

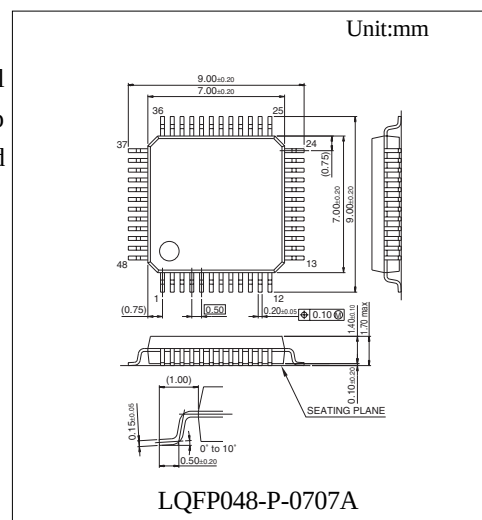
Audio Input/Output Interface IC AN2905FHQ

■ Overview

The AN2905FHQ is an audio input/output interface IC for digital still cameras that have built-in audio capability. This IC integrates in single chip configuration all audio processing functions that precede digital processing and follow D/A conversion, thus contributing to more compact equipment design.

■ Features

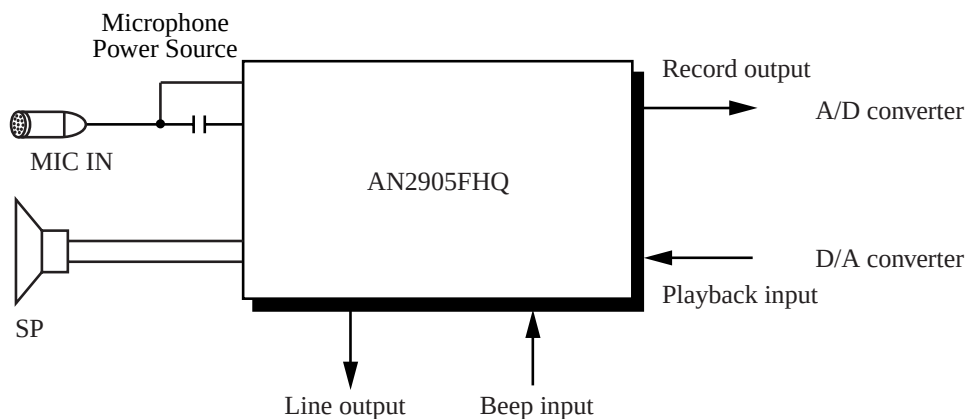
- Incorporates in a single chip all necessary functions for pre- and post audio processing.
- Built-in microphone amplifier and microphone power supply.
- Built-in 0.5W BTL amplifier.
- Built-in SP power-save and electronic volume control functions.
- Built-in internal microphone amplifier-off function.
- Built-in AGC SW function.
- Built-in playback AGC function.



