

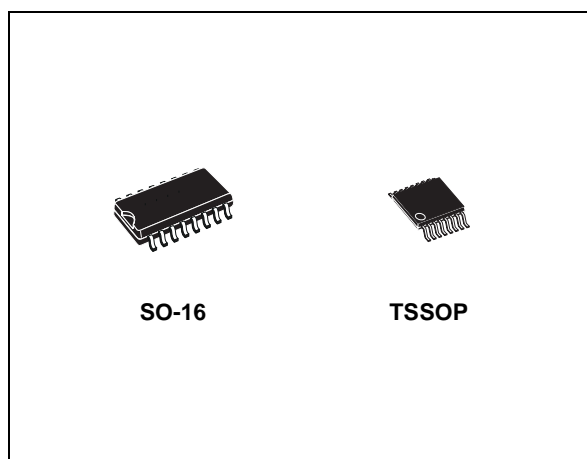


## 3V LVDS QUAD CMOS DIFFERENTIAL LINE DRIVER

- >400 MBPS (200MHZ) SWITCHING RATES
- FLOW-THROUGH PINOUT SIMPLIFIES PCB LAYOUT
- 300ps (MAX.) DIFFERENTIAL SKEW
- 1.8 ns (TYP.) PROPAGATION DELAY
- 3.3V POWER SUPPLY DESIGN
- $\pm 350$  mV DIFFERENTIAL SIGNALING
- LOW POWER DISSIPATION (3.5mW AT 3.3V STATIC IN TRISTATE)
- INTEROPERABLE WITH EXISTING 5V LVDS RECEIVERS
- HIGH IMPEDANCE ON LVDS OUTPUT ON POWER DOWN
- CONFORMS TO TIA/EIA-644 LVDS STANDARD
- INDUSTRIAL OPERATING TEMPERATURE RANGE (-40 °C TO +85 °C)
- AVAILABLE IN SURFACE MOUNT (SOIC) AND LOW PROFILE TSSOP PACKAGE

### DESCRIPTION

The STLVDS47 is a quad CMOS flow-through differential line driver designed for applications requiring ultra low power dissipation and high data rate. The device is designed to support data rates in excess of 400Mbps (200 MHz) utilizing Low Voltage Differential Signaling (LVDS) technology. The STLVDS47 accepts low voltage TTL/CMOS input levels and translates them to low voltage



(350 mV) differential output signals. In addition, the driver support a TRI-STATE function that may be used to disable the output stage, disabling the load current, and thus dropping the device to an ultra low idle power state of 1.3mW typical. The STLVDS47 has a flow-through pinout for easy PCB layout.

The EN and EN\* inputs are ANDed together and control the TRI-STATE output.

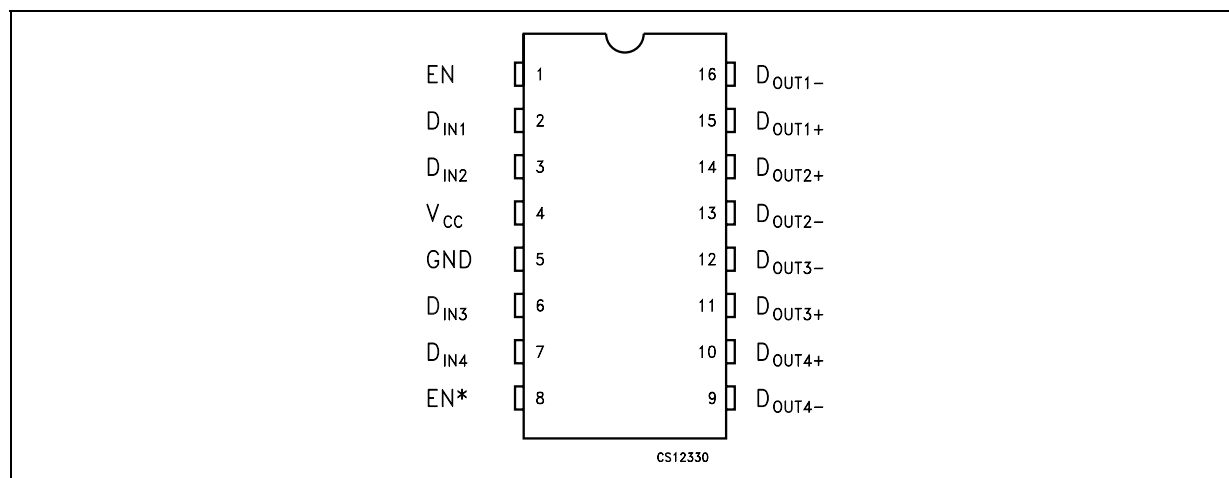
The STLVDS47 and companion line receiver (STLVDS48) provide a new alternative to high power pseudo-ECL devices for high-speed point-to-point interface applications.

