

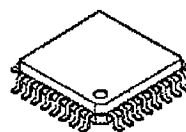
BASE BAND INTERFACE IC

■ GENERAL DESCRIPTION

The NJW2303 is base band interface IC for cellular phone system. It consists of speaker amplifier with limiter and noise canceller, microphone amplifier, and ringer driver. It also includes power down function which applies to low consumption power design.

The NJW2303 is suitable for PCS, cellular phone, and any other handy wireless communication equipments.

■ PACKAGE OUTLINE

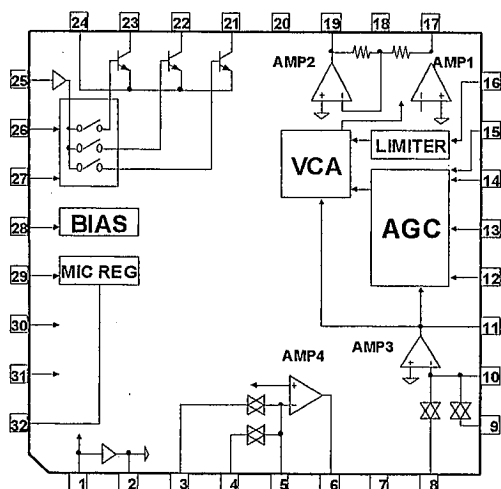


NJW2303F

■ FEATURES

- Operating Voltage (2.7~3.3V)
- Low Operating Current (2.2mA typ.)
- Internal Power-Down ON/OFF Switch
- Low Power-Down Operating Current (1μA MAX.)
- <Power Amplifier>
  - Output Power Exceeds 40mW ( $V^+=3V, R_L=32\Omega$ )
  - Low Output Noise Voltage (-100dBV typ.)
  - Input Limit Level (-14dBV typ.)
  - Internal Noise Cancel AGC Function
- <Microphone Amplifier>
  - Low Equivalent Input Noise Voltage (2μVrms typ.)
  - Internal Three Steps Ringer Driver
  - Bi-CMOS Technology
  - Package Outline QFP32

■ PIN CONFIGURATION



PIN FUNCTION

- |            |             |
|------------|-------------|
| 1. MICREF  | 17. POWOUT1 |
| 2. POWREF  | 18. PGND    |
| 3. MICIN1  | 19. POWOUT2 |
| 4. MICIN2  | 20. V+      |
| 5. MICIN3  | 21. RINOUT3 |
| 6. MICOUT  | 22. RINOUT2 |
| 7. SGND    | 23. RINOUT1 |
| 8. POWIN1  | 24. DGND    |
| 9. POWIN2  | 25. RININ   |
| 10. POWIN3 | 26. RINCNT1 |
| 11. POWFB  | 27. RINCNT2 |
| 12. CRECT  | 28. PD      |
| 13. TC1    | 29. REGSD   |
| 14. NRREF  | 30. SMONI   |
| 15. NRCNT  | 31. SP/EAR  |
| 16. TC2    | 32. REGOUT  |

## ■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V <sup>+</sup>	5	V
Power Dissipation	P <sub>o</sub>	300	mW
Operating Temperature Range	T <sub>o.p.r</sub>	-20~+75	°C
Storage Temperature Range	T <sub>s.t.g</sub>	-40~+125	°C

