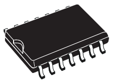
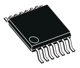
74LCX07

LOW VOLTAGE CMOS HEX BUFFER (OPEN DRAIN) WITH 5V TOLERANT INPUTS

- 5V TOLERANT INPUTS
- HIGH SPEED :
  t_{PD} = 5.2ns (MAX.) at V_{CC} = 3V
- POWER DOWN PROTECTION ON INPUTS AND OUTPUTS
- SYMMETRICAL OUTPUT IMPEDANCE:
  $|I_{OH}| = I_{OL}$ = 24mA (MIN) at V_{CC} = 3V
- PCI BUS LEVELS GUARANTEED AT 24 mA
- OPERATING VOLTAGE RANGE:
  V_{CC}(OPR) = 2.0V to 3.6V (1.5V Data Retention)
- PIN AND FUNCTION COMPATIBLE WITH 74 SERIES 07
- LATCH-UP PERFORMANCE EXCEEDS 500mA (JESD 17)
- ESD PERFORMANCE:
  HBM > 2000V (MIL STD 883 method 3015); MM > 200V



SOP



TSSOP

ORDER CODES

PACKAGE	TUBE	T & R
SOP	74LCX07M	74LCX07MTR
TSSOP		74LCX07TTR

DESCRIPTION

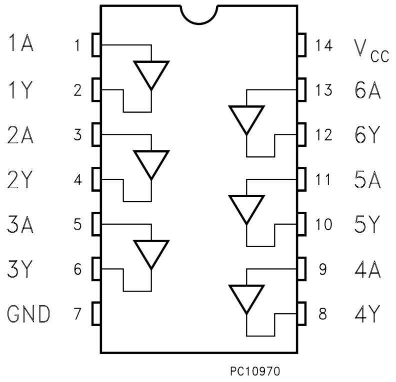
The 74LCX07 is a low voltage CMOS OPEN DRAIN HEX BUFFER fabricated with sub-micron silicon gate and double-layer metal wiring C^2MOS technology. It is ideal for low power and high speed 3.3V applications. It can be interfaced to 5V signal environment for inputs.

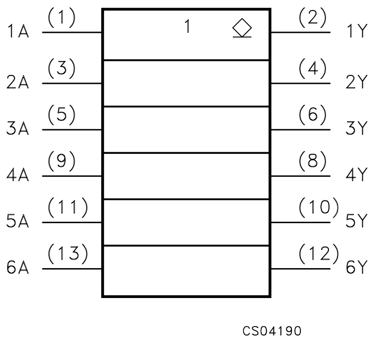
The internal circuit is composed of 2 stages including buffer output, which provides high noise immunity and stable output.

It has same speed performance at 3.3V than 5V AC/ACT family, combined with a lower power consumption.

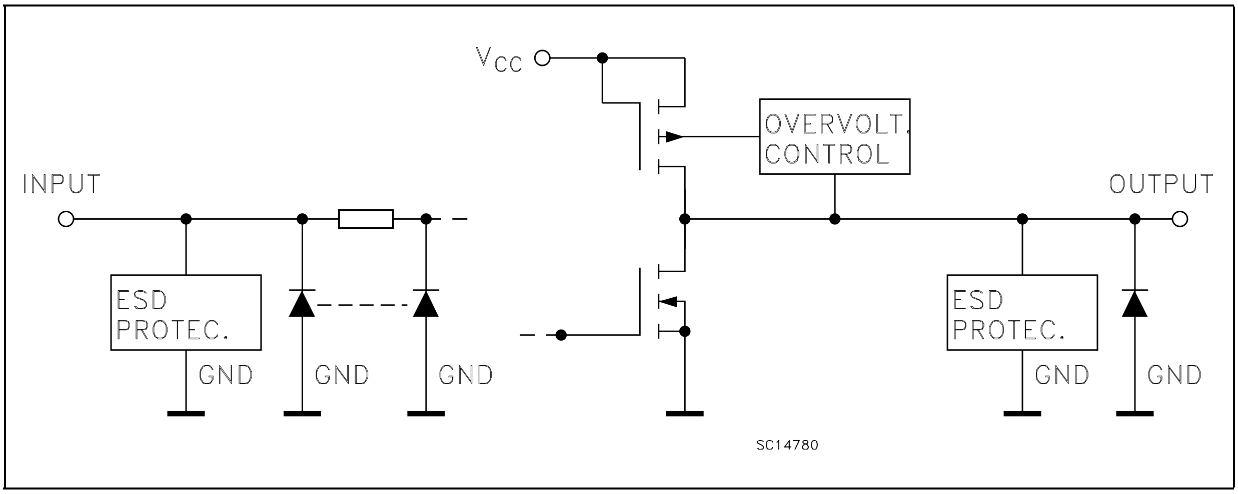
All inputs and outputs are equipped with protection circuits against static discharge, giving them 2KV ESD immunity and transient excess voltage.

