



## LOW VOLTAGE 4Ω SPDT SWITCH

- HIGH SPEED:  
 $t_{PD} = 0.3 \text{ ns}$  (TYP.) at  $V_{CC} = 5V$   
 $t_{PD} = 0.4 \text{ ns}$  (TYP.) at  $V_{CC} = 3.0V$
- LOW POWER DISSIPATION:  
 $I_{CC} = 1 \mu A$  (MAX.) at  $T_A = 85^\circ C$
- LOW "ON" RESISTANCE:  
 $R_{ON} = 4\Omega$  (MAX.  $T_a=25^\circ C$ ) AT  $V_{CC} = 5V$   
 $R_{ON} = 6\Omega$  (TYP.) AT  $V_{CC} = 3.0V$
- WIDE OPERATING VOLTAGE RANGE:  
 $V_{CC}$  (OPR) = 1.8V to 5.5V SINGLE SUPPLY



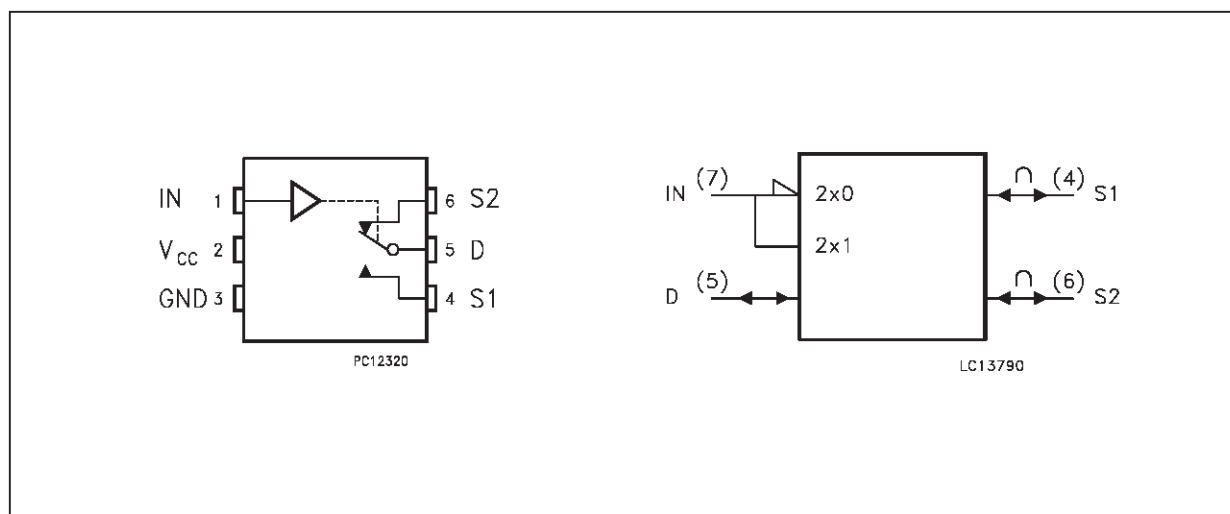
ORDER CODES		
PACKAGE	TUBE	T & R
SOT23-6L		STG719FTR

### DESCRIPTION

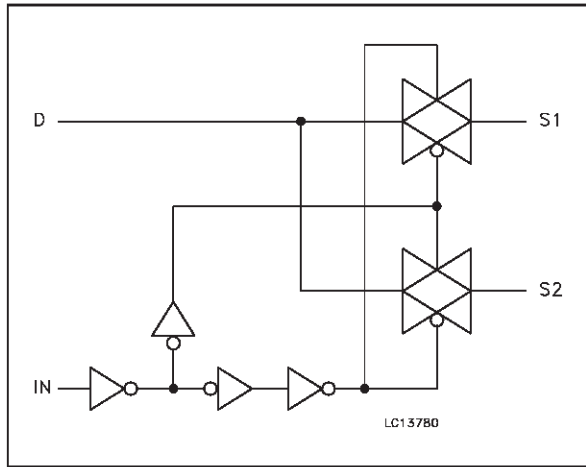
The STG719 is an high speed SPDT CMOS SWITCH fabricated in silicon gate C<sup>2</sup>MOS technology. It is designed to operate from 1.8V to 5.5V, making this device ideal for portable applications. It offers 4Ω ON-Resistance Max at

5V 25°C. Additional key features are fast switching speed ( $t_{ON}=7ns$ ,  $t_{OFF}=4.5ns$ ) and Low Power Consumption ( $<0.01\mu W$  Typ.). ESD immunity is higher than 1000V per Method 3015.7 of MIL-STD-883B. It's available in the commercial temperature range.

