

SINGLE SCHMITT INVERTER

- HIGH SPEED: $t_{PD} = 4.7 \text{ ns}$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION:
 $I_{CC} = 1 \mu A$ (MAX.) at $T_A = 25^\circ C$
- TYPICAL HYSTERESIS: $V_h = 0.7V$ AT $V_{CC} = 4.5V$
- POWER DOWN PROTECTION ON INPUT
- SYMMETRICAL OUTPUT IMPEDANCE:
 $|I_{OH}| = I_{OL} = 8 \text{ mA}$ (MIN)
- BALANCED PROPAGATION DELAYS:
 $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
 $V_{CC} \text{ (OPR)} = 4.5V \text{ to } 5.5V$
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74V1T14 is an advanced high-speed CMOS SINGLE SCHMITT INVERTER fabricated with sub-micron silicon gate and double-layer metal wiring C²MOS technology.

The internal circuit is composed of 3 stages including buffer output, which provide high noise immunity and stable output.

Power down protection is provided on input and 0 to 7V can be accepted on input with no regard to the supply voltage. This device can be used to



S
(SOT23-5L)



C
(SC-70)

ORDER CODE:

74V1T14S

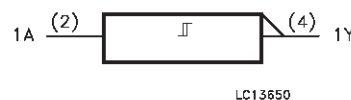
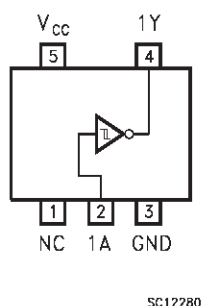
74V1T14C

interface 5V to 3V.

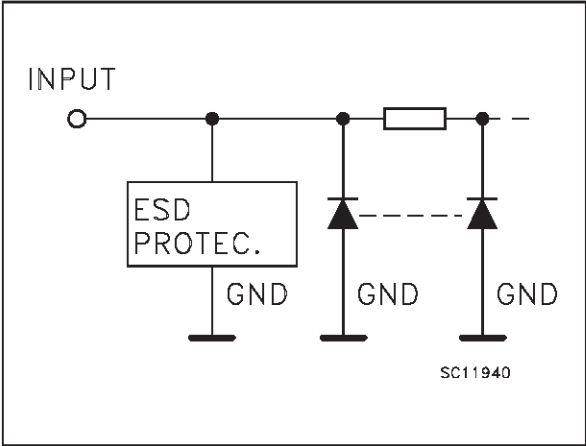
Pin configuration and function are the same as those of the V1G04 but the V1G14 has hysteresis.

The schmitt trigger function allows it to be used on line receivers with slow rise/fall input signals.

PIN CONNECTION AND IEC LOGIC SYMBOLS



INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

| PIN No | SYMBOL | NAME AND FUNCTION |
|--------|-----------------|-------------------------|
| 1 | N.C. | Not Connected |
| 2 | 1A | Data Input |
| 4 | 1Y | Data Output |
| 3 | GND | Ground (0V) |
| 5 | V _{CC} | Positive Supply Voltage |

TRUTH TABLE

| A | Y |
|---|---|
| L | H |
| H | L |

ABSOLUTE MAXIMUM RATINGS

| Symbol | Parameter | Value | Unit |
|-------------------------------------|--------------------------------------|-------------------------------|------|
| V _{CC} | Supply Voltage | -0.5 to +7.0 | V |
| V _I | DC Input Voltage | -0.5 to +7.0 | V |
| V _O | DC Output Voltage | -0.5 to V _{CC} + 0.5 | V |
| I _{IK} | DC Input Diode Current | - 20 | mA |
| I _{OK} | DC Output Diode Current | ± 20 | mA |
| I _O | DC Output Current | ± 25 | mA |
| I _{CC} or I _{GND} | DC V _{CC} or Ground Current | ± 50 | mA |
| T _{stg} | Storage Temperature | -65 to +150 | °C |
| T _L | Lead Temperature (10 sec) | 260 | °C |

Absolute Maximum Ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied.

