

DATA SHEET

NE529

Voltage comparator

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

2001 Aug 03

Voltage comparator

NE529

DESCRIPTION

The NE529 is a high-speed analog voltage comparator which, for the first time, mates state-of-the-art Schottky diode technology with the conventional linear process. This allows simultaneous fabrication of high-speed TTL gates with a precision linear amplifier on a single monolithic chip.

FEATURES

- 10 ns propagation delay
- Complementary output gates
- TTL or ECL compatible outputs
- Wide common-mode and differential voltage range
- Typical gain 5000

APPLICATIONS

- A/D conversion
- ECL-to-TTL interface
- TTL-to-ECL interface
- Memory sensing
- Optical data coupling

PIN CONFIGURATIONS

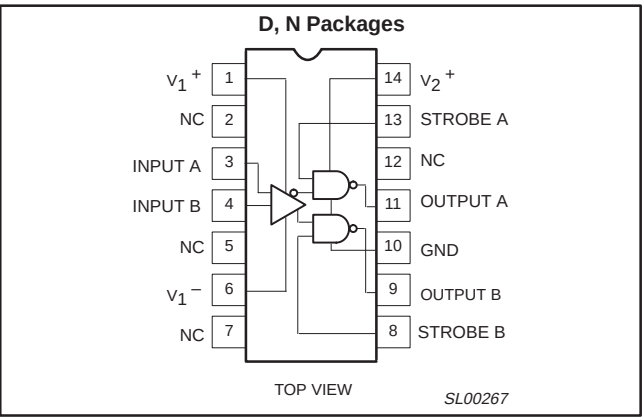


Figure 1. Pin Configuration

BLOCK DIAGRAM

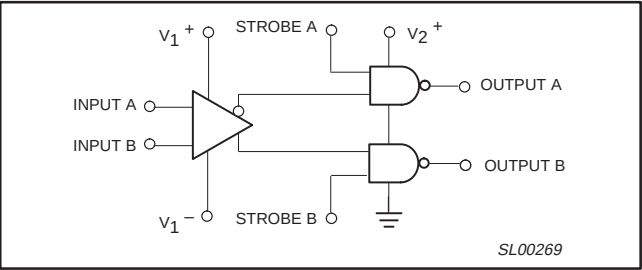


Figure 2. Block Diagram

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 °C to +70 °C	NE529N	SOT27-1
14-Pin Small Outline (SO) Package	0 °C to +70 °C	NE529D	SOT108-1