### PIN CONNECTION AND IEC LOGIC SYMBOLS



## LOGIC DIAGRAM



## PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1	IN	Control
4, 6	S1, S2	Independent Channel
5	D	Common Channel
3	GND	Ground (0V)
2	V <sub>CC</sub>	Positive Supply Voltage

## TRUTH TABLE

IN	SWITCH S1	SWITCH S2
L	ON	OFF
H	OFF	ON

## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
V <sub>CC</sub>	Supply Voltage	-0.5 to +7	V
V <sub>I</sub>	DC Input Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
V <sub>IC</sub>	Control Input Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
V <sub>O</sub>	DC Output Voltage	-0.5 to V <sub>CC</sub> + 0.5	V
I <sub>IK</sub>	DC Input Diode Current	± 20	mA
I <sub>OK</sub>	DC Output Diode Current	± 20	mA
I <sub>O</sub>	DC Output Current	± 50	mA
I <sub>CC</sub> or I <sub>GND</sub>	DC V <sub>CC</sub> or Ground Current	± 50	mA
T <sub>stg</sub>	Storage Temperature	-65 to +150	°C
T <sub>L</sub>	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 <sub>CC</sub>	Supply Voltage (note 1)	1.8 to 5.5	V
V <sub>I</sub>	Input Voltage	0 to V <sub>CC</sub>	V
V <sub>IC</sub>	Control Input Voltage	0 to V <sub>CC</sub>	V
V <sub>O</sub>	Output Voltage	0 to V <sub>CC</sub>	V
T <sub>op</sub>	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 6V

2) V<sub>IN</sub> from 30% to 70% V<sub>CC</sub>

## DC SPECIFICATIONS

Symbol	Parameter	Test Conditions		Value					Unit	
				V <sub>CC</sub> (V)	T <sub>A</sub> = 25 °C			-40 to 85 °C		
					Min.	Typ.	Max.	Min.		Max.
V <sub>IHC</sub>	High Level Control Input Voltage	3.0 <sup>(*)</sup>		2.0			2.0		V	
		5.0 <sup>(**)</sup>		2.4			2.4			
V <sub>ILC</sub>	Low Level Control Input Voltage	3.0 <sup>(*)</sup>				0.4		0.4	V	
		5.0 <sup>(**)</sup>				0.8		0.8		
R <sub>ON</sub>	ON Resistance	3.0 <sup>(*)</sup>	V <sub>S</sub> = 0 to V <sub>CC</sub> I <sub>S</sub> = 10 mA		6	7		10	Ω	
		5.0 <sup>(**)</sup>				4		5		
ΔR <sub>ON</sub>	ON Resistance Match Between Channels	3.0 <sup>(*)</sup>	V <sub>S</sub> = 0 to V <sub>CC</sub> I <sub>S</sub> = 10 mA		0.1			0.4	Ω	
		5.0 <sup>(**)</sup>			0.1			0.4		
R <sub>FLATON</sub>	ON Resistance Flatness	3.0 <sup>(*)</sup>	V <sub>S</sub> = 0 to V <sub>CC</sub> I <sub>S</sub> = 10 mA		2.5				Ω	
		5.0 <sup>(**)</sup>			0.75					
I <sub>SOFF</sub>	Source OFF Leakage	3.0 <sup>(*)</sup>	V <sub>S</sub> = 1V or V <sub>CC</sub> V <sub>D</sub> = V <sub>CC</sub> or 1V V <sub>IN</sub> = V <sub>CC</sub> or GND		±0.01	±0.25		±0.35	nA	
		5.0 <sup>(**)</sup>			±0.01	±0.25		±0.35		
I <sub>SON</sub>	Channel ON Leakage Current	3.0 <sup>(*)</sup>	V <sub>S</sub> =V <sub>D</sub> =1V to V <sub>CC</sub> -2.5V V <sub>IN</sub> = V <sub>IHC</sub>		±0.01	±0.25		±0.35	nA	
		5.0 <sup>(**)</sup>			±0.01	±0.25		±0.35		
I <sub>IN</sub>	Control Input Leakage Current	3.0 <sup>(*)</sup>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>		0.005			±0.1	μA	
		5.0 <sup>(**)</sup>			0.005			±0.1		
I <sub>CC</sub>	Quiescent Supply Current	3.0 <sup>(*)</sup>	V <sub>I</sub> = V <sub>CC</sub> or GND		0.001			1	μA	
		5.0 <sup>(**)</sup>			0.001			1		

