

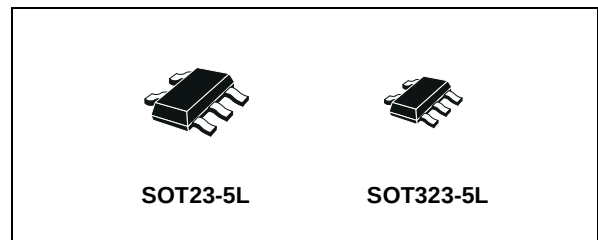
SINGLE BILATERAL SWITCH

- HIGH SPEED:
 $t_{PD} = 0.3ns$ (TYP.) at $V_{CC} = 5V$
- LOW POWER DISSIPATION:
 $I_{CC} = 1\mu A$ (MAX.) at $T_A = 25^\circ C$
- LOW "ON" RESISTANCE:
 $R_{ON} = 6.5\Omega$ (TYP.) AT $V_{CC} = 5V$ $I_{I/O} = 1mA$
- SINE WAVE DISTORTION:
0.04% AT $V_{CC} = 5V$ $f = 1KHz$
- COMPATIBLE WITH TTL OUTPUTS ON CONTROL PIN:
 $V_{IH} = 2V$ (MIN), $V_{IL} = 0.8V$ (MAX)
- OPERATING VOLTAGE RANGE:
 $V_{CC}(OPR) = 4.5V$ to $5.5V$
- IMPROVED LATCH-UP IMMUNITY

DESCRIPTION

The 74V1T66 is an advanced 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 bilateral switch handles rail to rail analog and digital signals that may vary across the full power supply range (from GND to V_{CC}).

The C input is provided to control the switch and it's compatible with standard TTL output; the switch is ON (port I/O is connected to Port O/I)



