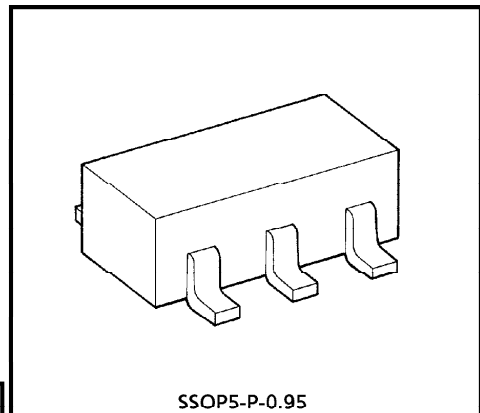


# TC4S30F

## EXCLUSIVE-OR GATE

TC4S30F contains one circuit of exclusive OR gate. Since the buffers of two stage inverters are provided for all the outputs, the input/output voltage characteristic has been improved and the noise immunity has been also improved. And increase of transmission time due to load capacity increase is kept minimum. Wide variety of applications are offered, such as digital comparators and parity circuits.

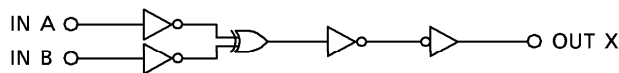


Weight : 0.016g (Typ.)

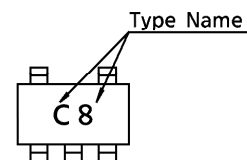
### MAXIMUM RATINGS

CHARACTERISTIC	SYMBOL	RATING	UNIT
DC Supply Voltage	$V_{DD}$	$V_{SS} - 0.5 \sim V_{SS} + 20$	V
Input Voltage	$V_{IN}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
Output Voltage	$V_{OUT}$	$V_{SS} - 0.5 \sim V_{DD} + 0.5$	V
DC Input Current	$I_{IN}$	$\pm 10$	mA
Power Dissipation	$P_D$	200	mW
Operating Temperature Range	$T_{opr}$	$-40 \sim 85$	$^{\circ}C$
Storage Temperature Range	$T_{stg}$	$-65 \sim 150$	$^{\circ}C$
Lead Temperature (10s)	$T_L$	260	$^{\circ}C$

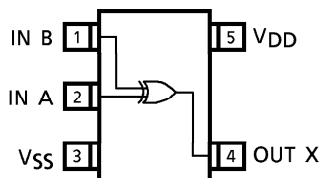
### LOGIC DIAGRAM



### MARKING



### PIN ASSIGNMENT (TOP VIEW)



### TRUTH TABLE

INPUT		OUTPUT
A	B	X
L	L	L
L	H	H
H	L	H
H	H	L

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

CHARACTERISTIC	SYMBOL		MIN.	TYP.	MAX.	UNIT
DC Supply Voltage	$V_{DD}$	—	3	—	18	V
Input Voltage	$V_{IN}$	—	0	—	$V_{DD}$	V

