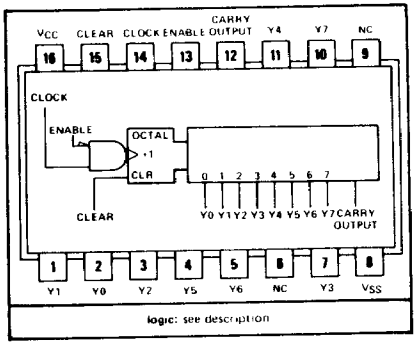
TYPES TF4022A, TP4022A
OCTAL COUNTERS/DIVIDERS

SEPTEMBER 1975

- Designed to be Interchangeable with RCA CD4022A
- Medium-Speed Operation . . . 5 MHz Typical Maximum Clock Frequency at V_{DD} = 10 V
- Fully Static Operation
- Carry Output for Cascading

J OR N
DUAL IN-LINE PACKAGE (TOP VIEW)



NC – No internal connection

description

The '4022A is a four-stage divide-by-8 Johnson counter with built-in code converter. High-speed operation and spike-free outputs are obtained by use of the Johnson octal counter configuration.

The eight decoded outputs are normally low and go high only at their respective octal time period. A high clear signal asynchronously clears the octal counter and sets the carry output and Y0 high. With enable low, the count is advanced on a low-to-high transition at the clock input. Alternatively, if the clock input is high, the count is advanced on a high-to-low transition at enable. The carry output is high while Y0, Y1, Y2, or Y3 is high, then is low while Y4, Y5, Y6, or Y7 is high.

specifications

MAXIMUM RATINGS	RECOMMENDED OPERATING CONDITIONS	ELECTRICAL CHARACTERISTICS
Page 62	Page 62 and below	Page 63, group 3, except as on following page

recommended operating conditions

		TF4022A				TP4022A				UNIT
		V_{DD} = 5 V		V_{DD} = 10 V		V_{DD} = 5 V		V_{DD} = 10 V		
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
Pulse width, t_w	Clock high or low	500		170		830		250		ns
	Clear	500		170		830		250		ns
Setup time, t_{su}	Enable	350		150		700		300		ns
	Clear inactive state	500		200		750		275		ns

electrical characteristics

PARAMETER		TEST CONDITIONS†		TF4022A		TP4022A		UNIT
				V_{DD} = 5 V	V_{DD} = 10 V	V_{DD} = 5 V	V_{DD} = 10 V	
				MIN MAX	MIN MAX	MIN MAX	MIN MAX	
I_{OH} High-level output-current	Y outputs	V_{IH} = V_{DD}, V_{IL} = 0, V_O = V_{OH} min	T_A = MIN	−120	−120	−85	−85	μA
			T_A = 25°C	−100	−100	−70	−70	
			T_A = MAX	−70	−70	−55	−55	
	Carry output		T_A = MIN	−450	−450	−300	−300	μA
			T_A = 25°C	−350	−350	−240	−240	
			T_A = MAX	−250	−250	−200	−200	
I_{OL} Low-level output current	Y outputs	V_{IH} = V_{DD}, V_{IL} = 0, V_O = V_{OL} max	T_A = MIN	60	120	30	85	μA
			T_A = 25°C	50	100	25	70	
			T_A = MAX	35	70	20	55	
	Carry output		T_A = MIN	185	450	95	300	μA
			T_A = 25°C	150	350	80	250	
			T_A = MAX	105	250	65	200	

†T_A = MIN or MAX refers to the respective values of temperature specified under recommended operating conditions.

switching characteristics at 25°C free-air temperature

PARAMETER‡	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	TF4022A		TP4022A		UNIT
				V_{DD} = 5 V	V_{DD} = 10 V	V_{DD} = 5 V	V_{DD} = 10 V	
				MIN MAX	MIN MAX	MIN MAX	MIN MAX	
f_{max}				1	3	0.6	2	MHz
t_{PLH}	Clock or clear	Any A output	C_L = 50 pF§, R_L = 200 kΩ, See Note 1	2000	600	2500	750	ns
t_{PHL}				2000	600	2500	750	
t_{PLH}	Clock or clear	Carry output		1300	400	1600	500	ns
t_{PHL}				1300	400	1600	500	
t_{TLH}		Any Y		1800	700	2400	900	ns
t_{THL}				1800	700	2400	900	
t_{TLH}		Carry output		600	300	700	400	ns
t_{THL}				600	300	700	400	

‡f_{max} = Maximum clock frequency
t_{PLH} = Propagation delay time, low-to-high-level output
t_{PHL} = Propagation delay time, high-to-low-level output
t_{TLH} = Transition time, low-to-high-level output
t_{THL} = Transition time, high-to-low-level output
§With a 15-pF load, these devices switch with times similar to those of the RCA CD4022A.
NOTE 1: See load circuit and voltage waveforms on page 170.

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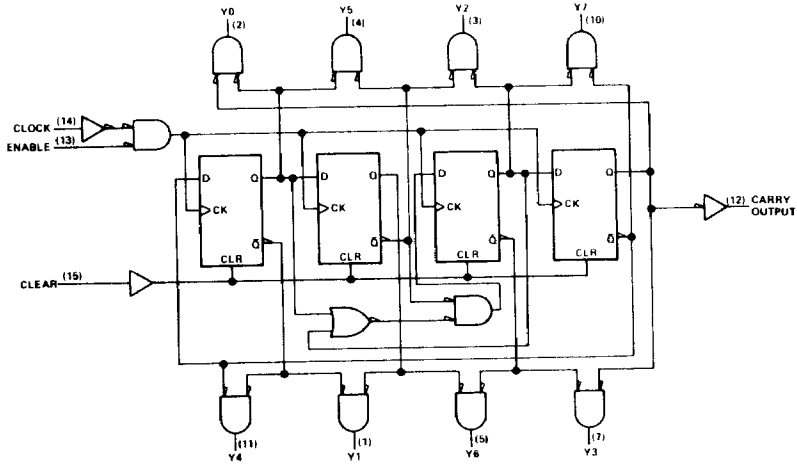
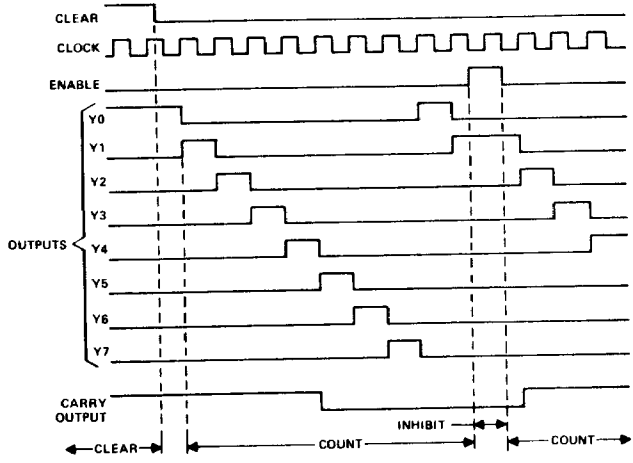
functional block diagram



typical clear, count, and inhibit sequences



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