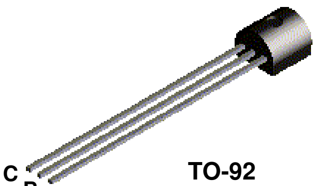
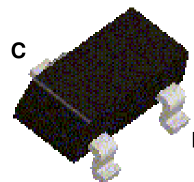
FAIRCHILD
SEMICONDUCTOR™

Discrete POWER & Signal Technologies

PN918 MMBT918



TO-92



SOT-23
Mark: 3B

NPN RF Transistor

This device is designed for use as RF amplifiers, oscillators and multipliers with collector currents in the 1.0 mA to 30 mA range. Sourced from Process 43.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	15	V
V_{CBO}	Collector-Base Voltage	30	V
V_{EBO}	Emitter-Base Voltage	3.0	V
I_C	Collector Current - Continuous	50	mA
T_J, T_{stg}	Operating and Storage Junction Temperature Range	-55 to +150	°C

*These ratings are limiting values above which the serviceability of any semiconductor device may be impaired.

NOTES:
1) These ratings are based on a maximum junction temperature of 150 degrees C.
2) These are steady state limits. The factory should be consulted on applications involving pulsed or low duty cycle operations.

Thermal Characteristics

TA = 25°C unless otherwise noted

Symbol	Characteristic	Max		Units
		PN918	*MMBT918	
P_D	Total Device Dissipation Derate above 25°C	350 2.8	225 1.8	mW mW/°C
$R_{\theta JC}$	Thermal Resistance, Junction to Case	125		°C/W
$R_{\theta JA}$	Thermal Resistance, Junction to Ambient	357	556	°C/W

*Device mounted on FR-4 PCB 1.6" X 1.6" X 0.06."

NPN RF Transistor
(continued)

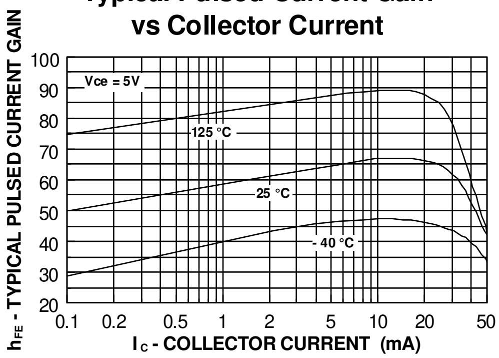
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{CEO(sus)}$	Collector-Emitter Sustaining Voltage*	I_C = 3.0 mA, I_B = 0	15		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	I_C = 1.0 µA, I_E = 0	30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	I_E = 10 µA, I_C = 0	3.0		V
I_{CBO}	Collector Cutoff Current	V_{CB} = 15 V, I_E = 0 V_{CB} = 15 V, T_A = 150°C		0.01 1.0	µA µA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	I_C = 3.0 mA, V_{CE} = 1.0 V	20		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA		0.4	V
$V_{BE(sat)}$	Base-Emitter Saturation Voltage	I_C = 10 mA, I_B = 1.0 mA		1.0	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	I_C = 4.0 mA, V_{CE} = 10 V, f = 100 MHz	600		MHz
C_{obo}	Output Capacitance	V_{CB} = 10 V, I_E = 0, f = 1.0 MHz V_{CB} = 0, I_E = 0, f = 1.0 MHz		1.7 3.0	pF pF
C_{ibo}	Input Capacitance	V_{BE} = 0.5 V, I_C = 0, f = 1.0 MHz		2.0	pF
NF	Noise Figure	I_C = 1.0 mA, V_{CE} = 6.0 V, R_G = 400Ω, f = 60 MHz		6.0	dB
FUNCTIONAL TEST					
G_{pe}	Amplifier Power Gain	V_{CB} = 12 V, I_C = 6.0 mA, f = 200 MHz	15		dB
P_O	Power Output	V_{CB} = 15 V, I_C = 8.0 mA, f = 500 MHz	30		mW
η	Collector Efficiency	V_{CB} = 15 V, I_C = 8.0 mA, f = 500 MHz	25		%

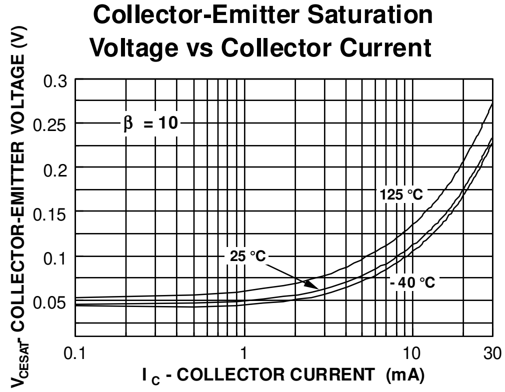
*Pulse Test: Pulse Width ≤ 300 µs, Duty Cycle ≤ 2.0%

