

The RF Line

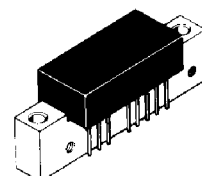
Wideband Linear Amplifiers

... designed for amplifier applications in 50 to 100 ohm systems requiring wide bandwidth, low noise and low distortion. This hybrid provides excellent gain stability with temperature and linear amplification as a result of the push-pull circuit design.

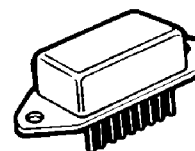
- Specified Characteristics at $V_{CC} = 24\text{ V}$, $T_C = 25^\circ\text{C}$:
 - Frequency Range — 1 to 520 MHz
 - Output Power — 440 mW Typ @ 1 dB Compression, $f = 1\text{--}520\text{ MHz}$
 - Power Gain — 30 dB Typ @ $f = 100\text{ MHz}$
 - Noise Figure — 8.3 dB Typ @ $f = 50\text{ MHz}$
- All Gold Metallization for Improved Reliability
- Unconditional Stability Under All Mismatch Conditions

CA2820
CA2820H

30 dB
1–520 MHz
440 mWATT
WIDEBAND
LINEAR AMPLIFIERS



CASE 714M-01, STYLE 2
(CA)
CA2820



CASE 826-01, STYLE 4
(SIP)
CA2820H

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
DC Supply Voltage	V_{CC}	28	Vdc
RF Power Input	P_{in}	+ 10	dBm
Operating Case Temperature Range	T_C	– 40 to + 100	$^\circ\text{C}$
Storage Temperature Range	T_{stg}	– 55 to + 125	$^\circ\text{C}$

ELECTRICAL CHARACTERISTICS ($T_C = 25^\circ\text{C}$, $V_{CC} = 24\text{ V}$, 50 Ω system unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency Range	BW	1	—	520	MHz
Gain Flatness ($f = 1\text{--}520\text{ MHz}$)	—	—	± 0.8	± 1.5	dB
Power Gain ($f = 100\text{ MHz}$)	P_G	29	30	31	dB
Noise Figure, Broadband $f = 30\text{ MHz}$ $f = 500\text{ MHz}$	NF	—	6 8.3	8 10	dB
Power Output — 1 dB Compression ($f = 1\text{--}520\text{ MHz}$)	$P_{o\ 1dB}$	400	440	—	mW
Third Order Intercept (See Figure 10, $f_1 = 520\text{ MHz}$)	ITO	35	37	—	dBm
Input/Output VSWR	Input Output VSWR	— —	1.5:1 1.8:1	2:1 2:1	—
Second Harmonic Distortion (Tone at 10 mW, $f_{2H} = 1\text{--}520\text{ MHz}$)	d_{so}	—	– 55	– 45	dB
Reverse Isolation ($f = 1\text{--}520\text{ MHz}$)	—	49	52	—	dB
Peak Envelope Power (Two Tone Distortion Test — See Figure 10) ($f = 1\text{--}520\text{ MHz}$ @ – 32 dB IMD)	PEP	300	400	—	mW
Supply Current	I_{CC}	300	330	360	mA

