74V1T66

SINGLE BILATERAL SWITCH

- HIGH SPEED:
  t_{PD} = 0.3ns (TYP.) at V_{CC} = 5V
- LOW POWER DISSIPATION:
  I_{CC} = 1µA(MAX.) at T_A=25°C
- LOW "ON" RESISTANCE:
  R_{ON} = 6.5Ω (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

SOT23-5L

SOT323-5L

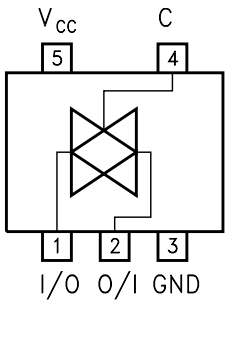
ORDER CODES

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

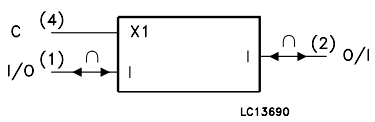
DESCRIPTION

The 74V1T66 is an advanced high-speed CMOS SINGLE BILATERAL SWITCH fabricated in silicon gate C^2MOS 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) 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.

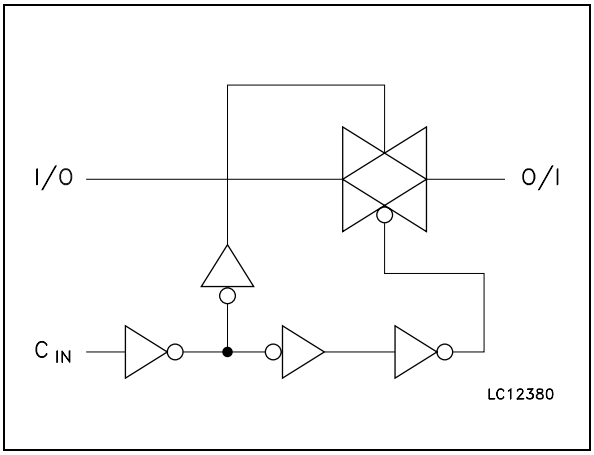
PIN CONNECTION AND IEC LOGIC SYMBOLS



SC12320



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 $I_{I/O} \leq 1mA$		7.5	10		12		14	V
R_{ON}	ON Resistance	5.0(*)	$V_{IC} = V_{IH}$ $V_{I/O} = V_{CC}$ or GND $I_{I/O} \leq 1mA$		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

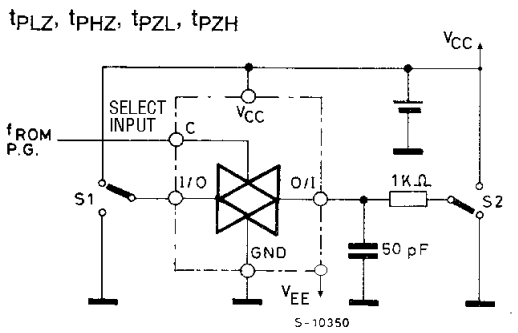
1) C_{PD} is defined as the value of the IC's internal equivalent capacitance which is calculated from the operating current consumption without load. (Refer to Test Circuit). Average operating current can be obtained by the following equation. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}$

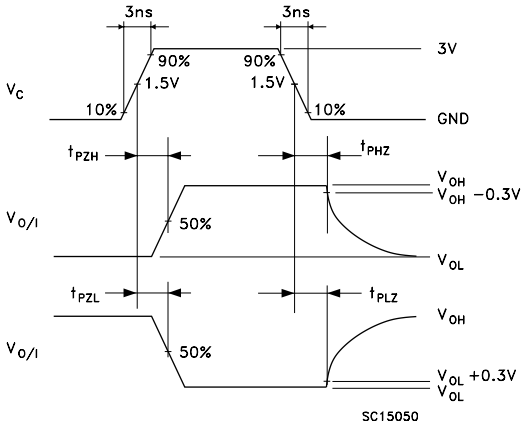
ANALOG SWITCH CHARACTERISTICS (GND = 0V; T_A = 25°C)