RECOMMENDED OPERATING CONDITIONS

| Symbol | Parameter | Value | Unit |
|-----------------|-----------------------|----------------------|------|
| V _{CC} | Supply Voltage | 4.5 to 5.5 | V |
| V _I | Input Voltage | 0 to 5.5 | V |
| V _O | Output Voltage | 0 to V _{CC} | V |
| T _{op} | Operating Temperature | -40 to +85 | °C |

DC SPECIFICATIONS

| Symbol | Parameter | Test Conditions | | Value | | | | | Unit |
|------------------|--------------------------------------|------------------------|--|------------------------|------|------|--------------|------|------|
| | | V _{CC} (V) | | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | | Min. | Typ. | Max. | Min. | Max. | |
| V _{I+} | High Level Input Voltage | 4.5 | | 2.0 | | | 2.0 | | V |
| | | 5.5 | | 2.0 | | | 2.0 | | |
| V _{I-} | Low Level Input Voltage | 4.5 | | | | 0.6 | | 0.6 | V |
| | | 5.5 | | | | 0.6 | | 0.6 | |
| V _h | Hysteresis Voltage | 4.5 | | 0.4 | | 1.4 | 0.4 | 1.4 | V |
| | | 5.5 | | 0.4 | | 1.5 | 0.4 | 1.5 | |
| V _{OH} | High Level Output Voltage | 4.5 | I _O =-50 μA | 4.4 | 4.5 | | 4.4 | | V |
| | | 4.5 | I _O =-8 mA | 3.94 | | | 3.8 | | |
| V _{OL} | Low Level Output Voltage | 4.5 | I _O =50 μA | | 0.0 | 0.1 | | 0.1 | V |
| | | 4.5 | I _O =8 mA | | | 0.36 | | 0.44 | |
| I _I | Input Leakage Current | 0 to 5.5 | V _I = 5.5V or GND | | | ±0.1 | | ±1.0 | μA |
| I _{CC} | Quiescent Supply Current | 5.5 | V _I = V _{CC} or GND | | | 1 | | 10 | μA |
| ΔI _{CC} | Additional Worst Case Supply Current | 5.5 | One Input at 3.4V, other input at V _{CC} or GND | | | 1.35 | | 1.5 | mA |

AC ELECTRICAL CHARACTERISTICS (Input t_r = t_f = 3 ns)

| Symbol | Parameter | Test Condition | | | Value | | | | | Unit |
|------------------|------------------------|----------------------------|------------|--|------------------------|------|------|--------------|------|------|
| | | V _{CC} (*) (V) | CL (pF) | | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | | | Min. | Typ. | Max. | Min. | Max. | |
| t _{PLH} | Propagation Delay Time | 5.0 | 15 | | | 5.0 | 7.5 | 1.0 | 9.0 | ns |
| t _{PHL} | | 5.0 | 50 | | | 6.5 | 8.5 | 1.0 | 10.0 | |

