MOTOROLA
**SEMICONDUCTOR**
TECHNICAL DATA

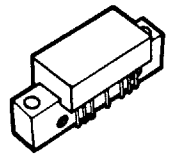
# CA2875R

## The RF Line
# Wideband Linear Amplifier

. . . 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 $V_{CC}$ = −19 V, $T_C$ = 25°C:
  - Frequency Range — 40 to 100 MHz
  - Output Power — 400 mW Typ @ 1 dB Compression, f = 100 MHz
  - Power Gain — 17.5 dB Typ @ f = 100 MHz
  - PEP — 300 mW Typ @ −32 dB IMD
  - Noise Figure — 4.5 dB Typ @ f = 70 MHz
  - ITO — 43 dBm @ f = 70 MHz
- All Gold Metallization for Improved Reliability
- Specified for 75 Ohm Systems

**17.5 dB**
**40–100 MHz**
**400 mWATT**
**WIDEBAND**
**LINEAR AMPLIFIER**



CASE 714H-01, STYLE 1
(CA)
CA2875R

**MAXIMUM RATINGS**

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| DC Supply Voltage | $V_{CC}$ | −28 | Vdc |
| RF Power Input | $P_{in}$ | +14 | dBm |
| Operating Case Temperature Range | $T_C$ | −40 to +100 | °C |
| Storage Temperature Range | $T_{stg}$ | −55 to +125 | °C |

**ELECTRICAL CHARACTERISTICS** ($T_C$ = 25°C, $V_{CC}$ = −19 V, 75 Ω system unless otherwise noted)

| Characteristic | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Frequency Range | BW | 40 | — | 100 | MHz |
| Gain Flatness (f = 40–100 MHz) | — | — | ±0.1 | ±0.2 | dB |
| Power Gain (f = 100 MHz) | $P_G$ | 17 | 17.5 | 18 | dB |
| Noise Figure, Broadband (f = 70 MHz) | NF | — | 4.5 | 5 | dB |
| Power Output — 1 dB Compression (f = 40–100 MHz) | $P_{o\ 1dB}$ | 315 | 400 | — | mW |
| Third Order Intercept (See Figure 11, $f_1$ = 70 MHz) | ITO | 42 | 43 | — | dBm |
| Input/Output VSWR (f = 40–100 MHz) | VSWR | — | — | 1.1:1 | — |
| Second Harmonic Distortion (Tone at 250 mW, $f_{2H}$ = 100 MHz) | $d_{so}$ | — | −40 | — | dB |
| Peak Envelope Power (Two Tone Distortion Test — See Figure 11) (f = 40–100 MHz @ −32 dB IMD) | PEP | 250 | 300 | — | mW |
| Supply Current | $I_{CC}$ | 140 | 155 | 170 | mA |

