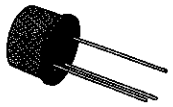
SGS-THOMSON MICROELECTRONICS

BCY70
BCY71/BCY72

GENERAL PURPOSE APPLICATIONS

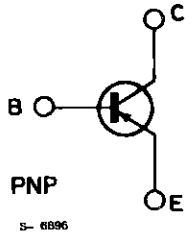
DESCRIPTION

The BCY70, BCY71 and BCY72 are silicon planar epitaxial PNP transistors in Jedec TO-18 metal case.



TO-18

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value			Unit
		BCY70	BCY71	BCY72	
V_{CBO}	Collector-base Voltage (I_E = 0)	– 50	– 45	– 25	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	– 40	– 45	– 25	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	– 5			V
I_{CM}	Collector Peak Current	– 200			mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C	350			mW
T_{stg}, T_j	Storage and Junction Temperature	– 65 to 200			°C

THERMAL DATA

$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	150	°C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	500	°C/W

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

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I_{CES}	Collector Cutoff Current (V_{BE} = 0)	For **BCY70**				
		V_{CE} = – 20 V			– 10	nA
		V_{CE} = – 50 V			– 500	nA
		For **BCY71**				
		V_{CB} = – 20 V			– 100	nA
		V_{CB} = – 45 V			– 10	µA
		For **BCY72**				
		V_{CB} = – 20 V			– 100	nA
		V_{CB} = – 25 V			– 10	µA
I_{EBO}	Emitter cutoff Current (I_C = 0)	V_{EB} = – 5 V			– 10	µA
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = – 10 mA I_B = – 1 mA			– 0.25	V
		I_C = – 50 mA I_B = – 5 mA			– 0.5	V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = – 10 mA I_B = – 1 mA				
		For **BCY70** and **BCY71** Only	– 0.6		– 0.9	V
		I_C = – 50 mA I_B = – 5 mA			– 1.2	V
h_{FE}*	DC Current Gain	For **BCY70**				
		I_C = – 0.1 mA V_{CE} = – 1 V	40			
		I_C = – 1 mA V_{CE} = – 1 V	45			
		I_C = – 10 mA V_{CE} = – 1 V	50			
		I_C = – 50 mA V_{CE} = – 1 V	15			
		For **BCY71**				
		I_C = – 0.01 mA V_{CE} = – 1 V		60		
		I_C = – 0.1 mA V_{CE} = – 1 V	80			
		I_C = – 1 mA V_{CE} = – 1 V	90			
		I_C = – 10 mA V_{CE} = – 1 V	100		600	
		I_C = – 50 mA V_{CE} = – 1 V	15			
		For **BCY72**				
		I_C = – 1 mA V_{CE} = – 1 V	40			
		I_C = – 10 mA V_{CE} = – 1 V	50			
h_{fe}	Small Signal Current Gain (for **BCY71** only)	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	100		400	
f_T	Transition Frequency	I_C = – 0.1 mA V_{CE} = – 20 V f = 10.7 MHz				
		For **BCY71**	15			MHz
		I_C = – 10 mA V_{CE} = – 20 V f = 100 MHz				
		For **BCY70**	250			MHz
		For **BCY70** and **BCY72**	200			MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 V_{EB} = – 1 V f = 1 MHz			8	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 V_{CB} = – 10 V f = 1 MHz			6	pF

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

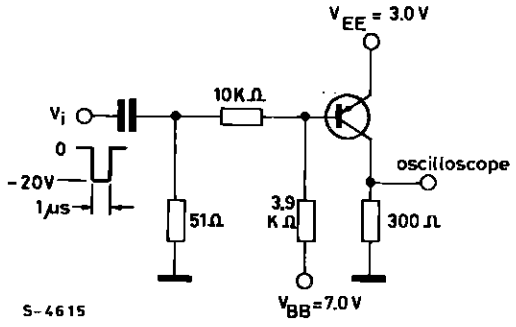
ELECTRICAL CHARACTERISTICS (continued)

