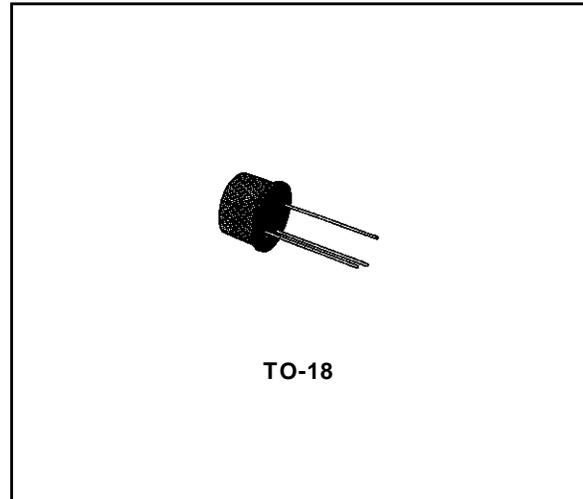


**LOW NOISE AUDIO AMPLIFIERS**

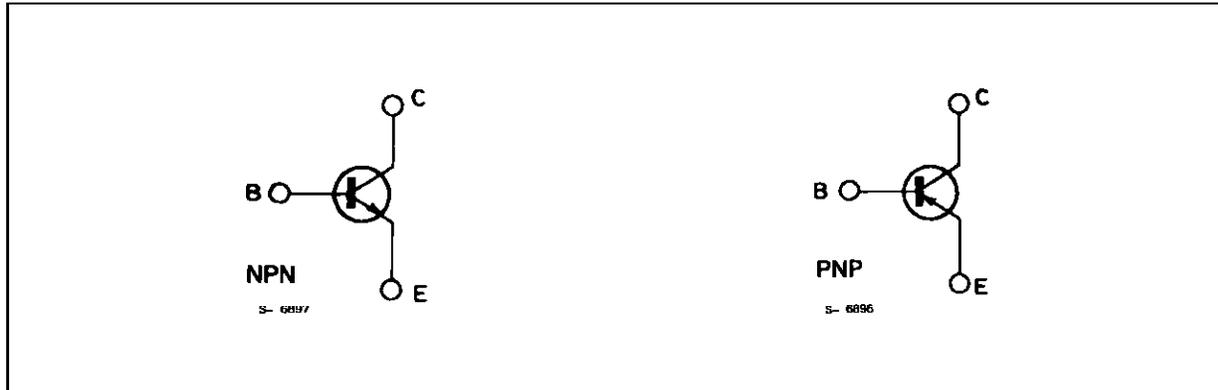
**DESCRIPTION**

The BCY58 and BCY59 are silicon planar epitaxial NPN transistors in Jedec TO-18 metal case.

They are intended for use in audio input stages, driver stages and low-noise input stages. The complementary PNP types are respectively the BCY78 and BCY79.



**INTERNAL SCHEMATIC DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value		Unit
		BCY58	BCY59	
$V_{CES}$	Collector-emitter Voltage ( $V_{BE} = 0$ )	32	45	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	32	45	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	7		V
$I_C$	Collector Current	200		mA
$I_B$	Base Current	50		mA
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$ at $T_{case} \leq 45\text{ }^\circ\text{C}$	0.39 1		mW W
$T_{stg}, T_j$	Storage and Junction Temperature	- 65 to 200		$^\circ\text{C}$

## BCY58-BCY59

### THERMAL DATA

$R_{th\ j-case}$	Thermal Resistance Junction-case	Max	150	$^{\circ}C/W$
$R_{th\ j-amb}$	Thermal Resistance Junction-ambient	Max	450	$^{\circ}C/W$

