

# DIGITAL MONOLITHIC INTEGRATED CIRCUITS (MOS)

## MOS IC, LSI

Type No.	Function	Maximum Ratings (Ta=25°C)	Electrical Characteristics (Ta=25°C)								
			Item	Symbol	Condition	min.	typ.	max.	Unit		
<b>MN6094</b> <b>MN6095</b> △ <b>MN6096</b>	CMOS Quartz Clock Circuit with 64Hz Synchronous Motor Driver	$V_{DD} = -0.3 \sim +4V$ $V_I = -0.3 \sim +4V$ $P_D = 300mW$ $T_{opr} = -30 \sim +70^\circ C$ $T_{stg} = -40 \sim +100^\circ C$	Supply Voltage	$V_{DD}$		1.2	1.5	1.9	V		
			Supply Current	$I_{DD}$	Without load		25	35		$\mu A$	
			Output Saturation Resistance (O1, O2)	$R_{sat1}$	$I_O = 3mA$				200	$\Omega$	
			Output Saturation Resistance (AL)	$R_{sat2}$	$I_O = 0.1mA$			1	4	$k\Omega$	
			Frequency Variation vs Supply Voltage	$\Delta f/f_o$	$V_{DD} = 1.2 \sim 1.7V$				$\pm 1$	ppm	
			Osc. Feedback Resistance	$R_f$		0.5	3			$M\Omega$	
			Osc. Rise Time	$t_{os}$	$V_{DD} = 1.2V$				1	s	
		Operating Condition	Alarm Signal Output Waveforms								
			$V_{DD} = 1.5V$ $V_{SS} = 0$ $f_{osc} = 4.19MHz$								
		<b>MN6220</b>	CMOS Quartz Clock Circuit with Time Signal Generator Usable Either with 0.5Hz Stepper or 16Hz Synchronous Motor	$V_{DD} = -0.3 \sim +4V$ $V_I = -0.3 \sim V_{DD} + 0.3V$ $T_{opr} = -30 \sim +70^\circ C$ $T_{stg} = -55 \sim +100^\circ C$ $V_{DD} = 1.5V$ $V_{SS} = 0$ $f_{osc} = 4.19MHz$	Supply Current	$I_{DD}$	Without load		50	70	$\mu A$
Power Consumption	$P_{tot}$				Without load		75	105		$\mu W$	
Output Saturation Resistance (O1, O2)	$R_{sat}(P+N)$				$V_{DD} = 1.2V, I_O = 3mA$		75	100		$\Omega$	
"H" Level Input Voltage (R)	$V_{IH}$				CNT, RST, CLR, HRS, SKP	1.1				V	
"L" Level Input Voltage (R)	$V_{IL}$				STP, ADJ, CST Pin				0.4	V	
Input Current	$I_{IL}$				$V_I = 0, RST, CLR, HRS, SKP, STP, ADJ, CST Pin$	-7.5	-15	-30		$\mu A$	
Output Resistance (1)	$R_{O1}$				Between OTS, OTR Pin and OTC Pin				2	$k\Omega$	
Output Resistance (2)	$R_{O2}$				Between OTC Pin and $V_{SS}$ Pin				0.5	$k\Omega$	
Frequency Variation vs Supply Voltage	$\Delta f/f_o$				$V_{DD} = 1.2 \sim 1.7V$				$\pm 1$	ppm	
Osc. Feedback Resistance	$R_f$					0.5	3			$M\Omega$	
Osc. Rise Time	$t_{os}$	$V_{DD} = 1.2V$				1	s				
<b>CMOS Watches</b>											
△ <b>MN6200</b>	CMOS Digital Quartz Watch Circuit for LCD Driver	$V_{SS} = -5 \sim +0.3V$ $T_{opr} = -10 \sim +70^\circ C$ $T_{stg} = -55 \sim +100^\circ C$ $V_{SS} = -1.5V$ $V_{LCD} = -3.0V$ $f_{osc} = 32.768kHz$	Supply Voltage	$V_{SS}$	$V_{SS} = 0V$	-1.25	-1.55	-1.80	V		
			Supply Current	$I_{SS}$	$V_{SS} = -1.55V$ Without load				-2.5	$\mu A$	
			Output Saturation Voltage	$V_{sat}$	$t_{osc} = 10s$					-1.4	V
			Frequency Variation vs Supply Voltage	$\Delta f/f_o$	$V_{SS} = -1.45 \sim -1.55V$				$\pm 2$	ppm	
			Oscillation Rise Time	$R_f$	$V_{SS} = -1.55V$			20		$M\Omega$	
<b>MN6201</b>	CMOS Digital Quartz Watch Circuit for LCD Driver	$V_{SS1} = +0.2 \sim -3V$ $V_{SS2} = +0.2 \sim -6V$ $T_{opr} = -20 \sim +70^\circ C$ $T_{stg} = -55 \sim +100^\circ C$ $V_{DD} = 0$ $V_{SS1} = -1.55V$ $V_{SS2} = -3V$ $f_{osc} = 32.768kHz$	Supply Voltage (1)	$V_{SS1}$		-1.25	-1.55	-1.8	V		
			Supply Voltage (2)	$V_{SS2}$	$C_1$ Open	-2	-3	-3.6	V		
			Supply Current	$I_{SS}$	Without load				-3.6	$\mu A$	
			Osc. Start Voltage	$V_{STA}$	$t_{osc} = 10s$				-1.4	V	
			Frequency Variation vs Supply Voltage	$\Delta f/f_o$	$V_{SS1} = -1.45 \sim -1.55V$				$\pm 2$	ppm	
			Osc. Feedback Resistance	$R_f$				20		$M\Omega$	

