

## FM-IF detector

**Dimensions (Units : mm)**

### BA4112 (DIP16)

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- Technical drawing of a 16-pin D-sub connector. The top view shows a rectangular housing with 16 pins, a mounting tab on the left, and a circular feature on the right. Dimensions include a total length of  $19.4 \pm 0.3$ , a pin pitch of 2.54, a mounting tab width of 0.5 (Min.), a pin diameter of  $0.3 \pm 0.1$ , and a housing width of  $6.5 \pm 0.3$ . The side view shows a height of 7.62 and a pin angle of approximately  $15^\circ$ .

- VHF-band FM transceivers
- cordless telephones

The diagram illustrates the internal architecture of the BA4112 IC, which is a monolithic integrated circuit for FM stereo reception. The components and their connections are as follows:

- Crystal Oscillator (OSC):** Connected to pins 1 and 2, providing a reference frequency to the mixer.
- Mixer (MIX):** Receives the RF signal (pin 16) and the oscillator signal, producing the mixer output (pin 3).
- VCC:** The main power supply, connected to pin 4.
- Squelch Control:** A central block that receives the mixer output (pin 3) and provides control signals to the audio mute (pin 14), scan control (pin 13), and squelch in (pin 12).
- Limiter (1F):** A limiter stage that receives the limiter input (pin 5) and produces the limiter output (pin 7).
- Decoupling:** A decoupling stage connected to pin 6.
- Detector (DET):** Receives the limiter output (pin 7) and produces the quad in signal (pin 8).
- Filtering and Amplification:** The quad in signal (pin 8) is filtered (pin 10) and then amplified (pin 11) to produce the filter out (pin 11) and AF out (pin 9) signals.
- Audio Mute:** Controls the audio mute function (pin 14).
- Scan Control:** Controls the scan function (pin 13).
- Squelch In:** Controls the squelch function (pin 12).
- RF In:** The radio frequency input signal (pin 16).
- GND:** Ground connection (pin 15).

**BA4112** Communications equipment: FM-IF detector**Absolute maximum ratings ( $T_a = 25^\circ\text{C}$ )**

Parameter	Symbol	Limits	Unit	Conditions
Power supply voltage	$V_{CC}$	12	V	
Power dissipation	$P_d$	500	mW	Reduce power by 5 mW/ $^\circ\text{C}$ for each degree above $25^\circ\text{C}$ .
Operating temperature	$T_{opr}$	$-10 \sim +60$	$^\circ\text{C}$	
Storage temperature	$T_{stg}$	$-25 \sim +75$	$^\circ\text{C}$	

**Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 6.0\text{ V}$ ,  $f_{IN} = 10.7\text{ MHz}$ ,  $\Delta f = \pm 3\text{ kHz}$ ,  $f_m = 1\text{ kHz}$ )**

Parameter	Symbol	Min	Typical	Max	Unit	Conditions
Quiescent current	$I_Q$	2.0	3.0	5.0	mA	No signal, squelch on
20 dB signal/noise sensitivity	20 dB S/N	15	-20	25	dB $\mu\text{V}$	
Detector output level	$V_{ODC}$	250	350	500	mV	$V_{IN} = 80\text{ dB}\mu\text{V}$
Detector output distortion	THD		1.8	3.0	%	$V_{IN} = 80\text{ dB}\mu\text{V}$
Detector output DC voltage	$V_{ODC}$	2.0	3.0	4.0	V	$V_{IN} = 0\text{ V}$
Detector output impedance	$Z_{OUT}$	280	400	520	$\Omega$	
Filter amplifier gain	$G_V$	41	46		dB	$V_{IN} = 1\text{ mV } 10\text{ kHz}$
Filter output DC voltage	$V_{ODC-f}$	1.5	2.0	2.5	V	
Squelch hysteresis	Hys	50	100	150	mV	
Mute low resistance	$R_{mL}$		10	50	$\Omega$	$V_{12} = \text{GND}$
Mute high resistance	$R_{mH}$	1.0	10		M $\Omega$	$V_{12} = 2.0\text{ V}$
Scan low voltage	$V_{ScL}$		0	0.5	V	$V_{12} = 2.0\text{ V}$
Scan high voltage	$V_{ScH}$	3.0	5.0	5.9	V	$V_{12} = \text{GND}$
Mixer conversion gain	$A_{vm}$	17	20		dB	$f_{IN} = 10.7\text{ MHz}$

**Note:** For the test circuit, see Figure 1

### Figure 2 Application example