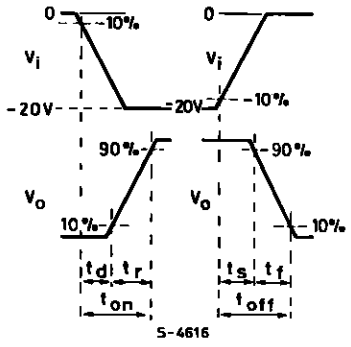
Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
NF	Noise Figure	I_C = – 0.1 mA V_{CE} = – 5 V R_g = 2 kΩ f = 10 to 10 000 Hz For **BCY70** and **BCY72** for **BCY71**			 6 2	 dB dB
h_{ie}	Input Impedance (for **BCY71** only)	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	2		12	kΩ
h_{re}	Reverse Voltage Ratio (for **BCY71** only)	I_C = – 1 mA V_{CE} = – 10 V f = 1kHz			$20x10^{-4}$	
h_{oe}	Output Admittance (for **BCY71** only)	I_C = – 1 mA V_{CE} = – 10 V f = 1 kHz	10		60	µS
t_d	Delay Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – 1 mA		23	35	ns
t_r	Rise Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – 1 mA		25	35	ns
t_s	Storage Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – I_{B2} = – 1 mA		270	350	ns
t_f	Fall Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – I_{B2} = – 1 mA		50	80	ns
t_{on}	Turn-on Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – 1 mA		48	65	ns
t_{off}	Turn-off Time (for **BCY70** and **BCY72** only)	I_C = – 10 mA V_{EE} = 3 V I_{B1} = – I_{B2} = – 1 mA		320	420	ns

* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

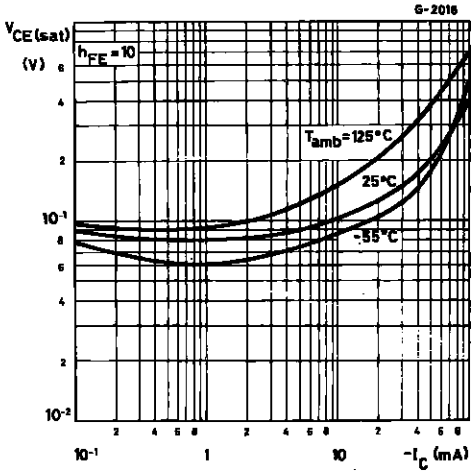
TEST CIRCUIT

Test Circuit for Switching Times.

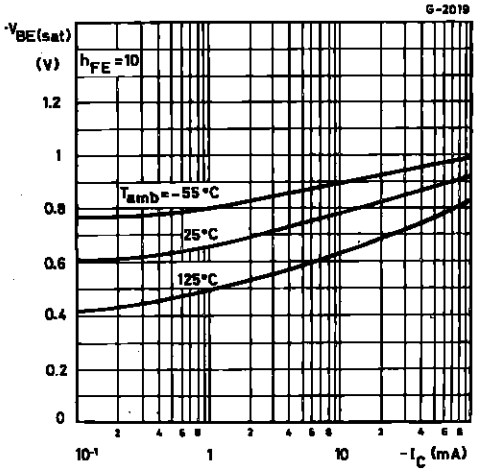




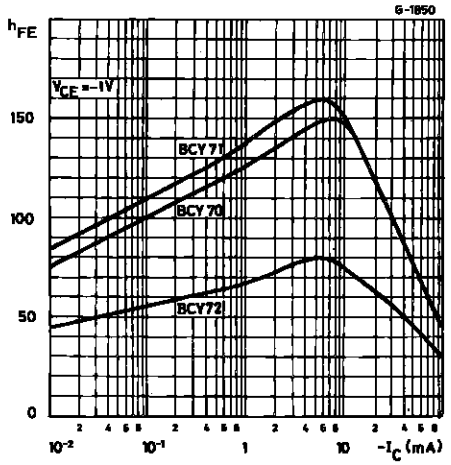
Collector-emitter Saturation Voltage.



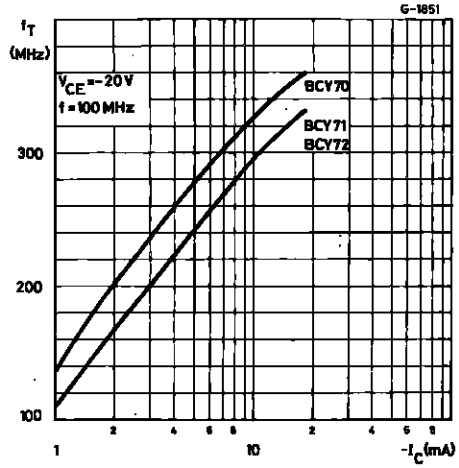
Base-emitter Saturation Voltage.



