

# DATA SHEET

**SA576**

Low power compandor

Product specification

1997 Aug 14

IC17 Data Handbook

# Low power compandor

# SA576

## DESCRIPTION

The SA576 is a unity gain level programmable compandor designed for low power applications. The SA576 is internally configured as an expander and a compressor to minimize external component count.

The SA576 can operate at 1.8V. During normal operations, the SA576 can operate from at least a 2V battery. If the battery voltage drops to 1.8V, this part will still continue to function, however, turning on the part at a  $V_{CC}$  of 1.8V requires two external resistors to bring  $V_{REF}$  to half  $V_{CC}$ . One resistor connects between  $V_{CC}$  and  $V_{REF}$ ; the other connects from  $V_{REF}$  to ground. A typical value for these external resistors is approximately 20k. A lower value can be used, but the power consumption will go up.

The SA576 is available in a 14-pin plastic DIP and SO packages.

## FEATURES

- Operating voltage range: 1.8V to 7V
- Low power consumption  
(1.4mA @ 3.6V)
- Over 80dB of dynamic range
- Wide input/output swing capability  
(rail-to-rail)
- Low external component count
- ESD hardened

## PIN CONFIGURATION

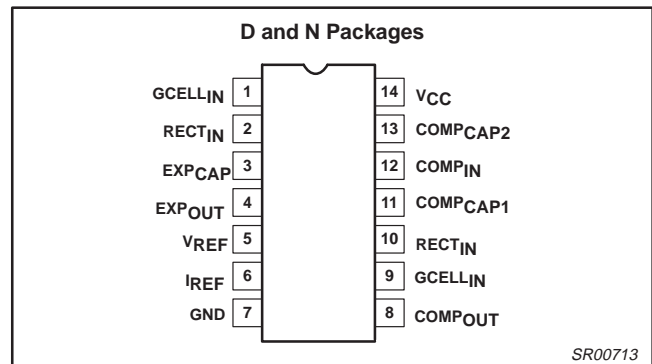


Figure 1. Pin Configuration

## APPLICATIONS

- Cordless telephone
- Consumer audio
- Wireless microphones
- Modems
- Electric organs
- Hearing aids
- Automatic level control

## ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	-40 to +85°C	SA576N	SOT27-1
14-Pin Plastic Small Outline (SO)	-40 to +85°C	SA576D	SOT108-1

## ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNITS
		SA576	
$V_{CC}$	Supply voltage	8	V
$T_A$	Operating ambient temperature range	-40 to +85	°C
$T_{STG}$	Storage temperature range	-65 to +150	°C
$\theta_{JA}$	Thermal impedance	DIP	90
		SO	125
			°C/W
			°C/W

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## BLOCK DIAGRAM and TEST AND APPLICATION CIRCUIT

