

LQV Series - Precision Crystal Clock Oscillators

Multiple Synchronous Frequencies & Low Power Consumption - f_0 : 12 Hz to 8 MHz

FEATURES

- 1) Up to 4 outputs (12 Hz to 8 MHz)
- 2) Mask programmable CMOS binary counter makes short lead times for prototypes and production.
- 3) Division of fundamental frequency up to 2^{18} .

LIST OF STANDARD FREQUENCIES (Source Oscillation)

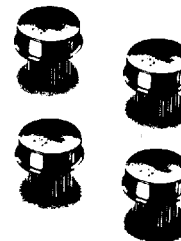
3.20000 MHz	4.8000 MHz
3.27680 MHz	4.9152 MHz
3.68640 MHz	5.0000 MHz
3.93216 MHz	5.1200 MHz
4.00000 MHz	6.0000 MHz
4.09600 MHz	6.1440 MHz
4.19430 MHz	8.0000 MHz

HOW TO ORDER

A. TTL Output

LQV - 3M2768 - 3 C G R

- ① Type
 ② Source Oscillation Frequency (MHz)
 (Exp: 3.2768 MHz)
 ③ Freq. Division Code
 (Exp. $f_0/2^3 = 409.6$ KHz)
 ④ Freq. Division Code (if needed)
 (Exp. $f_0/2^{12} = 800$ Hz)
 ⑤ Freq. Division Code (if needed)
 (Exp. $f_0/2^{16} = 50$ Hz)
 ⑥ Reset or Frequency Code (if needed).



FREQUENCY DIVISION CODE NO.

n =	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	RESET
Code No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	R

NOTE:

Position ② identifies fundamental crystal oscillation frequency only and does not identify an output. Positions ③ through ⑤ identify pin outputs. This means the fundamental frequency is used as an output frequency only when position ③ is a "0" (for $2^0 = 1$).

TYPE



Type	Source Oscillation Frequency (Hz)	Output Frequency (Hz)
LQV-8M00 -012	8.000 MHz	8.000M 4.000M 2.000M
LQV-6M00 -012	6.000 MHz	6.000M 3.000M 1.500M
LQV-5M12 -234	5.120 MHz	1.28M 640K 320K
LQV-4M194304 -3GR	4.194304 MHz	524.288K 64 RESET
LQV-3M93216 -01G	3.932160 MHz	3.93216M 1.96608M 60
LQV-3M2768 -3CGR	3.2768 MHz	409.6K 800 50 RESET

MAXIMUM ABSOLUTE RATING:

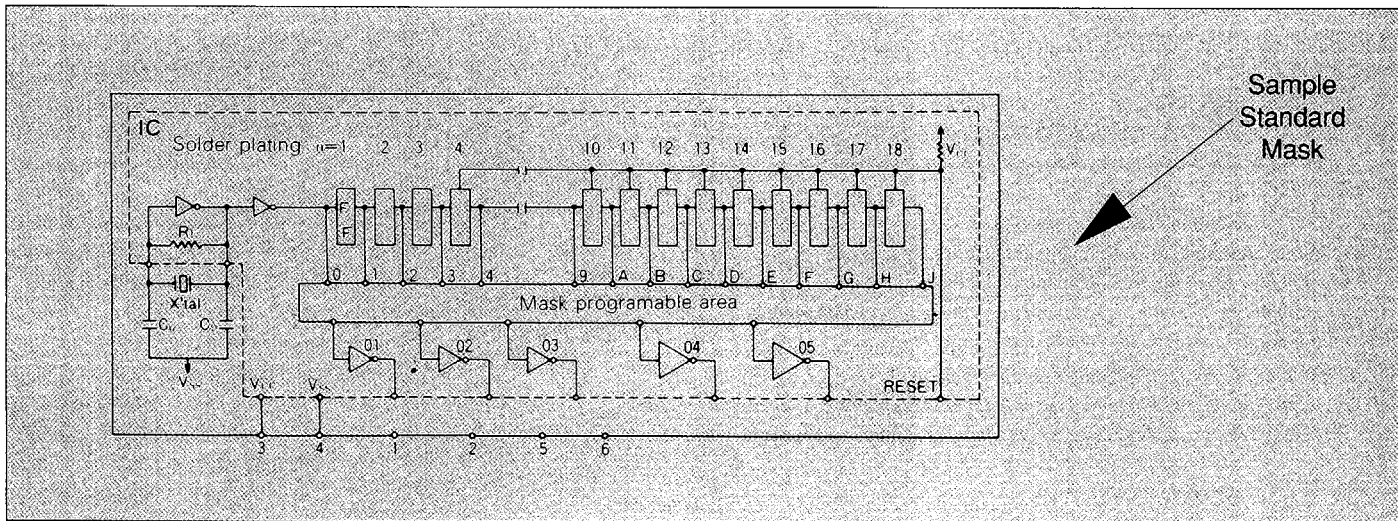
Classification	Code	Rating	Unit
Voltage	V_{CC}	-0.3 to +7.0	V
Working Temperature	T_{opr}	-35 to +85	°C
Storage Temperature	T_{stg}	-40 to +90	°C

