



# 74ACT1284

## HIGH SPEED IEEE1284 TRANSCEIVER

- **HIGH SPEED:**  
 $T_{PD} = 6.5 \text{ ns}$  (Max. 85°C) at  $V_{CC} = 4.5V$
- **LOW POWER DISSIPATION:**  
 $I_{CC} = 80 \mu A$  (MAX.) at  $V_{CC} = 5.5V$   $T = 85^\circ C$
- **TTL COMPATIBLE INPUTS**  
 $V_{IH} = 2V$  (Min.)  $V_{IL} = 0.8V$  (Max.)
- **OPERATING VOLTAGE RANGE:**  
 $V_{CC}$  (OPR.) = 4.5V to 5.5V
- A Port have standard 4mA totem pole output
- B Port high drive source/sink capability of 14mA
- Support IEEE Std 1284-I (level 1 type) and IEEE Std 1284-II (level 2 type) for bidirectional parallel communications between personal computer and printing peripherals.

### DESCRIPTION

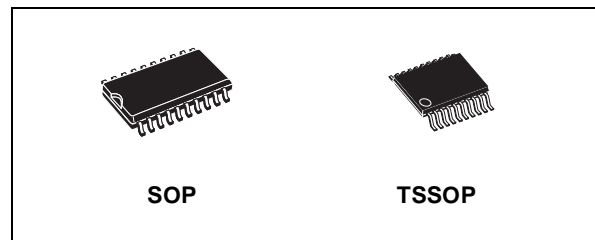
The 74ACT1284 contains four high-speed non-inverting bidirectional buffers and three non-inverting buffers with open drain outputs fabricated in silicon gate C<sup>2</sup>MOS technology.

It's intended to provide a standard signaling method for a bidirection parallel peripheral in an Extended Capabilities Port mode (ECP).

The HD (active High) input pin enables the B ports to switch from Open Drain to a high drive totem pole output, capable of sourcing 14mA on all seven buffers. The DIR input determines the direction of data flow on the bidirectional buffers.

DIR (active High) enables data flow from A Port to B Port. DIR (active Low) enables data flow from B Port to A Port.

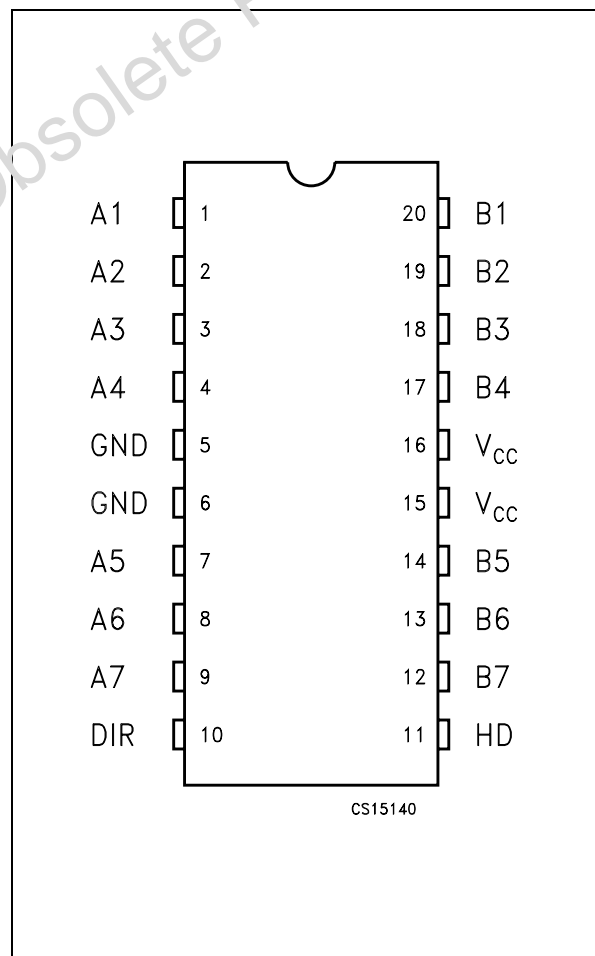
ESD protection is greater than 2000V per Method 3015.7 of MIL-STD-883B. It's available in the commercial temperature ranges.



