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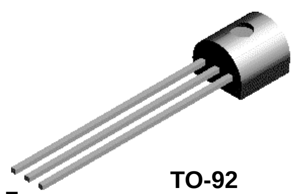
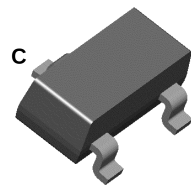
FAIRCHILD
SEMICONDUCTOR TM

MPSH11 MMBTH11





NPN RF Transistor

This device is designed for common-emitter low noise amplifier and mixer applications with collector currents in the 100 µA to 10 mA range to 300 MHz, and low frequency drift common-base VHF oscillator applications with high output levels for driving FET mixers. Sourced from Process 47.

Absolute Maximum Ratings*

TA = 25°C unless otherwise noted

Symbol	Parameter	Value	Units
V_{CEO}	Collector-Emitter Voltage	25	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
		MPSH11	*MMBTH11	
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)

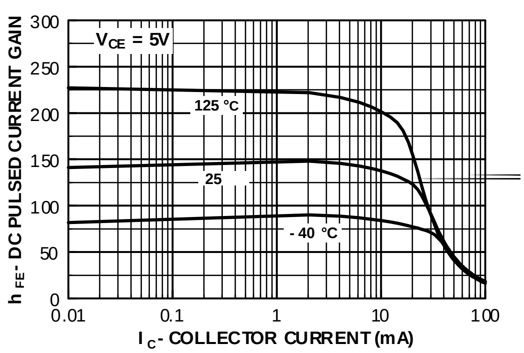
Electrical Characteristics
TA = 25°C unless otherwise noted

Symbol	Parameter	Test Conditions	Min	Max	Units
OFF CHARACTERISTICS					
$V_{(BR)CEO}$	Collector-Emitter Sustaining Voltage*	$I_C = 1.0$ mA, $I_B = 0$	25		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\ \mu$A, $I_E = 0$	30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\ \mu$A, $I_C = 0$	3.0		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 25$ V, $I_E = 0$		100	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 2.0$ V, $I_C = 0$		100	nA
ON CHARACTERISTICS					
h_{FE}	DC Current Gain	$I_C = 4.0$ mA, $V_{CE} = 10$ V	60		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 4.0$ mA, $I_B = 0.4$ mA		0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 4.0$ mA, $V_{CE} = 10$ V		0.95	V
SMALL SIGNAL CHARACTERISTICS					
f_T	Current Gain - Bandwidth Product	$I_C = 4.0$ mA, $V_{CE} = 10$ V, f = 100 MHz	650		MHz
C_{cb}	Collector-Base Capacitance	$V_{CB} = 10$ V, $I_E = 0$, f = 1.0 MHz		0.7	pF
C_{rb}	Common-Base Feedback Capacitance	$V_{CB} = 10$ V, $I_E = 0$, f = 1.0 MHz	0.6	0.9	pF
rb昃$_c$	Collector Base Time Constant	$I_C = 4.0$ mA, $V_{CB} = 10$ V, f = 31.8 MHz		9.0	pS

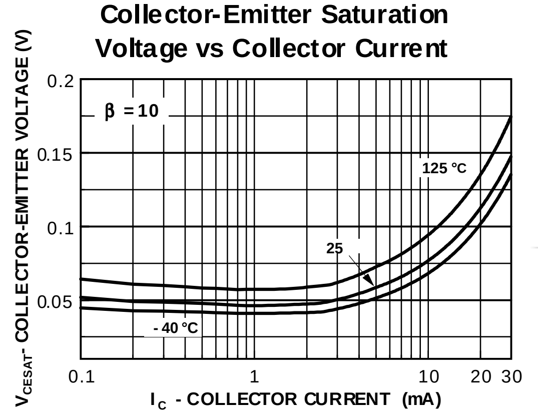
*Pulse Test: Pulse Width ≤ 300 μs, Duty Cycle ≤ 2.0%

