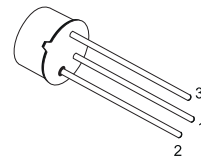


SMALL SIGNAL NPN TRANSISTOR

DESCRIPTION

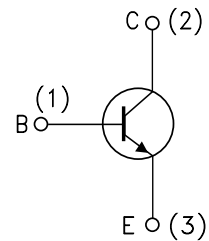
The BCY59 is a silicon Planar Epitaxial NPN transistor in Jedec TO-18 metal case. It is intended for use in audio input stages, driver stages and low-noise input stages.

The PNP complementary type is BCY79.



TO-18

INTERNAL SCHEMATIC DIAGRAM



SC06960

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	$^{\circ}\text{C}$

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)

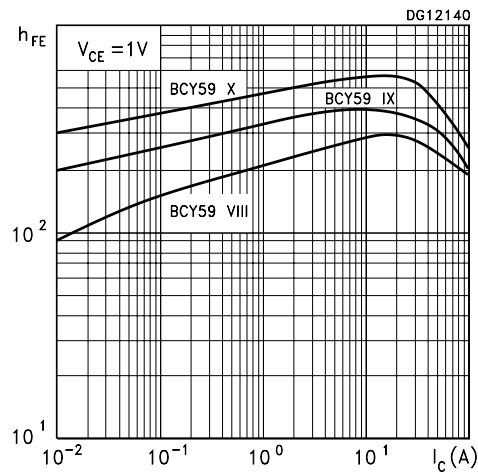
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I _{CES}	Collector Cut-off Current (V _{BE} = 0)	V _{CE} = 45 V V _{CE} = 45 V T _C = 150 °C		0.1 0.1	10 10	nA μA
I _{CEX}	Collector Cut-off Current (V _{BE} = -0.2 V)	V _{CE} = 45 V T _C = 100 °C			20	μA
I _{EBO}	Emitter Cut-off Current (I _C = 0)	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 I _C = 100 mA I _B = 2.5 mA		0.12 0.4	0.35 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
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 Gr. IX Gr. X I _C = 2 mA V _{CE} = 5 V Gr. VIII Gr. IX Gr. X I _C = 10 mA V _{CE} = 1 V Gr. VIII Gr. IX Gr. X I _C = 100 mA V _{CE} = 1 V Gr. VIII Gr. IX Gr. X	20 40 100 180 250 380 120 160 240 45 60 60	140 195 280 250 350 500 260 365 520	310 460 630	
h _{fe} *	Small Signal Current Gain	I _C = 2 mA V _{CE} = 5 V f = 1 KHz Gr. VIII Gr. IX Gr. X	175 250 350	350 500 700		
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 %

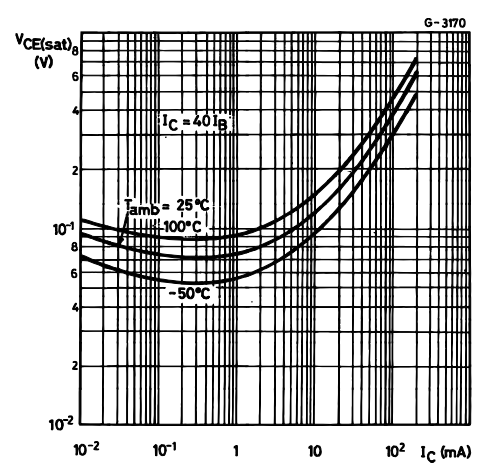
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
C _{CBO}	Collector-Base Capacitance	I _E = 0 V _{CB} = 10 V f = 1MHz		3.5	6	pF
C _{EBO}	Emitter-Base Capacitance	I _C = 0 V _{EB} = 0.5 V f = 1MHz		11	15	pF
NF	Noise Figure	I _C = 0.2 mA V _{CE} = 5 V f = 1KHz R _g = 2KΩ Δf = 200Hz		2	6	dB
t _{on}	Turn-on Time	I _C = 10 mA V _{CC} = 10 V I _{B1} = 1 mA I _C = 100 mA V _{CC} = 10 V I _{B1} = 10 mA		85 55	150 150	ns ns
t _{off}	Turn-off Time	I _C = 10 mA V _{CC} = 10 V I _{B1} = - I _{B2} = 1 mA I _C = 100 mA V _{CC} = 10 V I _{B1} = - I _{B2} = 10 mA		480 480	800 800	ns ns