■ Applications

- DSC

■ Sample Applications



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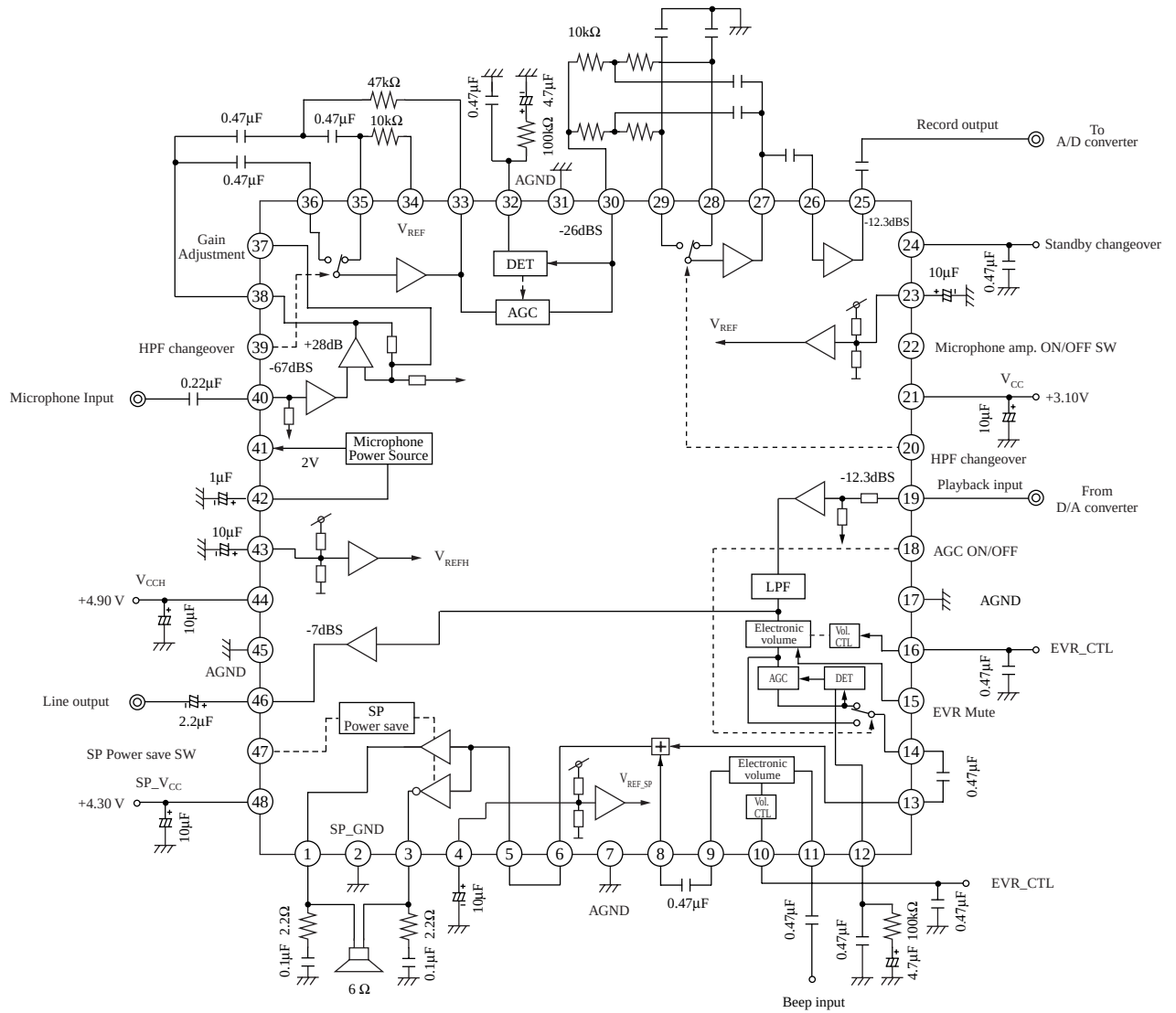
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New publication, effective from May. 25, 2001.

■ Block Diagram



■ Pin Descriptions

Pin No.	Function	Pin No.	Function
1	SP Output(+)	25	REC output
2	GND (for SP)	26	HPF OP Amp. input
3	SP Output(-)	27	OP Amp. output
4	$1/2V_{CC_SP}$	28	OP Amp. input
5	SP Amp. Input	29	OP Amp. input
6	MIX Amp. Output	30	AGC output
7	GND	31	GND
8	MIX Amp. input for Beep	32	AGC Det. pin
9	Electronic Volume Output for Bee	33	Noise for wind HPF output
10	Electronic Volume Control for Beep	34	Noise for wind HPF bias output
11	Beep input	35	Noise for wind HPF OP Amp. input
12	AGC Det. pin for playback	36	Noise for wind HPF through input
13	MIX Amp. input	37	MIC Amp. negative feedback pin
14	Electronic Volume Output	38	MIC Amp. Output
15	EVR mute	39	Noise for wind SW
16	Electronic Volume Control	40	MIC Amp. Input
17	GND	41	MIC Power supply
18	AGC changeover SW	42	MIC Power supply filter
19	Playback input	43	$1/2V_{CCH} (V_{REFH})$
20	HPF changeover SW	44	V_{CCH}
21	V_{CC}	45	GND
22	Microphone Amp. power save SW	46	Line Output
23	$1/2V_{CC} (V_{REF})$	47	SP Power save SW
24	Standby changeover	48	V_{CC_SP} (for SP drive)

■ Absolute Maximum Ratings

Parameter	Symbol	Rating	Unit	Note
Storage temperature	T _{stg}	-55 to +150	°C	1
Operating ambient temperature	T _{opr}	-20 to +70	°C	1
Supply voltage	V _{CC}	3.5	V	2
	V _{CCH} /V _{CC_SP}	5.2		
Supply current	I _{CC}	-	A	
Power dissipation	P _D	361	mW	3

Note 1) Ta=25°C except storage temperature and operating ambient temperature.

