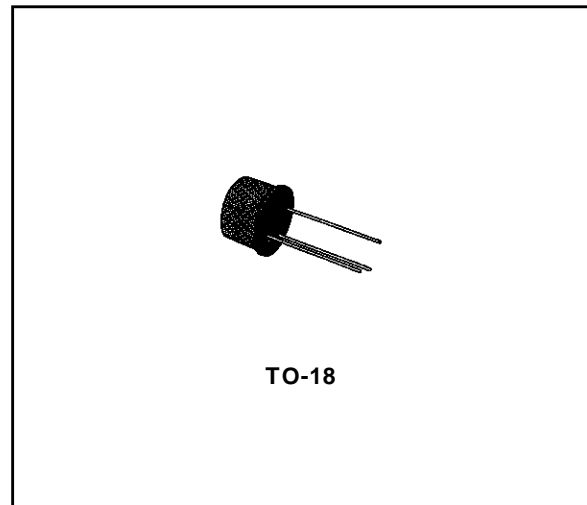


**LOW NOISE AUDIO AMPLIFIERS**

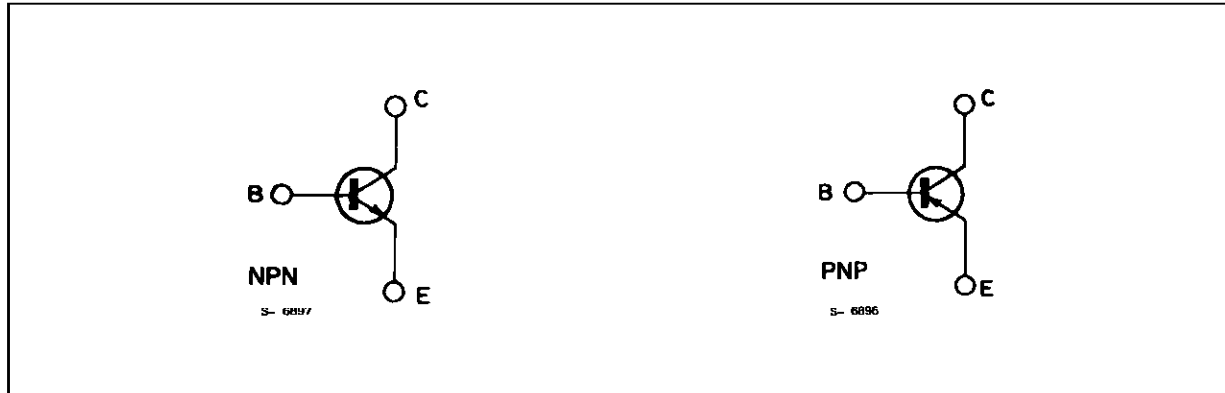
**DESCRIPTION**

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		mW
		1		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	$I_C = 10\ mA$ $I_C = 100\ mA$	$I_B = 0.25\ mA$ $I_B = 2.5\ mA$	0.12 0.4	0.35 0.7	V V	
$V_{BE}$	Base-emitter Voltage	$I_C = 2\ mA$ $I_C = 100\ mA$	$V_{CE} = 5\ V$ $V_{CE} = 1\ V$	0.55 0.75	0.65 0.7	V V	
$V_{BE(sat)}^*$	Base-emitter Saturation Voltage	$I_C = 10\ mA$ $I_C = 100\ mA$	$I_B = 0.25\ mA$ $I_B = 2.5\ mA$	0.6 0.75	0.7 0.9	0.85 1.2	V V
$h_{FE}^*$	DC Current Gain	$I_C = 10\ \mu A$ $I_C = 2\ mA$ $I_C = 10\ mA$ $I_C = 100\ mA$	$V_{CE} = 5\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $V_{CE} = 5\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $V_{CE} = 1\ V$ Gr.VII Gr.VIII Gr.IX Gr.X $V_{CE} = 1\ V$ 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	195 100 140 195 280 350 170 250 350 500 365 175 260 365 520	630 220 310 460 630	

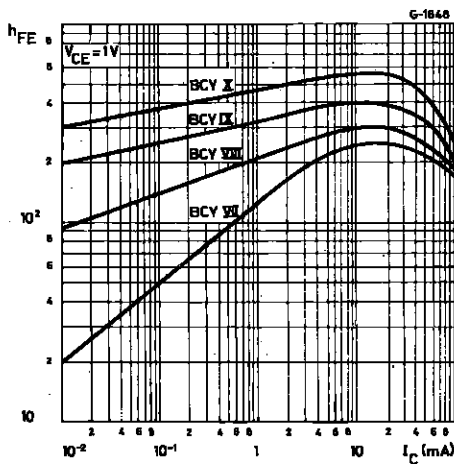
\* Pulsed : pulse duration = 300  $\mu s$ , duty cycle = 1 %.

