



SINGLE BILATERAL SWITCH

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



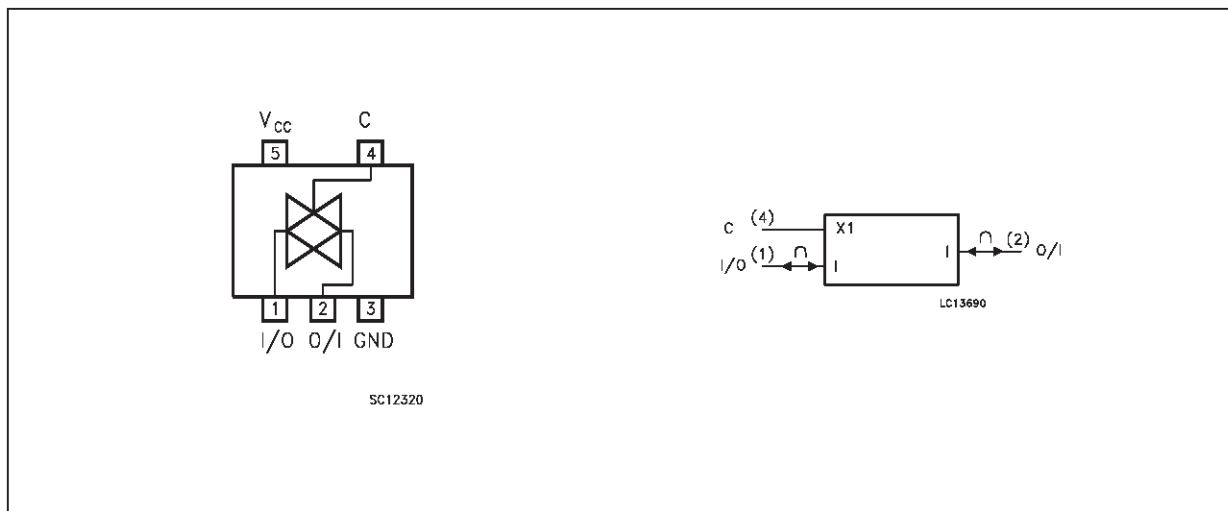
ORDER CODES		
PACKAGE	TUBE	T & R
SOT23-5L		74V1G66S-TR
SC-70		74V1G66C-TR

DESCRIPTION

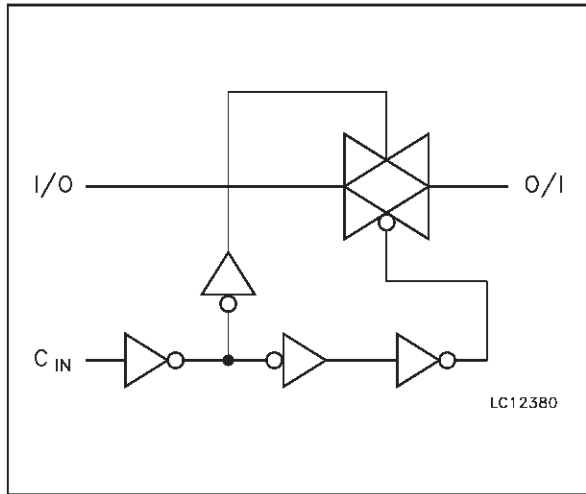
The 74V1G66 is an high-speed CMOS SINGLE BILATERAL SWITCH fabricated in silicon gate C2MOS technology. It achieves high speed propagation delay and VERY LOW ON resistances while maintaining true CMOS low power consumption. This feature makes this part ideal for battery-powered equipment. This bilateral 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



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	°C
T _L	Lead Temperature (10 sec)	300	°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 (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	°C
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
				T _A = 25 °C			-40 to 85 °C		
				V _{CC} (V)	Min.	Typ.	Max.	Min.	
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} ≤ 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} ≤ 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 ($C_L = 50 \text{ pF}$, Input $t_r = t_f = 3 \text{ ns}$)