△ Preliminary

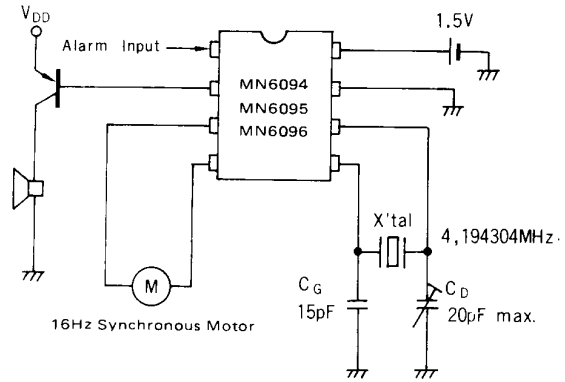
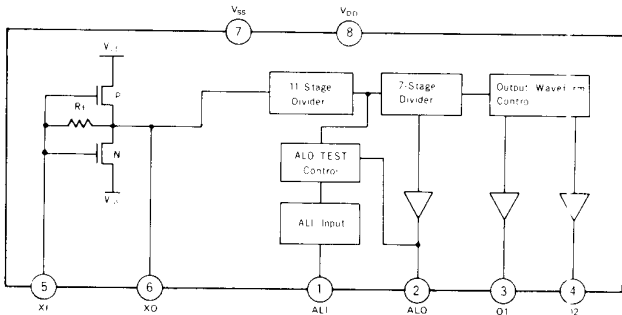
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MOS IC, LSI

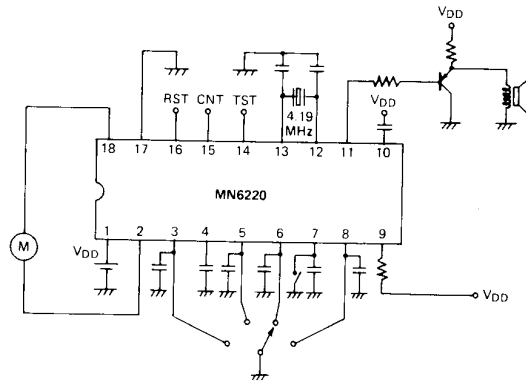
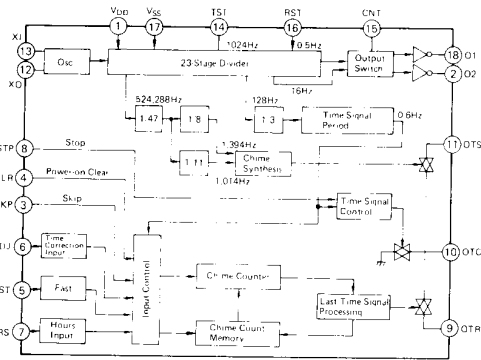
Block Diagram

Application Circuit

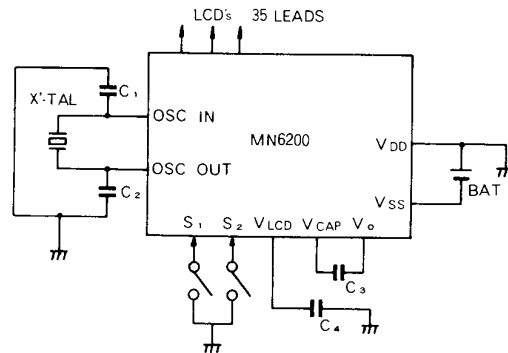
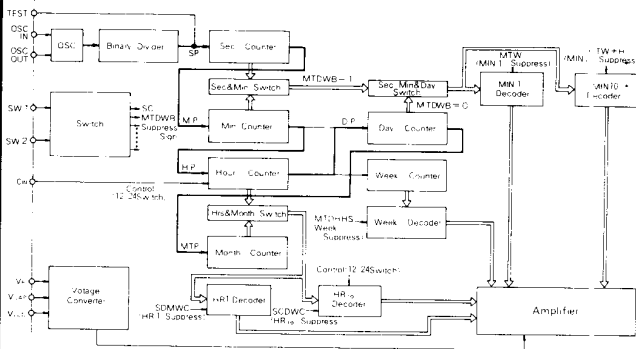
MN6094, MN6095, MN6096  
(Package L-9, 8-Lead Plastic DIL)



MN6220 (Package L-15, 18-Lead Plastic DIL)



MN6200 (Chip)



MN6201 (Chip)

Test Circuit