### ORDERING CODES

Type	Temperature Range	Package	Comments
STLVDS47BD	-40 to 85 °C	SO-16 (Tube)	50 parts per tube / 20 tube per box
STLVDS47BDR	-40 to 85 °C	SO-16 (Tape & Reel)	2500 parts per reel
STLVDS47BTR	-40 to 85 °C	TSSOP-16 (Tape & Reel)	2500 parts per reel

## STLVDS47

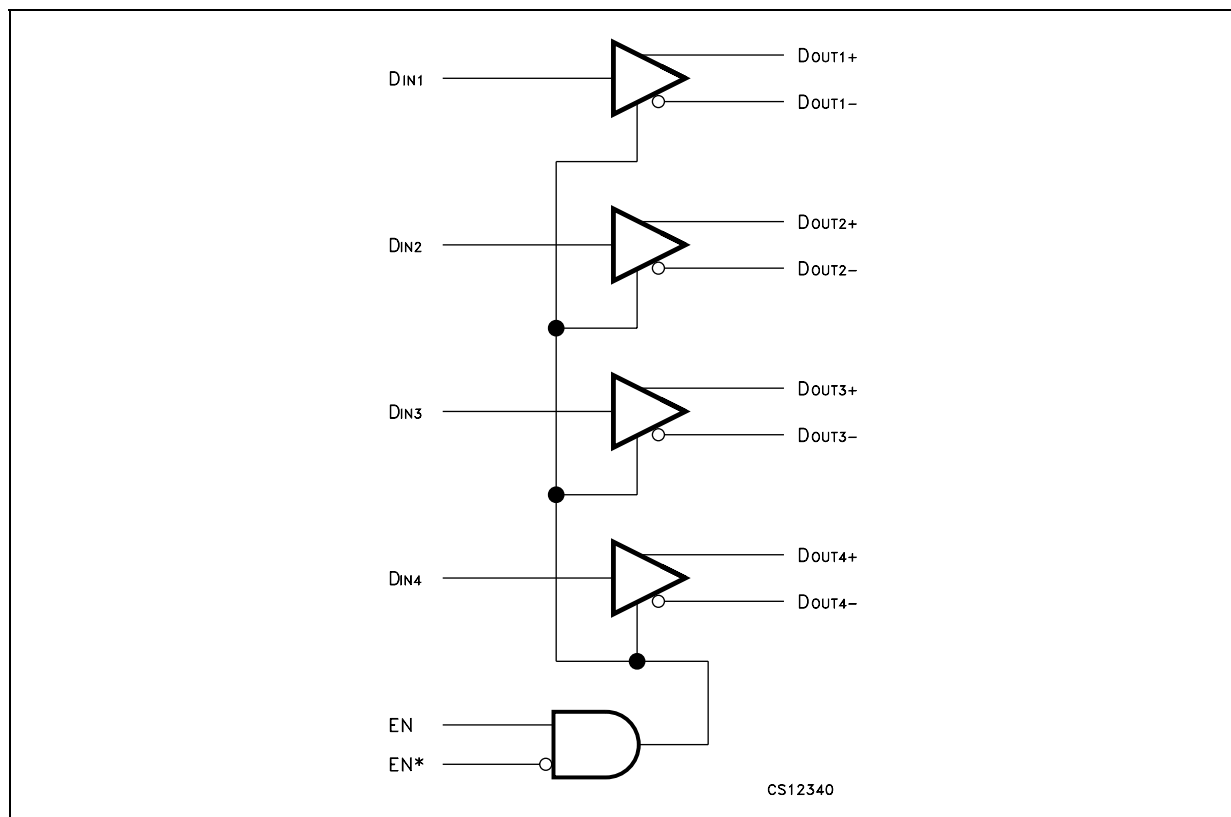
### PIN CONFIGURATION



### PIN DESCRIPTION

PIN N°	SYMBOL	NAME AND FUNCTION
1	EN	Enable
2	D <sub>IN1</sub>	First Driver Input
3	D <sub>IN2</sub>	Second Driver Input
4	V <sub>CC</sub>	Supply Voltage
5	GND	GROUND
6	D <sub>IN3</sub>	Third Driver Input
7	D <sub>IN4</sub>	Fourth Driver Input
8	EN*	Enable (inverting)
9	D <sub>OUT4-</sub>	Fourth Driver Inverting Output
10	D <sub>OUT4+</sub>	Fourth Driver non-Inverting Output
11	D <sub>OUT3+</sub>	Third Driver non-Inverting Output
12	D <sub>OUT3-</sub>	Third Driver Inverting Output
13	D <sub>OUT2-</sub>	Second Driver Inverting Output
14	D <sub>OUT2+</sub>	Second Driver non-Inverting Output
15	D <sub>OUT1+</sub>	First Driver non-Inverting Output
16	D <sub>OUT1-</sub>	First Driver Inverting Output

## FUNCTIONAL DIAGRAM



## ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	-0.3 to 4	V
$D_{IN}$	Input Voltage	-0.3 to 6	V
EN, EN*	Enable Input Voltage	-0.3 to 6	V
$D_{OUT+}, D_{OUT-}$	Output Voltage	-0.3 to 3.9	V
$I_{SCTOUT}$	Short Circuit Duration	Continuous	
$T_{stg}$	Storage Temperature Range	-65 to +150	°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	Min	TYP	Max	Unit
$V_{CC}$	Supply Voltage	3	3.3	3.6	V
$V_{IH}$	High-Level Input Voltage	2			V
$V_{IL}$	Low-Level Input Voltage			0.8	V
$T_A$	Operating Free-Air Temperature	-40		85	°C

