

DATA SHEET

NE529

Voltage comparator

Product data
Supersedes data of 1994 Aug 31
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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

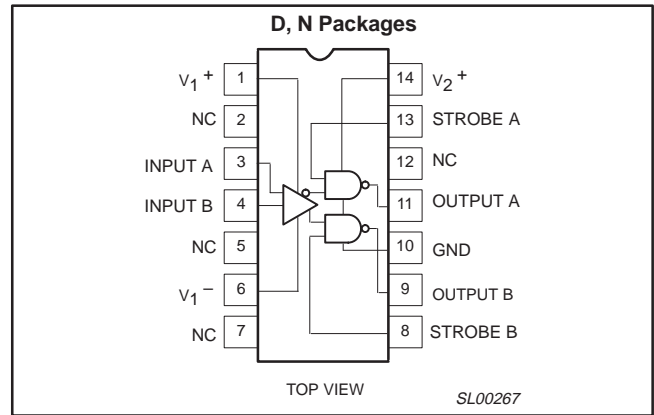


Figure 1. Pin Configuration

BLOCK DIAGRAM

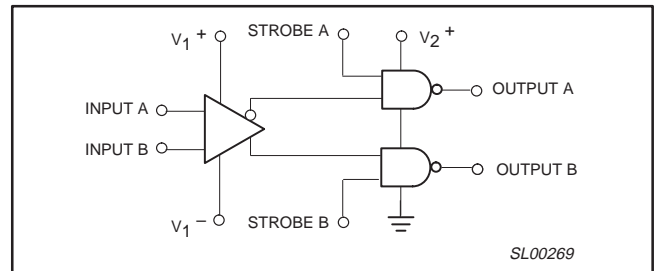


Figure 2. Block Diagram

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

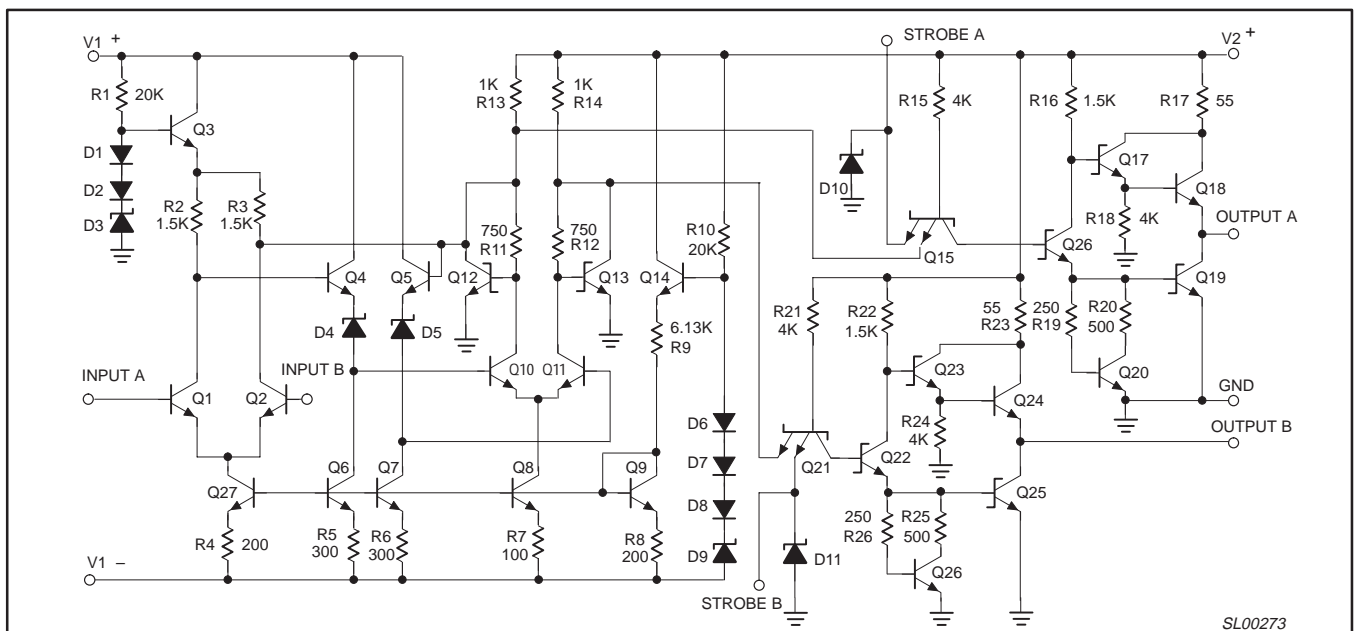


Figure 3.