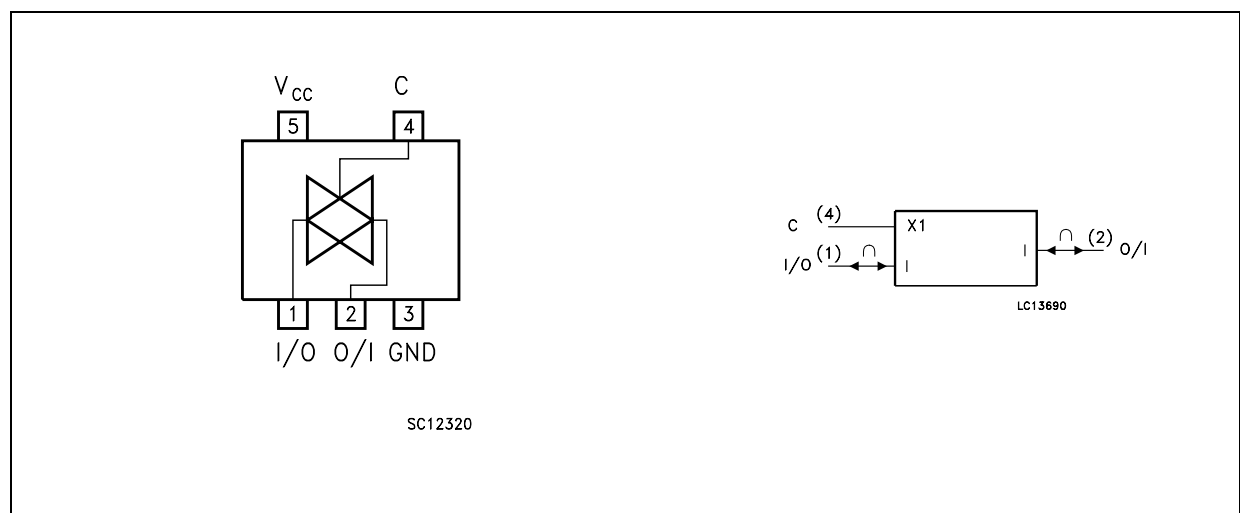
ORDER CODES

PACKAGE	T & R
SOT23-5L	74V1T66STR
SOT323-5L	74V1T66CTR

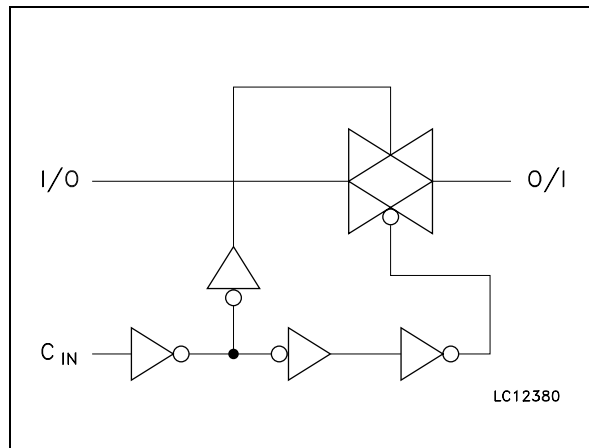
when the C input is held high and OFF (high impedance state exists between the two ports) when C is held low. It can be used in many application as Battery Powered System, Test Equipment. It's available in the commercial and extended temperature range in SOT23-5L and SC-70-5L package.

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

PIN CONNECTION AND IEC LOGIC SYMBOLS



INPUT EQUIVALENT CIRCUIT



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 +7.0	V
V _I	DC Input Voltage	-0.5 to V _{CC} + 0.5	V
V _{IC}	DC Control Input Voltage	-0.5 to +7.0	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 conditions is not implied.

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V _{CC}	Supply Voltage	4.5 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	-55 to 125	°C
dt/dv	Input Rise and Fall Time (note 1) V _{CC} = 5.0V	0 to 20	ns/V

1) V_{IN} from 0.8V to 2V on control pin

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 _{IH}	High Level Input Voltage	5.0(*)		2			2		2		V
V _{IL}	Low Level Input Voltage	5.0(*)				0.8		0.8		0.8	V
R _{ON}	ON Resistance	5.0(*)	V _{IC} = V _{IH} V _{I/O} = V _{CC} to GND I _{I/O} ≤ 1mA		7.5	10		12		14	V
R _{ON}	ON Resistance	5.0(*)	V _{IC} = V _{IH} V _{I/O} = V _{CC} or GND I _{I/O} ≤ 1mA		6.5	8.5		10		12	V
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		± 5	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		± 5	μA
I _{IN}	Control Input Leakage Current	0 to 5.5	V _{IC} = 5.5V or GND			± 0.1		± 1.0		± 1.0	μA
I _{CC}	Quiescent Supply Current	5.5	V _I = V _{CC} or GND			1		10		20	μA

(*) Voltage range is 5V ± 0.5V

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

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.
t _{PD}	Delay Time	5.0 ^(*)	t _r = t _f = 6ns		0.3	0.6		1.0		2.0	ns
t _{PLZ} t _{PHZ}	Output Disable Time	5.0 ^(*)	R _L = 500 Ω		5.0	7.5		9.0		10.0	ns
t _{PZL} t _{PZH}	Output Enable Time	5.0 ^(*)	R _L = 1 KΩ		2.0	4.0		5.0		7.0	ns

(*) Voltage range is 5.0V ± 0.5V

CAPACITIVE 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			3	10		10		10	pF	
C _{I/O}	Output Capacitance			10						pF	
C _{PD}	Power Dissipation Capacitance (note 1)			3						pF	

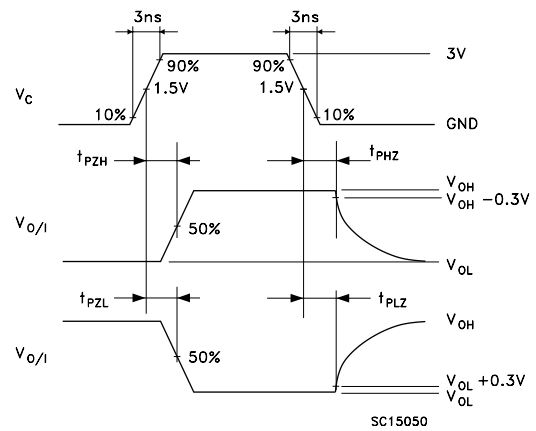
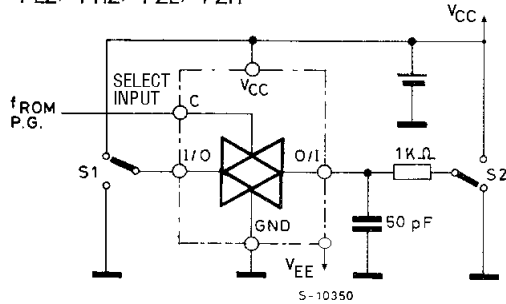
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