**ELECTRICAL CHARACTERISTICS** (Typical values are at  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V} \pm 10\%$ ,  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise specified). (Note 1, 2)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
$V_{OD1}$	Differential Output Voltage	$R_L = 100\ \Omega$	247	350	454	mV
$\Delta V_{OD1}$	Change in Magnitude of $V_{OD1}$ for Complementary Output States		-35		35	mV
$V_{OC}$	Offset Voltage		1.125	1.2	1.375	V
$\Delta V_{OC}$	Change in Magnitude of $V_{OS}$ for Complementary Output States		-25		25	mV
$I_{IH}$	Input High Current	$V_{IN} = 2\text{V}$			20	$\mu\text{A}$
$I_{IL}$	Input Low Current	$V_{IN} = 0.8\text{V}$			10	$\mu\text{A}$
$I_{OS}$	Output Short Circuit Current (Note 3)	ENABLED, $D_{IN} = V_{CC}$ , $D_{OUT+} = 0\text{V}$ or $D_{IN} = \text{GND}$ , $D_{OUT-} = 0\text{V}$		6	10	mA
$I_{OSD}$	Differential Output Short Circuit (Note 3)	ENABLED, $V_{OD} = 0\text{V}$		3	10	mA
$I_{OFF}$	Power-off Leakage	$V_{OUT} = 0\text{V}$ or $3.6\text{V}$ , $V_{CC} = 0\text{V}$ or Open			$\pm 1$	$\mu\text{A}$
$I_{OZ}$	Output TRI-STATE Current	$EN = 0.8\text{V}$ and $EN^* = 2\text{V}$ $V_{OUT} = 0\text{V}$ or $V_{CC}$			$\pm 1$	$\mu\text{A}$
$I_{CCL}$	Loaded Supply Current Drivers Enabled	$R_L = 100\ \Omega$ All Channels, $D_{IN} = V_{CC}$ or GND (all inputs)		18	26	mA
$I_{CCZ}$	No Load Supply Current Drivers Disabled	$D_{IN} = V_{CC}$ or GND, $EN = \text{GND}$ , $EN^* = V_{CC}$		0.4	1	mA

NOTE 1: Current into device pins is defined as positive. Current out of device pins as negative. All voltage are reference to ground except:  $V_{OD1}$  and  $\Delta V_{OD1}$ .