(\*) Voltage range is 3.0V ± 0.3V

(\*\*) Voltage range is 5V ± 0.5V

AC ELECTRICAL CHARACTERISTICS (C<sub>L</sub> = 35 pF, R<sub>L</sub> = 300Ω)

Symbol	Parameter	Test Condition		Value					Unit	
				V <sub>CC</sub> (V)	T <sub>A</sub> = 25 °C			-40 to 85 °C		
					Min.	Typ.	Max.	Min.		Max.
t <sub>PD</sub>	Delay Time	3.0 <sup>(*)</sup>	V <sub>S</sub> = 3V square wave f=1MHz t <sub>r</sub> =t <sub>f</sub> =6ns		0.4	0.8		1.2	ns	
		5.0 <sup>(**)</sup>			0.3	0.6		1.0		
t <sub>ON</sub>	ON Channel Time	3.0 <sup>(*)</sup>	V <sub>S</sub> = 2V		10			16	ns	
		5.0 <sup>(**)</sup>	V <sub>S</sub> = 3V		7			11		
t <sub>OFF</sub>	OFF Channel Time	3.0 <sup>(*)</sup>	V <sub>S</sub> = 2V		5.5			7	ns	
		5.0 <sup>(**)</sup>	V <sub>S</sub> = 3V		4.5			6		
t <sub>D</sub>	Break Before Make Time Delay	3.0 <sup>(*)</sup>	V <sub>S</sub> = 2V	1	4				ns	
		5.0 <sup>(**)</sup>	V <sub>S</sub> = 3V	1	4					
C <sub>SOFF</sub>	OFF Channel Capacitance				19				pF	
C <sub>SON</sub>	ON Channel Capacitance				33				pF	

(\*) Voltage range is 3.0V ± 0.3V

(\*\*) Voltage range is 5V ± 0.5V

**ANALOG SWITCH CHARACTERISTICS** ( $C_L = 5 \text{ pF}$ ,  $R_L = 50\Omega$ ,  $GND = 0 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ )

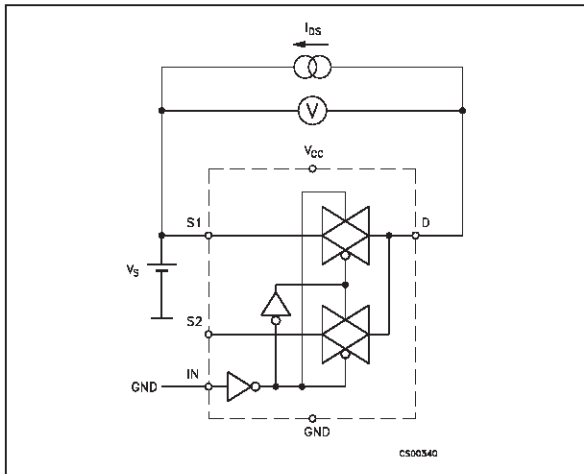
Symbol	Parameter	Test Condition		Value	Unit
		$V_{CC}$ (V)			
$f_{MAX}$	Frequency Response (Switch ON)	3.0 <sup>(*)</sup>	Bandwidth at -3dB	200	MHz
		5.0 <sup>(**)</sup>		200	
OIRR	OFF Isolation (Switch OFF)	3.0 <sup>(*)</sup>	$f_{IN} = 10\text{MHz}$ sine wave	-40	dB
		3.0 <sup>(*)</sup>	$f_{IN} = 1\text{MHz}$ sine wave	-74	
		5.0 <sup>(**)</sup>	$f_{IN} = 10\text{MHz}$ sine wave	-40	
		5.0 <sup>(**)</sup>	$f_{IN} = 1\text{MHz}$ sine wave	-74	
	Crosstalk (Between Channels)	3.0 <sup>(*)</sup>	$f_{IN} = 10\text{MHz}$ sine wave	-39	dB
		3.0 <sup>(*)</sup>	$f_{IN} = 1\text{MHz}$ sine wave	-52	
		5.0 <sup>(**)</sup>	$f_{IN} = 10\text{MHz}$ sine wave	-39	
		5.0 <sup>(**)</sup>	$f_{IN} = 1\text{MHz}$ sine wave	-52	