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

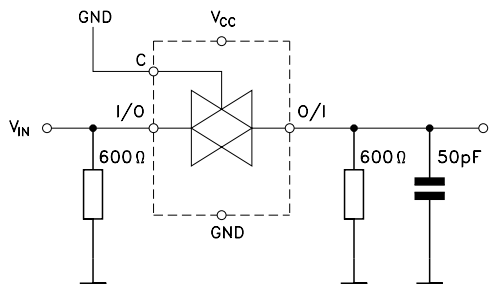
Symbol	Parameter	Test Condition			Value	Unit
		V_{CC} (V)	V_{IN} (V _{p-p})		Typ.	
	Sine Wave Distortion (THD)	5.0(*)	4	$f_{IN} = 1 \text{ KHz}$, $R_L = 10 \text{ K}\Omega$, $C_L = 50 \text{ pF}$	0.04	%
f_{MAX}	Frequency Response (Switch ON)	5.0(*)		Adjust f_{IN} voltage to obtain 0 dBm at V_{OS} . Increase f_{IN} Frequency until dB meter reads -3dB $R_L = 50\Omega$, $C_L = 10 \text{ pF}$	180	MHz
	Feed through Attenuation (Switch OFF)	5.0(*)		V_{IN} is centered at $V_{CC}/2$ Adjust f_{IN} Voltage to obtained 0dBm at V_{IS} $R_L = 600\Omega$, $C_L = 50 \text{ pF}$, $f_{IN} = 1\text{KHz}$ sine wave	-60	dB
	Crosstalk (Control Input to Signal Output)	5.0(*)		$R_L = 600\Omega$, $C_L = 50 \text{ pF}$, $f_{IN} = 1\text{KHz}$ square wave $t_r = t_f = 6\text{ns}$	60	mV

