74V1G66

SINGLE BILATERAL SWITCH

- HIGH SPEED:
  t_{PD} = 0.3 ns (TYP.) at V_{CC} = 5V
  t_{PD} = 0.4 ns (TYP.) at V_{CC} = 3.3V
- LOW POWER DISSIPATION:
  I_{CC} = 1 µA (MAX.) at T_A = 25 °C
- LOW "ON" RESISTANCE:
  R_{ON} = 7Ω (TYP.) AT V_{CC} = 5.0V $I_{I/O}$=1mA
  R_{ON} = 8.5Ω (TYP.) AT V_{CC} = 3.3V $I_{I/O}$=1mA
- SINE WAVE DISTORTION
  0.04% (TYP.) AT V_{CC}=3.3V f=1KHz
- WIDE OPERATING VOLTAGE RANGE:
  V_{CC} (OPR) = 2V to 5V

SOT23-5L

SC-70

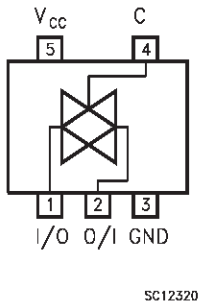
ORDER CODES		
PACKAGE	**TUBE**	**T & R**
SOT23-5L		74V1G66S-TR
SC-70		74V1G66C-TR

DESCRIPTION

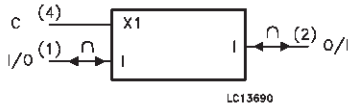
The 74V1G66 is an high-speed CMOS SINGLE BILATERAL SWITCH fabricated in silicon gate C2MOS technology. It achieves high speed propagation delay and VERY LOW ON resistances while maintaining true CMOS low power consumption. This feature makes this part ideal for battery-powered equipment. This bilateral switch handles rail to rail analog and digital signals that may vary across the full power-supply range (from Vcc to Ground).

The C input is provided to control the switch and it's compatible with standard CMOS output; the switch is ON (Port I/O is connected to Port O/I) when the C input is held high and OFF (high-impedance state exists between the two ports) when C is held low. It can be used in many application as Battery Powered System, Audio Signal Routing, Communications System, Test Equipment. It's available in the commercial temperature range in SOT23-5L and SC-70-5L package.

PIN CONNECTION AND IEC LOGIC SYMBOLS

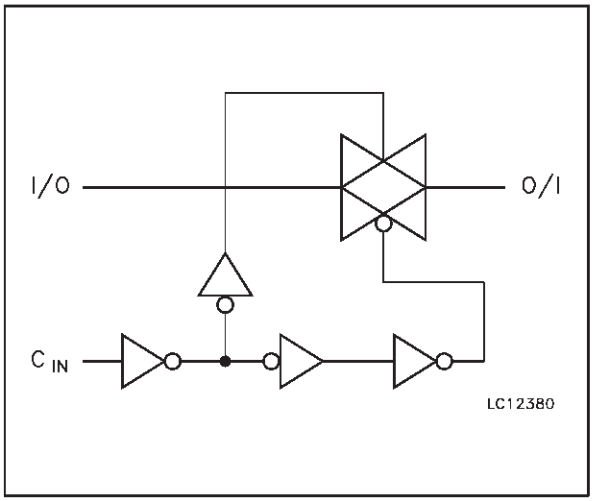


SC12320



LC13690

LOGIC DIAGRAM



PIN DESCRIPTION

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

TRUTH TABLE

CONTROL	SWITCH FUNCTION
H	ON
L	OFF *

* High Impedance State

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage	-0.5 to +7	V
V_I	DC Input Voltage	-0.5 to V_{CC} + 0.5	V
V_{IC}	DC Control Input Voltage	-0.5 to 7	V
V_O	DC Output Voltage	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC Input Diode Current	± 20	mA
I_{IK}	DC Control Input Diode Current	- 20	mA
I_{OK}	DC Output Diode Current	± 20	mA
I_O	DC Output Current	± 50	mA
I_{CC} or I_{GND}	DC V_{CC} or Ground Current	± 50	mA
T_{stg}	Storage Temperature	-65 to +150	^oC
T_L	Lead Temperature (10 sec)	300	^oC

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 (note 1)	2 to 5.5	V
V_I	Input Voltage	0 to V_{CC}	V
V_{IC}	Control Input Voltage	0 to 5.5	V
V_O	Output Voltage	0 to V_{CC}	V
T_{op}	Operating Temperature:	-40 to +85	^oC
dt/dv	Input Rise and Fall Time (note 2)	0 to 10	ns/V

