

DATA SHEET

NE527

Voltage comparator

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

2001 Aug 03

Voltage comparator

NE527

DESCRIPTION

The NE527 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. The NE527 is similar in design to the Philips Semiconductors NE529 voltage comparator except that it incorporates an "Emitter-Follower" input stage for extremely low input currents. This opens the door to a whole new range of applications for analog voltage comparators.

FEATURES

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

PIN CONFIGURATIONS

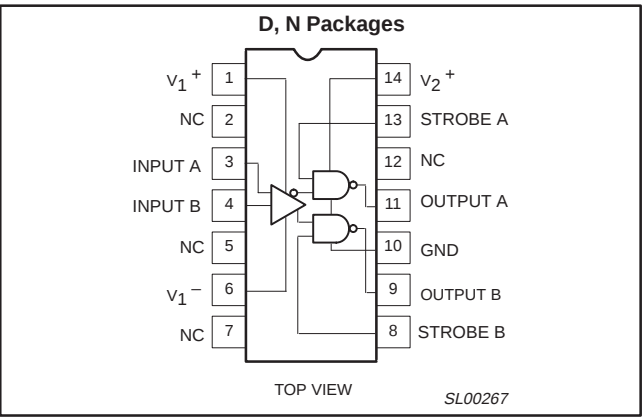


Figure 1. Pin Configuration

APPLICATIONS

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

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
14-Pin Plastic Dual In-Line Package (DIP)	0 °C to +70 °C	NE527N	SOT27-1
14-Pin Small Outline (SO) Package	0 °C to +70 °C	NE527D	SOT108-1