Symbol	Parameter	Test Condition		Value					Unit
				$T_A = 25 \text{ }^\circ\text{C}$			$-40 \text{ to } 85 \text{ }^\circ\text{C}$		
				V_{CC} (V)	Min.	Typ.	Max.	Min.	
t_{PD}	Delay Time	3.3 ^(*)	$t_r = t_f = 6 \text{ ns}$		0.4	0.8		1.2	ns
		5.0 ^(**)			0.3	0.6		1.0	
t_{PZL} t_{PZH}	Output Enable Time	3.3 ^(*)	$R_L = 1 \text{ k}\Omega$		2.5	4.0		5.0	ns
		5.0 ^(**)			2.0	4.0		5.0	
t_{PLZ} t_{PHZ}	Output Disable Time	3.3 ^(*)	$R_L = 500 \text{ }\Omega$		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. $I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}(\text{switch})$.

(*) Voltage range is $3.3\text{V} \pm 0.3\text{V}$

(**) Voltage range is $5\text{V} \pm 0.5\text{V}$

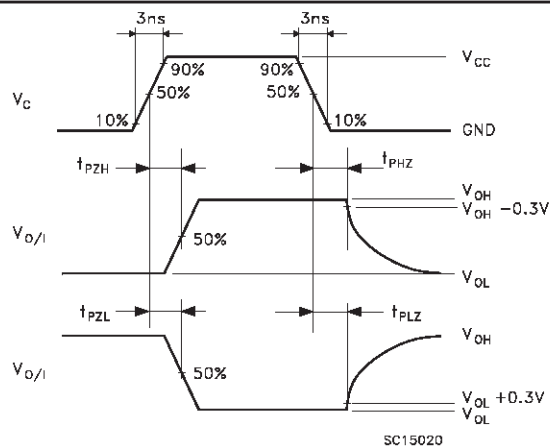
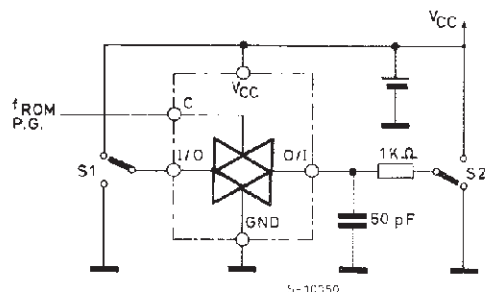
ANALOG SWITCH CHARACTERISTICS ($GND = 0 \text{ V}$, $T_A = 25^\circ\text{C}$)

Symbol	Parameter	Test Condition			Value	Unit
		V_{CC} (V)	V_{IN} (Vp-p)			
	Sine Wave Distortion (THD)	3.3	2.75	$f_{IN} = 1 \text{ KHz}$ $R_L = 10\text{K}\Omega$ $C_L = 50 \text{ pF}$	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 $R_L = 50\Omega$, $C_L = 10\text{pF}$		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} $R_L = 600\Omega$, $C_L = 50\text{pF}$, $f_{IN} = 1\text{MHz}$ sine wave		-60	dB
		5.0 ^(*)			-60	
	Crosstalk (Control Input to Signal Output)	3.3	$R_L = 600\Omega$, $C_L = 50\text{pF}$, $f_{IN} = 1\text{MHz}$ square wave $t_r = t_f = 6 \text{ ns}$		60	mV
		5.0 ^(*)			60	

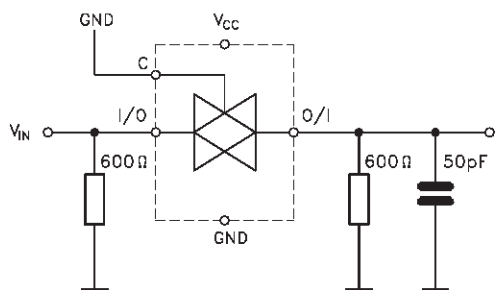
(*) Voltage range is $5\text{V} \pm 0.5\text{V}$

