

SINGLE BILATERAL SWITCH

- HIGH SPEED: $t_{PD} = 4 \text{ ns}$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION:
 $I_{CC} = 1 \mu A$ (MAX.) at $T_A = 25^\circ C$
- HIGH NOISE IMMUNITY:
 $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (MIN.)
- LOW "ON" RESISTANCE
 $R_{ON} = 50\Omega$ (TYP.) AT $V_{CC}=9V$ $I_{I/O}=100\mu A$
- SINE WAVE DISTORTION
0.042% (TYP.) AT $V_{CC}=4V$ $f=1KHz$
- WIDE OPERATING VOLTAGE RANGE:
 V_{CC} (OPR) = 2V to 12V

DESCRIPTION

The 74H1G66 is an high-speed CMOS SINGLE BILATERAL SWITCH fabricated in silicon gate C²MOS technology. It has high speed



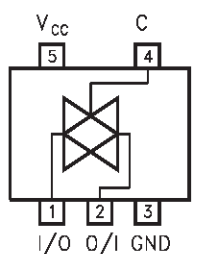
S
(SOT23-5L)

ORDER CODES :
74H1G66S

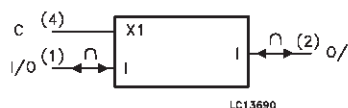
performance combined with true CMOS low power consumption.

The C input is provided to control the switch; the switch is ON when the C input is held high and off when C is held low.

PIN CONNECTION AND IEC LOGIC SYMBOLS



SC12320



The logic diagram of the LC12380 consists of two main parts. The upper part is an I/O multiplexer with a 2-to-1 selector. The selector input is connected to the output of a 3-bit counter. The two data inputs of the multiplexer are labeled 'I/O' and 'O/I'. The output of the multiplexer is labeled 'O/I'. The lower part is a 3-bit counter. It starts with an input 'C IN' connected to the first input of a first inverter. The output of this inverter is connected to the clock input of a second inverter. The output of the second inverter is connected to the clock input of a third inverter. The output of the third inverter is connected back to the input of the first inverter, forming a feedback loop. The output of the second inverter is also connected to the selector input of the I/O multiplexer.

PIN No	SYMBOL	NAME AND FUNCTION
1	I/O	Independent Input/Output
2	O/I	Independent Output/Input
4	C	Enable Input (Active HIGH)
3	GND	Ground (0V)
5	V _{CC}	Positive Supply Voltage

CONTROL	SWITCH FUNCTION
H	ON
L	OFF

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	-0.5 to +13	V
V _I	DC Input Voltage	-0.5 to V _{CC} +0.5	V
V _{I/O}	DC Input/Output Voltage	-0.5 to V _{CC} + 0.5	V
I _{IK}	Control Input DC Diode Current	± 20	mA
I _{IOK}	Input/Output DC Diode Current	± 20	mA
I _O	DC Output Source Sink Current Per Output Pin	± 25	mA
I _{CC} or I _{GND}	DC V _{CC} or Ground Current	± 50	mA
P _D	Power Dissipation	500 (*)	mW
T _{stg}	Storage Temperature	-65 to +150	°C
T _L	Lead Temperature (10 sec)	300	°C

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	2.0 to 12	V
V _I	Input Voltage (Control)	0 to V _{CC}	V
V _{I/O}	Input/Output Voltage	0 to V _{CC}	V
T _{op}	Operating Temperature	-40 to +85	°C
t _r , t _f	Input Rise and Fall Time	V _{CC} = 2V	ns
		V _{CC} = 4.5V	
		V _{CC} = 6V	
		V _{CC} = 10V	