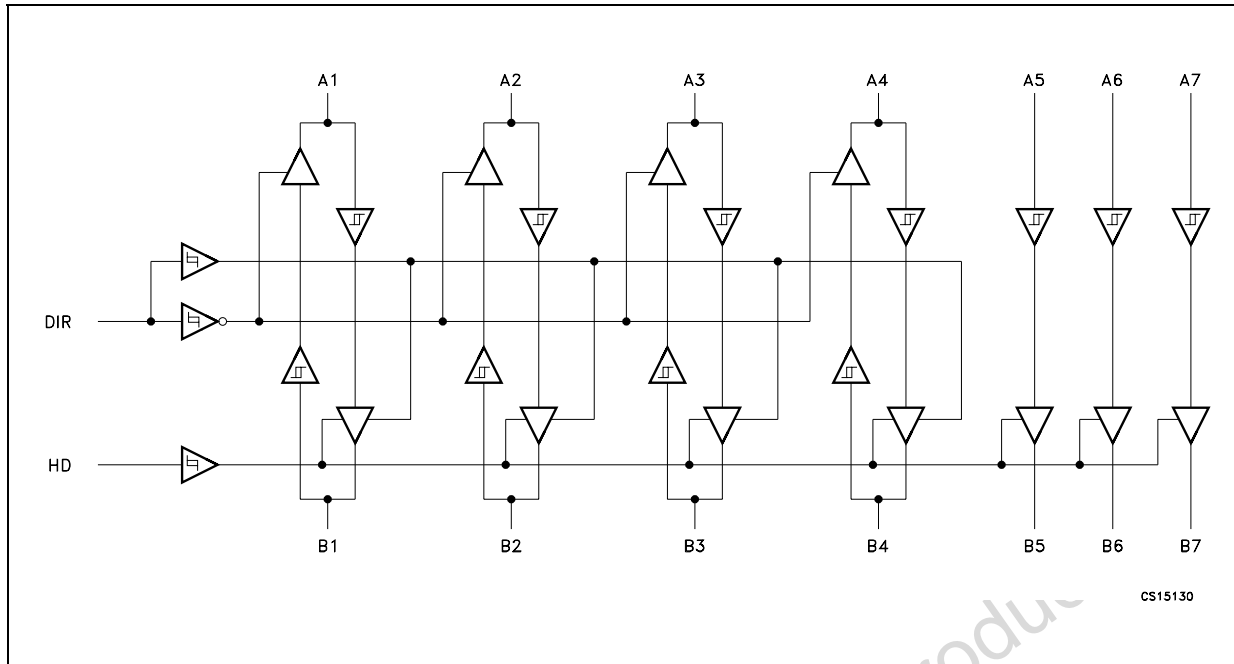
### ORDER CODES

PACKAGE	TUBE	T & F.
SOP	74ACT1284M	74ACT1284MTR
TSSOP		74ACT1284TTR

### PIN CONNECTION:



## LOGIC DIAGRAM



## PIN DESCRIPTION

PIN N.	SYMBOL	NAME AND FUNCTION
1 - 4	A1 - A4	Side A Input or Output
5, 6	GND	Ground
7 - 9	A5 - A7	Side A Input
10	DIR	Direction Control Input
11	HD	High Drive Enable Input
12 - 14	B5 - B7	Side B Output
15, 16	V <sub>CC</sub>	Power Supply

## TRUTH TABLE

INPUT		FUNCTION	OUTPUTS
DIR	HD		
L	L	B1 - B4 Data to A1 - A4	B5 - B7 Open Drain
L	H	A5 - A7 Data to B5 - B7	B5 - B7 Totem Pole
H	L	A1 - A7 Data to B1 - B7	B1 - B7 Open Drain
H	H	A1 - A7 Data to B1 - B7	B1 - B7 Totem Pole

**ABSOLUTE MAXIMUM RATINGS**

Symbol	Parameter	Value	Unit
$V_{CC}$	Supply Voltage	-0.5 to +7	V
$V_{IA}$	DC Input Voltage A Side	-0.5 to $V_{CC} + 0.5$	V
$V_{IB}$	DC Input Voltage B Side	-2 to +7 <sup>(1)</sup>	V
$V_{OA}$	DC Output Voltage A Side	-0.5 to $V_{CC} + 0.5$	V
$V_{OB}$	DC Output Voltage B Side	-2 to +7 <sup>(1)</sup>	V
$I_{IK}$	DC Input Diode Current	$\pm 20$	mA
$I_{OK}$	DC Output Diode Current	$\pm 50$	mA
$I_O$	DC Output Current	$\pm 50$	mA
$I_{CC}$ or $I_{GND}$	DC $V_{CC}$ or Ground Current	$\pm 200$	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) The AC input voltage pulse width is limited to 20ns if the input voltage goes more negative than -0.5V.

**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
$V_O$	Output Voltage HD = LOW	0 to 5.5	V
$T_{op}$	Operating Temperature	-40 to 85	°C

