

Audio Interface IC AN2906FJM

Overview

The AN2906FJM is an input/output interface IC that has built-in audio capability. This IC integrates in a single chip configuration a speaker amplifier, headphone amplifier, microphone amplifier, Electric Volume (EVR) and Auto Gain Control (AGC), thus contributing to more compact equipment design.

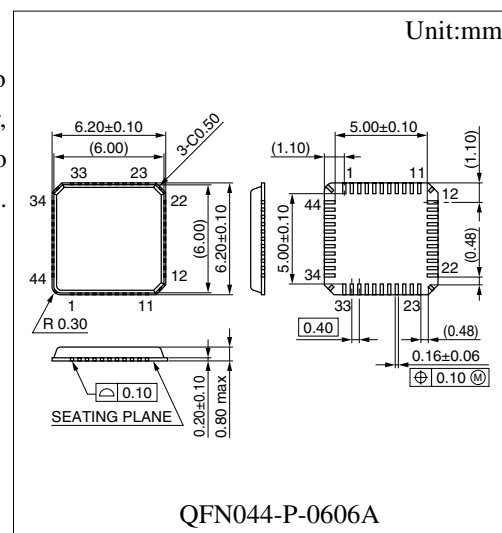
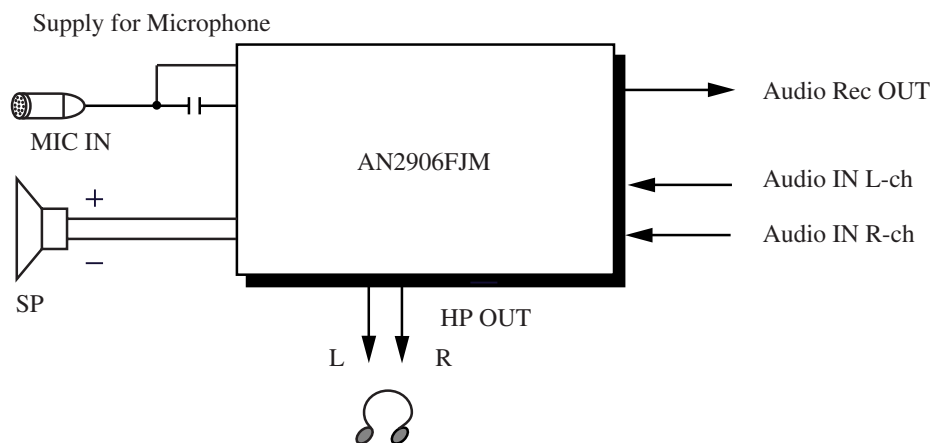
Features

- Speaker amplifier.
 - BTL amplifier (350mW 8Ω Vcc=3.3V)
- Built-in power-save function.
- Speaker amplifier, Headphone amplifier, Microphone amplifier.
- All functions.
- Electric Volume.
- Built-in ON/OFF switch.
- Input Auto Gain Control function.
- Built-in ON/OFF switch.
- Variable Gain Control for Low Pass Filter.
- Small and thin Package: High 0.8mm

