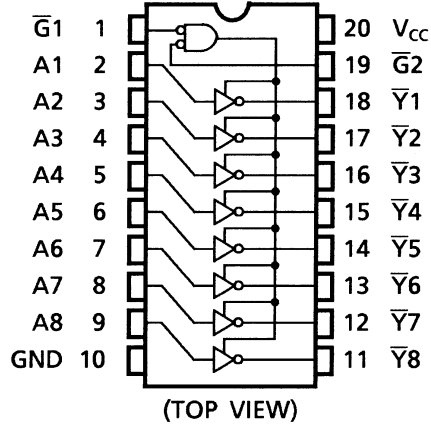
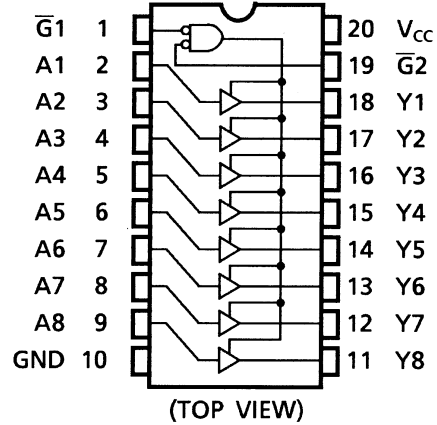


Pin Assignment

TC74HCT540A

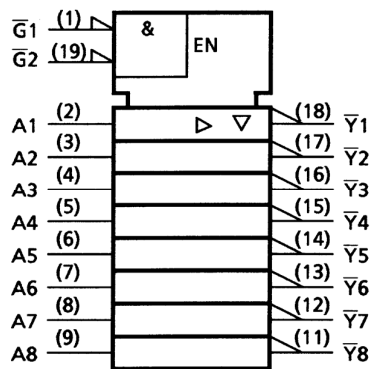


TC74HCT541A

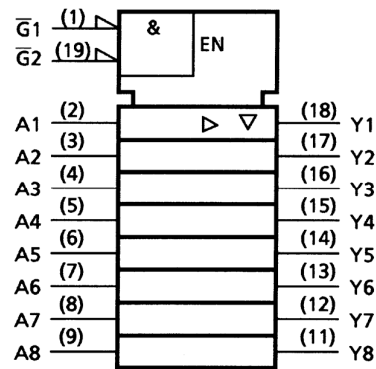


IEC Logic Symbol

TC74HCT540A



TC74HCT541A



Truth Table

Inputs			Outputs	
$\bar{G}1$	$\bar{G}2$	A _n	Y _n *	\bar{Y}_n *
H	X	X	Z	Z
X	H	X	Z	Z
L	L	H	H	L
L	L	L	L	H

X: Don't care

Z: High impedance

*: Y_n..... HCT541A

\bar{Y}_n HCT540A

Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V _{CC}	-0.5~7	V
DC input voltage	V _{IN}	-0.5~V _{CC} + 0.5	V
DC output voltage	V _{OUT}	-0.5~V _{CC} + 0.5	V
Input diode current	I _{IK}	±20	mA
Output diode current	I _{OK}	±20	mA
DC output current	I _{OUT}	±35	mA
DC V _{CC} /ground current	I _{CC}	±75	mA
Power dissipation	P _D	500 (DIP) (Note 2)/180 (SOP)	mW
Storage temperature	T _{stg}	-65~150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 2: 500 mW in the range of Ta = -40 to 65°C. From Ta = 65 to 85°C a derating factor of -10 mW/°C shall be applied until 300 mW.

Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	4.5~5.5	V
Input voltage	V _{IN}	0~V _{CC}	V
Output voltage	V _{OUT}	0~V _{CC}	V
Operating temperature	T _{opr}	-40~85	°C
Input rise and fall time	t _r , t _f	0~500	ns

