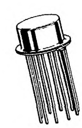
MC1550G

. . . a versatile, common-emitter, common-base cascode circuit for use in communications applications.



Lead 7 connected to case

CASE 71

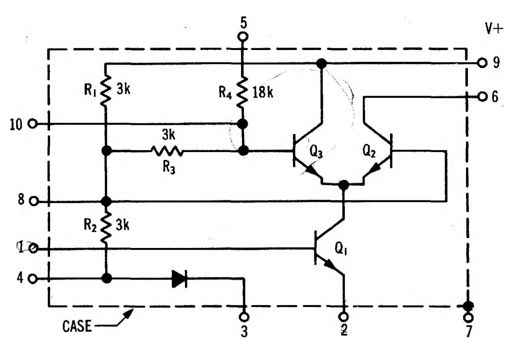
Typical Amplifier Features:

- Constant Input Impedance over entire AGC range
- Extremely Low y_{12} – 0.001 mmho
- High Power Gain – 30 dB @ 60 MHz (0.5 MHz BW)
- Good Noise Figure – 5.0 dB @ 60 MHz
- High Voltage-Gain–Bandwidth Product – 2.0 GHz

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	Value	Unit
Power Supply Voltage, Pin 9	V+	20	Vdc
AGC Supply Voltage	V_{AGC}	20	Vdc
Differential Input Voltage, Pin 1 to Pin 4 (R_S = 500 ohms)	V_{in}	±5	V (RMS)
Power Dissipation (Package Limitation) Derate above 25°C	P_D	680 4.6	mW mW/°C
Operating Temperature Range	T_A	-55 to +125	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

CIRCUIT SCHEMATIC



CIRCUIT DESCRIPTION

The MC1550 is built with monolithic fabrication techniques utilizing diffused resistors and small–geometry transistors. Excellent AGC performance is obtained by shunting the signal through the AGC transistor Q_3 maintaining the operating point of the input transistor Q_1. This keeps the input impedance constant over the entire AGC range.

The amplifier is intended to be used in a common-emitter, common-base configuration (Q_1 and Q_2) with Q_1 acting as an AGC transistor. The input signal is applied between pins 1 and 4, where pin 4 is ac-coupled to ground. DC source resistance between pins 1 and 4 should be small (less than 100 ohms). Pins 2 and 3 should be connected together and grounded. Pins 8 and 10 should be bypassed to ground. The positive supply voltage is applied at pin 9 and at higher frequencies, pin 9 should also be bypassed to ground. The output is taken between pins 6 and 9. The substrate is connected to pin 7 and should be grounded. AGC voltage is applied to pin 5.

ELECTRICAL CHARACTERISTICS (V+ = +6 Vdc, T_A = 25°C)

Characteristic	Conditions	Figure	Symbol	Min	Typ	Max	Unit
DC CHARACTERISTICS							
Output Voltage	V_{AGC} = 0 Vdc V_{AGC} = +6 Vdc	1	V_{out}	3.80 5.90	— —	4.65 6.00	Vdc
Test Voltage	V_{AGC} = 0 Vdc V_{AGC} = +6 Vdc	1	V_8	2.85 3.25	— —	3.40 3.80	Vdc
Supply Drain Current	V_{AGC} = 0 Vdc V_{AGC} = +6 Vdc	1	I_D	— —	— —	2.2 2.5	mAdc
AGC Supply Drain Current	V_{AGC} = 0 Vdc V_{AGC} = +6 Vdc	1	I_{AGC}	— —	— —	-0.2 0.18	mAdc
SMALL-SIGNAL CHARACTERISTICS							
Small-Signal Voltage Gain	f = 500 kHz	2	A_V	22	—	29	dB
Bandwidth	-3.0 dB	2	BW	22	—	—	MHz
Transducer Power Gain	f = 60 MHz, BW = 6 MHz f = 100 MHz, BW = 6 MHz	3	A_P	— —	25 21	— —	dB

