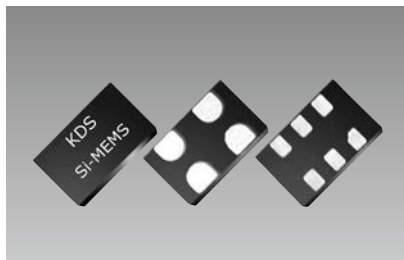


# MEMS Oscillators with Spread Spectrum Function (SSCG)

## MO9002/MO9003/MO9005



### ■ Features

- Spread options  
Center Spread:  $\pm 0.5\%$ ,  $\pm 0.25\%$   
Down Spread:  $-1\%$ ,  $-0.5\%$
- Standby, output enable or spread disable mode
- $<30$  ps cycle-to-cycle jitter

### ■ Applications

- Printers
- Flat panel drivers
- PCI
- Microprocessors



Model	Output Frequency (MHz)	Frequency Tolerance ( $\times 10^{-6}$ )	Supply Voltage (V)	Current Consumption (mA Typ.)	Size (mm)	Output
MO9002	1 to 220	$\pm 25$ , $\pm 50$	+1.71 to +1.89, +2.25 to +3.63	+48 to +75	5.0 $\times$ 3.2 $\times$ 0.8, 7.0 $\times$ 5.0 $\times$ 1.0 (QFN)	LVPECL CML LVDS HCSSL
MO9003	1 to 110	$\pm 50$ , $\pm 100$		+3.2 to +4.1 (+0.4 to +4.3 $\mu$ A stby)	2.5 $\times$ 2.0 $\times$ 0.8, 3.2 $\times$ 2.5 $\times$ 0.8, 5.0 $\times$ 3.2 $\times$ 0.8, 7.0 $\times$ 5.0 $\times$ 1.0 (QFN)	LVCMOS
MO9005	1 to 141	$\pm 20$ , $\pm 25$ , $\pm 50$	+1.62 to +1.98, +2.25 to +3.63	5.0 to 6.5 (0.4 to 4.3 $\mu$ A stby)	2.0 $\times$ 1.6 $\times$ 0.8, 2.5 $\times$ 2.0 $\times$ 0.8, 3.2 $\times$ 2.5 $\times$ 0.8 (QFN)	

### ■ Standard Specification (MO9005)

Item	Legend	Min.	Typ.	Max.	Unit	Condition
Output Frequency Range	f	1	-	141	MHz	
Supply Voltage	V <sub>dd</sub>	+1.62	+1.8	+1.98	V	
		+2.25	+2.5	+2.75		
		+2.52	+2.8	+3.08		
		+2.7	+3.0	+3.3		
		+2.97	+3.3	+3.63		
		+2.25	-	+3.63		
Operating Temperature Range	T <sub>use</sub>	-20	-	+70	°C	Extended Commercial
		-40	-	+85		Industrial
Frequency Tolerance	F <sub>tol</sub>	-20	-	+20	$\times 10^{-6}$	Inclusive of initial tolerance at +25°C, 1st year aging at +25°C, and variations over operating temperature, rated power supply voltage.
		-25	-	+25		
		-50	-	+50		
Current Consumption	I <sub>dd</sub>	-	+5.6	+6.5	mA	No load condition, f = 40 MHz, V <sub>dd</sub> = +2.5V to +3.3V
		-	+5.0	+5.5		No load condition, f = 40 MHz, V <sub>dd</sub> = +1.8V
Standby Current	I <sub>std</sub>	-	+2.1	+4.3	$\mu$ A	$\overline{ST}$ = GND, V <sub>dd</sub> = +2.5V to +3.3V, Output is weakly pulled down
		-	+0.4	+1.5		$\overline{ST}$ = GND, V <sub>dd</sub> = +1.8V, Output is weakly pulled down
Spread Spectrum	-	$\pm 0.125$ to $\pm 2.060$			%	Center Spread
		-4.28 to -0.25				Down Spread
Duty Cycle	DC	45	-	55	%	
Output Low Voltage	V <sub>OL</sub>	90%	-	-	V <sub>dd</sub>	I <sub>OH</sub> = -4 mA (V <sub>dd</sub> = +3.0V or +3.3V) I <sub>OH</sub> = -3 mA (V <sub>dd</sub> = +2.8V and V <sub>dd</sub> = +2.5V) I <sub>OH</sub> = -2 mA (V <sub>dd</sub> = +1.8V)
Output High Voltage	V <sub>OH</sub>	-	-	10%	V <sub>dd</sub>	I <sub>OL</sub> = +4 mA (V <sub>dd</sub> = +3.0V or +3.3V) I <sub>OL</sub> = +3 mA (V <sub>dd</sub> = +2.8V and V <sub>dd</sub> = +2.5V) I <sub>OL</sub> = +2 mA (V <sub>dd</sub> = +1.8V)
Rise and Fall Time	Tr, Tf	-	1	2	ns	V <sub>dd</sub> = +2.5V, +2.8V, +3.0V or +3.3V, 20% to 80%, default derive strength
		-	1.3	2.5		V <sub>dd</sub> = +1.8V, 20% to 80%, default derive strength
		-	-	2.0		V <sub>dd</sub> = +2.25V to +3.63V, 20% to 80%, default derive strength
Input Low Voltage	V <sub>IL</sub>	-	-	V <sub>dd</sub> $\times$ 0.3	V	Pin 1, OE or $\overline{ST}$
Input High Voltage	V <sub>IH</sub>	V <sub>dd</sub> $\times$ 0.7	-	-	V	Pin 1, OE or $\overline{ST}$
OE Disable Current	I <sub>oe</sub>	-	+5.0	+6.5	mA	f = 40 MHz, V <sub>dd</sub> = +2.5V to +3.3V, OE = GND, Output in high-Z state
		-	+4.6	+5.2		f = 40 MHz, V <sub>dd</sub> = +1.8V, OE = GND, Output in high-Z state
Enable/Disable Time	T <sub>oe</sub>	-	-	180	ns	f = 40 MHz - For other frequencies, T <sub>oe</sub> = 100ns + 3 period
Packing Unit	1000pcs./reel( $\phi$ 180)					