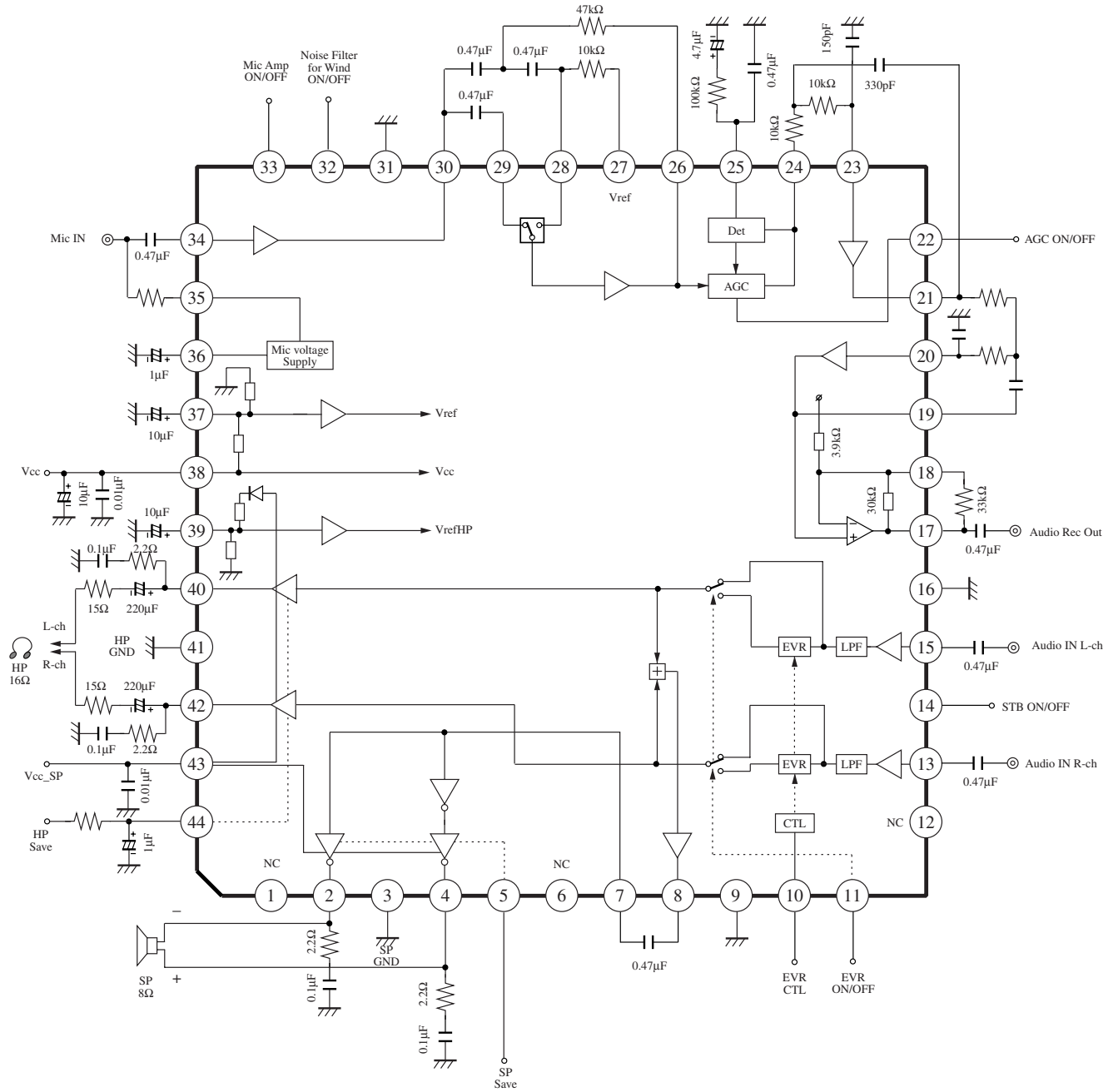
Applications

- PDA, Note-PC, IC-Recorder, etc

Applications Circuit



■ Block Diagram



■ Pin Discription

Pin No.	Function	Pin No.	Function
1	N.C	23	OP Amp.output for LPF
2	SP output (-)	24	AGC Output
3	GND (for SP)	25	AGC demodulation pin
4	SP output (+)	26	Nose for wind HPF output
5	SP Power save SW	27	Nose for wind HPF bias output
6	N.C	28	Nose for wind HPF OP amp. input
7	SP amp. input	29	Nose for wind HPF through input
8	MIX amp. output	30	MIC amp. output
9	GND	31	GND
10	EVR ATT control for HP & SP	32	Noise for wind SW
11	EVR ON/OFF control for HP & SP	33	MIC amp. power save SW
12	N.C	34	MIC amp. input
13	Playback input R-ch	35	MIC supply
14	Standby SW	36	MIC supply filter
15	Playback input L-ch	37	1/2 V _{CC} (V _{REF})
16	GND	38	V _{CC}
17	REC output	39	1/2 V _{CC_SP} (V _{REF_SP})
18	Feedback pin for Rec-out amp.	40	HP output L-ch
19	LPF bias output	41	GND (for HP)
20	LPF OP amp. input	42	HP output R-ch
21	OP amp. output for LPF	43	V _{CC_SP} (for SP drive)
22	AGC output	44	HP power save SW

■ Absolute Maximum Ratings

Parameters	Symbol	Rating	Item	Note
Storage temperature	T _{stg}	-55 to +125	°C	1
Operating ambient temperature	T _{opr}	-20 to +70	°C	1
Supply voltage	V _{CC} /V _{CC_SP}	5.2	V	2
Supply current	I _{CC}	-	mA	
Power dissipation	P _D	194.2	mW	3

Note1) All items are at T_a = 25°C, except for the operating ambient temperature and storage temperature parameters.

Note2) The range under Absolute Maximum Ratings, Power dissipation.

Note3) Power dissipation shows the value of only package at Ta=70°C

■ Recommended Operating Range

Supply voltage	V _{CC} /V _{CC_SP}	2.7 V to 5.0 V
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■ Electrical Characteristics at Ta = 25 °C ± 2 °C, V_{CC} = 3.3 V, V_{CC_SP} = 3.3 V, V₁₀ = V₁₁ = 0 V

Parameters	Symbol	Conditions	min	typ	max	Item
Circuit current						
Circuit current without signal(1A) (V _{CC} -system)	I _{VCCA}	—	3.5	5.5	8.0	mA
