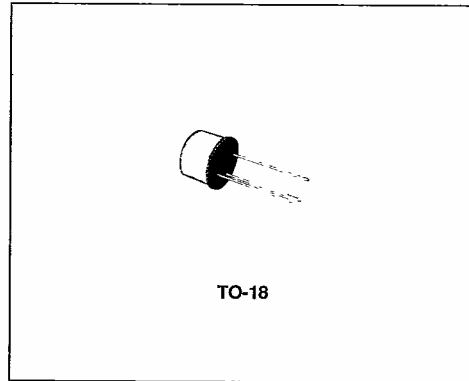


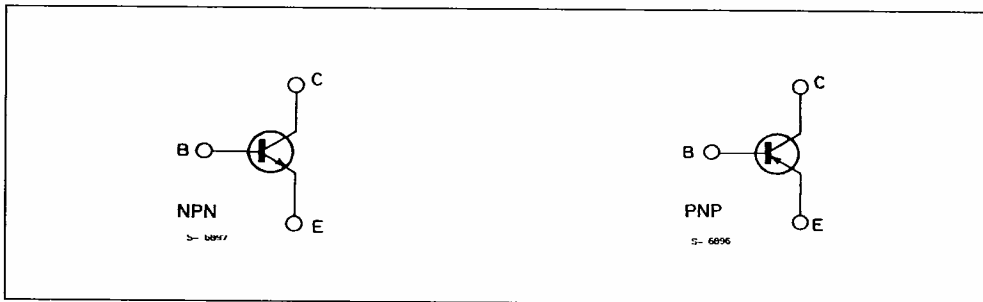
**LOW NOISE GENERAL PURPOSE AUDIO AMPLIFIERS**

**DESCRIPTION**

The BC107, BC108 and BC109 are silicon planar epitaxial NPN transistors in TO-18 metal case. They are suitable for use in driver stages, low noise input stages and signal processing circuits of television receivers. The complementary PNP types are respectively the BC177, BC178 and BC179.



**INTERNAL SCHEMATIC DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value			Unit
		BC107	BC108	BC109	
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	50	30	30	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	45	20	20	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	6	5	5	V
$I_C$	Collector Current	100			mA
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ at $T_{case} \leq 25^\circ\text{C}$	0.3			W
		0.75			W
$T_{stg}$	Storage Temperature	- 55 to 175			$^\circ\text{C}$
$T_J$	Junction Temperature	175			$^\circ\text{C}$

## THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	200	°C/W
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	500	°C/W

## ELECTRICAL CHARACTERISTICS ( $T_{amb} = 25\text{ °C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO}$	Collector Cutoff Current ( $I_E = 0$ )	for <b>BC107</b> $V_{CB} = 40\text{ V}$ $V_{CB} = 40\text{ V}$ $T_{amb} = 150\text{ °C}$ for <b>BC108-BC 109</b> $V_{CB} = 20\text{ V}$ $V_{CB} = 20\text{ V}$ $T_{amb} = 150\text{ °C}$			15 15 15 15	nA $\mu\text{A}$ $\mu\text{A}$ $\mu\text{A}$
$V_{(BR)CBO}$	Collector-base Breakdown Voltage ( $I_E = 0$ )	$I_C = 10\text{ }\mu\text{A}$ for <b>BC107</b> for <b>BC108</b> for <b>BC109</b>	50 30 30			V V V
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = 10\text{ mA}$ for <b>BC107</b> for <b>BC108</b> for <b>BC109</b>	45 20 20			V V V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage ( $I_C = 0$ )	$I_E = 10\text{ }\mu\text{A}$ for <b>BC107</b> for <b>BC108</b> for <b>BC109</b>	6 5 5			V V V
$V_{CE(sat)}^*$	Collector-emitter Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$ $I_B = 5\text{ mA}$		70 200	250 600	mV mV
$V_{BE}^*$	Base-emitter Voltage	$I_C = 2\text{ mA}$ $V_{CE} = 5\text{ V}$ $I_C = 10\text{ mA}$ $V_{CE} = 5\text{ V}$	550	650 700	700 700	mV mV
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10\text{ mA}$ $I_B = 0.5\text{ mA}$ $I_C = 100\text{ mA}$ $I_B = 5\text{ mA}$		750 900		mV mV
$h_{FE}^*$	DC Current Gain	$I_C = 2\text{ mA}$ $V_{CE} = 5\text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C  $I_C = 10\text{ }\mu\text{A}$ $V_{CE} = 5\text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C	110 110 200 110 110 200 420 200 200 420  40 40 100 40 40 100	230 180 290 350 180 290 520 350 290 520  120 90 150 120 90 150 270	450 220 450 800 220 450 800 800 450 800  150 120 270	

\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1 %.

