



**MOTOROLA**

## Advance Information 8-Line To 3-Line Priority Encoder

**ELECTRICALLY TESTED PER:  
MPG54F148**

The 54F148 is a Priority Encoder. It provides priority decoding of the inputs to ensure that only the highest order data line is encoded. The F148 has data inputs and outputs which are active at the low logic level.

The F148 encodes eight data lines to three-line (4-2-1) binary (octal). By providing cascading circuitry (Enable Input EI and Enable Output EO) octal expansion is allowed without needing external circuitry.

The 54F148 is a proprietary Motorola part incorporating a built-in deglitcher network which minimizes glitches on the GS output. The glitch occurs on the negative going transition of the EI input when data inputs 0-7 are at logical ones.

**Military 54F148**



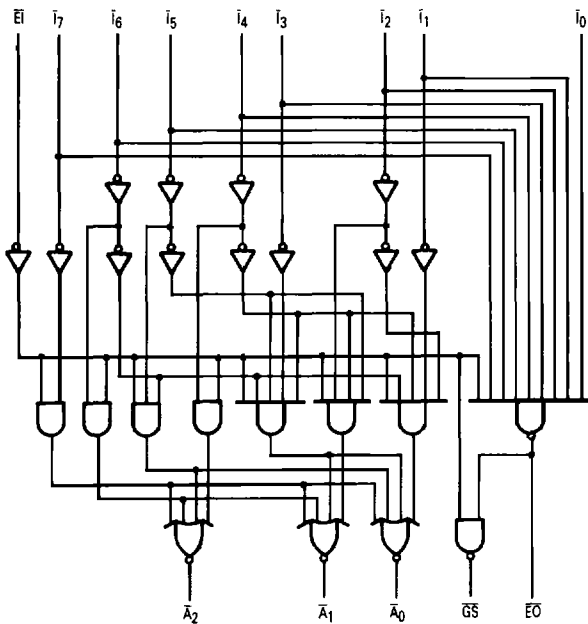
**AVAILABLE AS:**

- 1) JAN: \*
- 2) SMD: \*
- 3) 883C: \*

**X = CASE OUTLINE AS FOLLOWS:**  
**PACKAGE: CERDIP: E**  
**CERFLAT: F**  
**LCC: 2**

**\*Call Factory for latest update**

**LOGIC DIAGRAM**



**PIN ASSIGNMENTS**

FUNCTION	DIL	FLATS	LCC	BURN-IN (CONDITION A)
$\bar{I}_4$	1	1	2	GND
$\bar{I}_5$	2	2	3	GND
$\bar{I}_6$	3	3	4	GND
$\bar{I}_7$	4	4	5	GND
EI	5	5	7	GND
$\bar{A}_2$	6	6	8	OPEN
$\bar{A}_1$	7	7	9	OPEN
GND	8	8	10	GND
$\bar{A}_0$	9	9	12	OPEN
$\bar{I}_0$	10	10	13	GND
$\bar{I}_1$	11	11	14	GND
$\bar{I}_2$	12	12	15	GND
$\bar{I}_3$	13	13	17	GND
GS	14	14	18	OPEN
EO	15	15	19	OPEN
VCC	16	16	20	VCC

**BURN-IN CONDITIONS:**  
**VCC = 5.0 V MIN/6.0 V MAX**

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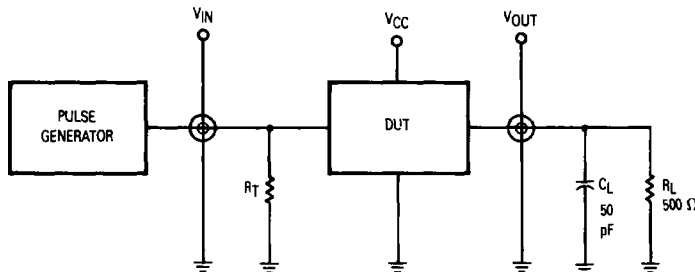
This document contains information on a new product. Specifications and information herein are subject to change without notice.

# 54F148

TRUTH TABLE														
Inputs									Outputs					
$\bar{E}1$	$\bar{I}_0$	$\bar{I}_1$	$\bar{I}_2$	$\bar{I}_3$	$\bar{I}_4$	$\bar{I}_5$	$\bar{I}_6$	$\bar{I}_7$	$\bar{G}S$	$\bar{A}_0$	$\bar{A}_1$	$\bar{A}_2$	$\bar{E}0$	
H	X	X	X	X	X	X	X	X	H	H	H	H	H	H
L	H	H	H	H	H	H	H	H	H	H	H	H	H	L
L	X	X	X	X	X	X	X	L	L	L	L	L	L	H
L	X	X	X	X	X	X	L	H	L	L	L	L	L	H
L	X	X	X	X	L	H	H	H	L	L	L	L	L	H
L	X	X	X	L	H	H	H	H	L	L	L	L	H	H
L	X	X	L	H	H	H	H	H	L	L	L	L	H	H
L	X	L	H	H	H	H	H	H	L	L	L	L	H	H
L	L	H	H	H	H	H	H	H	L	L	L	L	H	H

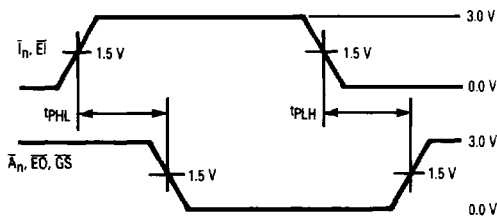
H = HIGH Voltage Levels  
 L = LOW Voltage Levels  
 X = Irrelevant