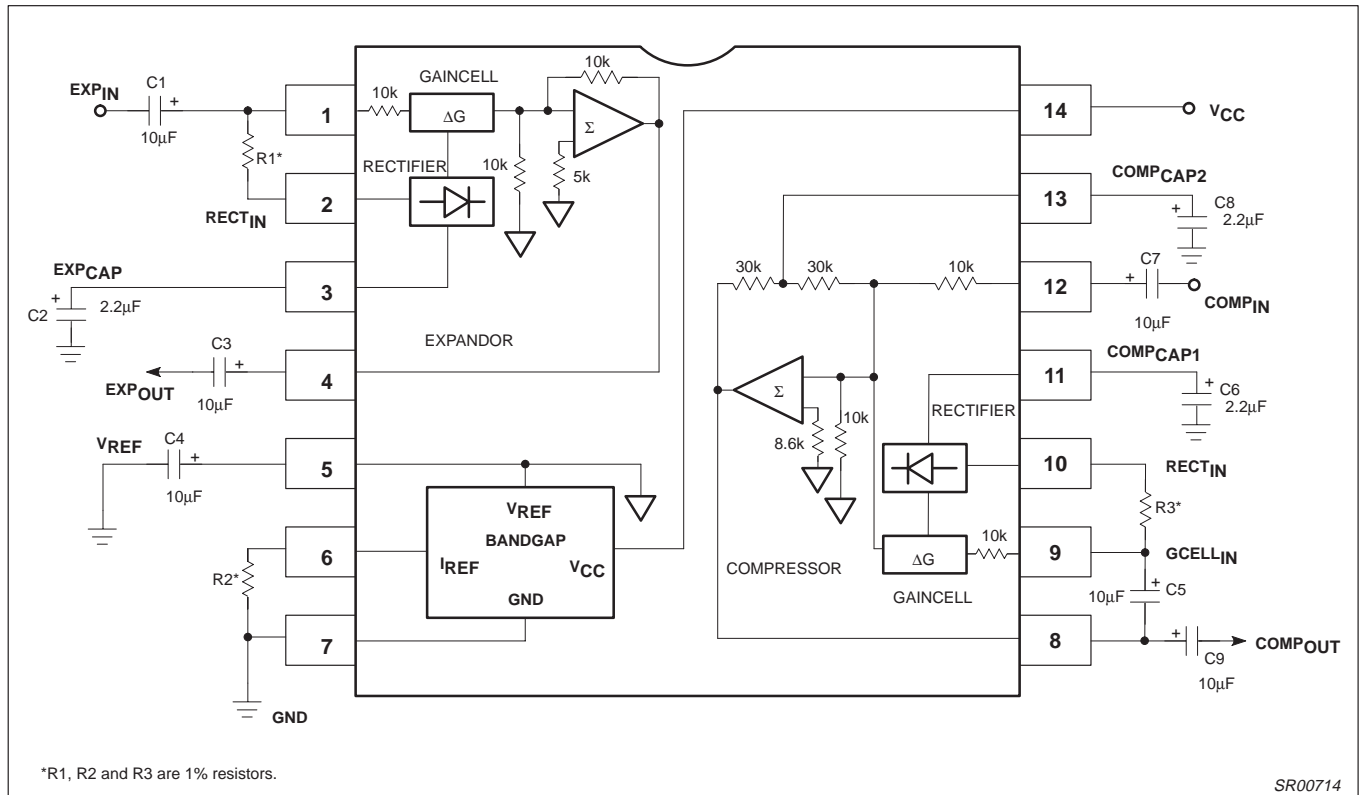


Figure 2. Block Diagram and Test and Application Circuit

## ELECTRICAL CHARACTERISTICS

T<sub>A</sub> = 25°C, V<sub>CC</sub> = 3.6VDC, compandor 0dB level = -20dBV = 100mV<sub>RMS</sub>, output load R<sub>L</sub> = 10kΩ, Freq = 1kHz, unless otherwise specified. R1, R2 and R3 are 1% resistors.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNITS
			SA576			
			MIN	TYP	MAX	
V <sub>CC</sub>	Supply voltage <sup>1</sup>		2	3.6	7	V
I <sub>CC</sub>	Supply current	No signal R <sub>2</sub> = 100kΩ		1.4	3	mA
V <sub>REF</sub>	Reference voltage <sup>2</sup>	V <sub>CC</sub> = 3.6V		1.8		V
R <sub>L</sub>	Summing amp output load		10			kΩ
THD	Total harmonic distortion	1kHz, 0dB, BW = 3.5kHz		0.25	1.5	%
E <sub>NO</sub>	Expander output noise voltage	BW = 20kHz, R <sub>S</sub> = 0Ω		10	30	μV
0dB	Unity gain level	0dB at 1kHz	-1.5	0.18	1.5	dB
V <sub>OS</sub>	Output voltage offset	No signal	-150	1	150	mV
	Expander output DC shift	No signal to 0dB	-100	7	100	mV
	Tracking error relative to 0dB output	-20dB expander	-1.0	0.3	1.0	dB
	Crosstalk, COMP to EXP	1kHz, 0dB, C <sub>REF</sub> = 10μF		-80		dB
V <sub>O</sub>	Output swing low			0.2		V
	Output swing high			V <sub>CC</sub> - 0.2		

**NOTE:**

1. Operation down to V<sub>CC</sub> = 1.8V is possible, see description on front page of SA576 data sheet.
2. Reference voltage, V<sub>REF</sub>, is typically at 1/2 V<sub>CC</sub>.

