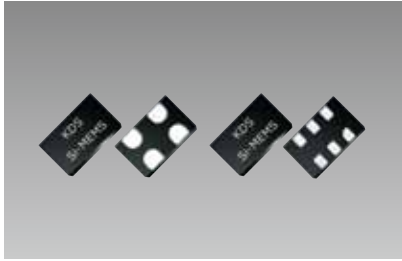


# MEMS Oscillators - Low Jitter

## MO9120/MO9121/MO9122/MO8208/MO8209



### ■ Features

- Frequency tolerance as low as  $\pm 10 \times 10^{-6}$
- Ultra-Low phase Jitter

### ■ Applications

- Computing, storage, networking
- Telecom, industrial control
- SATA, SAS, Ethernet, PCI Express, video, WiFi



Model	Output Frequency (MHz)	Frequency Tolerance ( $\times 10^{-6}$ )	Supply Voltage (V)	Current Consumption (mA Typ.)	Size (mm)	Output
MO9120	25 to 212.5	$\pm 10, \pm 20, \pm 25, \pm 50$	+2.25 to +3.63	+54 to +69	3.2×2.5×0.8, 5.0×3.2×0.8, 7.0×5.0×1.0 (QFN)	LVPECL LVDS
MO9121	1 to 220					
MO9122	220 to 625					
MO8208	1 to 80			+29 to +36 (+10 $\mu$ A stby)	2.7×2.4×0.8, 3.2×2.5×0.8, 5.0×3.2×0.8, 7.0×5.0×1.0 (QFN)	LVCMOS
MO8209	80 to 220					

### ■ Standard Specification (MO9121)

Item	Legend	Min.	Typ.	Max.	Unit	Condition
Output Frequency Range	f	1	-	220	MHz	Refer to datasheet for exact list of supported frequencies
Supply Voltage	Vdd	+2.97	+3.3	+3.63	V	
		+2.25	+2.5	+2.75		
		+2.25	-	+3.63		
Operating Temperature Range	T <sub>use</sub>	-20	-	+70	°C	Extended Commercial
		-40	-	+85		Industrial
Frequency Tolerance	F <sub>stab</sub>	-10	-	+10	$\times 10^{-6}$	Inclusive of initial tolerance, and variations over operating temperature, rated power supply voltage and output load.
		-20	-	+20		
		-25	-	+25		
		-50	-	+50		
First Year Aging	F <sub>aging1</sub>	-2.0	-	+2.0	$\times 10^{-6}$	T <sub>A</sub> = +25°C
10-year Aging	F <sub>aging10</sub>	-5.0	-	+5.0	$\times 10^{-6}$	T <sub>A</sub> = +25°C
Duty Cycle	DC	45	-	55	%	
Input Low Voltage	V <sub>IL</sub>	-	-	Vdd×0.3	V	Pin 1, OE or $\overline{ST}$
Input High Voltage	V <sub>IH</sub>	Vdd×0.7	-	-	V	Pin 1, OE or $\overline{ST}$
Start-up Time	T <sub>start</sub>	-	6.0	10	ms	Measured from the time Vdd reaches its rated minimum value.
Resume Time	T <sub>resume</sub>	-	6.0	10	ms	In Standby mode, measured from the time ST pin crosses 50% threshold.
LVPECL, DC and AC Characteristics						
Current Consumption	I <sub>dd</sub>	-	+61	+69	mA	Excluding Load Termination Current, Vdd = +3.3V or +2.5V
OE Disable Supply Current	I <sub>oe</sub>	-	-	+35	mA	OE = Low
Standby Current	I <sub>std</sub>	-	-	+100	$\mu$ A	$\overline{ST}$ = Low, for all Vdds
Output Low Voltage	V <sub>OL</sub>	Vdd - 1.9	-	Vdd - 1.5	V	
Output High Voltage	V <sub>OH</sub>	Vdd - 1.1	-	Vdd - 0.7	V	
Rise and Fall Time	Tr, Tf	-	300	700	ps	20% to 80%
Enable and Disable Time	T <sub>oe</sub>	-	-	115	ns	f = 212.5 MHz - For other frequencies, T <sub>oe</sub> = 100ns + 3 period
RMS Period Jitter	T <sub>jitt</sub>	-	1.2	1.7	ps	f = 100 MHz, Vdd = +3.3V or +2.5V
		-	1.2	1.7		f = 156.25 MHz, Vdd = +3.3V or +2.5V
		-	1.2	1.7		f = 212.5 MHz, Vdd = +3.3V or +2.5V
RMS Phase Jitter (random)	T <sub>phj</sub>	-	0.6	0.85	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds
LVDS, DC and AC Characteristics						
Current Consumption	I <sub>dd</sub>	-	+47	+55	mA	Excluding Load Termination Current, Vdd = +3.3V or +2.5V
OE Disable Supply Current	I <sub>oe</sub>	-	-	+35	mA	OE = Low
Standby Current	I <sub>std</sub>	-	-	+100	$\mu$ A	$\overline{ST}$ = Low, for all Vdds
Rise and Fall Time	Tr, Tf	-	495	700	ps	20% to 80%
Differential Output Voltage	V <sub>OD</sub>	+250	+350	+450	mV	
V <sub>OD</sub> Magnitude Change	$\Delta V_{OD}$	-	-	+50	mV	
Offset Voltage	V <sub>OS</sub>	+1.125	+1.2	+1.375	V	
V <sub>OS</sub> Magnitude Change	$\Delta V_{OS}$	-	-	+50	mV	
Enable and Disable Time	T <sub>oe</sub>	-	-	115	ns	f = 212.5 MHz - For other frequencies, T <sub>oe</sub> = 100ns + 3 period
RMS Period Jitter	T <sub>jitt</sub>	-	1.2	1.7	ps	f = 100 MHz, Vdd = +3.3V or +2.5V
		-	1.2	1.7		f = 156.25 MHz, Vdd = +3.3V or +2.5V
		-	1.2	1.7		f = 212.5 MHz, Vdd = +3.3V or +2.5V
RMS Phase Jitter (random)	T <sub>phj</sub>	-	0.6	0.85	ps	f = 156.25 MHz, Integration bandwidth = 12 kHz to 20 MHz, all Vdds
Packing Unit	1000pcs./reel ( $\phi$ 180) or 3000pcs./reel ( $\phi$ 180: 3225 package)					