PIN CONNECTION AND IEC LOGIC SYMBOLS





INPUT AND OUTPUT EQUIVALENT CIRCUIT



PIN DESCRIPTION

PIN No	SYMBOL	NAME AND FUNCTION
1, 3, 5, 9, 11, 13	1A to 6A	Data Inputs
2, 4, 6, 8, 10, 12	1Y to 6Y	Data Outputs
7	GND	Ground (0V)
14	V_{CC}	Positive Supply Voltage

TRUTH TABLE

A	Y
L	L
H	Z

Z : High Impedance

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 +7.0	V
V_O	DC Output Voltage (V_{CC} = 0V)	-0.5 to +7.0	V
V_O	DC Output Voltage (High or Low State) (note 1)	-0.5 to V_{CC} + 0.5	V
I_{IK}	DC Input Diode Current	- 50	mA
I_{OK}	DC Output Diode Current (note 2)	- 50	mA
I_O	DC Output Current	± 50	mA
I_{CC}	DC Supply Current per Supply Pin	± 100	mA
I_{GND}	DC Ground Current per Supply Pin	± 100	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

1) I_O absolute maximum rating must be observed

2) V_O < GND

RECOMMENDED OPERATING CONDITIONS

Symbol	Parameter	Value	Unit
V_{CC}	Supply Voltage (note 1)	2.0 to 3.6	V
V_I	Input Voltage	0 to 5.5	V
V_O	Output Voltage (V_{CC} = 0V)	0 to 5.5	V
V_O	Output Voltage (High or Low State)	0 to V_{CC}	V
I_{OH}, I_{OL}	High or Low Level Output Current (V_{CC} = 3.0 to 3.6V)	± 24	mA
I_{OH}, I_{OL}	High or Low Level Output Current (V_{CC} = 2.7V)	± 12	mA
T_{op}	Operating Temperature	-55 to 125	°C
dt/dv	Input Rise and Fall Time (note 2)	0 to 10	ns/V

1) Truth Table guaranteed: 1.5V to 3.6V
2) V_{IN} from 0.8V to 2V at V_{CC} = 3.0V

DC SPECIFICATIONS

Symbol	Parameter	Test Condition		Value				Unit
		V_{CC} (V)		-40 to 85 °C		-55 to 125 °C		
				Min.	Max.	Min.	Max.	
V_{IH}	High Level Input Voltage	2.7 to 3.6		2.0		2.0		V
V_{IL}	Low Level Input Voltage				0.8		0.8	V
V_{OL}	Low Level Output Voltage	2.7 to 3.6	I_O=100 µA		0.2		0.2	V
		2.7	I_O=12 mA		0.4		0.4	
		3.0	I_O=16 mA		0.4		0.4	
			I_O=24 mA		0.55		0.55	
I_I	Input Leakage Current	2.7 to 3.6	V_I = 0 to 5.5V		± 5		± 5	µA
I_{off}	Power Off Leakage Current	0	V_I or V_O = 5.5V		10		10	µA
I_{OZ}	High Impedance Output Leakage Current	2.7 to 3.6	V_I = V_{IH} or V_{IL} V_O = 0 to V_{CC}		± 5		± 5	µA
I_{CC}	Quiescent Supply Current	2.7 to 3.6	V_I = V_{CC} or GND		10		10	µA
			V_I or V_O= 3.6 to 5.5V		± 10		± 10	
ΔI_{CC}	I_{CC} incr. per Input	2.7 to 3.6	V_{IH} = V_{CC} - 0.6V		500		500	µA