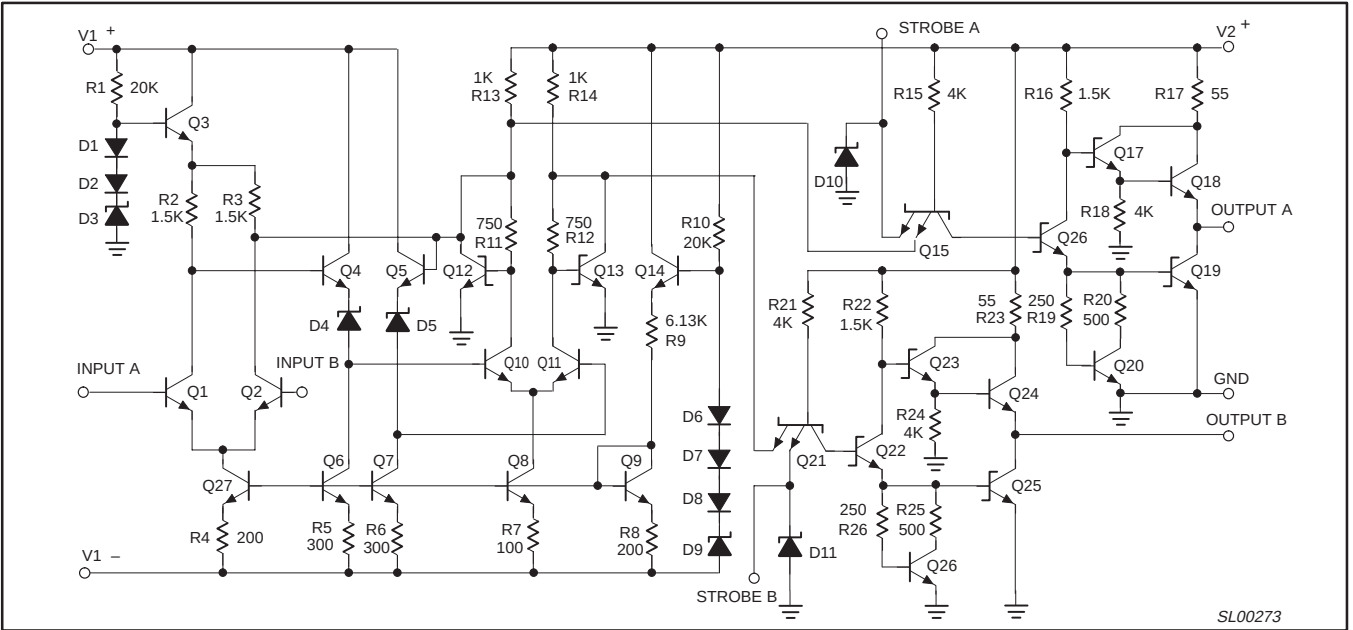


Figure 3.

Voltage comparator

NE529

ABSOLUTE MAXIMUM RATINGS

SYMBOL	PARAMETER	RATING	UNIT
V_{1+}	Positive supply voltage	+15	V
V_{1-}	Negative supply voltage	-15	V
V_{2+}	Gate supply voltage	+7	V
V_{OUT}	Output voltage	+7	V
V_{IN}	Differential input voltage	± 5	V
V_{CM}	Input common mode voltage	± 6	V
P_D	Maximum power dissipation ¹ $T_{amb} = 25\text{ }^{\circ}\text{C}$ (still-air) N package D package	1420 1040	mW mW
T_{amb}	Operating temperature range	0 to +70	$^{\circ}\text{C}$
T_{stg}	Storage temperature range	-65 to +150	$^{\circ}\text{C}$
T_{sld}	Lead soldering temperature (10 sec max)	+230	$^{\circ}\text{C}$

NOTES:

- Derate above 25 $^{\circ}\text{C}$ at the following rates:
N package at 11.5 mW/ $^{\circ}\text{C}$
D package at 8.3 mW/ $^{\circ}\text{C}$

Voltage comparator

NE529

DC ELECTRICAL CHARACTERISTICS

 $V_{1+} = +10\text{ V}$; $V_{2+} = +5.0\text{ V}$; $V_{1-} = -10\text{ V}$; unless otherwise specified.

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
Input characteristics						
V _{OS}	Input offset voltage @ 25 °C				6	mV
	Over temperature range				10	mV
I _{BIAS}	Input bias current @ 25 °C			5	20	μA
	Over temperature range	V _{IN} = 0 V			50	μA
I _{OS}	Input offset current @ 25 °C			2	5	μA
	Over temperature range	V _{IN} = 0 V			15	μA
V _{CM}	Common-mode voltage range		−5	0		V
Gate characteristics						
V _{OUT}	Output voltage					
	“1” state	V ₂₊ = 4.75 V; I _{SOURCE} = −1 mA	2.7	3.3		V
	“0” state	V ₂₊ = 4.75 V; I _{SINK} = 10 mA			0.5	V
	Strobe inputs					
	“0” Input current ¹	V ₂₊ = 5.25 V; V _{STROBE} = 0.5 V			−2	mA
	“1” Input current @ 25 °C ¹	V ₂₊ = 5.25 V; V _{STROBE} = 2.7 V			100	μA
	Over temperature range	V ₂₊ = 5.25 V; V _{STROBE} = 2.7 V			200	μA
	“0” input voltage	V ₂₊ = 4.75 V			0.8	V
	“1” input voltage	V ₂₊ = 4.75 V	2.0			V
I _{SC}	Short-circuit output current	V ₂₊ = 5.25 V; V _{OUT} = 0 V	−18		−70	mA
Power supply requirements						
V ₁₊ V _{1−} V ₂₊	Supply voltage		5 −6 4.75		10 −10 5.25	V V V
				5		
I ₁₊ I _{1−} I ₂₊	Supply current	V ₁₊ = 10 V; V _{1−} = −10 V				
		V ₂₊ = 5.25 V				
		Over temp.			5	mA
		Over temp.			10	mA
		Over temp.			20	mA

NOTE:

1. See logic function table.

AC ELECTRICAL CHARACTERISTICS

 $T_{amb} = 25\text{ °C}$ (See AC test circuit).

