

# DATA SHEET

## **NE522**

High-speed dual-differential  
comparator/sense amp

Product data  
Supersedes data of 1994 Aug 31  
File under Integrated Circuits, IC11 Handbook

2001 Aug 03

# High-speed dual-differential comparator/sense amp

# NE522

## FEATURES

- 15 ns maximum guaranteed propagation delay
- 20  $\mu$ A maximum input bias current
- TTL-compatible strobes and outputs
- Large common-mode input voltage range
- Operates from standard supply voltages

## APPLICATIONS

- MOS memory sense amp
- A-to-D conversion
- High-speed line receiver

## PIN CONFIGURATION

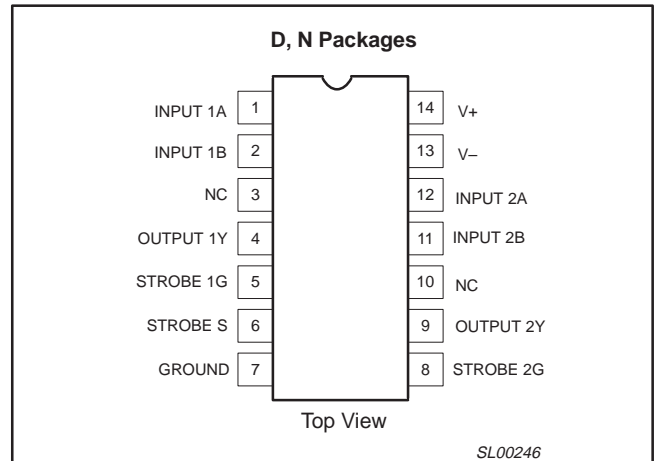


Figure 1. Pin Configuration

## BLOCK DIAGRAM

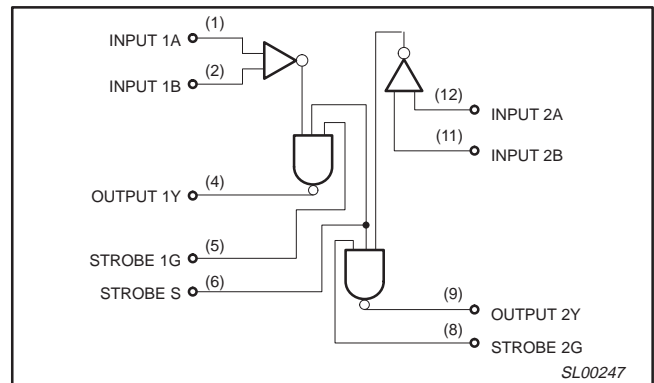


Figure 2. Block Diagram

## ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic DIP	0 °C to +70 °C	NE522N	SOT27-1
14-Pin Plastic SO	0 °C to +70 °C	NE522D	SOT108-1

## ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNITS
V+	Single supply voltage	+7	V
V-	Negative	-7	V
V <sub>IDR</sub>	Differential input voltage	±6	V
V <sub>IN</sub>	Input voltage	±5	V
	Common-mode	+5.25	V
	Strobe/gate		
P <sub>D</sub>	Power dissipation	600	mW
T <sub>amb</sub>	Operating temperature range	0 to 70	°C
T <sub>stg</sub>	Storage temperature range	-65 to +150	°C
T <sub>sld</sub>	Lead soldering temperature (10 sec max)	+230	°C