(\*) Voltage range is  $3.0\text{V} \pm 0.3\text{V}$

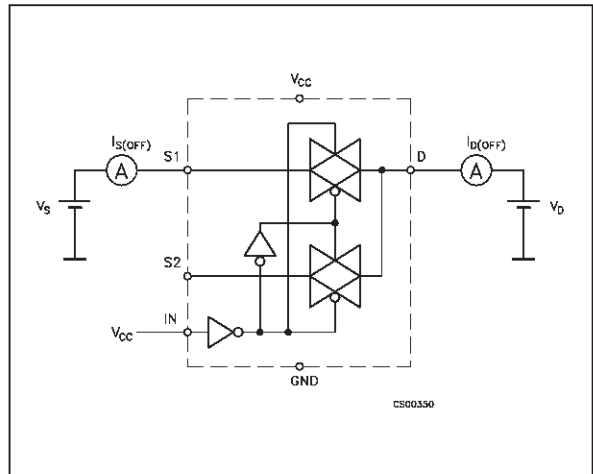
(\*\*) Voltage range is  $5\text{V} \pm 0.5\text{V}$

**TEST CIRCUITS**

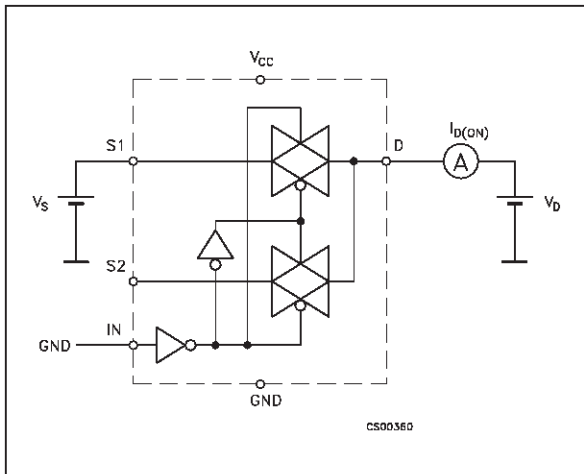
**ON RESISTANCE**



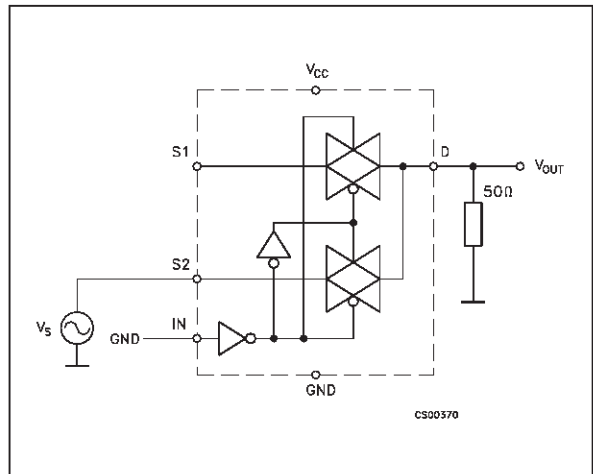