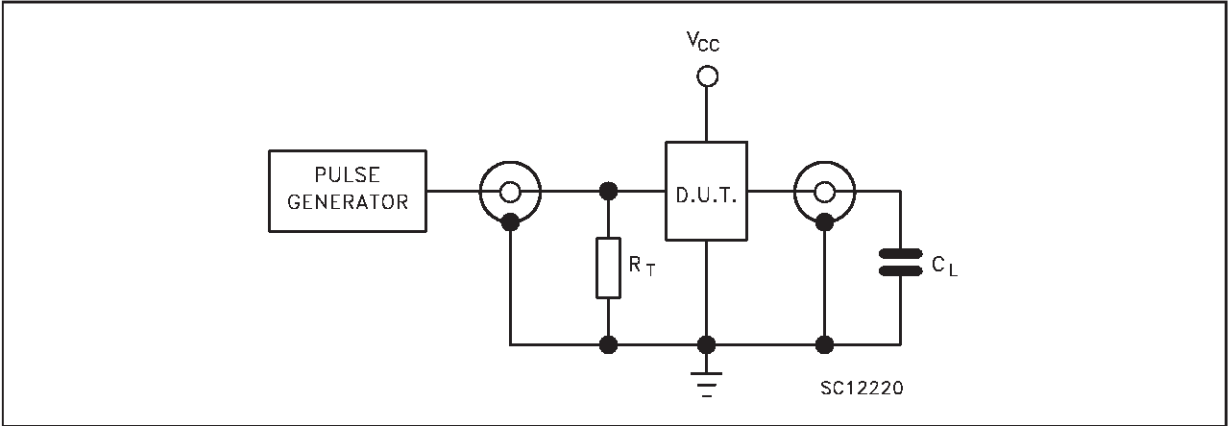
(*) Voltage range is 5V ± 0.5V

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Test Conditions | Value | | | | | Unit |
|-----------------|--|-----------------|------------------------|------|------|--------------|------|------|
| | | | T _A = 25 °C | | | -40 to 85 °C | | |
| | | | Min. | Typ. | Max. | Min. | Max. | |
| C _{IN} | Input Capacitance | | | 4 | 10 | | 10 | pF |
| C _{PD} | Power Dissipation Capacitance (note 1) | | | 12 | | | | pF |

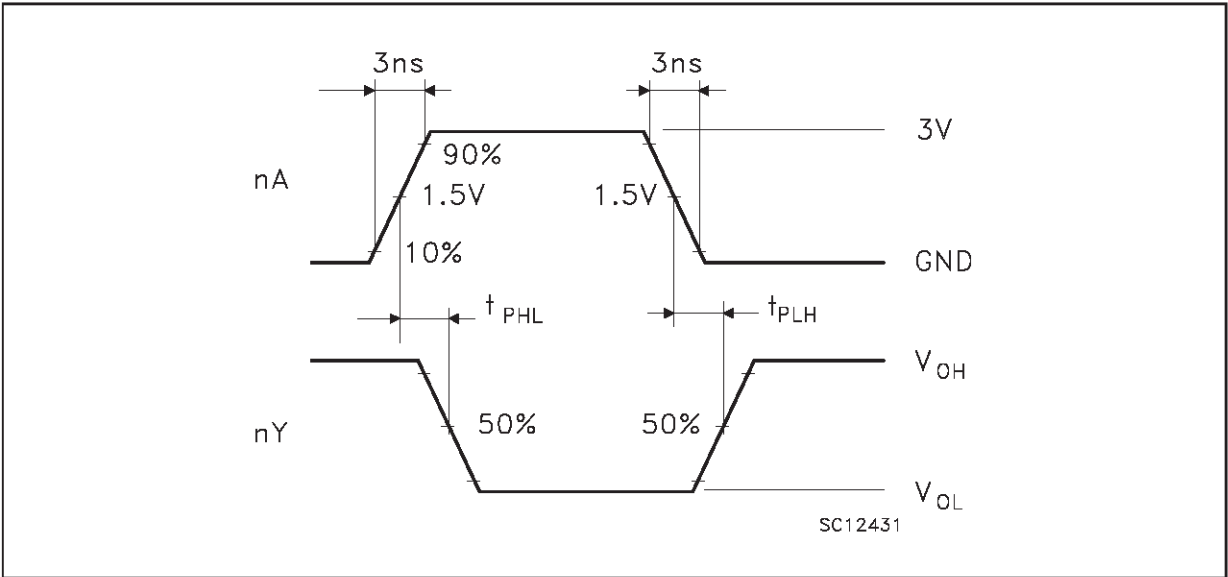
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. I_{CC(opr)} = C_{PD} • V_{CC} • f_{IN} + I_{CC}