SWITCHING CHARACTERISTICS TEST CIRCUIT

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

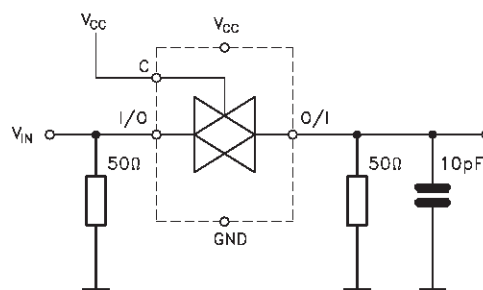


FEEDTHROUGH ATTENUATION



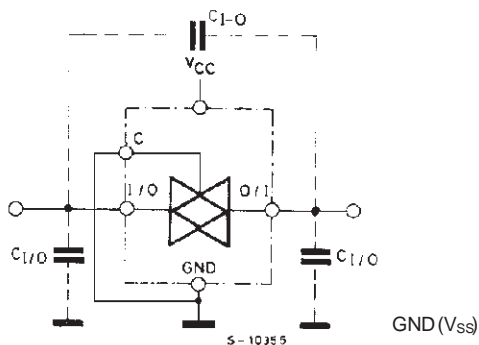
SC15030

BANDWIDTH ATTENUATION

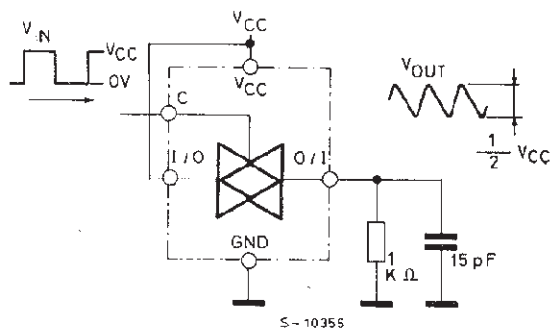


SC15040