(*) Voltage range is $5.0\text{V} \pm 0.5\text{V}$

SWITCHING CHARACTERISTIC TEST CIRCUIT

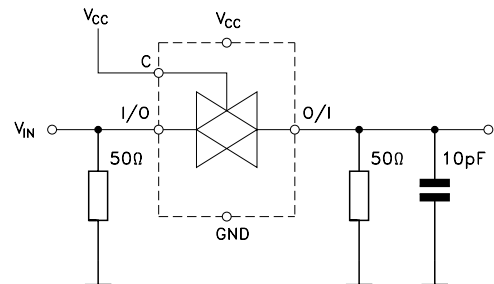
 t_{PLZ} , t_{PHZ} , t_{PZL} , t_{PZH} 

FEEDTHROUGH ATTENUATION



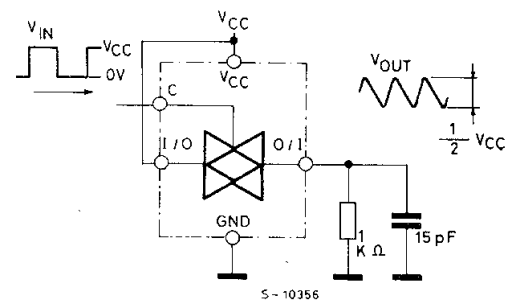
SC15030

BANDWIDTH ATTENUATION

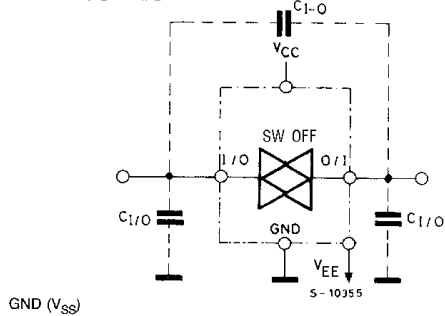


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MAXIMUM CONTROL FREQUENCY



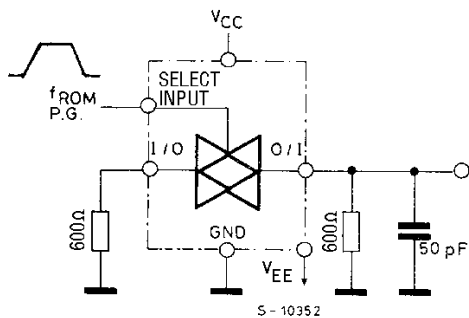
S-10356

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

S-10355

GND (V_{SS})

CROSSTALK (control to output)



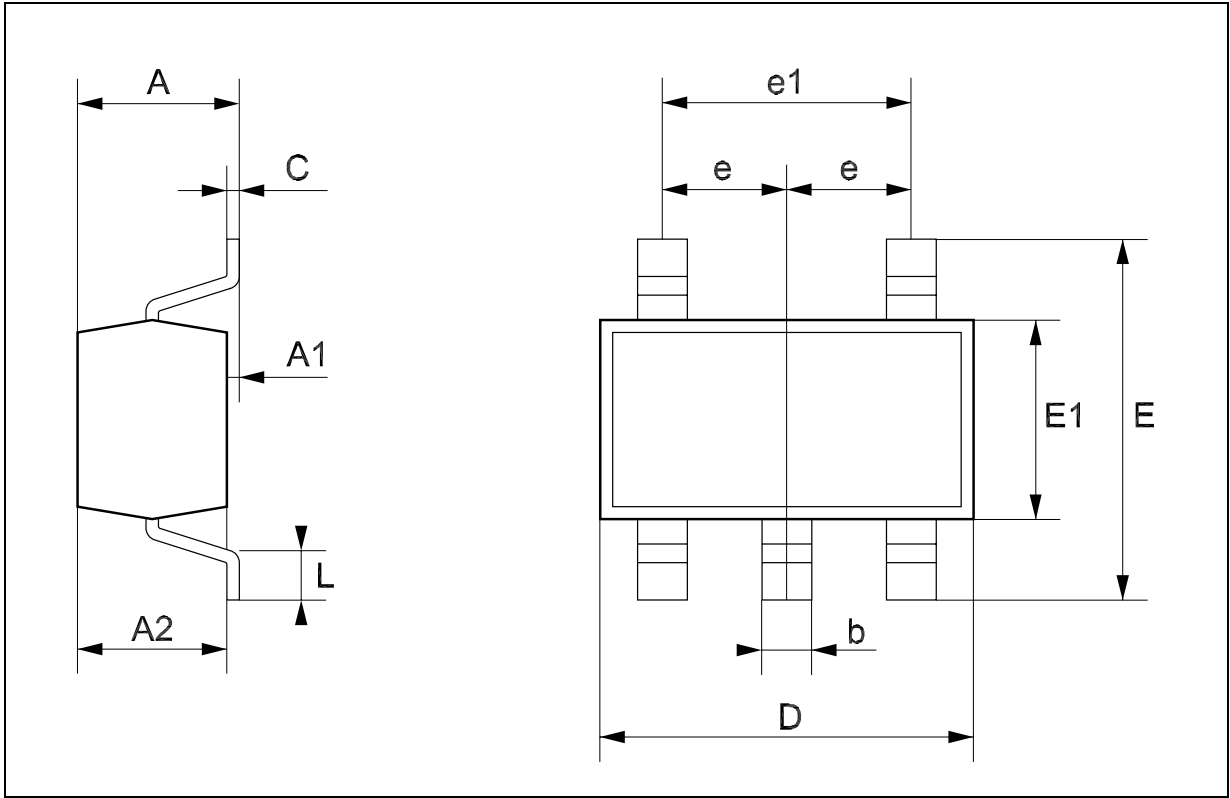
S-10352

The diagram illustrates a test setup for measuring the on-resistance (R_{ON}) of a 1T1R1C1 device. The circuit includes a voltage source V_{1-0} connected in series with a $100\mu A$ current source. The voltage across the device is measured using a voltmeter. The device is connected to a voltage source V_{1HC} and a voltage source V_{IN} . The device's output is connected to a node labeled $1/0$, which is also connected to a node labeled $0/1$. The device is grounded at GND . The formula for the on-resistance is given as:

$$R_{ON} = \frac{V_{1-0}}{10^{-4}} (\Omega)$$

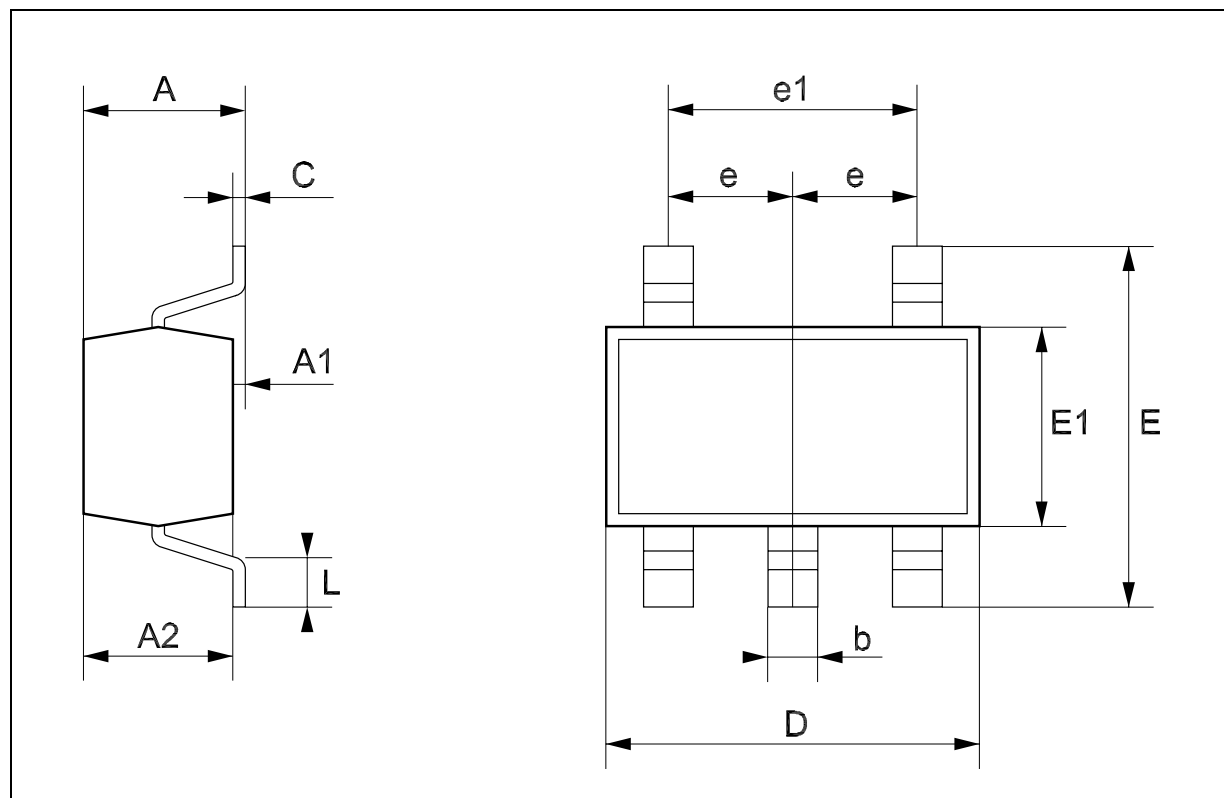
SOT23-5L MECHANICAL DATA

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
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6



