

SHARP

NEW PRODUCT INFORMATION

PRELIMINARY

IR3N74AN

Compander IC for Cordless Telephone

■ Description

The IR3N74AN is a compander IC for noise reduction of wireless telephones.

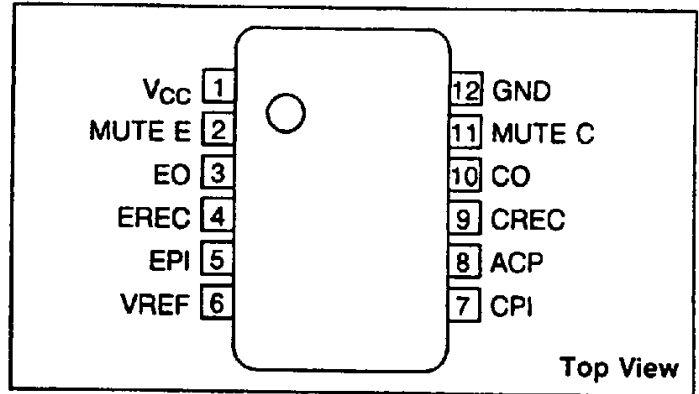
It consists of a compressor whose compressibility is 1/2 in logarithm and an expander whose expandability is 2 in logarithm. This IC ensures clearer speech quality by reducing radio-wave noise which is generated during communications using mobile communication equipment such as cordless telephones and cellular telephones.

In order to comply with the smaller size and lighter weight of those instruments, the IR3N74AN (12-pin SSOP) is offered in a smaller package with less pin count than the previous IR3N74N (16-pin SOP).

■ Features

1. Amplitude compression and expansion of speech signal
Compressibility: 1/2 (logarithm),
Expandability: 2 (logarithm)
2. Operation at low voltage, $V_{CC} = 2.4$ to $5.5V$ ($T_a = +25^\circ C$)
3. Low current consumption, $I_{CC} = 3.4mA$ (TYP.) ($V_{CC} = 3V$, $T_a = +25^\circ C$)
4. With a compressor input amplifier
5. Built-in limiter circuit
6. Muting capability
7. Package: 12-pin SSOP (SSOP12-P-225)