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 _{IH}	High Level Input Voltage	2.0		1.5			1.5		V
		4.5		3.15			3.15		
		9.0		6.3			6.3		
		12.0		8.4			8.4		
V _{IL}	Low Level Input Voltage	2.0				0.5		0.5	V
		4.5				1.35		1.35	
		9.0				2.7		2.7	
		12.0				3.6		3.6	
R _{ON}	ON Resistance	4.5	V _I = V _{IH} V _{I/O} = V _{CC} to GND I _{I/O} ≤ 1mA		96	170		200	Ω
		9.0			55	85		100	
		12.0			45	80		90	
		4.5	V _I = V _{IH} V _{I/O} = V _{CC} or GND I _{I/O} ≤ 1mA		70	100		130	
		9.0			50	75		95	
		12.0			45	70		90	
I _{OFF}	Input/Output Leakage Current (SWITCH OFF)	12.0	V _{OS} = V _{CC} to GND V _{IS} = V _{CC} to GND V _I = V _{IL}			±0.1		±1.0	μA
I _{IZ}	Switch Input Leakage Current (SWITCH ON, OUTPUT OPEN)	12.0	V _{OS} = V _{CC} to GND V _I = V _{IH}			±0.1		±1.0	μA
I _{IN}	Control Input Current	6.0	V _I = V _{CC} to GND			±0.1		±1.0	μA
I _{CC}	Quiescent Supply Current	6.0	V _I = V _{CC} or GND			1		10	μA
		9.0				4		40	
		12.0				8		80	

AC ELECTRICAL CHARACTERISTICS ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 6 \text{ ns}$)

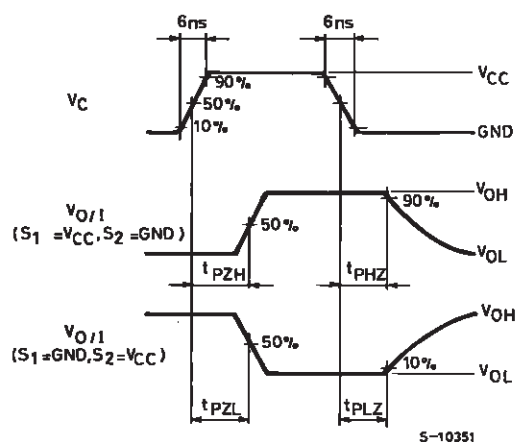
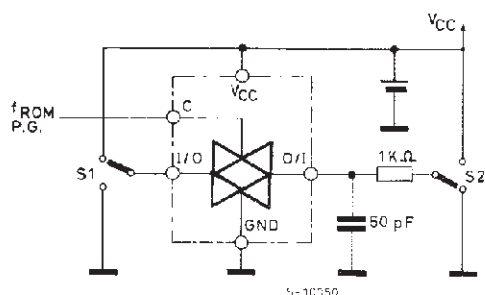
Symbol	Parameter	Test Condition		Value					Unit
		V _{CC} (V)		T _A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
Φ _{I/O}	Phase Difference Between Input and Output	2.0			10	50		65	ns
		4.5			4	10		15	
		9.0			3	8		13	
		12.0			3	7		10	
t _{PZL} t _{PZH}	Output Enable Time	2.0	R _L = 1 KΩ		18	100		125	ns
		4.5			8	20		25	
		9.0			6	12		22	
		12.0			6	12		18	
t _{PLZ} t _{PHZ}	Output Disable Time	2.0	R _L = 1 KΩ		20	115		145	ns
		4.5			10	23		29	
		9.0			8	20		25	
		12.0			8	18		22	
	Maximum Control Input Frequency	2.0	R _L = 1 KΩ C _L = 15 pF V _{OUT} = 1/2V _{CC}		30				MHz
		4.5			30				
		9.0			30				
		12.0			30				
C _{IN}	Input Capacitance				5	10		10	pF
C _{I/O}	Switch Terminal Capacitance				6				pF
C _{IOS}	Feed Through Capacitance				0.5				pF
C _{PD}	Power Dissipation Capacitance (note 1)				15				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. $I_{CC(opr)} = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}$

