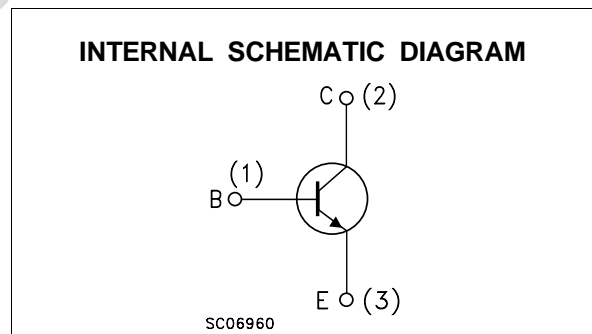
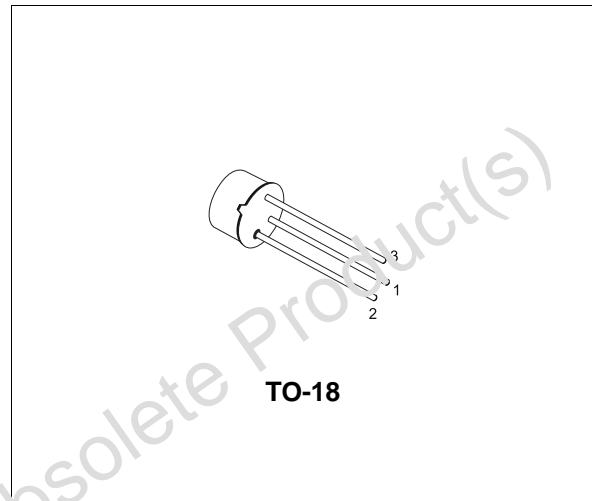


SMALL SIGNAL NPN TRANSISTOR

DESCRIPTION

The BCY59 is a silicon Planar Epitaxial NPN transistor in Jedec TO-18 metal case. It is intended for use in audio input stages, driver stages and low-noise input stages.

The PNP complementary type is BCY79.



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CES}	Collector-Emitter Voltage ($V_{BE} = 0$)	45	V
V_{CEO}	Collector-Emitter Voltage ($I_B = 0$)	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 Dissipation at $T_{amb} \leq 25\text{ }^\circ\text{C}$ at $T_C \leq 25\text{ }^\circ\text{C}$	0.39 1	W W
T_{stg}	Storage Temperature	-55 to 175	$^\circ\text{C}$
T_j	Max. Operating Junction Temperature	175	$^\circ\text{C}$

BCY59

THERMAL DATA

R _{thj-case}	Thermal Resistance Junction-Case	Max	150	°C/W
R _{thj-amb}	Thermal Resistance Junction-Ambient	Max	384.6	°C/W