**ELECTRICAL CHARACTERISTICS** (continued)

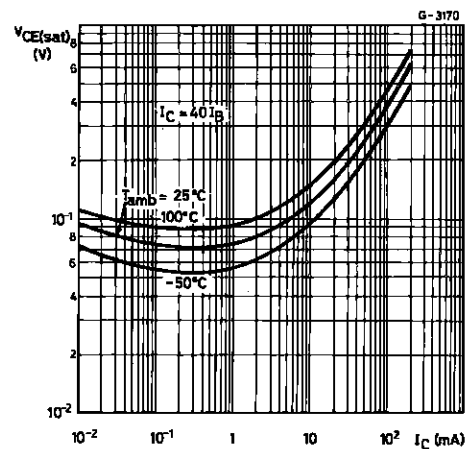
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$h_{fe}$	Small Signal Current Gain	$I_C = 2 \text{ mA}$ $f = 1 \text{ kHz}$ $V_{CE} = 5 \text{ V}$ Gr.VII Gr.VIII Gr.IX Gr.X	125 125 175 250 350		250 350 500 700	
$f_T$	Transition Frequency	$I_C = 10 \text{ mA}$ $f = 100 \text{ MHz}$ $V_{CE} = 5 \text{ V}$		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.

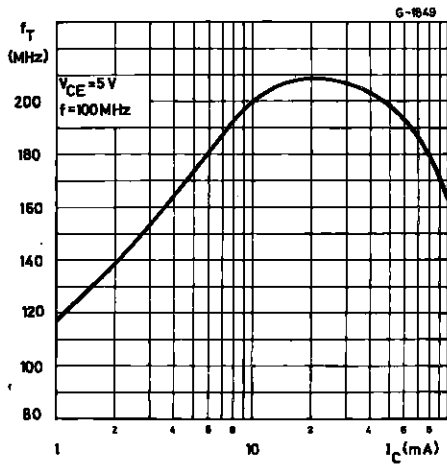


Collector-emitter Saturation Voltage.

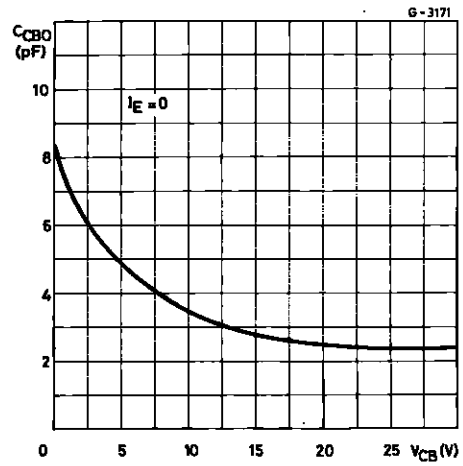


# BCY58-BCY59

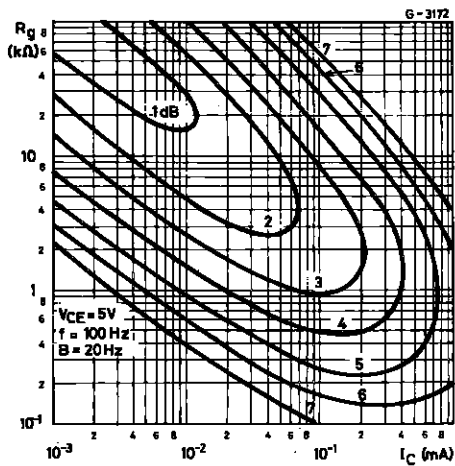
Transition Frequency.



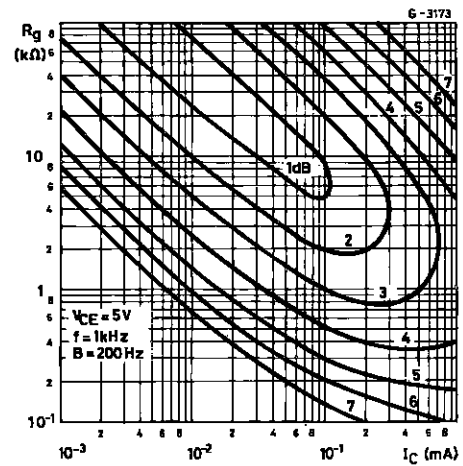
Collector-base Capacitance.