Note 2) When used within the range not exceeding the absolute maximum ratings and the power dissipation.

Note 3) Power dissipation shows the value of only package at Ta=70°C.

■ Recommended Operating Range

Operating supply voltage range	V _{CCH}	4.50 to 5.00 V
	V _{CC}	2.70 to 3.30 V
	V _{CC_SP}	2.70 to 5.00 V

■ Electrical Characteristics (Ta=25°C±2°C, V_{CCH}=4.9V, V_{CC_SP}=4.1V, V_{CC}=3.1V)

Parameter	Symbol	Condition	min	typ	max	Unit
Circuit current						
Circuit current without signal (1A) (V _{CC} -system)	I _{VCCA}	without signal	2.2	3.2	4.2	mA
Circuit current without signal (2A) (V _{CC-H} -system)	I _{VCHHA}	without signal	2.8	3.8	4.8	mA
Circuit current without signal (3A) (V _{CC-SP} -system)	I _{VCCSA}	without signal	1.0	3.0	6.0	mA
Circuit current without signal (1B) (V _{CC} -system)	I _{VCCB}	I/O power save	-	0.5	1.5	mA
Circuit current without signal (2B) (V _{CC-H} -system)	I _{VCHHB}	I/O power save	-	1.8	2.8	mA
Circuit current without signal (3B) (V _{CC-SP} -system)	I _{VCCSB}	SP power save	-	0.7	1.7	mA
Circuit current without signal (3C) (V _{CC-H} -system)	I _{VCHHC}	SP power save	-	3.0	4.0	mA
Circuit current without signal (3D) (V _{CC-H} -system)	I _{VCHHD}	SP,I/O power save	-	1.8	2.8	mA
Circuit current without signal (1C) (V _{CC} -system)	I _{VCCC}	MIC amp. OFF	-	1.8	2.8	mA
Power supply for microphone						
Microphone supply voltage	V _{MIC}	I _O = -5 mA	1.8	2.0	2.2	V

■ Electrical Characteristics (Ta=25°C±2°C, V_{CCH}=4.9V, V_{CC_SP}=4.1V, V_{CC}=3.1V)

Parameter	Symbol	Condition	min	typ	max	Unit
Microphone amp. Characteristics Microphone amp. input → Microphone amp. output						
Output level	V _{ROM}	Vin = -37 dBS, 1 kHz	-9	-8	-7	dBS
Output distortion factor 1	TH _{ROM1}	Vin = -37 dBS, 1 kHz, up to 5th THD	-	0.02	0.10	%
Output noise	N _{ROM}	Without signal, using A-curve filter	-	-89	-84	dBS
Output distortion factor 2	TH _{ROM2}	Vin = -33 dBS, 1 kHz, up to 5th THD	-	0.02	1.0	%
Rec. AGC characteristic AGC input→Rec. input						
Rec. reference output level A	V _{ROA}	Vin = -38 dBS, 1 kHz	-13.3	-12.3	-11.3	dBS
Rec. reference output distortion factor 1A	TH _{ROA}	Vin = -38 dBS, 1 kHz, up to 5th THD	-	0.01	0.10	%
Rec. reference output noise A	VN _{ROA}	Without signal, using A-curve filter	-	-81	-75	dBS
MIC AGC characteristics 1	V _{AGCML1}	Vin = -33 dBS, 1 kHz	-9.3	-7.3	-5.3	dBS
MIC AGC characteristics 2	V _{AGCML2}	Vin = -28 dBS, 1 kHz	-9.0	-6.0	-3.0	dBS
MIC AGC characteristics 3	V _{AGCML3}	Vin = -22 dBS, 1 kHz	-8.8	-5.8	-2.8	dBS
MIC AGC characteristics 3 distortion factor	TH _{AGCM3}	Vin = -22 dBS, 1 kHz up to 5th THD, load = 22 kΩ	-	0.10	0.40	%
MIC AGC characteristics 4	V _{AGCM4}	Vin = -4 dBS, 1 kHz	-8.0	-5.0	-2.0	dBV
MIC AGC characteristics 4 distortion factor	TH _{AGCM4}	Vin = -4 dBS, 1 kHz up to 5th THD, load = 22 kΩ	-	0.15	1.0	%
AGC DC offset voltage	VD _{ROM}	Without signal, difference from V _{REF}	-30	0	30	mV
PB line output characteristics PB input → LINE output						
Line reference output level at playback	V _{LOPS}	Vin = -12.3 dBS, 1 kHz	-8.0	-7.0	-6.0	dBS
Line reference output distortion factor at playback	TH _{LOPS}	Vin = -12.3 dBV, 1 kHz up to 5th THD	-	0.02	0.10	%
Line reference output noise at playback	VN _{OPS}	Without signal, using A-curve filter	-	-84	-78	dBS
Line maximum output level at playback	V _{LMAPOS}	f = 1 kHz, load = 22 kΩ THD = 1 % (up to 5th)	2.8	6.3	-	dBS
Line crosstalk Mic.-in → Line out	V _{SOPS1}	Vin = -61 dBV, f = 1 kHz using A-curve filter, at playback	-	-83	-78	dBS
REC crosstalk 1 PB-in → Rec.-out	V _{SOPS1}	Vin = -7.3 dBV, f = 1 kHz using A-curve filter	-	-81	-73	dBS