DYNAMIC SWITCHING CHARACTERISTICS

Symbol	Parameter	Test Condition		Value			Unit
		V_{CC} (V)		T_A = 25 °C			
				Min.	Typ.	Max.	
V_{OLP}	Dynamic Low Level Quiet Output (note 1)	3.3	V_{IL} = 0V V_{IH} = 3.3V		0.8		V
V_{OLV}					-0.8		

1) Number of outputs defined as "n". Measured with "n-1" outputs switching from HIGH to LOW or LOW to HIGH. The remaining output is measured in the LOW state.

AC ELECTRICAL CHARACTERISTICS

Symbol	Parameter	Test Condition				Value				Unit
		V_{CC} (V)	C_L (pF)	R_L (Ω)	$t_s = t_r$ (ns)	-40 to 85 °C		-55 to 125 °C		
						Min.	Max.	Min.	Max.	
t_{PLZ}	Propagation Delay Time	2.7	50	500	2.5		7.0		7.0	ns
		3.0 to 3.6				1.0	5.2	1.0	5.2	
t_{PZL}	Propagation Delay Time	2.7	50	500	2.5		7.0		7.0	ns
		3.0 to 3.6				1.0	5.2	1.0	5.2	
t_{OSLH} t_{OSHL}	Output To Output Skew Time (note1, 2)	3.0 to 3.6	50	500	2.5		1.0		1.0	ns

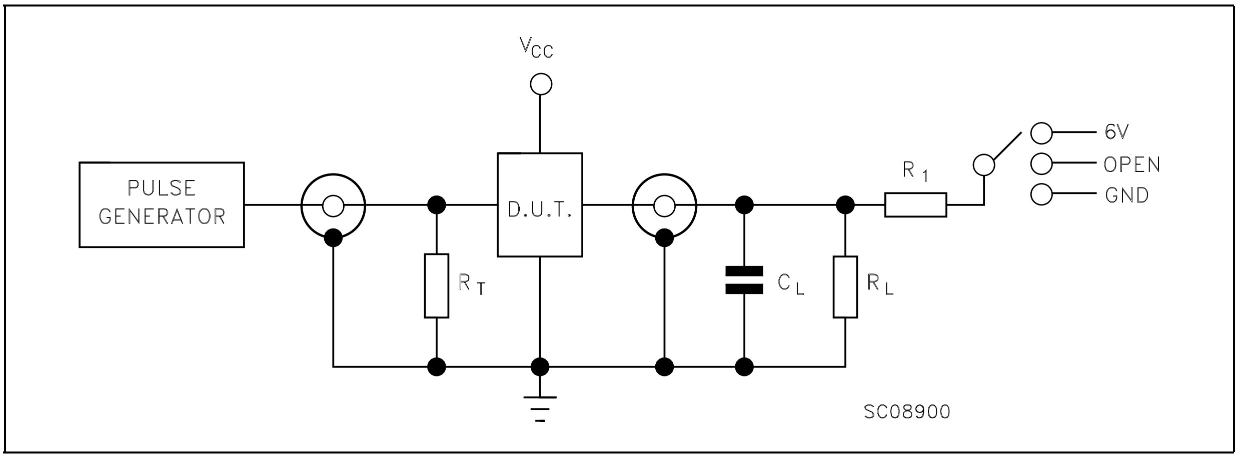
1) Skew is defined as the absolute value of the difference between the actual propagation delay for any two outputs of the same device switching in the same direction, either HIGH or LOW ($t_{OSLH} = | t_{PLHm} - t_{PLHn}|$, $t_{OSHL} = | t_{PHLm} - t_{PHLn}|$)
2) Parameter guaranteed by design