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
t_R	Transient response	$V_{IN} = \pm 100\text{ mV}$ step				
t_{PLH} t_{PHL}	Propagation delay time					
	Low-to-high			12	22	ns
	High-to-low			10	20	ns
	Delay between output A and B			2	5	ns
t_{ON} t_{OFF}	Strobe delay time					
	turn-on time			6		ns
	turn-off time			6		ns

Voltage comparator

NE529

TYPICAL PERFORMANCE CHARACTERISTICS

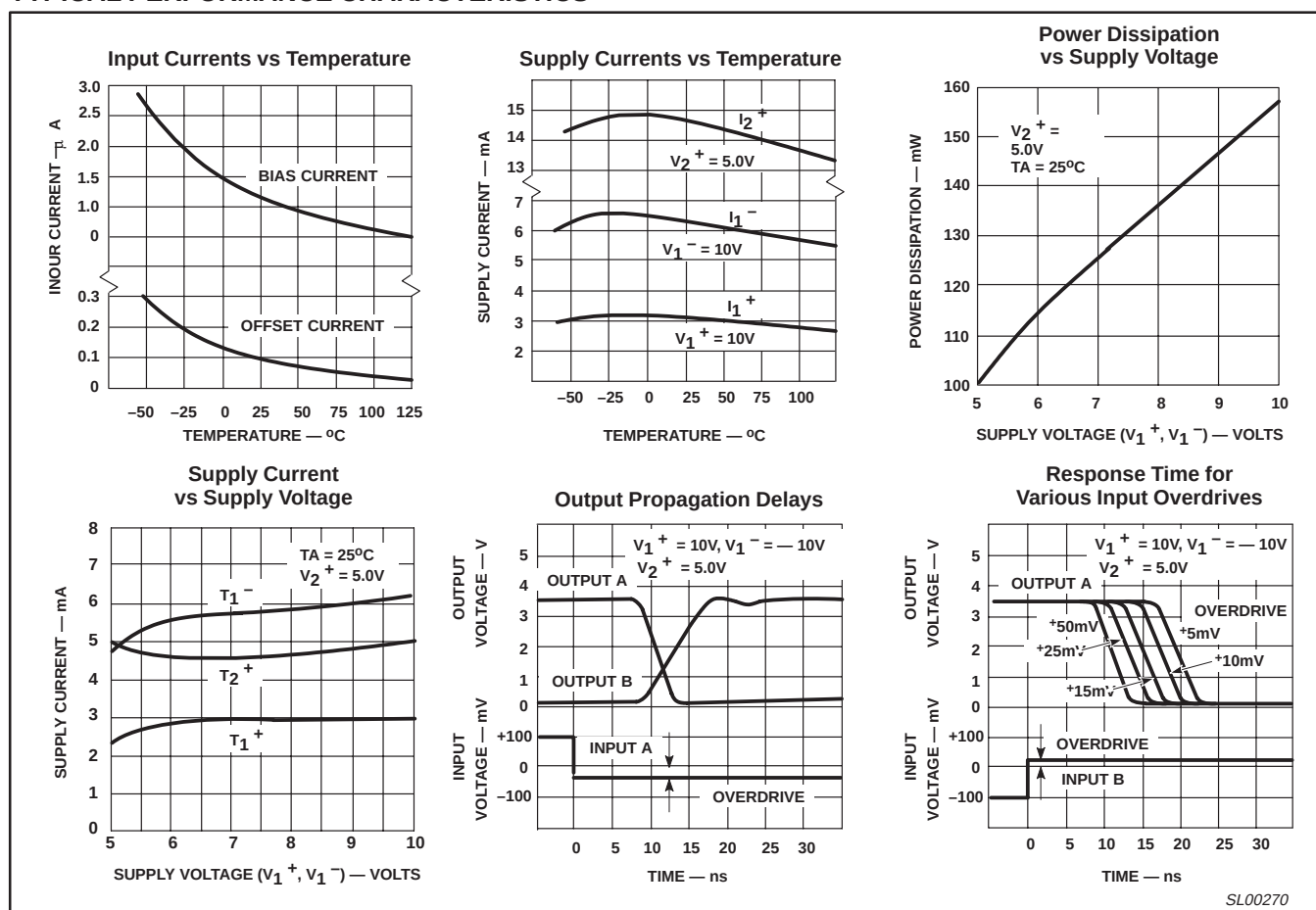


Figure 4. Typical Performance Characteristics

RESPONSE TIME TEST CIRCUIT

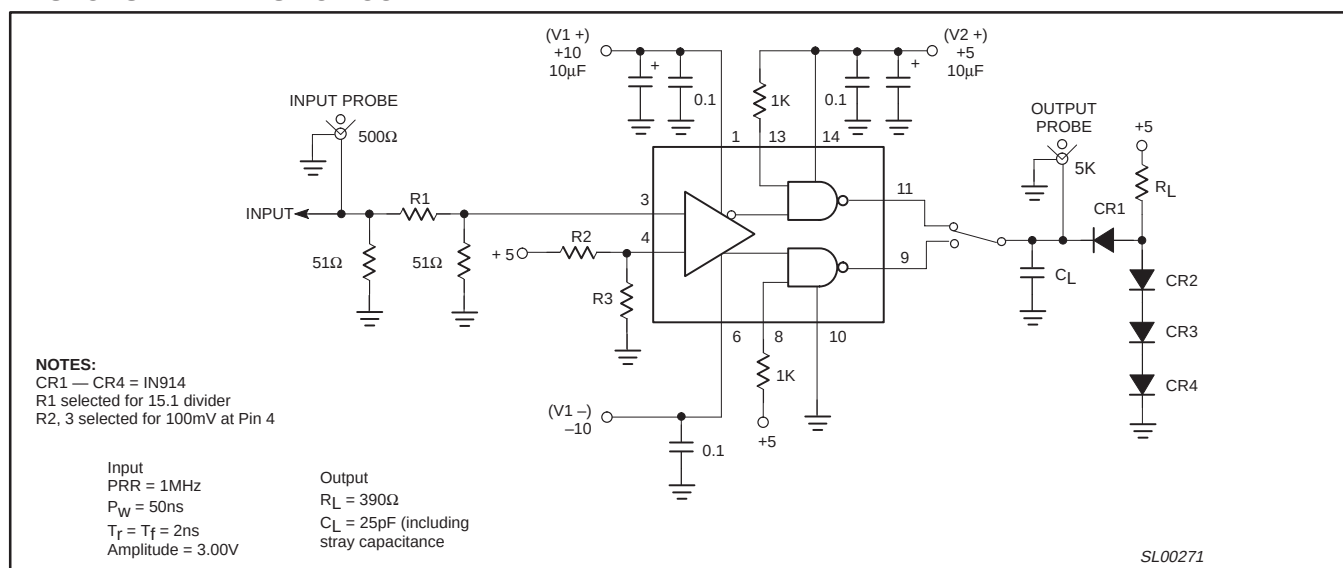


Figure 5. Response Time Test Circuit

Voltage comparator

NE529

APPLICATIONS

One of the main features of the device is that supply voltages (V_+ , V_-) need not be balanced, as in the following diagrams. For proper operation, however, negative supply (V_-) should always be at least 6 V more than the ground terminal (pin 6). Input Common-Mode

range should be limited to values of 2 V less than the supply voltages (V_+ and V_-) up to a maximum of ± 5 V as supply voltages are increased.

It is also important to note that Output A is in phase with Input A and Output B is in phase with Input B.

