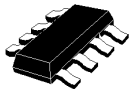
74V2G14

TRIPLE SCHMITT INVERTER

- HIGH SPEED: t_{PD} = 3.0ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION:
  I_{CC} = 1µA(MAX.) at T_A = 25°C
- TYPICAL HYSTERESIS:
  V_H = 800mV at V_{CC} = 4.5V
  V_H = 500mV at V_{CC} = 3.0V
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
  $|I_{OH}| = I_{OL}$ = 8mA (MIN) at V_{CC} = 4.5V
  $|I_{OH}| = I_{OL}$ = 4mA (MIN) at V_{CC} = 3.0V
- BALANCED PROPAGATION DELAYS:
  $t_{PLH} \cong t_{PHL}$
- OPERATING VOLTAGE RANGE:
  V_{CC}(OPR) = 2V to 5.5V
- IMPROVED LATCH-UP IMMUNITY



SOT23-8L

ORDER CODES

PACKAGE	T & R
SOT23-8L	74V2G14STR

DESCRIPTION

The 74V2G14 is an advanced high-speed CMOS TRIPLE SCHMITT TRIGGER INVERTER fabricated with sub-micron silicon gate and double-layer metal wiring C^2MOS tecnology.

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

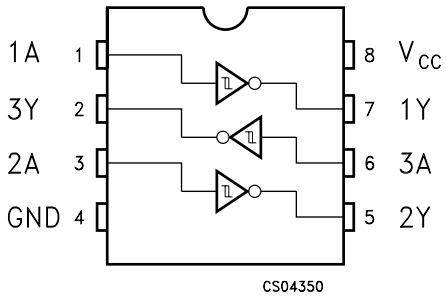
Power down protection is provided on all inputs and outputs and 0 to 7V can be accepted on inputs with no regard to the supply voltage.

Pin configuration and function are the same as those of the 74V2G04, but 74V2G14 has hysteresis on inputs.

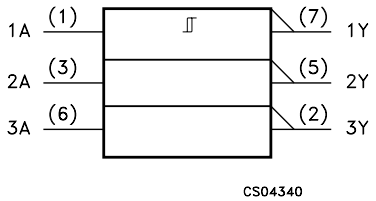
This device can be used to interface 5V to 3V systems and it is ideal for portable applications like personal digital assistant, camcorder and all battery-powered equipment.

All inputs and outputs are equipped with protection circuits against static discharge, giving them ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS



CS04350



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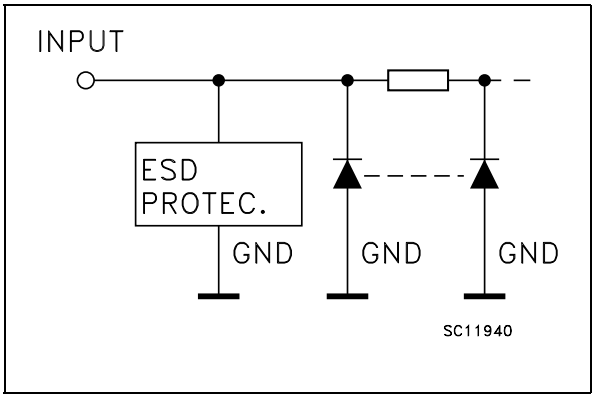
INPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME QND FUNCTION
1, 3, 6	1A, 2A, 3A	Data Inputs
7, 5, 2	1Y, 2Y, 3Y	Data Outputs
4	GND	Ground (0V)
8	V_{CC}	Positive Supply Voltage

TRUTH TABLE

nA	nY
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 (see note 1)	-0.5 to +7.0	V
V_O	DC Output Voltage (see note 2)	-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 conditions is not implied.
1) Vcc=0V
2) High or Low State

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	2 to 5.5	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage	0 to 5.5	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature	-55 to 125	°C