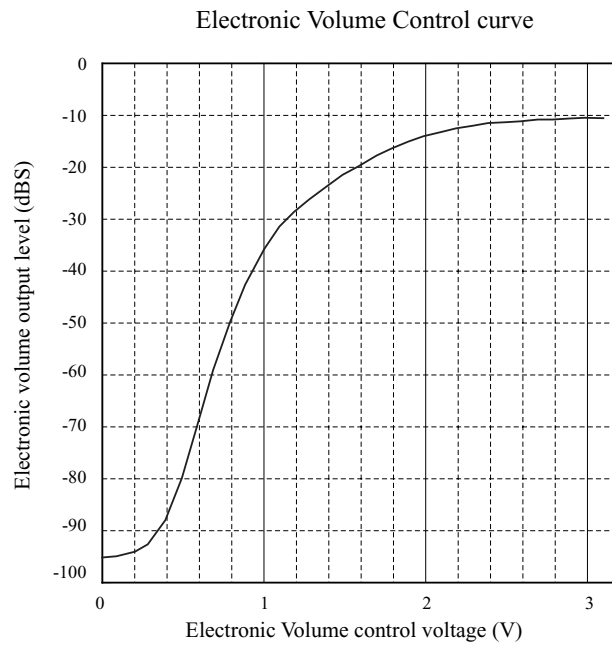
■ Electrical Characteristics (Ta=25°C±2°C, V_{CCH}=4.9V, V_{CC_SP}=4.1V, V_{CC}=3.1V)