LOGIC FUNCTION

V_{ID} (A^+ , B^-)	STROBE A	STROBE B	OUTPUT A	OUTPUT B
$V_{ID} \leq -V_{OS}$	H	X	L	H
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined	Undefined
$V_{ID} \geq V_{OS}$	X	H	H	L
X	L	L	H	H

TYPICAL APPLICATIONS

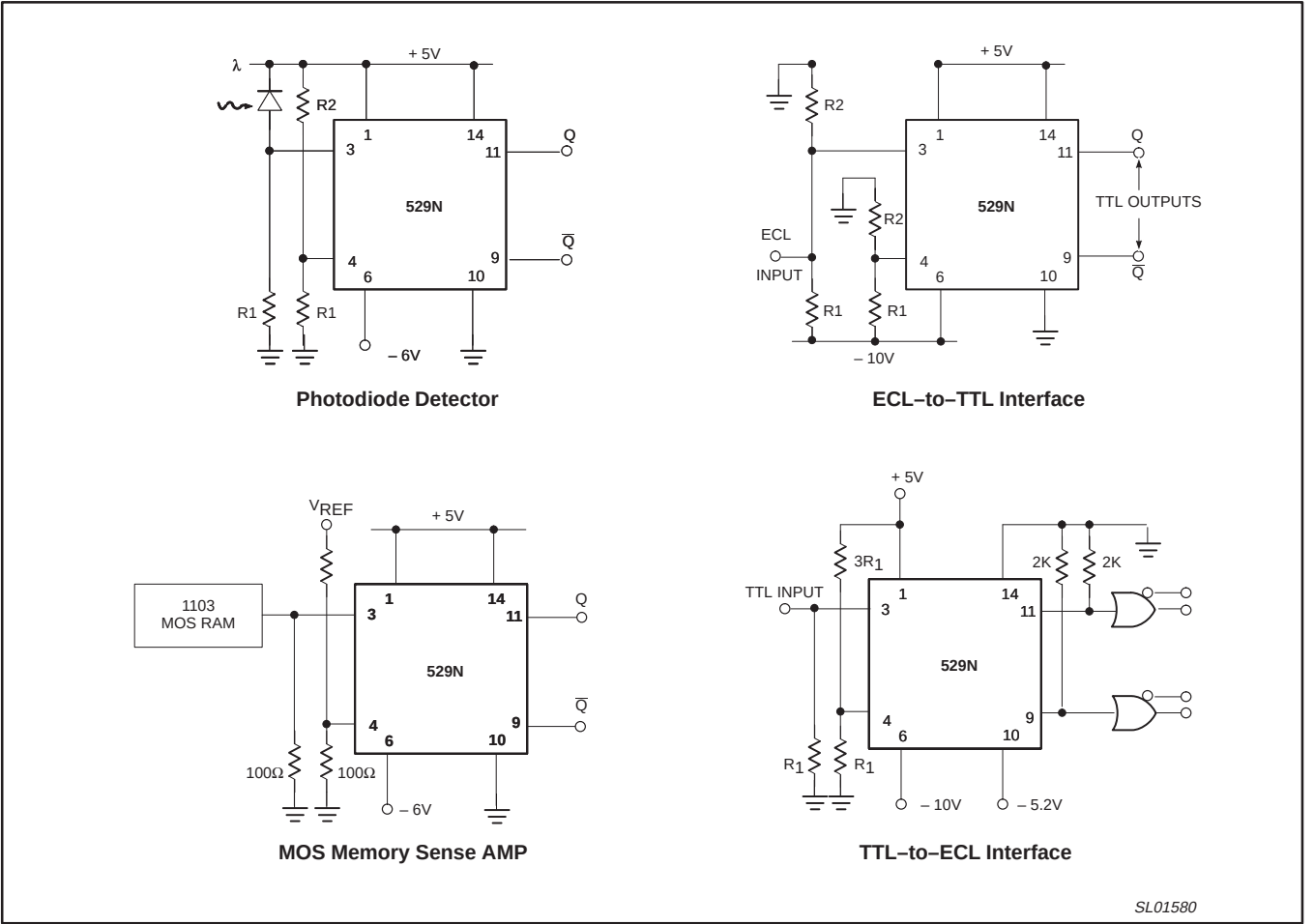


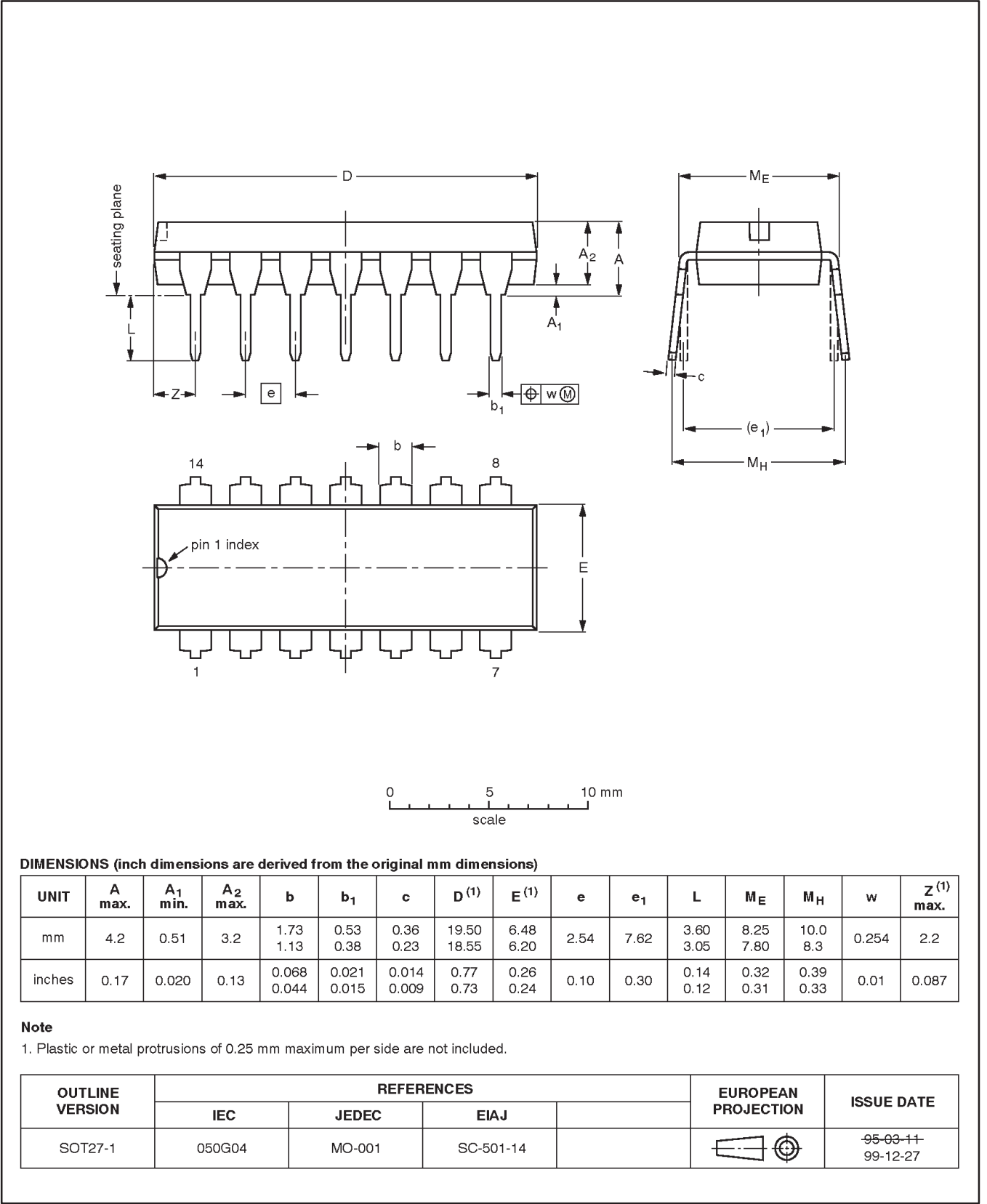
Figure 6. Typical Applications