EQUIVALENT SCHEMATIC

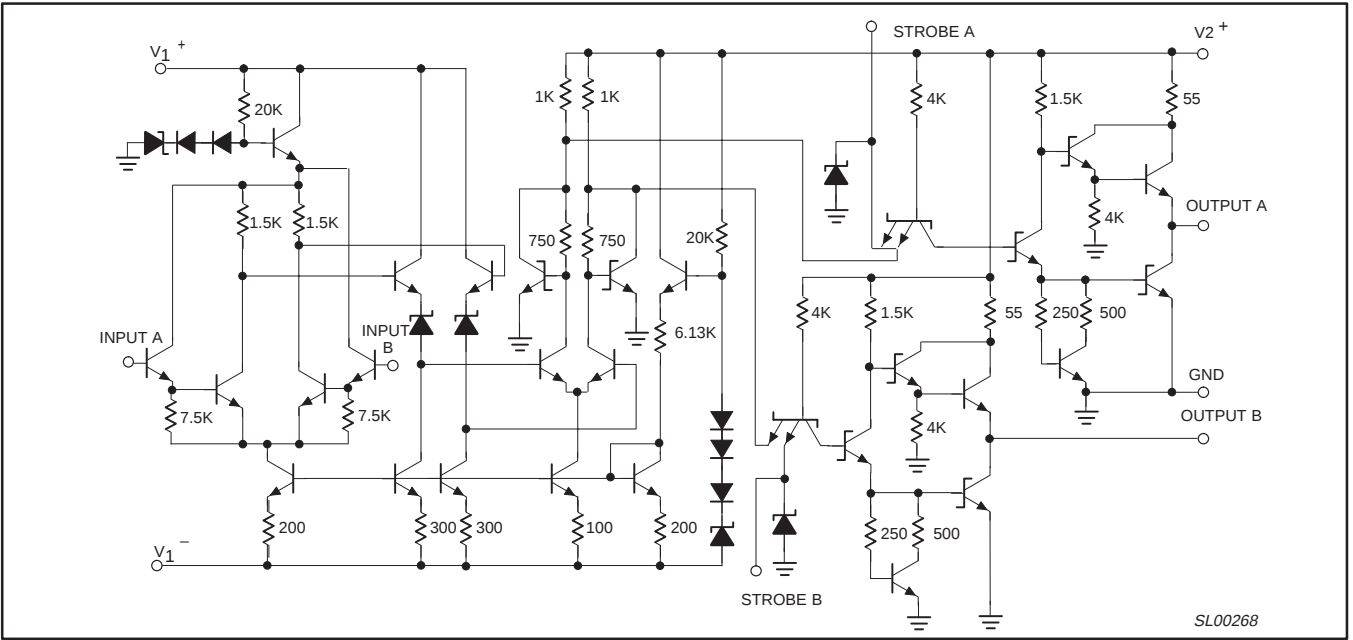


Figure 2. Equivalent Schematic

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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	Max power dissipation ¹ 25 °C ambient (still air)		
	N package	1420	mW
	D package	1040	mW
T _{amb}	Operating temperature range	0 to +70	°C
T _{stg}	Storage temperature range	−65 to +150	°C
T _{sld}	Lead soldering temperature (10sec max)	+230	°C

NOTES:

1. Derate above 25 °C, at the following rates:
N package 11.4 mW/°C
D package 8.3 mW/°C

BLOCK DIAGRAM

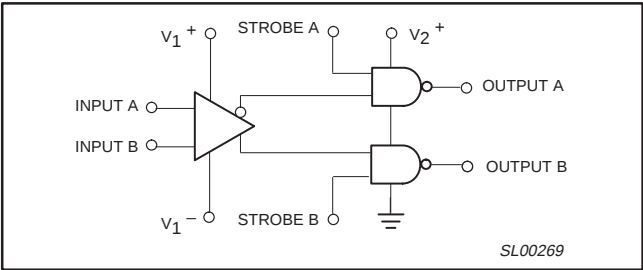


Figure 3. Block Diagram

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DC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS	NE527			UNIT
			Min	Typ	Max	
Input characteristics						
V _{OS}	Input offset voltage @ 25 °C over temperature range				6 10	mV
I _{BIAS}	Input bias current @ 25 °C over temperature range				2 4	μA
I _{OS}	Input offset current @ 25 °C over temperature range	V _{IN} = 0 V			0.75 1	μA μA
V _{CM}	Common-mode voltage range		−5		+5	V
Gate characteristics						
V _{OUT}	Output Voltage “1” State “0” State	V ₂₊ = 4.75 V; I _{SOURCE} = −1 mA V ₂₊ = 4.75 V; I _{SINK} = 10 mA	2.7	3.3	 0.5	V V
	Strobe inputs “0” Input current ¹ “1” Input current @ 25 °C ¹ Over temperature range “0” Input voltage “1” Input voltage	V ₂₊ = 5.25 V; V _{STROBE} = 0.5 V V ₂₊ = 5.25 V; V _{STROBE} = 2.7 V V ₂₊ = 5.25 V; V _{STROBE} = 2.7 V V ₂₊ = 4.75 V V ₂₊ = 4.75 V	 2.0		−2 100 200 0.8	mA μA μA V 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	 5	10 −10 5.25	V V V
I ₁₊ I _{1−} I ₂₊	Supply current	V ₁₊ = 10 V; V _{1−} = −10 V V ₂₊ = 5.25 V Over temp. Over temp. Over temp.			 5 10 20	mA mA mA

NOTE:

1. See Logic Function Table.

AC ELECTRICAL CHARACTERISTICS

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

SYMBOL	PARAMETER	TEST CONDITIONS	LIMITS			UNIT
			Min	Typ	Max	
t_{PLH} t_{PHL}	Transient response propagation delay time Low-to-High High-to-Low	$V_{IN} = \pm 100\text{ mV step}$		16 14	26 24	ns ns
	Delay between output A and B			2	5	ns
t_{ON} t_{OFF}	Strobe delay time Turn-on time Turn-off time			6 6		ns ns

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TYPICAL PERFORMANCE CHARACTERISTICS