## ■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V<sup>+</sup>=3V, f=1kHz)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT	
<b>Overall</b>							
Operating Voltage	V <sup>+</sup>		2.7	3.0	3.3	V	
Operating Current1	I <sub>cc1</sub>		—	2.2	3.0	mA	
Operating Current2	I <sub>cc2</sub>	Power Down Mode	—	—	1.0	μA	
Microphone Reference Voltage	MIC <sub>r.r.f</sub>		—	1.1	—	V	
Power Amplifier Reference Voltage	POW <sub>r.r.f</sub>		—	1.1	—	V	
Control High Level Voltage	V <sub>inH</sub>		2.1	—	V <sup>+</sup>	V	
Control Low Level Voltage	V <sub>inL</sub>		0	—	0.6	V	
<b>Power Amplifier</b>							
Output Voltage1	Pow1	R <sub>L</sub> =32Ω, THD=10%	BTL	3	6	—	mW
Output Voltage2	Pow2	R <sub>L</sub> =32Ω, THD=10% (Sound Monitor Mode)	BTL	40	60	—	mW
Voltage Gain	A <sub>v</sub>	A <sub>v</sub> =17pin/11pin		5.0	6.0	7.0	dB
Noise Reduction Operating Input Level	NR <sub>in</sub>	15pin=0.2V		-63	-60	-57	dBV
Noise Reduction Level	ATT	11pin Level=-50dBV 15pin=0.3V	SINGLE	—	-30	-15	dB
Reference Voltage	NR <sub>r.f</sub>			1.19	1.25	1.31	V
NRCNT Input Voltage Range	VNR	11pin Level=-10dBV		0.1	—	0.5	V
Limit Level	Limit		SINGLE	-16	-14	-12	dBV
Analog Switch On Resistance	R <sub>on</sub>			—	200	400	Ω
AMP2 Mute Level	Mute	Mute=19pin-17pin		—	—	-60	dB
Output Noise Voltage	V <sub>no</sub>	A-Weighting	BTL	—	-100	—	dBV
Output Offset Voltage	V <sub>os</sub>			-30	0	30	mV
Total Harmonic Distortion	THD		BTL	—	0.2	—	%
<b>Microphone Amplifier</b>							
Microphone Regulator Output1	Reg1	R <sub>L</sub> =2kΩ		2.3	2.4	2.5	V
Microphone Regulator Output2	Reg2	R <sub>L</sub> =2kΩ, Power OFF		—	—	0.01	V
Voltage Gain	A <sub>v</sub>	f=3kHz		—	40	—	dB
Analog Switch On Resistance	R <sub>on</sub>			—	200	400	Ω
Maximum Output Voltage Swing	V <sub>om</sub>	R <sub>L</sub> =5kΩ, THD=3%		0.6	0.65	—	V <sub>rms</sub>
Equivalent Input Noise Voltage	V <sub>ni</sub>	R <sub>s</sub> =50Ω, A-Weighting		—	2	6	μV <sub>rms</sub>
Total Harmonic Distortion	THD			—	0.2	—	%
<b>Ringer Driver</b>							
Low Level Output Voltage1	Ro1	I <sub>o</sub> =200mA		—	0.2	0.4	V
Low Level Output Voltage2	Ro2	I <sub>o</sub> =100mA		—	0.2	0.4	V
Low Level Output Voltage3	Ro3	I <sub>o</sub> =50mA		—	0.2	0.4	V

■ SWITCHING PIN FUNCTION

PIN NO.	PIN NAME	SWITCHING FUNCTION	LEVEL	FUNCTION
28	PD	Power ON/OFF	H	Power ON
			L	Power OFF
29	REGSD	Microphone Regulator ON/OFF	H	Microphone Regulator ON
			L	Microphone Regulator OFF
30	SMONI	Sound Monitor Mode	H	Limiter Circuit OFF
			L	Limiter Circuit ON
31	SP/EAR	Speaker, Earphone Microphone	H	IN1 Input, BTL Function
			L	IN2 Input, SINGLE Function

■ RINGER OUTPUT

PIN NO.	PIN NAME	RINGER OUTPUT LEVEL	RINCNT2(27pin)	RINCNT1(26pin)
21	RINOUT1	SMALL	L	H
22	RINOUT2	MEDIUM	H	L
23	RINOUT3	LARGE	H	H