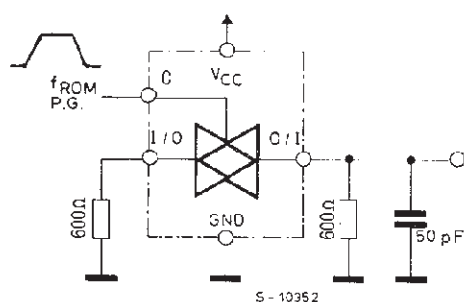
ANALOG SWITCH CHARACTERISTICS ($GND = 0 \text{ V}$, $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Condition			Value	Unit	
		V _{CC} (V)	V _{IN} (Vp-p)				
	Sine Wave Distortion (THD)	4.5	4	f _{IN} = 1 KHz R _L = 10KΩ C _L = 50 pF	0.05	%	
		9.0	8		0.04		
f _{MAX}	Frequency Responce (Switch ON)	4.5	Adjust f _{IN} voltage to Obtain odBm at V _{OS} . Increase f _{IN} Frequency until dB Meter reads -3dB R _L = 50Ω, C _L = 10pF			200	MHz
		9.0				200	
	Feedthrough Attenuation (Switch OFF)	4.5	V _{IN} is centered at V _{CC} /2. Adjust input for 0dBm R _L = 600Ω, C _L = 50pF, f _{IN} = 1MHz sine wave			-60	dB
		9.0				-60	
	Crosstalk (Control Input to Signal Ouput)	4.5	R _L = 600Ω, C _L = 50pF, f _{IN} = 1MHz sine wave (t _r = t _f = 6ns)			60	mV
		9.0				100	

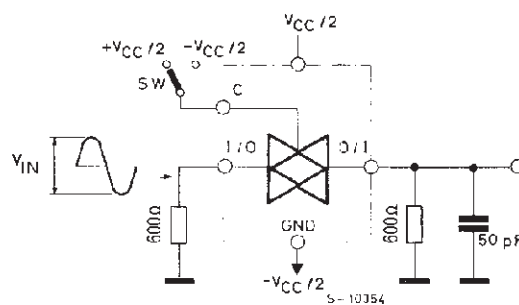
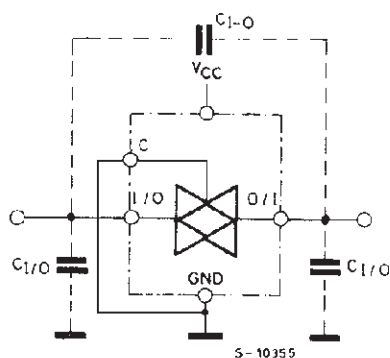
SWITCHING CHARACTERISTICS TEST CIRCUIT

 t_{PLZ} , t_{PHZ} , t_{PZL} , t_{PZH} .

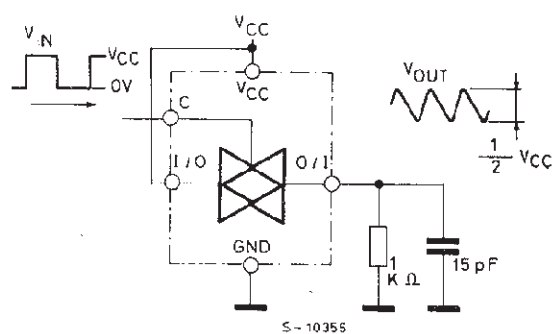
CROSSTALK (control to output)



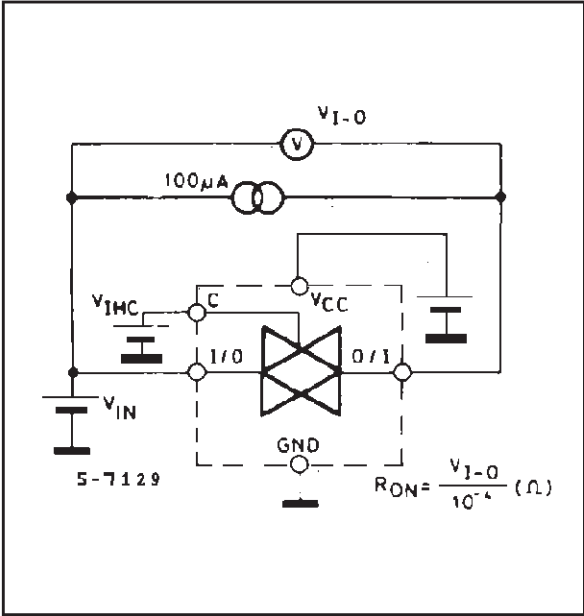
BANDWIDTH AND FEEDTHROUGH ATTENUATION

GND (V_{SS}) C_{I-O} $C_{I/O}$ GND (V_{SS})

