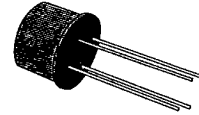


S G S-THOMSON

## HIGH-FREQUENCY OSCILLATORS AND AMPLIFIERS

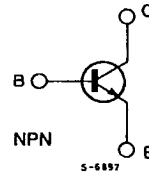
The BFX73, 2N918 and 2N3600 are silicon planar epitaxial NPN transistors in Jedec TO-72 metal case.

They are designed for low-noise VHF amplifiers, oscillators up to 1 GHz, non-neutralized IF amplifiers and non-saturating circuits with rise and fall times of less than 2.5 ns.



TO-72

## INTERNAL SCHEMATIC DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CBO}$	Collector-base Voltage ( $I_E = 0$ )	30	V
$V_{CEO}$	Collector-emitter Voltage ( $I_B = 0$ )	15	V
$V_{EBO}$	Emitter-base Voltage ( $I_C = 0$ )	3	V
$I_C$	Collector Current	50	mA
$P_{tot}$	Total Power Dissipation at $T_{amb} \leq 25^\circ\text{C}$ at $T_{amb} \leq 25^\circ\text{C}$	200	mW
		300	mW
$T_{stg}, T_J$	Storage and Junction Temperature	- 65 to 200	$^\circ\text{C}$

November 1988

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**THERMAL DATA**

R <sub>th j-case</sub>	Thermal Resistance Junction-case	Max	584	°C/W
R <sub>th j-amb</sub>	Thermal Resistance Junction-ambient	Max	875	°C/W

**ELECTRICAL CHARACTERISTICS (T<sub>amb</sub> = 25 °C unless otherwise specified)**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
I <sub>CB0</sub>	Collector Cutoff Current (I <sub>E</sub> = 0)	V <sub>CB</sub> = 15 V V <sub>CB</sub> = 15 V T <sub>amb</sub> = 150 °C			10 1	nA μA
V <sub>(BR)CBO</sub>	Collector-base Breakdown Voltage (I <sub>E</sub> = 0)	I <sub>C</sub> = 1 μA	30			V
V <sub>CEO (sus)</sub>	Collector-emitter Sustaining Voltage (I <sub>B</sub> = 0)	I <sub>C</sub> = 3 mA	15			V
V <sub>(BR) EBO</sub>	Emitter-base Breakdown Voltage (I <sub>C</sub> = 0)	I <sub>E</sub> = 10 μA	3			V
V <sub>CE (sat)</sub>	Collector-emitter Saturation Voltage	I <sub>C</sub> = 10 mA I <sub>B</sub> = 1 mA			0.4	V
V <sub>BE (sat)</sub>	Base-emitter Saturation Voltage	I <sub>C</sub> = 10 mA I <sub>B</sub> = 1 mA			1	V
h <sub>FE</sub>	DC Current Gain	I <sub>C</sub> = 3 mA V <sub>CE</sub> = 1 V for <b>2N918/BFX73</b> for <b>2N3600</b>	20 20	50	150	
f <sub>T</sub>	Transition Frequency	for <b>2N918/BFX73</b> I <sub>C</sub> = 4 mA V <sub>CE</sub> = 10 V f = 100 MHz for <b>2N3600</b> I <sub>C</sub> = 5 mA V <sub>CE</sub> = 6 V f = 100 MHz	600 850	900	1500	MHz MHz
C <sub>EBO</sub>	Emitter-base Capacitance	I <sub>C</sub> = 0 V <sub>EB</sub> = 0.5 V f = 1 MHz for <b>2N918/BFX73</b> for <b>2N3600</b>		1.4	2	pF pF
C <sub>OBO</sub>	Collector-base Capacitance (for <b>2N918/BFX73</b> only)	I <sub>E</sub> = 0 f = 1 MHz V <sub>CE</sub> = 0 V V <sub>CE</sub> = 10 V		1.8 1	3 1.7	pF pF
C <sub>ro</sub>	Reverse Capacitance (for <b>2N3600</b> only)	I <sub>C</sub> = 0 V <sub>CB</sub> = 10 V f = 1 MHz			1	pF
NF	Noise Figure	I <sub>C</sub> = 1.5 mA V <sub>CE</sub> = 6 V R <sub>g</sub> = 50 Ω f = 200 MHz for <b>2N3600</b> I <sub>C</sub> = 1 mA V <sub>CE</sub> = 6 V R <sub>g</sub> = 400 Ω f = 60 MHz for <b>2N918/BFX73</b> for <b>2N3600</b>			4.5 6 3	dB dB dB
G <sub>pe</sub>	Power Gain	R <sub>g</sub> = 50 Ω f = 200 MHz for <b>2N918/BFX73</b> I <sub>C</sub> = 6 mA V <sub>CE</sub> = 12 V for <b>2N3600</b> I <sub>C</sub> = 5 mA V <sub>CE</sub> = 6 V	15 17	21	24	dB dB

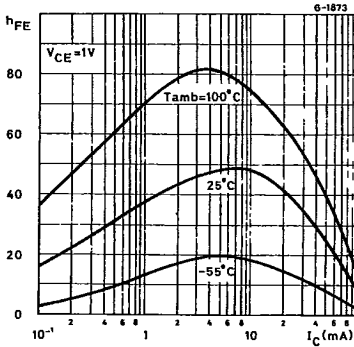
\* See test circuits.

