{ie}		1.6		Kohms
Output Admittance $I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$ $f = 1 \text{ KHz}$		h_{oe}		30		μmhos
Small Signal Current Gain $I_C = 2 \text{ mA}$, $V_{CE} = 5 \text{ V}$ $f = 1 \text{ KHz}$	BC320A	h_{fe}	125	220	260	
	BC321A		125	220	260	
	BC320B		240	290	500	
	BC321B		240	290	500	
	BC322B		240	290	500	

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