1) Truth Table guaranteed: 1.2V to 5.5V

2) V_{IN} from 30% to 70% V_{CC}

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 Control Input Voltage	2.0		1.5			1.5		V
		2.7 to 5.5		$0.7V_{CC}$			$0.7V_{CC}$		
V_{IL}	Low Level Control Input Voltage	2.0				0.5		0.5	V
		2.7 to 5.5				$0.3V_{CC}$		$0.3V_{CC}$	
R_{ON}	ON Resistance	3.3(**)	V_{IC} = V_{IH} $V_{I/O}$ = V_{CC} to GND $I_{I/O} \leq$ 1mA		15	19		23	Ω
		5.0(*)			8	10		12	
		3.3(**)	V_{IC} = V_{IH} $V_{I/O}$ = V_{CC} or GND $I_{I/O} \leq$ 1mA		8.5	10.5		12.5	
		5.0(*)			7	8.5		10	
I_{OFF}	Input/Output Leakage Current (SWITCH OFF)	5.5	V_{OS} = V_{CC} to GND V_{IS} = V_{CC} to GND V_{IC} = V_{IL}			±0.1		±1.0	µA
I_{IZ}	Switch Input Leakage Current (SWITCH ON, OUTPUT OPEN)	5.5	V_{OS} = V_{CC} to GND V_{IC} = V_{IH}			±0.1		±1.0	µA
I_{IN}	Control Input Leakage Current	0 to 5.5	V_{IC} = 5.5V or GND			±0.1		±1.0	µA
I_{CC}	Quiescent Supply Current	5.5	V_{IC} = V_{CC} or GND			1		10	µA

(*) Voltage range is 5V ± 0.5V
(**) Voltage range is 3.3V ± 0.3V

AC ELECTRICAL CHARACTERISTICS (C_L = 50 pF, Input $t_r = t_f$ =3 ns)

Symbol	Parameter	Test Condition		Value					Unit
		V_{CC} (V)		T_A = 25 °C			-40 to 85 °C		
				Min.	Typ.	Max.	Min.	Max.	
t_{PD}	Delay Time	3.3(*)	$t_r = t_f$ =6 ns		0.4	0.8		1.2	ns
		5.0(**)			0.3	0.6		1.0	
t_{PZL} t_{PZH}	Output Enable Time	3.3(*)	R_L = 1kΩ		2.5	4.0		5.0	ns
		5.0(**)			2.0	4.0		5.0	
t_{PLZ} t_{PHZ}	Output Disable Time	3.3(*)	R_L = 500 Ω		5.0	7.5		9.0	ns
		5.0(**)			5.0	7.5		9.0	
C_{IN}	Input Capacitance				5				pF
$C_{I/O}$	Switch Terminal Capacitance				10				pF
C_{PD}	Power Dissipation Capacitance (note 1)	3.3			2.5				pF
		5.0			3				

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. $I_{CC}(opr) = C_{PD} \bullet V_{CC} \bullet f_{IN} + I_{CC}$ (switch).
(*) Voltage range is 3.3V ± 0.3V
(**) Voltage range is 5V ± 0.5V

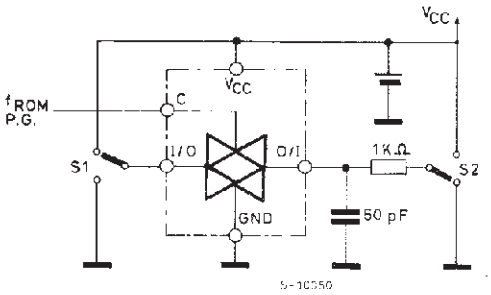
ANALOG SWITCH CHARACTERISTICS (GND = 0 V, T_A = 25°C)

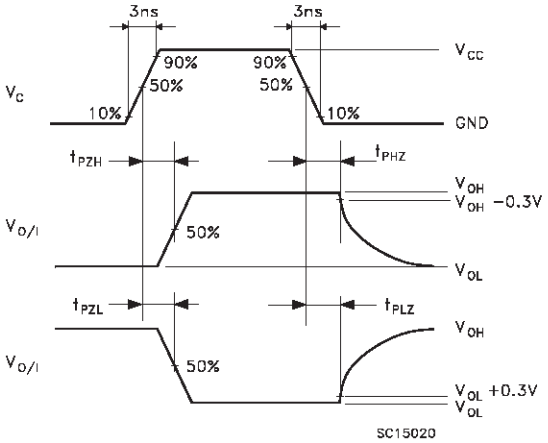
Symbol	Parameter	Test Condition			Value	Unit
		V_{CC} (V)	V_{IN} (Vp-p)			
	Sine Wave Distortion (THD)	3.3	2.75	f_{IN} = 1 KHz R_L = 10KΩ C_L = 50 pF	0.04	%
		5.0(*)	4		0.04	
f_{MAX}	Frequency Response (Switch ON)	3.3	Adjust f_{IN} voltage to Obtain 0dBm at V_{OS}. Increase f_{IN} Frequency until dB Meter reads -3dB R_L = 50Ω, C_L = 10pF		150	MHz
		5.0(*)			180	
	Feedthrough Attenuation (Switch OFF)	3.3	V_{IN} is centered at V_{CC}/2. Adjust f_{IN} voltage to obtain 0dBm at V_{IS} R_L = 600Ω, C_L = 50pF, f_{IN} = 1MHz sine wave		-60	dB
		5.0(*)			-60	
	Crosstalk (Control Input to Signal Output)	3.3	R_L = 600Ω, C_L = 50pF, f_{IN} = 1MHz square wave $t_r = t_f$ = 6 ns		60	mV
		5.0(*)			60	