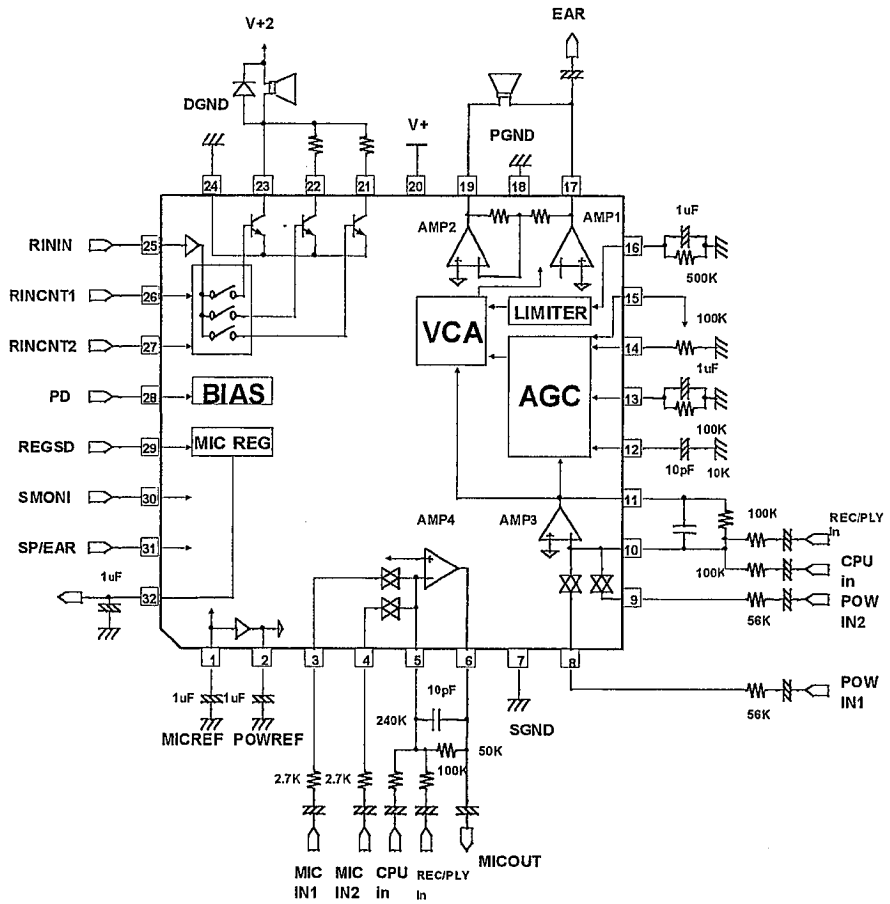
■ PIN INFORMATION

PIN	PIN NAME	FUNCTION	PIN	PIN NAME	FUNCTION
1	MICREF	Mic. Amplifier Reference	17	POWOUT1	Power Amplifier Output1
2	POWREF	Power Amplifier Referenc	18	PGND	Power Ground
3	MICIN1	Mic. Amplifier Input1	19	POWOUT2	Power Amplifier Output2
4	MICIN2	Mic. Amplifier Input2	20	V <sup>+</sup>	Power Supply
5	MICIN3	Mic. Amplifier Input3	21	RINOUT3	Ringer Output3
6	MICOUT	Mic. Amplifier Output	22	RINOUT2	Ringer Output2
7	SGND	System Ground	23	RINOUT1	Ringer Output1
8	POWIN1	Power Amplifier Input1	24	DGND	Digital Ground
9	POWIN2	Power Amplifier Input2	25	RININ	Ringer Input
10	POWIN3	Power Amplifier Input3	26	RINCNT1	Ringer Control1
11	POWFB	Feed Back Pin	27	RINCNT2	Ringer Control2
12	CRECT	Cap. for Rectification Circuit	28	PD	Power Down Control
13	TC1	NR Circuit Time Constant	29	REGSD	Mic. Regulator ON/OFF
14	NRREF	Reference Voltage	30	SMONI	Sound Monitor Switching
15	NRCNT	NR Operating Level Control	31	SP/EAR	Speaker/Earphone Mic. SW
16	TC2	Limit Circuit Time Constant	32	REGOUT	Regulator Output

NR:Noise Reduction

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## APPLICATION CIRCUIT



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## MEMO

[CAUTION]

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