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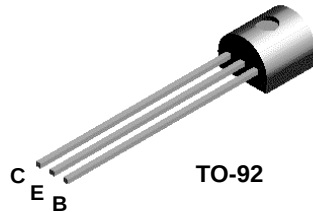
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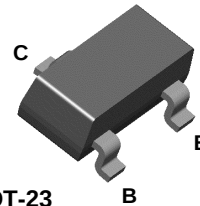
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MPSH11



TO-92

MMBTH11



SOT-23
Mark: 3G

NPN RF Transistor

This device is designed for common-emitter low noise amplifier and mixer applications with collector currents in the 100 μ A 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 _{θJC}	Thermal Resistance, Junction to Case	125		°C/W
R _{θJA}	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
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OFF CHARACTERISTICS

$V_{(BR)CEO}$	Collector-Emitter Sustaining Voltage*	$I_C = 1.0\text{ mA}, I_B = 0$	25		V
$V_{(BR)CBO}$	Collector-Base Breakdown Voltage	$I_C = 100\text{ }\mu\text{A}, I_E = 0$	30		V
$V_{(BR)EBO}$	Emitter-Base Breakdown Voltage	$I_E = 10\text{ }\mu\text{A}, I_C = 0$	3.0		V
I_{CBO}	Collector Cutoff Current	$V_{CB} = 25\text{ V}, I_E = 0$		100	nA
I_{EBO}	Emitter Cutoff Current	$V_{EB} = 2.0\text{ V}, I_C = 0$		100	nA

ON CHARACTERISTICS

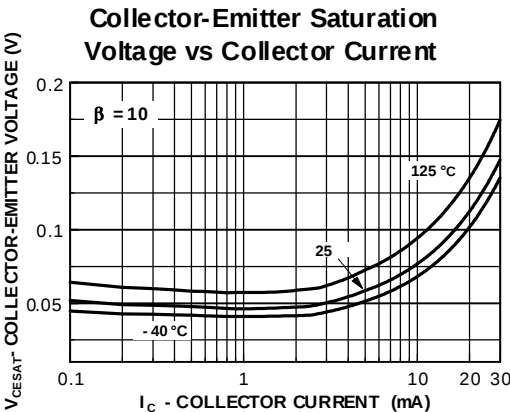
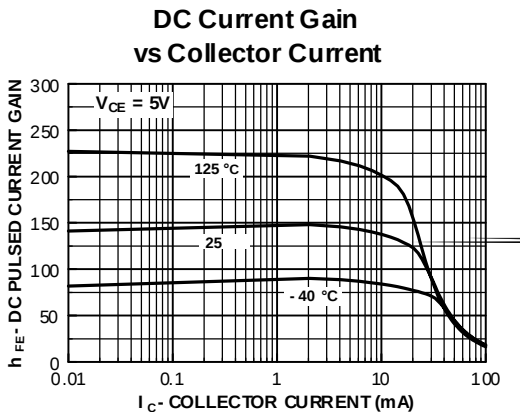
h_{FE}	DC Current Gain	$I_C = 4.0\text{ mA}, V_{CE} = 10\text{ V}$	60		
$V_{CE(sat)}$	Collector-Emitter Saturation Voltage	$I_C = 4.0\text{ mA}, I_B = 0.4\text{ mA}$		0.5	V
$V_{BE(on)}$	Base-Emitter On Voltage	$I_C = 4.0\text{ mA}, V_{CE} = 10\text{ V}$		0.95	V

SMALL SIGNAL CHARACTERISTICS

f_T	Current Gain - Bandwidth Product	$I_C = 4.0\text{ mA}, V_{CE} = 10\text{ V}, f = 100\text{ MHz}$	650		MHz
C_{cb}	Collector-Base Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$		0.7	pF
C_{rb}	Common-Base Feedback Capacitance	$V_{CB} = 10\text{ V}, I_E = 0, f = 1.0\text{ MHz}$	0.6	0.9	pF
$r_b \text{ 或 } \tau_c$	Collector Base Time Constant	$I_C = 4.0\text{ mA}, V_{CB} = 10\text{ V}, f = 31.8\text{ MHz}$		9.0	pS