Typical Characteristics

DC Current Gain vs Collector Current

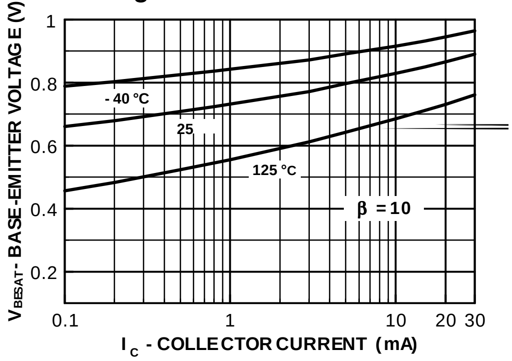


Collector-Emitter Saturation Voltage vs Collector Current

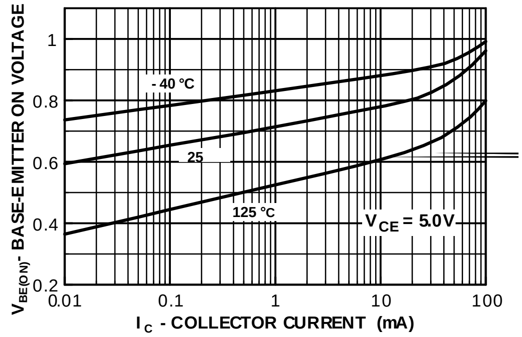


Typical Characteristics (continued)

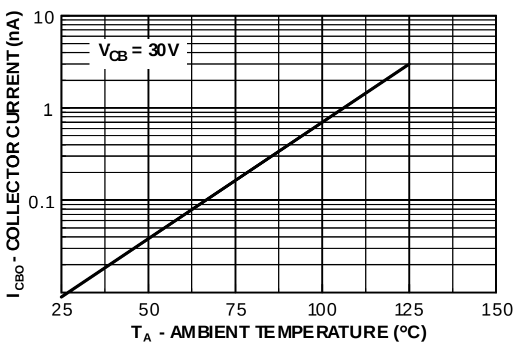
Base-Emitter Saturation Voltage vs Collector Current



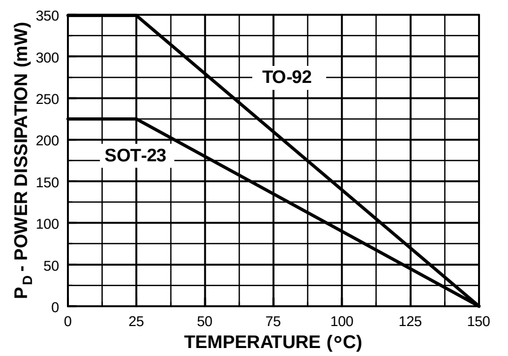
Base-Emitter ON Voltage vs Collector Current



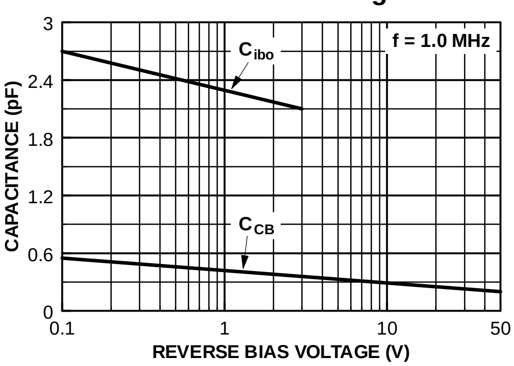
Collector Cut-Off Current vs Ambient Temperature



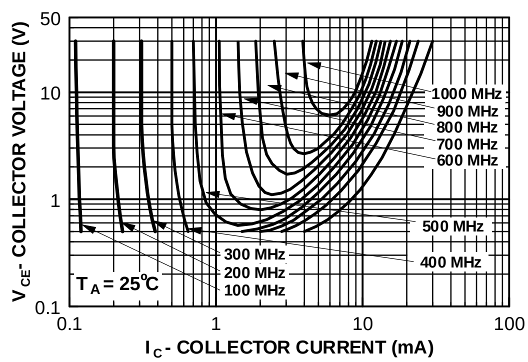
Power Dissipation vs Ambient Temperature



Capacitance vs Reverse Bias Voltage



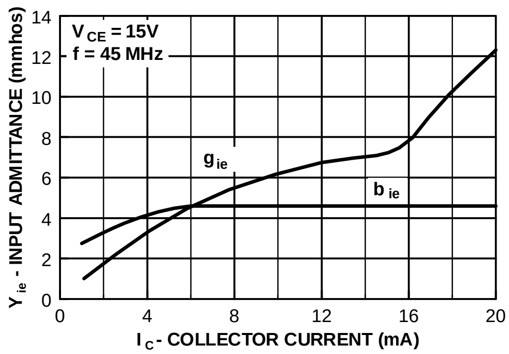
Contours of Constant Gain Bandwidth Product (f_T)