Circuit current without signal(2SA) (V _{CC_SP} -system)	I _{VCCSA}	V ₄₄ = 0 V	1.0	5.2	9.0	mA
Circuit current without signal(2HA) (V _{CC_SP} -system)	I _{VCCHA}	V ₅ = 0 V	1.0	4.3	8.0	mA
Circuit current without signal(1B) at STB mode(V _{CC} -system)	I _{VCCB}	V ₁₄ = 0 V	—	0.05	1.0	μA
Circuit current without signal(2B) at STB mode(V _{CC_SP} -system)	I _{VCCSB}	V ₁₄ = 0 V	—	0.05	1.0	μA
Circuit current without signal(1C) at Power save mode(V _{CC} -system)	I _{VCCC}	V ₅ = V ₄₄ = 0 V	—	4.2	7.0	mA
Circuit current without signal(2C) at Power save mode(V _{CC_SP} -system)	I _{VCCSC}	V ₅ = V ₄₄ = 0 V	—	0.2	0.5	mA
Power supply for microphone						
Microphone power supply	V _{MIC}	with output current -5 mA	1.8	2.0	2.2	V
Microphone amp. characteristics Microphone amp. input→ Microphone amp. output						
Output level	V _{ROM}	Vin = -39 dBV, 1 kHz	-20.5	-19.0	-17.5	dBV
Output distortion1	TH _{ROM1}	Vin = -39 dBV, 1 kHz, up to 5 th THD	—	0.005	0.10	%
Output noise	N _{ROM}	Without input signal, using A-curve filter	—	-101	-96	dBs
Output distortion2	TH _{ROM2}	Vin = -35 dBV, 1 kHz, up to 5 th THD, load = 22 kΩ	—	0.009	1.0	%
Rec. AGC characteristics AGC input→Rec. input						
Rec. reference output level A (input: microphone amp.)	V _{ROA}	Vin = -49.7 dBV, 1 kHz	-16.5	-15.0	-13.5	dBV
Rec. reference output distortion 1A (input: microphone amp.)	TH _{ROA}	Vin = -49.7 dBV, 1 kHz, up to 5 th THD	—	0.009	0.10	%
Rec. output noise voltage A	VN _{ROA}	With out input signal, using A-curve filter	—	-76	-72	dBV
Microphone AGC characteristics 1	V _{AGCML1}	Vin = -44.7 dBV, 1 kHz	-12	-10	-8	dBV
Microphone AGC characteristics 2	V _{AGCML2}	Vin = -39.7 dBV, 1 kHz	-11.2	-8.2	-5.2	dBV
Microphone AGC characteristics 3	V _{AGCML3}	Vin = -33.7 dBV, 1 kHz	-11	-8	-5	dBV
Microphone AGC characteristics 4	V _{AGCM4}	Vin = -15.7 dBV, 1 kHz	-10.2	-7.2	-4.2	dBV
Microphone AGC characteristics 4 distortion	TH _{AGCM4}	Vin = -15.7 dBV, 1 kHz up to 5 th THD, load = 22 kΩ	—	0.17	1.0	%

