LPO	Low Power	CMOS	Thru-Hole	3.3V	5.0V	12V	15V	Min. 1Hz	Max. 160KHz

Applications

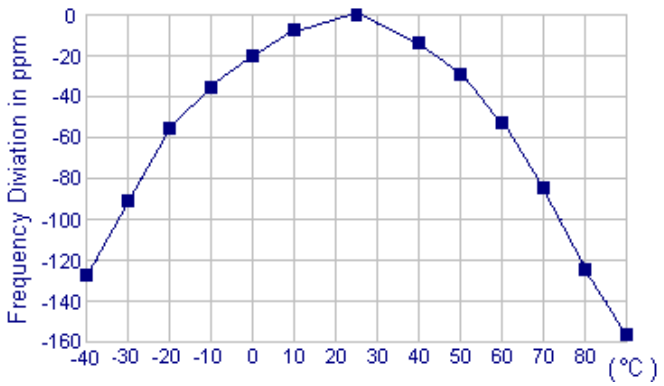
- Frequency Range : Hz and KHz range using a tuning fork crystal.
- Current consumption: μA range
- LPO (Low Power Oscillator), such as 32.768 KHz, provides a time base for a real time clock.
- Low current consumption.
- Suitable for battery-operated devices such as data logging and portable test equipment.

General specifications of all available packages , at Ta=+25°C , CL=15pF

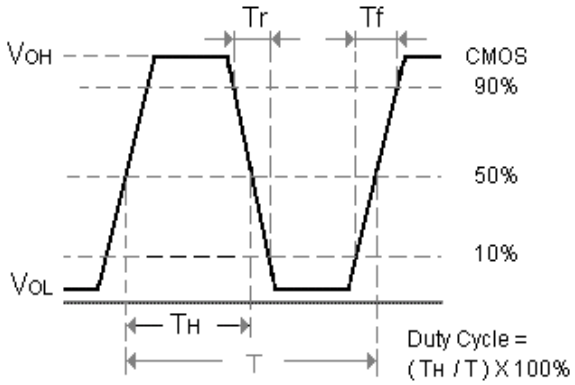
Model	LPO	
Input Voltage (VDD)	+3.3V D.C.±5%	+5.0V D.C.±10%
	+3.0V to +15V is also available	
Frequency Range	1Hz to 160KHz	
Output Wave Form	CMOS (square wave)	
Frequency Tolerance (at 25°C)	± 10 ppm (Tolerance Code is " ***P*** ")	± 50 ppm (Tolerance Code is " ***B*** ")
	± 25 ppm (Tolerance Code is " ***A*** ")	± 100 ppm (Tolerance Code is " ***C*** ")
Frequency Stability [1]	-100 ppm (typ.) over 0°C to +70°C	
	-160 ppm (typ.) over -40°C to +85°C	
Current Consumption	26 μA (typ.)	45 μA (typ.)
Output Logic High " 1 "	2.97 V (min.)	4.5 V (min.)
Output Logic Low " 0 "	0.33V (max.)	0.5 V (max.)
Rise Time (Tr) & Fall Time (Tf)	0.5 μsec (typ.) ; 1.0 μsec. (max.)	25 μsec (typ.) ; 50 μsec. (max.)
Fan-out	2 CMOS gates	
Start-up Time	450 m Sec.(max.)	
Duty Cycle	50%±5% (typ.) ; 50%±10% (max.)	
Storage Temperature	-50°C to 100°C	
Aging	±5 ppm per year (max.)	

Note : [1] Inclusive of 25°C tolerance , operating temperature range , ±10% input voltage variation , load change , aging , shock and vibration.