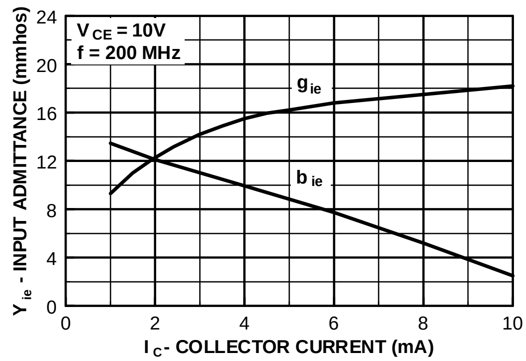
NPN RF Transistor
(continued)

Common Emitter Y Parameters

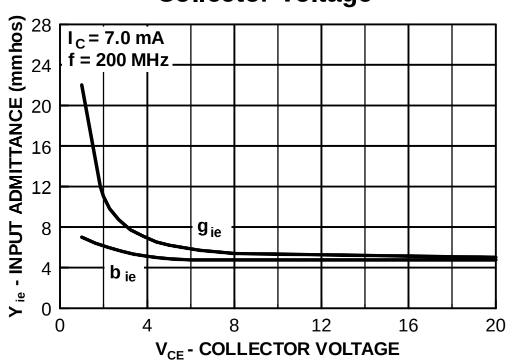
Input Admittance vs Collector Current



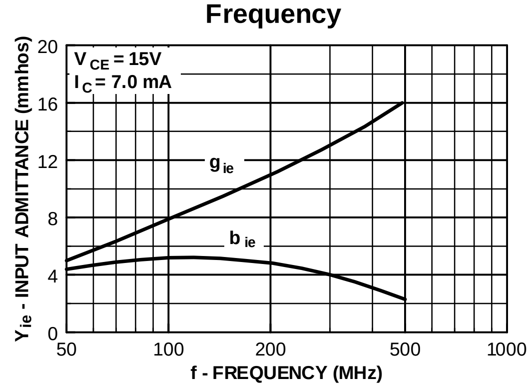
Input Admittance vs Collector Current



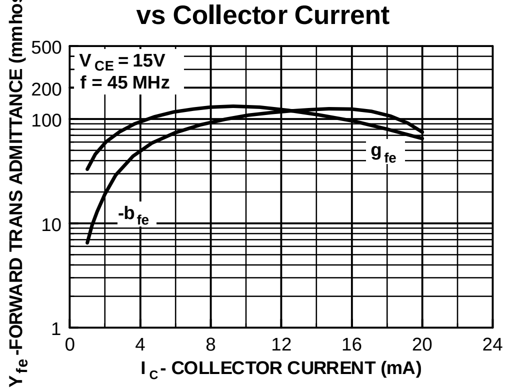
Input Admittance vs Collector Voltage



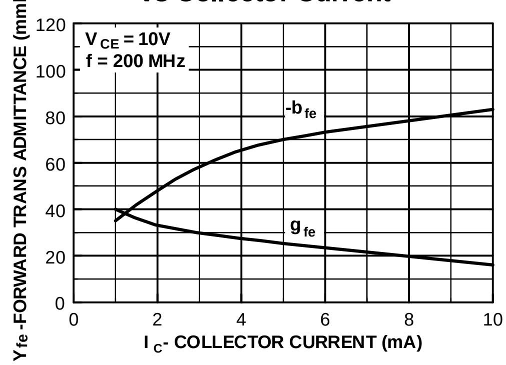
Input Admittance vs Frequency



Forward Transfer Admittance vs Collector Current

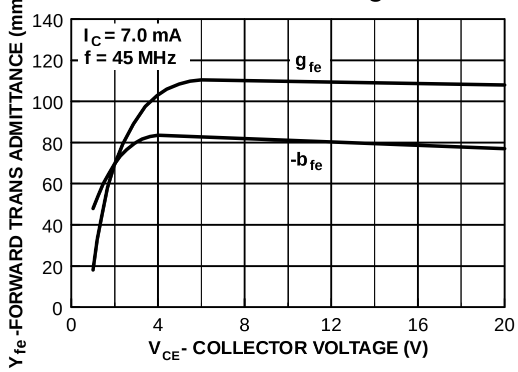


Forward Transfer Admittance vs Collector Current

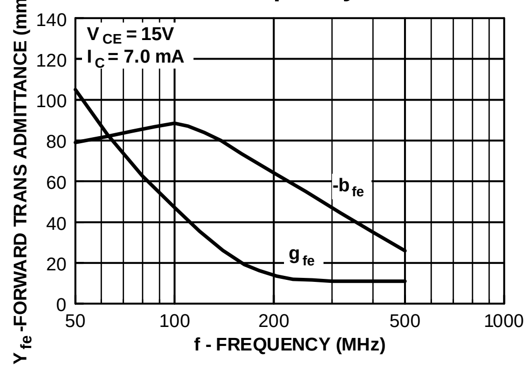


Common Emitter Y Parameters (continued)