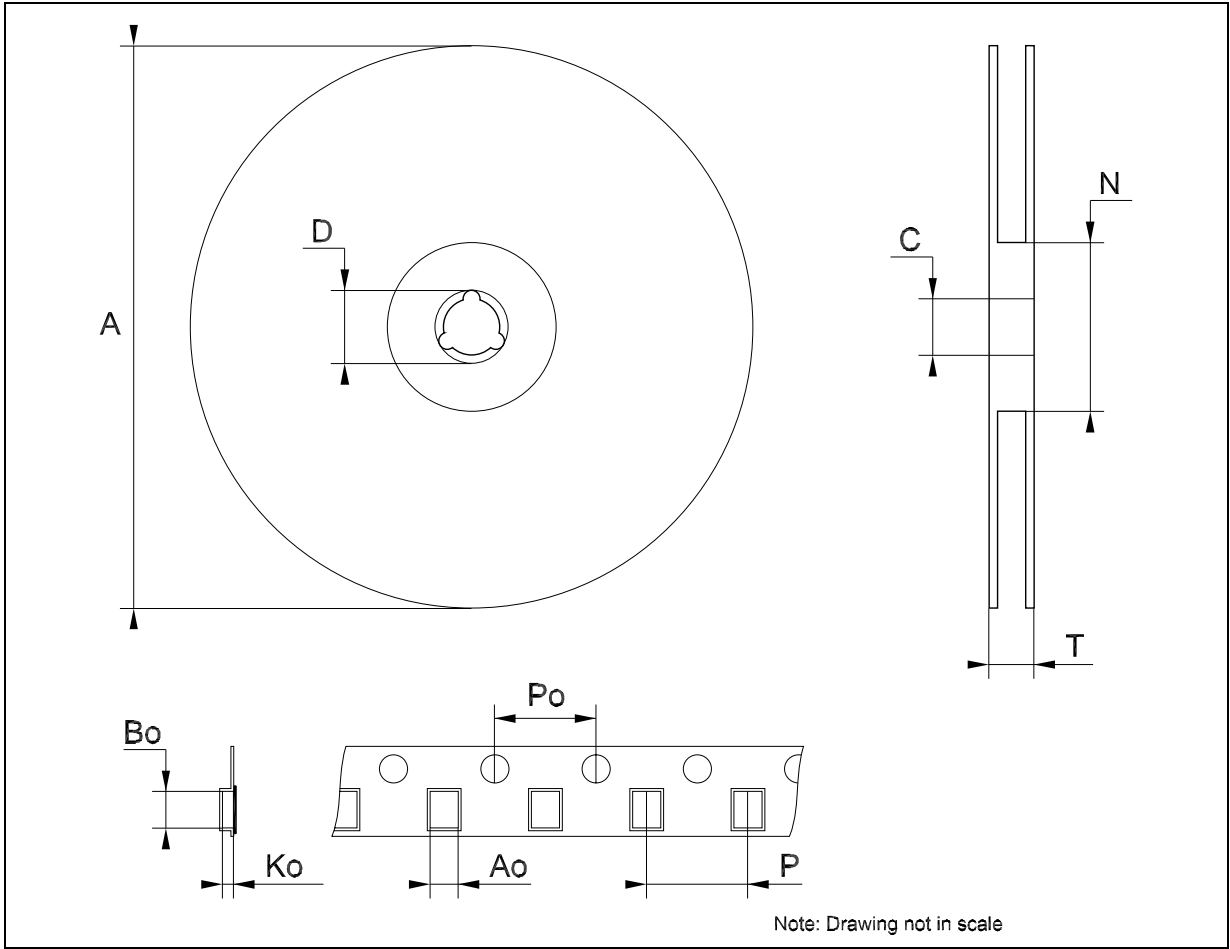
SOT323-5L MECHANICAL DATA

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
e		0.65			25.6	
e1		1.3			51.2	
L	0.10		0.30	3.9		11.8