**SGS-THOMSON**  
**ELECTRICAL CHARACTERISTICS (continued)**

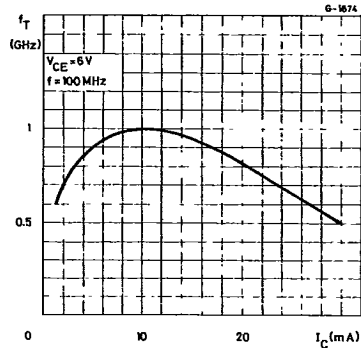
**T-31-15**

Symbol	Parameter	Test Conditions	Min.	Typ.	Max.	Unit
$P_o^*$	Output Power	$I_C = 12 \text{ mA}$ $V_{CB} = 10 \text{ V}$ $f = 500 \text{ MHz}$ for 2N918/BFX73 for 2N3600	30 20	40		mW mW
$\pi$	Collector Efficiency (for 2N918/BFX73 only)	$I_C = 12 \text{ mA}$ $V_{CB} = 10 \text{ V}$ $f = 500 \text{ MHz}$	25			%
$r_{b'b}, C_{b'b'c}$	Feedback Time Constant (for 2N3600 only)	$I_C = 5 \text{ mA}$ $V_{CB} = 6 \text{ V}$ $f = 31.9 \text{ MHz}$	4		15	ps

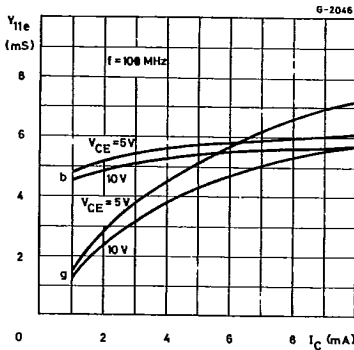
**DC Current Gain.**



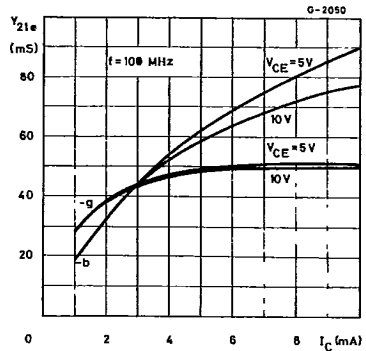
**Transition Frequency.**



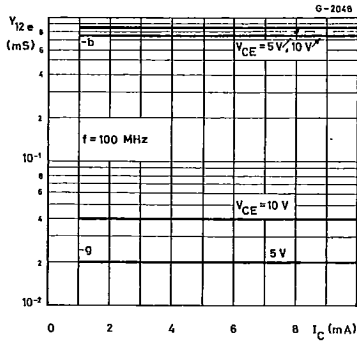
**Input Admittance vs. Collector Current.**



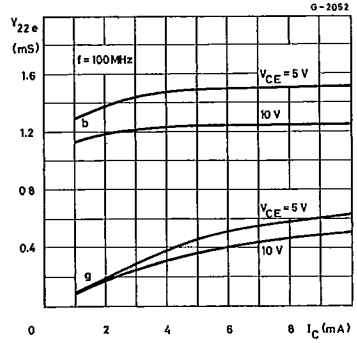
**Forward Transadmittance vs. Collector Current.**



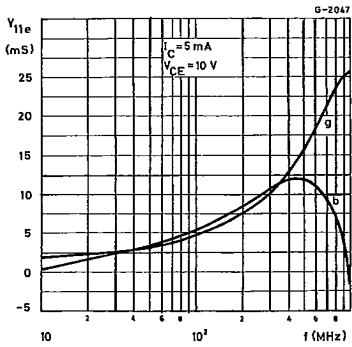
Reverse Transadmittance vs. Collector Current.



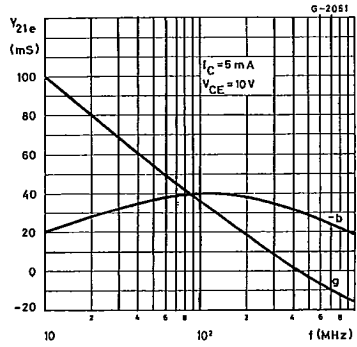
Output Admittance vs. Collector Current.



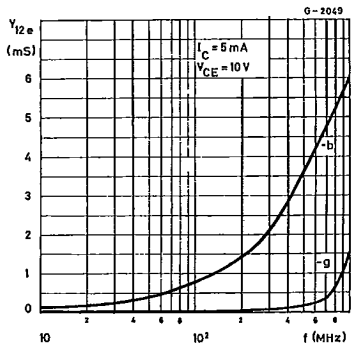
Input Admittance vs. Frequency.



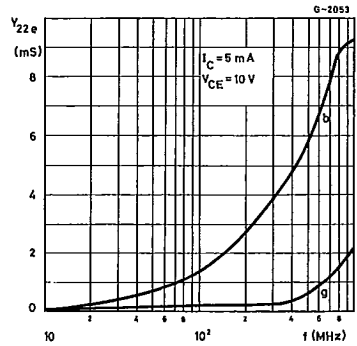
Forward Transadmittance vs. Frequency.



Reverse Transadmittance vs. Frequency.



Output Admittance vs. Frequency.



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Figure 1 : 500 MHz Oscillator Test Circuit.

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