SGS-THOMSON MICROELECTRONICS

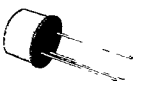
S G S-THOMSON

BCY70
BCY71/BCY72

GENERAL PURPOSE APPLICATIONS

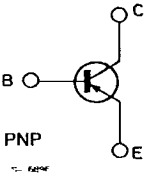
DESCRIPTION

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

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

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 V_{CE} = − 50 V For **BCY71** V_{CB} = − 20 V V_{CB} = − 45 V For **BCY72** V_{CB} = − 20 V V_{CB} = − 25 V			− 10 − 500 − 100 − 10 − 100 − 10	nA nA nA µA nA 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 I_C = − 50 mA I_B = − 5 mA			− 0.25 − 0.5	V V
$V_{BE(sat)}$*	Base-Emitter Saturation Voltage	I_C = − 10 mA I_B = − 1 mA For **BCY70** and **BCY71** Only I_C = − 50 mA I_B = − 5 mA	 − 0.6 		 − 0.9 − 1.2	 V V
h_{FE}*	DC Current Gain	For **BCY70** I_C = − 0.1 mA V_{CE} = − 1 V I_C = − 1 mA V_{CE} = − 1 V I_C = − 10 mA V_{CE} = − 1 V I_C = − 50 mA V_{CE} = − 1 V For **BCY71** I_C = − 0.01 mA V_{CE} = − 1 V I_C = − 0.1 mA V_{CE} = − 1 V I_C = − 1 mA V_{CE} = − 1 V I_C = − 10 mA V_{CE} = − 1 V I_C = − 50 mA V_{CE} = − 1 V For **BCY72** I_C = − 1 mA V_{CE} = − 1 V I_C = − 10 mA V_{CE} = − 1 V	 40 45 50 15 80 90 100 15 40 50	 60	 600	
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** I_C = − 10 mA V_{CE} = − 20 V f = 100 MHz For **BCY70** For **BCY70** and **BCY72**	 15 250 200		 	 MHz MHz 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 %.

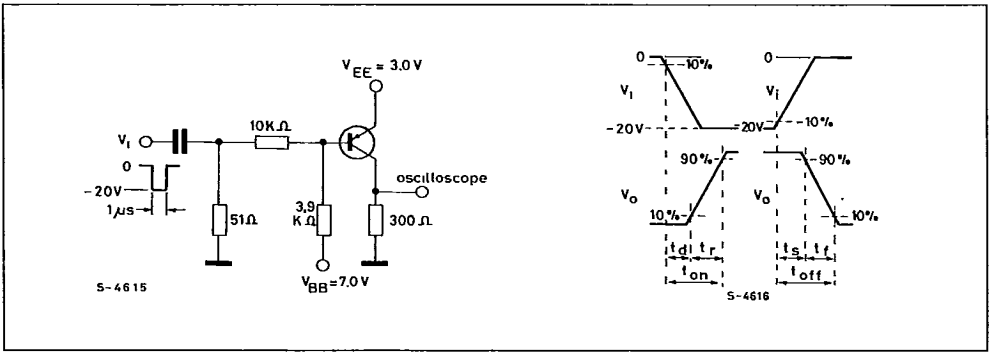
ELECTRICAL CHARACTERISTICS (continued)

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

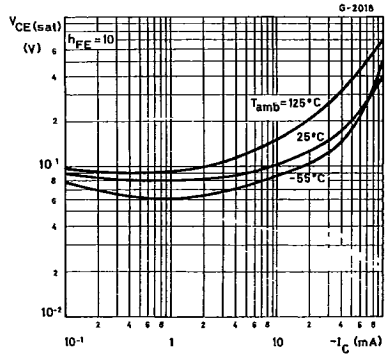
* Pulsed : pulse duration = 300 µs, duty cycle = 1 %.

TEST CIRCUIT

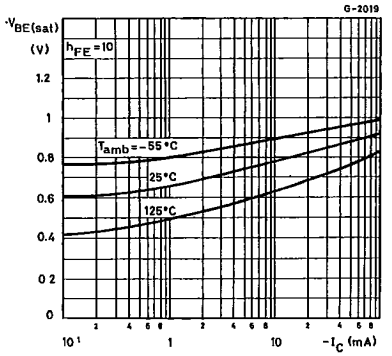
Test Circuit for Switching Times.

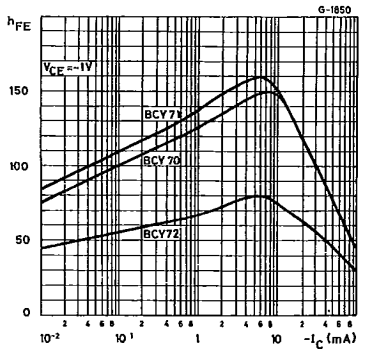


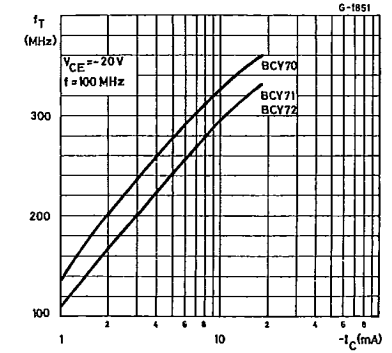
Collector-emitter Saturation Voltage.



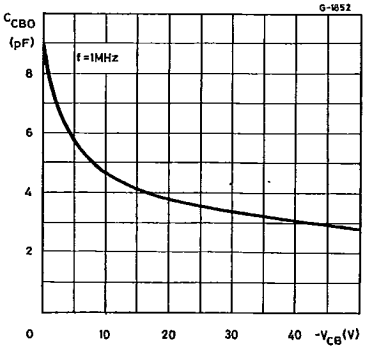
Base-emitter Saturation Voltage.



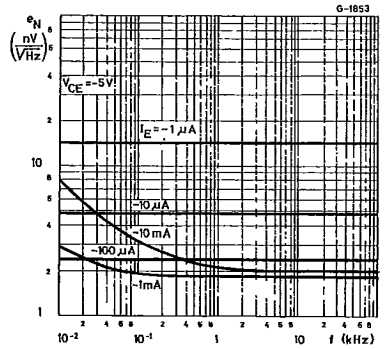




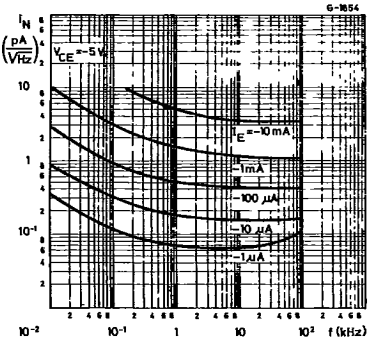
Collector-base Capacitance.



Equivalent Input Noise Voltage (for BCY71 only).



Equivalent Input Noise Current (for BCY71 only).



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