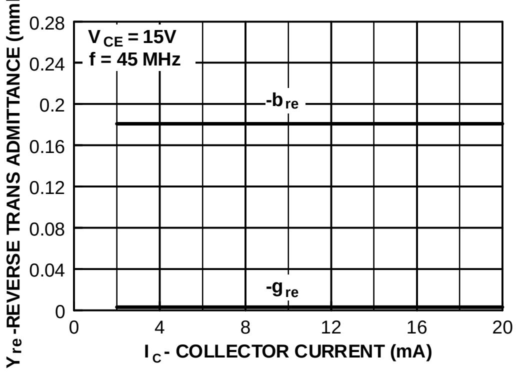
Forward Transfer Admittance vs Collector Voltage



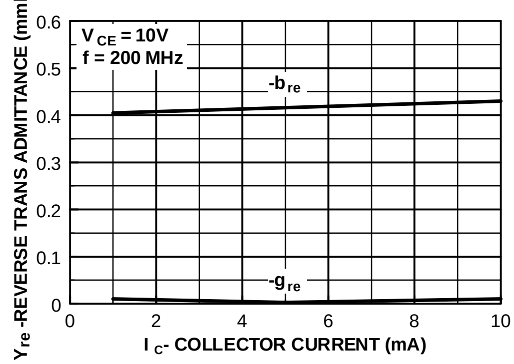
Forward Transfer Admittance vs Frequency



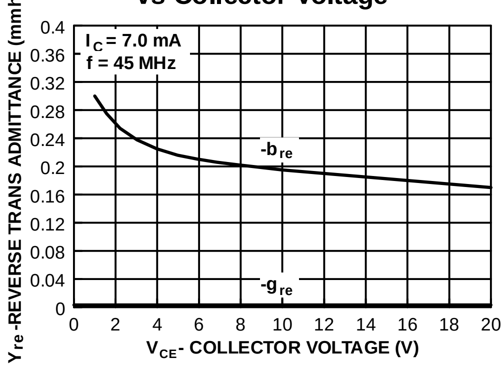
Reverse Transfer Admittance vs Collector Current



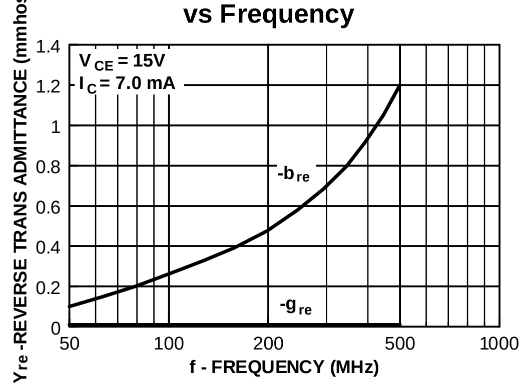
Reverse Transfer Admittance vs Collector Current



Reverse Transfer Admittance vs Collector Voltage

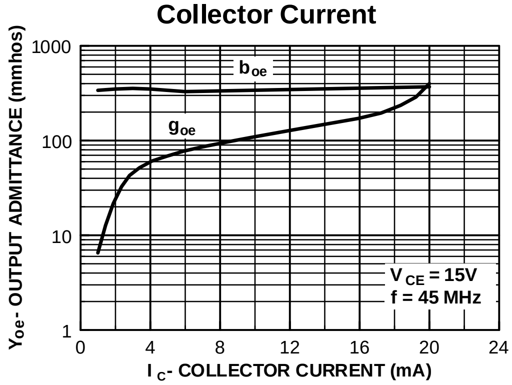


Reverse Transfer Admittance vs Frequency

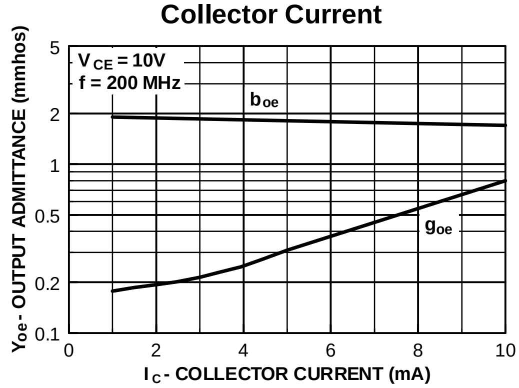


Common Emitter Y Parameters (continued)