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

NOTES:

- Derate above 25 °C at the following rates:
N package at 11.5 mW/°C
D package at 8.3 mW/°C

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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	$V_{IN} = 0\text{ V}$			50	μA
I_{OS}	Input offset current @ 25 °C			2	5	μA
	Over temperature range	$V_{IN} = 0\text{ V}$			15	μA
V_{CM}	Common-mode voltage range		-5	0		V
Gate characteristics						
V_{OUT}	Output voltage					
	"1" state	$V_{2+} = 4.75\text{ V}$; $I_{SOURCE} = -1\text{ mA}$	2.7	3.3		V
	"0" state	$V_{2+} = 4.75\text{ V}$; $I_{SINK} = 10\text{ mA}$			0.5	V
	Strobe inputs					
	"0" Input current ¹	$V_{2+} = 5.25\text{ V}$; $V_{STROBE} = 0.5\text{ V}$			-2	mA
	"1" Input current @ 25 °C ¹	$V_{2+} = 5.25\text{ V}$; $V_{STROBE} = 2.7\text{ V}$			100	μA
	Over temperature range	$V_{2+} = 5.25\text{ V}$; $V_{STROBE} = 2.7\text{ V}$			200	μA
	"0" input voltage	$V_{2+} = 4.75\text{ V}$			0.8	V
	"1" input voltage	$V_{2+} = 4.75\text{ V}$	2.0			V
I_{SC}	Short-circuit output current	$V_{2+} = 5.25\text{ V}$; $V_{OUT} = 0\text{ V}$	-18		-70	mA
Power supply requirements						
V_{1+} V_{1-} V_{2+}	Supply voltage					
			5		10	V
			-6		-10	V
			4.75	5	5.25	V
I_{1+} I_{1-} I_{2+}	Supply current	$V_{1+} = 10\text{ V}$; $V_{1-} = -10\text{ V}$				
		$V_{2+} = 5.25\text{ V}$				
		Over temp.			5	mA
		Over temp.			10	mA
		Over temp.			20	mA

NOTE:

- 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

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TYPICAL PERFORMANCE CHARACTERISTICS