DC Typical Characteristics

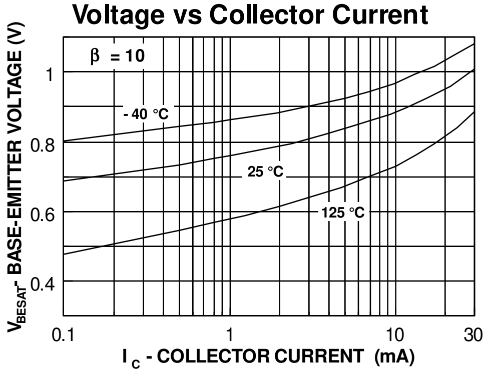
Typical Pulsed Current Gain vs Collector Current



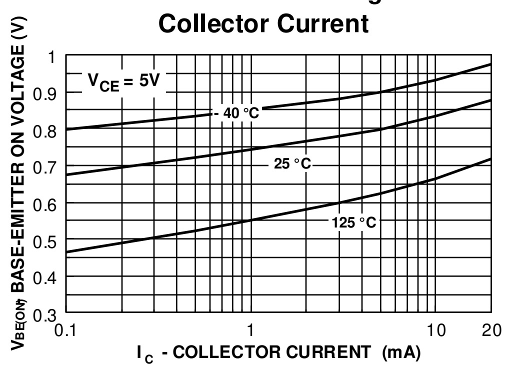
Collector-Emitter Saturation Voltage vs Collector Current



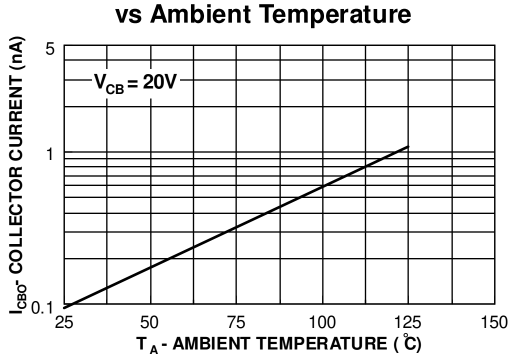
Base-Emitter Saturation Voltage vs Collector Current



Base-Emitter ON Voltage vs Collector Current

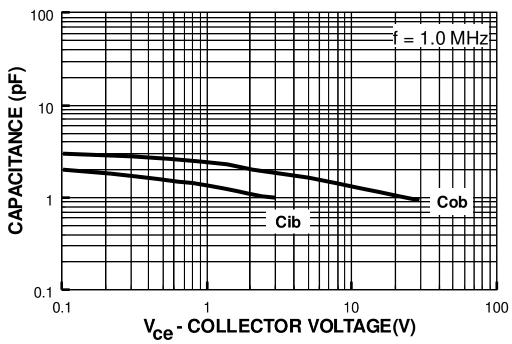


Collector-Cutoff Current vs Ambient Temperature

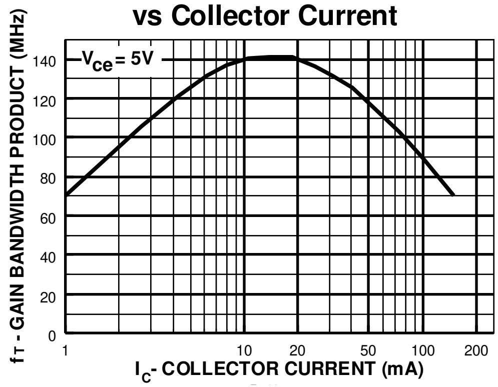


AC Typical Characteristics

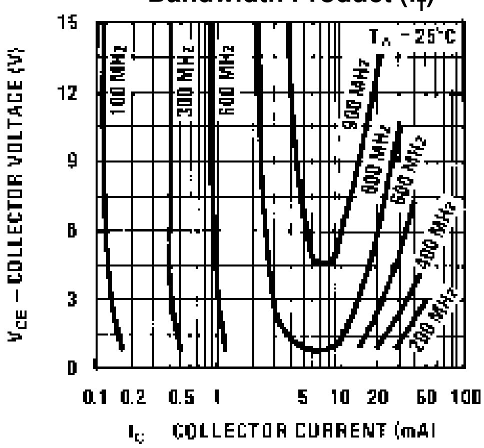
Input and Output Capacitance vs Reverse Voltage



