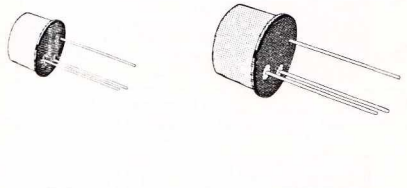
SGS-THOMSON
MICROELECTRONICS

2N3930
2N3931

HIGH-VOLTAGE AMPLIFIERS

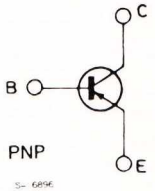
DESCRIPTION

The 2N3930 and 2N3931 are silicon planar epitaxial PNP transistors in Jedec TO-18 (2N3930) and Jedec TO-39 (2N3931) metal cases.
Both devices feature high voltage, high gain, low noise and excellent current gain linearity from 10 μA to 50 mA.



TO-18 TO-39

INTERNAL SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CBO}	Collector-base Voltage (I_E = 0)	– 180	V
V_{CEO}	Collector-emitter Voltage (I_B = 0)	– 180	V
V_{EBO}	Emitter-base Voltage (I_C = 0)	– 6	V
I_C	Collector Current	– 100	mA
P_{tot}	Total Power Dissipation at $T_{amb} \leq 25$ °C		
	For **2N3930**	0.4	W
	For **2N3931**	0.7	W
	at $T_{case} \leq 25$ °C		
	For **2N3930**	1.4	W
	For **2N3931**	2.5	W
T_{stg}, T_j	Storage and Junction Temperature	– 55 to 200	°C

THERMAL DATA

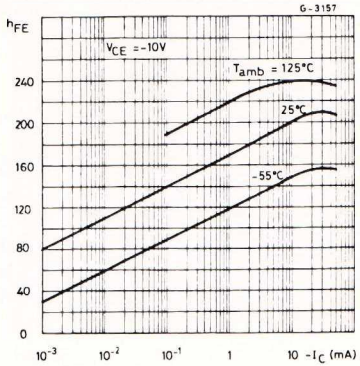
			2N3930	2N3931
$R_{th\ j\text{-}case}$	Thermal Resistance Junction-case	Max	125 °C/W	70 °C/W
$R_{th\ j\text{-}amb}$	Thermal Resistance Junction-ambient	Max	438 °C/W	250 °C/W

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

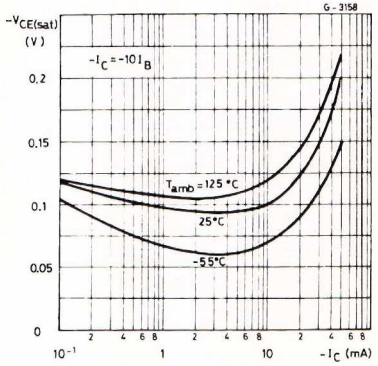
Symbol	Parameter	Test Conditions		Min.	Typ.	Max.	Unit
I_{CBO}	Collector Cutoff Current (I_E = 0)	V_{CB} = – 100 V				– 10	nA
		V_{CB} = – 100 V	T_{amb} = 125 °C			– 10	μA
I_{EBO}	Emitter Cutoff Current (I_C = 0)	V_{EB} = – 4 V				– 10	nA
$V_{(BR)CBO}$	Collector-base Breakdown Voltage (I_E = 0)	I_C = – 10 μA		– 180			V
$V_{(BR)CEO}$*	Collector-emitter Breakdown Voltage (I_B = 0)	I_C = – 2 mA		– 180			V
$V_{(BR)EBO}$	Emitter-base Breakdown Voltage (I_C = 0)	I_E = – 10 μA		– 6			V
$V_{CE(sat)}$*	Collector-emitter Saturation Voltage	I_C = – 10 mA	I_B = – 1 mA		– 0.1	– 0.25	V
$V_{BE(sat)}$*	Base-emitter Saturation Voltage	I_C = – 10 mA	I_B = – 1 mA		– 0.74	– 0.9	V
h_{FE}*	DC Current Gain	I_C = – 10 μA	V_{CE} = – 10 V	60	110		
		I_C = – 1 mA	V_{CE} = – 10 V	80	170		
		I_C = – 10 mA	V_{CE} = – 10 V	80	200	300	
		I_C = – 10 μA	V_{CE} = – 10 V				
		T_{amb} = – 55 °C		15	60		
		I_C = – 100 μA	V_{CE} = – 10 V				
		T_{amb} = – 55 °C		30	90		
f_T	Transition Frequency	I_C = – 1 mA f = 20 MHz	V_{CE} = – 10 V	40	60	160	MHz
C_{EBO}	Emitter-base Capacitance	I_C = 0 f = 1 MHz	V_{EB} = – 0.5 V		20	25	pF
C_{CBO}	Collector-base Capacitance	I_E = 0 f = 1 MHz	V_{CB} = – 5 V		5	7	pF
NF	Noise Figure	I_C = – 10 μA R_g = 10 kΩ	V_{CE} = – 5 V				
		f = 10 kHz	B = 2 kHz		1	3	dB
		f = 1 kHz	B = 200 Hz		1	3	dB
		f = 100 Hz	B = 20 Hz		2	10	dB