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

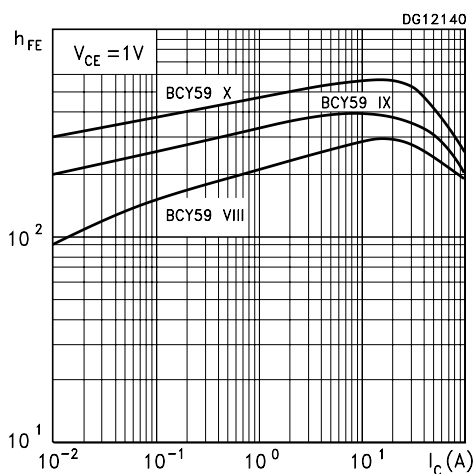
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CEs}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 45 V		0.1	10	nA
		V _{CE} = 45 V T _C = 150 °C		0.1	10	μA
I _{CEX}	Collector Cut-off Current (V _{BE} = -0.2 V)	V _{CE} = 45 V T _C = 100 °C			20	μA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	V _{EB} = 5 V			10	nA
V _{(BR)CEO*}	Collector-Emitter Breakdown Voltage (I _B = 0)	I _C = 2 mA	45			V
V _{(BR)EBO}	Emitter-Base Breakdown Voltage (I _C = 0)	I _E = 10 μA	7			V
V _{CE(sat)*}	Collector-Emitter Saturation Voltage	I _C = 10 mA I _B = 0.25 mA		0.12	0.35	V
		I _C = 100 mA I _B = 2.5 mA		0.4	0.7	V
V _{BE(sat)*}	Base-Emitter Saturation Voltage	I _C = 10 mA I _B = 0.25 mA	0.6	0.7	0.85	V
		I _C = 100 mA I _B = 2.5 mA	0.75	0.9	1.2	V
V _{BE(on)*}	Base-Emitter (on) 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
h _{FE*}	DC Current Gain	I _C = 10 μA V _{CE} = 5 V	Gr. VIII	20	140	
			Gr. IX	40	195	
			Gr. X	100	280	
		I _C = 2 mA V _{CE} = 5 V	Gr. VIII	180	250	310
			Gr. IX	250	350	460
			Gr. X	380	500	630
		I _C = 10 mA V _{CE} = 1 V	Gr. VIII	120	260	
			Gr. IX	160	365	
			Gr. X	240	520	
		I _C = 100 mA V _{CE} = 1 V	Gr. VIII	45		
			Gr. IX	60		
			Gr. X	60		
h _{fe*}	Small Signal Current Gain	I _C = 2 mA V _{CE} = 5 V f = 1 KHz	Gr. VIII	175	350	
			Gr. IX	250	500	
			Gr. X	350	700	
f _T	Transition Frequency	I _C = 10 mA V _{CE} = 5 V f = 100 MHz		200		MHz

* Pulsed: Pulse duration = 300 μs, duty cycle ≤ 1 %

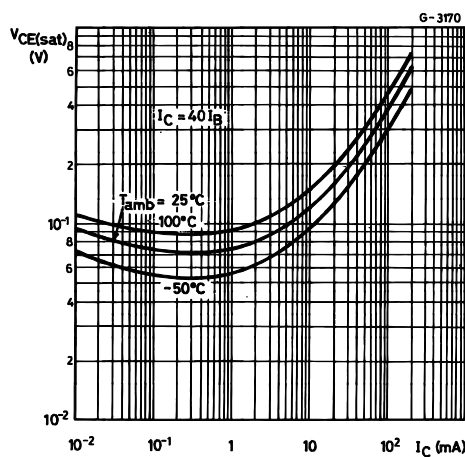
ELECTRICAL CHARACTERISTICS ($T_{case} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C_{CBO}	Collector-Base Capacitance	$I_E = 0$ $V_{CB} = 10\text{ V}$ $f = 1\text{ MHz}$		3.5	6	pF
C_{EBO}	Emitter-Base Capacitance	$I_C = 0$ $V_{EB} = 0.5\text{ V}$ $f = 1\text{ MHz}$		11	15	pF
NF	Noise Figure	$I_C = 0.2\text{ mA}$ $V_{CE} = 5\text{ V}$ $f = 1\text{ KHz}$ $R_g = 2\text{ K}\Omega$ $\Delta f = 200\text{ Hz}$		2	6	dB
t_{on}	Turn-on Time	$I_C = 10\text{ mA}$ $V_{CC} = 10\text{ V}$ $I_{B1} = 1\text{ mA}$ $I_C = 100\text{ mA}$ $V_{CC} = 10\text{ V}$ $I_{B1} = 10\text{ mA}$		85	150	ns
t_{off}	Turn-off Time	$I_C = 10\text{ mA}$ $V_{CC} = 10\text{ V}$ $I_{B1} = -I_{B2} = 1\text{ mA}$ $I_C = 100\text{ mA}$ $V_{CC} = 10\text{ V}$ $I_{B1} = -I_{B2} = 10\text{ mA}$		480	800	ns