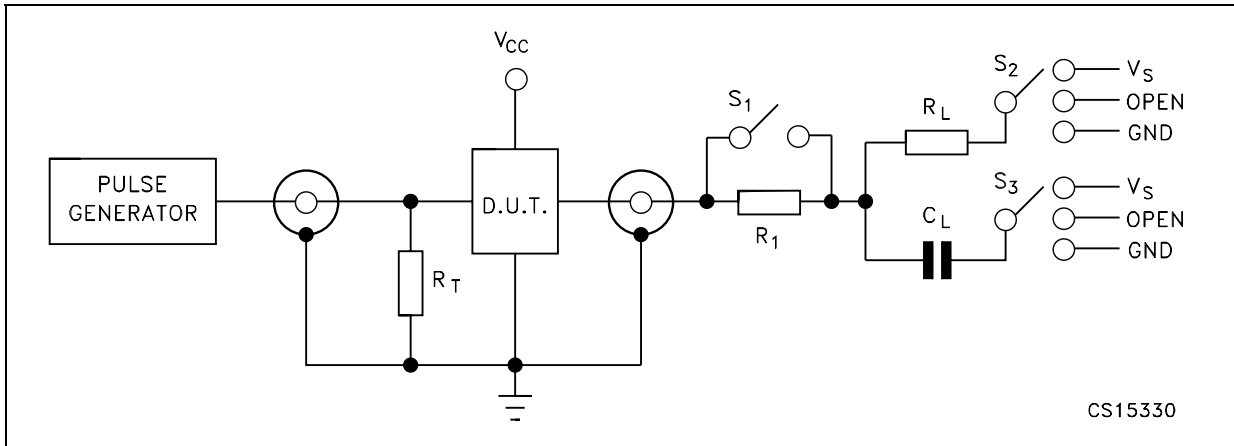
## DC ELECTRICAL CHARACTERISTICS

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.	
V <sub>IH</sub>	High Level Input Voltage	4.5 to 5.5		2.0			2.0		V
V <sub>IL</sub>	Low Level Input Voltage	4.5 to 5.5				0.8		0.8	V
V <sub>OHB</sub>	High Level Output Voltage B Port	4.5	I <sub>OH</sub> = -14mA	3.86			3.76		V
V <sub>OHA</sub>	High Level Output Voltage A Port	4.5	I <sub>O</sub> = -50μA	4.4			4.4		V
			I <sub>O</sub> = -4mA	3.86			3.76		
V <sub>OLB</sub>	Low Level Output Voltage B Port	4.5	I <sub>OH</sub> = 14mA			0.4		0.4	V
V <sub>OLA</sub>	Low Level Output Voltage A Port	4.5	I <sub>O</sub> = 50μA			0.1		0.1	V
			I <sub>O</sub> = 4mA			0.36		0.44	
I <sub>I</sub>	Input Current	5.5	V <sub>I</sub> = V <sub>CC</sub> or GND (DIR, A5, A6, A7, HD)			± 0.1		± 1	μA
I <sub>CCT</sub>	Max I <sub>CC</sub> /Input	5.5	V <sub>I</sub> = V <sub>CC</sub> - 2.1V		0.6			1.5	mA
I <sub>CC</sub>	Quiescent Supply Current	5.5	V <sub>I</sub> = V <sub>CC</sub> or GND			8		80	μA
I <sub>OZ</sub>	Output Leakage Current	5.5	V <sub>O</sub> = V <sub>CC</sub> or GND			± 0.5		± 5	μA
I <sub>OFF</sub>	B Side Power Down Leakage Current	0	V <sub>O</sub> = 5.25V			4		40	μA
V <sub>HYS</sub>	Input Hysteresis	5.0	V <sub>T</sub> <sup>+</sup> = V <sub>T</sub>		0.4		0.35		V
Z <sub>O</sub>	Output Impedance B Port	5.0	V <sub>B</sub> = V <sub>OH</sub>	8				24	Ω

AC ELECTRICAL CHARACTERISTICS (f = 1MHz, t<sub>r</sub> = t<sub>f</sub> = 2.5ns)

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>PLH</sub>	Propagation Delay Time A1 - A7 to B1 - B7	4.5 to 5.5	R <sub>L</sub> =500Ω, C <sub>L</sub> =50pF (fig. 1-2)	1		5.6	1	6.5	ns
t <sub>PHL</sub>				1		5.6	1	6.5	
t <sub>PLH</sub>	Propagation Delay Time B1 - B4 to A1 - A4	4.5 to 5.5	R <sub>L</sub> =500Ω, C <sub>L</sub> =50pF (fig. 3)	1		7.5	1	8.5	ns
t <sub>PHL</sub>				1		7.5	1	8.5	
t <sub>EN</sub>	Enable Delay Time HD to B1 - B7	4.5 to 5.5	R <sub>S</sub> =33Ω, R <sub>L</sub> =62Ω C <sub>L</sub> =50pF (fig. 2)	1		7.5	1	8.5	ns
t <sub>DIS</sub>	Disable Delay Time HD to B1 - B7			1		7.5	1	8.5	ns
t <sub>r</sub> , t <sub>f</sub>	t <sub>rise</sub> , t <sub>fall</sub> B1 - B7 Open Drain	4.5 to 5.5	R <sub>PULL_UP</sub> =500Ω C <sub>L</sub> =50pF (fig. 4)			120		120	ns
C <sub>I</sub>	Control Input Capacitance (HD, DIR, A5 - A7)	Open			4				pF
C <sub>I/O</sub>	I/O Pin Capacitance	5.0			12				pF