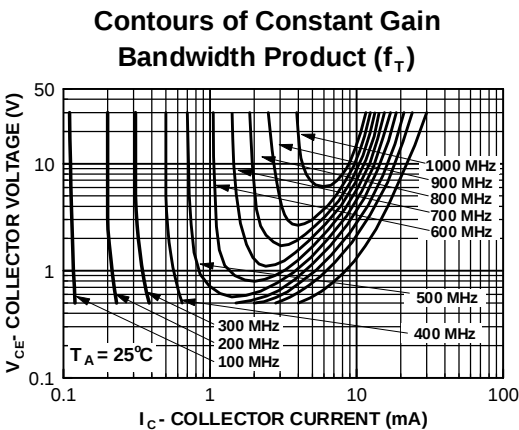
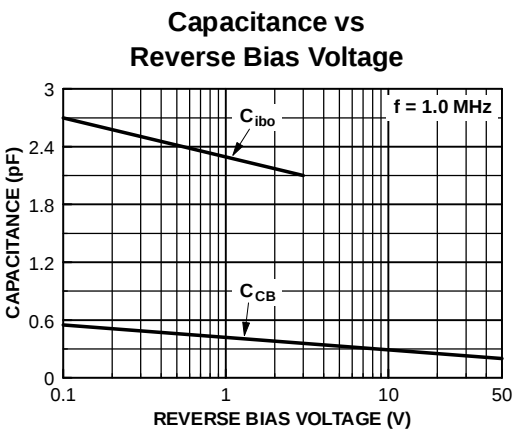
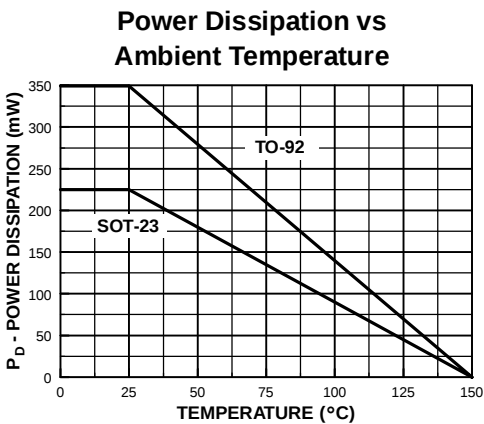
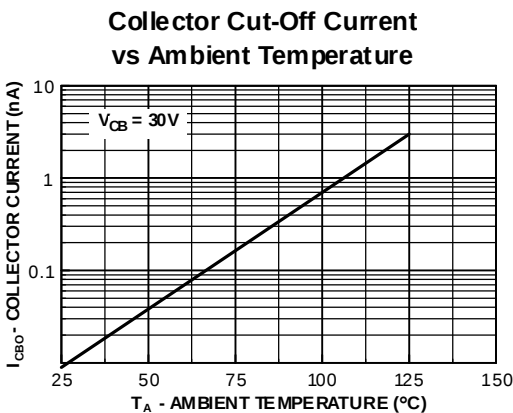
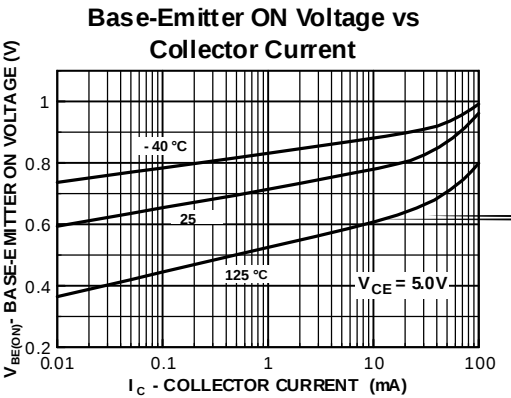
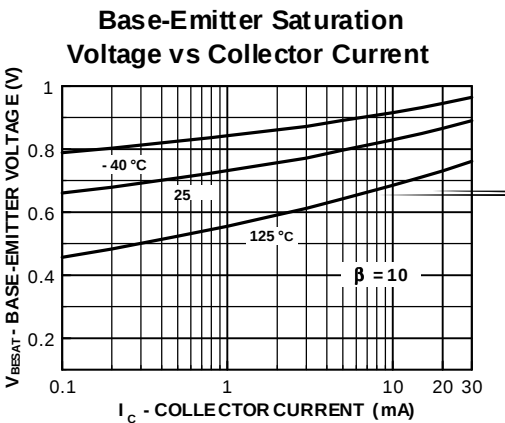
*Pulse Test: Pulse Width $\leq 300\text{ }\mu\text{s}$, Duty Cycle $\leq 2.0\%$