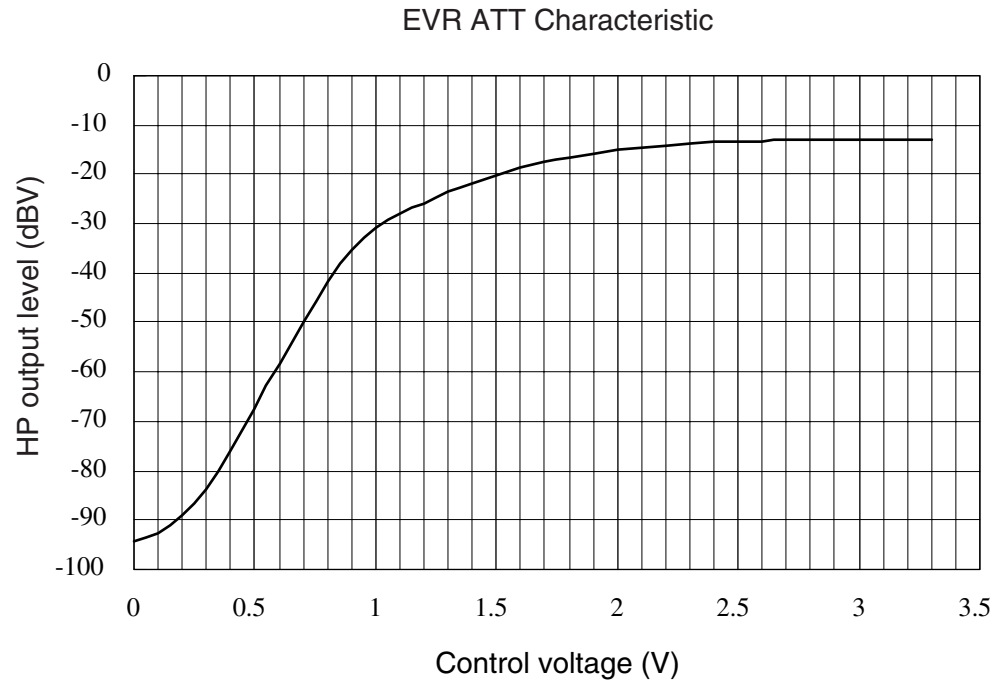
■ Electrical Characteristics at $T_a = 25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, $V_{CC} = 3.3\text{ V}$, $V_{CC_SP} = 3.3\text{ V}$