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

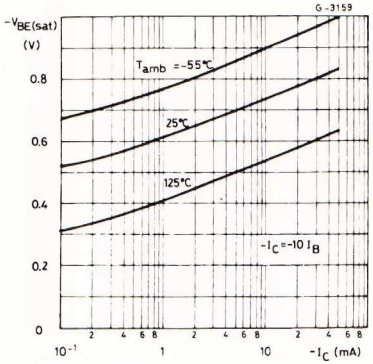
DC Current Gain.



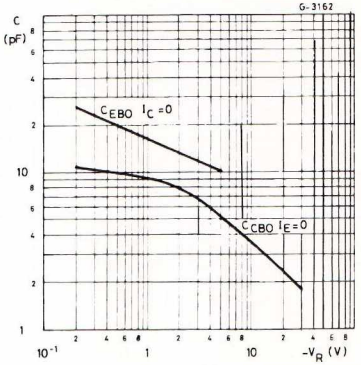
Collector-emitter Saturation Voltage.



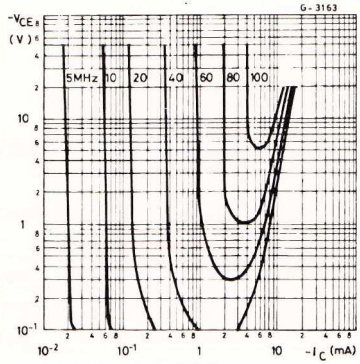
Base-emitter Saturation Voltage.



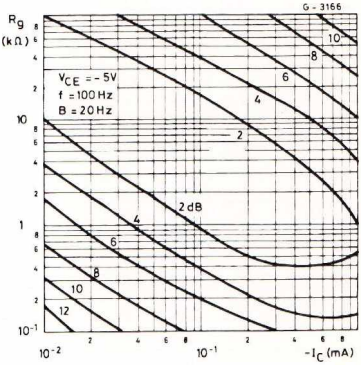
Emitter-base and collector-base capacitances.



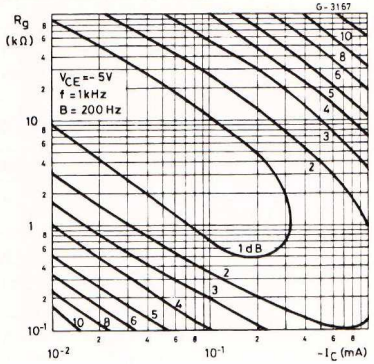
Contours of Constant Transition Frequency.



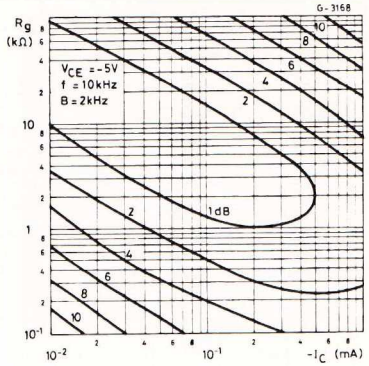
Contours of Constant Noise Figure (f = 100 Hz).



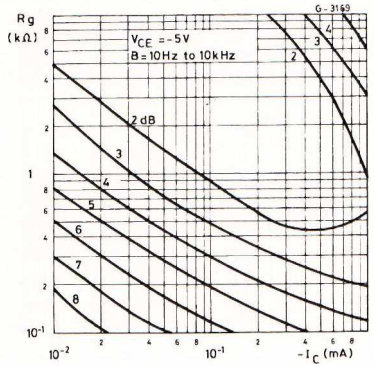
Contours of Constant Noise Figure (f = 1 kHz).



Contours of Constant Noise Figure (f = 10 kHz).



Contours of Constant Wide Band Noise Figure.



Noise Figure vs. Frequency.