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### EQUIVALENT SCHEMATIC

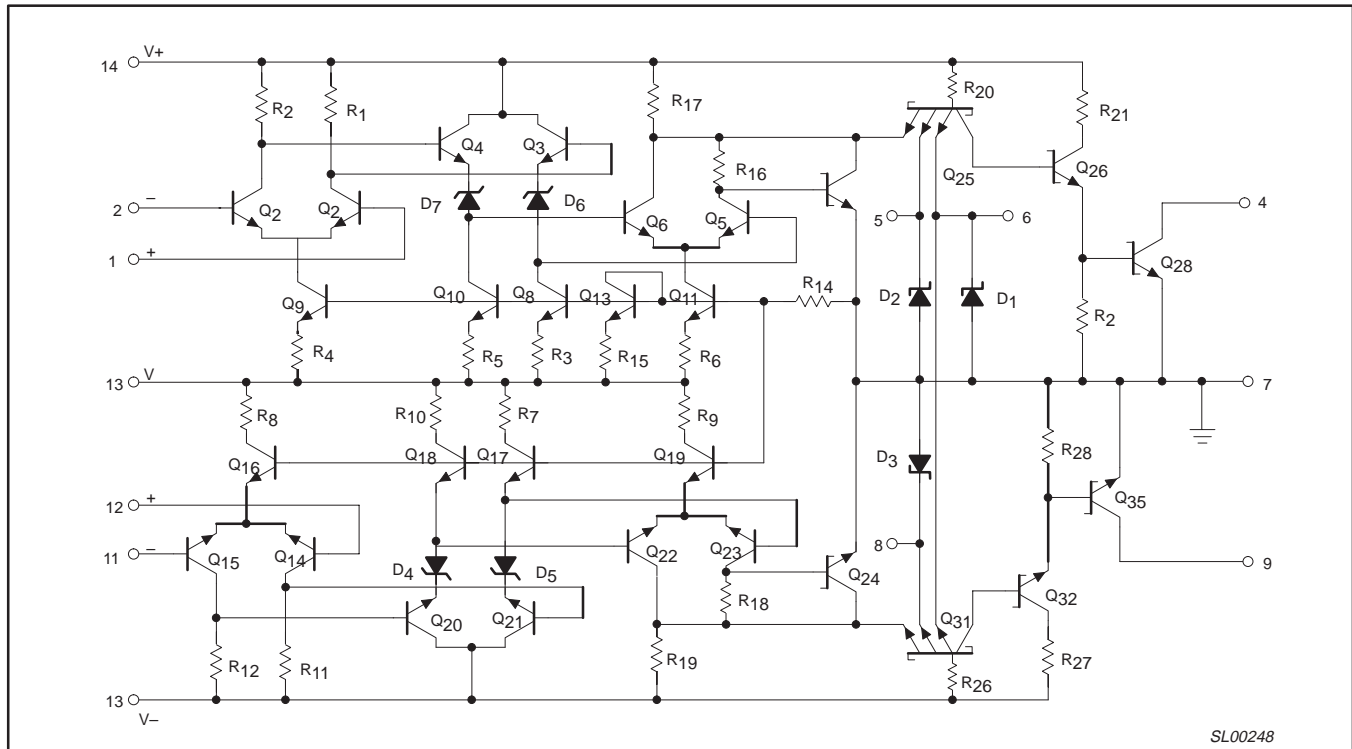


Figure 3. Equivalent Schematic

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**DC ELECTRICAL CHARACTERISTICS** $V_{\pm} = \pm 5 \text{ V} \pm 5\%$ ;  $T_{\text{amb}} = 0 \text{ }^{\circ}\text{C}$  to  $+70 \text{ }^{\circ}\text{C}$ , unless otherwise stated.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNITS
			MIN	TYP	MAX	
$V_{\text{OS}}$	Input offset voltage At 25 °C Over temperature range	$V_{+} = +4.75 \text{ V}$ ; $V_{-} = -4.75 \text{ V}$		6	7.5 10	mV mV
$I_{\text{BIAS}}$	Input bias current At 25 °C Over temperature range	$V_{+} = +5.25 \text{ V}$ ; $V_{-} = -5.25 \text{ V}$		7.5	20 40	$\mu\text{A}$ $\mu\text{A}$
$I_{\text{OS}}$	Input offset current At 25 °C Over temperature range	$V_{+} = +5.25 \text{ V}$ ; $V_{-} = -5.25 \text{ V}$		1.0	5 12	$\mu\text{A}$ $\mu\text{A}$
$V_{\text{CM}}$	Common-mode voltage range	$V_{+} = +4.75 \text{ V}$ ; $V_{-} = -4.75 \text{ V}$	-3		+3	V
$V_{\text{IL}}$	LOW-level input voltage At 25 °C Over temperature range				0.8 0.7	V V
$V_{\text{IH}}$	High level temperature		2.0			V
$I_{\text{IH}}$	HIGH-level input current 1G or 2G strobe Common strobe S	$V_{+} = +5.25 \text{ V}$ ; $V_{-} = -5.25 \text{ V}$ ; $V_{\text{IH}} = 2.7 \text{ V}$			50 100	$\mu\text{A}$ $\mu\text{A}$
$I_{\text{IL}}$	LOW-level input current 1G or 2G strobe Common strobe S	$V_{\text{IL}} = 0.5 \text{ V}$			-2.0 -4.0	mA mA
$V_{\text{OL}}$	LOW-level output voltage	$V_{+} = +5.25 \text{ V}$ ; $V_{-} = -5.25 \text{ V}$ ; $V_{\text{I(S)}} = 2.0 \text{ V}$ ; $I_{\text{LOAD}} = 20 \text{ mA}$			0.5	V
$I_{\text{OH}}$	HIGH-level output current	$V_{+} = +4.75 \text{ V}$ ; $V_{-} = -4.75 \text{ V}$ ; $V_{\text{OH}} = 5.25 \text{ V}$			250	$\mu\text{A}$
$V_{+}$ $V_{-}$	Supply voltage Positive Negative		4.75 -4.75	5.0 -5.0	5.25 -5.25	V V
$I_{\text{CC+}}$ $I_{\text{CC-}}$	Supply current Positive Negative	$V_{+} = +5.25 \text{ V}$ ; $V_{-} = -5.25 \text{ V}$ ; $T_{\text{amb}} = 25 \text{ }^{\circ}\text{C}$		27 -15	35 -28	mA