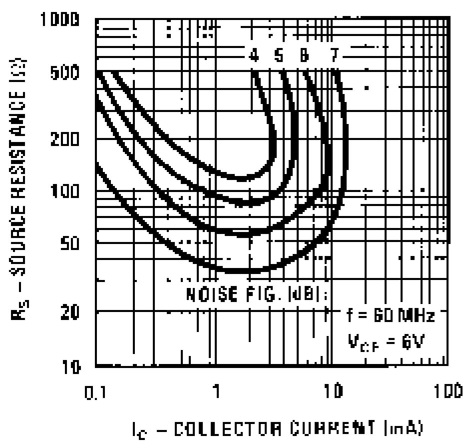
Gain Bandwidth Product vs Collector Current



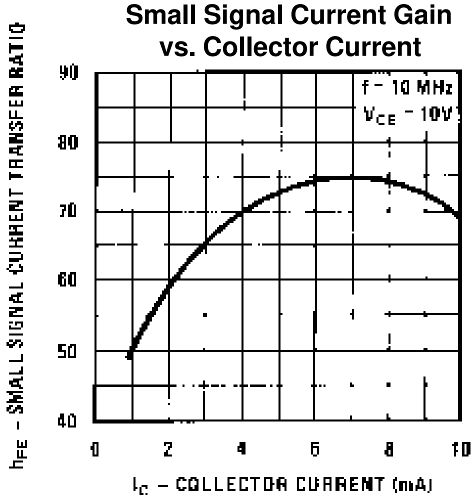
Contours of Constant Gain Bandwidth Product (f_T)



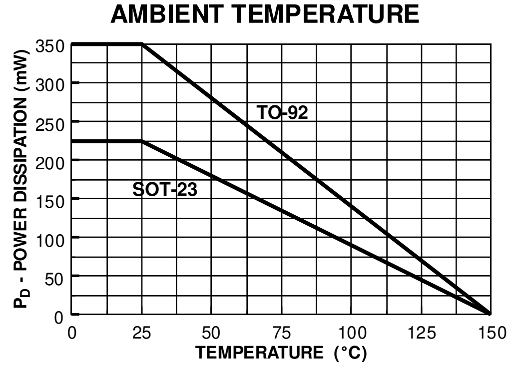
Contours of Constant Noise Figure



Small Signal Current Gain vs. Collector Current

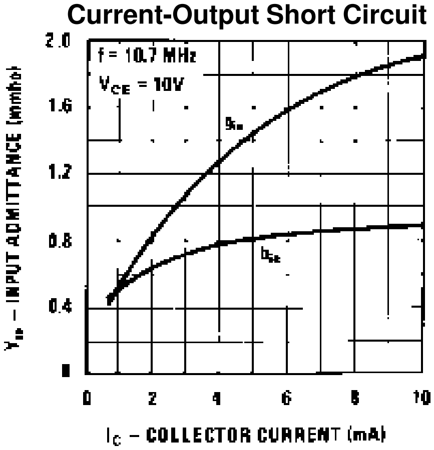


POWER DISSIPATION vs AMBIENT TEMPERATURE

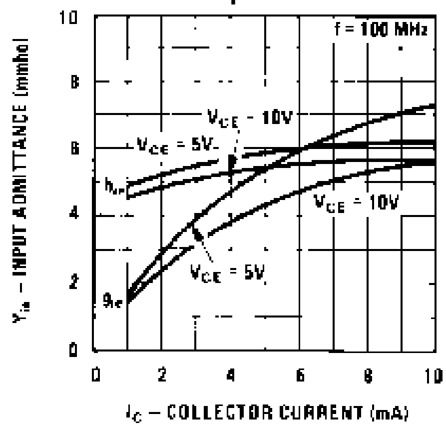


Common Emitter Y Parameters vs. Frequency

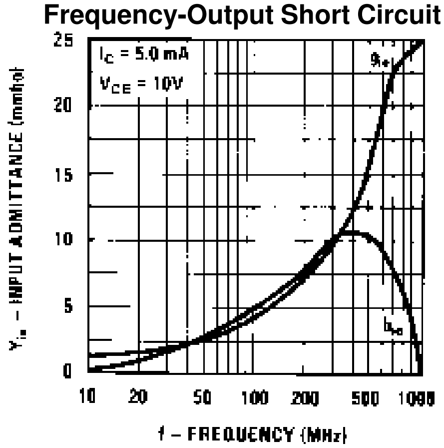
Input Admittance vs. Collector Current-Output Short Circuit