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value							Unit
		V_{CC} (V)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
				Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
V_P	High Level Input Voltage	3.0				2.20		2.20		2.20	V
		4.5				3.15		3.15		3.15	
		5.5				3.85		3.85		3.85	
V_N	Low Level Input Voltage	3.0		0.90			0.90		0.90		V
		4.5		1.35			1.35		1.35		
		5.5		1.65			1.65		1.65		
V_H	Hysteresis Voltage	3.0		0.30		1.20	0.30	1.20	0.30	1.20	V
		4.5		0.40		1.40	0.40	1.40	0.40	1.40	
		5.5		0.50		1.60	0.50	1.60	0.50	1.60	
V_{OH}	High Level Ouput Voltage	2.0	I_O=-50 µA	1.9	2.0		1.9		1.9		V
		3.0	I_O=-50 µA	2.9	3.0		2.9		2.9		
		4.5	I_O=-50 µA	4.4	4.5		4.4		4.4		
		3.0	I_O=-4 mA	2.58			2.48		2.4		
		4.5	I_O=-8 mA	3.94			3.8		3.7		
V_{OL}	Low Level Output Voltage	2.0	I_O=50 µA		0.0	0.1		0.1		0.1	V
		3.0	I_O=50 µA		0.0	0.1		0.1		0.1	
		4.5	I_O=50 µA		0.0	0.1		0.1		0.1	
		3.0	I_O=4 mA			0.36		0.44		0.55	
		4.5	I_O=8 mA			0.36		0.44		0.55	
I_I	Input Leakage Current	0 to 5.5	V_I = 5.5V or GND			± 0.1		± 1		± 1	µA
I_{CC}	Quiescent Supply Current	5.5	V_I = V_{CC} or GND			1		10		20	µA
I_{OPD}	Power down Output Leakage Current	0	V_O = 5.5			0.5		5		10	µA

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

Symbol	Parameter	Test Condition			Value							Unit
		V_{CC} (V)	C_L (pF)		T_A = 25°C			-40 to 85°C		-55 to 125°C		
					Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
t_{PLH} t_{PHL}	Propagation Delay Time	3.3(*)	15			3.7	7.0	1.0	8.0	1.0	9.0	ns
		3.3(*)	50			5.3	8.0	1.0	9.5	1.0	10.5	
		5.0(**)	15			3.0	5.0	1.0	6.0	1.0	7.0	
		5.0(**)	50			4.1	6.5	1.0	7.5	1.0	8.5	

(*) Voltage range is 3.3V ± 0.3V
(**) Voltage range is 5.0V ± 0.5V

CAPACITANCE CHARACTERISTICS

Symbol	Parameter	Test Condition	Value							Unit
			T_A = 25°C			-40 to 85°C		-55 to 125°C		
			Min.	Typ.	Max.	Min.	Max.	Min.	Max.	
C_{IN}	Input Capacitance			4	10		10		10	pF
C_{PD}	Power Dissipation Capacitance (note 1)			12						pF

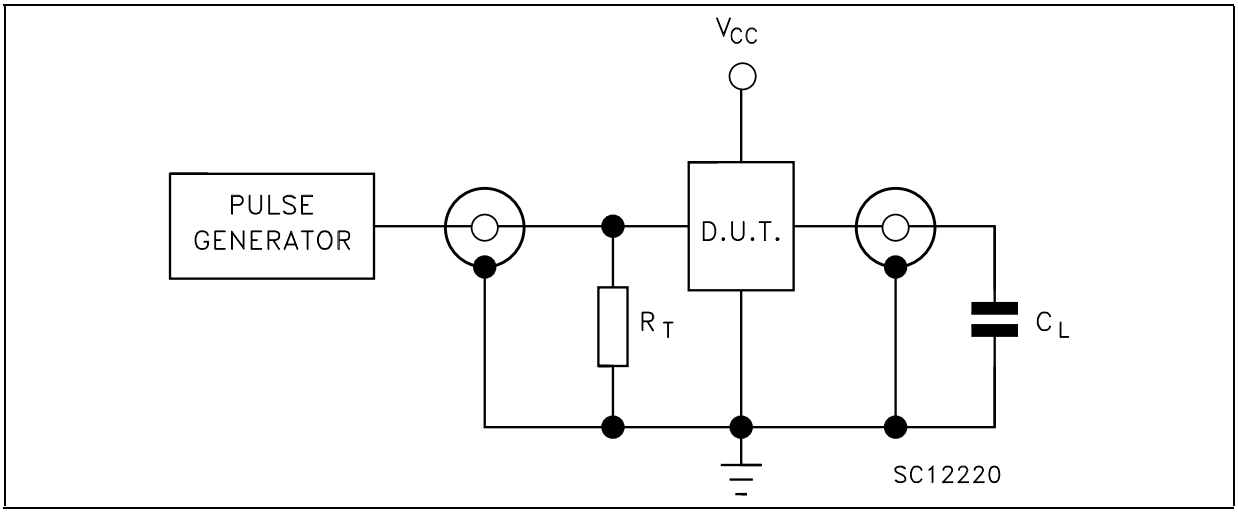
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/3$

DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Condition		Value		Unit
		V_{CC} (V)		T_A = 25 °C		
				Min.	Max.	
V_{OLP}	Dynamic Low Level Quiet Output (note 1)	5.0	C_L = 50pF V_{IL} = 0V, V_{IH} = 3.3V		0.8	V
V_{OLV}				-0.8		

