

# 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

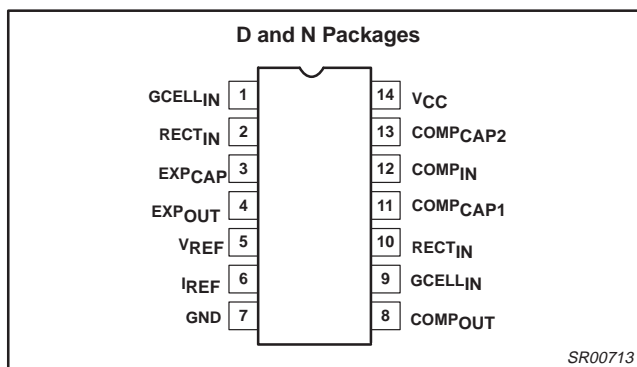


Figure 1. Pin Configuration

## 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 °C/W
		SO	125 °C/W

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## BLOCK DIAGRAM and TEST AND APPLICATION CIRCUIT

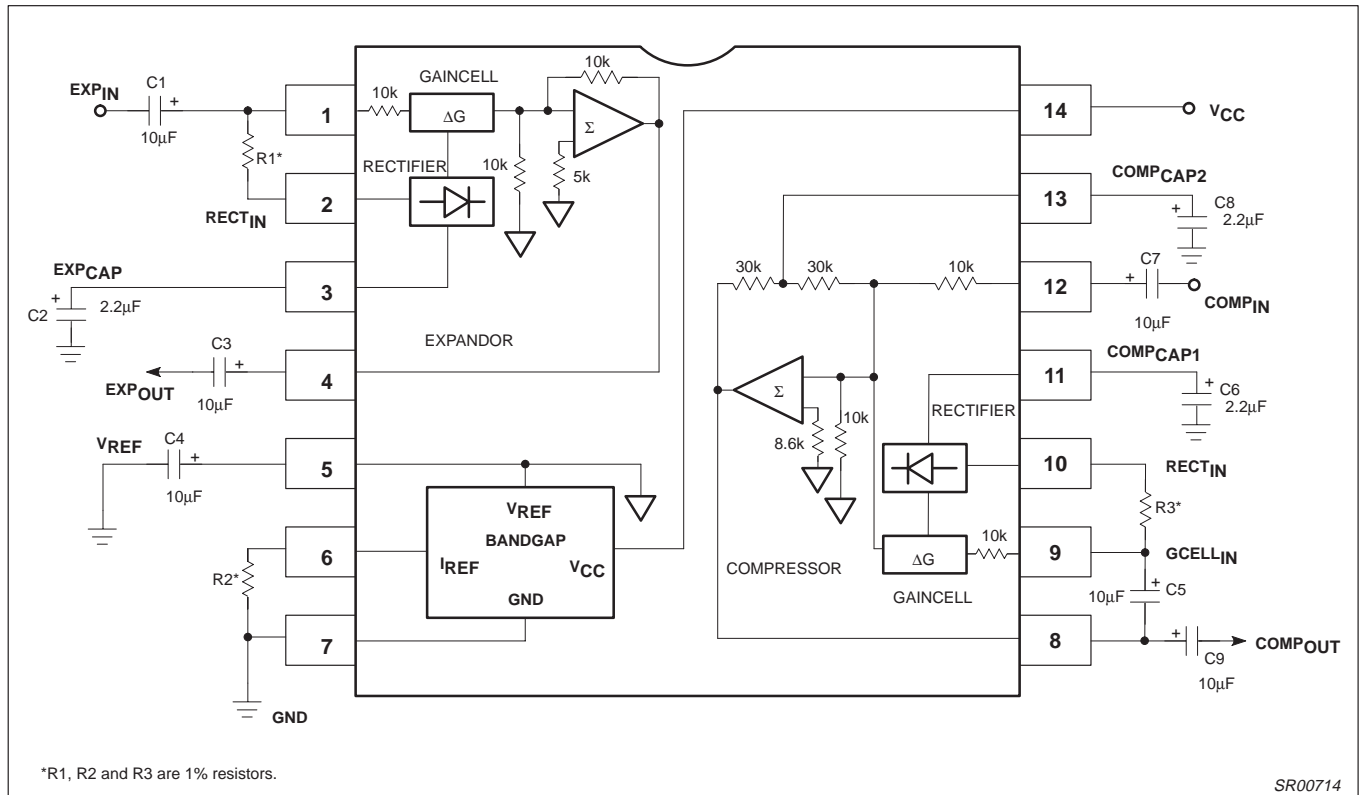


Figure 2. Block Diagram and Test and Application Circuit