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$I_{CES}$	Collector Cutoff Current ( $V_{BE} = 0$ )	For <b>BCY58</b> $V_{CE} = 32\ V$ $V_{CE} = 32\ V$ For <b>BCY59</b> $V_{CE} = 45\ V$ $V_{CE} = 45\ V$ $T_{amb} = 150^{\circ}C$ $T_{amb} = 150^{\circ}C$		0.1 0.1 0.1 0.1	10 10 10 10	nA $\mu A$ nA $\mu A$
$I_{CEX}$	Collector Cutoff Current ( $V_{BE} = -0.2\ V$ )	For <b>BCY58</b> $V_{CE} = 32\ V$ For <b>BCY59</b> $V_{CE} = 45\ V$ $T_{amb} = 100^{\circ}C$ $T_{amb} = 100^{\circ}C$			20 20	$\mu A$ $\mu A$
$I_{EBO}$	Emitter cutoff Current ( $I_C = 0$ )	$V_{EB} = 5\ V$			10	nA
$V_{(BR)CEO}^*$	Collector-emitter Breakdown Voltage ( $I_B = 0$ )	$I_C = 2\ mA$ For <b>BCY58</b> For <b>BCY59</b>	32 45			V V
$(BR)EBO^*$	Emitter-base Breakdown Voltage ( $I_C = 0$ )	$I_E = 10\ \mu A$	7			V
$V_{CE(sat)}^*$	Collector-Emitter Saturation Voltage	$I_C = 10\ mA$ $I_B = 0.25\ mA$ $I_C = 100\ mA$ $I_B = 2.5\ mA$		0.12 0.4	0.35 0.7	V V
$V_{BE}$	Base-emitter Voltage	$I_C = 2\ mA$ $V_{CE} = 5\ V$ $I_C = 100\ mA$ $V_{CE} = 1\ V$	0.55	0.65 0.75	0.7	V V
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10\ mA$ $I_B = 0.25\ mA$ $I_C = 100\ mA$ $I_B = 2.5\ mA$	0.6 0.75	0.7 0.9	0.85 1.2	V V
$h_{FE}^*$	DC Current Gain	$I_C = 10\ \mu A$ $V_{CE} = 5\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $I_C = 2\ mA$ $V_{CE} = 5\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $I_C = 10\ mA$ $V_{CE} = 1\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $I_C = 100\ mA$ $V_{CE} = 1\ V$ Gr.VII Gr.VIII Gr.IX Gr.X		195 100 20 40 100 120 120 180 250 380 80 80 120 160 240 40 40 45 60 60		630 220 310 460 630

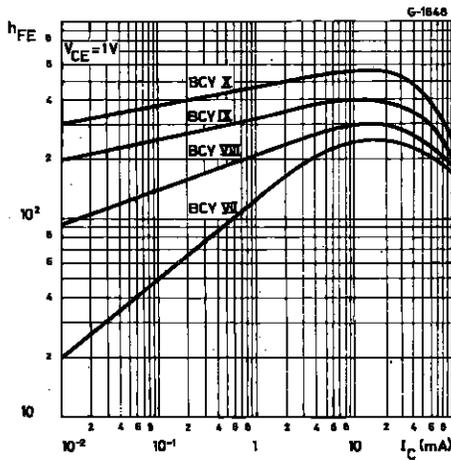
\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.

**ELECTRICAL CHARACTERISTICS** (continued)

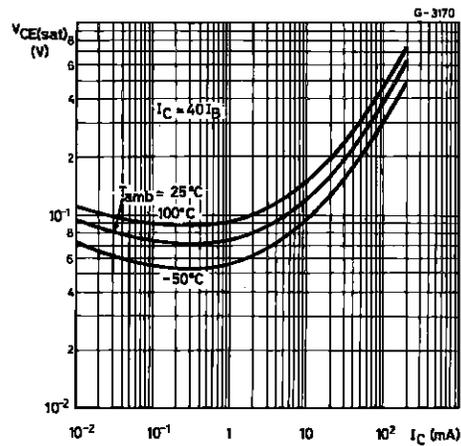
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$h_{fe}$	Small Signal Current Gain	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ Gr.VII Gr.VIII Gr.IX Gr.X	125 125 175 250 350		250 350 500 700	
$f_T$	Transition Frequency	$I_C = 10 \text{ mA}$ $f = 100 \text{ MHz}$ $V_{CE} = 5 \text{ V}$		200		MHz
$C_{EBO}$	Emitter-base Capacitance	$I_C = 0$ $f = 1 \text{ MHz}$ $V_{EB} = 0.5 \text{ V}$		11	15	pF
$C_{CBO}$	Collector-base Capacitance	$I_E = 0$ $f = 1 \text{ MHz}$ $V_{CB} = 10 \text{ V}$		3.5	6	pF
NF	Noise Figure	$I_C = 0.2 \text{ mA}$ $R_g = 2 \text{ k}\Omega$ $V_{CE} = 5 \text{ V}$ $f = 1 \text{ kHz}$		2	6	dB
$t_{on}$	Turn-on Time	$I_C = 10 \text{ mA}$ $I_{B1} = 1 \text{ mA}$ $I_C = 100 \text{ mA}$ $I_{B1} = 10 \text{ mA}$ $V_{CC} = 10 \text{ V}$		85 55	150 150	ns
$t_{off}$	Turn-off Time	$I_C = 10 \text{ mA}$ $I_{B1} = -I_{B2} = 1 \text{ mA}$ $I_C = 100 \text{ mA}$ $I_{B1} = -I_{B2} = 10 \text{ mA}$ $V_{CC} = 10 \text{ V}$		480 480	800 800	ns

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

DC Current Gain.

