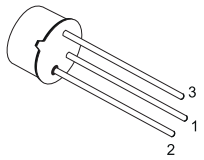
BCY59

SMALL SIGNAL NPN TRANSISTOR

DESCRIPTION

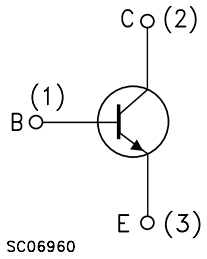
The BCY59 is a silicon Planar Epitaxial NPN transistor in Jedec TO-18 metal case. It is intented for use in audio input stages, driver stages and low-noise input stages.

The PNP complementary type Is BCY79.



TO-18

INTERNAL SCHEMATIC DIAGRAM



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 $T_{amb} \leq 25\ ^oC$ at $T_C \leq 25\ ^oC$	0.39 1	W W
T_{stg}	Storage Temperature	-55 to 175	^oC
T_j	Max. Operating Junction Temperature	175	^oC

THERMAL DATA

$R_{thj\text{-}case}$	Thermal Resistance Junction-Case Max	150	°C/W
$R_{thj\text{-}amb}$	Thermal Resistance Junction-Ambient Max	384.6	°C/W

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

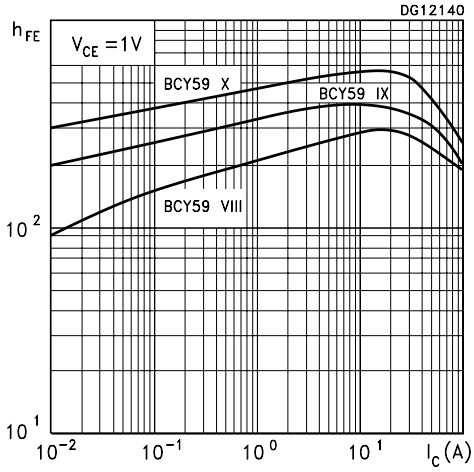
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cut-off Current (V_{BE} = 0)	V_{CE} = 45 V V_{CE} = 45 V T_C = 150 °C		0.1 0.1	10 10	nA µA
I_{CEX}	Collector Cut-off Current (V_{BE} = -0.2 V)	V_{CE} = 45 V T_C = 100 °C			20	µA
I_{EBO}	Emitter Cut-off Current (I_C = 0)	V_{EB} = 5 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 %

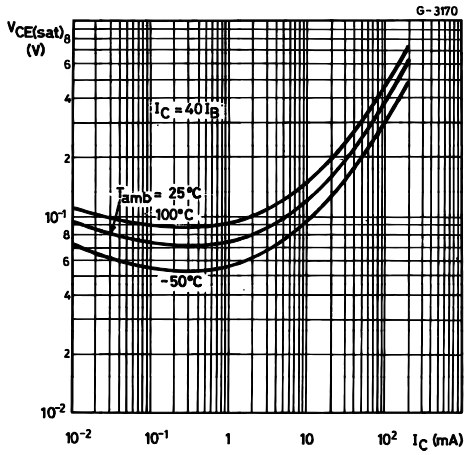
ELECTRICAL CHARACTERISTICS (T_{case} = 25 °C unless otherwise specified)