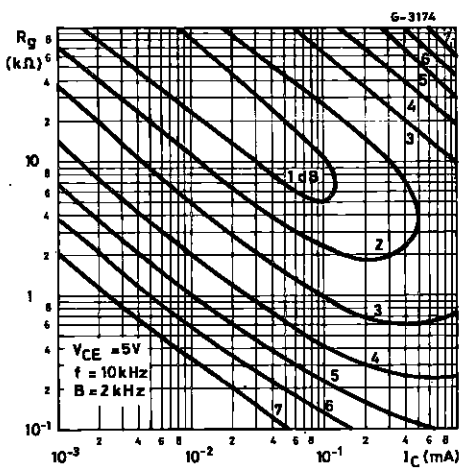
Noise Figure (f = 100 Hz).



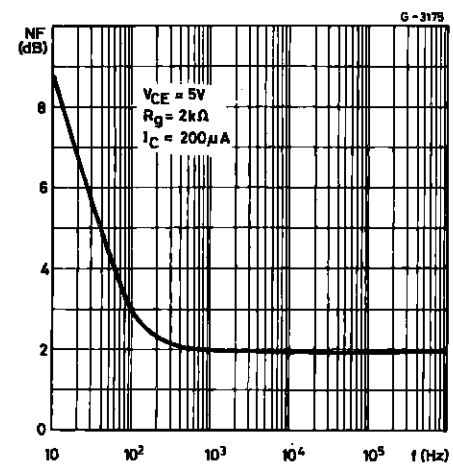
Noise Figure (f = 1 kHz).



Noise Figure (f = 10 kHz).

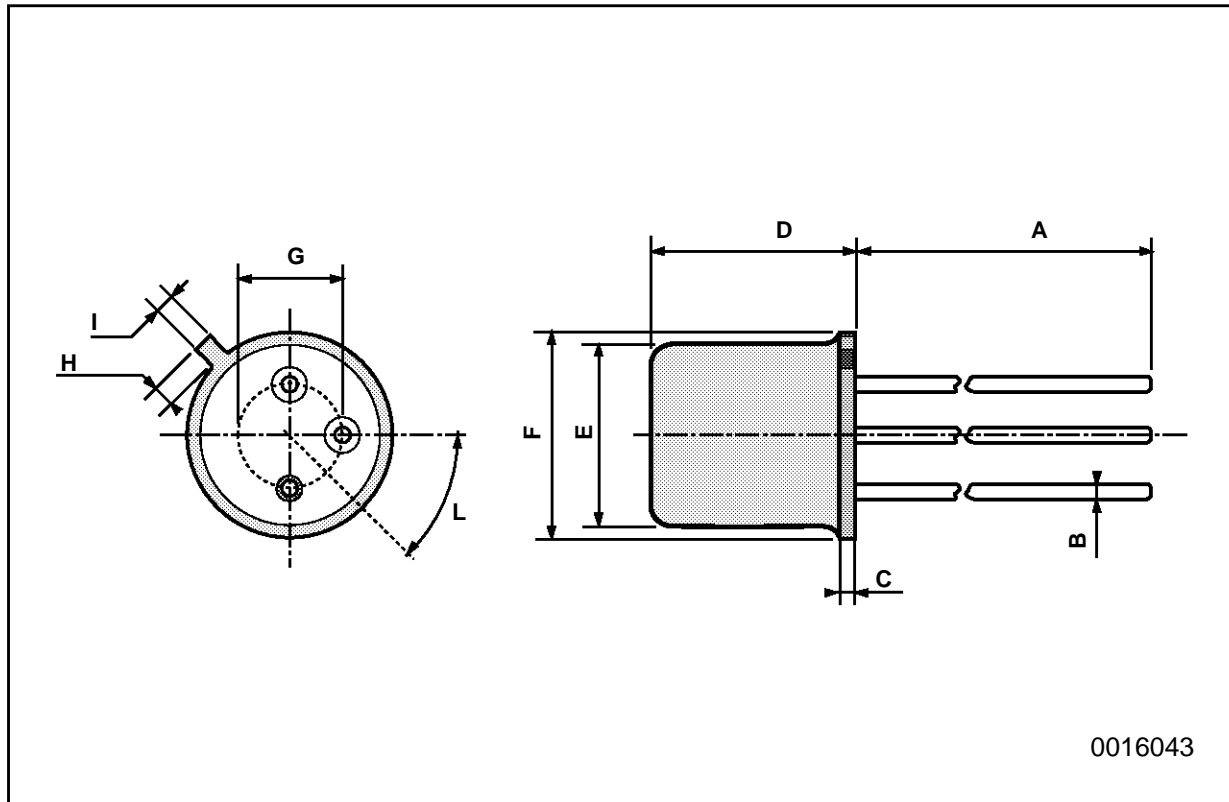


Noise Figure vs. Frequency.



**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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