■ Pin Connections



■ Pin Description

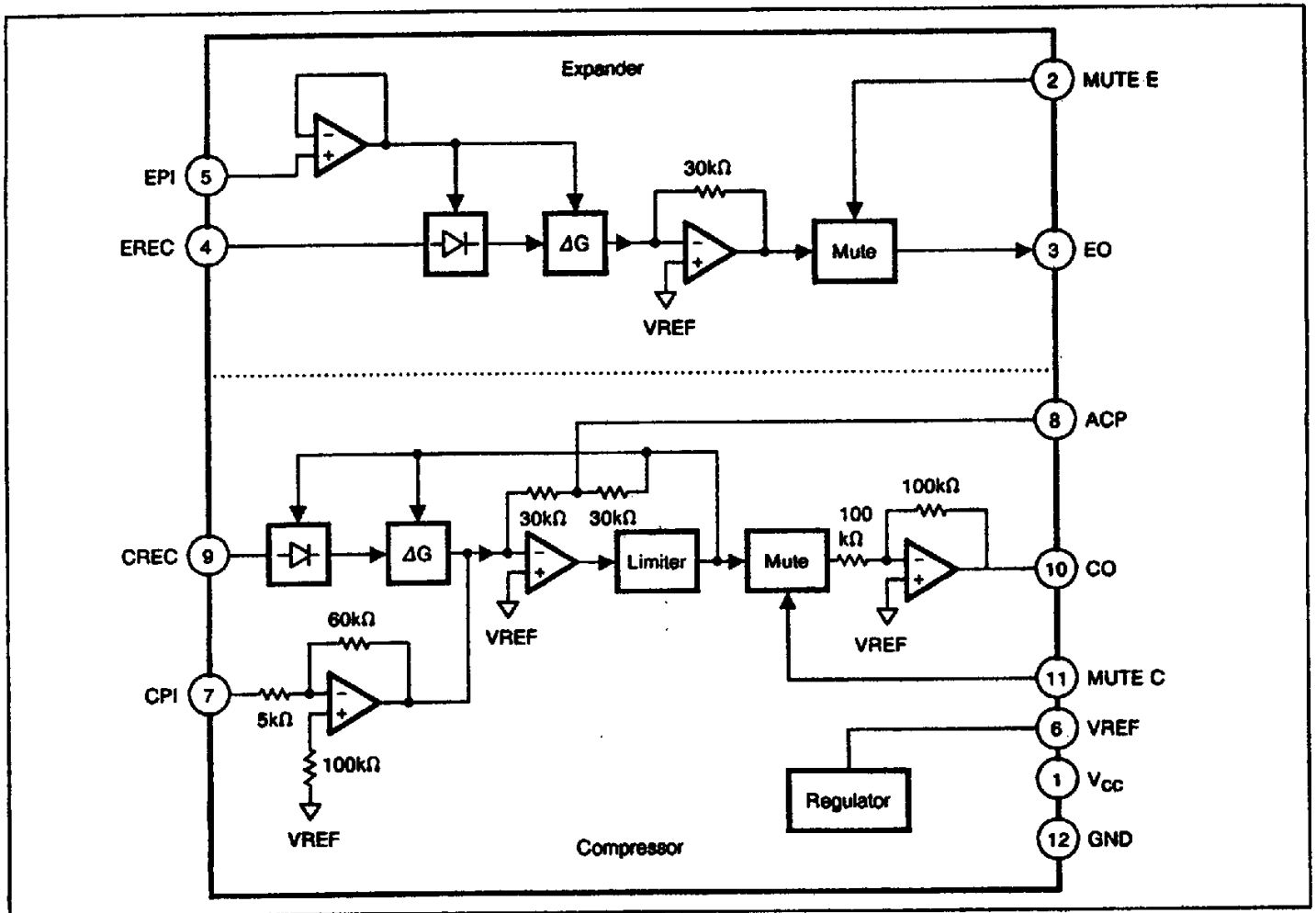
Symbol	Pin name
V_{CC}	Power supply pin
MUTE E	Mute output pin for expander
EO	Expander output pin
EREC	Smoothing capacitor pin for expander
EPI	Expander input pin
VREF	Reference voltage output pin
CPI	Compressor input pin
ACP	Decoupling capacitor pin
CREC	Smoothing capacitor pin for compressor
CO	Compressor output pin
MUTE C	Mute output pin for compressor
GND	Ground pin

IC

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Block Diagram



Absolute Maximum Ratings

($T_a = +25^\circ\text{C}$)

Parameter	Symbol	Rating	Unit	Note
Supply voltage	V_{CC}	6	V	
Mute voltage	V_{MUTE}	V_{CC}	V	1
Power dissipation	PD	350	mW	2
Operating temperature	T_{opr}	-20 to +85	$^\circ\text{C}$	
Storage temperature	T_{stg}	-55 to +150	$^\circ\text{C}$	

Note 1: Applied to pins MUTE E and MUTE C.

Note 2: When $T_a = +25^\circ\text{C}$. PD derating ratio is $3\text{mW}/^\circ\text{C}$.

Electrical Characteristics (1)

 (V_{CC} = 3.0V, f = 1kHz, R_L = 10kΩ, T_a = +25°C)