## 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

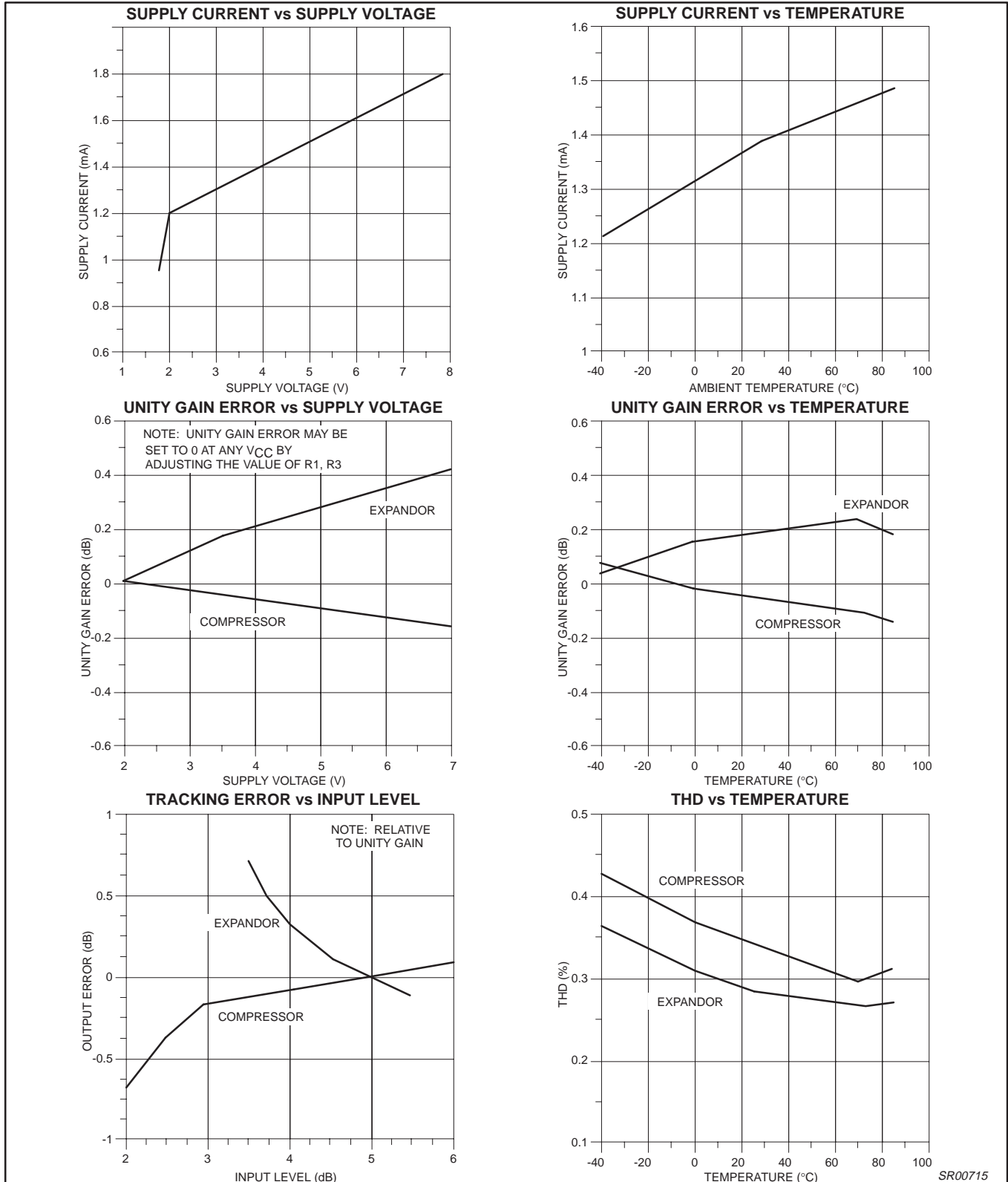


Figure 3. Typical Performance Characteristics

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.
<i>Product Specification</i>	<b>Full Production</b>	This data sheet contains Final Specifications. 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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