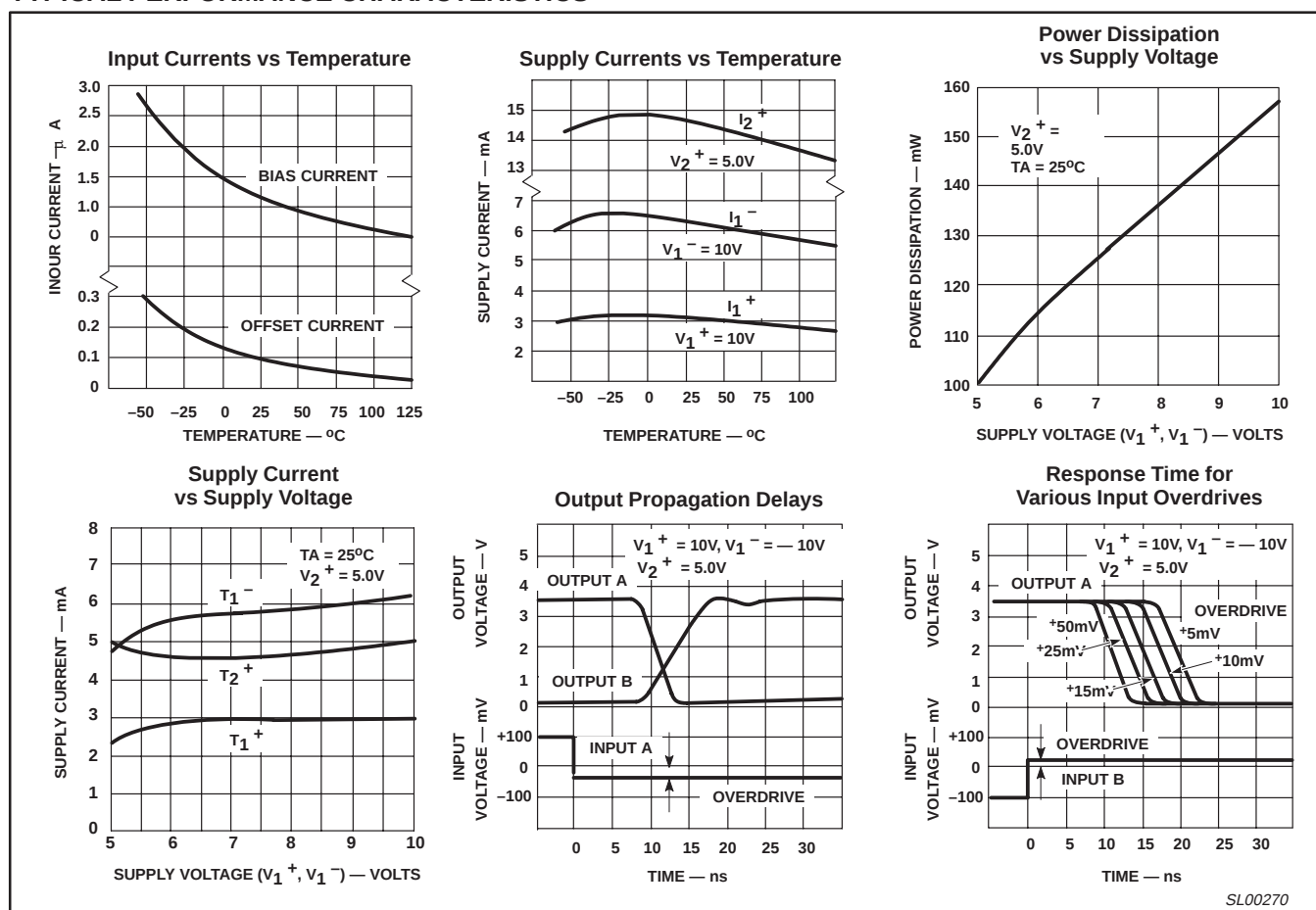


Figure 4. Typical Performance Characteristics

RESPONSE TIME TEST CIRCUIT

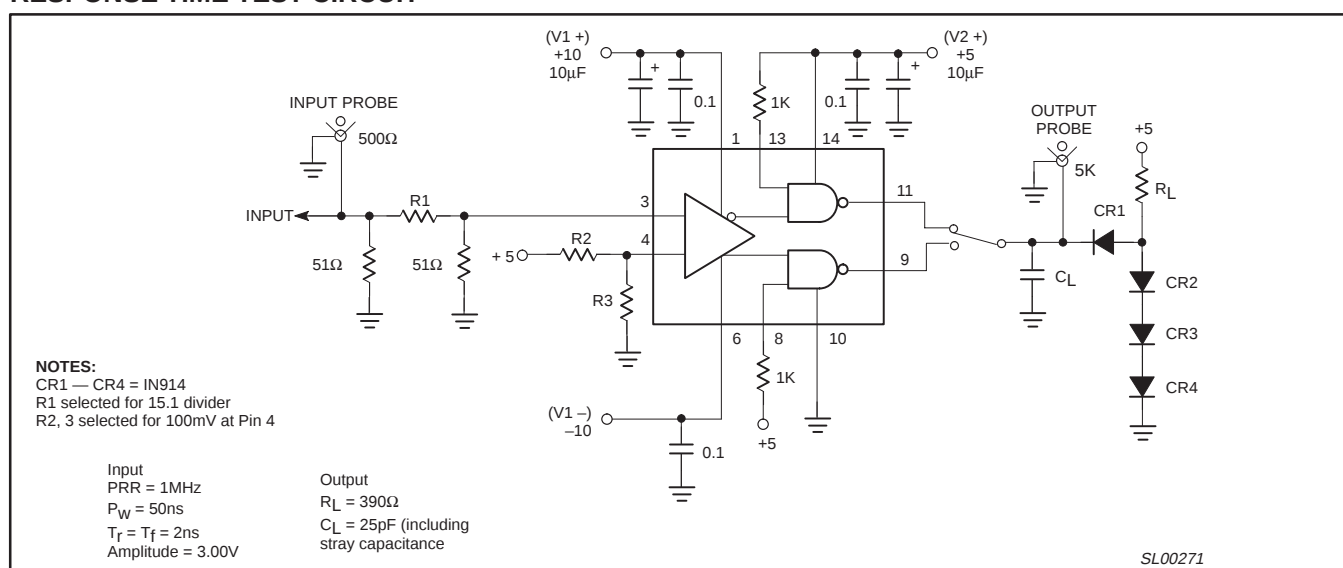


Figure 5. Response Time Test Circuit

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APPLICATIONS

One of the main features of the device is that supply voltages (V_{1+} , V_{1-}) need not be balanced, as in the following diagrams. For proper operation, however, negative supply (V_{1-}) 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_{1+} and V_{1-}) 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	COMMENT
$V_{ID} \leq -V_{OS}$	H	X	L	H	Read I _{IHA} , I _{ILB}
$-V_{OS} < V_{ID} < V_{OS}$	H	H	Undefined	Undefined	
$V_{ID} \geq V_{OS}$	X	H	H	L	Read I _{ILA} , I _{IHB}
X	L	L	H	H	