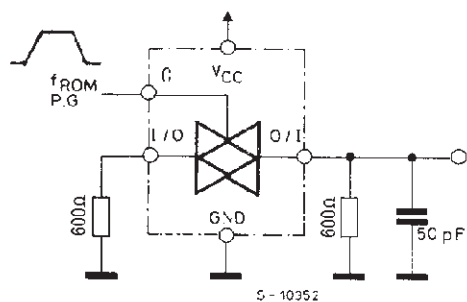
C_{I-O} $C_{I/O}$



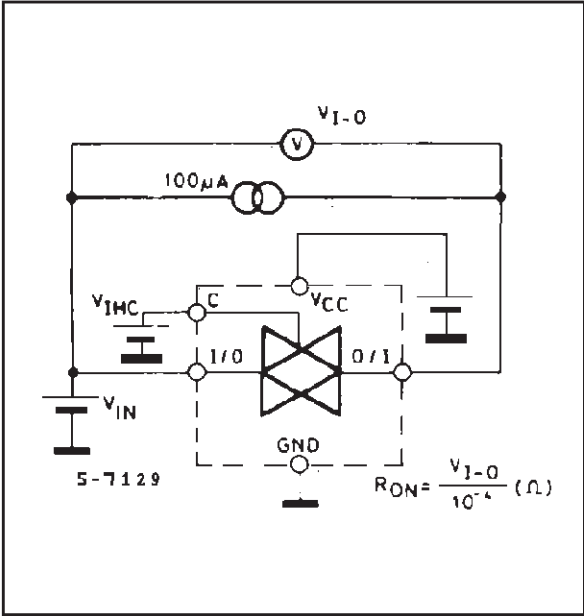
MAXIMUM CONTROL FREQUENCY



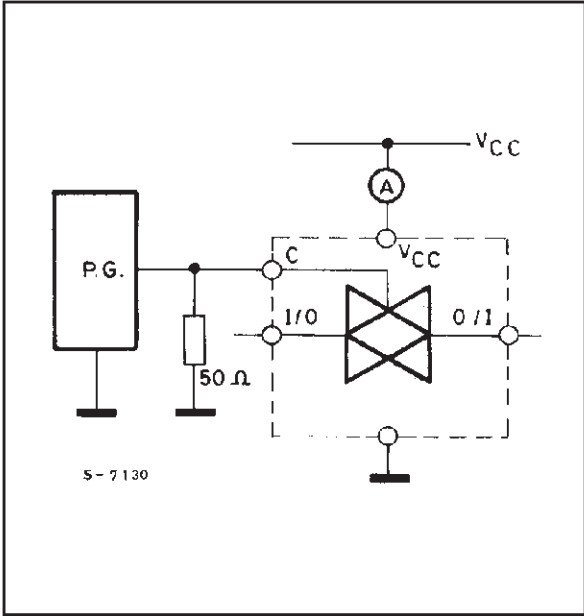
CROSSTALK (control to output)



CHANNEL RESITANCE (RON)

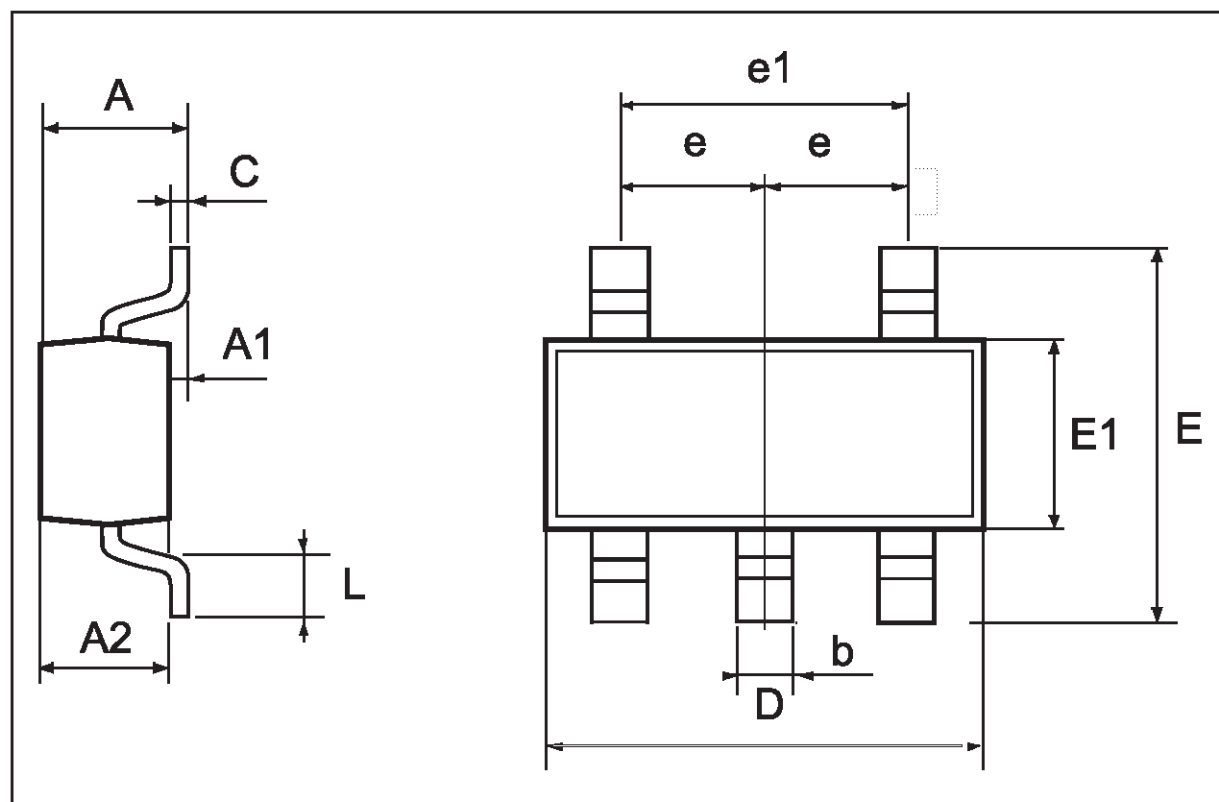


Icc (Opr.)