5

## TYPICAL CHARACTERISTICS

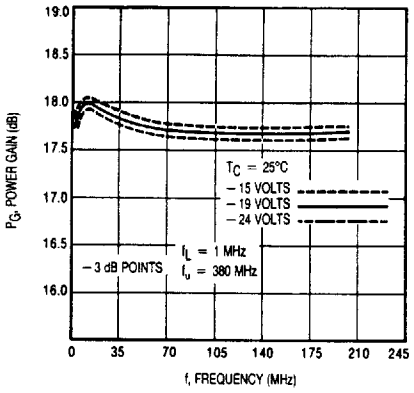



**Figure 1. Power Gain versus Frequency**

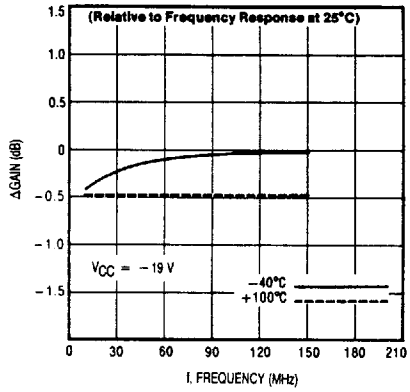



**Figure 2. Relative Power Gain versus Temperature**

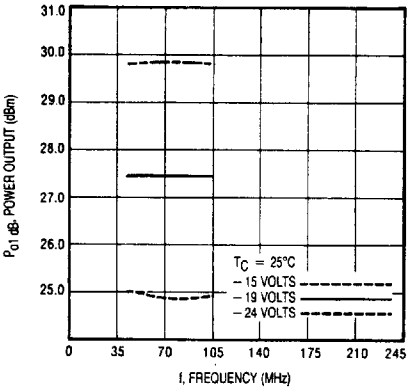



**Figure 3. 1 dB Gain Compression versus Voltage**

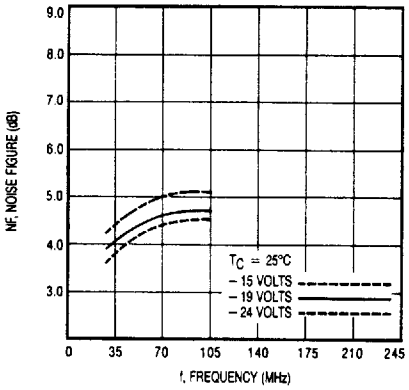



**Figure 4. Noise Figure versus Voltage**

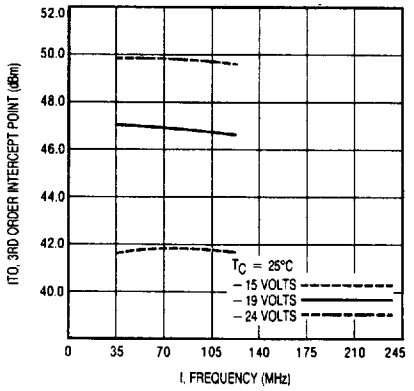



**Figure 5. Third Order Intercept versus Voltage**

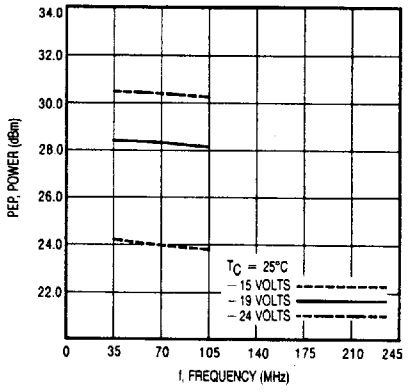



**Figure 6. Peak Envelope Power versus Voltage**

5

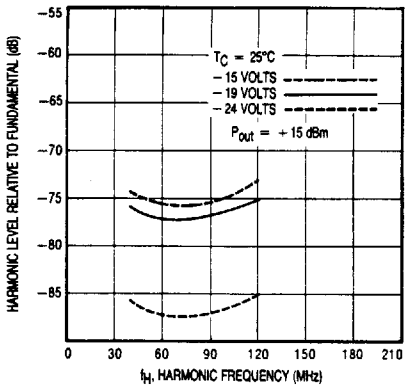



**Figure 7. Second Harmonic Distortion versus Voltage**

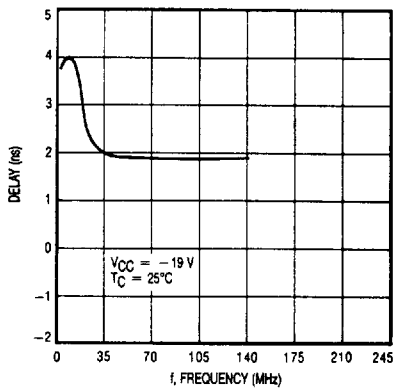



**Figure 8. Group Delay versus Frequency**

**Biased at −19 Volts** T = 25°C Zo = 75Ω

| Frequency (MHz) | S11 | | S21 | | S12 | | S22 | |
|---|---|---|---|---|---|---|---|---|
| | Mag | Ang | Mag | Ang | Mag | Ang | Mag | Ang |
| 40 | -32.1 | 14.8 | 17.6 | -27.4 | -24.2 | 161 | -40.5 | -31.1 |
| 50 | -32.7 | 2.0 | 17.6 | -34.3 | -24.3 | 156 | -39.4 | -38.1 |
| 70 | -33.4 | -16.0 | 17.6 | -48.1 | -24.3 | 147 | -36.0 | -57.2 |
| 90 | -32.8 | -27.0 | 17.5 | -60.9 | -24.4 | 138 | -32.4 | -76.7 |
| 100 | -32.6 | -34.0 | 17.5 | -68.0 | -24.5 | 133 | -30.3 | -87.7 |

Magnitude in dB, Phase Angle in degrees.

**Figure 9. S-Parameters**

5

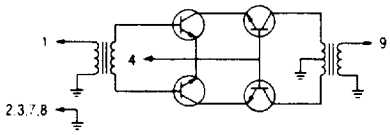
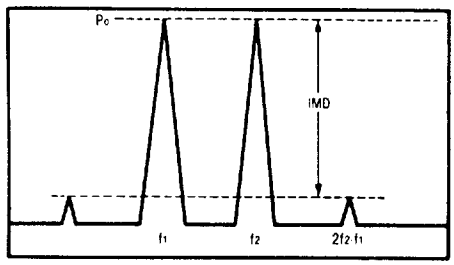



**Figure 10. Functional Schematic**




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

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

**Figure 11. Intermodulation Test**