NOTE 2: The STLVD47 is a current mode device and only functions within datasheet specifications when a resistive load is applied to the driver outputs typical range is (90  $\Omega$  to 110  $\Omega$ ).

NOTE 3: Output short circuit current ( $I_{OS}$ ) is specified as magnitude only, minus sign indicates direction only.

**SWITCHING CHARACTERISTICS** (Typical values are at  $T_A = 25^\circ\text{C}$ ,  $V_{CC} = 3.3\text{V} \pm 10\%$ ,  $T_A = -40$  to  $85^\circ\text{C}$ , unless otherwise specified). (Note 1, 2)

Symbol	Parameter	Test Conditions	Value			Unit
			Min.	Typ.	Max.	
$t_{PLH}$	Propagation Delay Time Low-to-High-Level output	$R_L = 100\ \Omega$ , $C_L = 5\ \text{pF}$	1.6	1.8	2.7	ns
$t_{PHL}$	Propagation Delay Time High-to-Low-Level output		1.6	1.8	2.7	ns
$t_r$	Differential Output signal rise time			0.5	1	ns
$t_f$	Differential Output signal fall time			0.5	1	ns
$t_{SK(p)}$	Pulse Skew ( $ t_{PHL} - t_{PLH} $ )			100	300	ps
$t_{SK(o)}$	Channel-to-Channel Output Skew (Note 1)			100	300	ps
$t_{SK(pp)}$	Part-to-Part Skew (Note 2)				1	ns
$t_{PZH}$	Propagation Delay Time, high-impedance-to-high-level output			5.4	10	ns
$t_{PZL}$	Propagation Delay Time, high-impedance-to-low-level output			7.4	12	ns
$t_{PHZ}$	Propagation Delay Time, high-level-to-high-impedance output			3.5	6	ns
$t_{PLZ}$	Propagation Delay Time, low-level-to-high-impedance output			3.9	6	ns
$f_{MAX}$	Maximum Operating Frequency			250		MHz

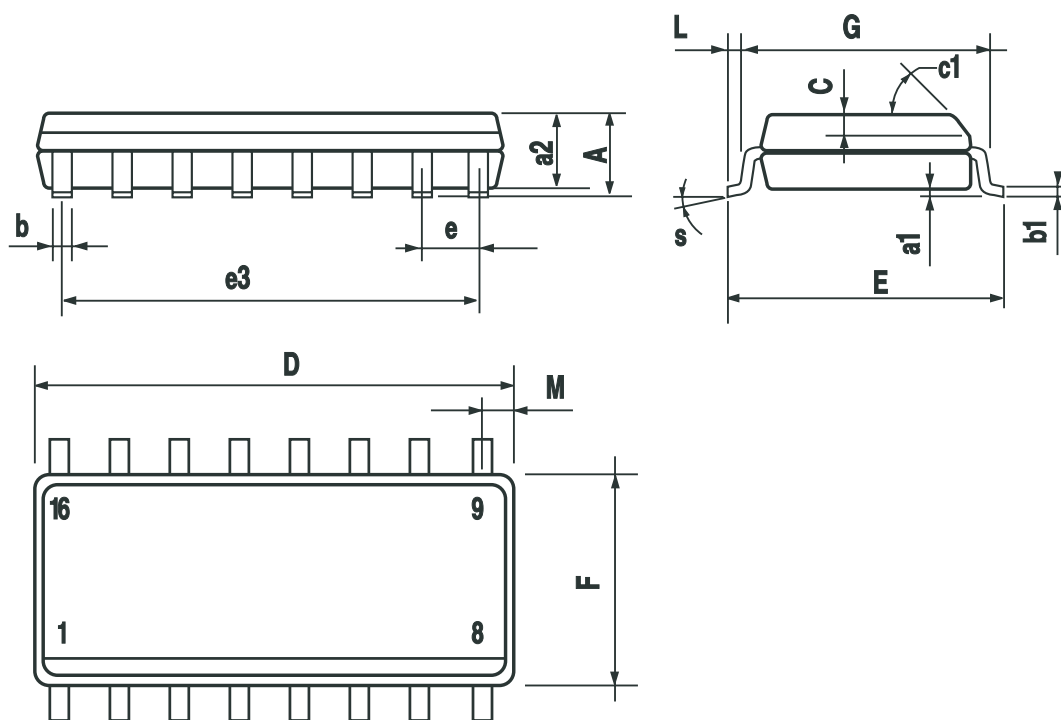
NOTE 1:  $C_L$  includes probe and jig capacitance.