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 KHz R_L = 10 KΩ, C_L = 50 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 = 50Ω, C_L = 10 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 = 600Ω, C_L = 50 pF, f_{IN} = 1KHz sine wave		-60	dB
	Crosstalk (Control Input to Signal Output)	5.0(*)	R_L = 600Ω, C_L = 50 pF, f_{IN} = 1KHz square wave $t_r = t_f$ = 6ns		60	mV

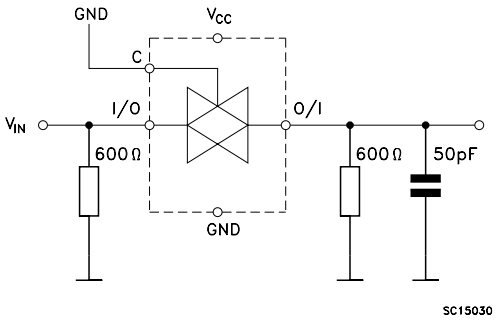
(*) Voltage range is 5.0V ± 0.5V

SWITCHING CARACTERISTICS TEST CIRCUIT

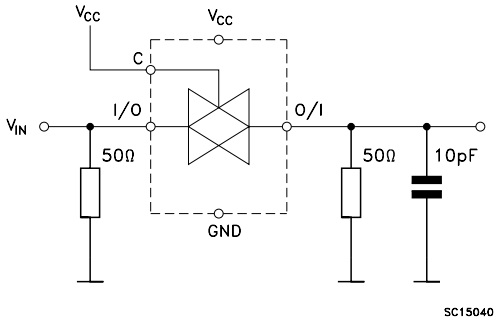




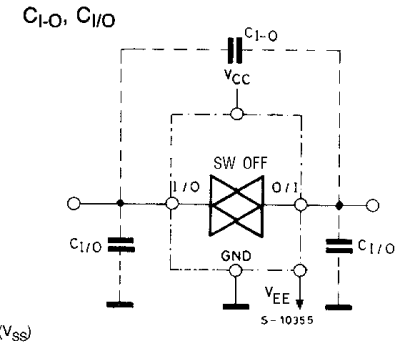
FEEDTHROUGH ATTENUATION

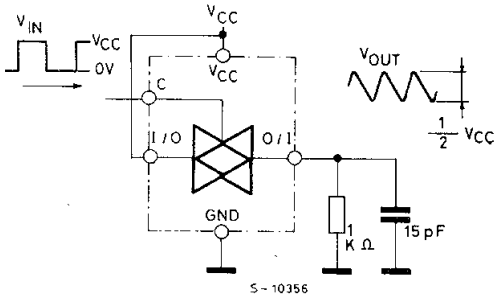


BANDWIDTH ATTENUATION

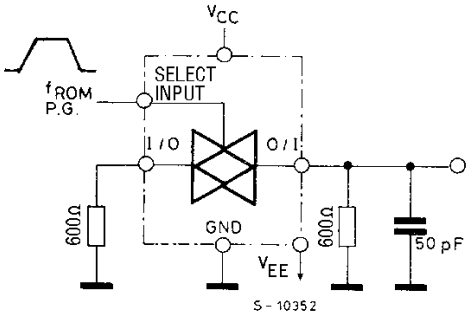


MAXIMUM CONTROL FREQUENCY

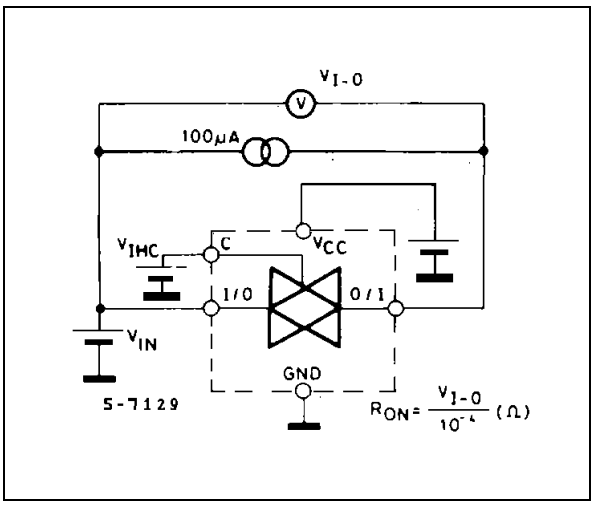




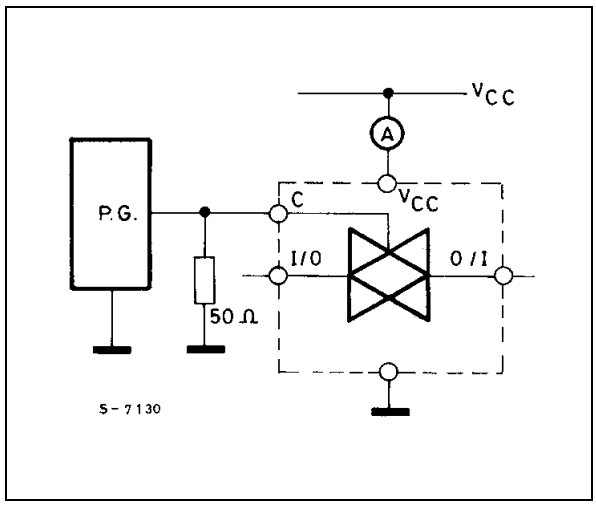
CROSSTALK (control to output



CHANNEL RESISTANCE (R_{ON})

