

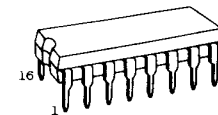
# TC40H138P/F

C<sup>2</sup>MOS DIGITAL INTEGRATED CIRCUIT  
SILICON MONOLITHIC

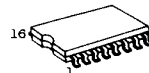
## TC40H138 3-TO-8-LINE DECODER/DEMULTIPLEXER

The TC40H138 is a DECODER/DEMULTIPLEXER which can select arbitrary one of eight output lines through three binary input lines A, B and C. In this case, the selected output goes to "L" level.

Further, when ENABLE input G1 is set to "L" level or ENABLE input  $\overline{G2}$  to "H" level, selection is inhibited regardless of other input signals, and all the outputs go to "H" level.



DIP16(3D16A-P)

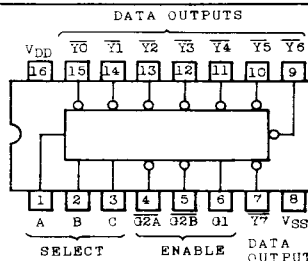


MFP16(F16GC-P)

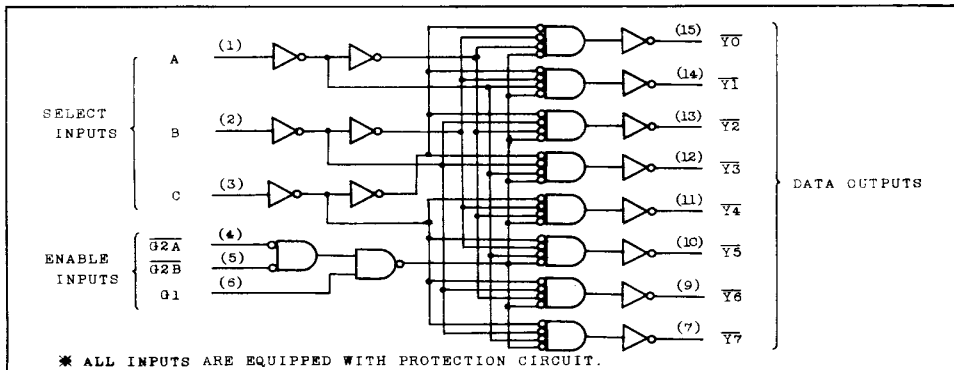
### PIN CONNECTION

### MAXIMUM RATINGS

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



### LOGIC DIAGRAM



## TC40H138P/F

RECOMMENDED OPERATING CONDITIONS ( $V_{SS}=0.0V$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage	$V_{DD}$	-	2.0	-	8.0	V
Input Voltage	$V_{IN}$	-	0	-	$V_{DD}$	V
Operating Temperature	$T_{OPR}$	-	-40	-	85	°C

## TRUTH TABLE

INPUTS						OUTPUTS							
ENABLE			SELECT			$\overline{Y0}$	$\overline{Y1}$	$\overline{Y2}$	$\overline{Y3}$	$\overline{Y4}$	$\overline{Y5}$	$\overline{Y6}$	$\overline{Y7}$
G1	G2A	G2B	A	B	C								
L	*	*	*	*	*	H	H	H	H	H	H	H	H
*	H	*	*	*	*	H	H	H	H	H	H	H	H
*	*	H	*	*	*	H	H	H	H	H	H	H	H
H	L	L	L	L	L	L	H	H	H	H	H	H	H
H	L	L	L	L	L	H	L	H	H	H	H	H	H
H	L	L	L	H	L	H	H	L	H	H	H	H	H
H	L	L	L	H	H	H	H	L	H	H	H	H	H
H	L	L	L	L	H	H	H	H	H	L	H	H	H
H	L	L	L	L	H	H	H	H	H	H	L	H	H
H	L	L	L	H	H	H	H	H	H	H	H	L	H
H	L	L	L	H	H	H	H	H	H	H	H	H	L

\* Don't care

ELECTRICAL CHARACTERISTICS ( $V_{SS}=0.0V$ )

CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{DD}$ (V)	-40°C		25°C			85°C		UNIT	
				MIN.	MAX.	MIN.	TYP.	MAX.	MIN.	MAX.		
High Level Output Voltage	$V_{OH}$	$ I_{OUT}  < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	4.95	-	4.95	5.0	-	4.95	-	V	
Low Level Output Voltage	$V_{OL}$	$ I_{OUT}  < 1\mu A$ $V_{IN}=V_{SS}, V_{DD}$	5	-	0.05	-	0.0	0.05	-	0.05		
High Level Output Current	$I_{OH}$	$V_{OH}=4.6V$ $V_{IN}=V_{SS}, V_{DD}$	5	-0.52	-	-0.44	-	-	-0.36	-	mA	
Low Level Output Current	$I_{OL}$	$V_{OL}=0.4V$ $V_{IN}=V_{SS}, V_{DD}$	5	1.4	-	1.1	-	-	0.8	-		
Input Voltage	"H" Level	$V_{IH}$	5	4.0	+	4.0	-	4.0	-	4.0	-	V
	"L" Level	$V_{IL}$										
Input Current	"H" Level	$I_{IH}$	8	-	0.3	-	$10^{-5}$	0.3	-	1.0	$\mu A$	
	"L" Level	$I_{IL}$	8	-	-0.3	-	$-10^{-5}$	-0.3	-	-1.0		
Quiescent Supply Current	$I_{DD}$	* $V_{IN}=V_{SS}, V_{DD}$	5	-	12.5	-	$10^{-2}$	12.5	-	75	$\mu A$	

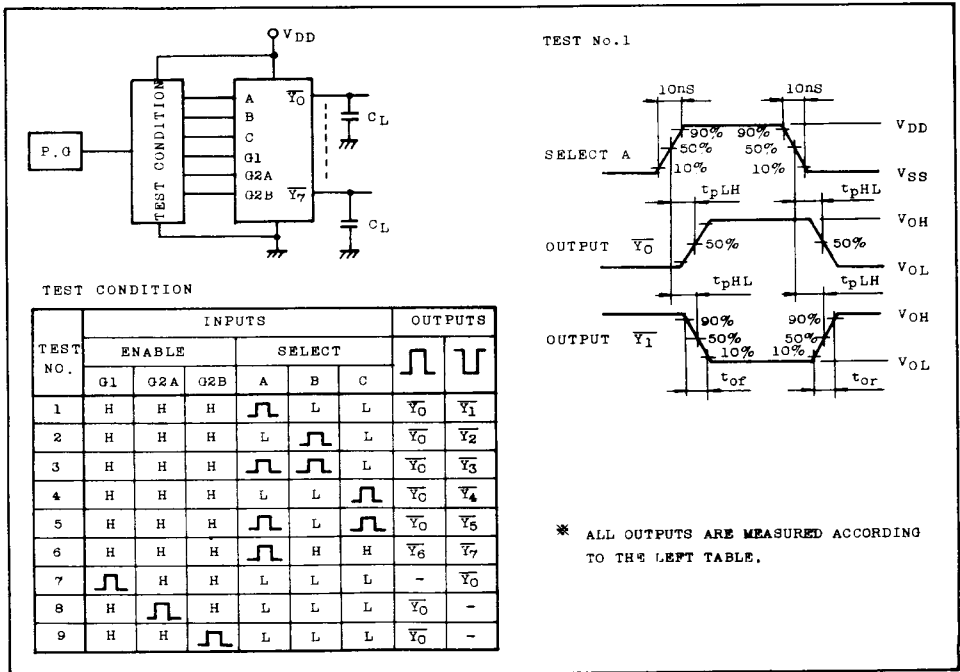
\*All valid input combinations.

## TC40H138P/F

SWITCHING CHARACTERISTIC (Ta=25°C, VSS=0.0V, CL=15pF)

CHARACTERISTIC	SYMBOL	TEST CONDITION	VDD	MIN.	TYP.	MAX.	UNIT
			(V)				
Output Rise Time	t <sub>or</sub>		5	-	17	35	ns
Output Fall Time	t <sub>of</sub>		5		13	30	
Propagation Delay Time (Low-High)	t <sub>pLH</sub>	SELECT- $\bar{Y}$	5		35	53	ns
Propagation Delay Time (High-Low)	t <sub>pHL</sub>		5		40	60	
Propagation Delay Time (Low-High)	t <sub>pLH</sub>	ENABLE- $\bar{Y}$	5	-	35	53	ns
Propagation Delay Time (High-Low)	t <sub>pHL</sub>		5	-	40	60	
Input Capacitance	C <sub>IN</sub>			-	5	-	pF

## SWITCHING TIME TEST CIRCUIT AND WAVEFORM



# TC40H138P/F