Voltage comparator

NE529

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

SOT27-1

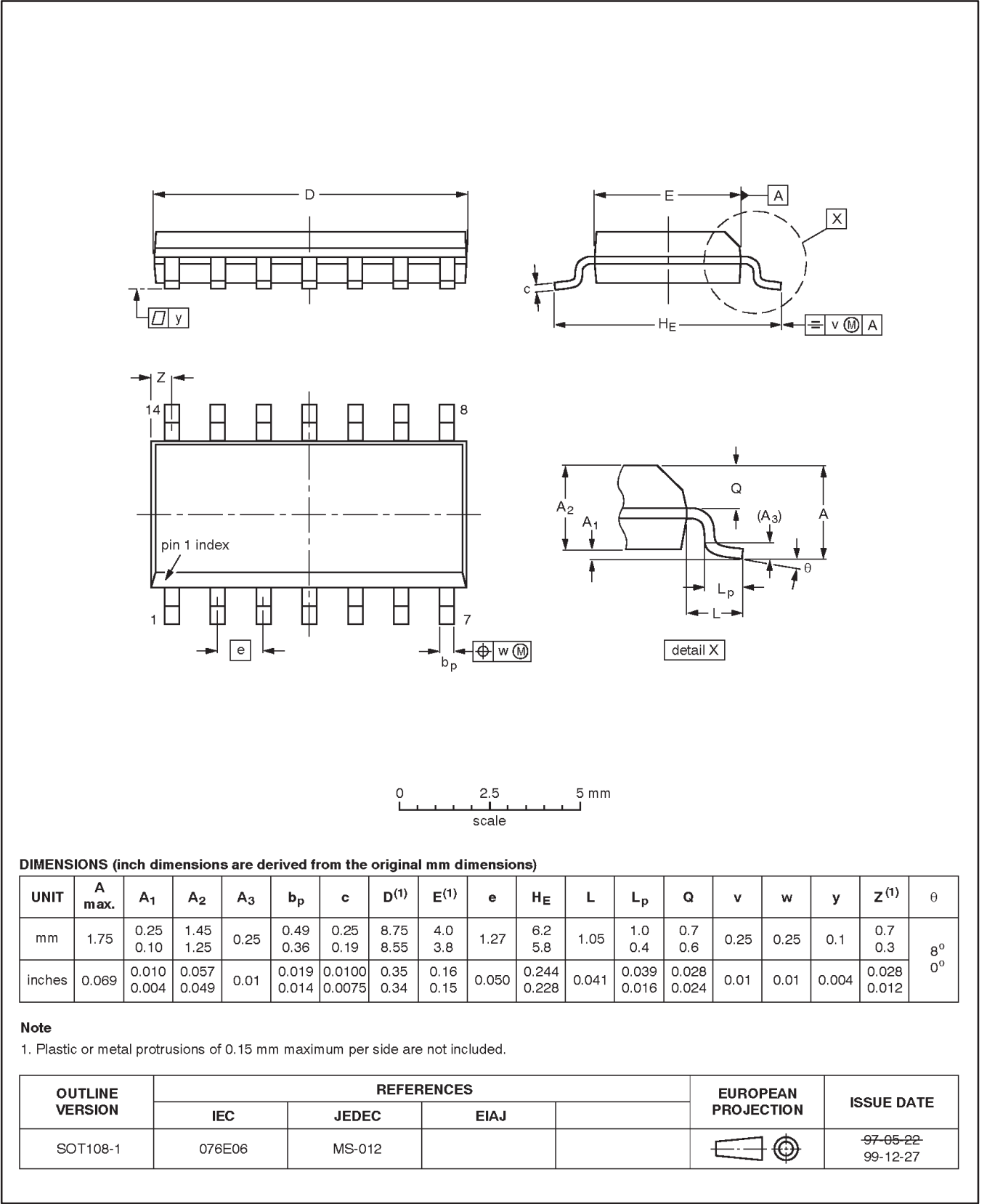


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NE529

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

SOT108-1



Voltage comparator

NE529

NOTES

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NE529

Data sheet status

Data sheet status ^[1]	Product status ^[2]	Definitions
Objective data	Development	This data sheet contains data from the objective specification for product development. Philips Semiconductors reserves the right to change the specification in any manner without notice.
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