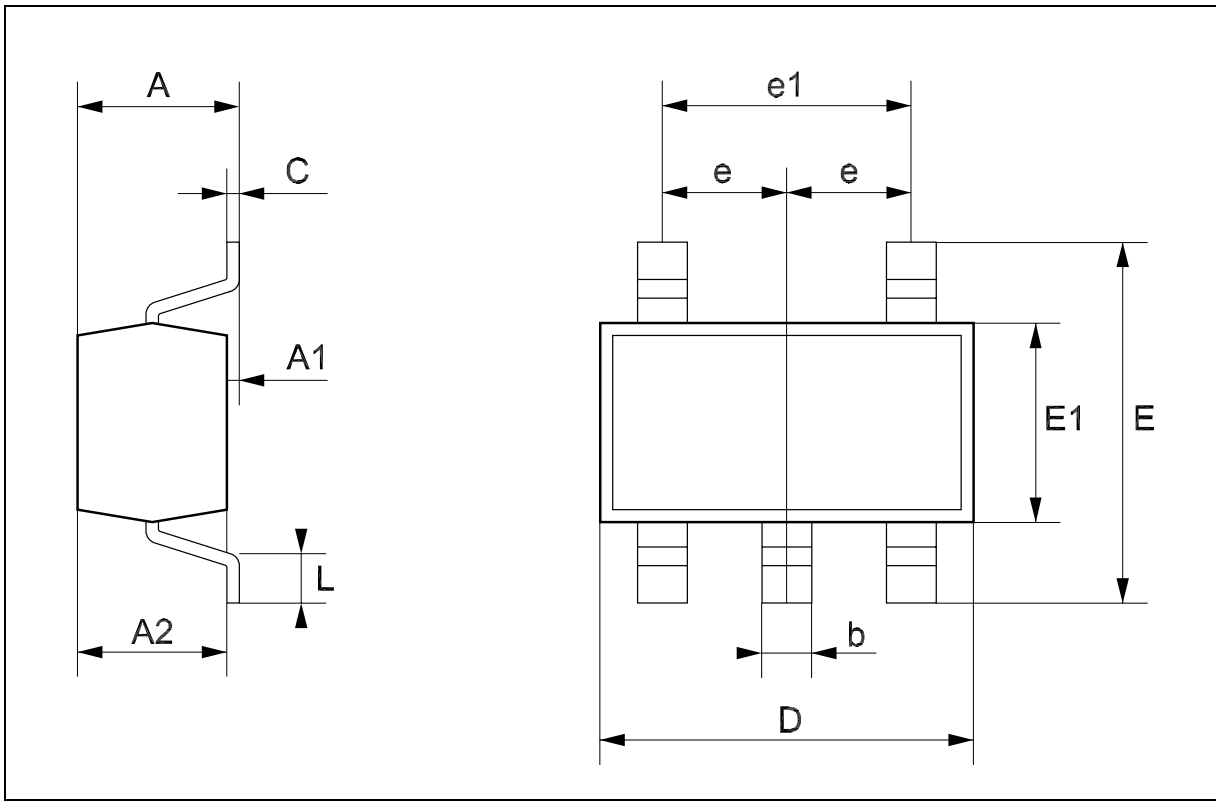


I_{CC} (Opr.)



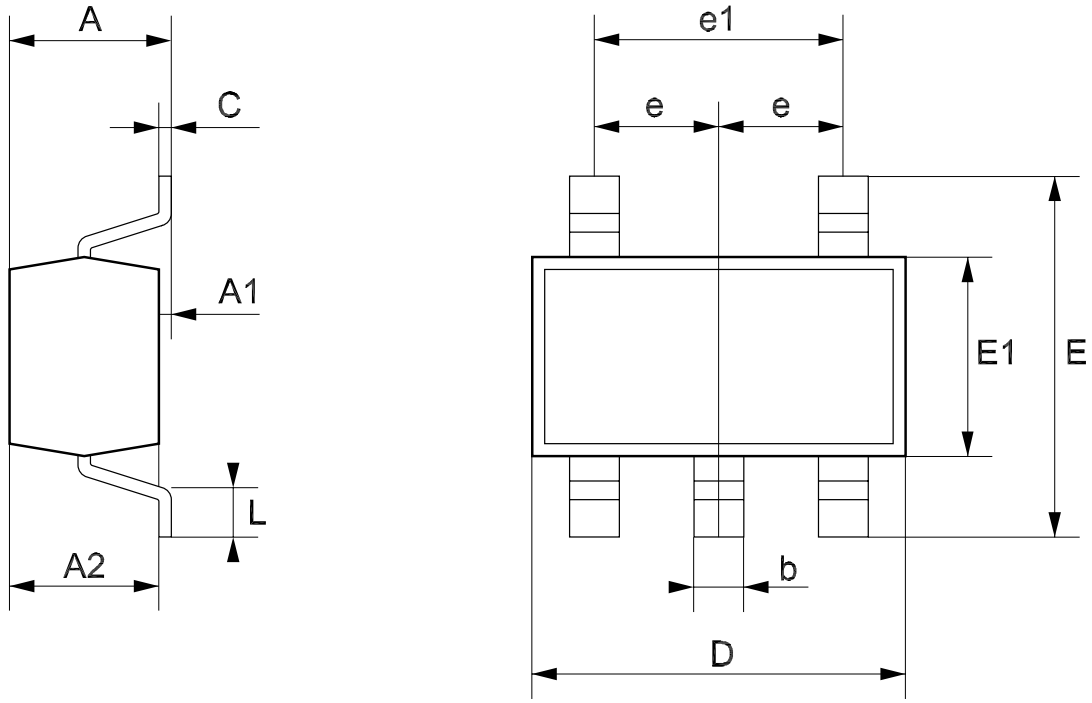
SOT23-5L MECHANICAL DATA

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
e		0.95			37.4	
e1		1.9			74.8	
L	0.35		0.55	13.7		21.6