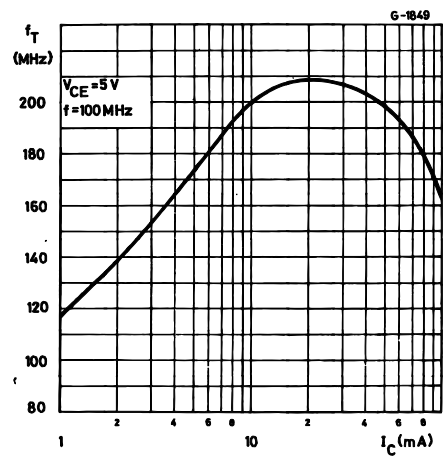
DC Current Gain



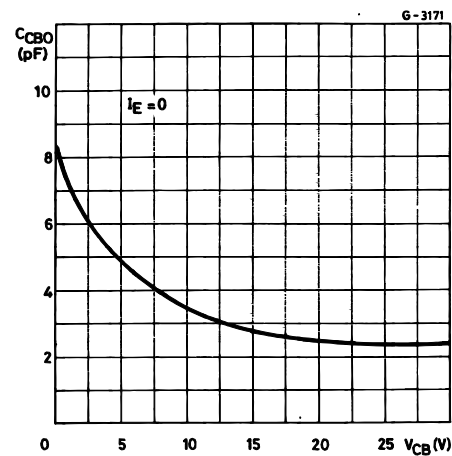
Collector-Emitter Saturation Voltage



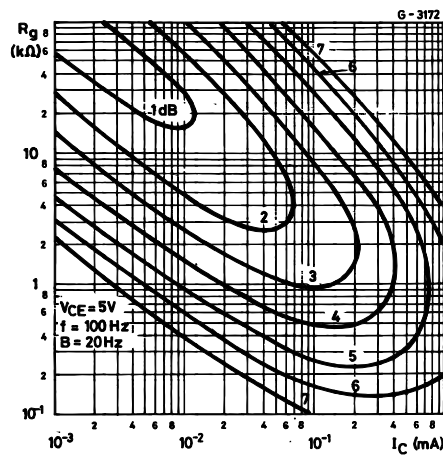
Transition Frequency



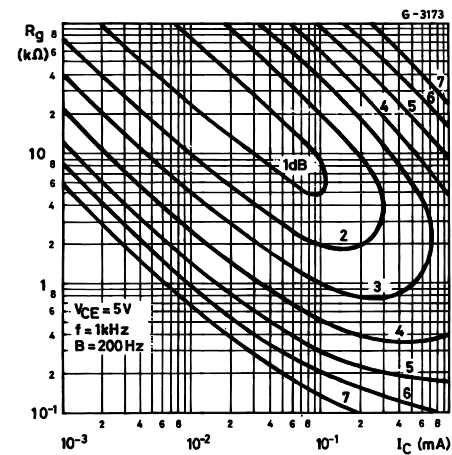
Collector-Base Capacitance



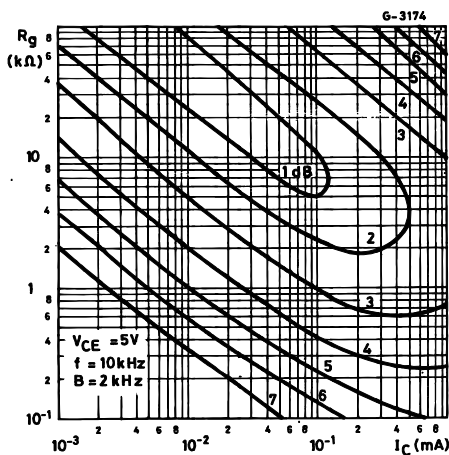
Noise Figure ($f = 100\text{ Hz}$)



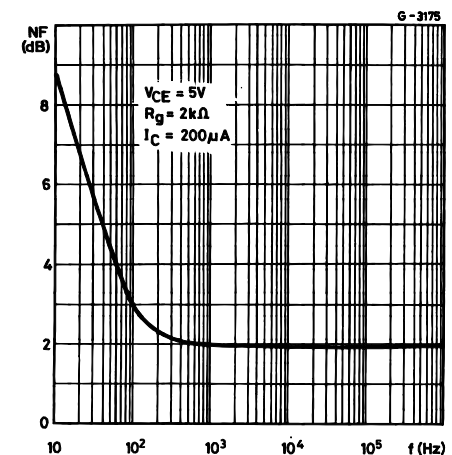
Noise Figure ($f = 1\text{ KHz}$)



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

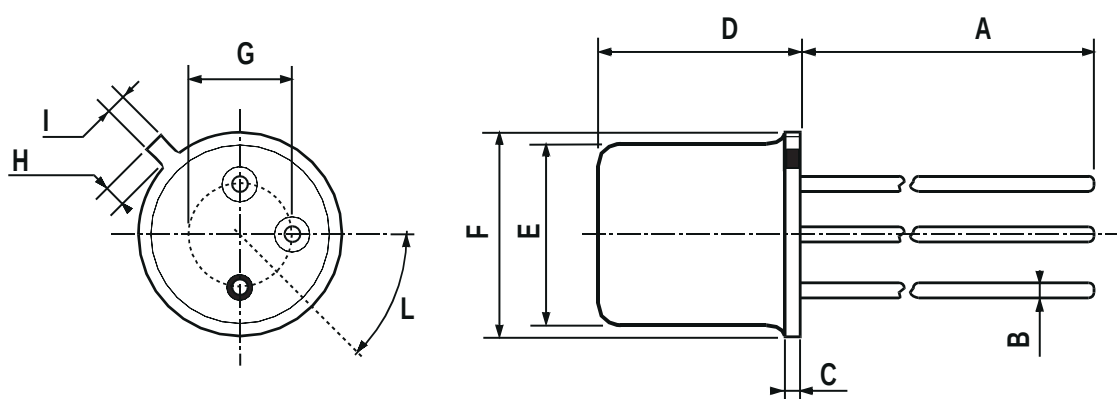


Noise Figure vs. Frequency



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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