TYPICAL APPLICATIONS

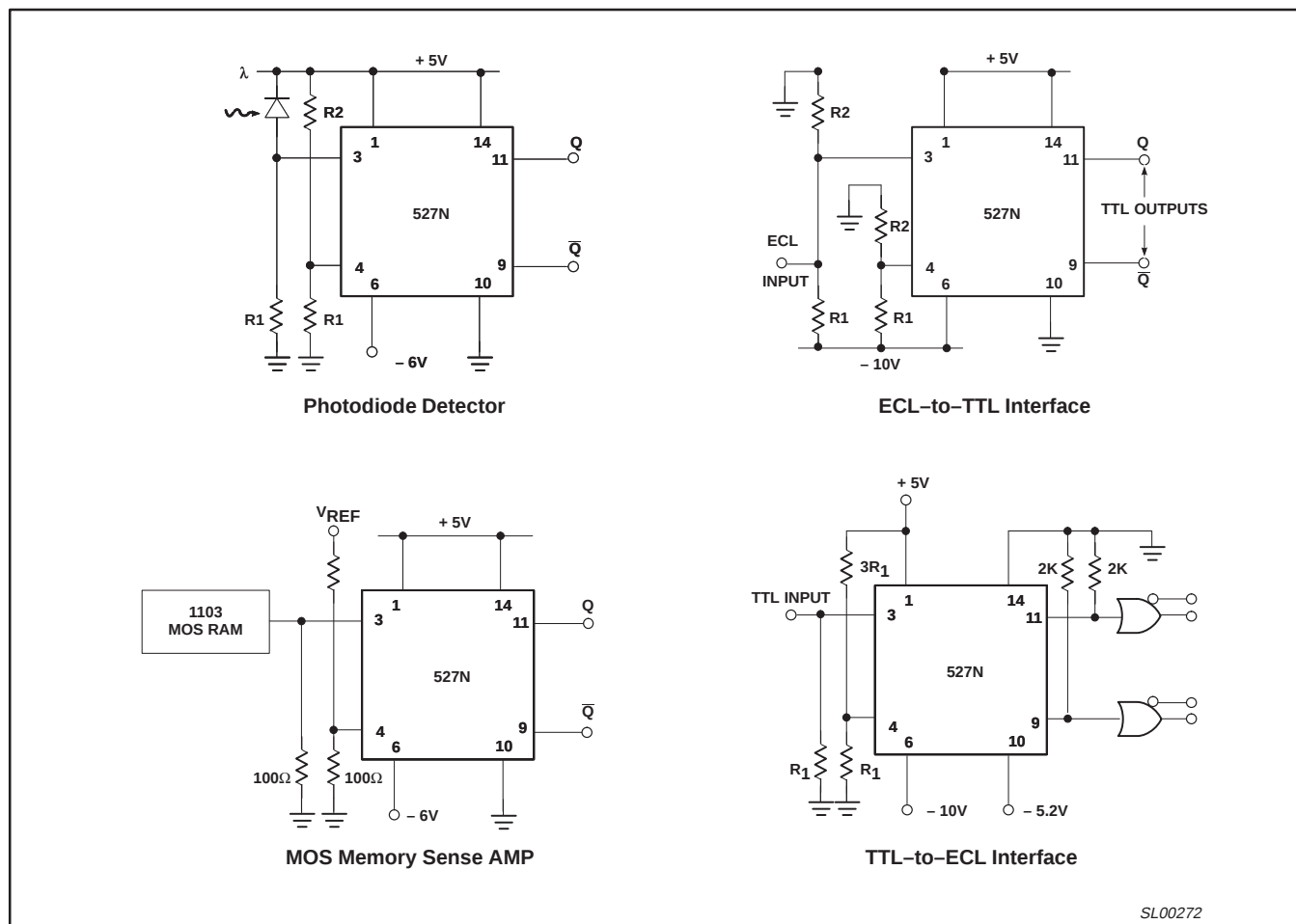


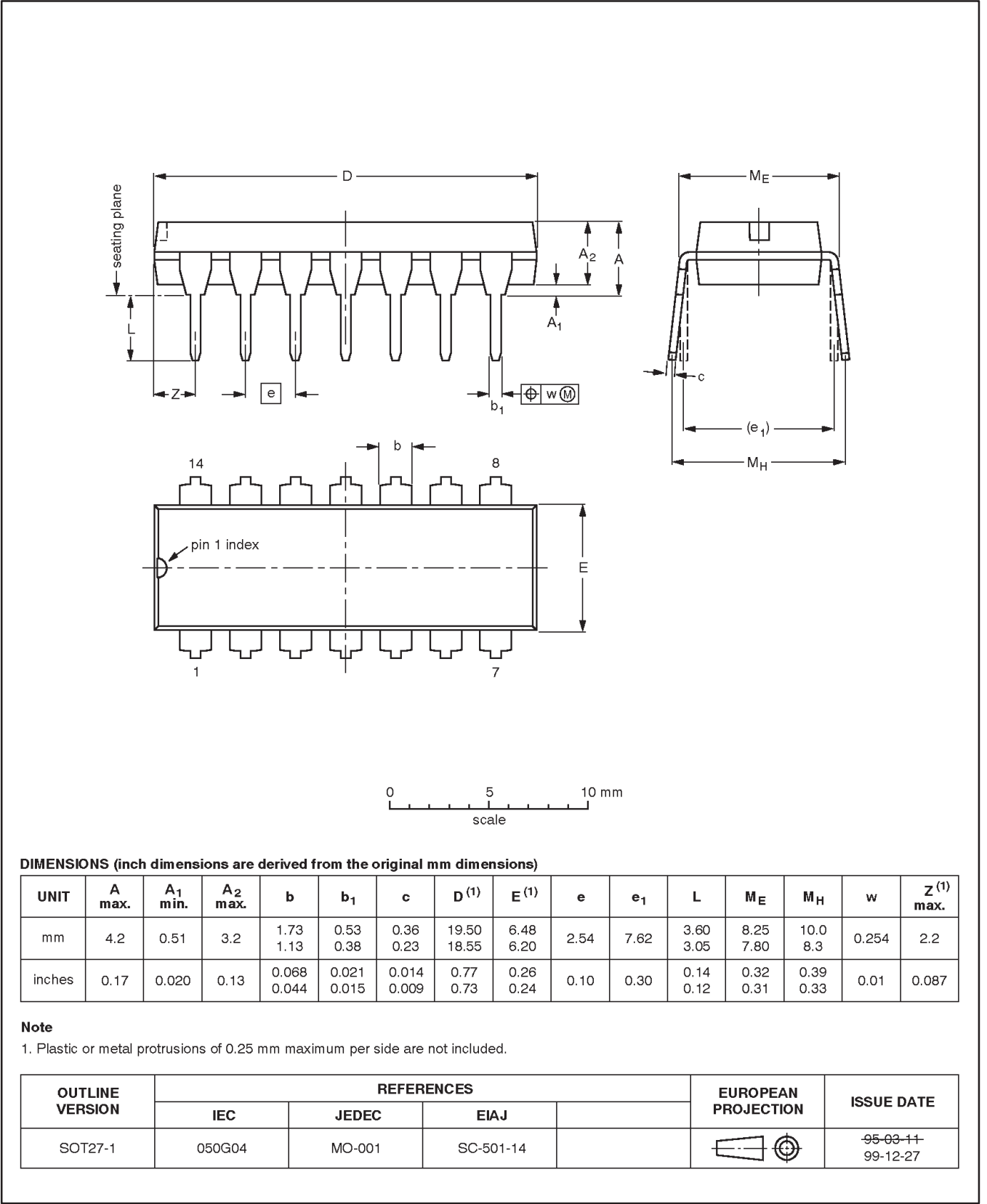
Figure 6. Typical Applications

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

SOT27-1

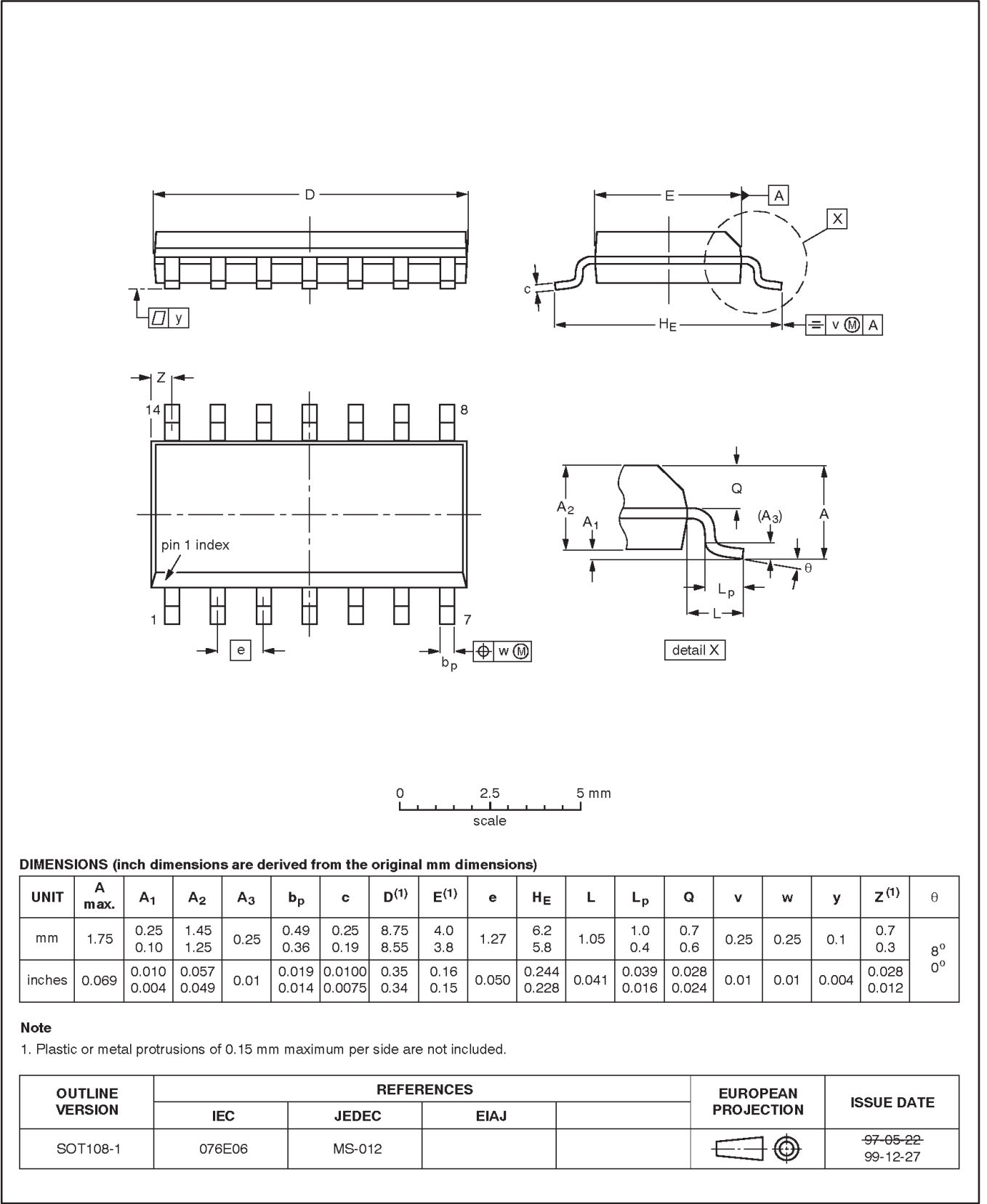


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SO14: plastic small outline package; 14 leads; body width 3.9 mm

SOT108-1



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NOTES

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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.
Preliminary data	Qualification	This data sheet contains data from the preliminary specification. Supplementary data will be published at a later date. Philips Semiconductors reserves the right to change the specification without notice, in order to improve the design and supply the best possible product.
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