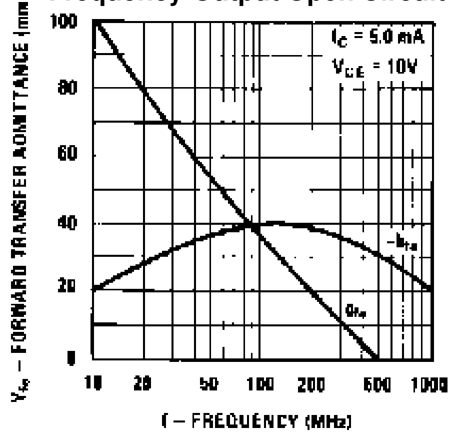
Input Admittance vs. Collector Current-Output Short Circuit



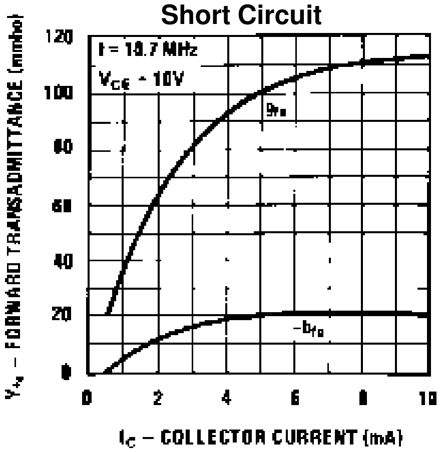
Input Admittance vs. Frequency-Output Short Circuit



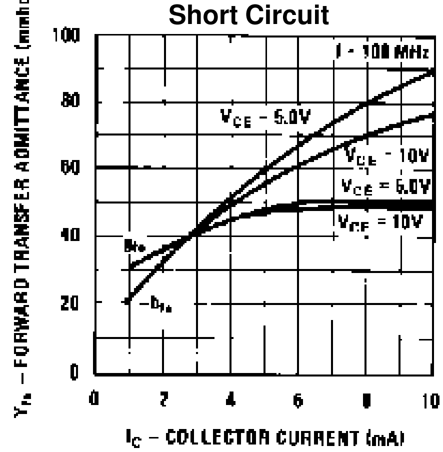
Forward Transfer Admittance vs. Frequency-Output Open Circuit



Forward Transfer Admittance vs. Collector Current-Output Short Circuit

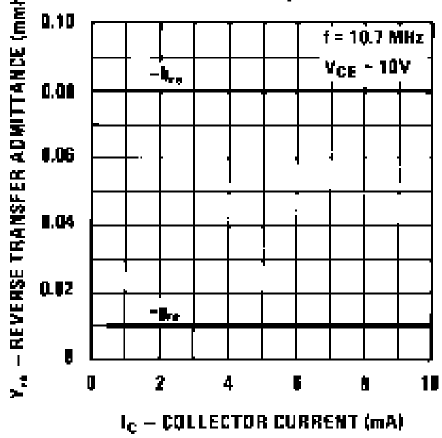


Forward Transfer Admittance vs. Collector Current-Output Short Circuit

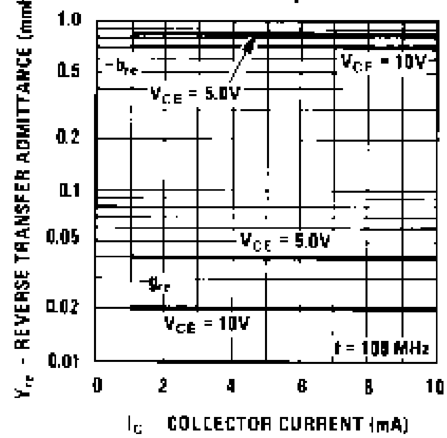


Common Emitter Y Parameters vs. Frequency (continued)

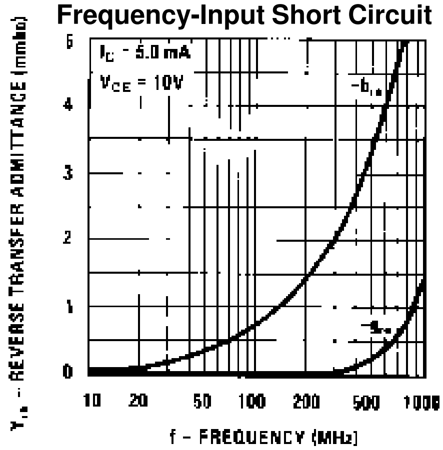
Reverse Transfer Admittance vs. Collector Current-Input Short Circuit