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## TYPICAL PERFORMANCE CHARACTERISTICS

$V_{CC} = 3.6V$ ,  $T_A = 25^\circ C$ ,  $R_1=R_3=7.15k\Omega$ ,  $R_2=100k\Omega$ , 0dB level = 100mV, Freq. = 1kHz

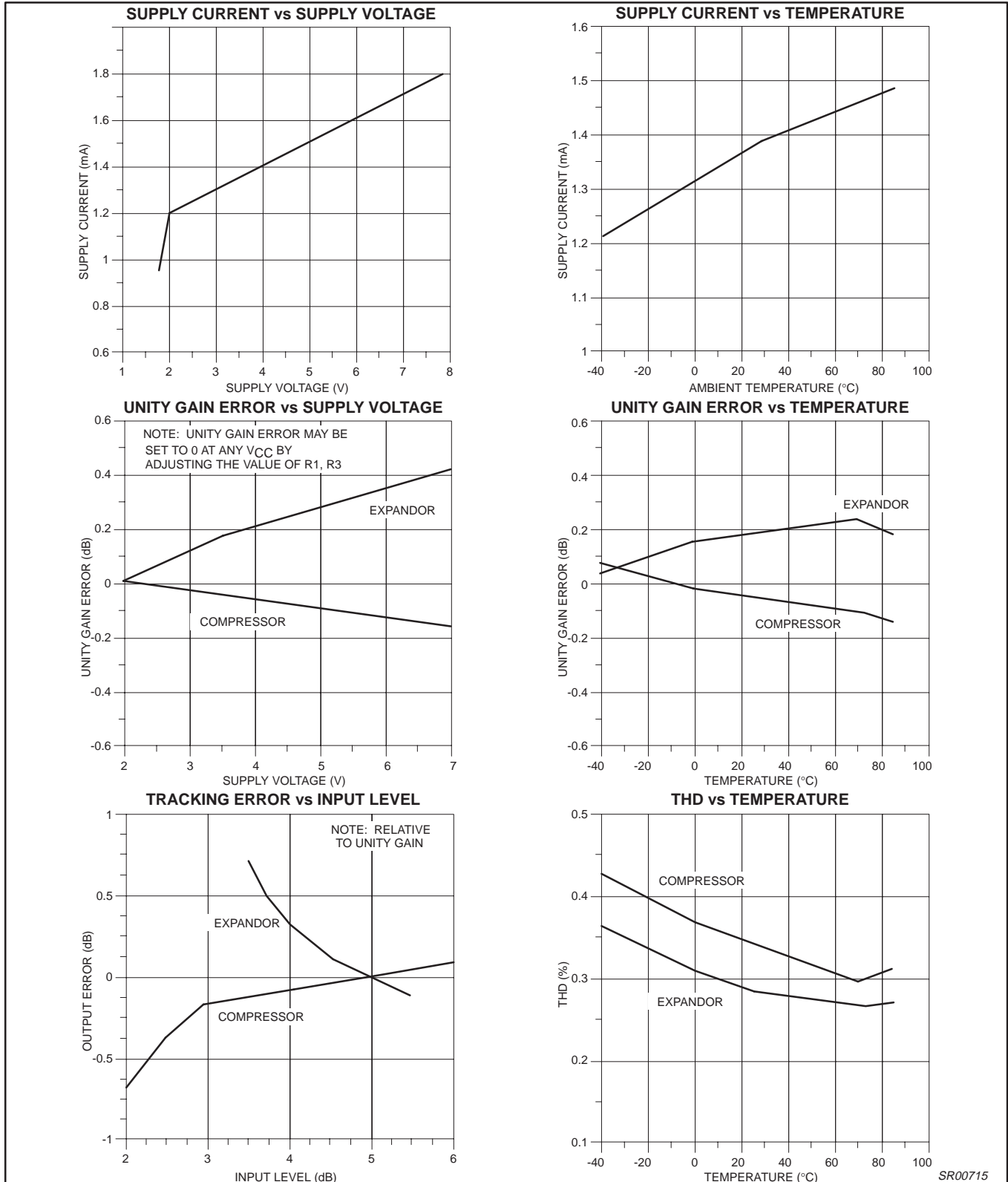


Figure 3. Typical Performance Characteristics

SR00715

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DIP14: plastic dual in-line package; 14 leads (300 mil)

SOT27-1



**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

UNIT	A max.	A <sub>1</sub> min.	A <sub>2</sub> max.	b	b <sub>1</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	e <sub>1</sub>	L	M <sub>E</sub>	M <sub>H</sub>	w	Z <sup>(1)</sup> max.
mm	4.2	0.51	3.2	1.73 1.13	0.53 0.38	0.36 0.23	19.50 18.55	6.48 6.20	2.54	7.62	3.60 3.05	8.25 7.80	10.0 8.3	0.254	2.2
inches	0.17	0.020	0.13	0.068 0.044	0.021 0.015	0.014 0.009	0.77 0.73	0.26 0.24	0.10	0.30	0.14 0.12	0.32 0.31	0.39 0.33	0.01	0.087