TYPICAL CHARACTERISTICS

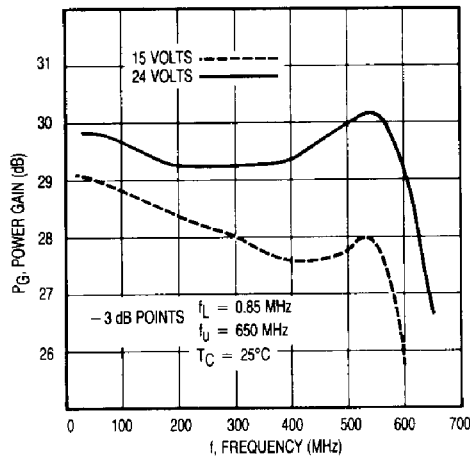


Figure 1. Power Gain versus Frequency

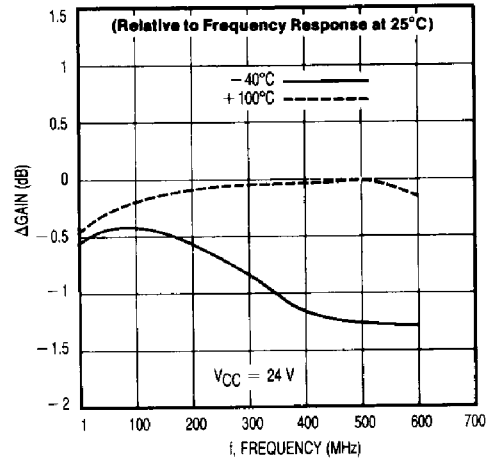


Figure 2. Relative Power Gain versus Temperature

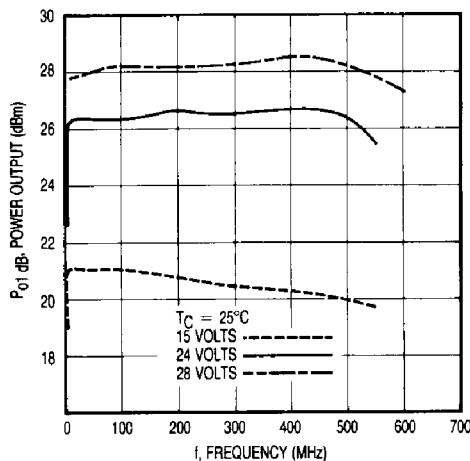


Figure 3. 1 dB Gain Compression versus Voltage

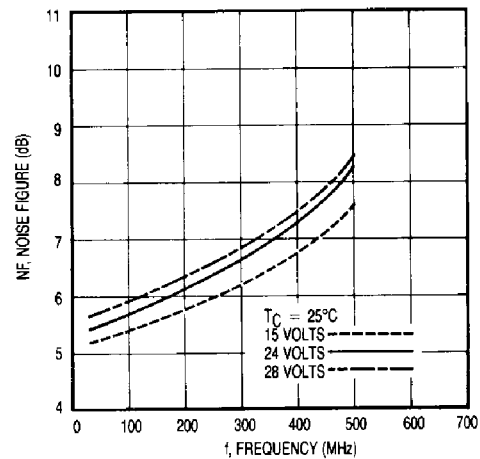


Figure 4. Noise Figure versus Voltage

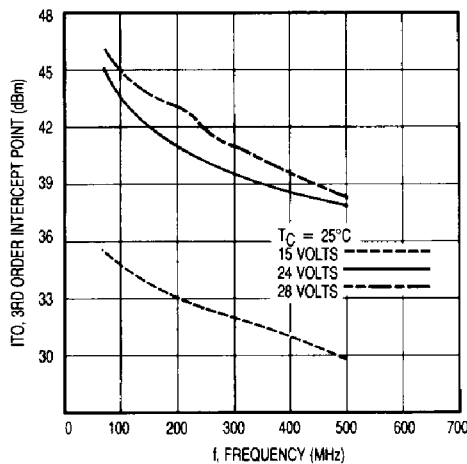


Figure 5. Third Order Intercept versus Voltage

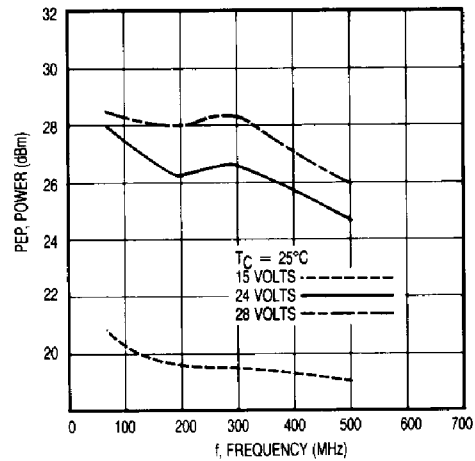


Figure 6. Peak Envelope Power versus Voltage

CA2820, CA2820H

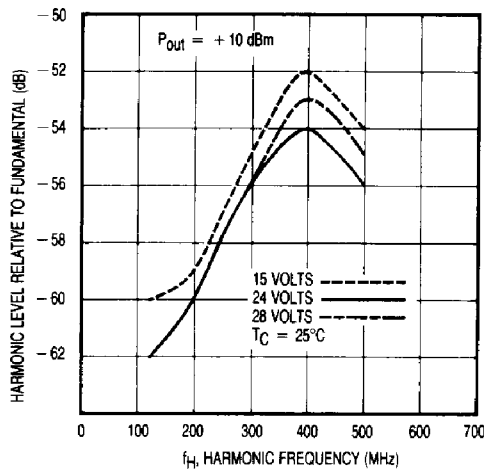


Figure 7. Second Harmonic Distortion versus Voltage

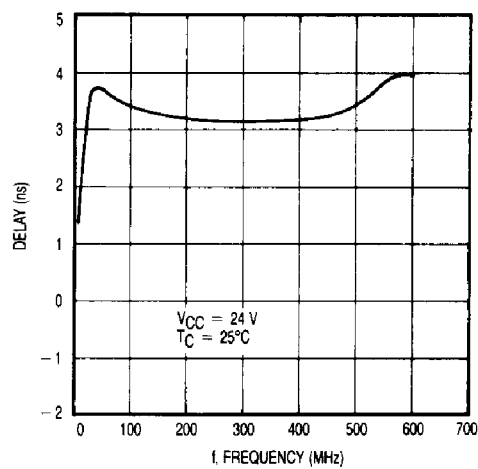


Figure 8. Group Delay versus Frequency

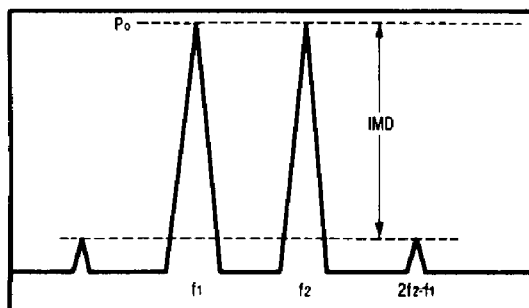
