

May 1999

Features

- Excellent Overload Characteristics
- AGC for IF Amplifier
- Buffered Output Signal for Tuning Meter
- Internal Zener Diode Provides Voltage Regulation
- Two IF Amplifier Stages
- Low-Noise Converter and First IF Amplifier
- Low Harmonic Distortion (THD)
- Delayed AGC for RF Amplifier
- Terminals for Optional Inclusion of Tone Control
- Operates from Wide Range of Power Supplies:
V+ = 6V to 16V
- Optional AC and/or DC Feedback on Wide-Band Amplifier
- Array of Amplifiers for General-Purpose Applications
- Suitable for Use With Optional External RF Stage,
Either MOS or Bipolar
- Related at:
 - Refer to AN6022 for Application Note Information

Part Number Information

| PART NUMBER | TEMP. RANGE (°C) | PACKAGE | PKG. NO. |
|-------------|---------------------|------------|-------------|
| CA3088E | -40 to 85 | 16 Ld PDIP | E16.3 |

Description

The CA3088E, a monolithic integrated circuit, is an AM sub-system that provides the converter, IF amplifier, detector, and audio preamplifier stages for an AM receiver.

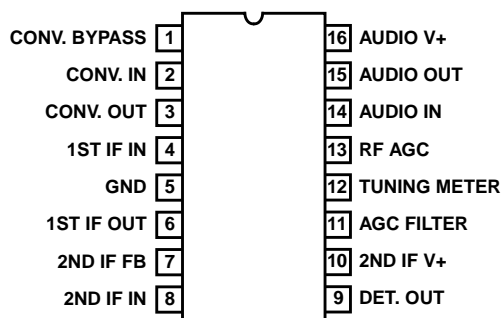
The CA3088E also provides internal AGC for the first IF amplifier stage, delayed AGC for an optional external RF amplifier, a buffer stage to drive a tuning meter, and terminals facilitating the optional use of a tone control.

Figure 2 is a functional diagram of the CA3088E. The signal from the low-noise converter is applied to the first IF amplifier and is then coupled to the second IF amplifier. This IF signal is then detected and externally filtered. The resultant audio signal is applied to an audio preamplifier. Optionally, a tone control circuit may be connected at the junction of the detector circuit and the audio preamplifier. The gain of the first IF amplifier stage is controlled by an internal AGC circuit. The CA3088E supplies a delayed AGC signal output for use with an external RF amplifier. A buffered output signal is also available for driving a tuning meter. A DC voltage, internally regulated by a Zener diode, supplies the second IF amplifier, the AGC and tuning meter circuits and may also be used with any other stage.

The CA3088E features four independent transistor amplifiers, each incorporating internal biasing for temperature tracking. These amplifiers are particularly useful in general-purpose amplifier, oscillator, and detector applications in a wide variety of equipment designs.

Pinout

CA3088E
(PDIP)
TOP VIEW



CA3088E

Absolute Maximum Ratings $T_A = 25^\circ\text{C}$

Supply Voltage
(Across Term. 5 and Terms. 3, 6, 13, 16, Respectively) 16V
Output Current
Terminals 3, 6, 13, 16, (Respectively) 10mA
Terminal 10 30mA

Thermal Information

Thermal Resistance (Typical, Note 1) θ_{JA} ($^\circ\text{C}/\text{W}$)
PDIP Package 110
Maximum Junction Temperature (Plastic Package) 150°C
Maximum Storage Temperature Range -65°C to 150°C
Maximum Lead Temperature (Soldering 10s) 300°C

Operating Conditions

Temperature Range -40°C to 85°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE:

1. θ_{JA} is measured with the component mounted on an evaluation PC board in free air.