Parameters	Symbol	Conditions	min	typ	max	Item
HP or SP output characteristics at EVR=OFF mode ($V_{10} = V_{11} = 0\text{ V}$)						
HP output characteristics PB input→HP output						
Line reference output level at playback	V_{LOPS}	$V_{in} = -15\text{ dBV}$, 1 kHz, load = $16\text{ }\Omega$	-20.7	-18.7	-16.7	dBV
Line reference output distortion at playback	TH_{LOPS}	$V_{in} = -15\text{ dBV}$, 1 kHz, up to 5 th THD load = $16\text{ }\Omega$	—	0.06	0.20	%
Line reference output noise at playback	V_{NOPS}	Without input signal, using A-curve filter up to 5 th THD, load = $16\text{ }\Omega$	—	-94	-90	dBV
Line maximum output level at playback	V_{LMAPOS}	$f = 1\text{ kHz}$, load = $16\text{ }\Omega$ input level THD = 1 % (up to 5 th)	-5.2	-2.5	—	dBV
Line maximum input level at playback	V_{LMAPLS}	$f = 1\text{ kHz}$, load = $16\text{ }\Omega$ input level THD = 1 % (up to 5 th)	0	1.2	—	dBV
SP output characteristics						
SP reference output level at playback	V_{SPPS}	$V_{in} = -15\text{ dBV}$, 1 kHz $R_{OUT} = 8\text{ }\Omega$	-14.2	-12.7	-11.2	dBV
SP reference output distortion at playback	TH_{SPPS}	$V_{in} = -15\text{ dBV}$, 1 kHz $R_{OUT} = 8\text{ }\Omega$	—	0.16	0.9	%
SP reference output noise at playback	V_{NSPPS}	Without input signal, using A-curve filter $R_{OUT} = 8\text{ }\Omega$	—	-91	-87	dBV
SP maximum rating output at playback	V_{MSPPS}	$f = 1\text{ kHz}$ Power consumption at $R_{OUT} = 8\text{ }\Omega$, THD = 10 %	200	350	—	mW
SP output at power save and playback	V_{PSPPS}	$V_{in} = -15\text{ dBV}$, 1 kHz, using A-curve filter $R_{OUT} = 8\text{ }\Omega$	—	-115	-102	dBV
HP or SP output characteristics at EVR=ON mode ($V_{10} = V_{11} = 3.3\text{ V}$)						
HP output characteristics PB input→HP output						
Line reference output level at playback	V_{LOPS}	$V_{in} = -15\text{ dBV}$, 1 kHz, load = $31\text{ }\Omega$	-15.2	-13.2	-11.2	dBV
Line reference output distortion at playback	TH_{LOPS}	$V_{in} = -15\text{ dBV}$, 1 kHz, up to 5 th THD load = $31\text{ }\Omega$	—	0.07	0.20	%
Line reference output noise at playback	V_{NOPS}	Without input signal, using A-curve filter up to 5 th THD, load = $31\text{ }\Omega$	—	-85	-81	dBV
SP output characteristics						
SP reference output level at playback	V_{SPPS}	$V_{in} = -15\text{ dBV}$, 1 kHz $R_{OUT} = 8\text{ }\Omega$	-8.7	-7.2	-4.7	dBV
SP reference output distortion at playback	TH_{SPPS}	$V_{in} = -15\text{ dBV}$, 1 kHz $R_{OUT} = 8\text{ }\Omega$	—	0.14	0.9	%
SP reference output noise at playback	V_{NSPPS}	Without input signal, using A-curve filter $R_{OUT} = 8\text{ }\Omega$	—	-82	-78	dBV