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**AC ELECTRICAL CHARACTERISTICS** $T_{amb} = 25\text{ }^{\circ}\text{C}$ ;  $R_L = 280\text{ }\Omega$ ;  $C_L = 15\text{ pF}$ ; unless otherwise stated.

SYMBOL	PARAMETER	FROM INPUT	TO OUTPUT	LIMITS			UNITS
				MIN	TYP	MAX	
$I_R$	Input resistance				4		$k\Omega$
$I_C$	Input capacitance				3		pF
<b>Large-signal switching speed</b>							
	Propagation delay						
$t_{PLH(D)}$	Low to high <sup>1</sup>	Amp	Output		10	15	ns
$t_{PHL(D)}$	High to low <sup>1</sup>	Amp	Output		8	12	
$t_{PLH(S)}$	Low to high <sup>2</sup>	Strobe	Output		6	13	
$t_{PHL(S)}$	High to low <sup>2</sup>	Strobe	Output		5	9	
$I_{MAX}$	Maximum operating frequency			25	35		MHz

**NOTES:**

- Response time measured from 0 V point of +100 mV<sub>p-p</sub> 10 MHz square wave to the 1.5 V point of the output.
- Response time measured from 1.5 V point of the input to 1.5 V point of the output.

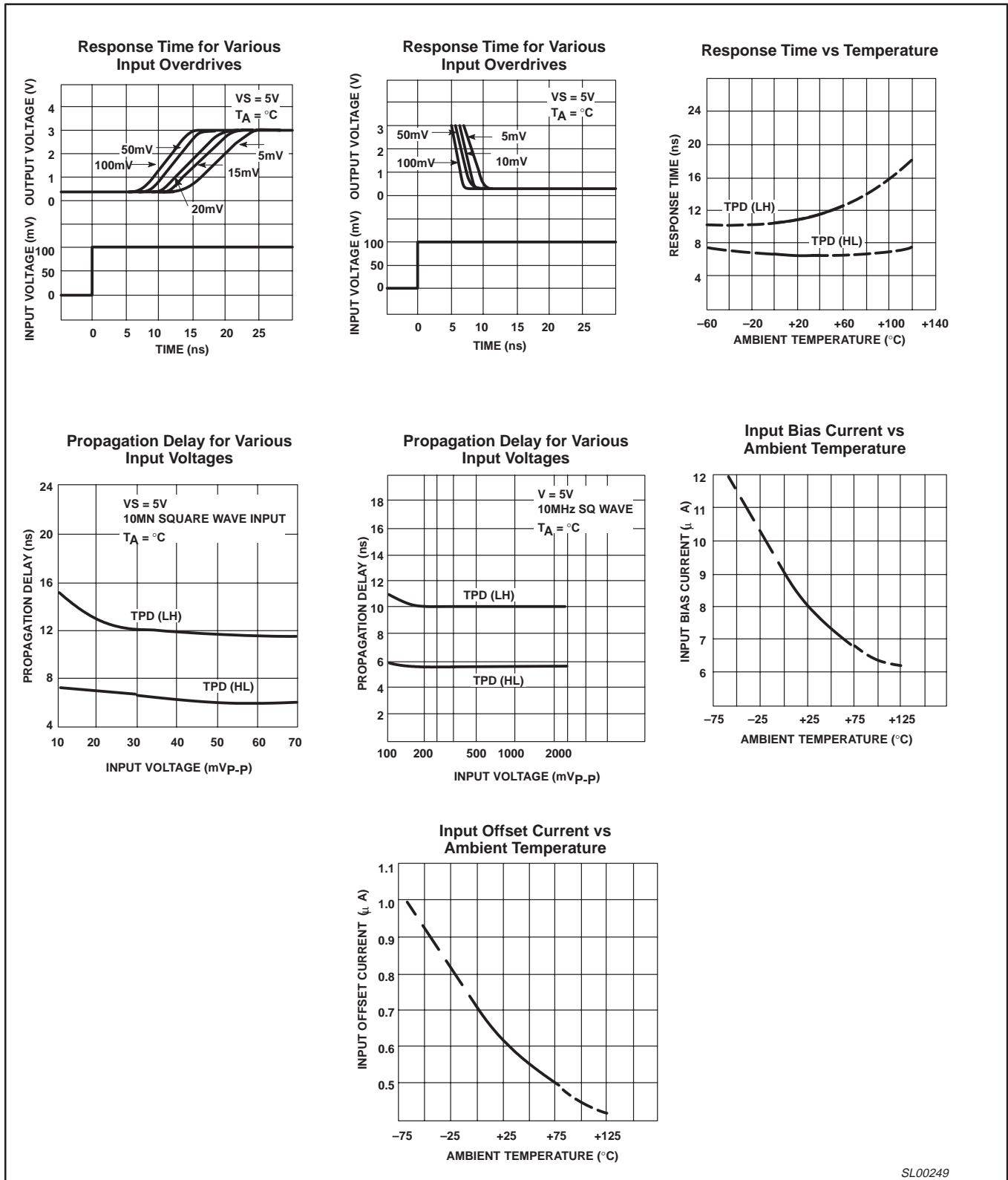
**LOGIC FUNCTION TABLE**

$V_{ID} (A^+, B^-)$	STRS	STRG	OUTPUT TRANSISTOR
$< -V_{OS}$	H	H	ON
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined
$> V_{OS}$	H	H	OFF
X	L	X	OFF
X	X	L	OFF

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## TYPICAL PERFORMANCE CHARACTERISTICS



SL00249

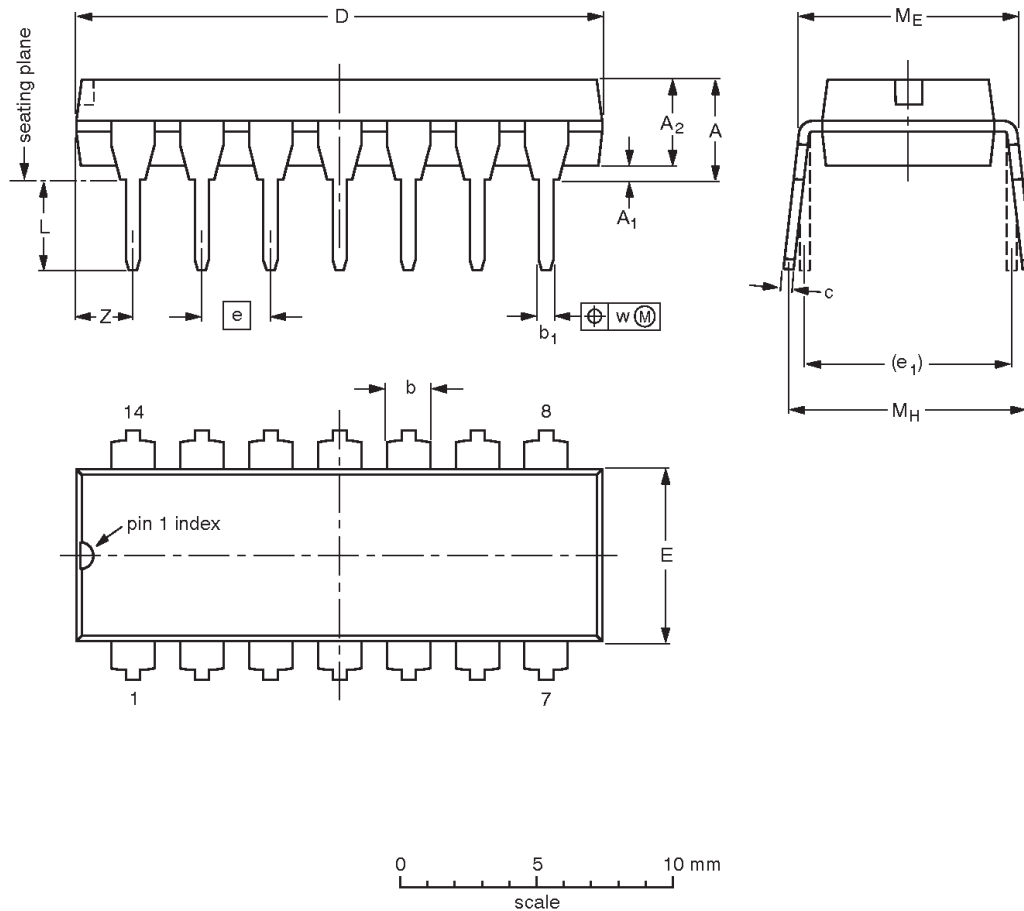
Figure 4. Typical Performance Characteristics