TEST CIRCUIT



TEST	S1	S2	S2
$t_{PHL}$ (A1-A7 to B1-B7) $R_L = 62\Omega$ , $R_1 = 33\Omega$ (see waveform 1)	OPEN	$V_{CC}$	$V_{CC}$
$t_{PLH}$ (A1-A7 to B1-B7) $R_L = 62\Omega$ (see waveform 1)	CLOSED	GND	GND
$t_{PHL}$ , $t_{PLH}$ (B1-B4 to A1-A4) $R_L = 500\Omega$ (see waveform 2)	CLOSED	GND	GND
$t_r$ , $t_f$ (A1-A7 to B1-B7) $R_L = 500\Omega$ (see waveform 1)	CLOSED	$V_{CC}$	$V_{CC}$
$t_{EN}$ (HD to B1-B7) $R_L = 62\Omega$ , $R_1 = 33\Omega$ (see waveform 3)	OPEN	GND	GND
$t_{DIS}$ (HD to B1-B7) $R_L = 62\Omega$ (see waveform 3)	CLOSED	GND	GND

$C_L = 50$  pF or equivalent (includes jig and probe capacitance)  
 $R_T = Z_{OUT}$  of pulse generator (typically  $50\Omega$ )

Figure 1 : Propagation Delay Time

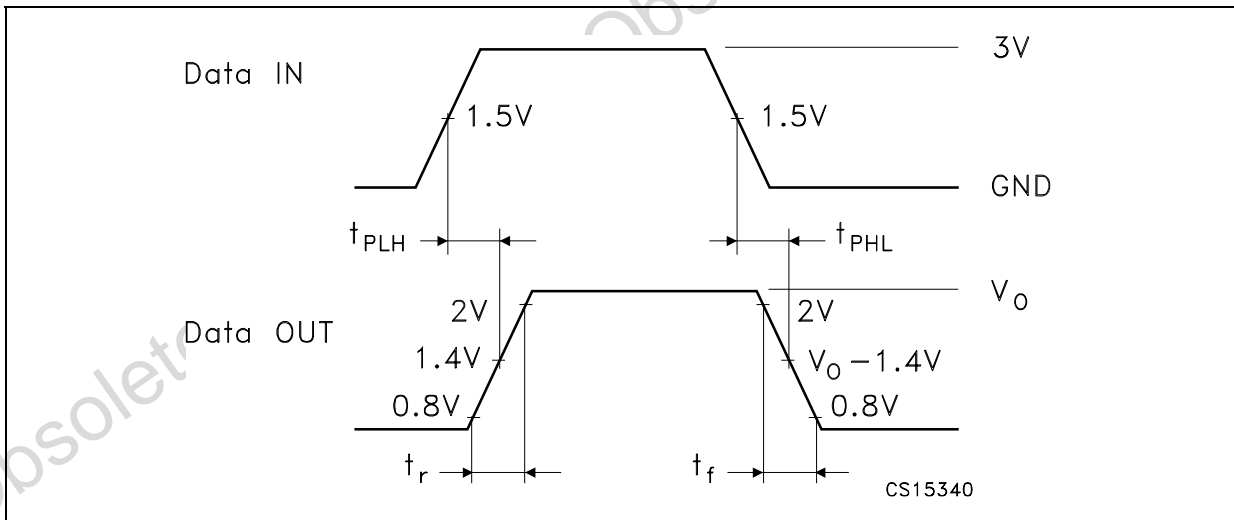
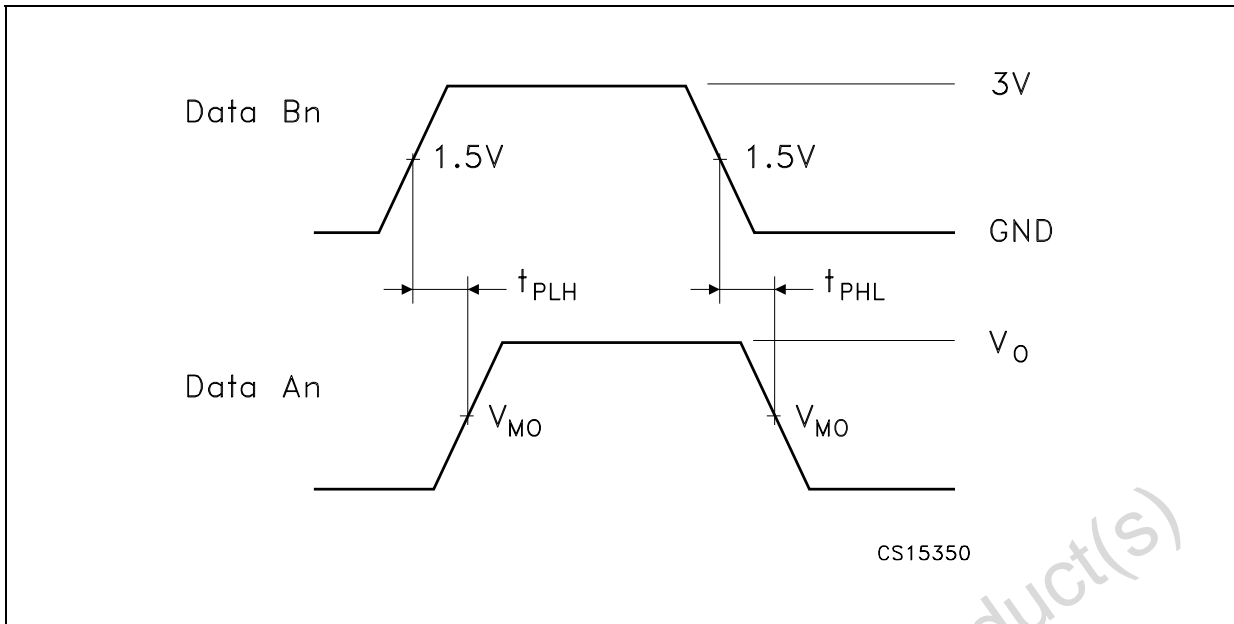
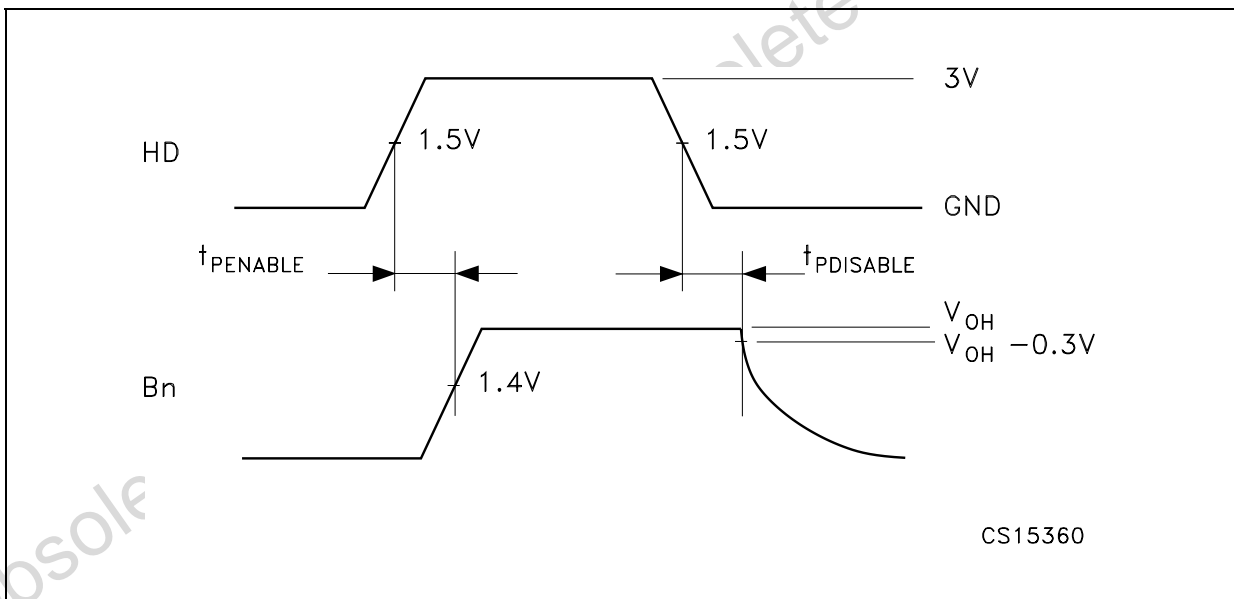