**Note**

1. Plastic or metal protrusions of 0.25 mm maximum per side are not included.

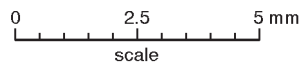
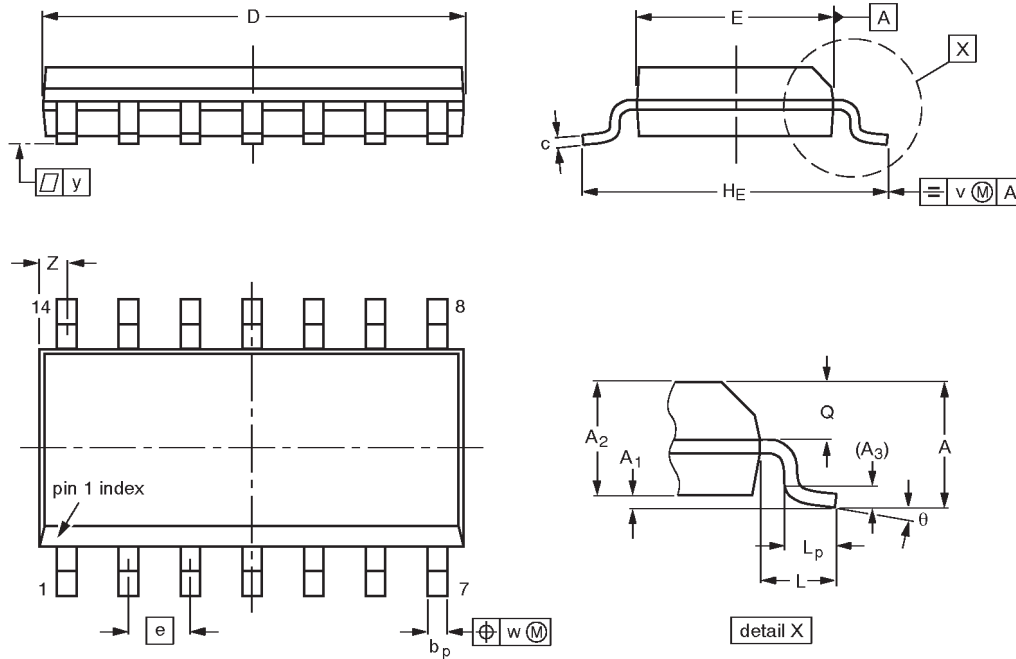
OUTLINE VERSION	REFERENCES			EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ		
SOT27-1	050G04	MO-001AA			92-11-17 95-03-11

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**SO14: plastic small outline package; 14 leads; body width 3.9 mm**

**SOT108-1**



**DIMENSIONS (inch dimensions are derived from the original mm dimensions)**

UNIT	A max.	A <sub>1</sub>	A <sub>2</sub>	A <sub>3</sub>	b <sub>p</sub>	c	D <sup>(1)</sup>	E <sup>(1)</sup>	e	H <sub>E</sub>	L	L <sub>p</sub>	Q	v	w	y	Z <sup>(1)</sup>	θ
mm	1.75	0.25 0.10	1.45 1.25	0.25	0.49 0.36	0.25 0.19	8.75 8.55	4.0 3.8	1.27	6.2 5.8	1.05	1.0 0.4	0.7 0.6	0.25	0.25	0.1	0.7 0.3	8° 0°
inches	0.069	0.0098 0.0039	0.057 0.049	0.01	0.019 0.014	0.0098 0.0075	0.35 0.34	0.16 0.15	0.050	0.24 0.23	0.041	0.039 0.016	0.028 0.024	0.01	0.01	0.004	0.028 0.012	

**Note**

1. Plastic or metal protrusions of 0.15 mm maximum per side are not included.

OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT108-1	076E06S	MS-012AB				91-08-13 95-01-23

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## DEFINITIONS

Data Sheet Identification	Product Status	Definition
<i>Objective Specification</i>	<b>Formative or in Design</b>	This data sheet contains the design target or goal specifications for product development. Specifications may change in any manner without notice.
<i>Preliminary Specification</i>	<b>Preproduction Product</b>	This data sheet contains preliminary data, and supplementary data will be published at a later date. Philips Semiconductors reserves the right to make changes at any time without notice in order to improve design and supply the best possible product.
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