

CMOS DIGITAL INTEGRATED CIRCUIT
SILICON MONOLITHIC

TC40H042P/F

TC40H042 BCD-TO-DECIMAL DECODER/DRIVER

The TC40H042 is a BCD-to-decimal decoder which converts BCD signal into decimal signal.

The output corresponding to BCD input code attains "L" level, and all other outputs attain "H" level.

Further, for BCD input code "10" or more, all the outputs attain "H" level.

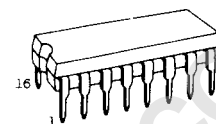
MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
Supply Voltage	V _{DD}	V _{SS} -0.5 ~ V _{SS} +10	V
Input Voltage	V _{IN}	V _{SS} -0.5 ~ V _{DD} +0.5	V
Output Voltage	V _{OUT}	V _{SS} -0.5 ~ V _{DD} +0.5	V
Input Current	I _{IN}	±10	mA
Power Dissipation	PD	300(DIP)/180(MFP)	mW
Storage Temperature	T _{stg}	-65 ~ 150	°C
Lead Temp./Time	T _{sol}	260° • 10 sec	

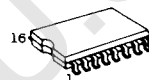
TRUTH TABLE

No.	BCD INPUTS				DECIMAL OUTPUTS									
	A	B	C	D	0	1	2	3	4	5	6	7	8	9
0	L	L	L	L	L	H	H	H	H	H	H	H	H	H
1	H	L	L	L	H	L	H	H	H	H	H	H	H	H
2	L	H	L	L	H	H	L	H	H	H	H	H	H	H
3	H	H	L	L	H	H	H	L	H	H	H	H	H	H
4	L	L	H	L	H	H	H	H	L	H	H	H	H	H
5	H	L	H	L	H	H	H	H	H	L	H	H	H	H
6	L	H	H	L	H	H	H	H	H	H	L	H	H	H
7	H	H	H	L	H	H	H	H	H	H	H	L	H	H
8	L	L	L	H	H	H	H	H	H	H	H	H	L	H
9	H	L	L	H	H	H	H	H	H	H	H	H	H	L
10	*	H	*	H	H	H	H	H	H	H	H	H	H	H
15	*	*	H	H	H	H	H	H	H	H	H	H	H	H

* Don't care

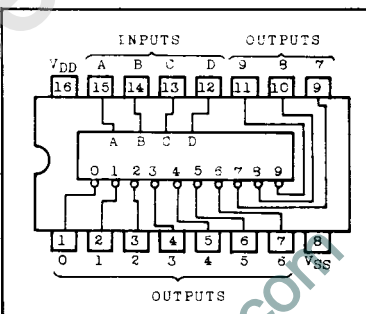


DIP16 (3D16A-F)

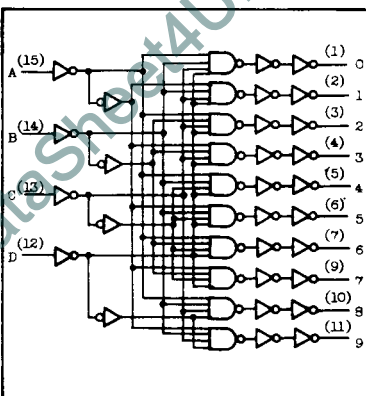


MFP16 (F16GJ-F)

PIN CONNECTION



LOGIC DIAGRAM



TC40H042P/F

RECOMMENDED OPERATING CONDITIONS (V_{SS}=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Supply Voltage	V _{DD}	-	2.0	-	8.0	V
Input Voltage	V _{IN}	-	0	-	V _{DD}	V
Operating Temp.	T _{opr}	-	-40	-	85	°C