(*) Voltage range is 5V ± 0.5V

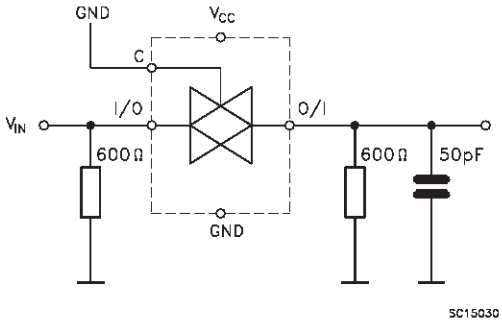
SWITCHING CHARACTERISTICS TEST CIRCUIT

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

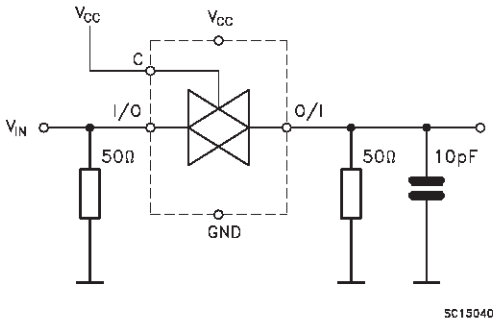




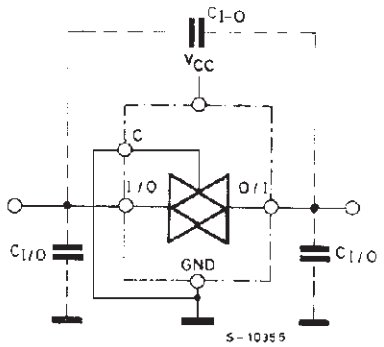
FEEDTHROUGH ATTENUATION



BANDWIDTH ATTENUATION

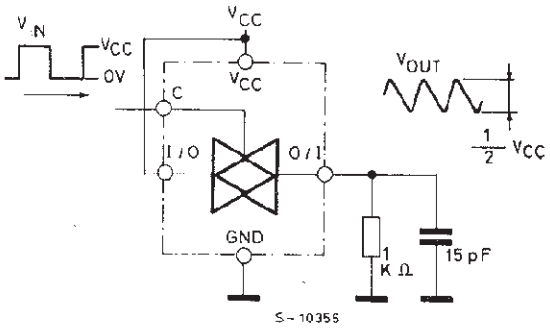


C_{I-O} $C_{I/O}$

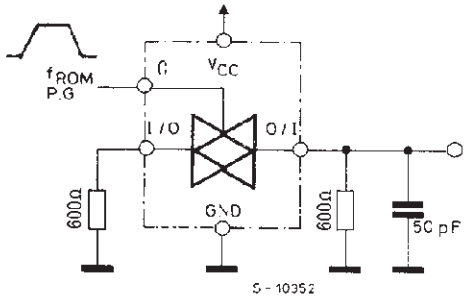


GND (V_{SS})