Figure 2 : Propagation Delay Time



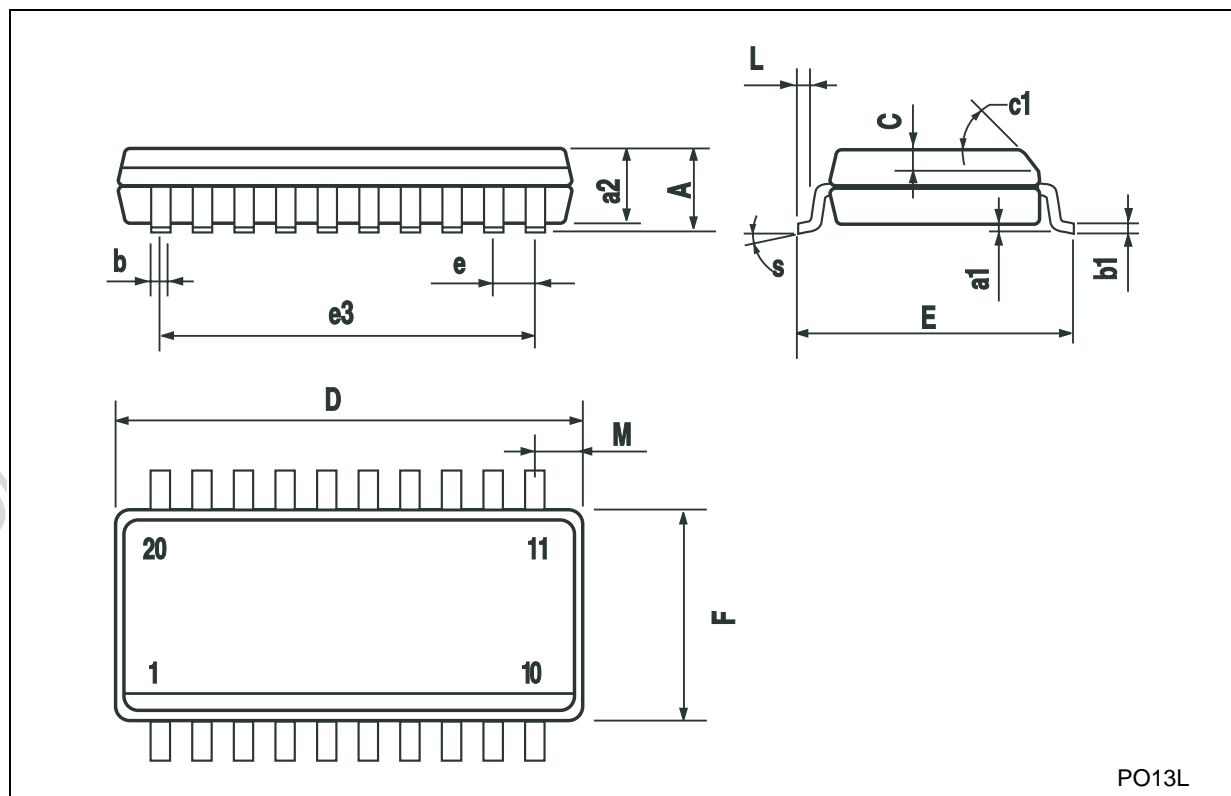
V<sub>MO</sub> = 50%V<sub>CC</sub>

Figure 3 : Enable and Disable Time



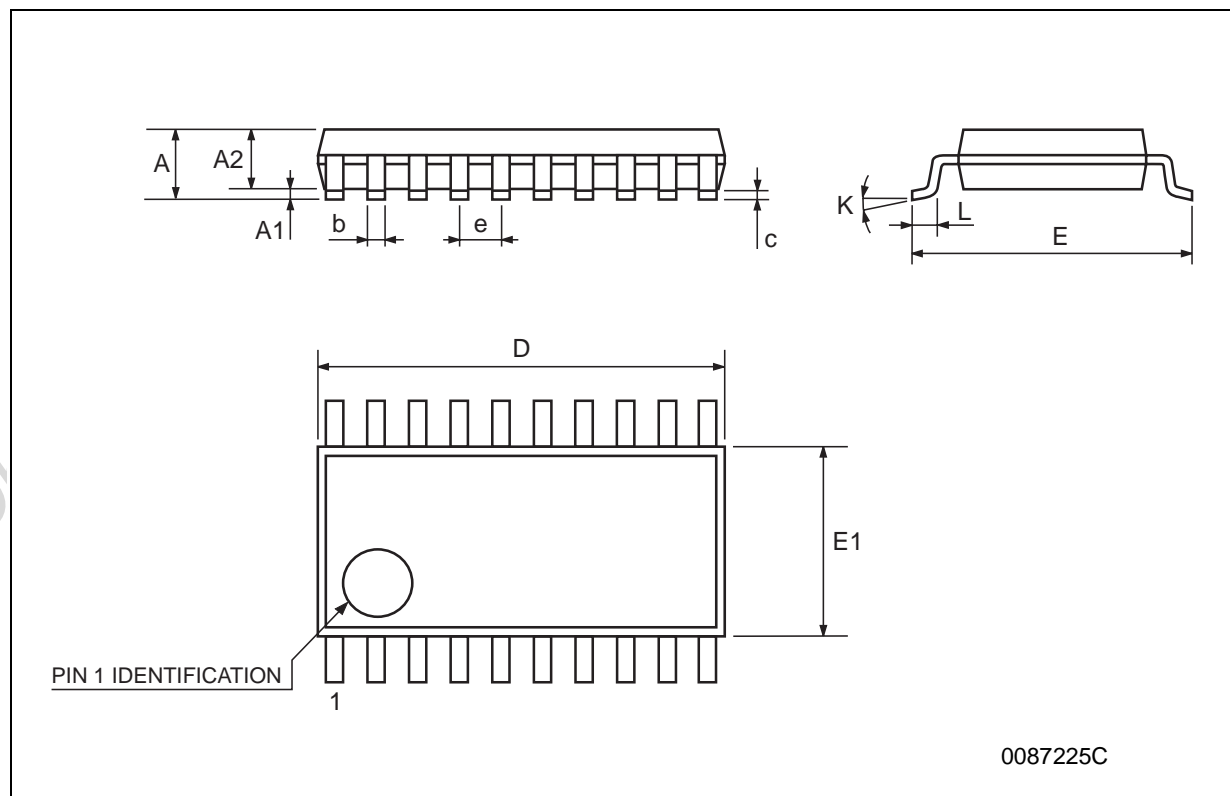
## SO-20 MECHANICAL DATA

DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			2.65			0.104
a1	0.1		0.2	0.004		0.008
a2			2.45			0.096
b	0.35		0.49	0.014		0.019
b1	0.23		0.32	0.009		0.012
C		0.5			0.020	
c1	45° (typ.)					
D	12.60		13.00	0.496		0.512
E	10.00		10.65	0.393		0.419
e		1.27			0.050	
e3		11.43			0.450	