ELECTRICAL CHARACTERISTICS (V_{SS}=0V)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	V _{DD} (V)	-40°C		25°C			85°C		UNIT
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.	
"H" Level Output Voltage	V _{OH}	I _{OUT} < 1μA V _{IN} =V _{SS} , V _{DD}	5	4.95	-	4.95	5.0	-	4.95	-	V
"L" Level Output Voltage	V _{OL}	I _{OUT} < 1μA V _{IN} =V _{SS} , V _{DD}	5	-	0.05	-	0.0	0.05	-	0.05	
"H" Level Output Current	I _{OH}	V _{OH} =4.6V V _{IN} =V _{SS} , V _{DD}	5	-1.04	-	-0.88	-	-	-0.72	-	mA
"L" Level Output Current	I _{OL}	V _{OL} =0.4V V _{IN} =V _{SS} , V _{DD}	5	2.8	-	2.2	-	-	1.6	-	
Input Voltage	"H" Level V _{IH}	I _{OUT} < 1μA V _{OUT} =0.5V V _{OUT} =4.5V	5	4.0	-	4.0	-	-	4.0	-	V
	"L" Level V _{IL}		5	-	1.0	-	-	1.0	-	1.0	
Input Current	"H" Level I _{IH}	V _{IH} =8.0V	8	-	0.3	-	10 ⁻⁵	0.3	-	1.0	μA
	"L" Level I _{IL}	V _{IL} =0.0V	8	-	-0.3	-	-10 ⁻⁵	-0.3	-	-1.0	
Quiescent Supply Current	I _{DD}	*V _{IN} =V _{SS} , V _{DD}	5	-	12.5	-	10 ⁻³	12.5	-	75	μA

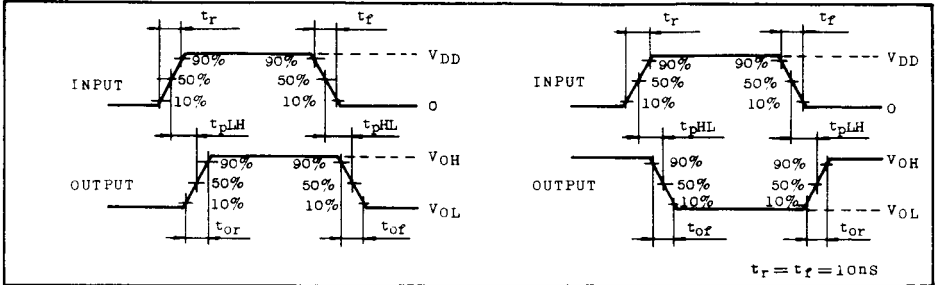
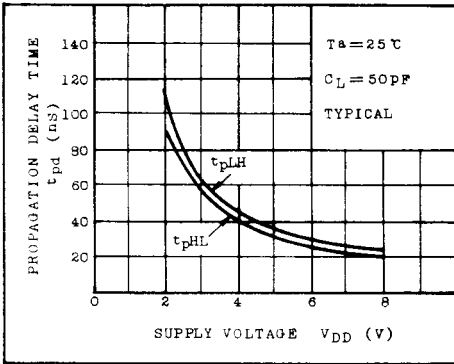
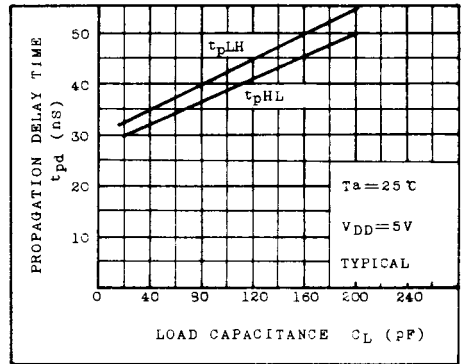
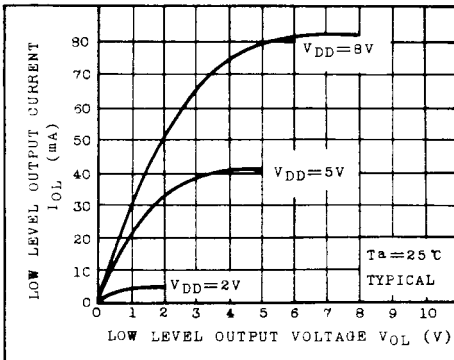
* All valid input combinations.

SWITCHING CHARACTERISTICS (T_a=25°C, V_{DD}=5V, V_{SS}=0V, C_L=50pF)

CHARACTERISTIC	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNIT
Output Rise Time	t _{or}		-	22	35	ns
Output Fall Time	t _{of}		-	16	30	
Propagation Delay Time	(Low-High) t _{PLH}		-	36	54	ns
	(High-Low) t _{PHL}		-	33	50	
Input Capacitance	C _{IN}		-	5		pF

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SWITCHING TIME TEST WAVEFORM

 $t_{pd} - V_{DD}$  $t_{pd} - C_L$  $I_{OL} - V_{OL}$  $I_{OH} - (V_{DD} - V_{OH})$ 