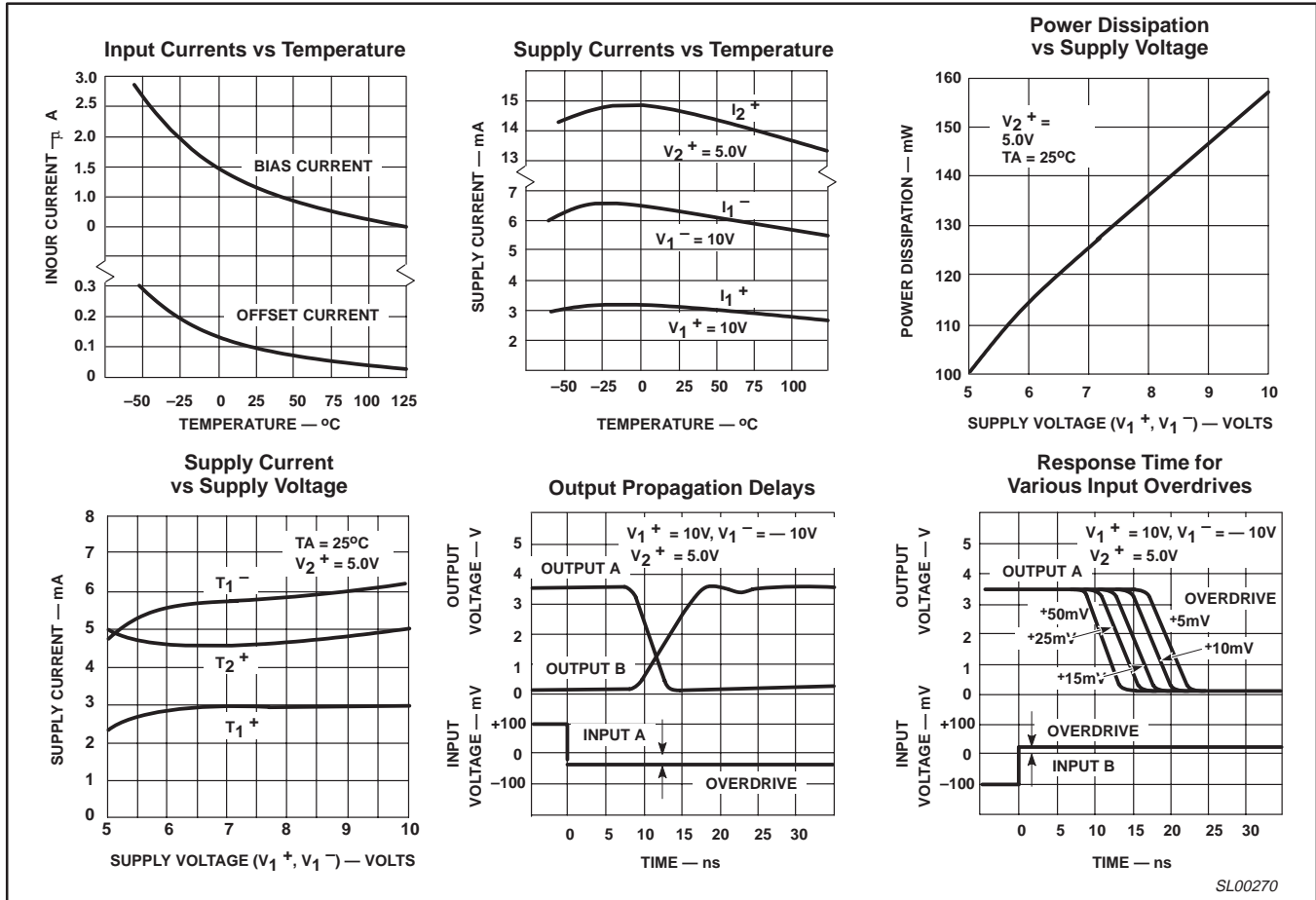


Figure 4. Typical Performance Characteristics

RESPONSE TIME TEST CIRCUIT

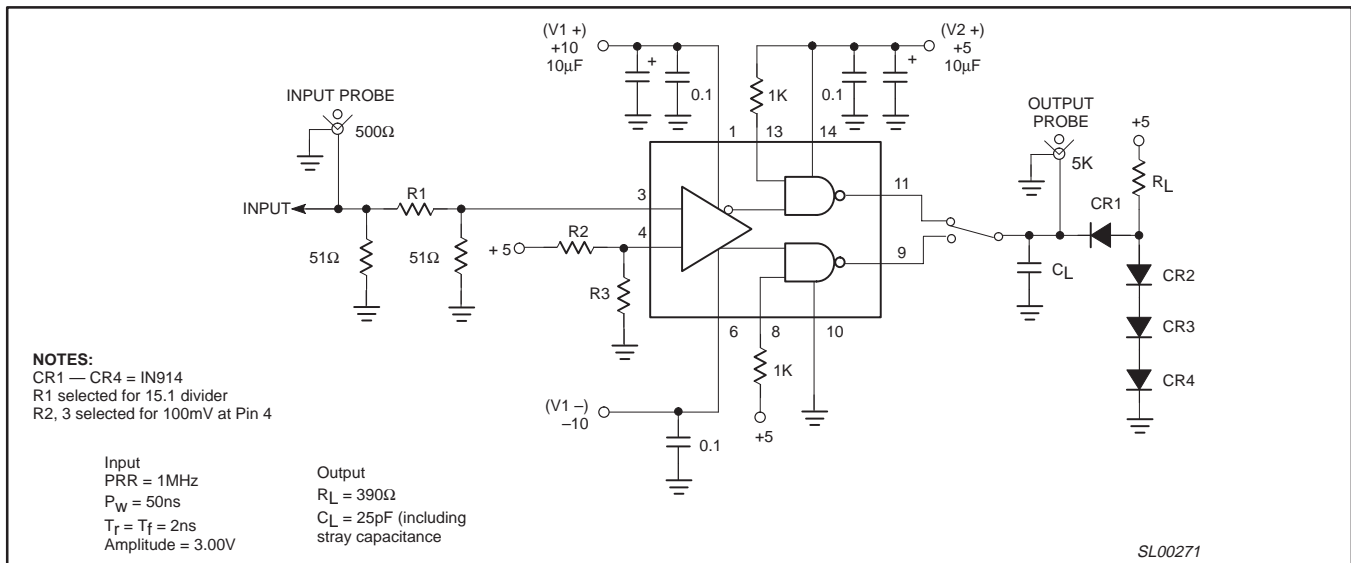


Figure 5. Response Time Test Circuit

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APPLICATIONS

One of the main features of the device is that supply voltages (V_+ , 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