Electrical Specifications $T_A = 25^\circ\text{C}$, $V_+ = 12\text{V}$

| PARAMETER | SYMBOL | TEST CONDITIONS | MIN | TYP | MAX | UNITS |
|---|-------------------------|-------------------------------------|-----|------|-----|------------------------|
| DC CHARACTERISTICS | | | | | | |
| Voltage (Figure 1) | V_1, V_4, V_9, V_{11} | Terminals 1, 4, 9, 11 | - | 0.7 | - | V |
| | V_2, V_7, V_8 | Terminals 2, 7, 8 | - | 1.4 | - | V |
| | V_{10} | Terminal 10 | - | 5.6 | - | V |
| | V_{12} | Terminal 12 | - | 0 | - | V |
| | V_{15} | Terminal 15 | - | 3.5 | - | V |
| Current (Figure 1) | I_3 | Terminal 3 | - | 0.35 | - | mA |
| | I_6 | Terminal 6 | - | 1.0 | - | mA |
| | I_{10} | Terminal 10 | - | 20 | - | mA |
| | I_{13} | Terminal 13 | - | 0 | - | mA |
| | I_{16} | Terminal 16 | - | 1.2 | - | mA |
| DYNAMIC CHARACTERISTICS | | | | | | |
| Detector Output (Figure 2) | | 30% Modulation | - | 75 | - | mV _{RMS} |
| Audio Amplifier Gain (Figure 2) | A_{AF} | $f = 1\text{kHz}$ | - | 30 | - | dB |
| Audio Distortion (Figure 2) | | $V_{OUT} = 100\text{mV}$ | - | 0.2 | - | % |
| Sensitivity ($f_{IN} = 1\text{MHz}$, Signal-to-Noise Ratio (S/N) = 20dB)) | | At Converter Stage Input (Figure 2) | - | 200 | - | $\mu\text{V}/\text{m}$ |
| | | At RF Stage Input (Figure 2) | - | 100 | - | $\mu\text{V}/\text{m}$ |
| Total Harmonic Distortion (Figure 2) | THD | 30% Modulation | - | 1.0 | - | % |
| Input Resistance (No AGC, $f_{IN} = 1\text{MHz}$) | R_{IN} | At Transistor Q_1 | - | 3500 | - | Ω |
| | | At Transistor Q_5 | - | 2000 | - | Ω |
| Input Capacitance (No AGC, $f_{IN} = 1\text{MHz}$) | C_{IN} | At Transistor Q_1 | - | 17 | - | pF |
| | | At Transistor Q_5 | - | 12 | - | pF |
| Feedback Capacitance (No AGC, $f_{IN} = 1\text{MHz}$) | C_{FB} | At Transistor Q_1 | - | 1.5 | - | pF |
| | | At Transistor Q_5 | - | 1.5 | - | pF |