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$h_{fe}$	Small Signal Current Gain	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C $I_C = 10 \text{ mA}$ $f = 100 \text{ MHz}$ $V_{CE} = 10 \text{ V}$		250 190 300 370 190 300 500 370 300 550 2		
$C_{cbo}$	Collector-base Capacitance	$I_E = 0$ $f = 1 \text{ MHz}$ $V_{CB} = 10 \text{ V}$		4	6	pF
$C_{ebo}$	Emitter-base Capacitance	$I_C = 0$ $f = 1 \text{ MHz}$ $V_{EB} = 0.5 \text{ V}$		12		pF
NF	Noise Figure	$I_C = 0.2 \text{ mA}$ $R_g = 2 \text{ k}\Omega$ $B = 200 \text{ Hz}$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ kHz}$ for <b>BC107</b> for <b>BC108</b> for <b>BC109</b> $I_C = 0.2 \text{ mA}$ $R_g = 2 \text{ k}\Omega$ $f = 10 \text{ Hz to } 10 \text{ kHz}$ $B = 15.7 \text{ kHz}$ for <b>BC109</b>		2 2 1.5 1.5	10 10 4 4	dB dB dB dB
$h_{ie}$	Input Impedance	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C		4 3 4.8 5.5 3 4.8 7 5.5 4.8 7		k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$ k $\Omega$

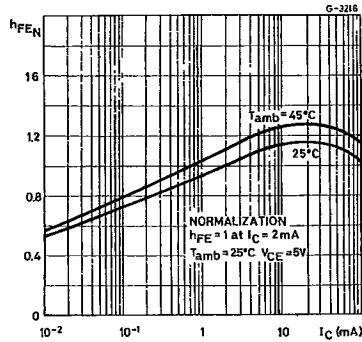
\* Pulsed : pulse duration = 300  $\mu$ s, duty cycle = 1 %.

**ELECTRICAL CHARACTERISTICS** (continued)

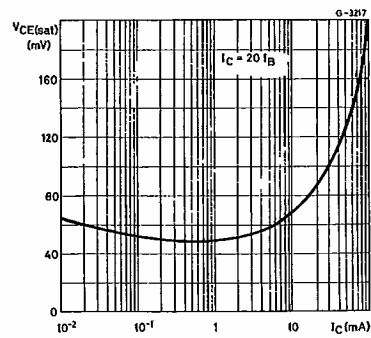
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$h_{re}$	Reverse Voltage Ratio	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C		$2.2 \times 10^{-4}$ $1.7 \times 10^{-4}$ $2.7 \times 10^{-4}$ $3.1 \times 10^{-4}$ $1.7 \times 10^{-4}$ $2.7 \times 10^{-4}$ $3.8 \times 10^{-4}$ $3.1 \times 10^{-4}$ $2.7 \times 10^{-4}$ $3.8 \times 10^{-4}$		
$h_{oe}$	Output Admittance	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ for <b>BC107</b> for <b>BC107</b> Gr. A for <b>BC107</b> Gr. B for <b>BC108</b> for <b>BC108</b> Gr. A for <b>BC108</b> Gr. B for <b>BC108</b> Gr. C for <b>BC109</b> for <b>BC109</b> Gr. B for <b>BC109</b> Gr. C		20 13 26 30 13 26 34 30 26 34		$\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$ $\mu\text{S}$

\* Pulsed : pulse duration = 300  $\mu\text{s}$ , duty cycle = 1 %.

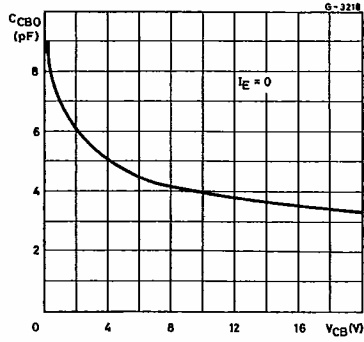
**DC Normalized Current Gain.**



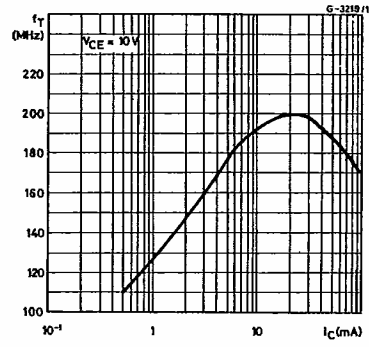
**Collector-emitter Saturation Voltage.**



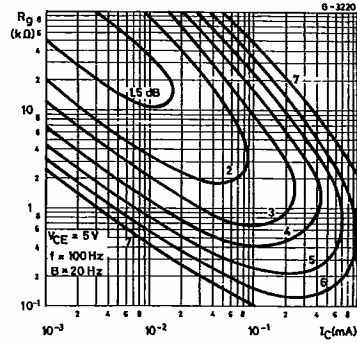
Collector-base Capacitance.



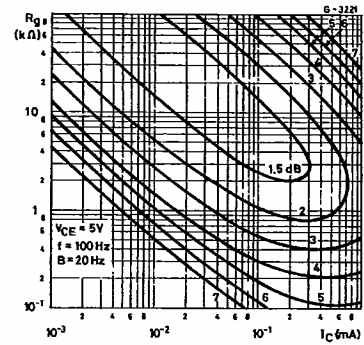
Transition Frequency



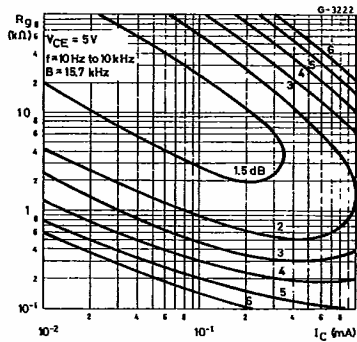
Noise Figure (for BC 109 only).



Noise Figure (for BC 109 only).



Noise Figure (for BC 109 only).



Power Rating Chart.