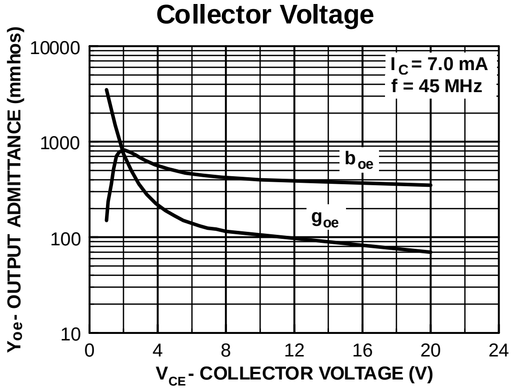
Output Admittance vs Collector Current



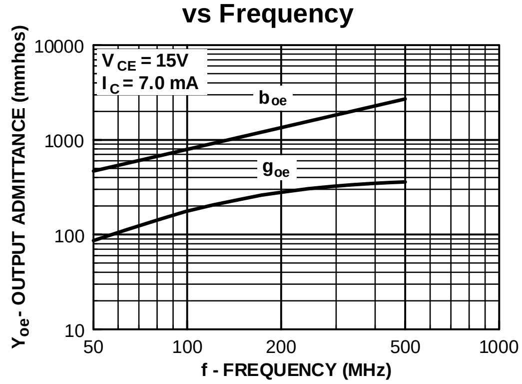
Output Admittance vs Collector Current



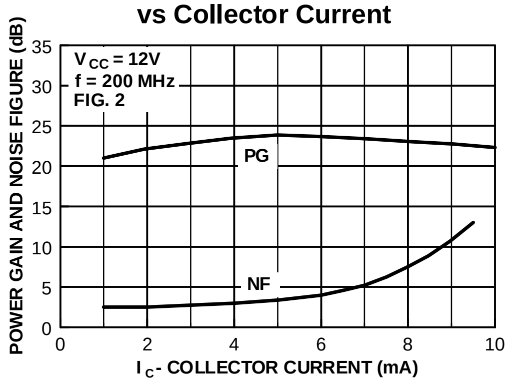
Output Admittance vs Collector Voltage



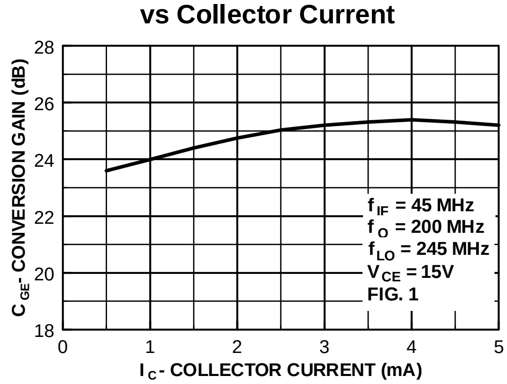
Output Admittance vs Frequency



Power Gain and Noise Figure vs Collector Current