CA3088E

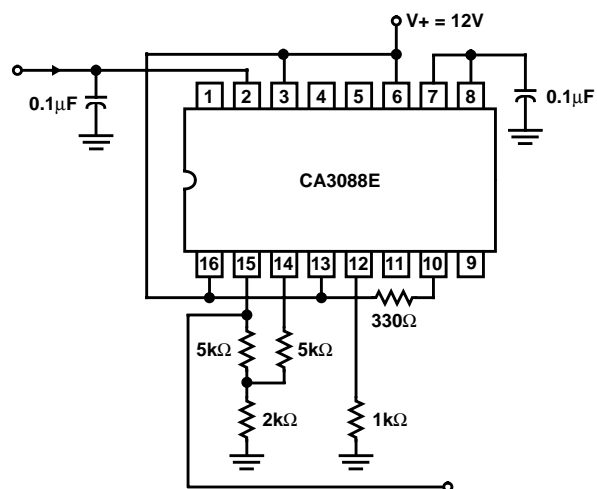


FIGURE 1. TEST CIRCUIT FOR DC CHARACTERISTICS

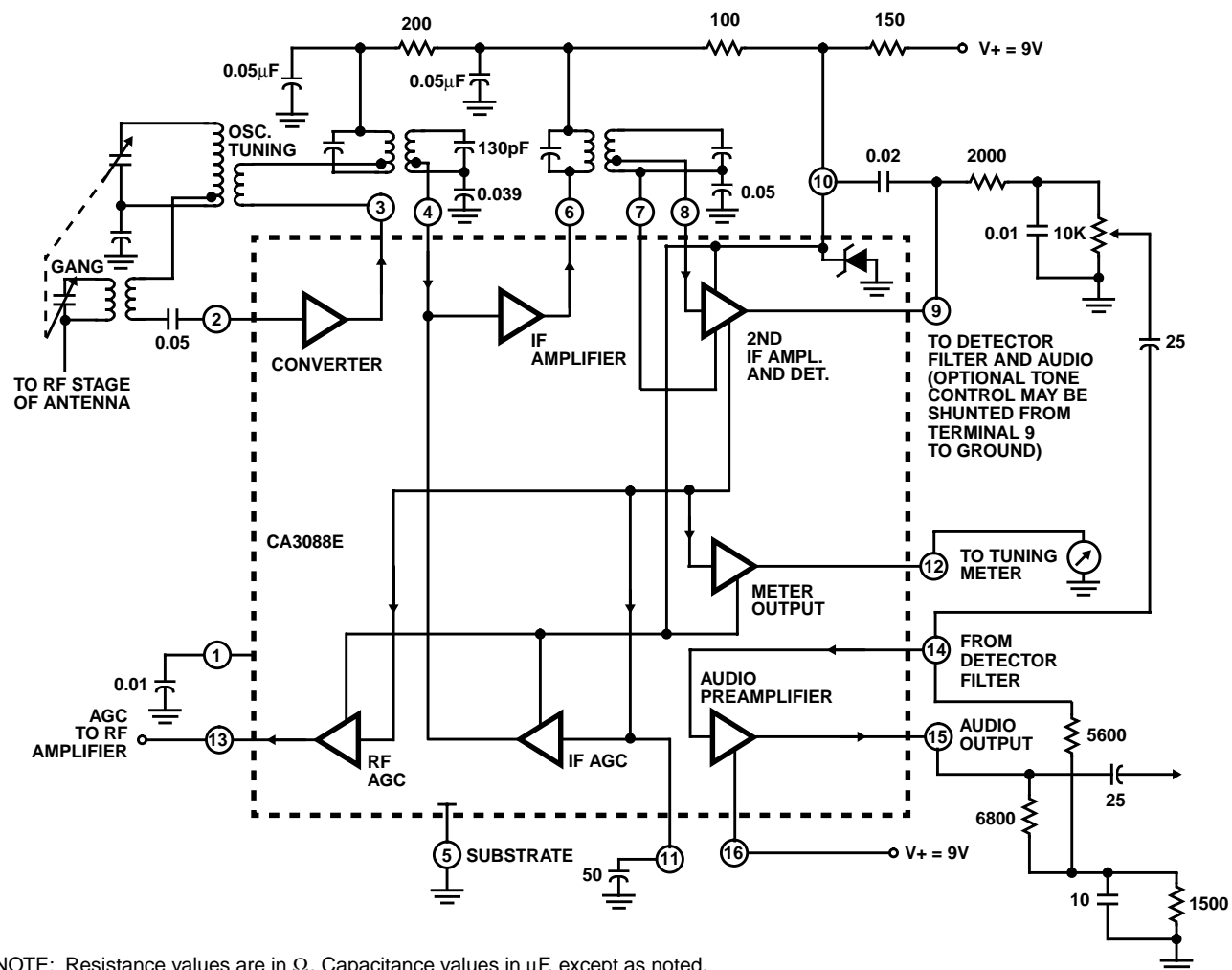