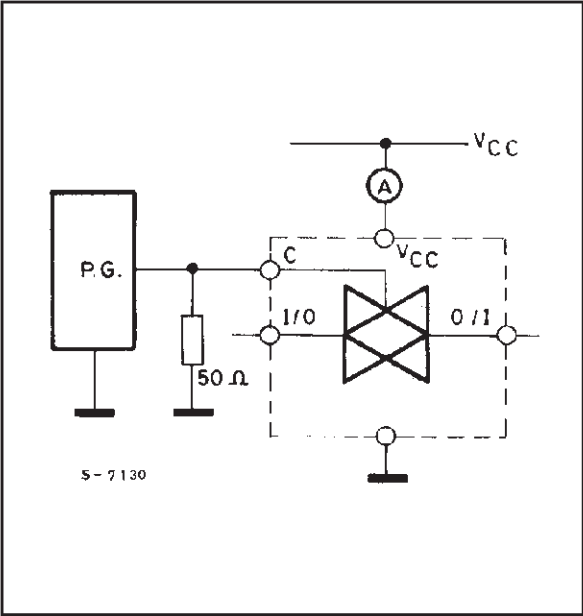
MAXIMUM CONTROL FREQUENCY



CHANNEL RESITANCE (RON)

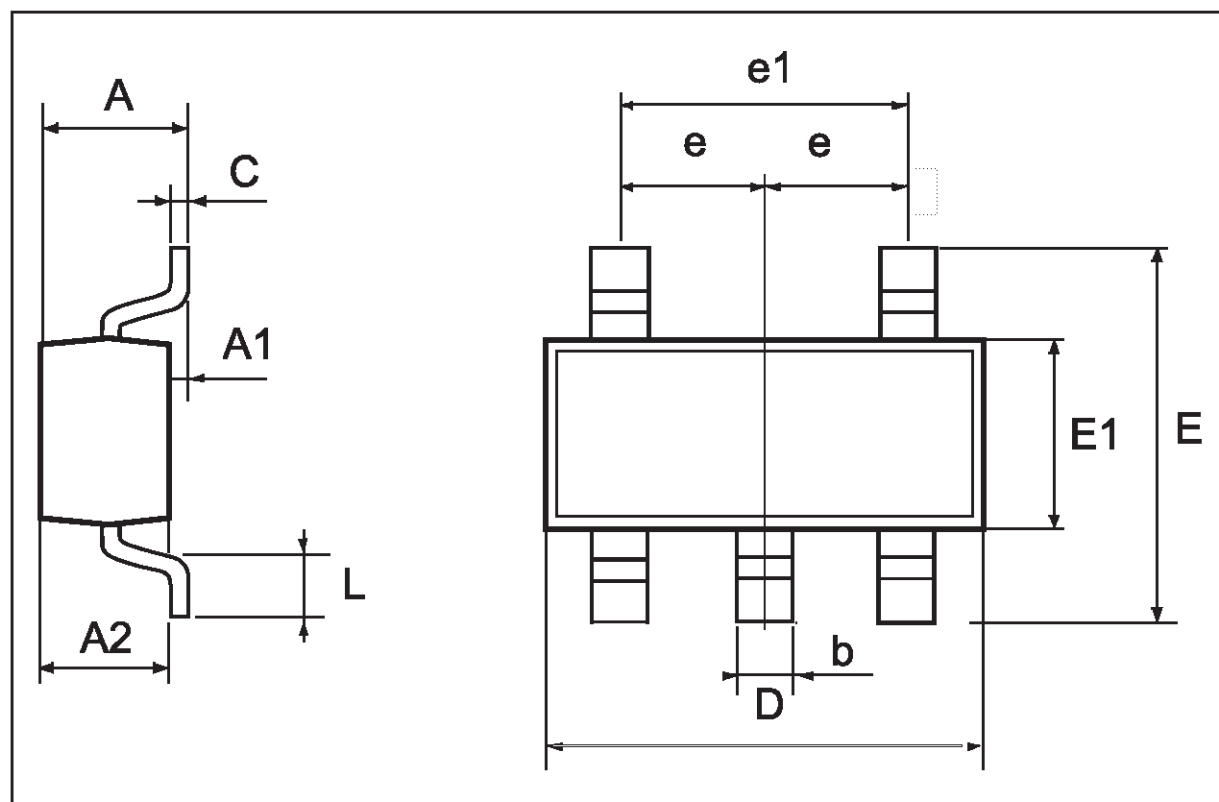


I_{CC} (Opr.)



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	



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