CAPACITIVE CHARACTERISTICS

Symbol	Parameter	Test Condition		Value			Unit
		V_{CC} (V)		T_A = 25 °C			
				Min.	Typ.	Max.	
C_{IN}	Input Capacitance	3.3	V_{IN} = 0 to V_{CC}		6		pF
C_{OUT}	Output Capacitance	3.3	V_{IN} = 0 to V_{CC}		14		pF
C_{PD}	Power Dissipation Capacitance (note 1)	3.3	f_{IN} = 10MHz V_{IN} = 0 or V_{CC}		4.3		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. $I_{CC(opr)} = C_{PD} \times V_{CC} \times f_{IN} + I_{CC}/6$ (per gate)

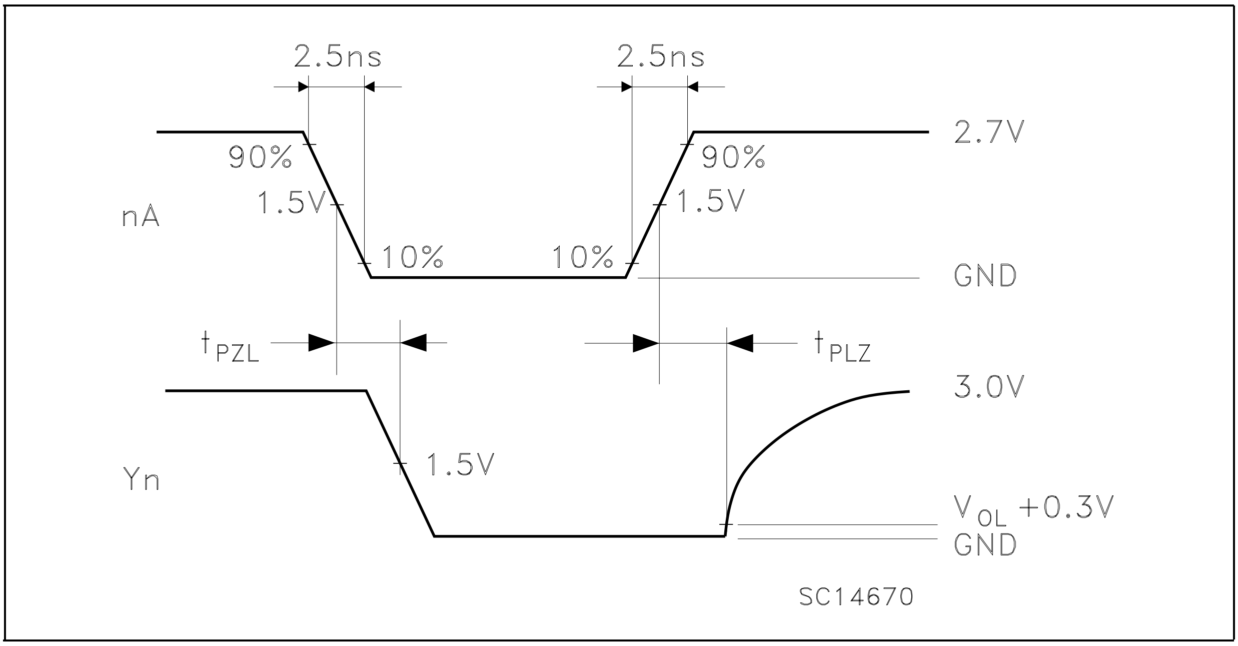
TEST CIRCUIT



TEST	SWITCH
t_{PLH}, t_{PHL}	Open
t_{PZL}, t_{PLZ}	6V
t_{PZH}, t_{PHZ}	GND

