COS/MOS INTEGRATED CIRCUIT

M 714

PRELIMINARY DATA

23-STAGE COUNTER

- LOW QUIESCENT POWER DISSIPATION
- WIDE SUPPLY VOLTAGE RANGE: 3 to 15V
- HIGH NOISE IMMUNITY: 45% of V_{DD} (TYP.)
- INPUTS FULLY PROTECTED
- OUTPUT WAVEFORMS SHAPED for a 25% DUTY CYCLE

The M714 (standard temperature range) is 23-stage binary counter constructed with MOS-P channel and N-channel enhancement mode devices in a single monolithic chip. The device may be used as timing circuit. It consist of 23 flip-flops, two output buffers, providing push-pull operation one zener diode providing transient protection at ~ 10V, and input inverters for use in a crystal oscillator. The device is available in 14-lead dual in-line plastic or ceramic package.

ABSOLUTE MAXIMUM RATINGS*

V_{DD} **	Supply voltage	-0.5 to 15 V
V_i	Input voltage (at any pin)	$V_{SS} \leqslant V_i \leqslant V_{DD}$
P_{tot}	Total power dissipation (per package, including zener diode)	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.

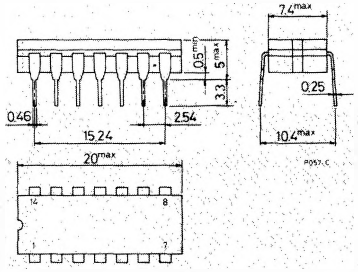
** With respect to V_{SS} (GND) pin.

ORDERING NUMBERS: M714 D1 for dual in-line ceramic package frit seal
M714 B1 for dual in-line plastic package

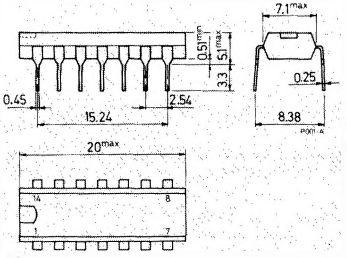
MECHANICAL DATA

Dimensions in mm

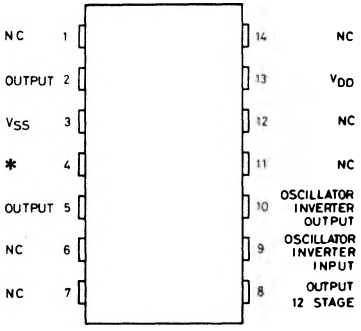
Dual in-line ceramic package, frit seal



Dual in-line plastic package



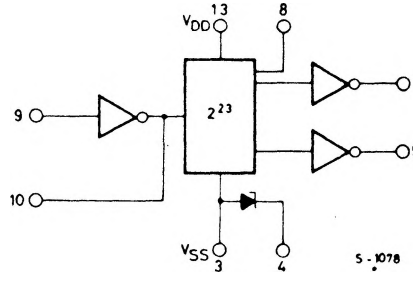
PIN CONNECTIONS



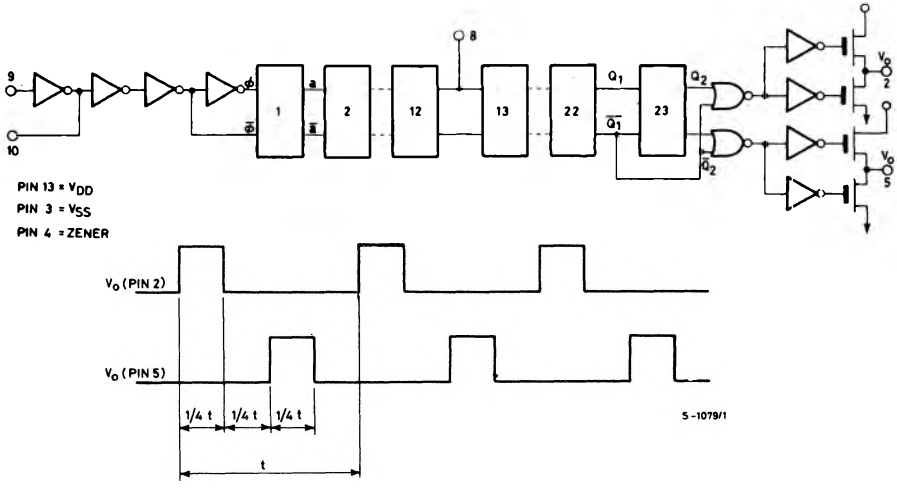
* ZENER CATHODE

S-1080/1

LOGIC DIAGRAM



BLOCK DIAGRAM and OUTPUT WAVEFORMS



RECOMMENDED OPERATING CONDITIONS

V_{DD}	Supply voltage: for general applications	3 to 15	V
	for oscillator starting	6 to 15	V
V_I	Input voltage	V_{DD} to V_{SS}	
T_{op}	Operating temperature	-40 to 85	°C

STATIC ELECTRICAL CHARACTERISTICS (over recommended operating conditions)

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_L	Quiescent supply current			5			50		1	50			700	μA
				10			100		2	100			1400	
				15										
V_{OH}	Output high voltage	$I_O = 0$		5	4.99			4.99	5		4.95			V
				10	9.99			9.99	10		9.95			
V_{OL}	Output low voltage	$I_O = 0$		5			0.01		0	0.01			0.05	V
				10			0.01		0	0.01			0.05	
V_{NH}	Noise immunity			5	1.4			1.5	2.25		1.5			V
				10	2.9			3	4.5		3			
V_{NL}	Noise immunity		1	5	1.5			1.5	2.25		1.4			V
			1	10	3			3	4.5		2.9			
I_{DN}	Output drive current N-channel		0.5	5	2.2			1.8	4		1.3			mA
			0.5	10	3.5			2.8	8		2			
I_{DP}	Output drive current P-channel		4.5	5	-1.6			-1.3	-4		-0.9			mA
			9.5	10	-2.8			-2.3	-8		-1.6			
V_Z	Zener voltage	I_Z=100μA							10.5					V
		I_Z=10 mA							11.2					
I_{IH},I_{IL}	Input leakage curr.								10					pA

DYNAMIC ELECTRICAL CHARACTERISTICS (T_{amb} = 25°C, C_L = 15 pF, typical temperature coefficient for all V_{DD} values is 0.3%/°C, all input rise and fall time = 20 ns.

Parameter		Test conditions		Values			Unit
			V_{DD} (V)	Min.	Typ.	Max.	
t_r, t_f	Input clock rise and fall time		5			15	μs
			10			10	
f_{CL}	Maximum clock input frequency		5	3.5	5		MHz
			10	6.5	10		
C_I	Input capacitance	Any input			5		pF

TYPICAL APPLICATIONS

Digital equipment in which ultra-low dissipation and/or operation using a battery source are primary design requirements.
Accurate timing from a crystal oscillator for timing applications such as wall clocks, table clocks, automobile clocks, and digital timing references in any circuit requiring accurately timed outputs.
Driving miniature synchronous motors, stepping motors, or external bipolar transistors in push-pull fashion.