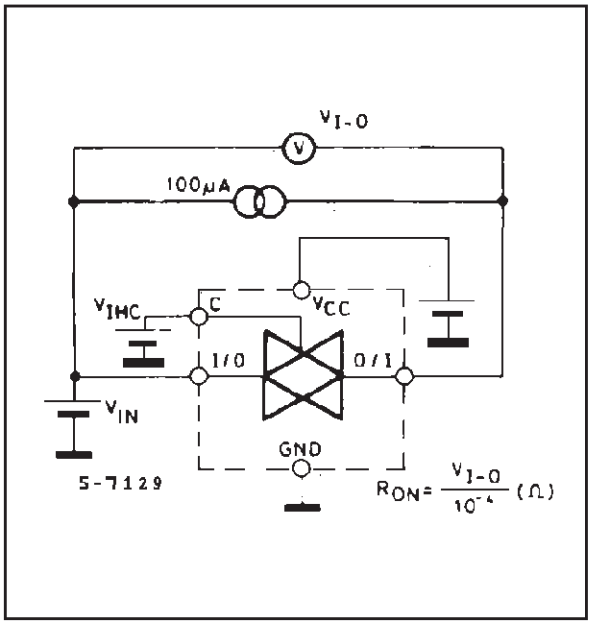
MAXIMUM CONTROL FREQUENCY



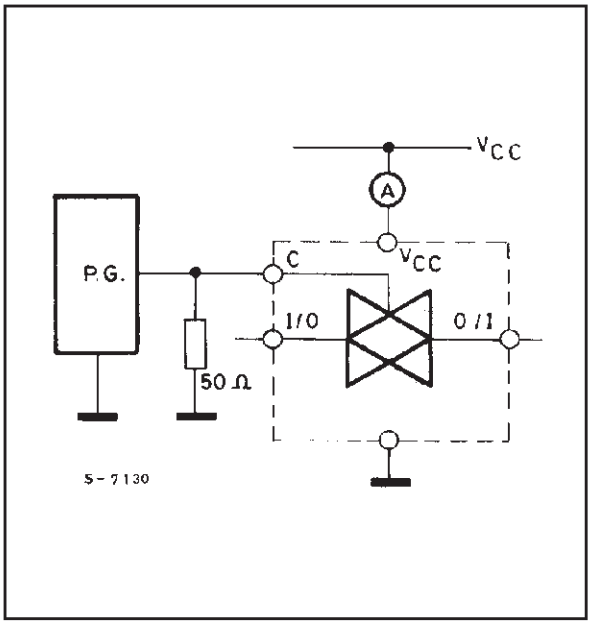
CROSSTALK (control to output)



CHANNEL RESITANCE (R_{ON})

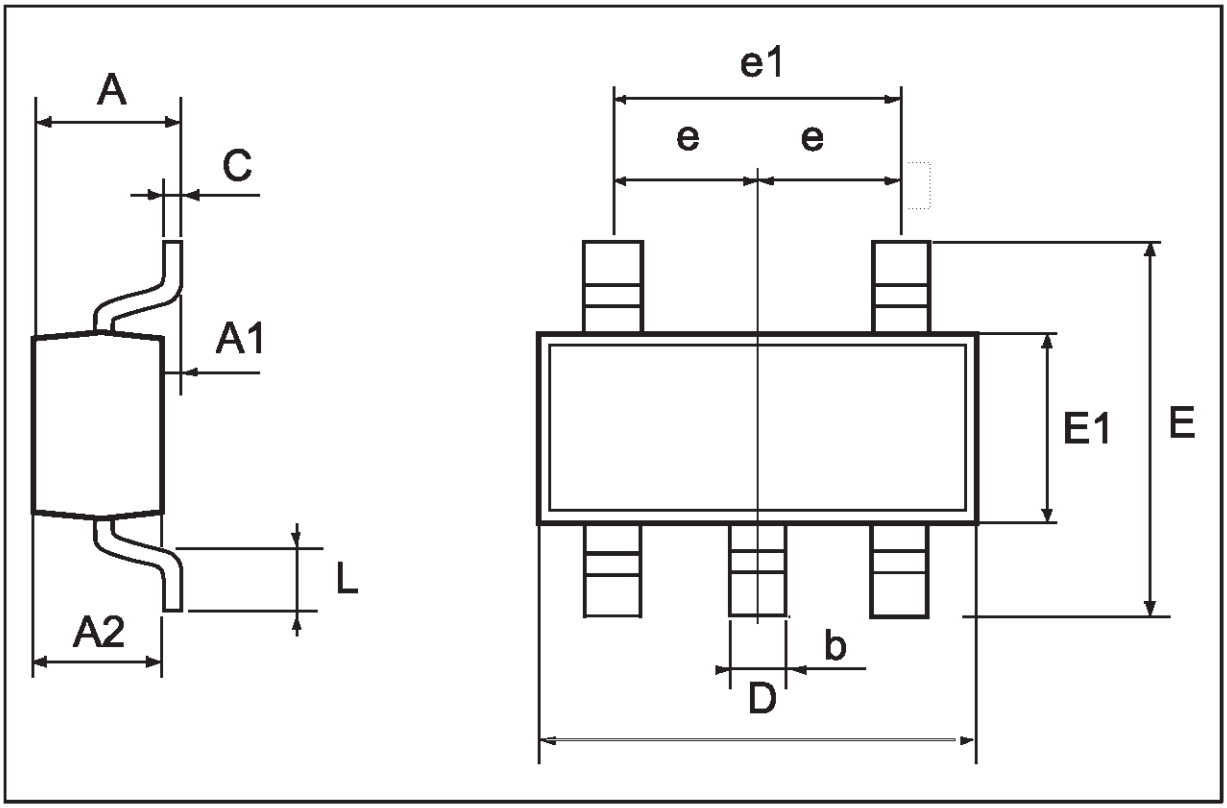


I_{CC} (Opr.)



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	



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