FIGURE 1 — DC CHARACTERISTICS TEST CIRCUIT

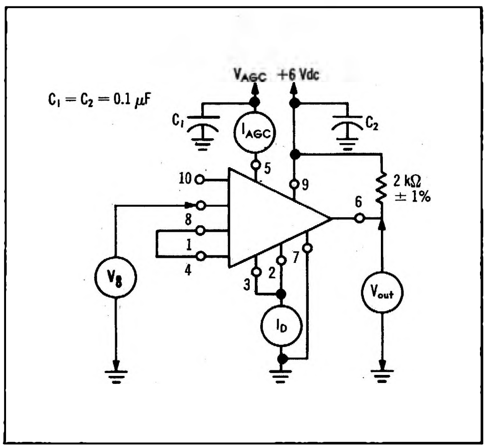


FIGURE 2 — VOLTAGE GAIN AND BANDWIDTH TEST CIRCUIT

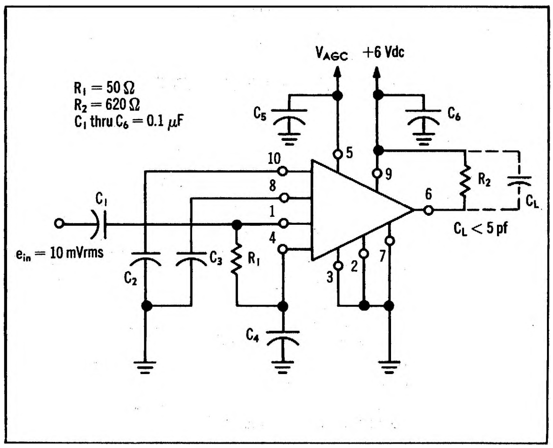


FIGURE 3 — POWER GAIN TEST CIRCUIT @ 60 MHz

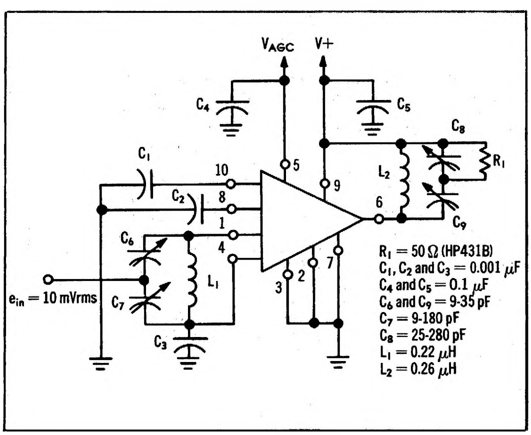


FIGURE 4 — DRAIN CURRENT TEMPERATURE CHARACTERISTICS

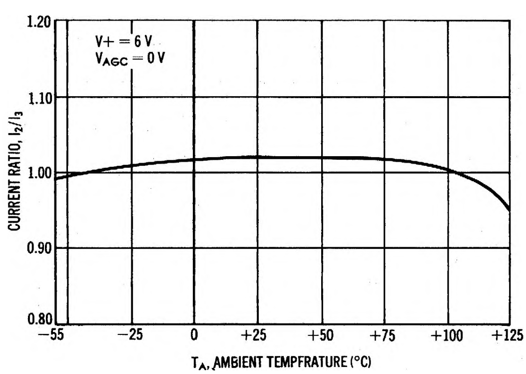


FIGURE 5 — INPUT RESISTANCE AND CAPACITANCE versus FREQUENCY

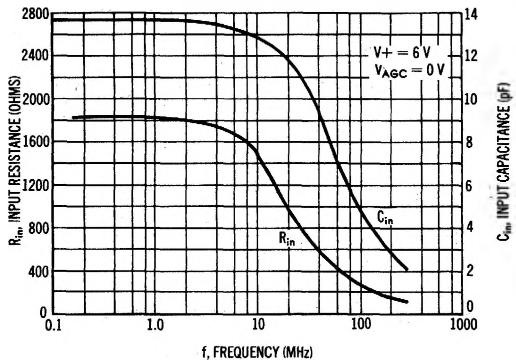