FIGURE 2. FUNCTIONAL BLOCK DIAGRAM OF THE CA3088E

CA3088E

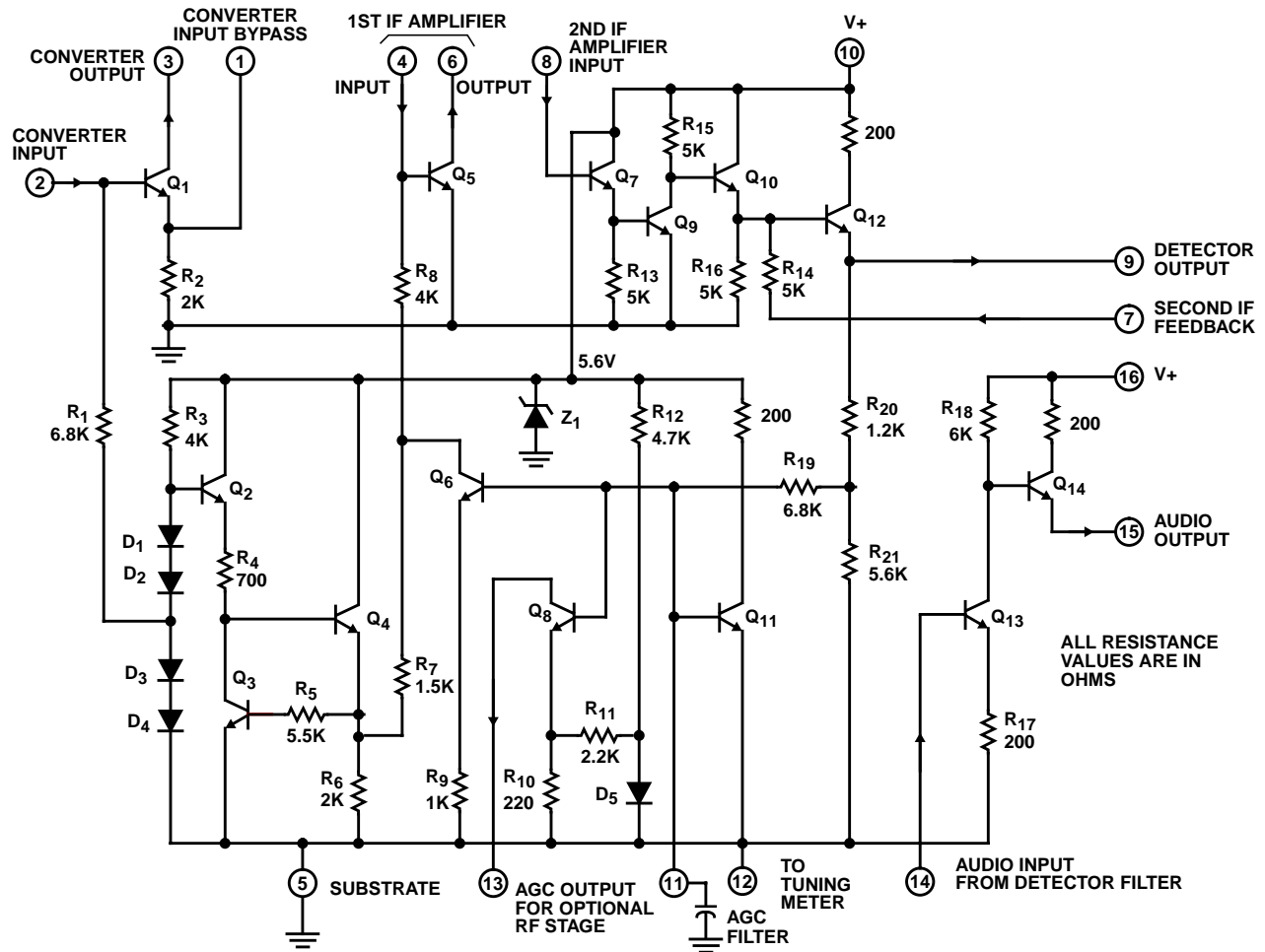


FIGURE 3. SCHEMATIC DIAGRAM OF THE CA3088E