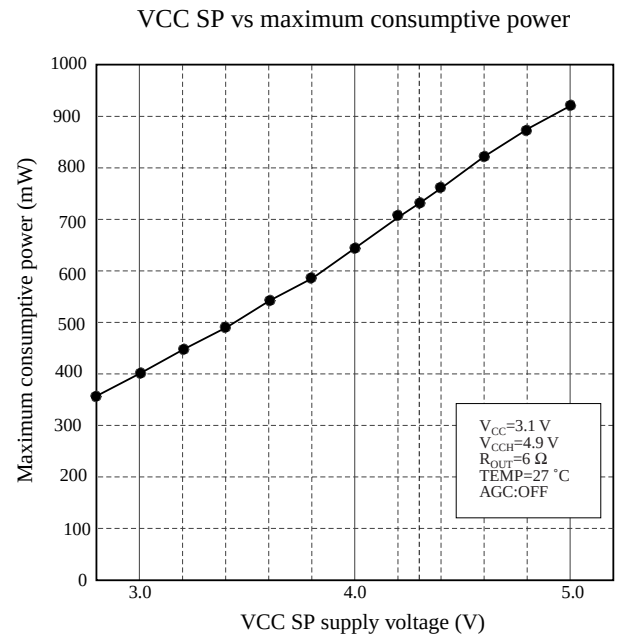
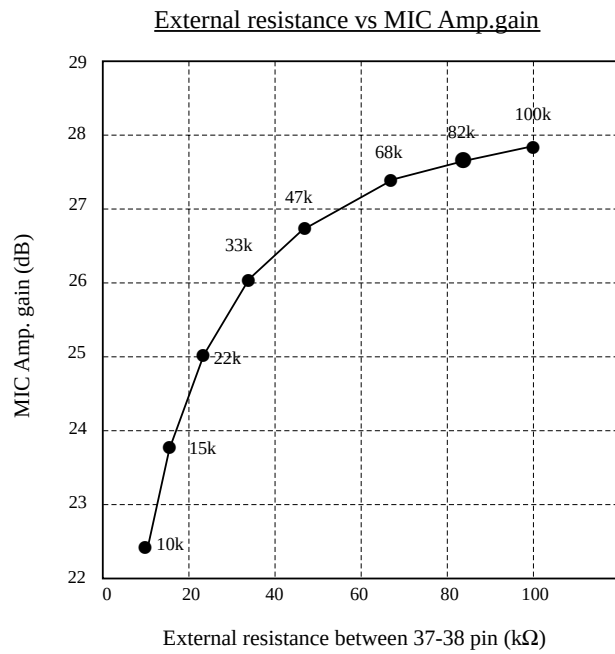
Parameter	Symbol	Condition	min	typ	max	Unit
Electronic Volume Characteristic PB input→ EVR output (AGC=OFF)						
Electronic Volume MAX (+10dB)gain	VE _{VMA}	Vin = -12.3 dBS, 1 kHz Vol.= MAX(V ₁₆ =3.1 V)	-12.0	-11.0	-10.0	dBS
Electronic Volume TYP (0dB)gain	VE _{VTP}	Vin = -12.3 dBS, 1 kHz Vol.= CENTER(V ₁₆ =1.55 V)	-24.0	-21.0	-18.0	dBS
Electronic Volume MIN ((maximum attenuation)gain	VE _{VMI}	Vin = -12.3 dBS, 1 kHz Vol.= MIN(V ₁₆ =0 V), using A-curve filter	-	-90	-80	dBS
Playback system AGC ON characteristics						
AGC characteristics 1	VPB _{AGC1}	Vin = -22.3 dBS, 1 kHz Vol.=MAX	-20	-18	-16	dBS
AGC characteristics 2 Reference +10dB	VPB _{AGC2}	Vin = -12.3 dBS, 1 kHz Vol.=MAX	-12.5	-9.5	-6.5	dBS
AGC characteristics 3 Reference +22.3dB	VPB _{AGC3}	Vin = 0 dBS, 1 kHz Vol.=MAX	-11.5	-8.5	-5.5	dBS
AGC characteristics 3 Reference +22.3dB distortion factor	THPB _{AGC3}	Vin = 0 dBS, 1 kHz Vol.=MAX, up to 5th THD	-	0.85	1.0	%
Speaker output-system characteristics 1 (AGC OFF)						
Reference output level at playback	V _{SPPS}	Vin = -14.3 dBS, 1 kHz, Vol=MAX Beep EVR = MIN, R _L = 6 Ω	0.0	1.5	3.0	dBS
Reference output distortion factor at playback	TH _{SPPS}	Vin = -14.3 dBS, 1 kHz, Vol=MAX Beep EVR = MIN, R _L = 6 Ω	-	0.2	0.9	%
Reference output noise voltage at playback	VN _{SPPS}	without signal, using A-curve filter Vol=TYP, Beep EVR = MIN, R _L = 6 Ω	-	-78	-74	dBS
maximum rating output at playback	V _{MSPPS}	f = 1 kHz, Vol = MAX Beep EVR = MIN, R _L = 6 Ω, THD = 10 %	300	500	-	mW
Power save output at playback	V _{PSPPS}	Vin = -14.3 dBS, 1 kHz, Vol=MAX using A-curve filter, R _L = 6 Ω	-	-110	-90	dBS
Beep EVR characteristics 1 (EVR = MAX)	V _{BMA}	Vin = -15 dBS, 1 kHz Vol = MIN, R _L = 6 Ω	0.0	1.5	3.0	dBS
Beep EVR characteristics 2 (EVR = MIN)	V _{BMI}	Vin = -15 dBS, 1 kHz, Vol = MIN using A-curve filter, R _L = 6 Ω	-	-72	-67	dBS
Speaker output-system characteristics 2 (AGC ON)						
Reference output level at playback	V _{SPPS}	Vin = -12.3 dBS, 1 kHz, Vol=MAX Beep EVR = MIN, R _L = 6 Ω	2.0	5.0	6.5	dBS
Reference output distortion factor at playback	TH _{SPPS}	Vin = -12.3 dBS, 1 kHz, Vol=MAX Beep EVR = MIN, R _L = 6 Ω	-	0.2	0.9	%
Reference output noise voltage at playback	VN _{SPPS}	without signal, Ausing A-curve filter Vol=TYP, Beep EVR = MIN, R _L = 6Ω	-	-72	-68	dBS