FIGURE 6 — INPUT RESISTANCE AND CAPACITANCE versus AGC VOLTAGE

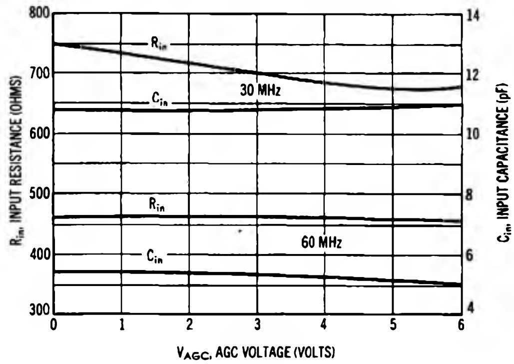


FIGURE 7 — OUTPUT RESISTANCE AND CAPACITANCE versus FREQUENCY

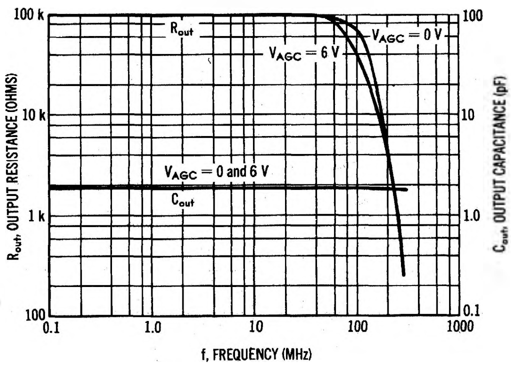


FIGURE 8 — OUTPUT RESISTANCE AND CAPACITANCE versus AGC VOLTAGE

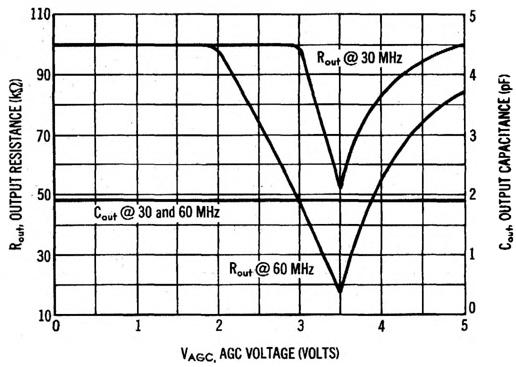


FIGURE 9 — FORWARD TRANSFER ADMITTANCE versus FREQUENCY

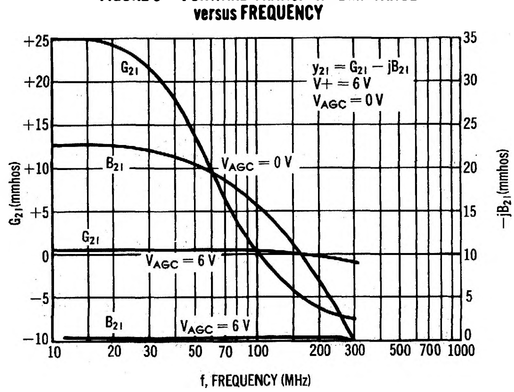


FIGURE 10 — FORWARD TRANSFER ADMITTANCE versus AGC VOLTAGE

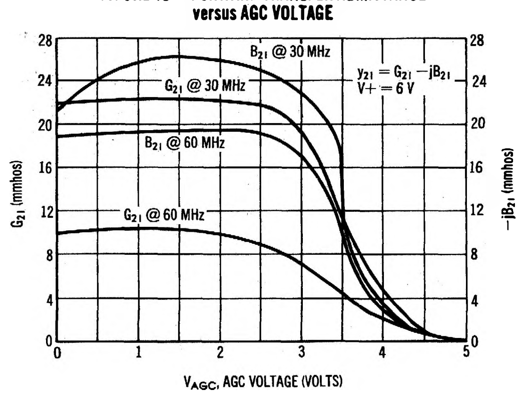