NOTE 2:  $t_{SK(o)}$  is the magnitude of the time difference between the  $t_{PLH}$  or  $t_{PHL}$  of all drivers of a single device with all of their inputs connected together.

NOTE 3:  $t_{SK(pp)}$  is the magnitude of the difference in propagation delay times between any specified terminals of two devices when both devices operate with same supply voltage, at the same temperature, and have identical packages and test circuits.

## SO-16 MECHANICAL DATA

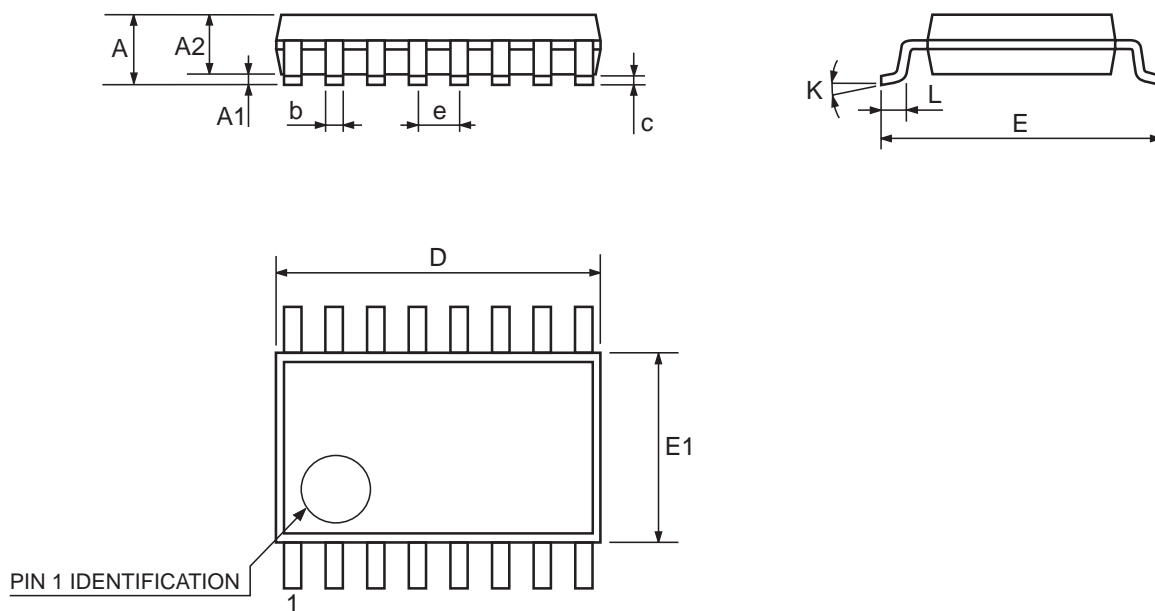
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.75			0.068
a1	0.1		0.2	0.004		0.008
a2			1.65			0.064
b	0.35		0.46	0.013		0.018
b1	0.19		0.25	0.007		0.010
C		0.5			0.019	
c1	45° (typ.)					
D	9.8		10	0.385		0.393
E	5.8		6.2	0.228		0.244
e		1.27			0.050	
e3		8.89			0.350	
F	3.8		4.0	0.149		0.157
G	4.6		5.3	0.181		0.208
L	0.5		1.27	0.019		0.050
M			0.62			0.024
S	8° (max.)					