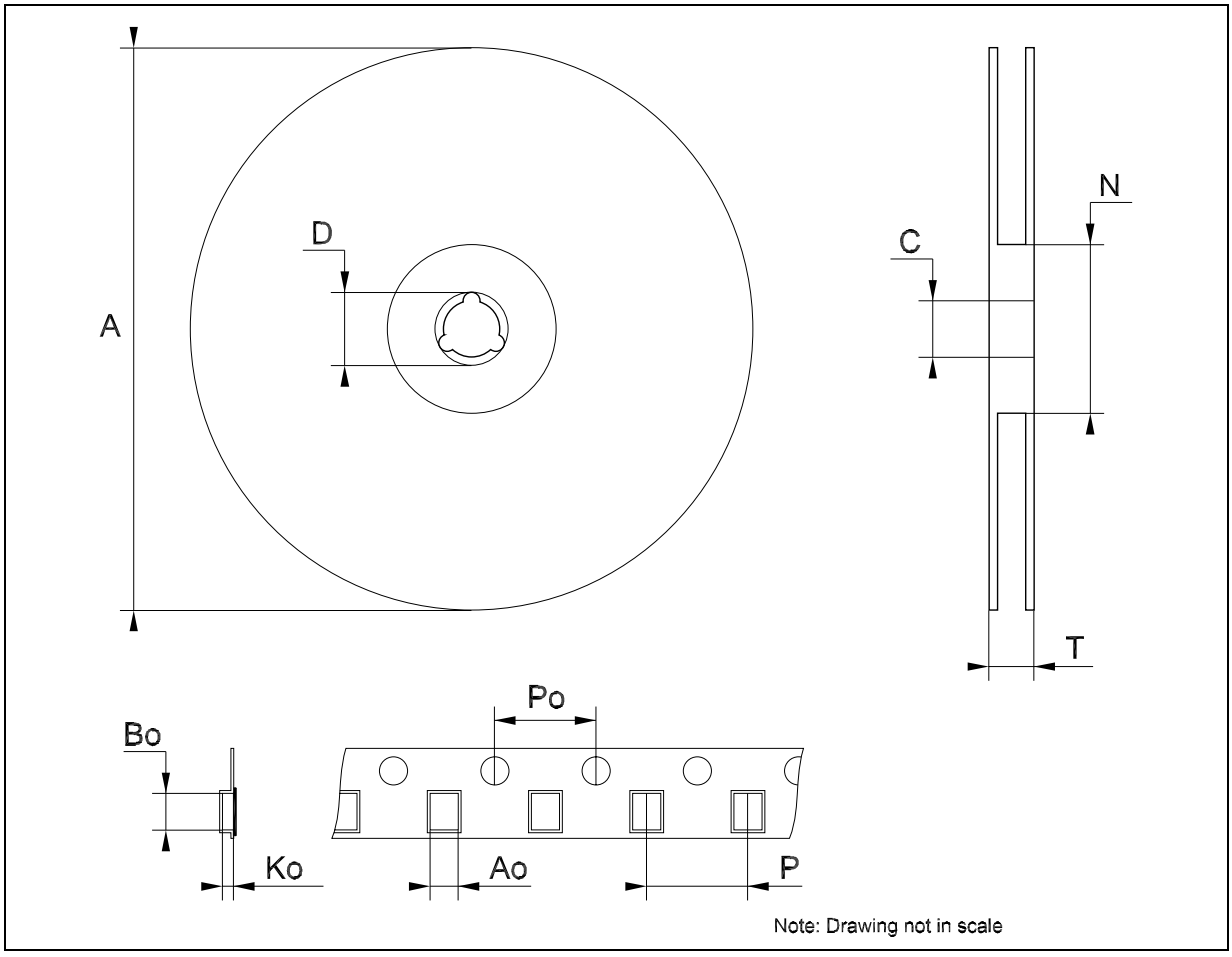
SOT323-5L MECHANICAL DATA

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	0.0.58
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