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

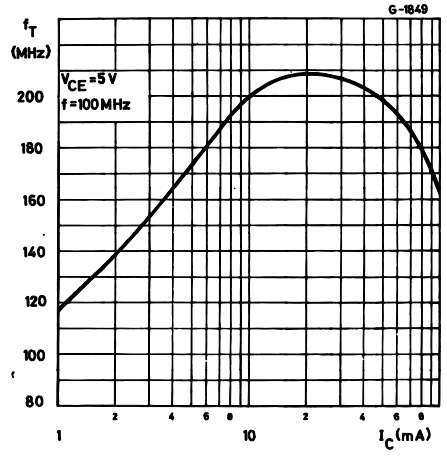
DC Current Gain



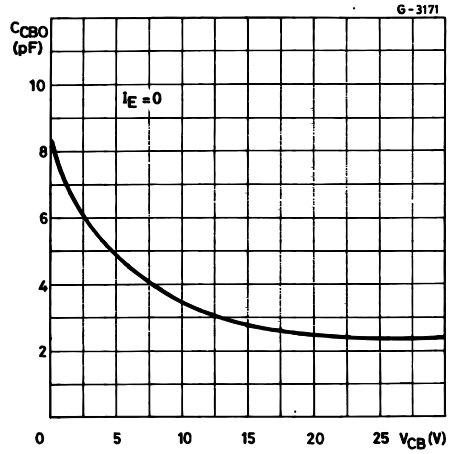
Collector-Emitter Saturation Voltage



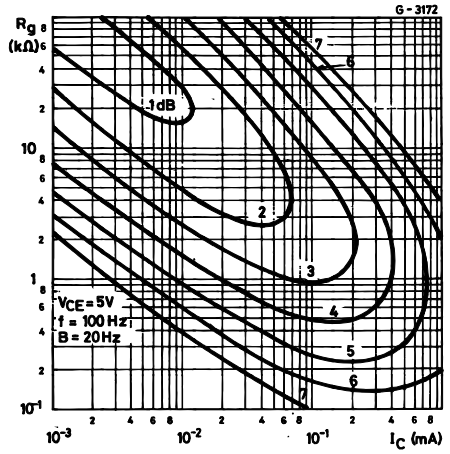
Transition Frequeny



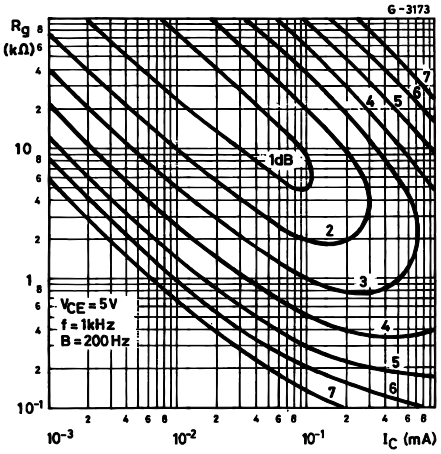
Collector-Base Capacitance



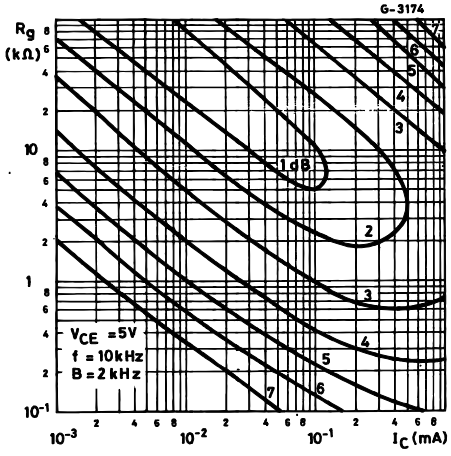
Noise Figure (f = 100 Hz)



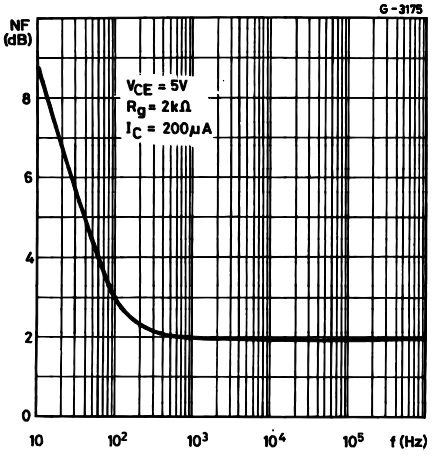
Noise Figure (f = 1 KHz)



Noise Figure (f = 10 KHz)

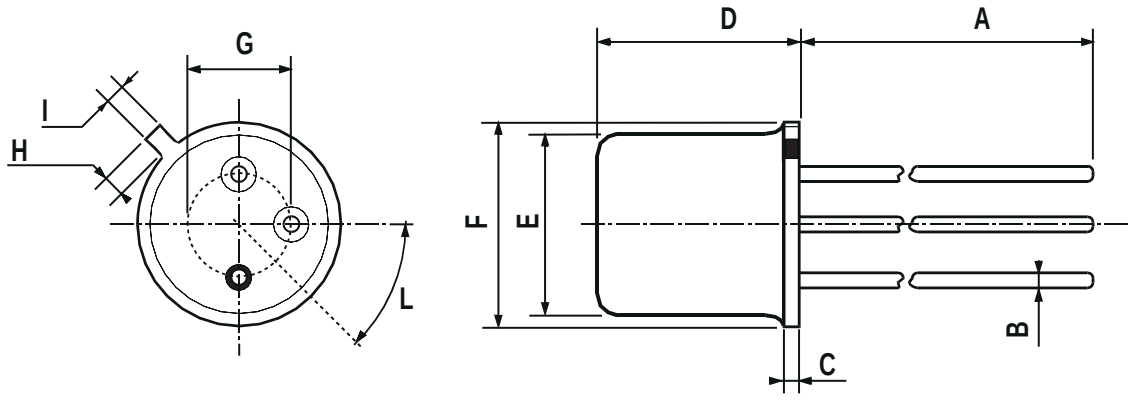


Noise Figure vs. Frequency



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^o			45^o		



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