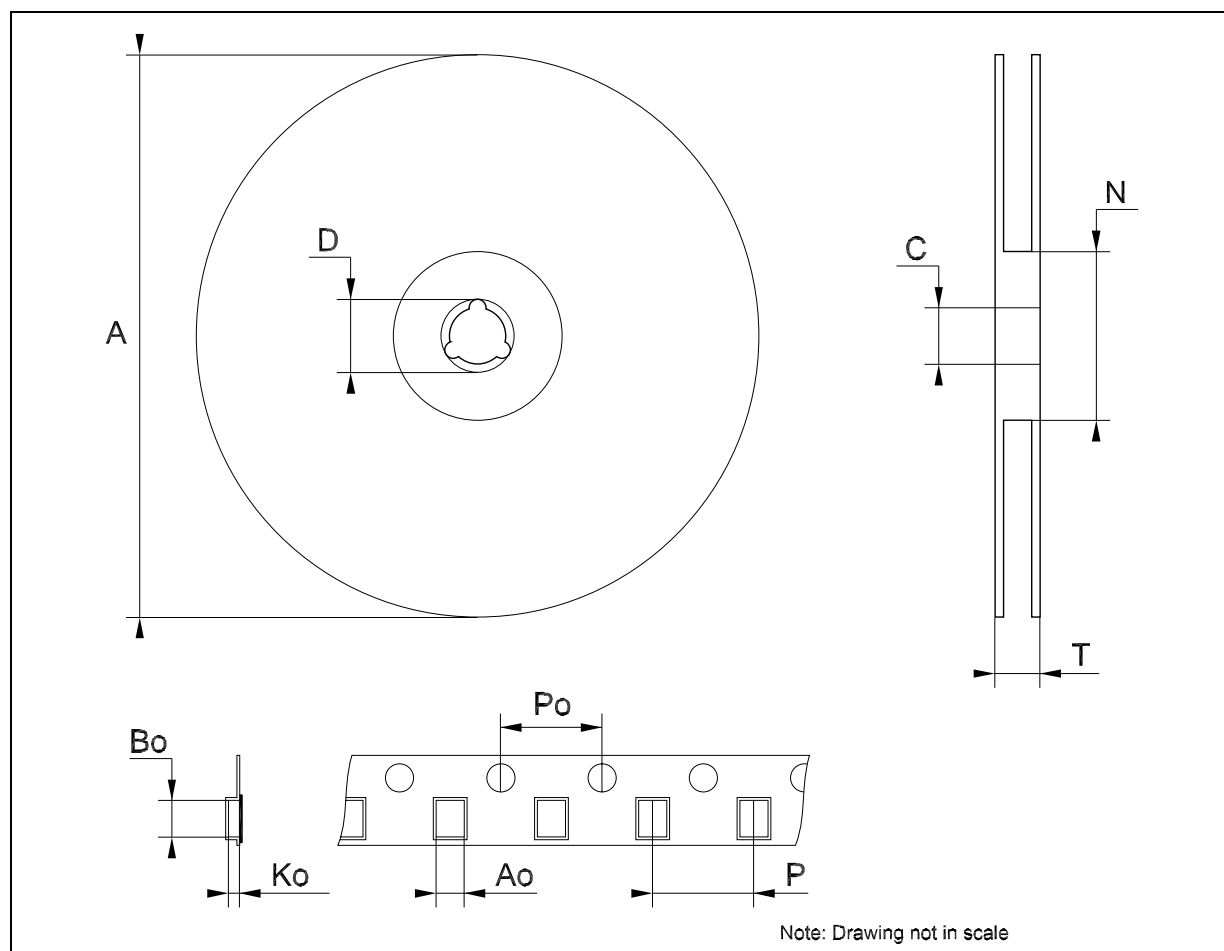
Tape & Reel SOT23-xL MECHANICAL DATA

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	0.058
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



Tape & Reel SOT323-xL MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A	175	180	185	6.889	7.086	7.283
C	12.8	13	13.2	0.504	0.512	0.519
D	20.2			0.795		
N	59.5	60	60.5		2.362	
T			14.4			0.567
Ao		2.25			0.088	
Bo		2.7			0.106	
Ko		1.2			0.047	
Po	3.98	4	4.2	0.156	0.157	0.165
P	3.98	4	4.2	0.156	0.157	0.165



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