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FREQUENCY DIVIDER

GENERAL DESCRIPTION

MMC 362 frequency divider is a metal gate CMOS integrated circuit. The time base of the circuit is provided by connecting a 4 MHz quartz and a RC network to the on-chip CMOS inverter/amplifier. The circuit provides multiplexing signals at a 1 KHz rate, with a 25% duty cycle, and clock signals of period ,01 s, .1 s, 1 s and 1 min. The circuit is supplied in a 16-lead dual-in-line package.

FEATURES

- wide supply range: 3 ... 18 V
- 4 MHz crystal-controlled operation
- available in 16-lead dual-in-line package

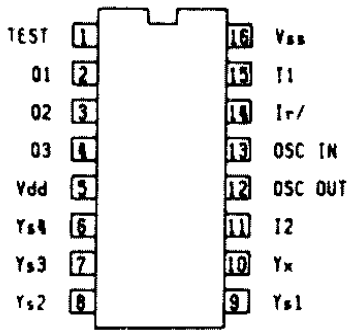
ABSOLUTE MAXIMUM RATINGS

V_{DD}	Supply voltage	-0.5 ...	18	V
V_I	Input voltage	-0.5 ...	V_{DD} + 0.5	V
I_I	DC input current	+10 mA		
P_D	Total power dissipation	200 mW		
T_A	Operating temperature	-40 ...	+ 85	°C
T_S	Storage temperature	-65 ...	+150	°C

RECOMMENDED OPERATING CONDITIONS

V_{DD}	Supply voltage	3 ...	15	V
V_I	Input voltage	0 ...	V_{DD}	
T_A	Operating temperature	-40 ...	+85	°C

CONNECTION DIAGRAM



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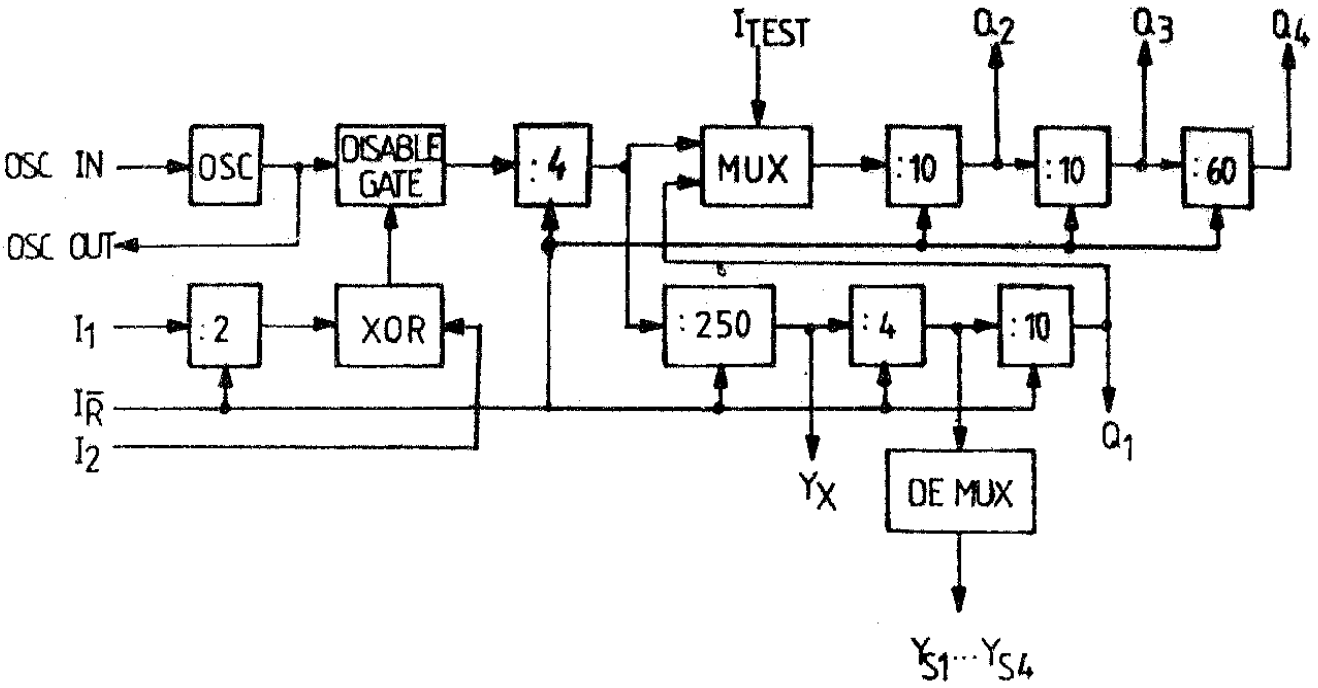
BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The precision tine base of the circuit is provided by connecting a 4 MHz quartz crystal and a RC network together with the on-chip CMOS inverter/amplifier. The inputs I_1, I_2 disable the access of the signal generated by the internal oscillator to the dividing chain, by a pulse applied on I_1 or by a step applied on I_2. The state after reset make access possible if I_2 is connected to V_{SS}. A low level on the I_R input resets to 0 the flip-flops of the circuit; Schmitt Trigger action on this input permits unlimited clock rise and fall times.