Biased at 24 Volts

T = 25°C Z₀ = 50Ω

Frequency (MHz)	S11		S21		S12		S22	
	Mag	Ang	Mag	Ang	Mag	Ang	Mag	Ang
1	-12.5	-41.4	30.1	169	-52.8	150	-6.3	138
10	-25.4	-24.0	29.6	5.0	-53.8	5.0	-24.1	78
100	-27.5	5.6	29.6	-120	-55.3	-51.0	-39.3	-126
200	-21.4	3.6	29.3	120	-59.0	-118	-21.3	15.7
300	-17.1	-43	29.1	-1.6	-58.2	145	-16.0	-30
400	-15.5	-106	29.1	-123	-53.2	89.8	-10.4	-56.6
500	-16.5	-181	29.5	109	-50.3	36.0	-37.7	150
600	-17.3	129	28.7	-41.2	-55.4	14.8	-2.5	-14.2

Magnitude in dB, Phase Angle in degrees.

Figure 9. S-Parameters



$$I_{T0} = P_o + \frac{IMD}{2} @ IMD > 60dB$$

$$PEP = 4X P_o @ IMD = -32dB$$

Figure 10. Intermodulation Test

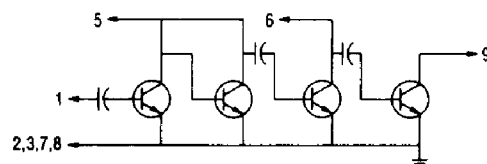


Figure 11. Functional Schematic

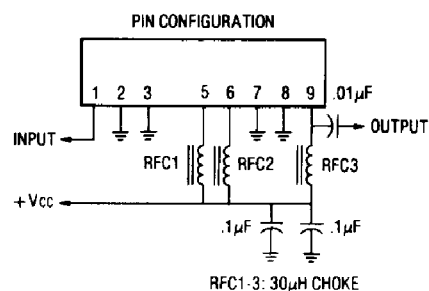


Figure 12. External Connections