## TEST CIRCUIT

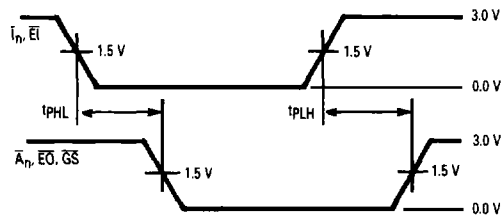


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## WAVEFORMS



Propagation Delay Times For Inverting Outputs



Propagation Delay Times For Noninverting Outputs

### NOTES:

- Input pulse characteristics are as follows:  
 PRR = 1.0 MHz,  $t_{TLH} = t_{THL} = 2.5$  ns, duty cycle = 50%.
- $C_L = 50$  pF  $\pm 10\%$  including probe and jig capacitance.
- $R_T =$  termination resistance,  $R_T = Z_{out}$  of the pulse generator.
- $R_L = 500 \Omega \pm 5.0\%$ .
- Terminal conditions (pins not designated may be high  $\geq 2.0$  V, low  $\leq 0.8$  V, or open).

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Symbol	Parameter	Limits						Units	Test Condition (Unless Otherwise Specified)
		+ 25°C		+ 125°C		- 55°C			
		Subgroup 1		Subgroup 2		Subgroup 3			
		Min	Max	Min	Max	Min	Max		
V <sub>OH</sub>	Logical "1" Output Voltage	2.5		2.5		2.5		V	V <sub>CC</sub> = 4.5 V, I <sub>OH</sub> = - 1.0 mA, V <sub>IL</sub> = 0.8 V, V <sub>IH</sub> = 2.0 V.
V <sub>OL</sub>	Logical "0" Output Voltage		0.5		0.5		0.5	V	V <sub>CC</sub> = 4.5 V, I <sub>OL</sub> = 20 mA, V <sub>IL</sub> = 0.8 V, V <sub>IH</sub> = 2.0 V.
V <sub>IC</sub>	Input Clamping Voltage		- 1.2					V	V <sub>CC</sub> = 4.5 V, I <sub>IN</sub> = - 18 mA, other inputs are open.
I <sub>IH</sub>	Logical "1" Input Current		20		20		20	μA	V <sub>CC</sub> = 5.5 V, V <sub>IH</sub> = 2.7 V.
I <sub>IHH</sub>	Logical "1" Input Current		100		100		100	μA	V <sub>CC</sub> = 5.5 V, V <sub>IHH</sub> = 7.0 V.
I <sub>IL</sub>	Logical "0" Input Current		- 0.6		- 0.6		- 0.6	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.5 V.
I <sub>IL(I1-I7)</sub>	Logical "0" Input Current		- 1.2		- 1.2		- 1.2	mA	V <sub>CC</sub> = 5.5 V, V <sub>IN</sub> = 0.5 V.
I <sub>OS</sub>	Short Circuit Output Current	- 60	- 150	- 60	- 150	- 60	- 150	mA	V <sub>CC</sub> = 5.5 V, V <sub>OUT</sub> = GND.
I <sub>CC</sub>	Power Supply Current Off		35		35		35	mA	V <sub>CC</sub> = 5.5 V.
V <sub>IH</sub>	Logical "1" Input Voltage	2.0		2.0		2.0		V	V <sub>CC</sub> = 4.5 V.
V <sub>IL</sub>	Logical "0" Input Voltage		0.8		0.8		0.8	V	V <sub>CC</sub> = 4.5 V.
		Subgroup 7		Subgroup 8A		Subgroup 8B			per Truth Table with V <sub>CC</sub> = 5.0 V, V <sub>INL</sub> = 0.5 V, and V <sub>INH</sub> = 2.5 V.
	Functional Tests								

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## 54F148

Symbol	Parameter	Limits						Units	Test Condition (Unless Otherwise Specified)
		+25°C		+125°C		-55°C			
		Subgroup 9		Subgroup 10		Subgroup 11			
		Min	Max	Min	Max	Min	Max		
tPHL1	Propagation Delay Data-Output $\bar{I}_n$ to $\bar{A}_n$	1.0	11	1.0	15	1.0	15	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH1	Propagation Delay Data-Output $\bar{I}_n$ to $\bar{A}_n$	1.0	9.0	1.0	12	1.0	12	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPHL2	Propagation Delay Data-Output $\bar{I}_n$ to $\bar{E}O$	1.0	8.0	1.0	11	1.0	11	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH2	Propagation Delay Data-Output $\bar{I}_n$ to $\bar{E}O$	1.0	7.0	1.0	9.0	1.0	9.0	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPHL3	Propagation Delay Data-Output: $\bar{I}_n$ to $\bar{G}S$	1.0	11	1.0	15	1.0	15	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH3	Propagation Delay Data-Output $\bar{I}_n$ to $\bar{G}S$	1.0	11	1.0	15	1.0	15	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPHL4	Propagation Delay Data-Output $\bar{E}I$ to $\bar{A}_n$	1.0	8.0	1.0	11	1.0	11	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH4	Propagation Delay Data-Output $\bar{E}I$ to $\bar{A}_n$	1.0	9.0	1.0	12	1.0	12	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPHL5	Propagation Delay Data-Output $\bar{E}I$ to $\bar{G}S$	1.0	11	1.0	15	1.0	15	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH5	Propagation Delay Data-Output $\bar{E}I$ to $\bar{G}S$	1.0	7.0	1.0	9.0	1.0	9.0	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPHL6	Propagation Delay Data-Output $\bar{E}I$ to $\bar{E}O$	1.0	11	1.0	13	1.0	13	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .
tPLH6	Propagation Delay Data-Output $\bar{E}I$ to $\bar{E}O$	1.0	7.0	1.0	9.0	1.0	9.0	ns	$V_{CC} = 5.0\text{ V}$ , $C_L = 50\text{ pF}$ , $R_L = 500\ \Omega$ .