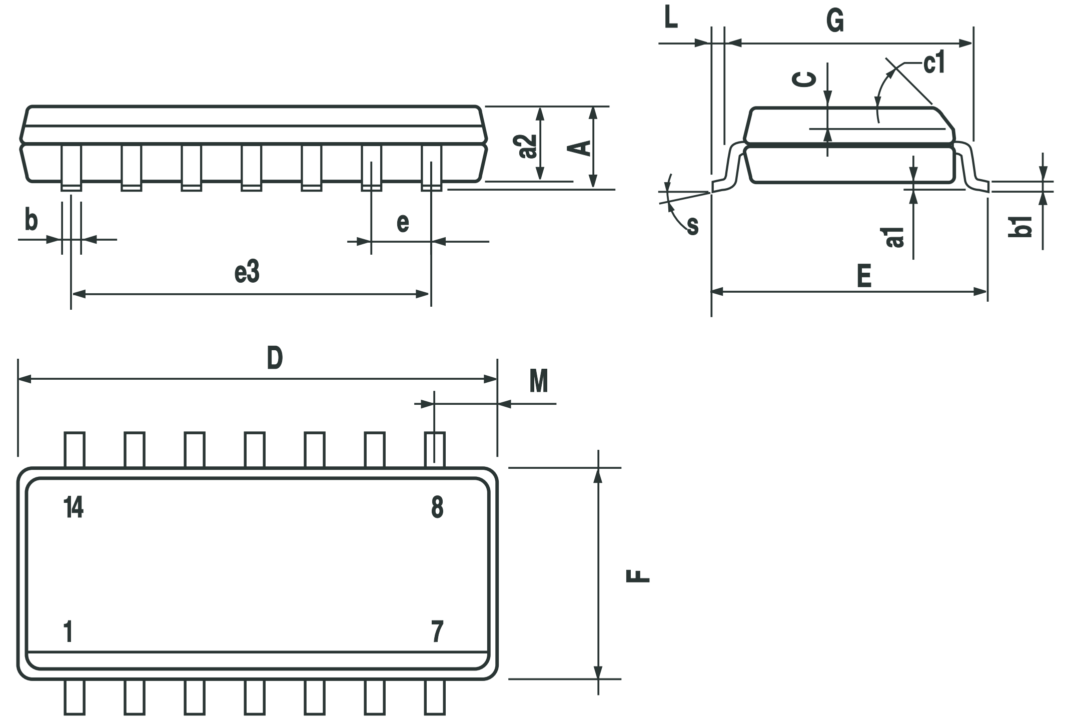
C_L = 50 pF or equivalent (includes jig and probe capacitance)
R_L = R1 = 500Ω or equivalent
R_T = Z_{OUT} of pulse generator (typically 50Ω)

WAVEFORM : PROPAGATION DELAY (f=1MHz; 50% duty cycle)



SO-14 MECHANICAL DATA

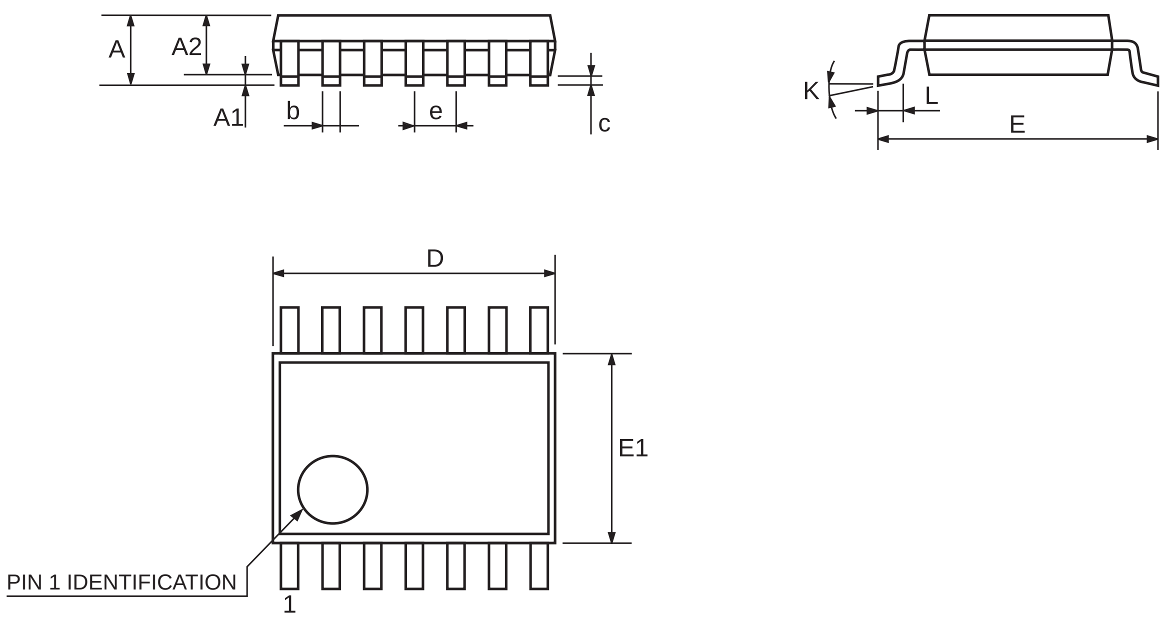
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.003		0.007
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	8.55		8.75	0.336		0.344
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		7.62			0.300	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.68			0.026
S	8° (max.)					