FIGURE 11 — MAXIMUM TRANSDUCER POWER GAIN versus FREQUENCY

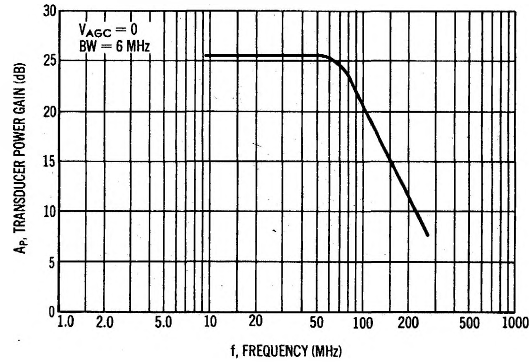


FIGURE 12 — TRANSDUCER POWER GAIN versus TEMPERATURE

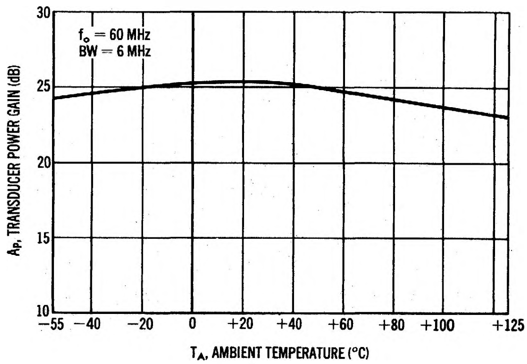


FIGURE 13 — TRANSDUCER POWER BANDWIDTH versus AGC VOLTAGE

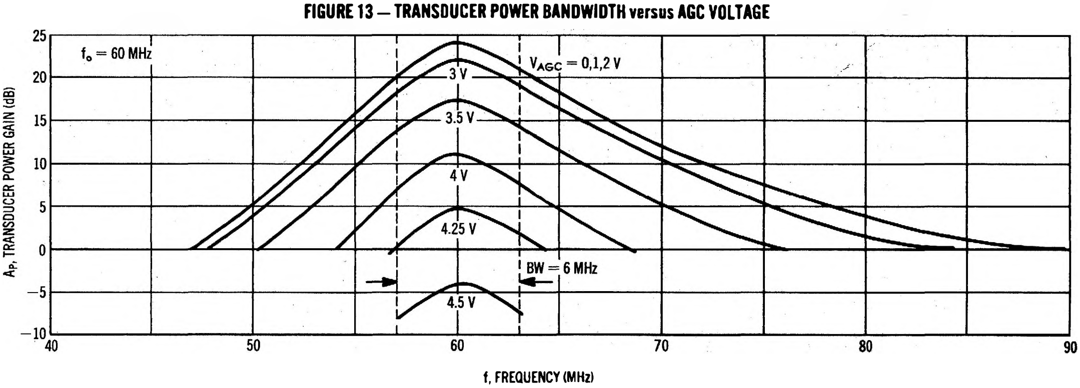


FIGURE 14 — NOISE FIGURE AND OPTIMUM SOURCE RESISTANCE versus FREQUENCY

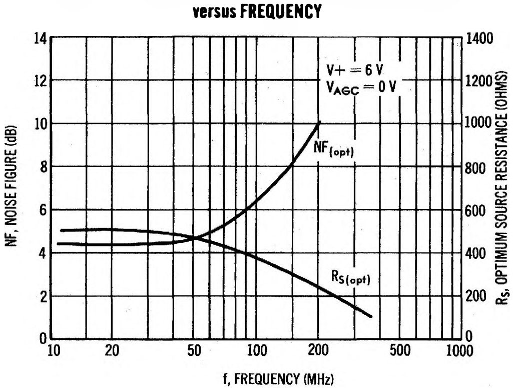


FIGURE 15 — NOISE FIGURE versus SOURCE RESISTANCE