**STATIC ELECTRICAL CHARACTERISTICS ( $V_{SS} = 0V$ )**

CHARACTERISTIC	SYM-BOL	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	5.00	—	4.95	—	V	
			10	9.95	—	9.95	10.00	—	9.95	—		
			15	14.95	—	14.95	15.00	—	14.95	—		
Low-Level Output Voltage	$V_{OL}$	$ I_{OUT}  < 1\mu A$ $V_{IN} = V_{SS}, V_{DD}$	5	—	0.05	—	0.00	0.05	—	0.05	V	
			10	—	0.05	—	0.00	0.05	—	0.05		
			15	—	0.05	—	0.00	0.05	—	0.05		
Output High Current	$I_{OH}$	$V_{OH} = 4.6V$ $V_{OH} = 2.5V$ $V_{OH} = 9.5V$ $V_{OH} = 13.5V$ $V_{IN} = V_{SS}, V_{DD}$	5	-0.61	—	-0.51	-1.0	—	-0.42	—	mA	
			5	-2.5	—	-2.1	-4.0	—	-1.7	—		
			10	-1.5	—	-1.3	-2.2	—	-1.1	—		
			15	-4.0	—	-3.4	-9.0	—	-2.8	—		
Output Low Current	$I_{OL}$	$V_{OL} = 0.4V$ $V_{OL} = 0.5V$ $V_{OL} = 1.5V$ $V_{IN} = V_{SS}, V_{DD}$	5	0.61	—	0.51	1.2	—	0.42	—	mA	
			10	1.5	—	1.3	3.2	—	1.1	—		
			15	4.0	—	3.4	12.0	—	2.8	—		
Input High Voltage	$V_{IH}$	$V_{OUT} = 0.5V, 4.5V$ $V_{OUT} = 1.0V, 9.0V$ $V_{OUT} = 1.5V, 13.5V$ $ I_{OUT}  < 1\mu A$	5	3.5	—	3.5	2.75	—	3.5	—	V	
			10	7.0	—	7.0	5.5	—	7.0	—		
			15	11.0	—	11.0	8.25	—	11.0	—		
Input Low Voltage	$V_{IL}$	$V_{OUT} = 0.5V, 4.5V$ $V_{OUT} = 1.0V, 9.0V$ $V_{OUT} = 1.5V, 13.5V$ $ I_{OUT}  < 1\mu A$	5	—	1.5	—	2.25	1.5	—	1.5	V	
			10	—	3.0	—	4.5	3.0	—	3.0		
			15	—	4.0	—	6.75	4.0	—	4.0		
Input Current	H Level	$I_{IH}$	$V_{IH} = 18V$	18	—	0.1	—	$10^{-5}$	0.1	—	1.0	$\mu A$
	L Level	$I_{IL}$	$V_{IL} = 0V$	18	—	-0.1	—	$-10^{-5}$	-0.1	—	-1.0	
Quiescent Device Current	$I_{DD}$	$V_{IN} = V_{SS}, V_{DD}$	5	—	1	—	0.001	1	—	7.5	$\mu A$	
			10	—	2	—	0.002	2	—	15		
			15	—	4	—	0.002	4	—	30		

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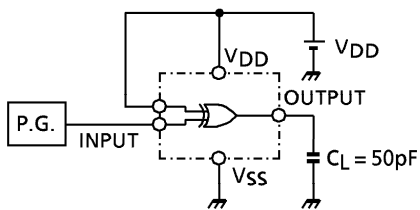
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**DYNAMIC ELECTRICAL CHARACTERISTICS** ( $T_a = 25^\circ\text{C}$ ,  $V_{SS} = 0\text{V}$ ,  $C_L = 50\text{pF}$ )

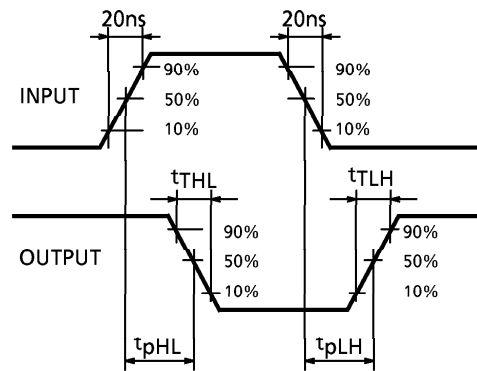
CHARACTERISTIC	SYMBOL	TEST CONDITION	$V_{DD}$ (V)	MIN.	TYP.	MAX.	UNIT
Output Transition Time (Low to High)	$t_{TLH}$	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Output Transition Time (High to Low)	$t_{THL}$	—	5	—	70	200	ns
			10	—	35	100	
			15	—	30	80	
Propagation Delay Time	$t_{pLH}$ $t_{pHL}$	—	5	—	90	280	ns
			10	—	45	130	
			15	—	35	100	
Input Capacitance	$C_{IN}$	—	—	5	7.5	pF	

**CIRCUIT AND WAVEFORM FOR MEASUREMENT OF DYNAMIC CHARACTERISTICS**

CIRCUIT



WAVEFORM



OUTLINE DRAWING  
SSOP5-P-0.95

Unit : mm



Weight : 0.016g (Typ.)