Typical Characteristics



NPN RF Transistor
(continued)

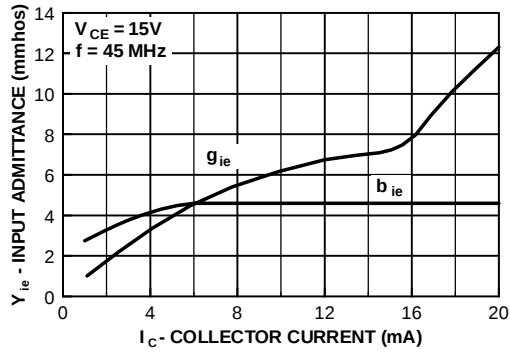
Typical Characteristics (continued)



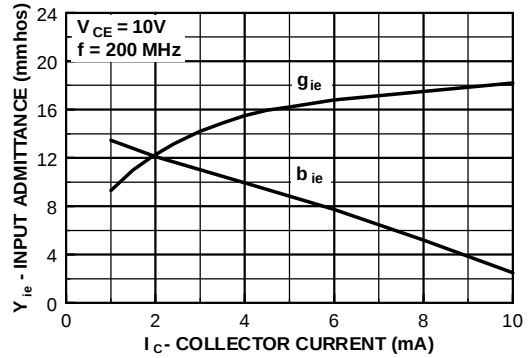
NPN RF Transistor (continued)