Parameter		Symbol	Test condition	MIN.	TYP.	MAX.	Unit	Note
Operating supply-voltage		V _{CC}		2.4		5.5	V	
Current consumption at no signal		I _{CC}			3.4	5.3	mA	
Reference pin voltage		V _{REF}		1.15	1.25	1.35	V	
Mute switching voltage		V _{TH}		1.8		V _{CC}	V	
		V _{TL}		0		0.8		
Compressor	Reference output voltage	V _{ROC}	V _{IN} = -24.0dBV	-12.0	-10.0	-8.2	dBV	
	Output deviation	V _{OCC1}	V _{IN} = -20.0dB	-0.6	-0.1	0.4	dB	1
		V _{OCC2}	V _{IN} = -40.0dB	-0.8	-0.2	0.2		
		V _{OCC3}	V _{IN} = -60.0dB		-1.3			
	Distortion	THD _C	V _{IN} = -24.0dBV		0.4	1.0	%	
	Limiting voltage	LV _{OC}	Output distortion: 3%	420	480	540	mV _{rms}	
	Output noise voltage	VN _{OC}	R _g = 600Ω		1.5	4.5	mV _{rms}	
	Mute attenuation	MA _C	V _{IN} = -24.0dBV Pin No. 11 shall be grounded.	60	80		dB	
	Crosstalk (E→C)	CT (E→C)	Expander input should be -10.0dBV R _g = 600Ω		-40	-30	dB	
	Frequency characteristic	FR _C	V _{IN} = -24.0dBV f = 200 to 5kHz f = 1kHz as reference.	-0.5	0	0.5	dB	
DC voltage difference at mute switching	V _{MOC} (OFF→ON)	Voltage at Pin No. 10	-20		20	mV		

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($V_{CC} = 3.0V$, $f = 1kHz$, $R_L = 10k\Omega$, $T_a = +25^\circ C$)

Parameter		Symbol	Test condition	MIN.	TYP.	MAX.	Unit	Note
Expander	Reference output voltage	V_{ROE}	$V_{IN} = -10.0dBV$	-12.0	-10.0	-8.2	dBV	
	Output deviation	V_{OE1}	$V_{IN} = -15.0dB$	-0.3	0.2	0.7	dB	2
		V_{OE2}	$V_{IN} = -25.0dB$	-0.3	0.2	0.7		
		V_{OE3}	$V_{IN} = -35.0dB$	-1.0	0.2	1.0		
	Distortion	THD_E	$V_{IN} = -10.0dBV$		0.7	1.5	%	
	Output dynamic range	DR_{OE}	Output distortion: 10%	750	900		mV rms	
	Output noise voltage	V_{NOE}	$R_g = 600\Omega$		20	40	μV rms	
	Mute attenuation	MA_E	$V_{IN} = -10.0dBV$ Pin No. 2 shall be grounded.	60	80		dB	
	Crosstalk (C→E)	CT (C→E)	Compressor input should be $-24.0dBV$ $R_g = 600\Omega$		-80	-70	dB	
	Frequency characteristic	FR_E	$V_{IN} = -10.0dBV$ $f = 200$ to $5kHz$ $f = 1kHz$ as reference.	-0.5	0	0.5	dB	
DC voltage difference at mute switching	V_{MOE} (OFF→ON)	Voltage at Pin No. 3	-20		20	mV		
Compander	Voltage gain	V_{ROCE}	$V_{IN} = -24.0dBV$	11.0	14.0	17.0	dB	
	Distortion	THD_{CE}	$V_{IN} = -24.0dBV$		0.5	2.0	%	
	Frequency characteristic	FR_{CE}	$V_{IN} = -24.0dBV$ $f = 200$ to $5kHz$ $f = 1kHz$ as reference.	-0.5	0	0.5	dB	

Note 1: $V_{IN} = 0dB = -24dBV$, output deviation = $(V_{OC} - V_{ROC}) - 0.5 \times V_{IN}$ (dB)

Note 2: $V_{IN} = 0dB = -10dBV$, output deviation = $(V_{OE} - V_{ROE}) - 2 \times V_{IN}$ (dB)

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Compander IC for Cordless Telephone

($V_{CC} = 3.0V$, $f = 1kHz$, $R_L = 10k\Omega$, $T_a = -20$ to $+85^\circ C$)