For testing purposes, I_{TEST} input connected to V_{SS} allows a 1 MHz signal to be applied to the second section of the dividing chain instead of the 100 Hz signal in normal operation.
The circuit provides 25% duty cycle, 1 KHz frequency multiplexing signals, Y_{S1} . . . Y_{S4}, and a 4 KHz signal, Y_X, for timing purposes.
It also provides signals of period equal to .01 s, .1 s, 1 s, 1 min, that can be used as clock input for a timer. The circuit being mounted in 16-lead dual-in-line package, the .01 s output is not connected.

STATIC ELECTRICAL CHARACTERISTICS

PARAMETER			TEST CONDITIONS				VALUES						UNIT
			V_I (V)	V_O (V)	I_O (μA)	V_{DD} (V)	T_{LOW}		25°C		T_{HIGH}		
							min.	max.	min.	max.	min.	max.	
I_L	Quiescent current	G, H types	0/ 5			5		20		20		600	μA
			0/10			10		40		40		1200	
			0/15			15		80		80		2400	
			0/20			20		400		400		12000	
		E, F types	0/ 5			5		80		80		600	
			0/10			10		160		160		1200	
			0/15			15		320		320		2400	
V_{OH}	Output low voltage		0/ 5		< 1	5	4.95		4.95		4.95		V
			0/10		< 1	10	9.95		9.95		9.95		
			0/15		< 1	15	14.95		14.95		14.95		
V_{OL}	Output low voltage		5 /0		< 1	5		0.05		0.05		0.05	V
			10/0		< 1	10		0.05		0.05		0.05	
			15/0		< 1	15		0.05		0.05		0.05	

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STATIC ELECTRICAL CHARACTERISTICS (cont'd)

PARAMETER			TEST CONDITIONS V_I (V)	V_O (V)	I_O (μA)	V_{DD} (V)	VALUES T_{LOW} min.	T_{LOW} max.	25°C min.	25°C max.	T_{HIGH} min.	T_{HIGH} max.	UNIT
V_{IH}	Input high voltage			0.5/4.5 1/9 1.5/13.5	< 1 < 1 < 1	5 10 15	4 8 12.5		4 8 12.5		4 8 12.5		V
V_{IL}	Input low voltage			4.5/0.5 9/1 13.5/1.5	< 1 < 1 < 1	5 10 15		1.5 3.0 4.0		1.5 3.0 4.0		1.5 3.0 4.0	V
I_{IH}, I_{IL}	Input leakage curent	G, H types	0/18			18				.1		1.0	μA
		E, F types	0/15			15		.3		.3		1.0	
I_{OH}	Output drive current	G, H types	0/ 5 0/ 5 0/10 0/15	2.5 4.6 9.5 13.5		5 5 10 15	−2.0 −0.6 −1.6 −4.2		−1.6 −0.5 −1.3 −3.4		−1.1 −0.3 −0.9 −2.4		mA
		E, F types	0/ 5 0/ 5 0/10 0/15	2.5 4.6 9.5 13.5		5 5 10 15	−1.5 −0.5 −1.3 −3.6		−1.3 −0.4 −1.1 −3.0		−1.1 −0.3 −0.9 −2.4		
I_{OL}	Output sink current	G, H types	0/ 5 0/10 0/16	0.4 0.5 1.5		5 10 15	0.6 1.6 4.2		0.5 1.3 3.4		0.3 0.9 2.4		mA
		E, F types	0/ 5 0/10 0/15	0.4 0.5 1.5		5 10 15	0.5 1.3 3.6		0.4 1.1 3.0		0.3 0.9 2.4		
C_I	Input capacitance		Any input							7.5			pF

DYNAMIC ELECTRICAL CHAHACTERISTICS

PARAMETER		TEST CONDITIONS V_{DD} (V)	VALUES min.	VALUES max.	UNIT
t_{PLH}, t_{PHL}	Propagation delay I-O	15		5	μs
t_{TLH}, t_{THL}	Transition delay	15		150	ns
f_{CK}	Clock frequency	5 15		5 15	MHz

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