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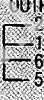
Multiple Synchronous Frequencies & Low Power Consumption - f_0 : 12 Hz to 8 MHz

- CMOS IC is shown in dashed-line box . However, a selection of voluntary frequency comparison is possible due to mask-programmable wiring in solid line box. 
- The source oscillation crystal vibration can be selected in the range between 3.0 to 8.0 MHz.
- Since the oscillator case has 6 pins and two are necessary for V_{DD} and V_{SS} , output is possible from a maximum of 4 pins.
- Unnecessary pins become NC and should not be used as tie point terminals.
- Resetting is also possible. In such a case, one pin is necessary for reset function, then the maximum number of outputs will be three. (Reset possible on divider stage 4 or higher.)

FUNCTION BLOCK DIAGRAM:



MASK PROGRAMS OF POSSIBLE FREQUENCY COMBINATIONS:

Number of Output	PIN No.	Output ratio) A = 10 steps B = 1 steps C = 12 steps G = 16 steps (reset effective starting with 4th step)
1		1 0 1 2 3 4 5 6 7 8 9 A C Reset Possible
2	 	0 0 0 1 1 1 1 1 2 2 2 2 3 3 3 3 3 4 4 4 4 4 4 5 5 6 7 7 7 8 1 2 C 2 7 8 9 C 3 4 5 C 4 5 6 8 C 5 6 7 8 A C 7 A 8 8 9 A 9 Reset Possible 0 1 1 2 2 3 3 3 4 4 4 4 4 5 5 6 7 7 8 9 A C G A G 6 G 6 A G 6 A B G 6 B A A B A A B G Reset Possible
3		0 0 0 0 0 0 1 1 1 1 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 3 3 3 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 4 5 5 5 6 7 7 7 7 8 1 1 1 2 2 C 2 2 C 7 7 7 8 8 9 3 3 3 3 3 4 4 4 4 4 4 4 4 4 4 4 5 5 6 6 7 7 8 A C 7 7 A 8 8 8 9 A 9 2 C G C G G C G G 8 9 A 9 A A 4 5 6 C G 5 6 C G 6 G 5 6 8 A C G 6 8 A G 6 7 A B 8 A A B A B G A B B A 9 A A B A Reset Possible
4		0 0 0 0 1 1 1 1 1 2 2 2 2 2 2 2 2 3 3 3 3 3 3 4 4 4 4 4 4 5 7 1 1 1 2 2 7 7 7 8 3 3 3 3 3 3 4 4 4 4 4 4 4 4 6 5 5 5 6 7 7 8 2 2 C C C 8 8 9 9 4 4 4 4 5 C 5 C 5 6 6 8 C 8 7 7 A 8 A 9 C G G G G 9 A A A 5 6 C G 6 G 6 G 6 8 A A G A A B B A B B A

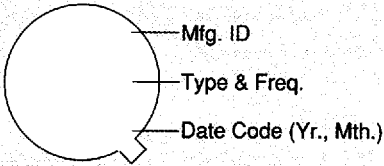
LQV Series - Precision Crystal Clock Oscillators

Multiple Synchronous Frequencies & Low Power Consumption - f_o : 12 Hz to 8 MHz

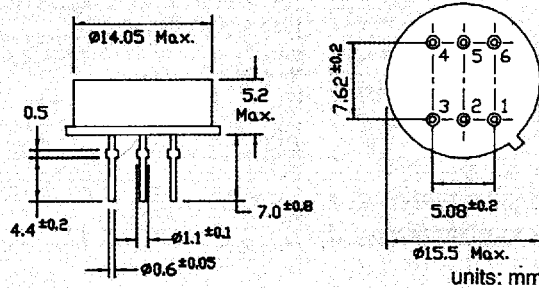
SPECIFICATIONS: (LQV Series)