Parameter	Symbol	Test condition	MIN.	TYP.	MAX.	Unit	Note	
Expander	Reference output voltage	V_{ROE}	$V_{IN} = -10.0dBV$	-12.6	-10.0	-7.6	dBV	
	Output deviation	V_{OE1}	$V_{IN} = -15.0dBV$	-0.3	0.2	1.0	dB	2
		V_{OE2}	$V_{IN} = -25.0dBV$	-0.3	0.2	1.0		
		V_{OE3}	$V_{IN} = -35.0dBV$		0.2			
	Distortion	THD_E	$V_{IN} = -10.0dBV$		0.7	2.5	%	
	Output dynamic range	DR_{OE}	Output distortion: 10%	650	900		mV rms	
	Output noise voltage	V_{NOE}	$R_g = 600\Omega$		20	40	μV rms	
	Mute attenuation	MA_E	$V_{IN} = -10.0dBV$ Pin No. 2 shall be grounded.	60	80		dB	
	Crosstalk (C→E)	CT (C→E)	Compressor input should be $-24.0dBV$ $R_g = 600\Omega$		-80	-60	dB	
	Frequency characteristic	FR_E	$V_{IN} = -10.0dBV$ $f = 200$ to $5kHz$ $f = 1kHz$ as reference.	-0.8	0	0.8	dB	
DC voltage difference at mute switching	V_{MOE} (OFF→ON)	Voltage at Pin No. 3	-30		30	mV		
Compander	Voltage gain	V_{ROCE}	$V_{IN} = -24.0dBV$	10.5	14.0	17.5	dB	
	Distortion	THD_{CE}	$V_{IN} = -24.0dBV$		0.5		%	
	Frequency characteristic	FR_{CE}	$V_{IN} = -24.0dBV$ $f = 200$ to $5kHz$ $f = 1kHz$ as reference.	-0.8	0	0.8	dB	

Note 1: $V_{IN} = 0dB = -24dBV$, output deviation = $(V_{OC} - V_{ROC}) - 0.5 \times V_{IN}$ (dB)

Note 2: $V_{IN} = 0dB = -10dBV$, output deviation = $(V_{OE} - V_{ROE}) - 2 \times V_{IN}$ (dB)

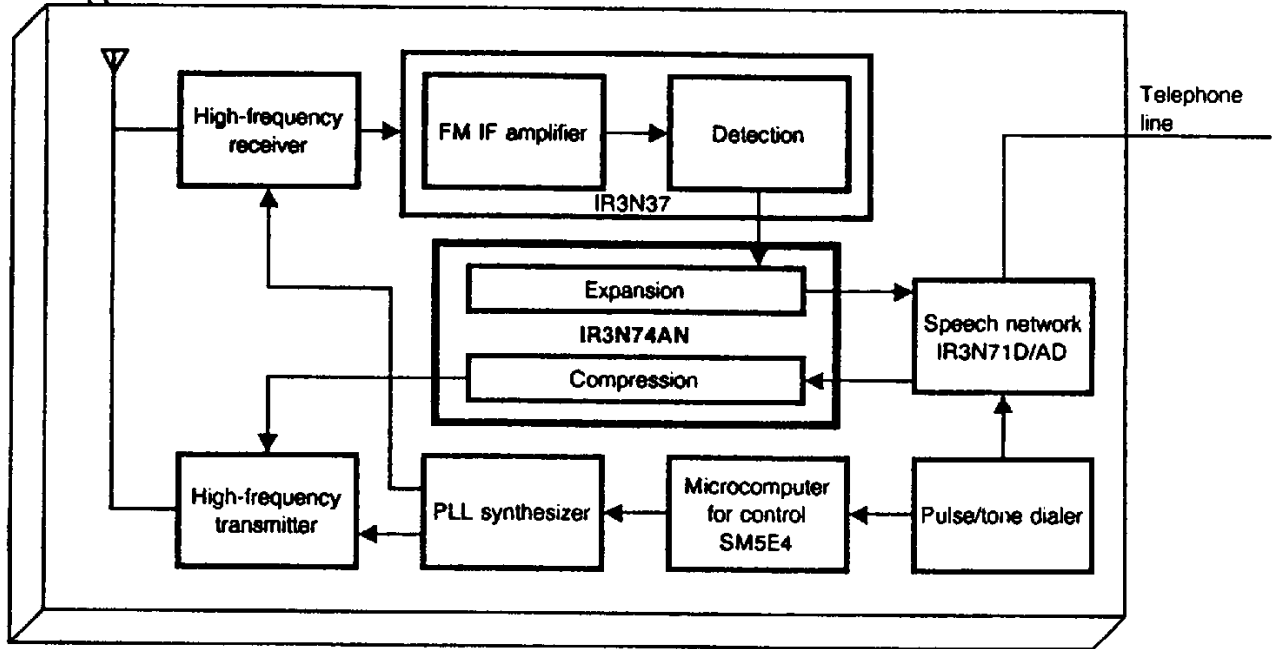
■ Electrical Characteristics (2)