F	7.40		7.60	0.291		0.300
L	0.50		1.27	0.020		0.050
M			0.75			0.029
S	8° (max.)					



## TSSOP20 MECHANICAL DATA

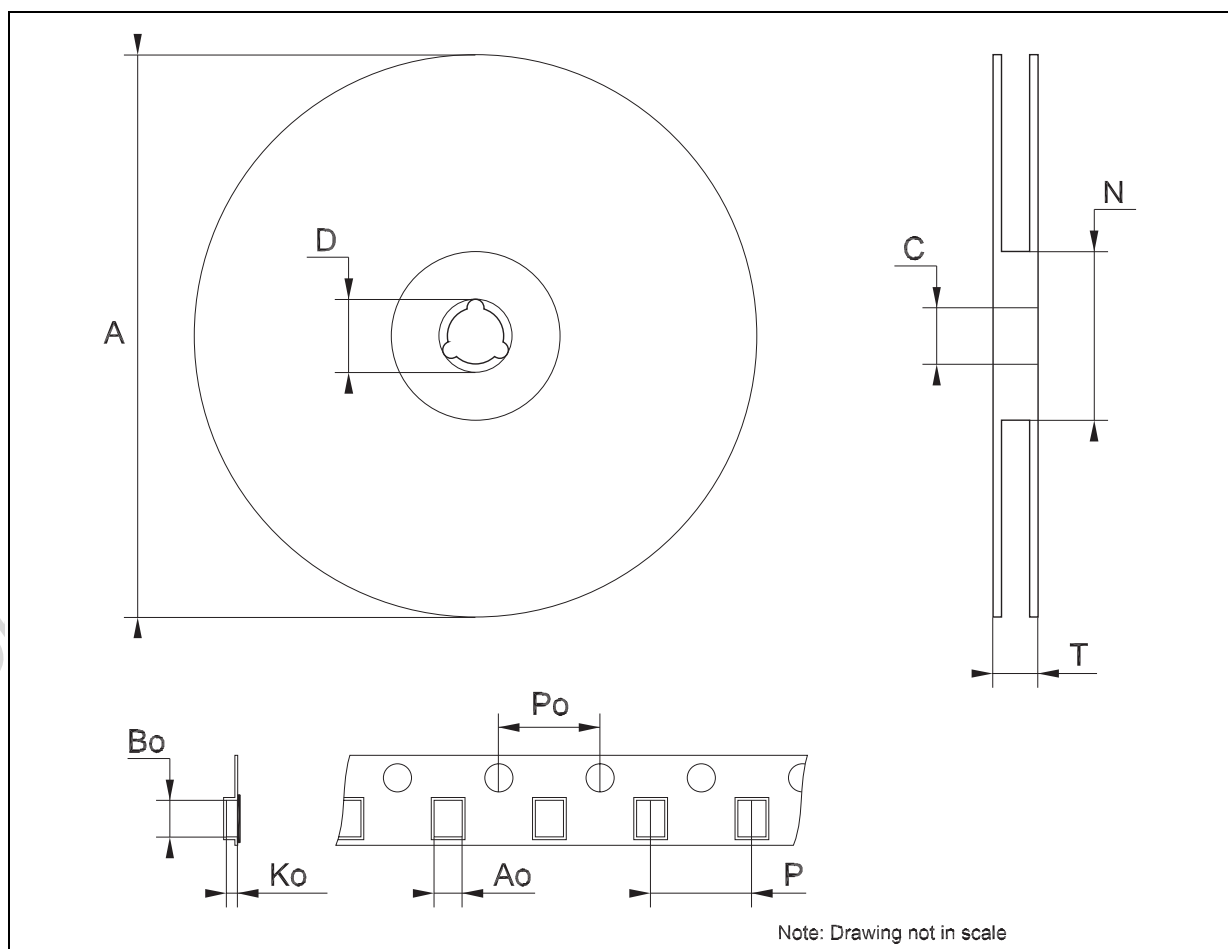
DIM.	mm.			inch		
	MIN.	TYP.	MAX.	MIN.	TYP.	MAX.
A			1.2			0.047
A1	0.05		0.15	0.002	0.004	0.006
A2	0.8	1	1.05	0.031	0.039	0.041
b	0.19		0.30	0.007		0.012
c	0.09		0.20	0.004		0.0079
D	6.4	6.5	6.6	0.252	0.256	0.260
E	6.2	6.4	6.6	0.244	0.252	0.260
E1	4.3	4.4	4.48	0.169	0.173	0.176
e		0.65 BSC			0.0256 BSC	
K	0°		8°	0°		8°
L	0.45	0.60	0.75	0.018	0.024	0.030