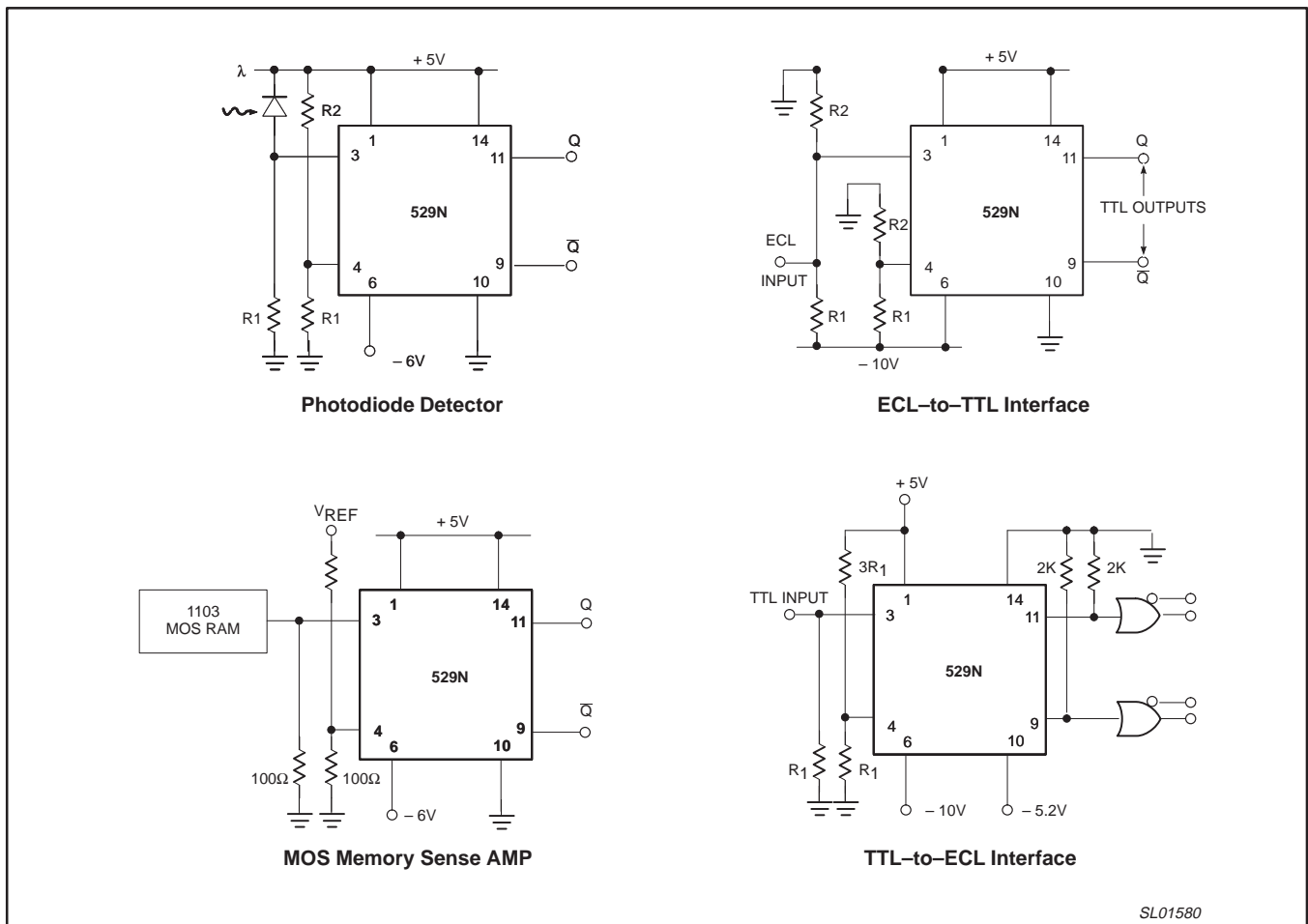


Figure 6. Typical Applications

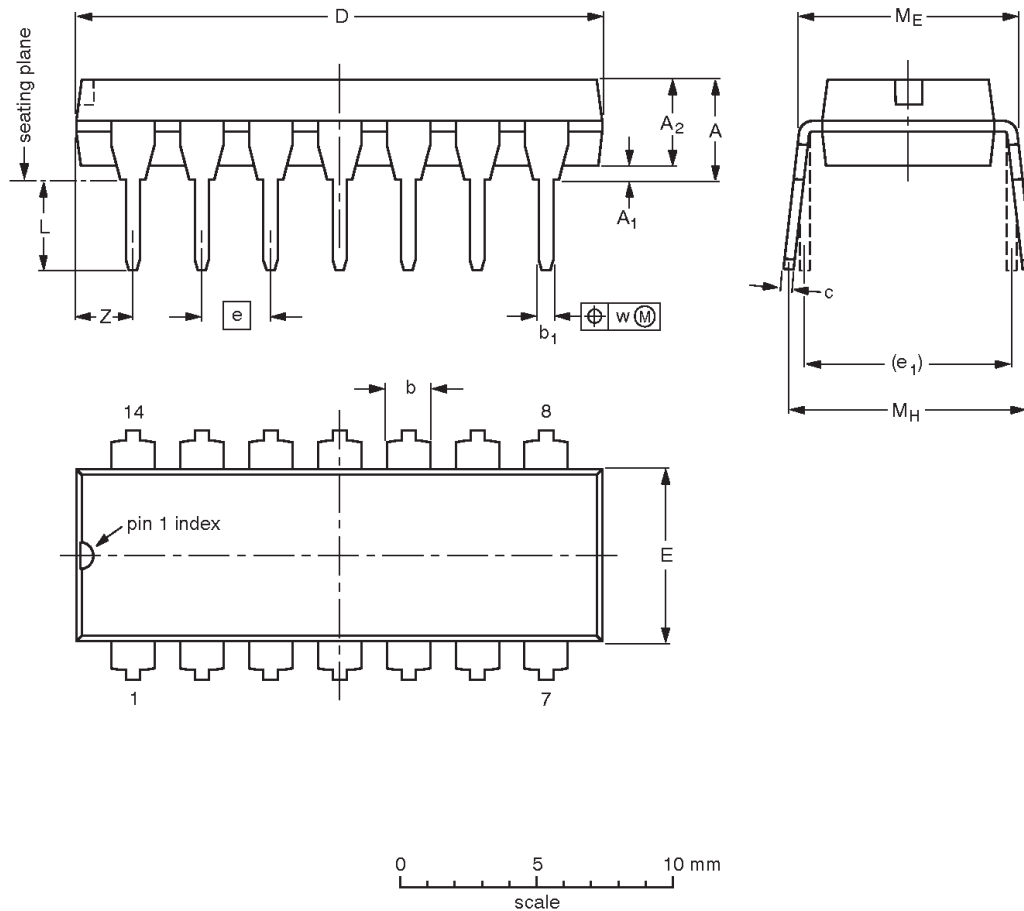
SL01580

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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 ₁ min.	A ₂ max.	b	b ₁	c	D ⁽¹⁾	E ⁽¹⁾	e	e ₁	L	M _E	M _H	w	Z ⁽¹⁾ 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.