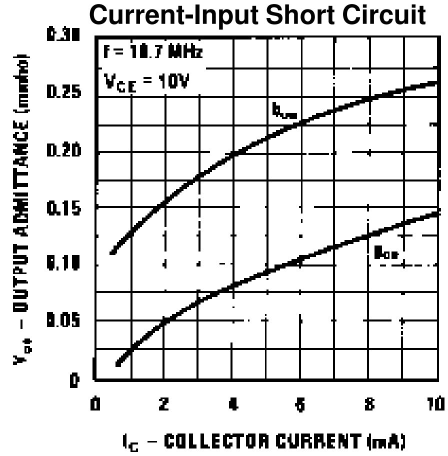
Reverse Transfer Admittance vs. Collector Current-Input Short Circuit



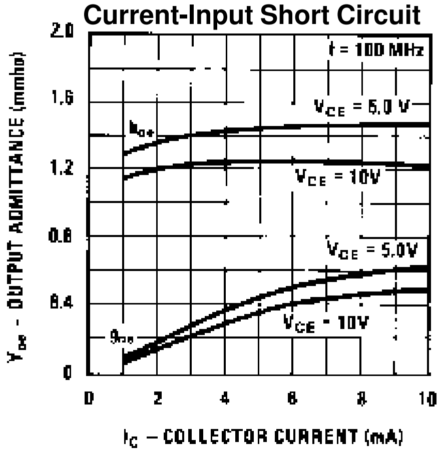
Reverse Transfer Admittance vs. Frequency-Input Short Circuit



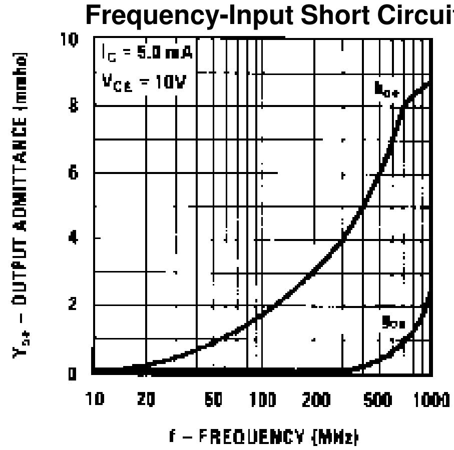
Output Admittance vs. Collector Current-Input Short Circuit



Output Admittance vs. Collector Current-Input Short Circuit



Output Admittance vs. Frequency-Input Short Circuit



Test Circuit

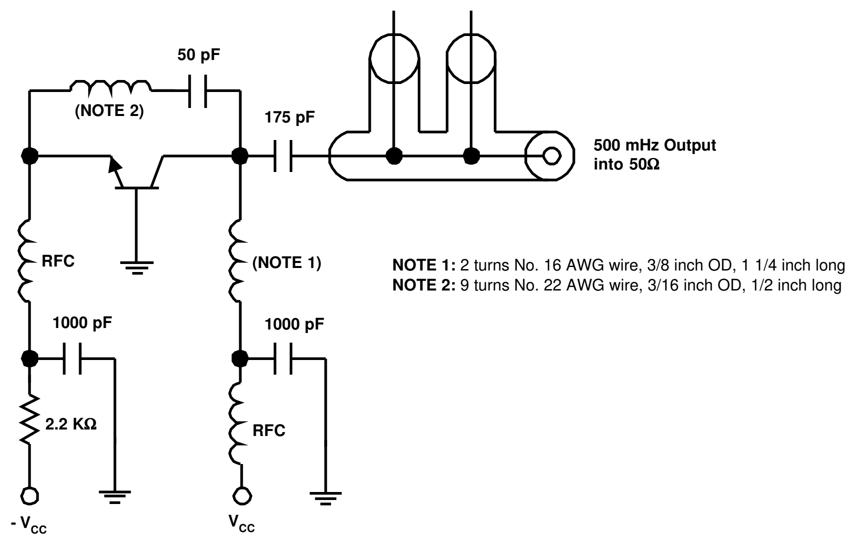


FIGURE 1: 500 MHz Oscillator Circuit