**OFF LEAKAGE**



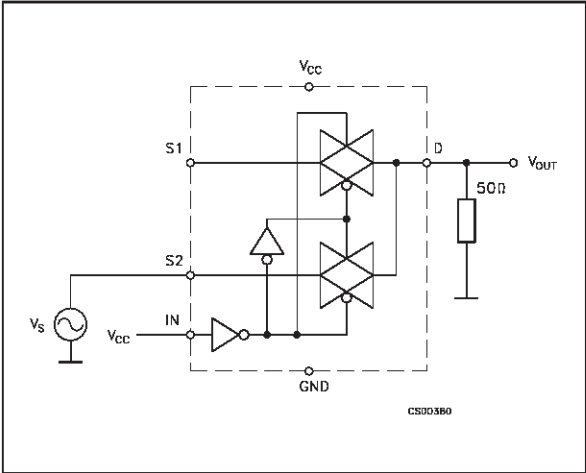
**ON LEAKAGE**



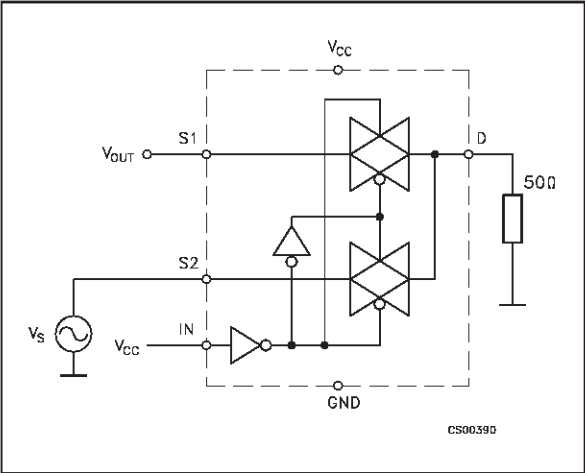
**OFF ISOLATION**



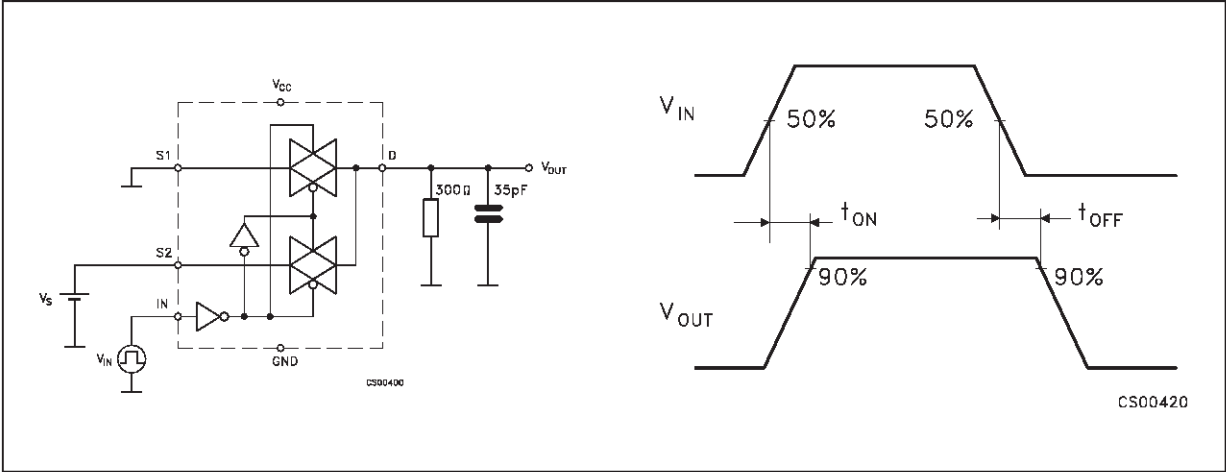
**BANDWIDTH**



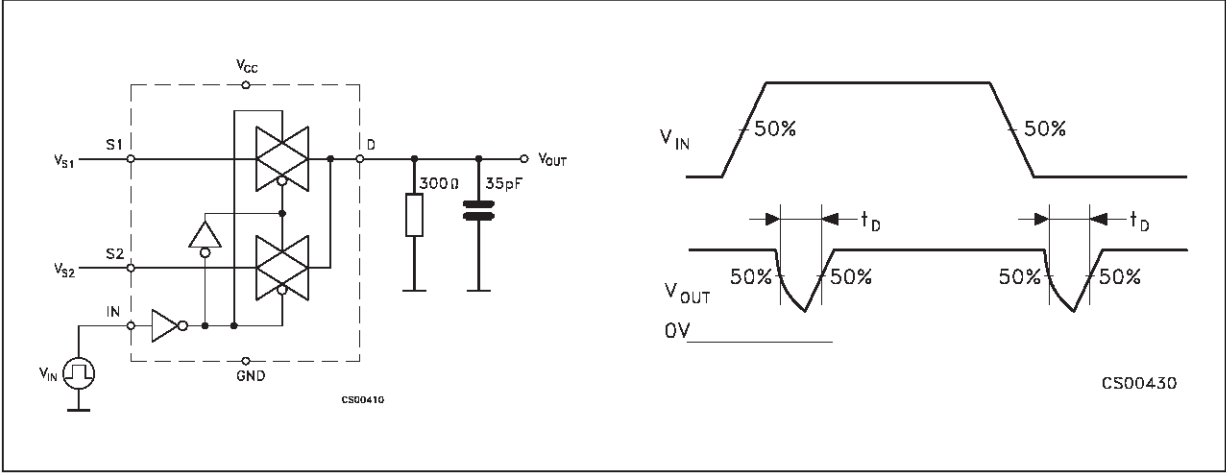