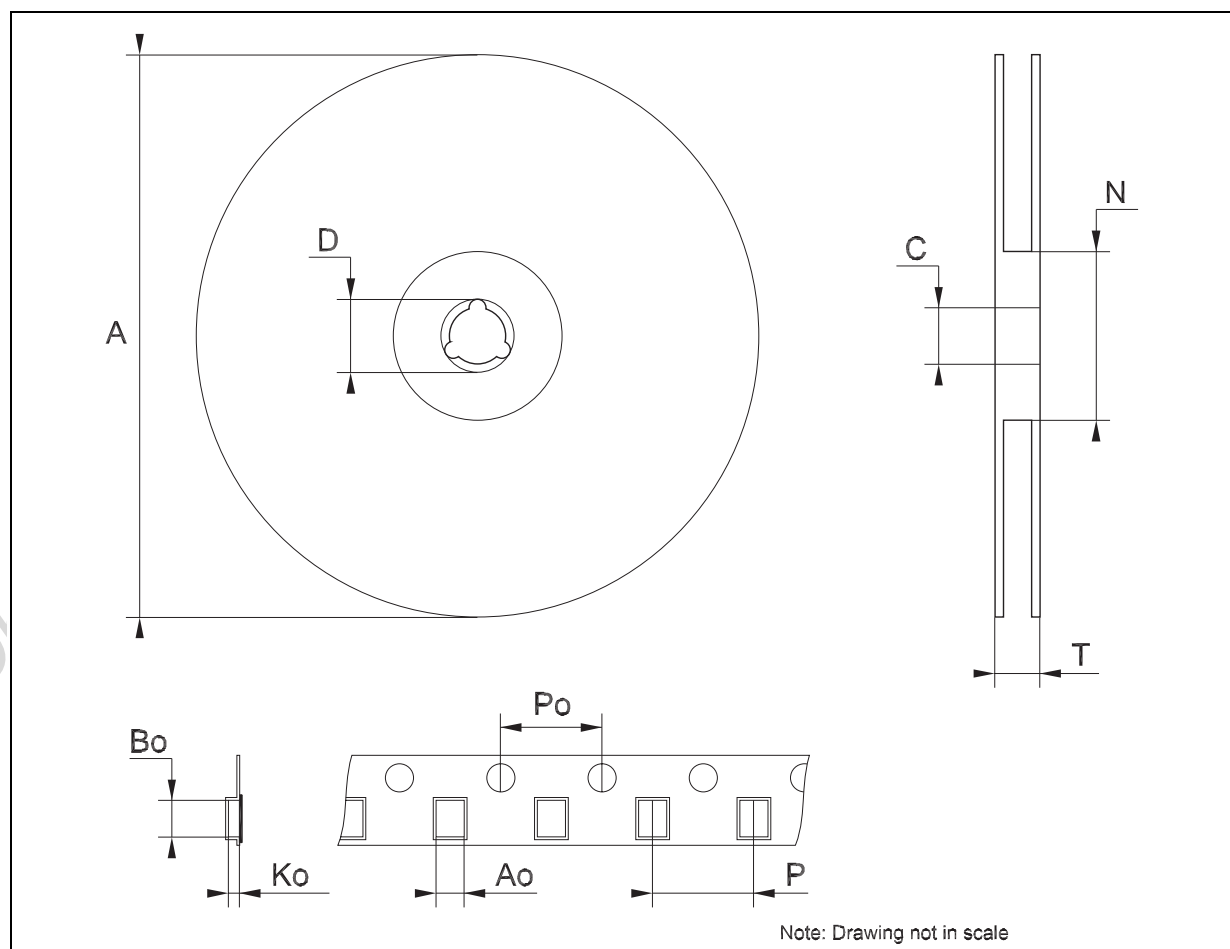
## Tape &amp; Reel SO-20 MECHANICAL DATA

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			30.4			1.197
Ao	10.8		11	0.425		0.433
Bo	13.2		13.4	0.520		0.528
Ko	3.1		3.3	0.122		0.130
Po	3.9		4.1	0.153		0.161
P	11.9		12.1	0.468		0.476



## Tape &amp; Reel TSSOP20 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	6.8		7	0.268		0.276
Bo	6.9		7.1	0.272		0.280
Ko	1.7		1.9	0.067		0.075
Po	3.9		4.1	0.153		0.161
P	11.9		12.1	0.468		0.476



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

© 2003 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>