COS/MOS INTEGRATED CIRCUITS

M 738/M 740
M 741/M 747

PRELIMINARY DATA

7-STAGE DIVIDER

- LOW POWER DISSIPATION
- LOW OUTPUT IMPEDANCE ON BOTH HIGH AND LOW STATE
- WIDE SUPPLY VOLTAGE RANGE: 5 to 15V
- HIGH NOISE IMMUNITY
- INPUTS FULLY PROTECTED

The M738/M740/M741/M747 are integrated circuits constructed in COS/MOS technology for use as frequency dividers in electronic organs. All the devices consist of 7 stages of binary division connected to give five divider blocks for the M741/M747 and four divider blocks for the M738/M740. The information transfer occurs on the positive going edge of the clock, for M740 and M747, and the negative going edge of the clock for M738/M741, and each output features a symmetrical impedance buffer (300Ω typ. at V_{DD}= 10V). They are available in 14 lead dual in-line plastic package.

ABSOLUTE MAXIMUM RATINGS*

V_{DD}**	Supply voltage	-0.5 to	15	V
V_I	Input voltage (at any pin)	-0.5 to V_{DD}+0.5		V
P_{tot}	Total power dissipation (per package)		200	mW
T_{stg}	Storage temperature	-65 to	150	°C
T_{op}	Operating temperature	-40 to	85	°C

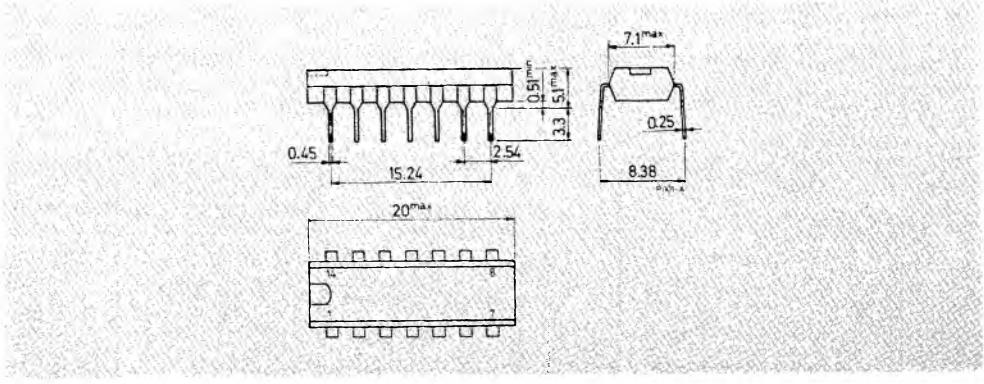
* Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