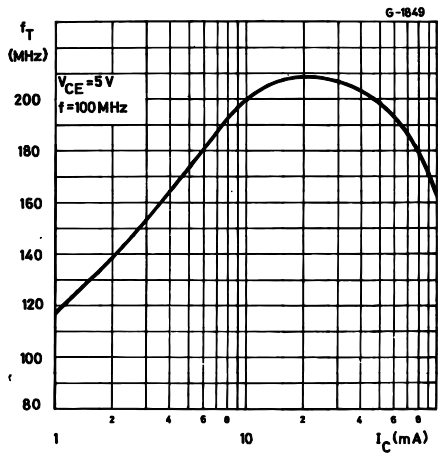
DC Current Gain



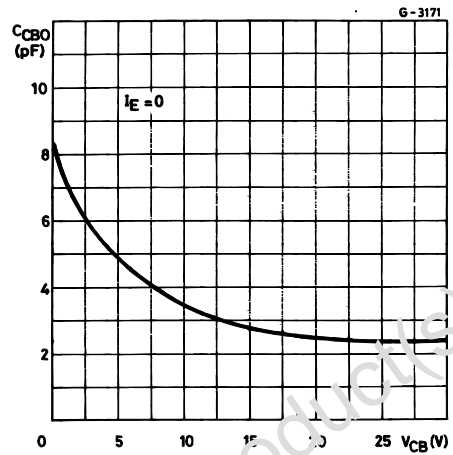
Collector-Emitter Saturation Voltage



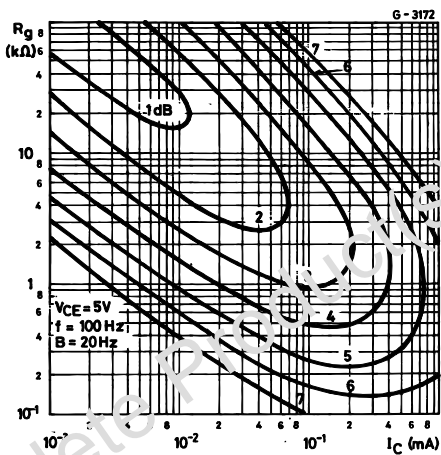
Transition Frequency



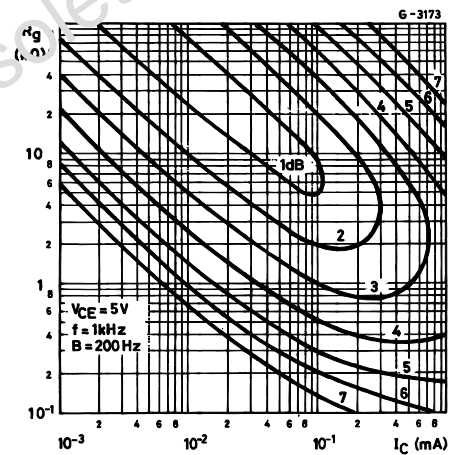
Collector-Base Capacitance



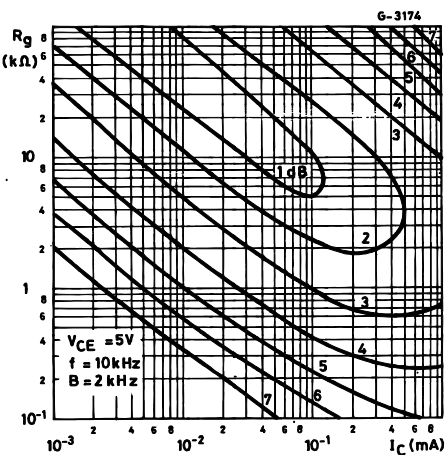
Noise Figure (f = 100 Hz)