TEST CIRCUIT



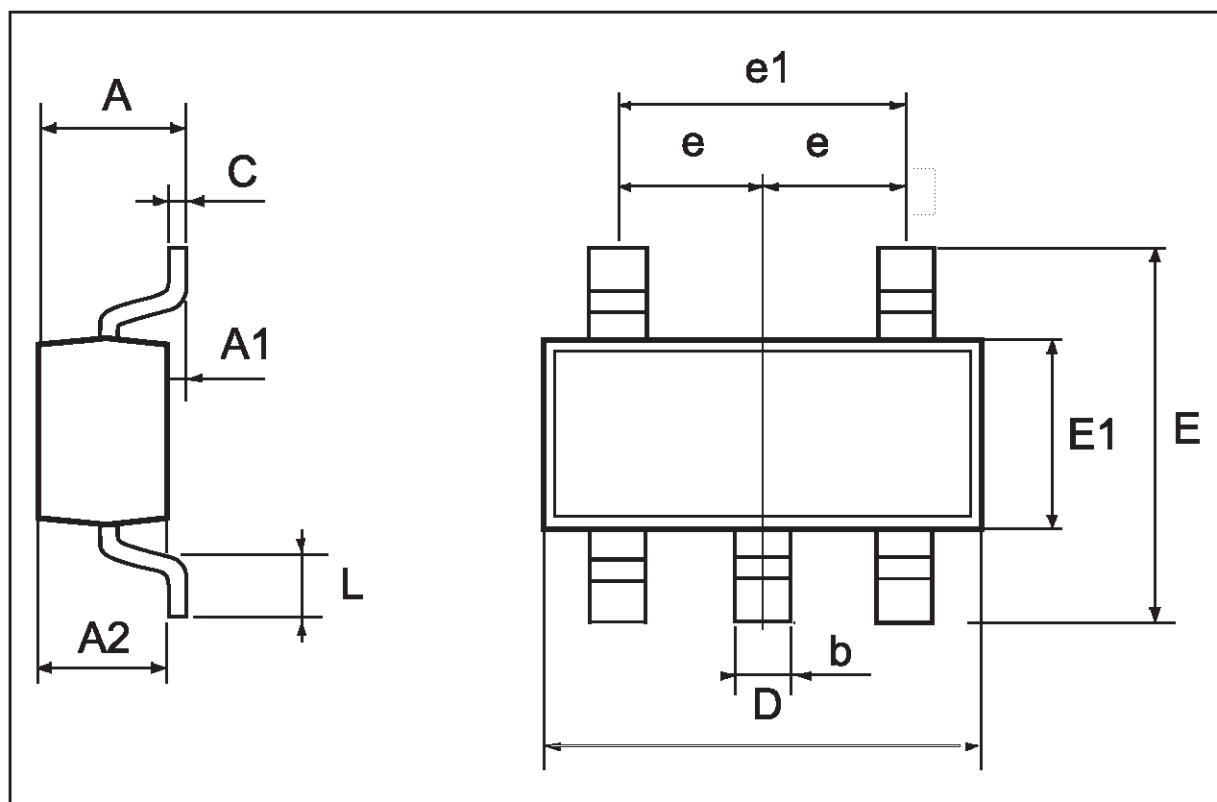
$C_L = 15/50$ pF or equivalent (includes jig and probe capacitance)
 $R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

WAVEFORM: PROPAGATION DELAYS (f=1MHz; 50% duty cycle)