Note: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit		
			V _{CC} (V)	Min	Typ.	Max	Min		Max	
High-level input voltage	V _{IH}	—	4.5~5.5	2.0	—	—	2.0	—	V	
Low-level input voltage	V _{IL}	—	4.5~5.5	—	—	0.8	—	0.8	V	
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 μA	4.5	4.4	4.5	—	4.4	—	V
			I _{OH} = -6 mA	4.5	4.18	4.31	—	4.13	—	
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20 μA	4.5	—	0.0	0.1	—	0.1	V
			I _{OL} = 6 mA	4.5	—	0.17	0.26	—	0.33	
3-state output off-state current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND	5.5	—	—	±0.5	—	±5.0	μA	
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND	5.5	—	—	±0.1	—	±1.0	μA	
Quiescent supply current	I _{CC}	V _{IN} = V _{CC} or GND	5.5	—	—	4.0	—	40.0	μA	
	I _C	Per input: V _{IN} = 0.5 V or 2.4 V Other input: V _{CC} or GND	5.5	—	—	2.0	—	2.9	mA	

AC Characteristics (input: $t_r = t_f = 6 \text{ ns}$)

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40~85°C		Unit	
		CL (pF)	VCC (V)	Min	Typ.	Max	Min	Max		
Output transition time	t_{TLH}	—	50	4.5	—	7	12	—	15	ns
	t_{THL}			5.5	—	6	11	—	14	
Propagation delay time (TC74HCT540A)	t_{pLH}	—	50	4.5	—	12	20	—	25	ns
				5.5	—	9	18	—	23	
	t_{pHL}		150	4.5	—	17	26	—	33	
				5.5	—	14	24	—	30	
Propagation delay time (TC74HCT541A)	t_{pLH}	—	50	4.5	—	14	23	—	29	ns
				5.5	—	11	21	—	27	
	t_{pHL}		150	4.5	—	19	29	—	36	
				5.5	—	16	27	—	33	
Output enable time	t_{pZL}	$R_L = 1 \text{ k}\Omega$	50	4.5	—	18	30	—	38	ns
				5.5	—	16	27	—	35	
	t_{pZH}		150	4.5	—	23	36	—	45	
				5.5	—	21	33	—	41	
Output disable time	t_{pLZ}	$R_L = 1 \text{ k}\Omega$	50	4.5	—	18	30	—	38	ns
				5.5	—	16	27	—	35	
t_{pHZ}	150		4.5	—	23	36	—	45		
			5.5	—	21	33	—	41		
Input capacitance	C_{IN}	—	—	—	5	10	—	10	pF	
Output capacitance	C_{OUT}	—	—	—	10	—	—	—	pF	
Power dissipation capacitance	C_{PD} (Note)	TC74HCT540A	—	—	35	—	—	—	pF	
		TC74HCT541A	—	—	31	—	—	—		

Note: C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

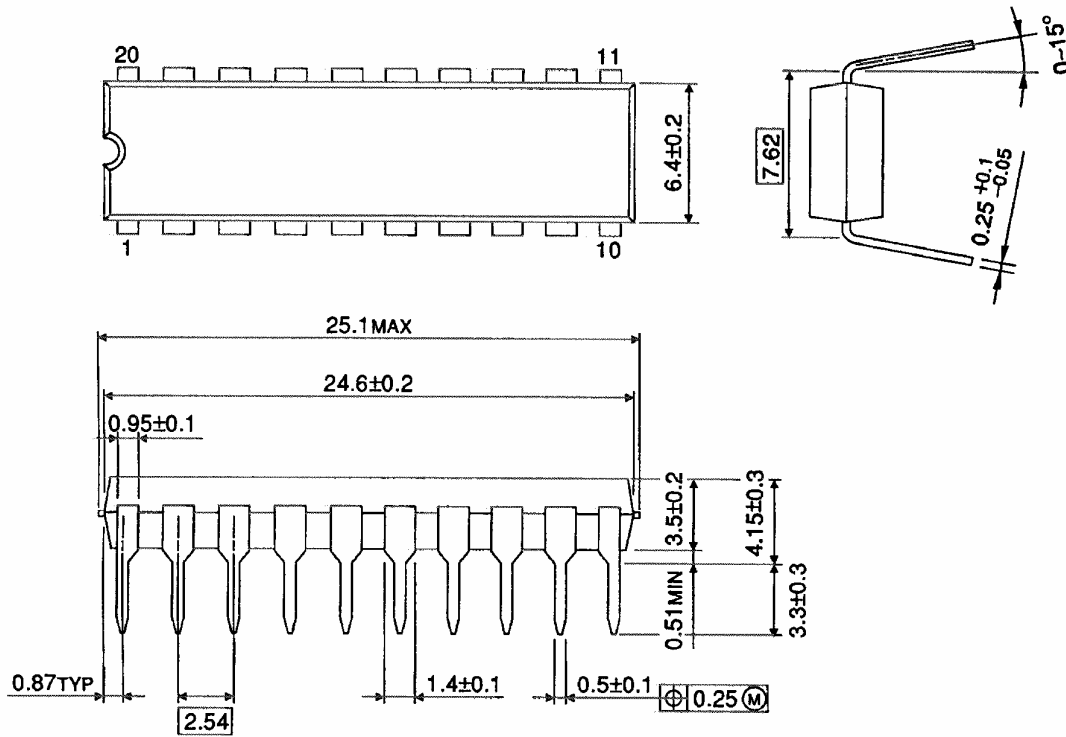
Average operating current can be obtained by the equation:

$$I_{CC} (\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8 \text{ (per bit)}$$

Package Dimensions

DIP20-P-300-2.54A

Unit : mm

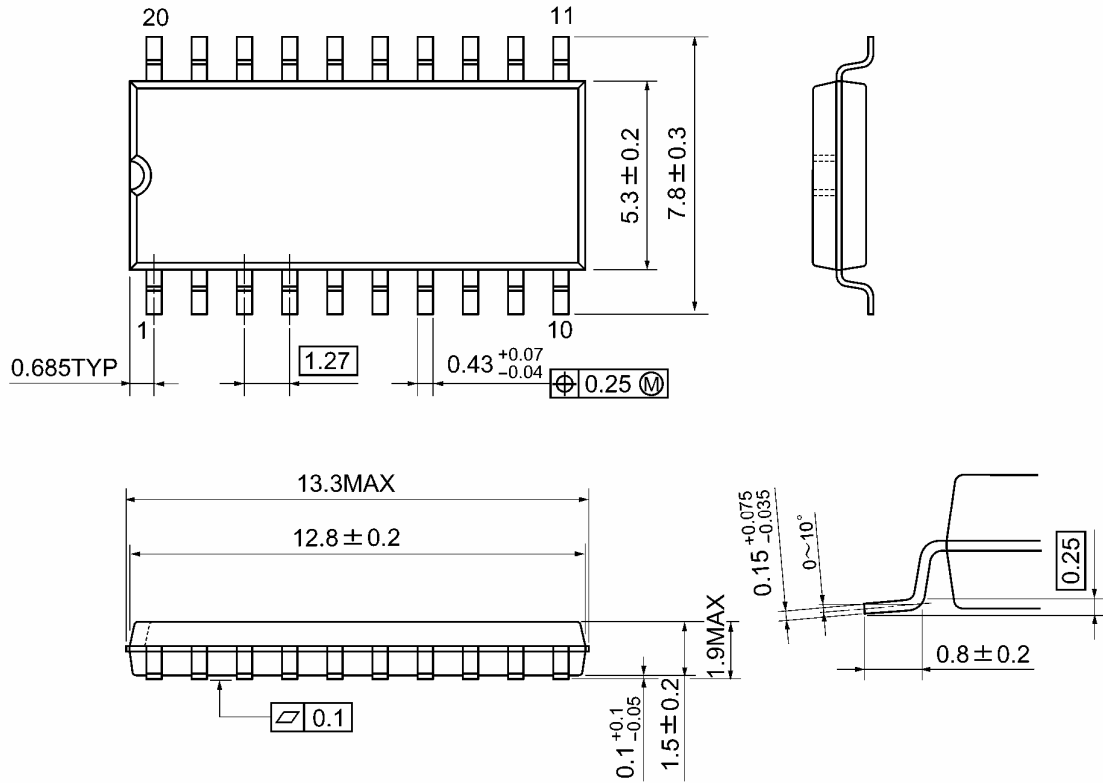


Weight: 1.30 g (typ.)

Package Dimensions

SOP20-P-300-1.27A

Unit: mm



Weight: 0.22 g (typ.)

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20070701-EN GENERAL

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