TOSHIBA Bi-CMOS Digital Integrated Circuit Silicon Monolithic

TD74BC541P,TD74BC541F

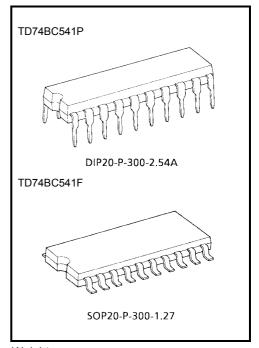
Octal Bus Buffer with 3-State Outputs (Non-Inverted)

The TD74BC541P/TD74BC541F is a high-speed octal 3-state buffer fabricated with silicon gate Bi-CMOS technology. It achieves the high-speed operation equivalent to the FAST family while maintaining the Bi-CMOS low-power dissipation. The TD74BC541P/F is a non-inverting buffer. It is controlled by two enable inputs ($\overline{\text{OE}}$ 0, $\overline{\text{OE}}$ 1). When either $\overline{\text{OE}}$ 0 and $\overline{\text{OE}}$ 1 are high, all eight outputs are in the high-impedance state, which facilitates the interface with bus lines.

All inputs are equipped with resistors and diodes to protect against Electro Static Discharge (ESD).

Features

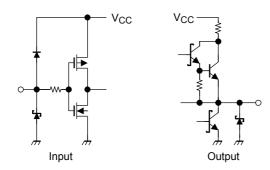
- $\label{eq:tpd} \begin{array}{lll} \bullet & \mbox{High-speed operation} & \mbox{$t_{pd} = 4.8 \ ns (typ.)$} \\ \bullet & \mbox{Symmetrical output impedance} & \mbox{$I_{OL} = 48 \ mA (max)$} \\ \bullet & \mbox{$I_{OL} = 48 \ mA (max)$} \\ \bullet & \mbox{$L_{OCD} = 8 \ mA (typ.)$} \\ \bullet & \mbox{$I_{CCZ} = 10 \ \mu A (typ.)$} \\ \bullet & \mbox{$Operating temperature range} & \mbox{$T_{a} = -40 ^{\circ}$C to $85 ^{\circ}$C} \\ \bullet & \mbox{$High ESD protection} & \mbox{$2000 \ V (MIL standard)$} \end{array}$
- Pin and function compatible with FAST (74F541)



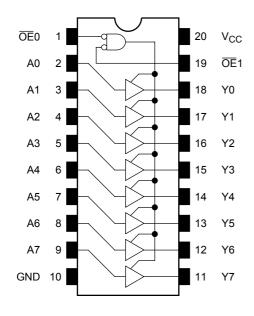
Weight

DIP20-P-300-2.54A: 1.48 g (typ.) SOP20-P-300-1.27: 0.25 g (typ.)

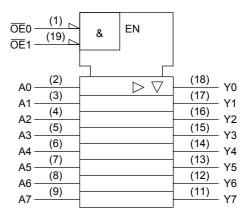
Input Protection Circuit and Output Equivalent Circuit



Pin Assignment (top view)



Logic Symbol



Truth Table

	Outputs		
ŌĒ0	ŌĒ1	An	Yn
Н	Х	Х	Z
Х	Н	Х	Z
L	L	Н	Н
L	L	L	L

X: Don't care

Z: High impedance

Absolute Maximum Ratings

Characteristics		Symbol	Rating	Unit	
Power supply voltage		V _{CC}	−0.5 to 7.0	V	
Input voltage		V _{IN}	-1.2 to $V_{CC} + 0.5$	V	
Output voltage		VO	-0.5 to $V_{CC} + 0.5$	V	
Input clamp diode current		I _{IK}	±30	mA	
Output clamp diode current		I _{OK}	-30	mA	
Output current (output low state)		l _{OL}	96	mA	
Power dissipation	BC541P	P _D	1380 (Note 1)	mW	
	BC541F	' D	860 (Note 1)	11100	
Storage temperature		T _{stg}	-65 to 150	°C	

Note 1: $Ta = 25^{\circ}C$

Recommended Operating Conditions

Characteristics		Symbol	Min	Тур.	Max	Unit	
Power supply voltage		V _{CC}	4.5	5.0	5.5	V	
Input voltage		V _{IN}	0	_	V _{CC}	V	
Output voltage		VO	0	_	V _{CC}	V	
Output current	High level	I _{OH}	_	_	-15	mA	
	Low level	l _{OL}	_	_	48	IIIA	
Operating temperature		T _{opr}	-40	25	85	°C	

Electrical Characteristics

DC Characteristics (unless otherwise specified, $V_{CC} = 4.5 \text{ V}$ to 5.5 V, $Ta = -40 ^{\circ}\text{C}$ to $85 ^{\circ}\text{C}$)