PO13G

TSSOP14 MECHANICAL DATA

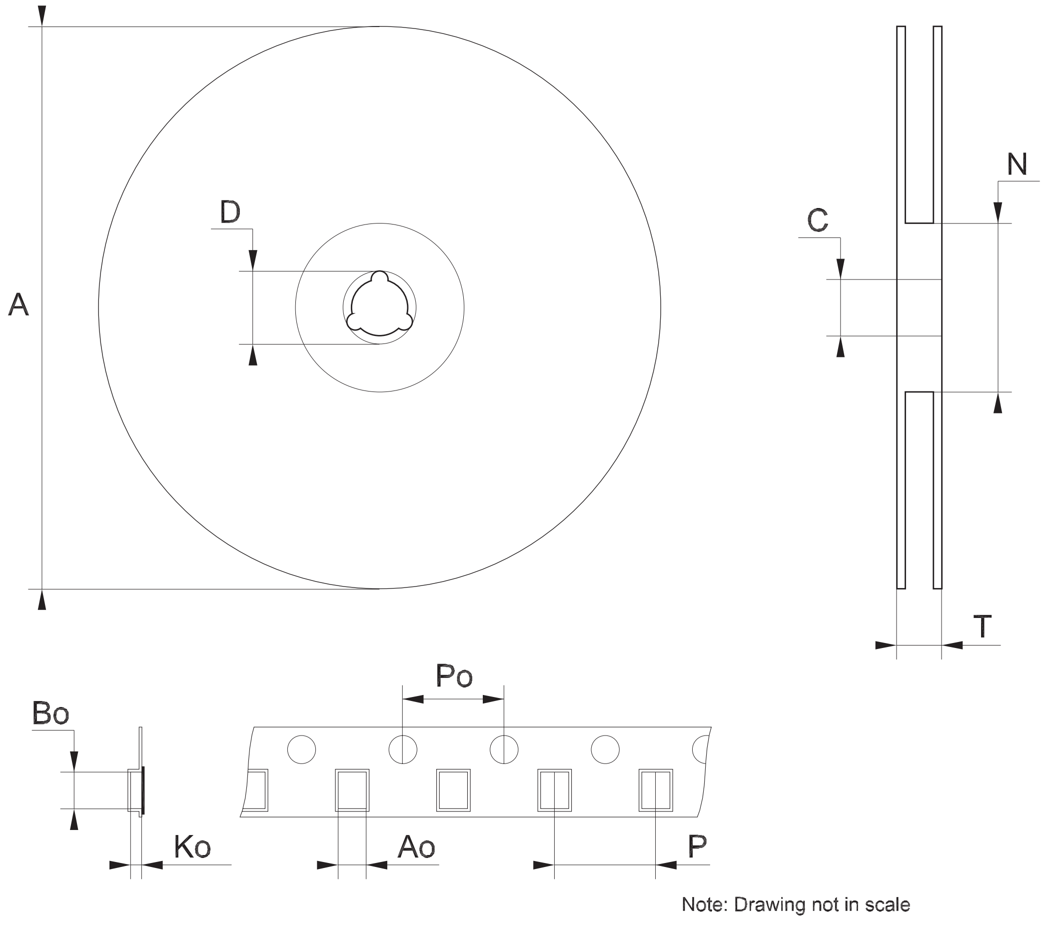
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0089
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