($V_{CC} = 3.0V$, $f = 1kHz$, $R_L = 10k\Omega$, $T_a = -20$ to $+85^\circ C$)

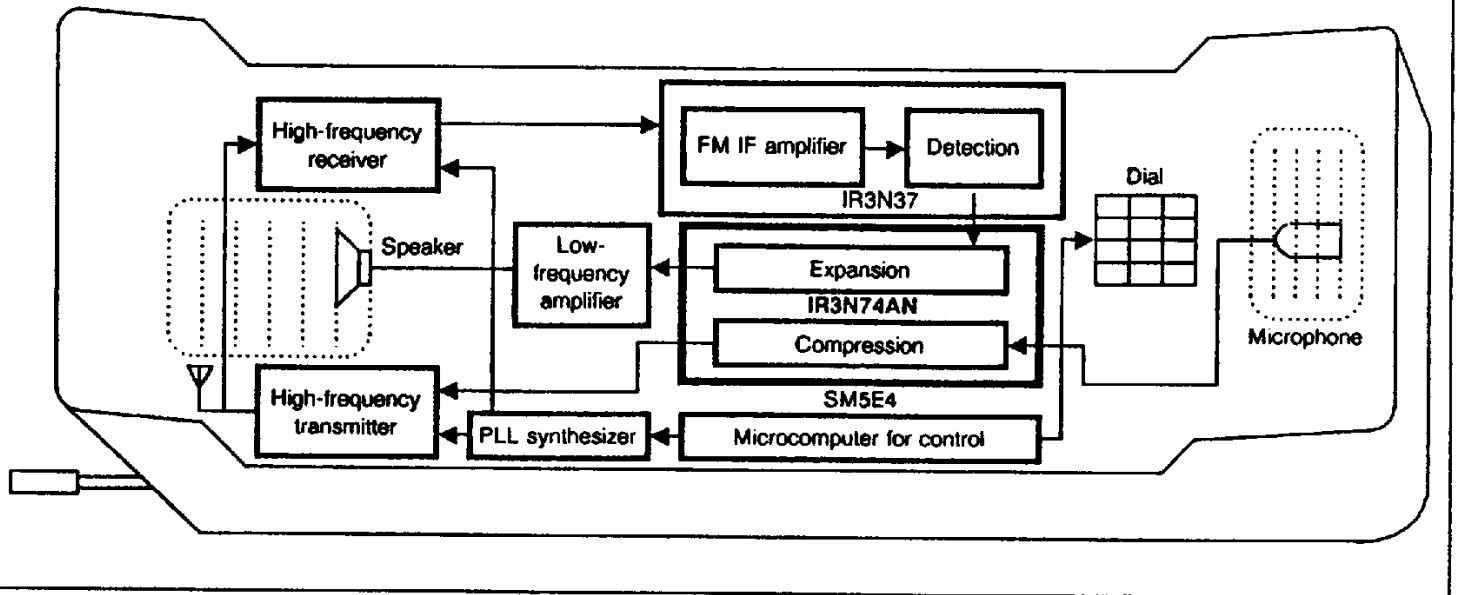
Parameter		Symbol	Test condition	MIN.	TYP.	MAX.	Unit	Note
Operating supply voltage		V_{CC}		2.5		5.5	V	
Current consumption at no signal		I_{CC}			3.4	5.7	mA	
Reference pin voltage		V_{REF}		1.10	1.25	1.40	V	
Mute switching voltage		V_{TH}		2.0		V_{CC}	V	
		V_{TL}		0		0.6		
Compressor	Reference output voltage	V_{ROC}	$V_{IN} = -24.0dBV$	-12.6	-10.0	-7.6	dBV	
	Output deviation	V_{OC1}	$V_{IN} = -20.0dB$	-0.7	-0.1	0.4	dB	1
		V_{OC2}	$V_{IN} = -40.0dB$	-1.2	-0.2	0.2		
		V_{OC3}	$V_{IN} = -60.0dB$		-1.3			
	Distortion	THD_C	$V_{IN} = -24.0dBV$		0.4		%	
	Limiting voltage	LV_{OC}	Output distortion: 3%	380	480	570	mV rms	
	Output noise voltage	V_{NOC}	$R_g = 600\Omega$		1.5	4.5	mV rms	
	Mute attenuation	MA_C	$V_{IN} = -24.0dBV$ Pin No. 11 shall be grounded.	60	80		dB	
	Crosstalk (E→C)	CT (E→C)	Expander input should be $-10.0dBV$ $R_g = 600\Omega$		-40	-30	dB	
	Frequency characteristic	FR_C	$V_{IN} = -24.0dBV$ $f = 200$ to $5kHz$ $f = 1kHz$ as reference.	-0.8	0	0.8	dB	
DC voltage difference at mute switching	V_{MOC} (OFF→ON)	Voltage at Pin No. 10	-30		30	mV		