Common Emitter Y Parameters

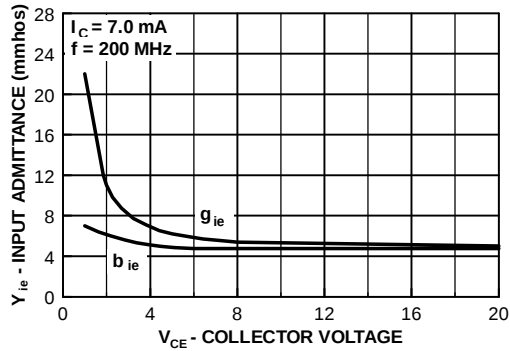
Input Admittance vs
Collector Current



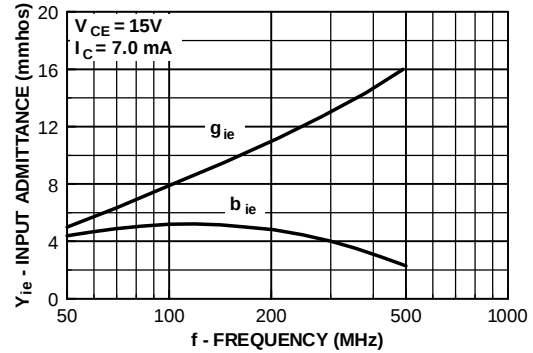
Input Admittance vs
Collector Current



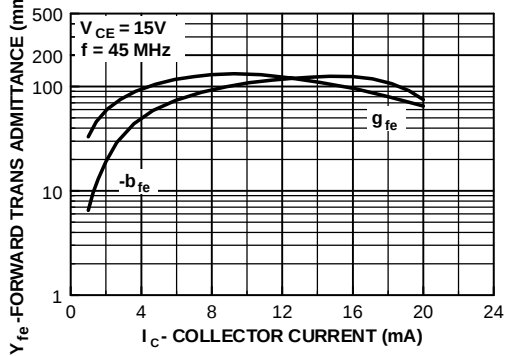
Input Admittance vs
Collector Voltage



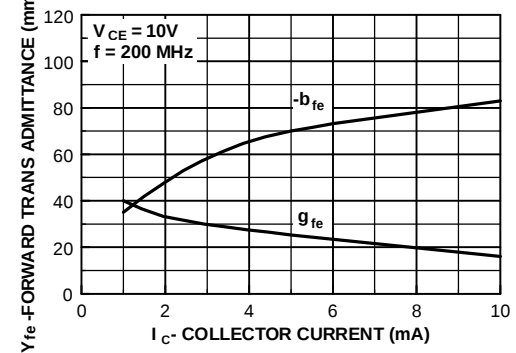
Input Admittance vs
Frequency



Forward Transfer Admittance
vs Collector Current

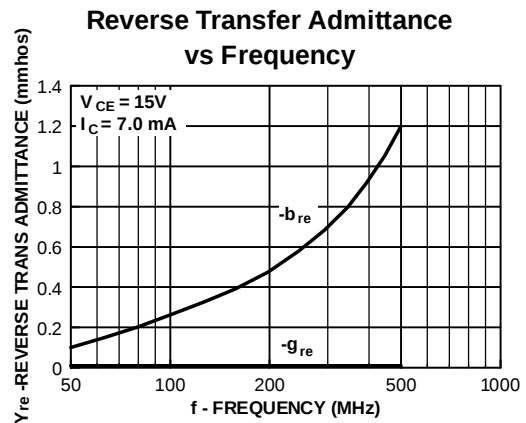
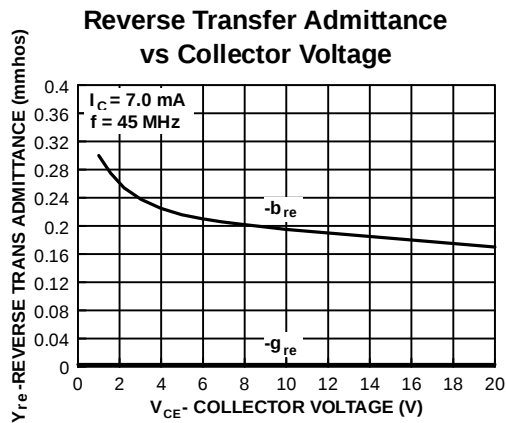
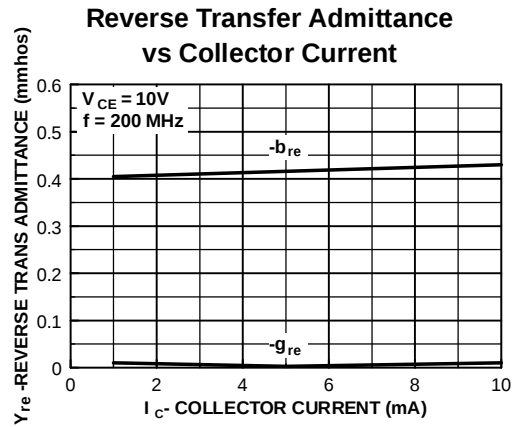
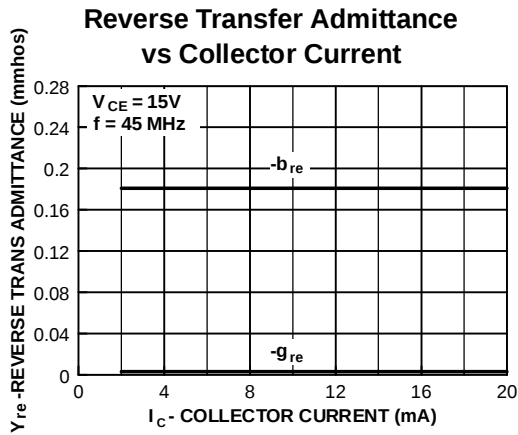
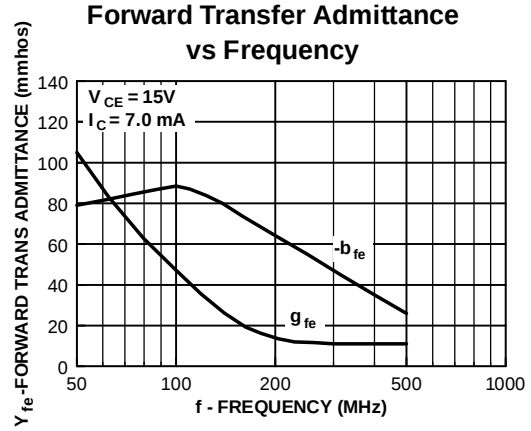
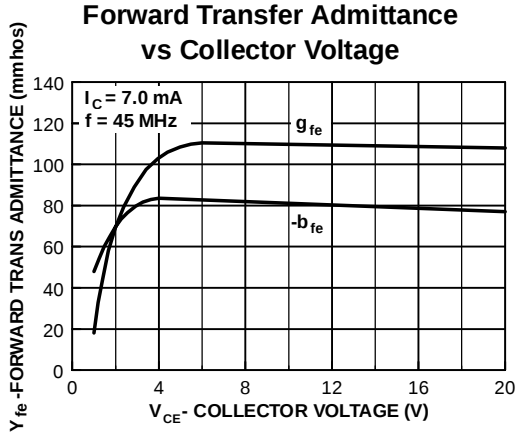