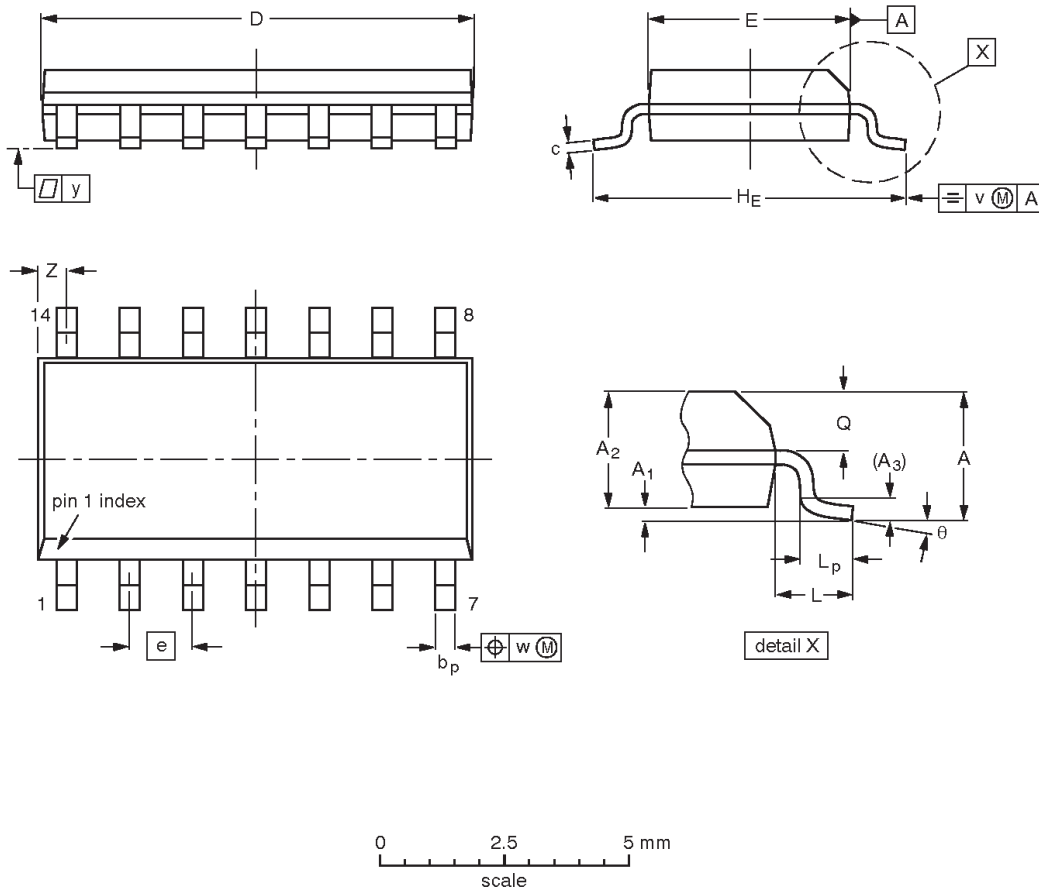
OUTLINE VERSION	REFERENCES				EUROPEAN PROJECTION	ISSUE DATE
	IEC	JEDEC	EIAJ			
SOT27-1	050G04	MO-001	SC-501-14			95-03-11 99-12-27

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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 ₁	A ₂	A ₃	b _p	c	D ⁽¹⁾	E ⁽¹⁾	e	H _E	L	L _p	Q	v	w	y	Z ⁽¹⁾	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 ^[1]	Product status ^[2]	Definitions
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