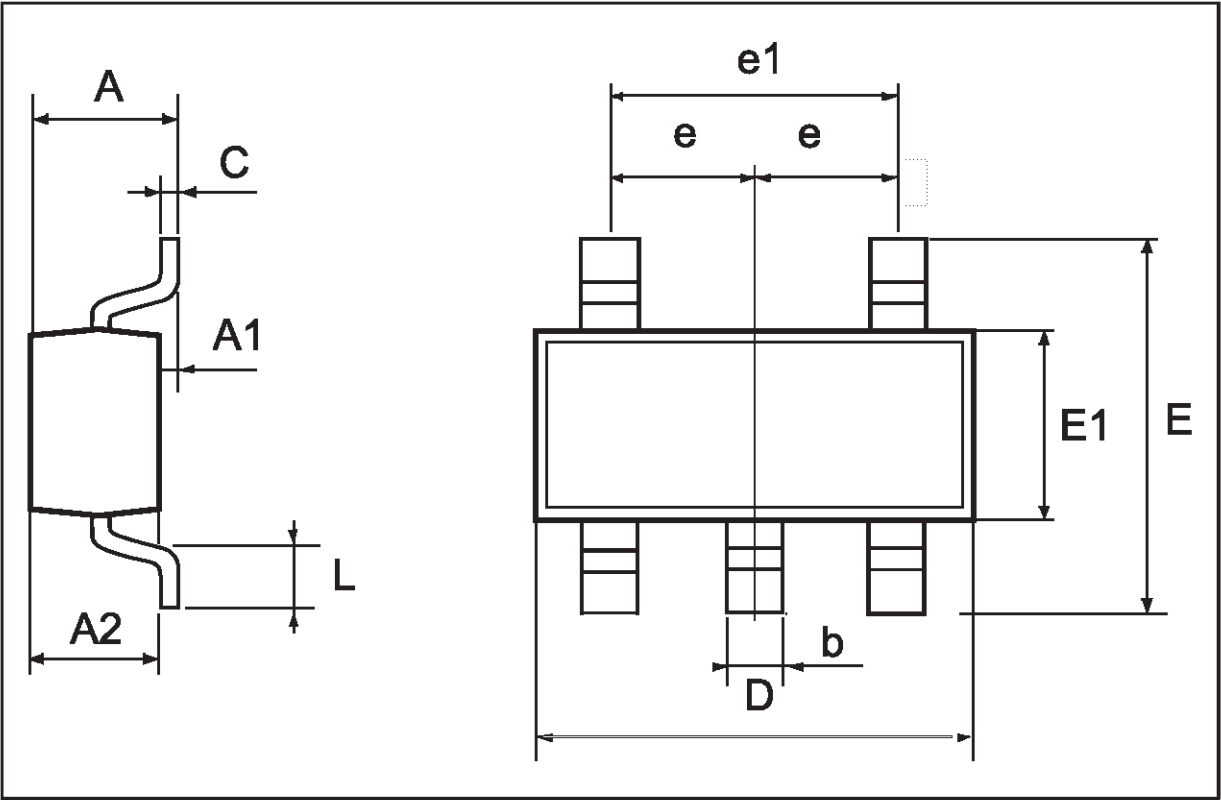
SOT23-5L MECHANICAL DATA

| DIM. | mm | | | mils | | |
|------|------|------|------|-------|------|-------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 0.90 | | 1.45 | 35.4 | | 57.1 |
| A1 | 0.00 | | 0.15 | 0.0 | | 5.9 |
| A2 | 0.90 | | 1.30 | 35.4 | | 51.2 |
| b | 0.35 | | 0.50 | 13.7 | | 19.7 |
| C | 0.09 | | 0.20 | 3.5 | | 7.8 |
| D | 2.80 | | 3.00 | 110.2 | | 118.1 |
| E | 2.60 | | 3.00 | 102.3 | | 118.1 |
| E1 | 1.50 | | 1.75 | 59.0 | | 68.8 |
| L | 0.35 | | 0.55 | 13.7 | | 21.6 |
| e | | 0.95 | | | 37.4 | |
| e1 | | 1.9 | | | 74.8 | |



SC-70 MECHANICAL DATA

| DIM. | mm | | | mils | | |
|------|------|------|------|------|------|------|
| | MIN. | TYP. | MAX. | MIN. | TYP. | MAX. |
| A | 0.80 | | 1.10 | 31.5 | | 43.3 |
| A1 | 0.00 | | 0.10 | 0.0 | | 3.9 |
| A2 | 0.80 | | 1.00 | 31.5 | | 39.4 |
| b | 0.15 | | 0.30 | 5.9 | | 11.8 |
| C | 0.10 | | 0.18 | 3.9 | | 7.1 |
| D | 1.80 | | 2.20 | 70.9 | | 86.6 |
| E | 1.80 | | 2.40 | 70.9 | | 94.5 |
| E1 | 1.15 | | 1.35 | 45.3 | | 53.1 |
| L | 0.10 | | 0.30 | 3.9 | | 11.8 |
| e | | 0.65 | | | 25.6 | |
| e1 | | 1.3 | | | 51.2 | |



Information furnished is believed to be accurate and reliable. However, STMicroelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of STMicroelectronics. Specification mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. STMicroelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of STMicroelectronics.

The ST logo is a registered trademark of STMicroelectronics

© 1999 STMicroelectronics – Printed in Italy – All Rights Reserved

STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - China - Finland - France - Germany - Hong Kong - India - Italy - Japan - Malaysia - Malta - Morocco
Singapore - Spain - Sweden - Switzerland - United Kingdom - U.S.A.

<http://www.st.com>