■ Electrical Characteristics (Ta=25°C±2°C, V_{CCH}=4.9V, V_{CC_SP}=4.1V, V_{CC}=3.1V)

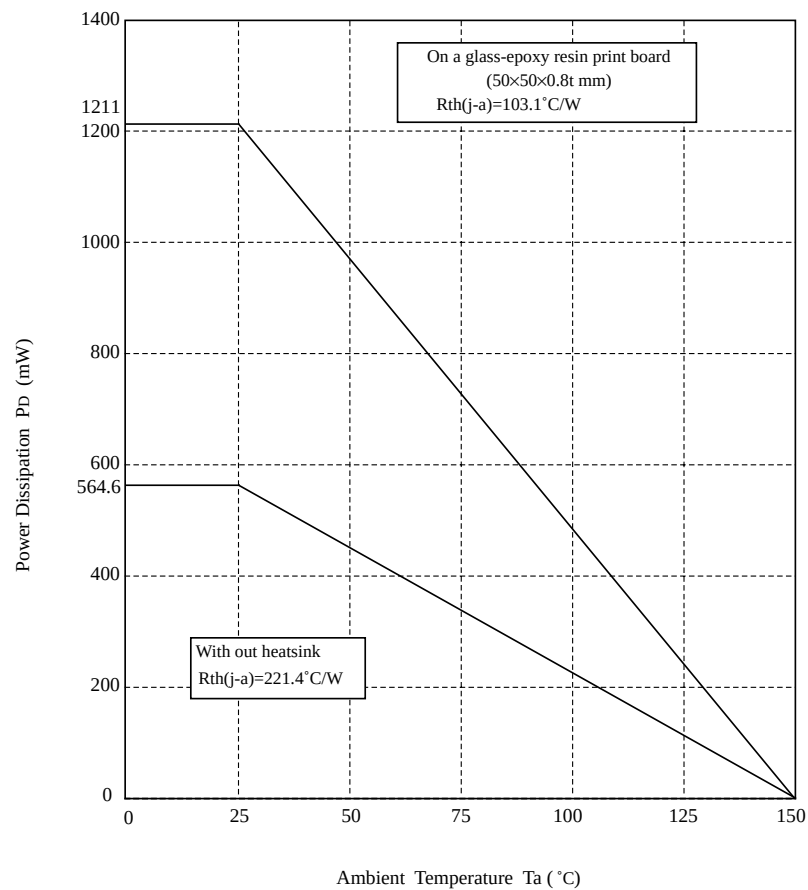
Parameter	Symbol	Condition	min	typ	max	Unit
Mode selection hold voltage						
HPF OFF hold voltage range	V _{39L}	-	0.0	-	0.5	V
HPF ON hold voltage range	V _{39H}	-	2.5	-	3.1	V
SP output ON hold voltage range	V _{47L}	-	0.0	-	0.5	V
SP output OFF hold voltage range	V _{47H}	-	2.6	-	4.3	V
Standby ON hold voltage range	V _{24L}	-	0.0	-	0.5	V
Standby OFF hold voltage range	V _{24H}	-	2.6	-	3.1	V
MIC Amp. ON hold voltage range	V _{22H}	-	0.0	-	0.5	V
MIC Amp. OF F hold voltage range	V _{22L}	-	2.6	-	3.1	V
HPF ON hold voltage range	V _{20L}	-	0.0	-	0.5	V
HPF OFF hold voltage range	V _{20H}	-	2.6	-	3.1	V
AGC ON hold voltage range	V _{18L}	-	0.0	-	0.5	V
AGC OFF hold voltage range	V _{18H}	-	2.6	-	3.1	V
EVR mute ON hold voltage range	V _{15L}	-	0.0	-	0.5	V
EVR mute OFF hold voltage range	V _{15H}	-	2.6	-	3.1	V

■ Characteristics Curve





■ Package Power Dissipation



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