Forward Transfer Admittance
vs Collector Current



NPN RF Transistor (continued)

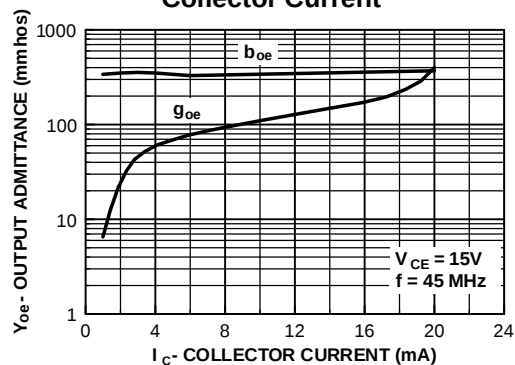
Common Emitter Y Parameters (continued)



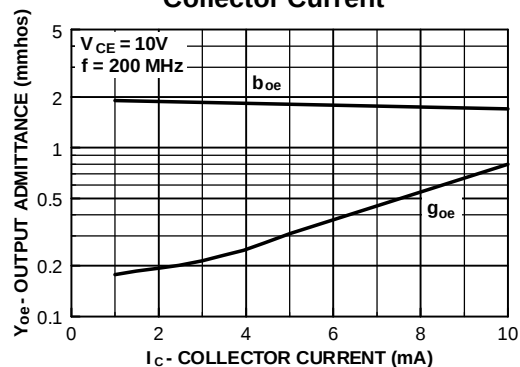
NPN RF Transistor (continued)

Common Emitter Y Parameters (continued)