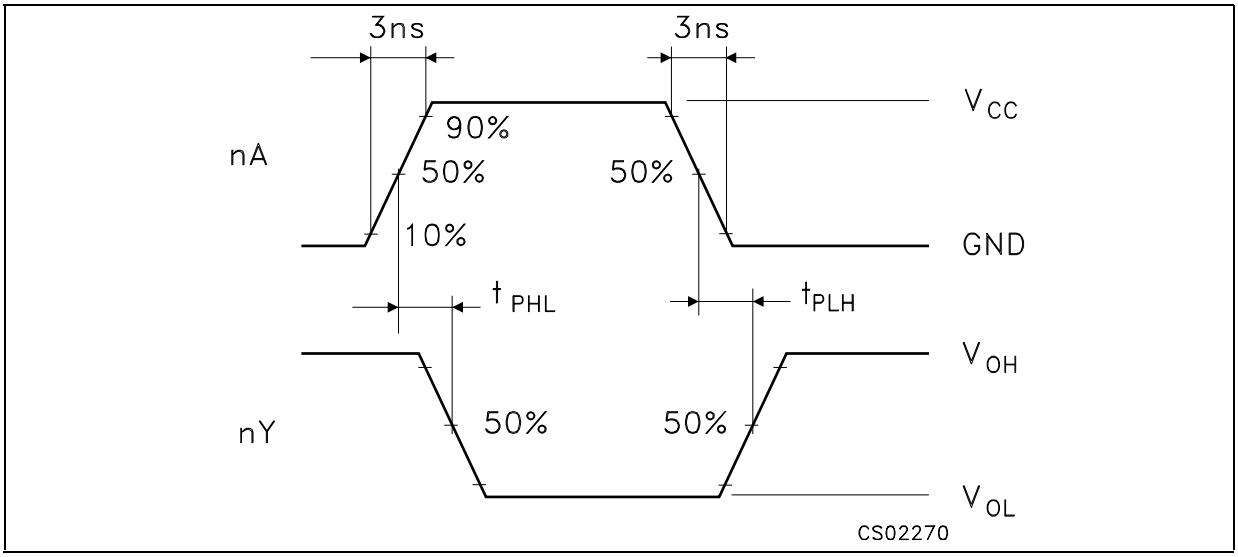
1) Number of output defined as "n". Measured with "n-1" outputs switching from HIGH to LOW or LOW to HIGH. The remaining outputs is measured in the LOW state.

TEST CIRCUIT



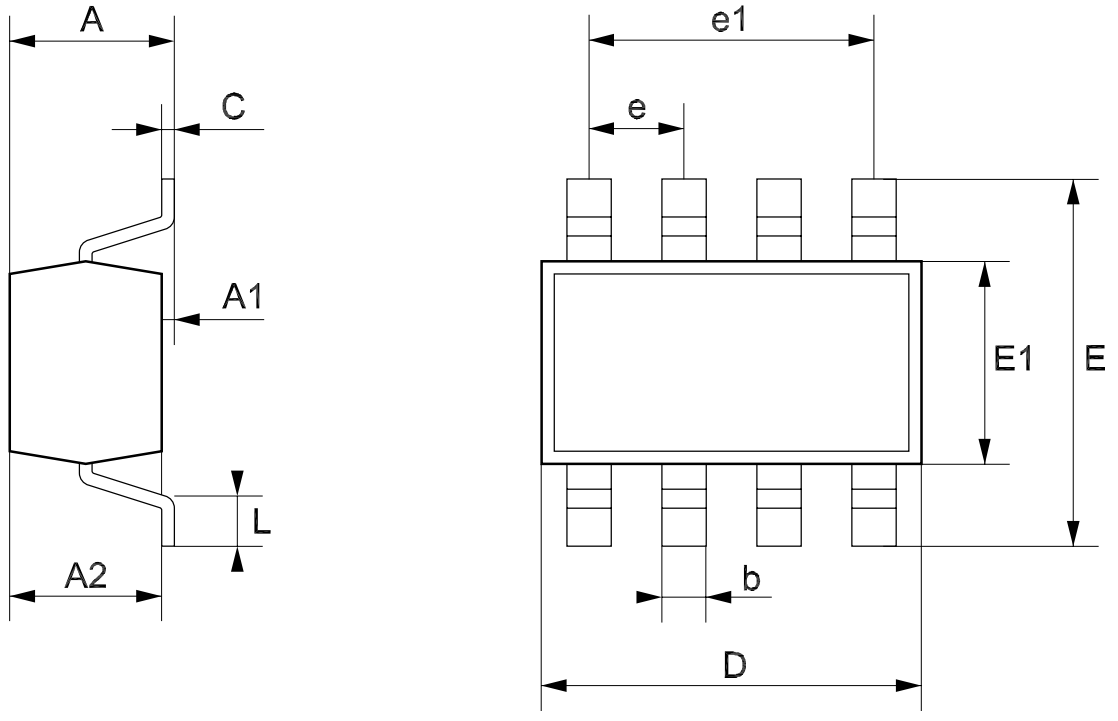
C_L = 15/50pF or equivalent (includes jig and probe capacitance)
$R_T = Z_{OUT}$ of pulse generator (typically 50Ω)