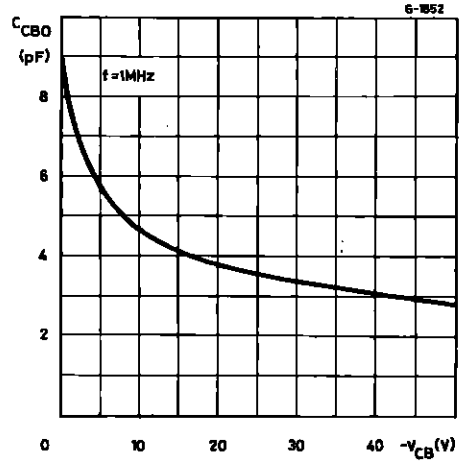
DC Current Gain.



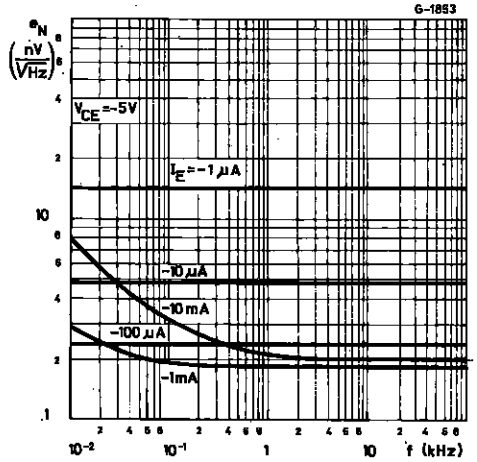
Transition Frequency.



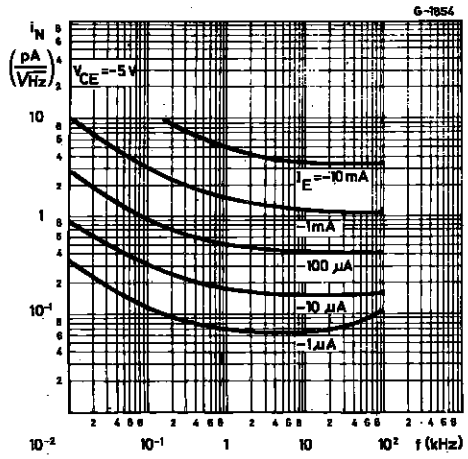
Collector-base Capacitance.



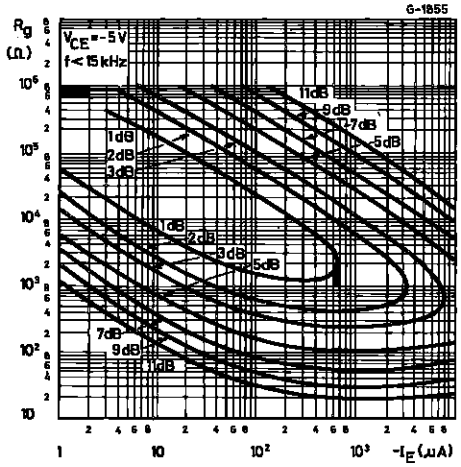
Equivalent Input Noise Voltage (for BCY71 only).



Equivalent Input Noise Current (for BCY71 only).

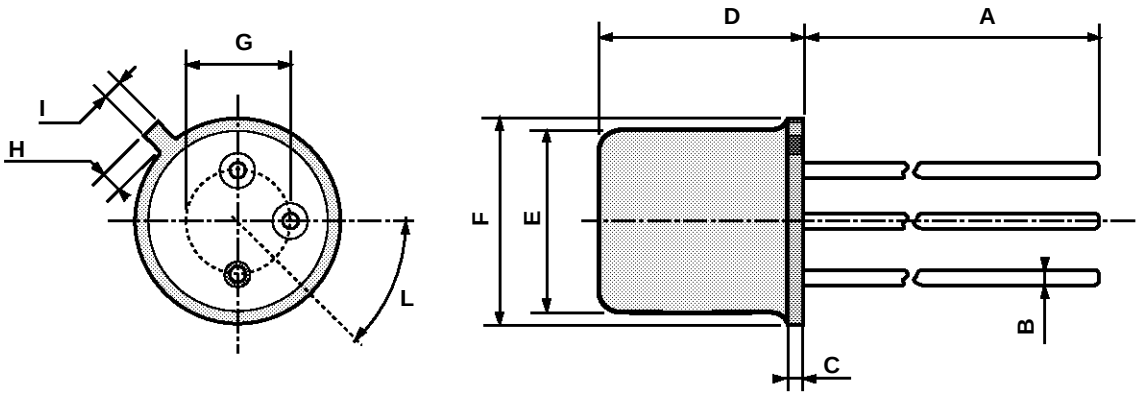


Countours of Constant White Noise Figure (for BCY71 only).



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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