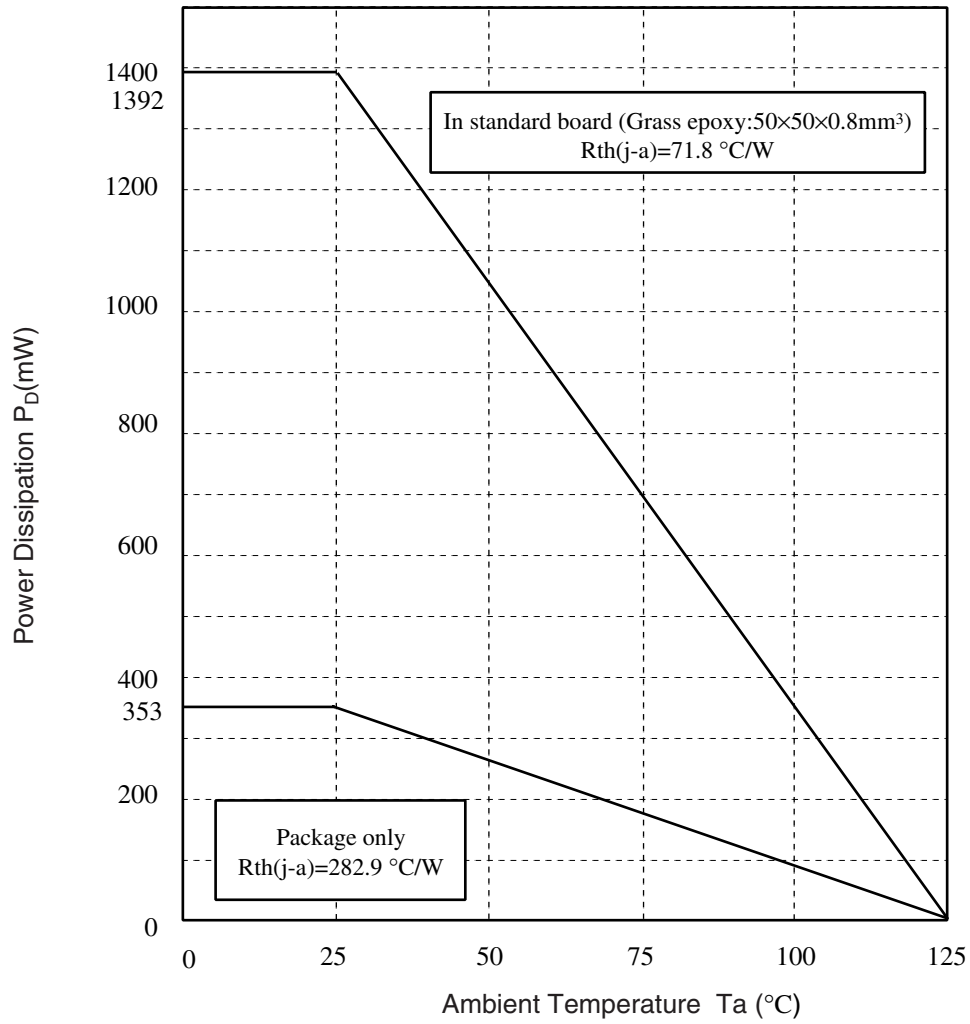
■ Electrical Characteristics at Ta = 25 °C ± 2 °C, V_{CC} = 3.3 V, V_{CC_SP} = 3.3 V, V₁₀ = V₁₁ = 0 V

Parameters	Symbol	Conditions	min	typ	max	Item
Mode selection hold voltage						
MIC amp. off hold voltage range	V _{33L}	—	0	—	0.5	V
MIC amp. on hold voltage range	V _{33H}	—	2.8	—	3.3	V
HPF on hold voltage range	V _{32L}	—	0	—	0.5	V
HPF off hold voltage range	V _{32H}	—	2.8	—	3.3	V
AGC off hold voltage range	V _{22L}	—	0	—	0.5	V
AGC on hold voltage range	V _{22H}	—	2.8	—	3.3	V
Standby on hold voltage range	V _{14L}	—	0	—	0.5	V
Standby off hold voltage range	V _{14H}	—	2.8	—	3.3	V
SP power save on hold voltage range	V _{5L}	—	0	—	0.5	V
SP power save off hold voltage range	V _{5H}	—	2.8	—	3.3	V
HP power save on hold voltage range	V _{44L}	—	0	—	0.5	V
HP power save off hold voltage range	V _{44H}	—	2.8	—	3.3	V

■ Characteristic Curve



■ Package Power Dissipation



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