** All voltages values are refered to V_{SS} pin voltage.

ORDERING NUMBERS: M 7XX B1 for dual in-line plastic package

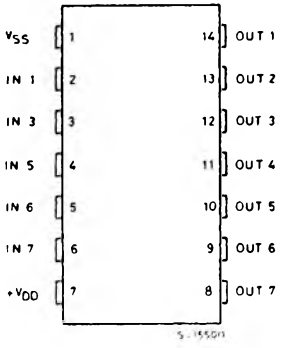
MECHANICAL DATA

Dimensions in mm



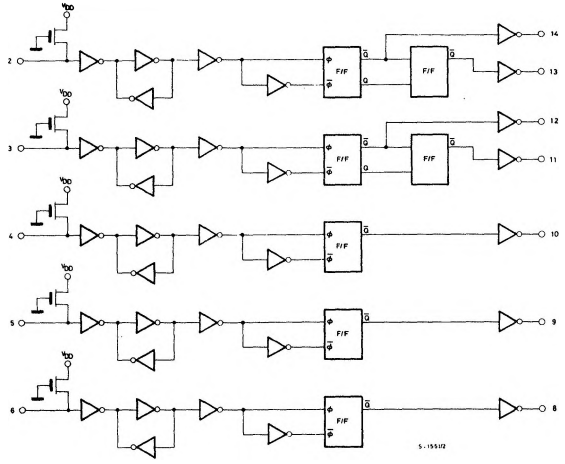
CONNECTION DIAGRAMS

For M741/M747

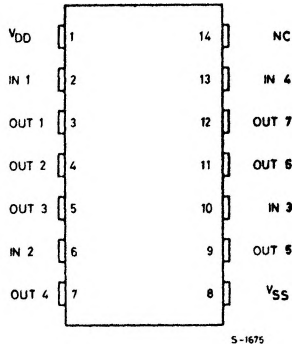


FUNCTIONAL DIAGRAMS

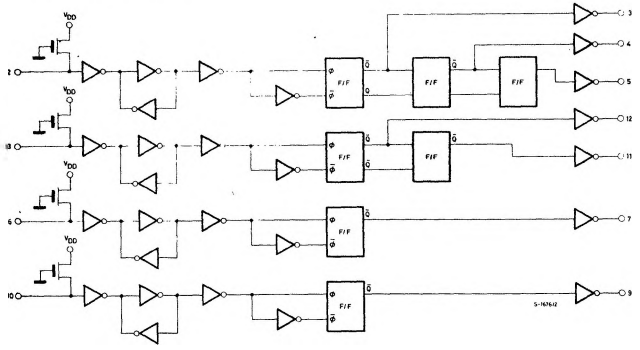
For M741/M747



For M738/M740



For M738/M740



RECOMMENDED OPERATING CONDITIONS

Parameter		V_{DD}(V)	Min.	Typ.	Max.	Unit
V_{DD}	Supply voltage		5		15	V
V_I	Input voltage		-0.5		V_{DD} +0.5	V
T_{op}	Operating temperature		-40		85	°C
t_w	Width of clock pulse (high or low)	5		200		ns
		10		100		

STATIC ELECTRICAL CHARACTERISTICS (over recomended operating conditions)

Typical values are at T_{amb} = 25°C

Parameter		Test conditions			Values									Unit
			V_O (V)	V_{DD} (V)	-40°C			25°C			85°C			
					Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
I_{CCL}	Quiescent supply current	V_i=V_{DD}		5			5			5			300	µA
				10			10			10			600	
				15			50			50			2000	
V_{OH}	High level output voltage	I_o= 0		5	4.99			4.99			4.95			V
				10	9.99			9.99			9.95			
				15	14.99			14.99			14.95			
V_{OL}	Low level output voltage	I_o= 0		5			0.01			0.01			0.05	V
				10			0.01			0.01			0.05	
				15			0.01			0.01			0.05	
I_{OL}	Output drive current N-channel		0.5	5	0.5			0.5	0.8		0.45			mA
			0.5	10	1			1	1.6		0.95			
			0.5	15	1.6			1.6	2.5		1.55			
I_{OH}	Output drive current P-channel		4.5	5	-0.5			-0.5	-0.8		-0.45			mA
			9.5	10	-1			-1	-1.6		-0.95			
			14.5	15	-1.6			-1.6	-2.5		-1.55			
I_{IL}	Input current	V_i= 0		15				3	30	100				µA
I_{IH}	Input current	V_i=V_{DD}		15			1			1			1	µA

DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C)

Parameter			Test conditions	Values				Unit
				V_{DD}(V)	Min.	Typ.	Max.	
t_{PLH}, t_{PHL}	Propagation delay time from inputs to:	1 division stage outputs	C_L = 15 pF on all outputs see timing diagram	5			500	ns
				10			250	
		2 division stage outputs		5			1000	ns
				10			500	
		3 division stage outputs		5			1500	ns
				10			750	
t_{TLH}, t_{THL}	Output transition time			5			500	ns
				10			250	
f_{max}	Maximum toggle frequency		C_L= 15 pF on all outputs	5	0.6	2.5		MHz
				10	2	5		
*	Cross talk immunity level					70		dB
C_I	Input capacitance					5		pF

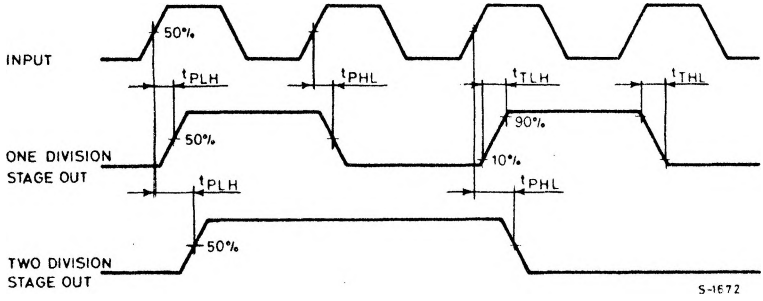
* Send a frequency of 20 kHz to input V_{I1} charge output V_{O1} with 5 kΩ and 15 pF, measure the level of the 10 kHz frequency present at all outputs.

Cross talk level = $20 \log \frac{V_{O1}\ (10\ kHz)}{V_{OX}\ (10\ kHz)}$.

With the exception of V_{O1}, the output where the 10 kHz signal is greatest is V_{OX}.
This operation is repeated for all the inputs.

TIMING DIAGRAM

For M740/M747



For M738/M741