# High-speed dual-differential comparator/sense amp

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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.

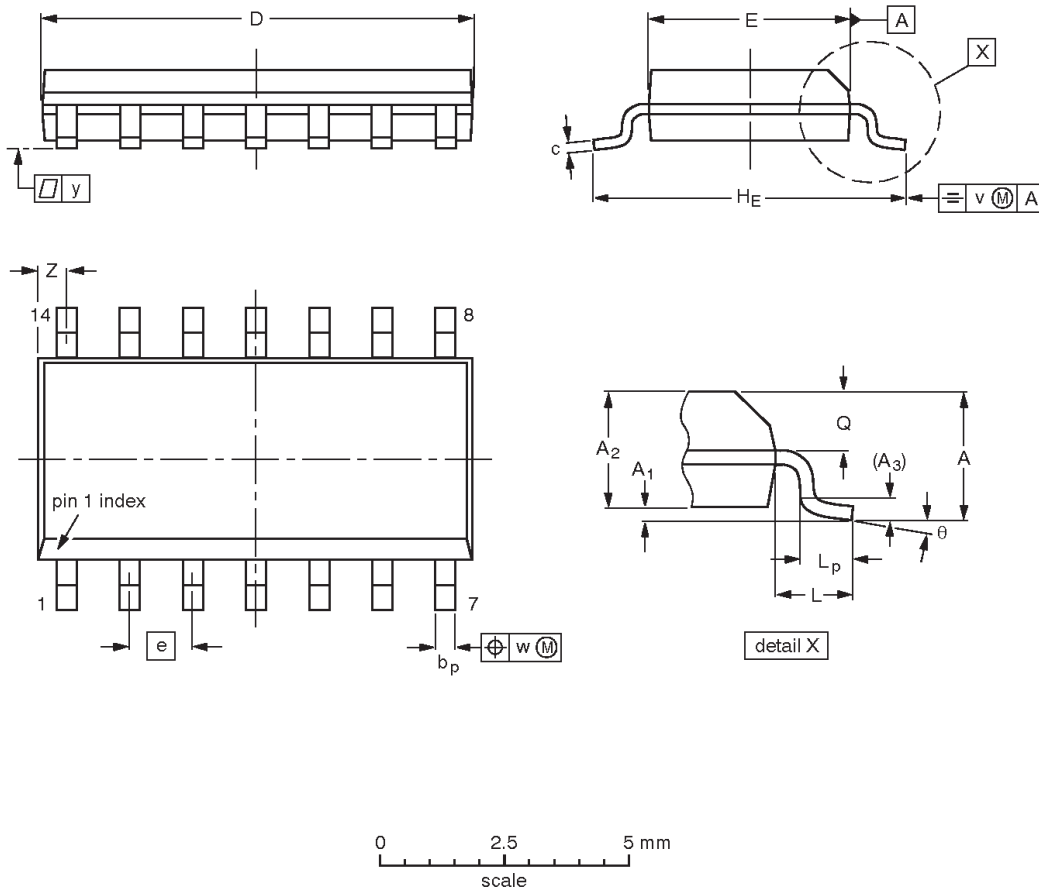
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001	SC-501-14			95-03-11 99-12-27

# High-speed dual-differential comparator/sense amp

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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	0.010 0.004	0.057 0.049	0.01	0.019 0.014	0.0100 0.0075	0.35 0.34	0.16 0.15	0.050	0.244 0.228	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	076E06	MS-012				97-05-22 99-12-27



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**NOTES**

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## Data sheet status

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