Classification		Code	Rating	Unit	Remarks
Output frequency		f_{out}	12 to 8M	Hz	Sine Wave 50% Duty
Frequency precision		$\Delta f/f$ (25°C)	0: ± 10	ppm	
			1: ± 50	ppm	
			2: ± 100	ppm	
			3: ± 0.2	%	
Frequency temperature Characteristic		$\Delta f/f$ (T)	± 20 Max	ppm	-10°C -- +60°C range based on $T_a = 25^\circ\text{C}$, $V_{CC} = 5.0\text{V}$
Voltage characteristic		$\Delta f/f$ (V_{CC})	± 2 Typical	ppm/V	-
Operating temperature range		T_{opr}	-20 to +70	°C	-
Voltage		V_{CC}	+5.0 \pm 0.5	V	DC
Current consumption (at no load)		I_C	0.5 Max to 5.0 Max	mA	Varies with source freq. & output freq.
Output current	01, 02, 03	I_{OH}	-0.08 Min	mA	$V_{CC} = 5.0\text{V}$, $V_{OH} = 4.6\text{V}$
		I_{OL}	0.51 Min	mA	$V_{CC} = 5.0\text{V}$, $V_{OL} = 0.4\text{V}$
	04, 05	I_{OH}	-0.51 Min	mA	$V_{CC} = 5.0\text{V}$, $V_{OH} = 4.6\text{V}$
		I_{OL}	0.51 Min	mA	$V_{CC} = 5.0\text{V}$, $V_{OL} = 0.4\text{V}$
Fan Out		n	LS TTL 1 gate		

MARKING:



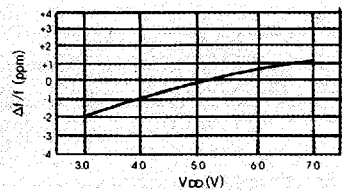
DIMENSIONS:



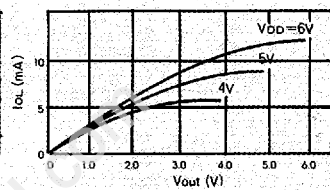
PIN CONNECTION:

PIN No.	Function
1	OUT 2
2	OUT 1
3	V_{CC}
4	V_{SS}
5	OUT 4 RESET
6	OUT 3
	NO CONNECTION

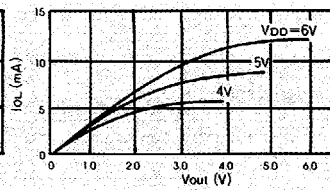
PERFORMANCE CHARACTERISTICS:



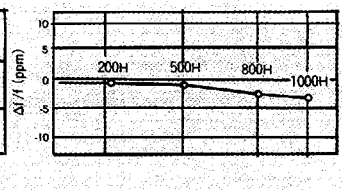
Voltage - Oscillation Frequency Fluctuation Characteristic



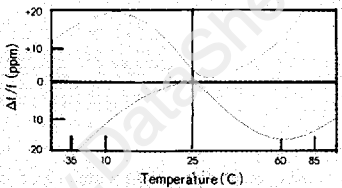
Vout Characteristic Sample - Buffer Amplifier 04, 05 ($T_a = 25^\circ\text{C}$)



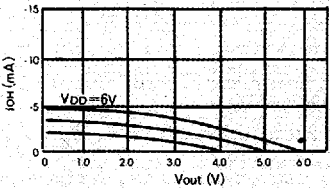
Vout Characteristic Sample - Buffer Amplifier 01, 02, 03 ($T_a = 25^\circ\text{C}$)



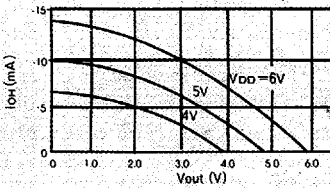
High Temperature Exposure (85°C)



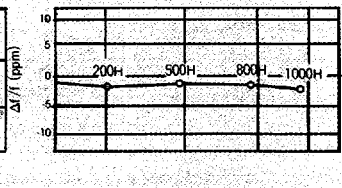
Temperature - Oscillation Frequency Fluctuation Characteristic ($V_{DD} = 5.0\text{V}$)



Vout Characteristic Sample - Buffer Amplifier 01, 02, 03 ($T_a = 25^\circ\text{C}$)



Vout characteristic Sample - Buffer Amplifier 04, 05 ($T_a = 25^\circ\text{C}$)



Low Temperature Exposure (-40°C)