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



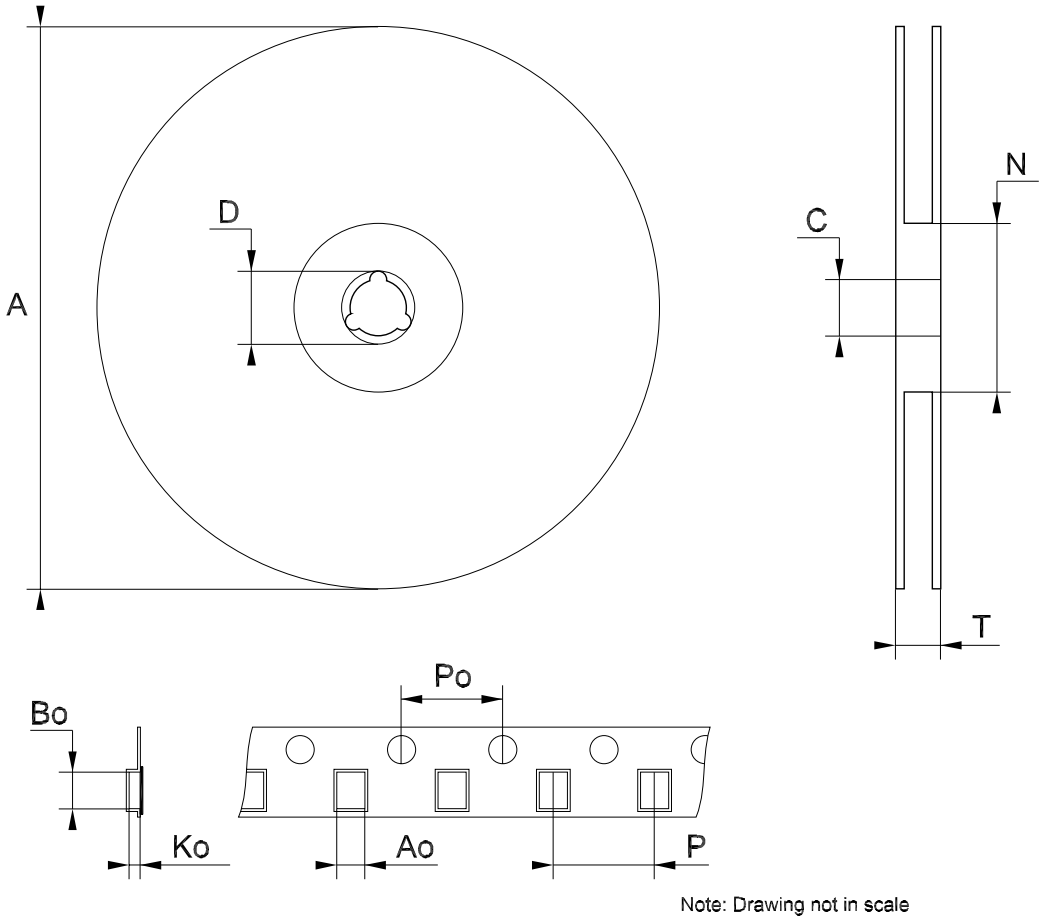
SOT23-8L MECHANICAL DATA

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	0.22		0.38	8.6		14.9
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
e	0	.65			25.6	
e1		1.95			76.7	
L	0.35		0.55	13.7		21.6



Tape & Reel SOT23-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			180			7.086
C	12.8	13.0	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	60			2.362		
T			14.4			0.567
Ao	3.13	3.23	3.33	0.123	0.127	0.131
Bo	3.07	3.17	3.27	0.120	0.124	0.128
Ko	1.27	1.37	1.47	0.050	0.054	0.0.58
Po	3.9	4.0	4.1	0.153	0.157	0.161
P	3.9	4.0	4.1	0.153	0.157	0.161



Note: Drawing not in scale