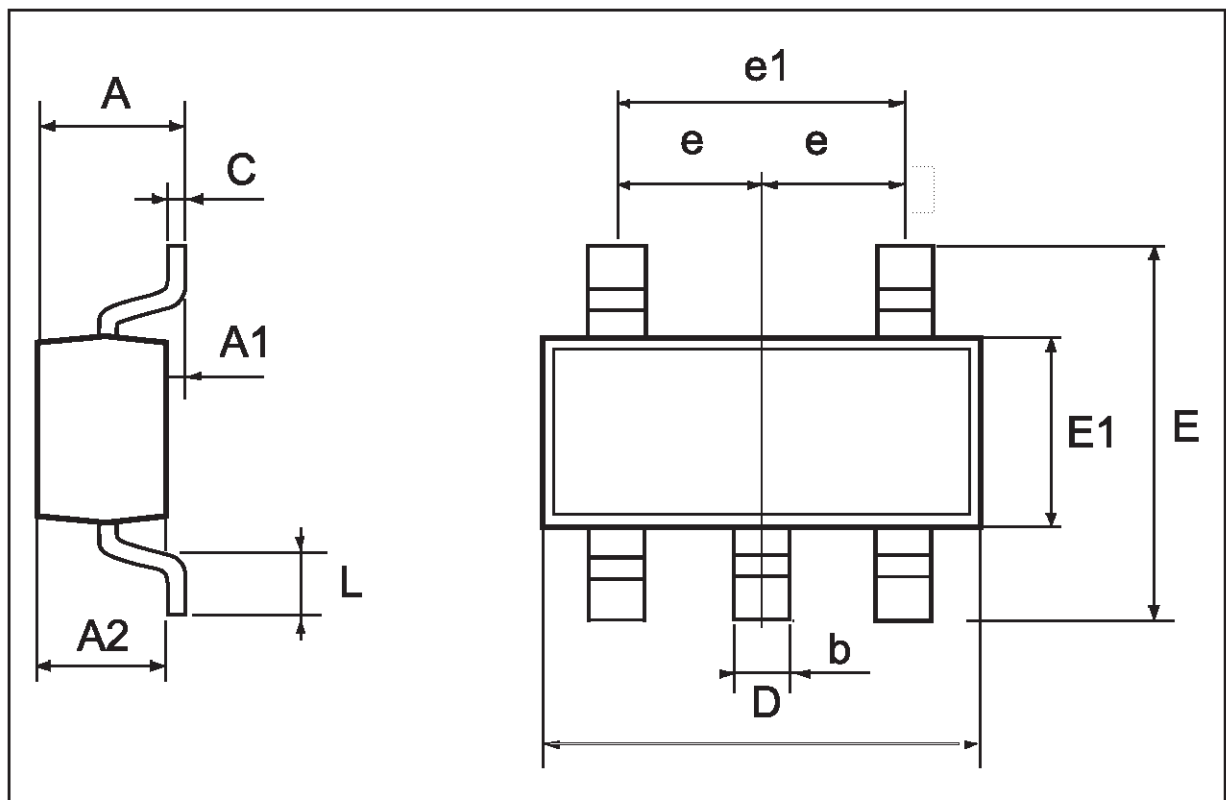
SOT23-5L MECHANICAL DATA

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	



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

© 2001 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>