**CHANNEL TO CHANNEL CROSSTALK**



**SWITCHING TIMES**

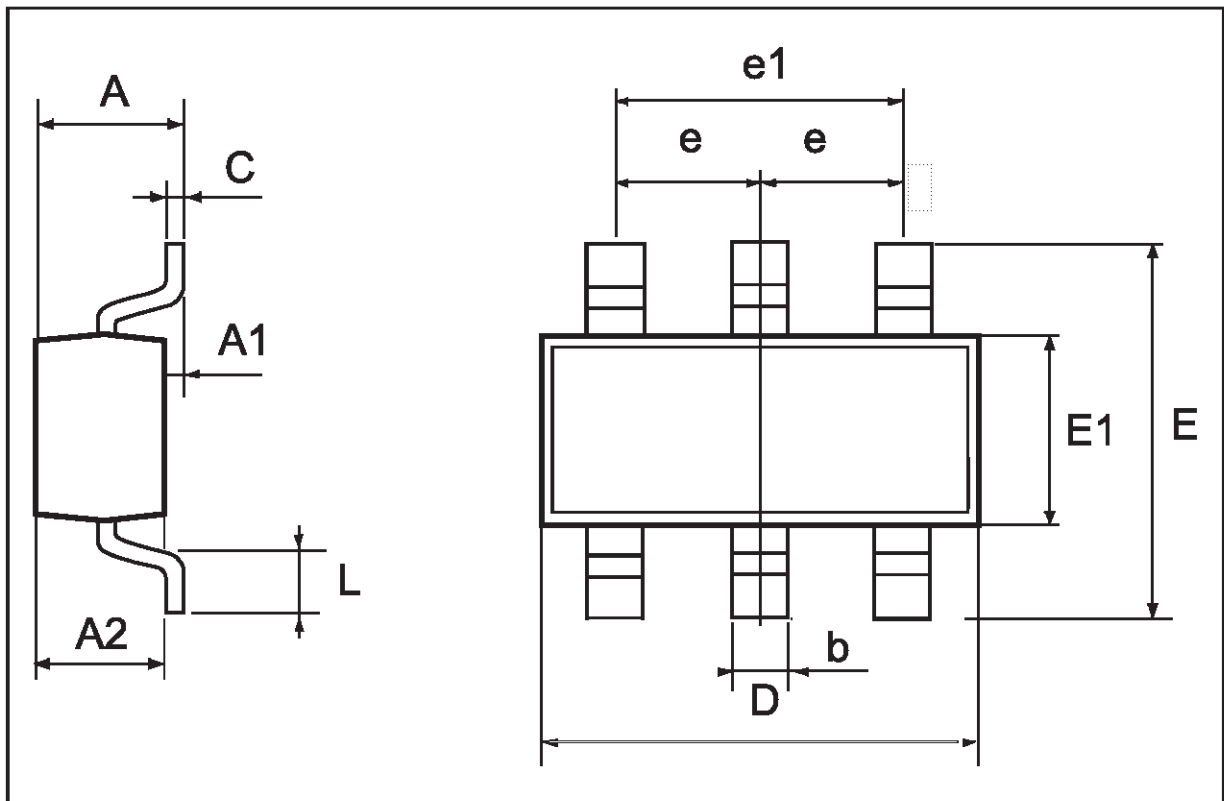


**BREAK BEFORE MAKE TIME DELAY**



**SOT23-6L 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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