0080337D

Tape & Reel SO-14 MECHANICAL DATA

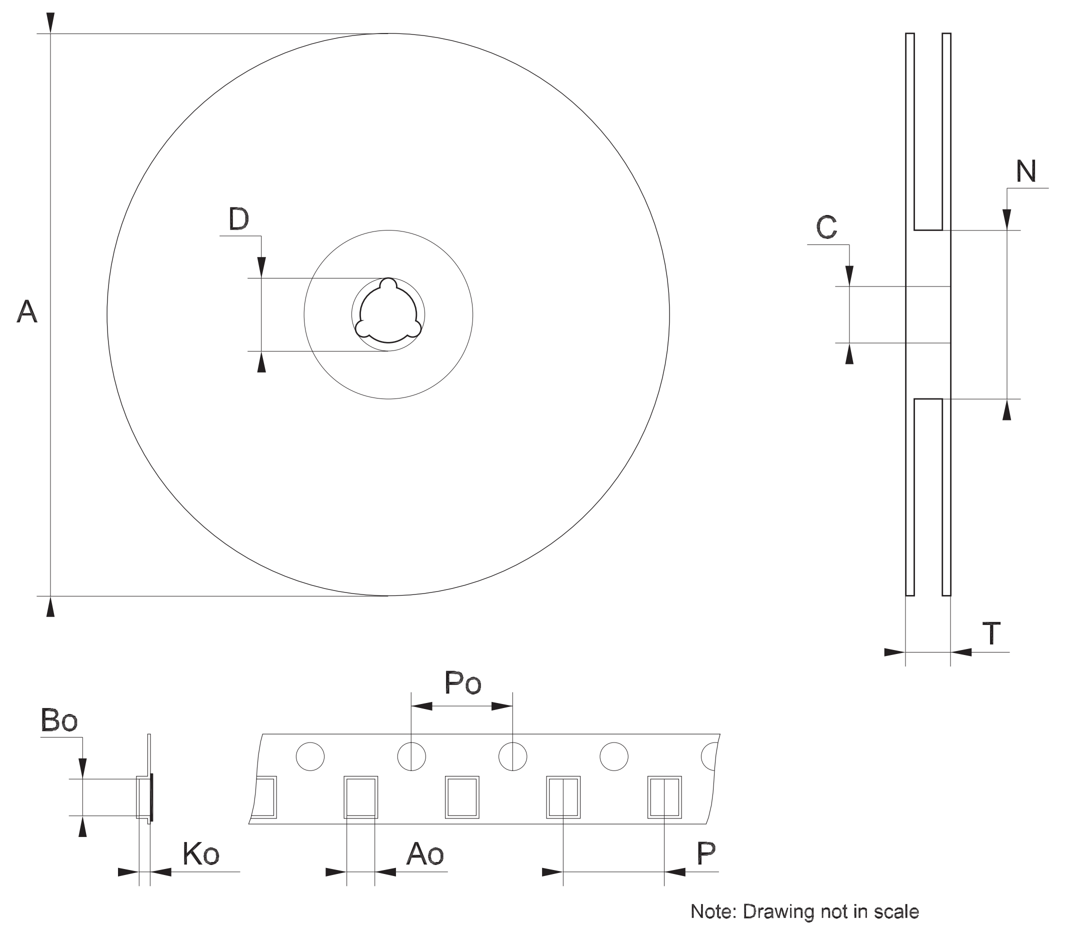
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.4		6.6	0.252		0.260
Bo	9		9.2	0.354		0.362
Ko	2.1		2.3	0.082		0.090
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

Tape & Reel TSSOP14 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			330			12.992
C	12.8		13.2	0.504		0.519
D	20.2			0.795		
N	60			2.362		
T			22.4			0.882
Ao	6.7		6.9	0.264		0.272
Bo	5.3		5.5	0.209		0.217
Ko	1.6		1.8	0.063		0.071
Po	3.9		4.1	0.153		0.161
P	7.9		8.1	0.311		0.319



Note: Drawing not in scale

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