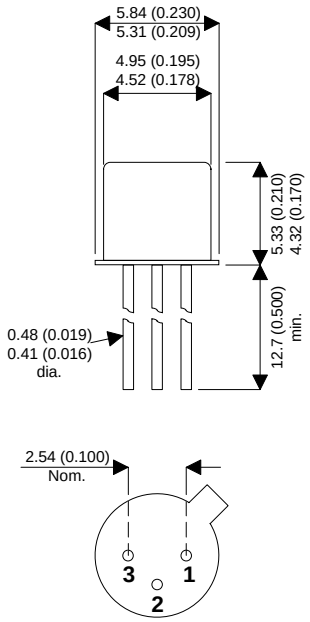
BC107
BC108
BC109

MECHANICAL DATA
Dimensions in mm (inches)



TO–18 METAL PACKAGE

Underside View

PIN 1 – Emitter PIN 2 – Base PIN 3 – Collector

GENERAL PURPOSE SMALL SIGNAL NPN BIPOLAR TRANSISTOR

FEATURES

- **SILICON NPN**
- **HERMETICALLY SEALED TO18**
- **SCREENING OPTIONS AVAILABLE**

ABSOLUTE MAXIMUM RATINGS (T_A = 25°C unless otherwise stated)

V_{CBO}	Collector – Base Continuous Voltage	**BC017**	50V
		BC108, BC109	30V
V_{CEO}	Collector – Emitter Continuous Voltage With Zero Base Current	**BC107**	45V
		BC108, BC109	20V
V_{CES}	Collector – Emitter Continuous Voltage With Base Shortcircuited to Emitter		
		BC107	50V
		BC108, BC109	30V
V_{EBO}	Emitter – Base Continuous Voltage Reverse Voltage	**BC107**	6V
		BC108, BC109	5V
I_C	Continuous Collector Current		100mA
I_{CM}	Peak Collector Current		200mA
P_{tot}	Power Dissipation @ T_{amb} = 25°C		300mW
T_{amb}	Ambient Operating Temperature Range		-65 to +175°C
T_{stg}	Storage Temperature Range		-65 to +175°C

SEME LAB

BC107
BC108
BC109

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

	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CBO(1)}$	Collector-Base Leakage Current	V_{CB} = 45V **BC107** V_{CB} = 25V **BC108, BC109**			15 15	nA
$I_{CBO(1)}$	Collector-Emitter Leakage Current @Tamb =125°C	V_{CB} = 45V **BC107** V_{CB} = 25V **BC108, BC109**			4 4	µA
I_{EBO}	Emitter Cut-off Current	V_{EB} = 4V I_C = 0			1	µA
h_{21E}	Static Forward Current Transfer Ratio	V_{CE} = 5V I_C = 2mA **Group A** **BC107, BC108** **Group B** **All Types** **Group C** **BC108, BC109** **BC107** **BC108** **BC109**	 110 180 380 110 110 180		 220 460 800 460 800 800	
V_{BE}	Base – Emitter Breakdown	V_{CE} = 5V I_C = 2mA			0.7	V
$V_{BE(sat)(1)}$	Base – Emitter Saturation Voltage	I_B = 0.5mA I_C = 10mA			0.83	V
$V_{CE(sat)(1)}$	Collector – Emitter Saturation Voltage	I_B = 0.5mA I_C = 10mA			0.25	V
f_T	Transition Frequency	V_{CE} = 5V I_C = 10mA f = 100MH$_z$	150			MHz
F	Noise Factor	V_{CE} = 5V I_C = 0.2mA R = 2kΩ f =1kH$_z$ ΔF=200H$_z$ **BC109** **BC107, BC108**			 4 10	dB
h_{21e}	Small Signal Forward Current Transfer Ratio	V_{CE} = 5V I_C = 2mA f =100kH$_z$ **Group A** **BC107, BC108** **Group B** **All Types** **Group C** **BC108, BC109** **BC107** **BC108** **BC109**	 125 240 450 125 125 240		 260 500 900 500 900 900	
h_{11e}	Common Emitter Input Impedance	V_{CE} = 5V I_C = 2mA f = 1kH$_z$ **Group A** **BC107, BC108** **Group B** **All Types** **Group C** **BC108, BC109**	 1.6 3.2 6.0		 4.5 8.5 15	kΩ
h_{22e}	Common Emitter Output Admittance	V_{CE} = 5V I_C = 2mA f = 1kH$_z$ **Group A** **BC107, BC108** **Group B** **All Types** **Group C** **BC108, BC109**			 30 60 110	µS
C_{22b}	Common Base Output Capacitance	V_{CB} = 10V f = 1MH$_z$			6	pF
$R_{th(j\text{-}amb)}$	Thermal Resistance: Junction to Ambient				500	°C/W

SGS-THOMSON MICROELECTRONICS

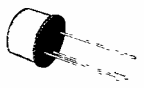
S G S-THOMSON

BC107
BC108-BC109

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.