Characteristics		Symbol	Test Condition	V _{CC}	Min	Typ. (Note 1)	Max	Unit	
lament violtama	High level	V _{IH}	_	_	2.0	_	_	V	
Input voltage	Low level	V _{IL}	_	_	_	_	0.8	v	
Input clamp voltage		V _{IK}	I _{IK} = -18 mA	4.5	_	_	-1.2	V	
			I _{OH} = -3.0 mA	4.5	2.4	3.4	_		
	High level	V_{OH}	$I_{OH} = -3.0 \text{ mA}$	4.75	2.7	3.4	_		
Output voltage			I _{OH} = -15 mA	4.5	2.0	_	_	V	
	Low level	V _{OL}	I _{OL} = 24 mA	4.5	_	_	0.5		
	Low level	VOL	I _{OL} = 48 mA	4.5	_	_	0.55		
		lį	$V_{IN} = V_{CC}$	5.5	_	_	±1.0		
Input current (all input	pins)	I _{IH}	V _{IN} = 2.7 V	5.5	_	_	±1.0	μΑ	
		I _{IL}	V _{IN} = 0.5 V or GND	5.5	_	_	±1.0		
2 state OFF lookage of	0.11.0551.1		V _O = 2.7 V	5.5	_	_	50	^	
3-state OFF leakage cu	urrent	l _{OZL}	V _O = 0.5 V	5.5	_	_	-50	μА	
Output short current (Note 2)		I _{OS}	V _O = GND	5.5	-100	_	-255	mA	
Quiescent supply current (total)		I _{CCL}	V _{IN} = V _{CC} or ground All outputs are low.	5.5	_	20	27	mA	
		Іссн	V _{IN} = V _{CC} or ground All outputs are high.	5.5	_	10	50		
		lccz	V _{IN} = V _{CC} or ground All outputs are in the high-impedance state.	5.5	_	10	50	μΑ	
Quiescent supply current (each bit) -		Δl _{CC1}	One input: $V_{IN} = 0.5 \text{ V}$ Other inputs: V_{CC} or GND	—	—	_	1.5	mA	
		Δl _{CC2}	One input: $V_{IN} = V_{CC} - 2.1 \text{ V}$ Other inputs: V_{CC} or GND			_	1.5	IIIA	

Note 1: Typical value is measured at $V_{CC} = 5.0 \text{ V}$ and $T_{a} = 25^{\circ}\text{C}$.

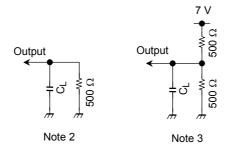
Note 2: Only one output at a time should be shorted. Duration should not exceed one second.

3

AC Characteristics (Input $t_r = t_f = 2.5 \text{ ns}$)

Characteristics		Symbol	Test Condition	Ta = 25°C V _{CC} = 5.0 V			$Ta = -40^{\circ}$ $V_{CC} = 5.0$		
		Cymbol		Min	Тур.	Max	Min	Max	Offic
Propagation delay time	A-Y	t _{pLH}	- C _L = 50 pF	2.0	5.0	6.3	2.0	7.5	ns
		t _{pHL}		2.0	4.5	5.8	2.0	6.8	
3-state output enable time	OE -Y	t _{pZH}		2.0	8.0	9.5	2.0	11.0	ns ns
		t _{pZL}		2.0	6.5	9.5	2.0	11.0	
3-state output disable time	OE-Y	t _{pHZ}		2.0	6.0	9.5	2.0	10.0	
		t_{pLZ}		2.0	5.0	8.5	2.0	9.5	
Dynamia aupply aurrent			f = 1 MHz		8	13		16	mA
Dynamic supply current		ICCD	Output open		0	13		10	IIIA

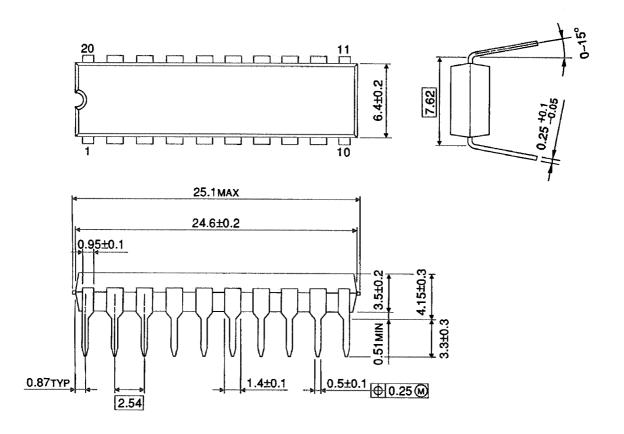
Note 1: When measuring t_{pLH} , t_{pHL} , t_{pZH} and t_{pHZ} , the output pin should be connected as shown in Note 2. When measuring t_{pZL} , and t_{pLZ} , the output pin should be connected as shown in Note 3.



4

Package Dimensions

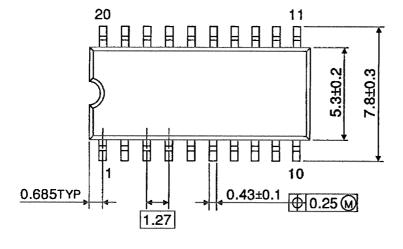
DIP20-P-300-2.54A Unit: mm

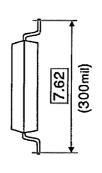


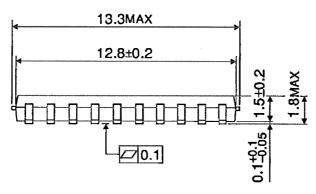
Weight: 1.48 g (typ.)

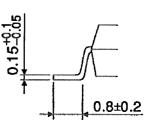
Package Dimensions

SOP20-P-300-1.27 Unit: mm









Weight: 0.25 g (typ.)

6

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