Conversion Gain vs Collector Current



Test Circuits

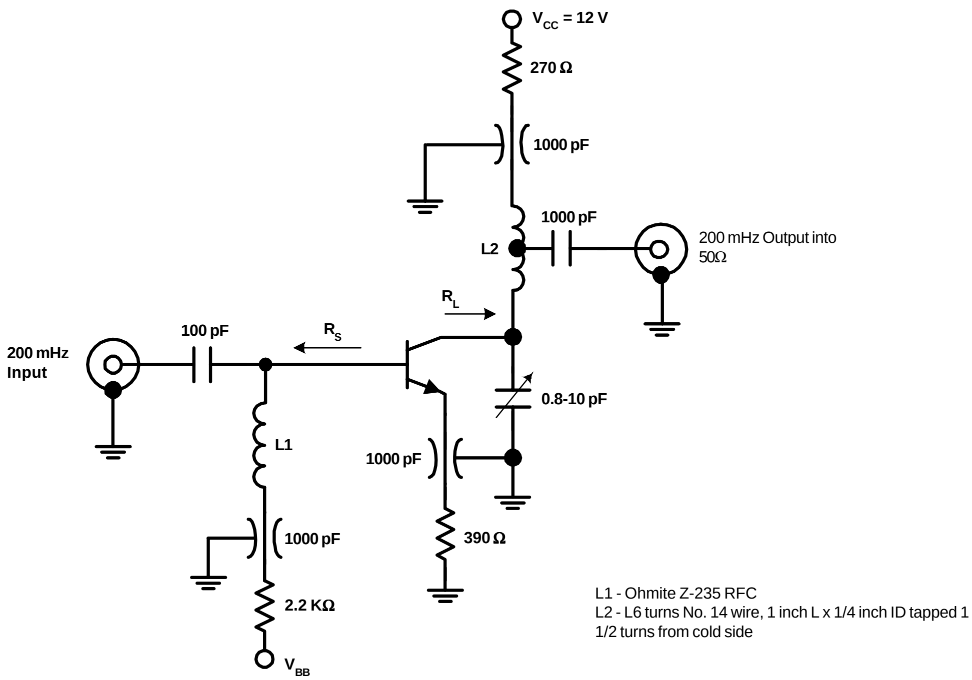


FIGURE 1: Unneutralized 200 MHz PG and NF Test Circuit

Test Circuits (continued)

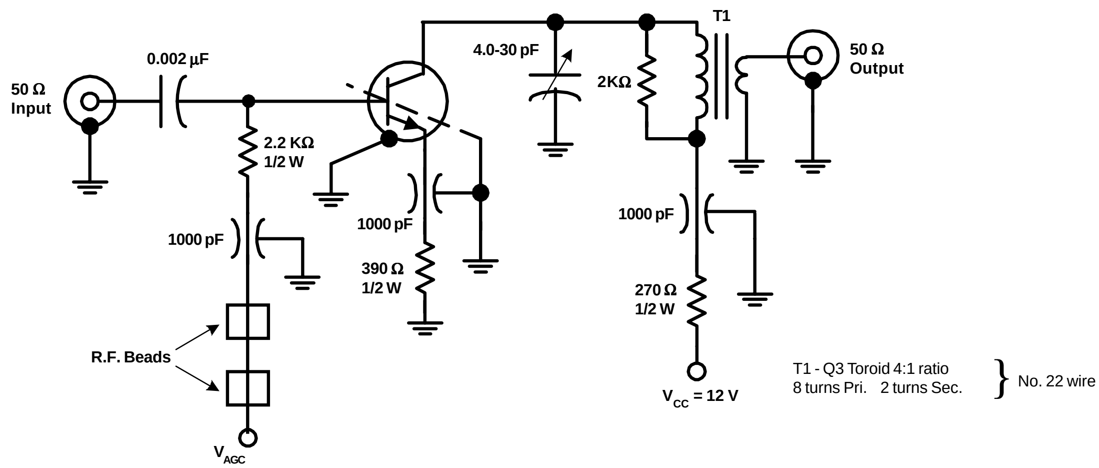


FIGURE 2: 45 MHz Power Gain Circuit

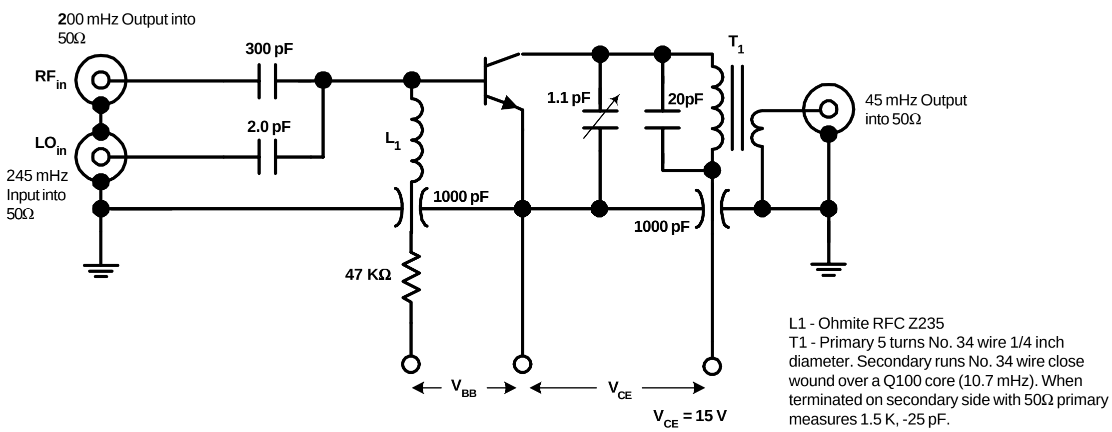


FIGURE 3: 200 MHz Conversion Gain Test Circuit

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