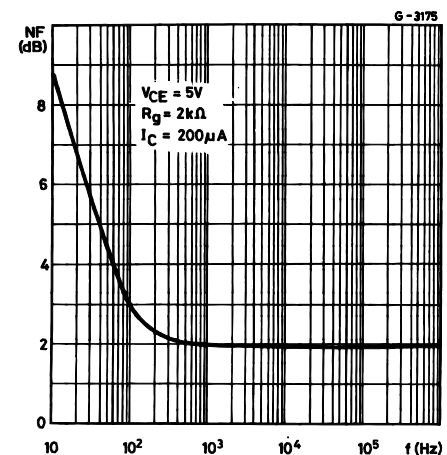
Noise Figure (f = 1 kHz)



Noise Figure (f = 10 kHz)

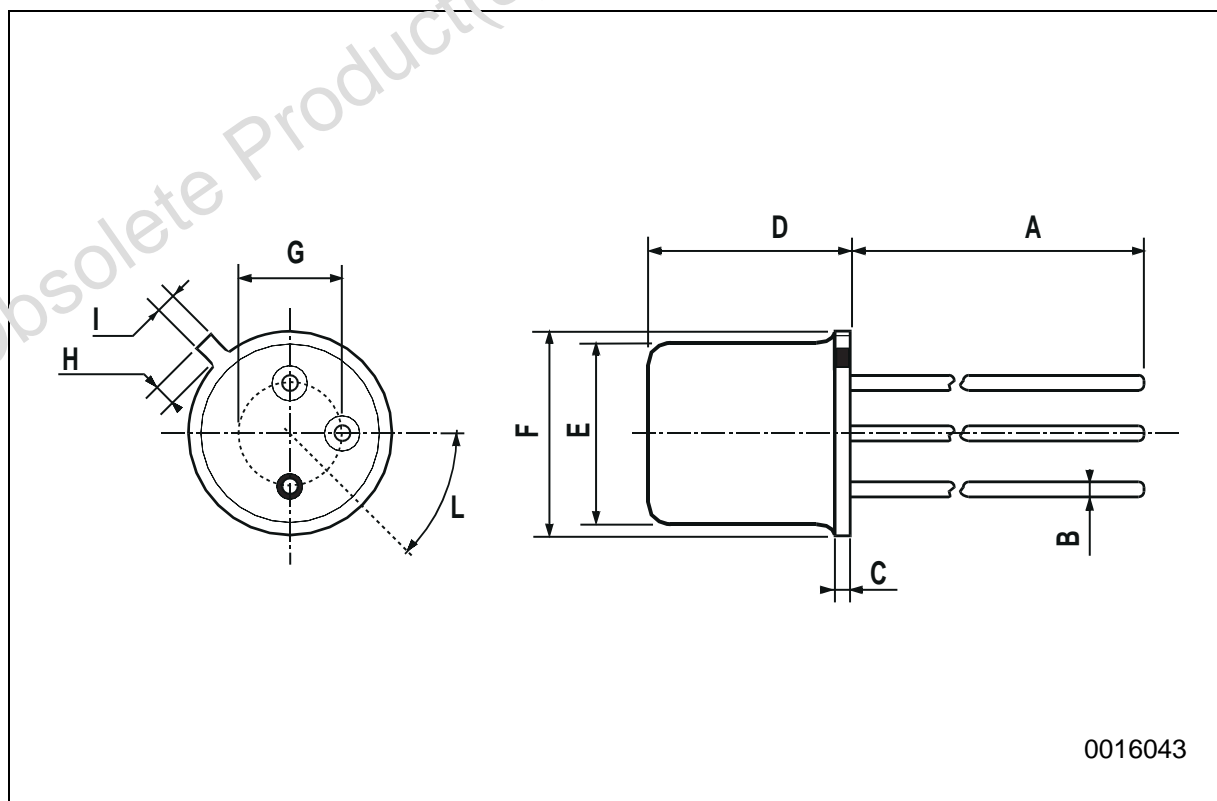


Noise Figure vs. Frequency



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			0.203
E			4.9			0.193
F			5.8			0.228
G	2.54			0.100		
H			1.2			0.047
I			.16			0.045
L	45°			45°		



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