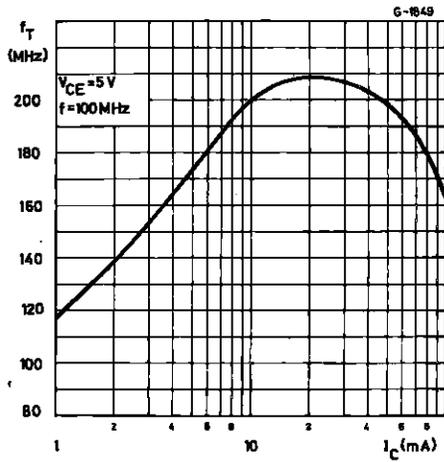


Collector-emitter Saturation Voltage.

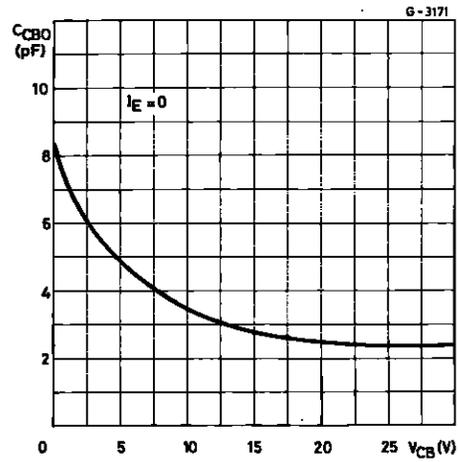


# BCY58-BCY59

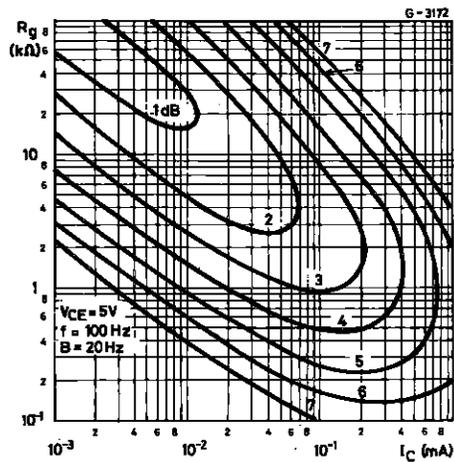
Transition Frequency.



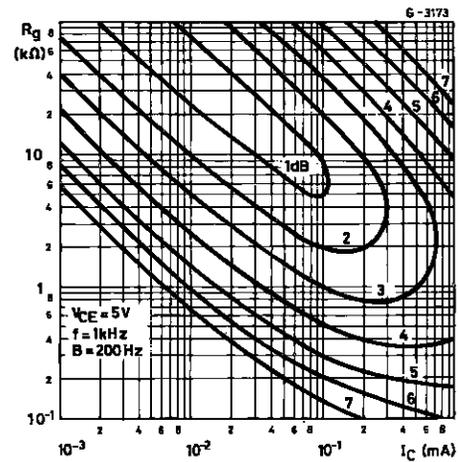
Collector-base Capacitance.



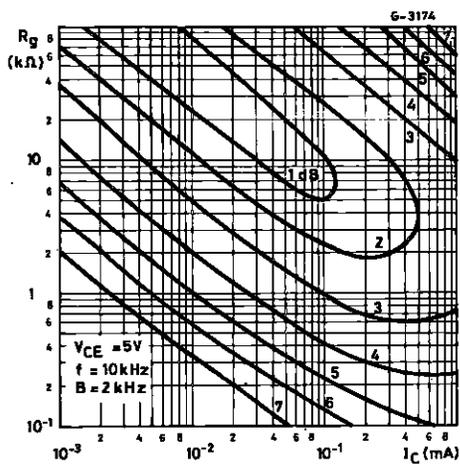
Noise Figure ( $f = 100\text{ Hz}$ ).