Typical Frequency Stability vs Temperature Curve



CMOS Output Wave Form



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Low Power Clock Oscillator [(LPO series) CMOS square wave]

Part Number Format and Example

[1]	[2]	[3]		[4]		[5]
Supply Voltage	Holder Type	G	–	Frequency Tolerance (25 °C)	–	Center Frequency

Example	(1)	3	LPO14	G	–	P	–	32.768K
	(1)	5	LPO8	G	–	A	–	25.600K

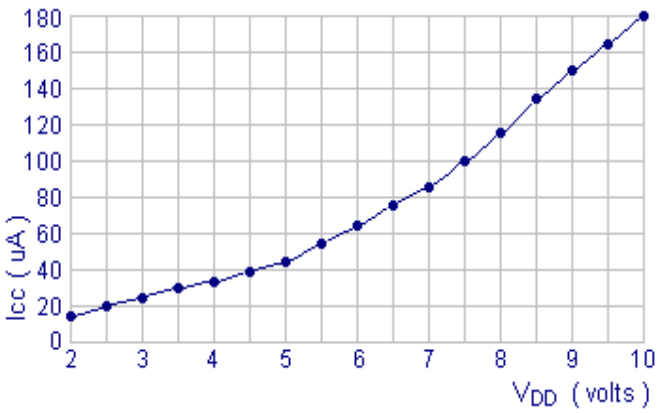
Ex (1) : 3LPO14G - P - 32.768K [+3.3V input voltage , full size package 4 pins Dip type , RoHS compliant , ±10ppm frequency tolerance , 32.768 KHz]

Ex (1) : 5LPO8G - A - 25.600K [+5.0V input voltage , half size 4 pin package Dip type , RoHS compliant , ±25 ppm frequency tolerance, 25.600 KHz]

[1]	Supply voltage , " 3 " for +3.3V ; " 5 " for +5.0V			
[2]	Holder Type			
[3]	Please add " G " after the " type code " for RoHS compliance . Omit " G " if not required.			
[4]	± 10 ppm (Code is " P ")	± 25 ppm (Code is " A ")	± 50 ppm (Code is " B ")	± 100 ppm (Code is " C ")
[5]	Frequency in KHz			

Current Consumption (Icc) vs Supply Voltage V_{DD} , Measured with 10pF Load .

LPO 32.768 KHz model " 4 "



To calculate the frequency deviation at one particular temperature

To calculate the frequency deviation at one particular temperature (Tx) with respect to the frequency at +25ºC:

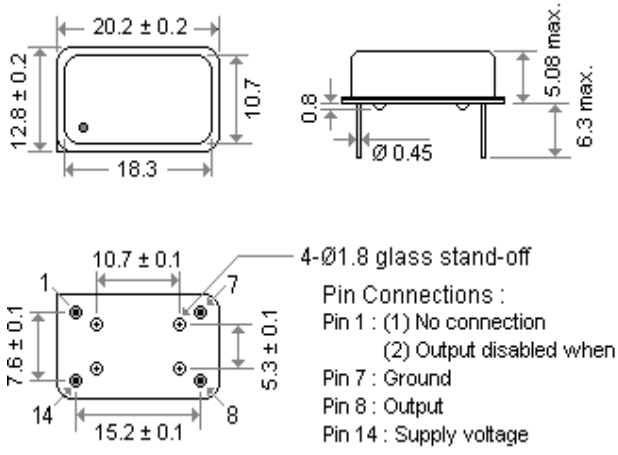
$\Delta f / f$ (ppm) = -0.035 * (Tx - 25)^2

Example: At +60ºC, the frequency drift is -42.8 ppm

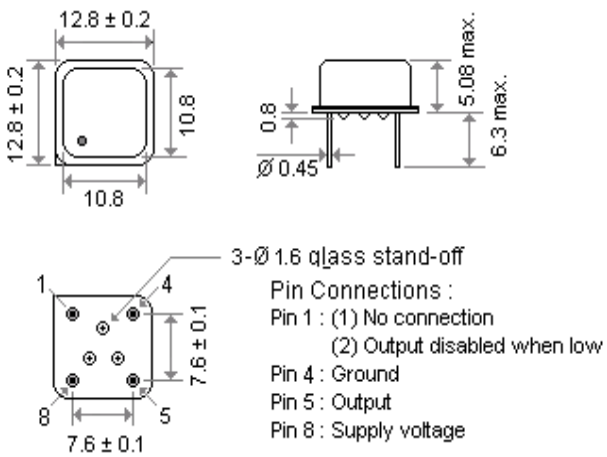
$\Delta f / f$ (ppm) = - 0.035 * (60 - 25)^2 = -42.8

Outline Dimensions (Unit : mm)

[LPO 14]



[LPO 8]



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