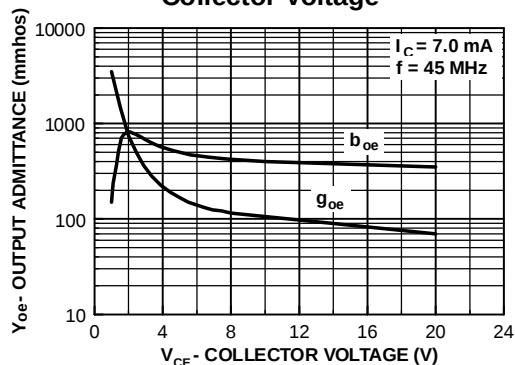
Output Admittance vs
Collector Current



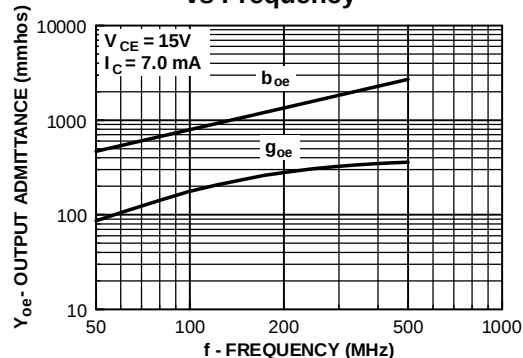
Output Admittance vs
Collector Current



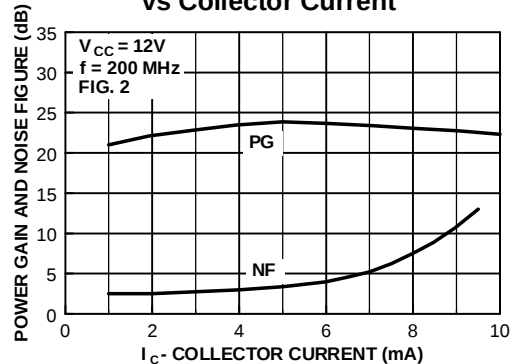
Output Admittance vs
Collector Voltage



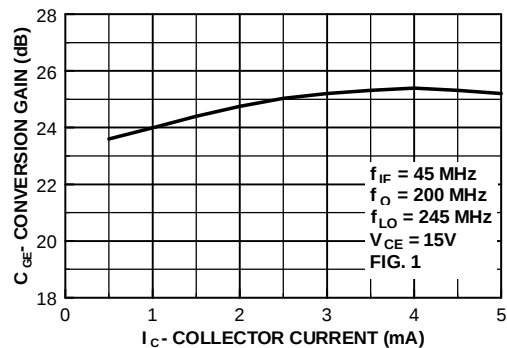
Output Admittance
vs Frequency



Power Gain and Noise Figure
vs Collector Current



Conversion Gain
vs Collector Current



NPN RF Transistor
(continued)

Test Circuits

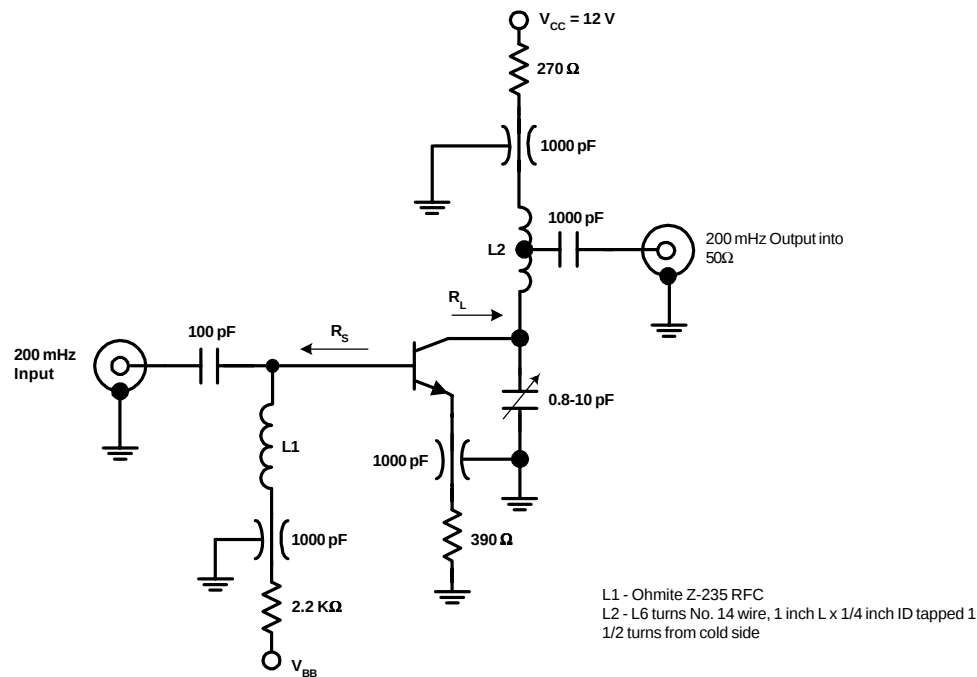


FIGURE 1: Unneutralized 200 MHz PG and NF Test Circuit

NPN RF Transistor (continued)