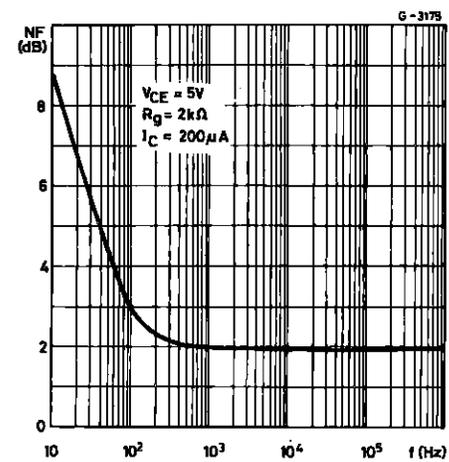
Noise Figure ( $f = 1\text{ kHz}$ ).



Noise Figure ( $f = 10\text{ kHz}$ ).

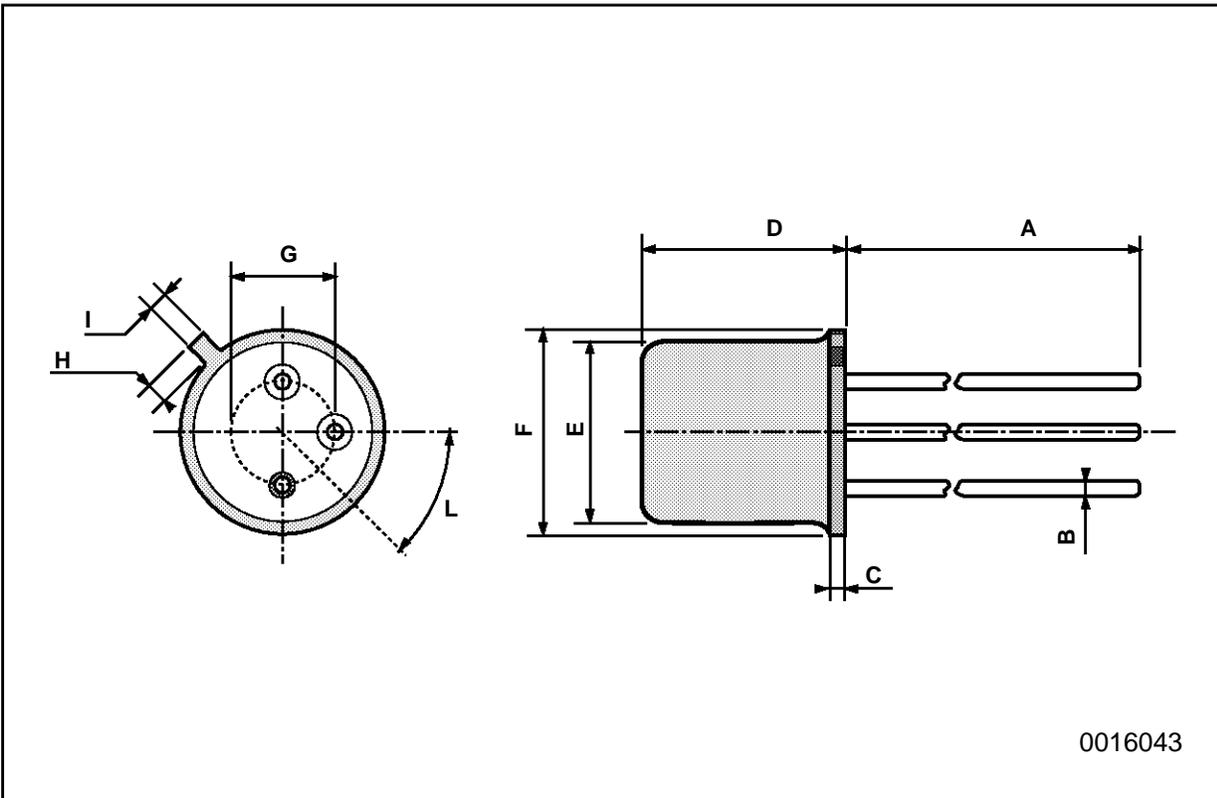


Noise Figure vs. Frequency.



**TO-18 MECHANICAL DATA**

DIM.	mm			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A		12.7			0.500	
B			0.49			0.019
D			5.3			0.208
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			1.16			0.045
L	45°			45°		



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