■ System Configuration Example (Cordless Telephone)

Base unit



Portable unit



■ Sharp's Product Lineup

Model No.		IR3N74N	IR3N74AN
Package	Type	16SOP	12SSOP
	Pin pitch	1.27mm	0.75mm
Input port	Expander	3 ports	1 port
	Compressor	2 ports	1 port
	Data	1 port	—

■ Development Schedule (Target)

Sample Available
 Mass production start May, '91

The information described herein is intended to introduce descriptions for products that are in development, and specifications and circuitry are subject to change upon final characterization.

SHARP

SHARP CORPORATION Japan
 IC SALES DEPARTMENT
 INTERNATIONAL SALES & MARKETING GROUP
 IC/ELECTRONIC COMPONENTS
 2613-1 ICHINOMOTO-CHO TENRI-CITY NARA 632, JAPAN
 PHONE: (07436) 5-1321
 TELEX: LABOMETA-B J63428
 FACSIMILE: (07436) 5-1532

NORTH AMERICA: SHARP ELECTRONICS CORPORATION
 Microelectronics Group
 5700 Northwest Pacific Film Boulevard Suite 20
 Camas, Washington 98607, U.S.A.
 PHONE: (206) 834-2600
 TELEX: 48008472 (SHARPCAM)
 FACSIMILE: (206) 834-8903

EUROPE: SHARP ELECTRONICS (EUROPE) GmbH
 Microelectronics Division
 Sonninstrasse 3, 2000 Hamburg 1, F.R. Germany
 PHONE: (40) 23-775-216
 TELEX: 2161867 (HEEG D)
 FACSIMILE: (40) 23-775-232

HONG KONG: SHARP-ROXY (HONG KONG) LTD.
 3rd Business Division
 Room 1701-1710, Admiralty Centre, Tower 1,
 18 Harcourt Road, Hong Kong
 PHONE: 8229311/8229348
 TELEX: 74258 SRHL HX
 FACSIMILE: 5297561/8660779

SINGAPORE: SHARP-ROXY SALES (SINGAPORE) PTE. LTD.
 100G Peir Panjang Road, Singapore 0611
 PHONE: 4731011
 TELEX: 55504 (SRSSIN RS)
 FACSIMILE: 4794105

KOREA: SHARP ELECTRONICS INDUSTRIAL CORPORATION
 4F. Das San Bldg. 14-27 Yeoyido-dong,
 Young Deung Po-hu, Seoul, Korea
 PHONE: 782-8837 ~ 40
 TELEX: SHARPEI K28754
 FACSIMILE: (02) 782-5070

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