Test Circuits (continued)

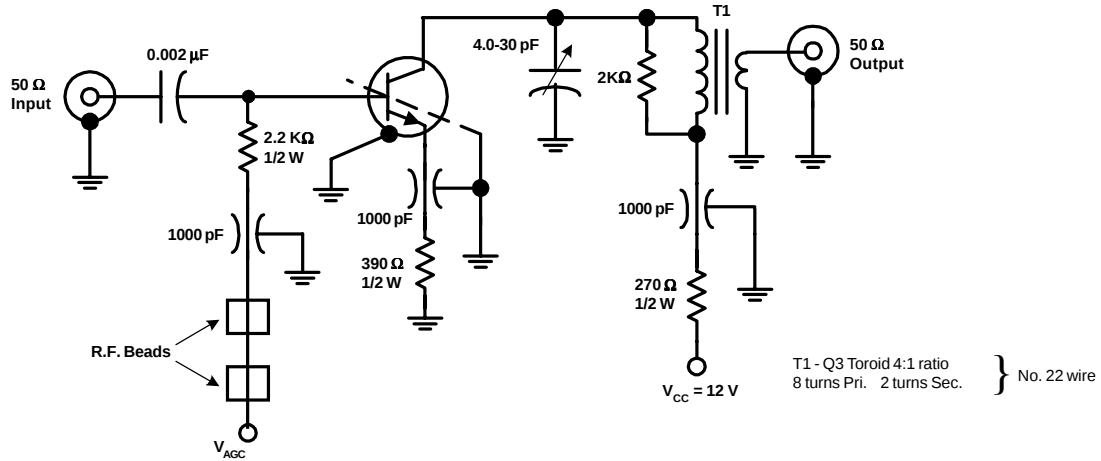


FIGURE 2: 45 MHz Power Gain Circuit

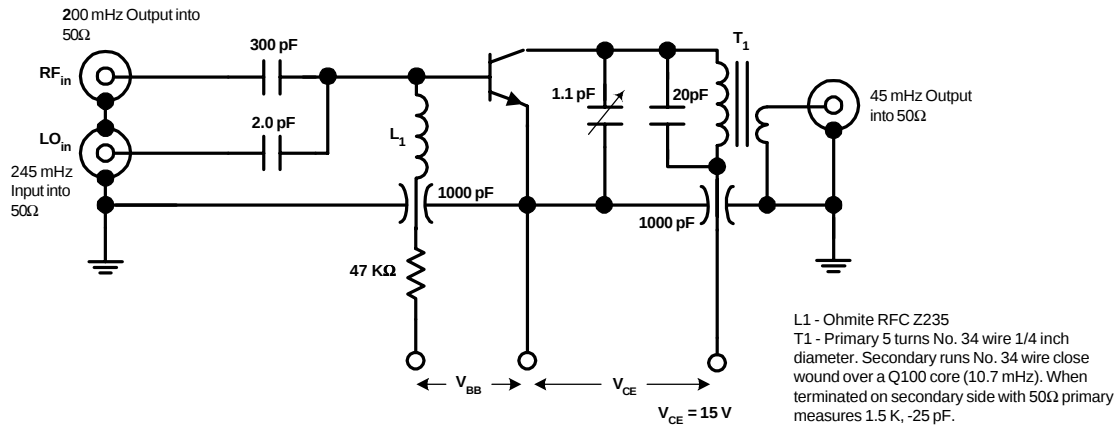


FIGURE 3: 200 MHz Conversion Gain Test Circuit

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