PO13H

## TSSOP16 MECHANICAL DATA

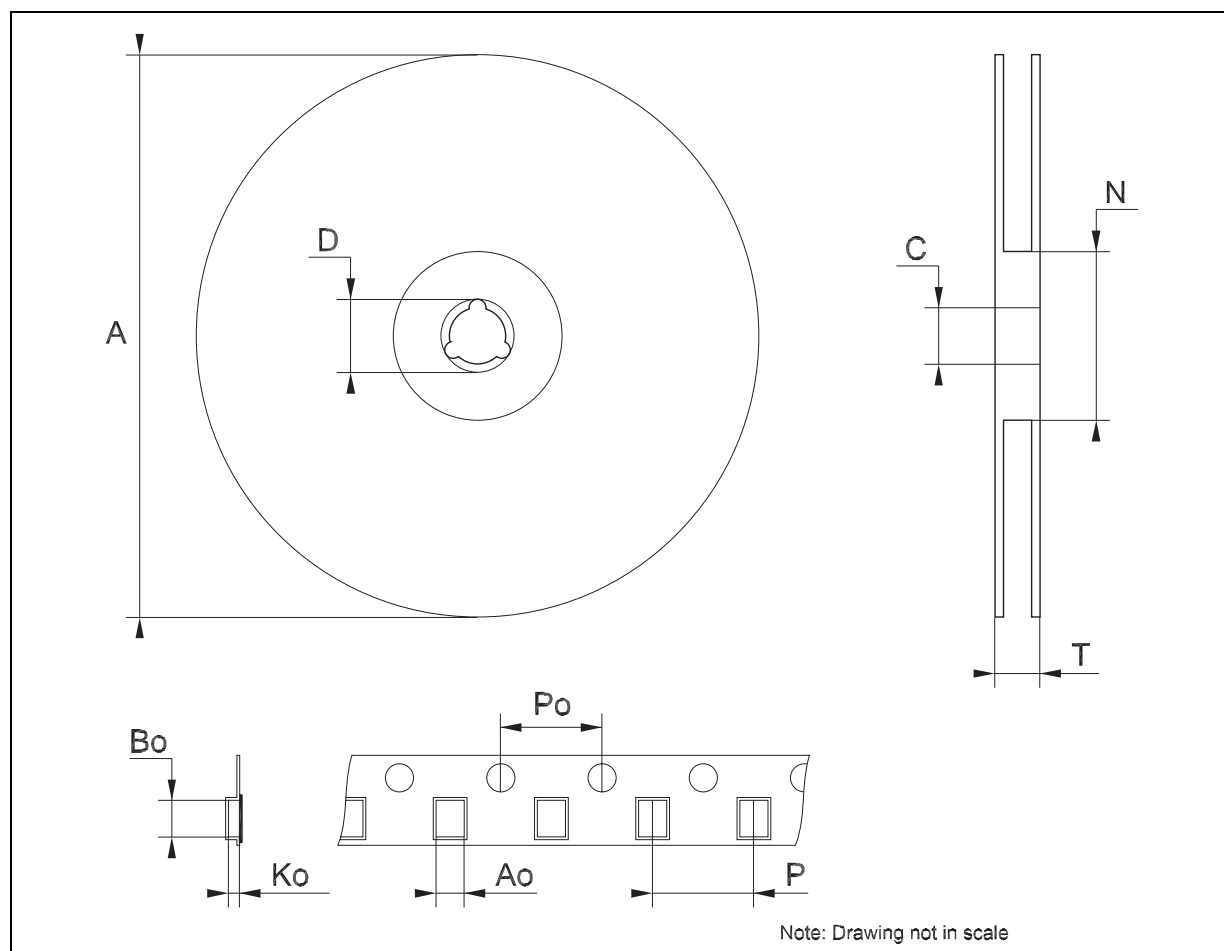
DIM.	mm.			inch		
	MIN.	TYP	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0079
D	4.9	5	5.1	0.193	0.197	0.201
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030