TO-18

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 $T_{amb} \leq 25$ °C at $T_{case} \leq 25$ °C	0.3 0.75			W W
T_{stg}	Storage Temperature	– 55 to 175			°C
T_j	Junction Temperature	175			°C

THERMAL DATA

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

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C unless otherwise specified)

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

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

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

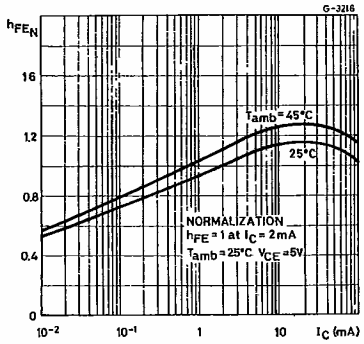
* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

ELECTRICAL CHARACTERISTICS (continued)

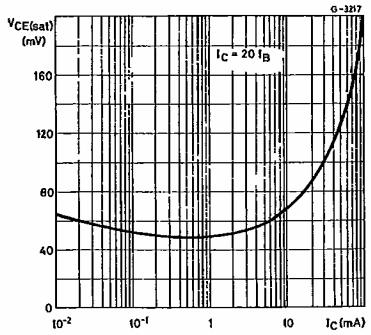
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
h_{re}	Reverse Voltage Ratio	I_C = 2 mA V_{CE} = 5 V f = 1 kHz				
		for **BC107**		$2.2x10^{-4}$		
		for **BC107** Gr. A		$1.7x10^{-4}$		
		for **BC107** Gr. B		$2.7x10^{-4}$		
		for **BC108**		$3.1x10^{-4}$		
		for **BC108** Gr. A		$1.7x10^{-4}$		
		for **BC108** Gr. B		$2.7x10^{-4}$		
		for **BC108** Gr. C		$3.8x10^{-4}$		
		for **BC109**		$3.1x10^{-4}$		
		for **BC109** Gr. B		$2.7x10^{-4}$		
		for **BC109** Gr. C		$3.8x10^{-4}$		
h_{oe}	Output Admittance	I_C = 2 mA V_{CE} = 5 V f = 1 kHz				
		for **BC107**		20		µS
		for **BC107** Gr. A		13		µS
		for **BC107** Gr. B		26		µS
		for **BC108**		30		µS
		for **BC108** Gr. A		13		µS
		for **BC108** Gr. B		26		µS
		for **BC108** Gr. C		34		µS
		for **BC109**		30		µS
		for **BC109** Gr. B		26		µS
		for **BC109** Gr. C		34		µS

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

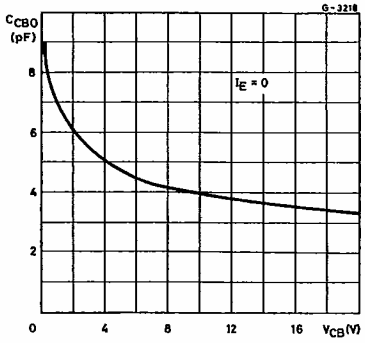
DC Normalized Current Gain.



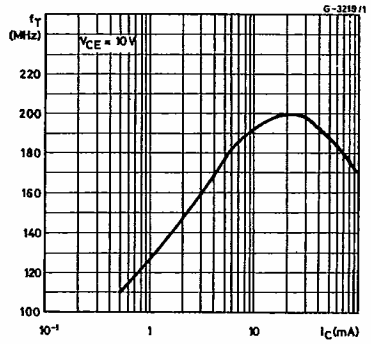
Collector--emitter Saturation Voltage.



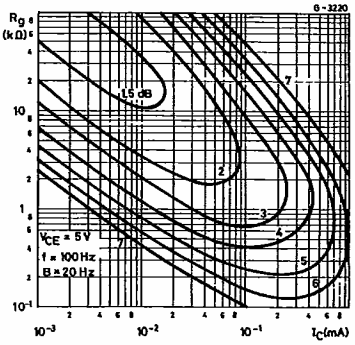
Collector-base Capacitance.



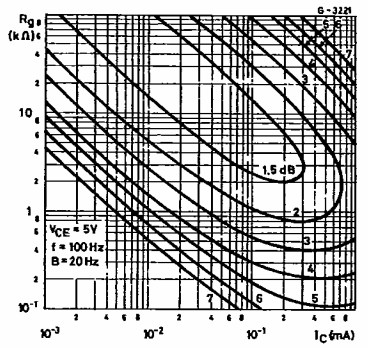
Transition Frequency



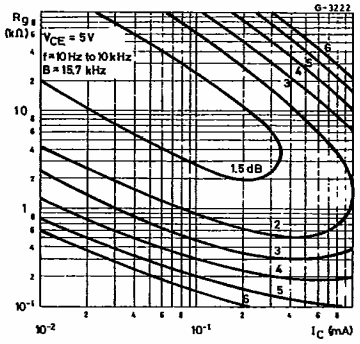
Noise Figure (for **BC 109** only).



Noise Figure (for **BC 109** only).



Noise Figure (for **BC 109** only).



Power Rating Chart.