0080338D

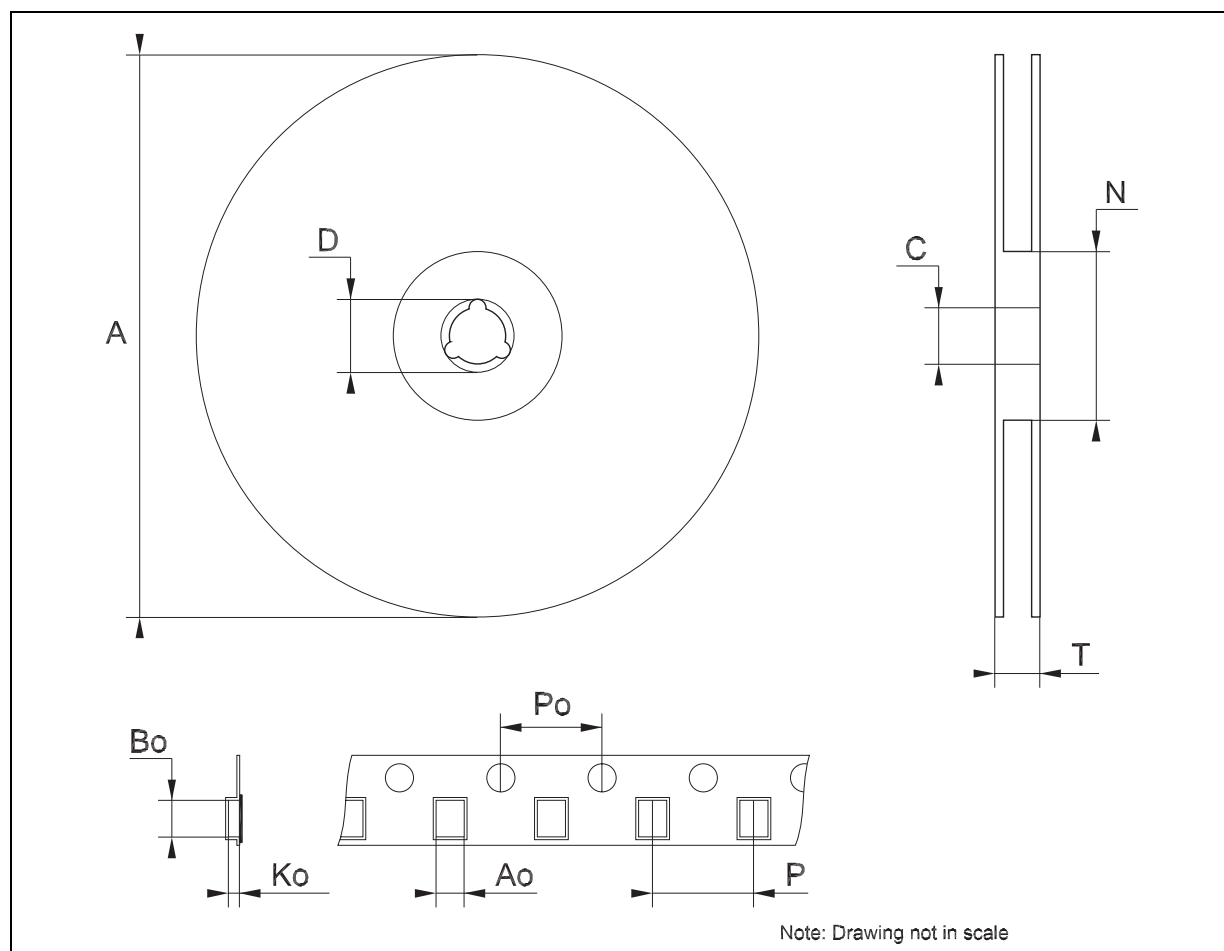
## Tape &amp; Reel SO-16 MECHANICAL DATA

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	6.45		6.65	0.254		0.262
Bo	10.3		10.5	0.406		0.414
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



### Tape & Reel TSSOP16 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



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. Specifications 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

© 2002 STMicroelectronics - Printed in Italy - All Rights Reserved  
STMicroelectronics GROUP OF COMPANIES

Australia - Brazil - Canada - China - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco  
Singapore - Spain - Sweden - Switzerland - United Kingdom - United States.

© <http://www.st.com>