VOLTAGE -CONTROLLED CRYSTAL OSCILLATOR (VCXO)

TCO - 2000 / 2100 series

- •Frequency range : 60 MHz to 800 MHz
- •Supply voltage : 3.3 V
- •Frequency control range : ±100 × 10^{-6} Min.
- •Features : High reliability(20 years aging)
  : Wide frequency control range
  : Low phase noise, low jitter
  : With HFF-XTAL technology
  Fundamental oscillation (60 MHz to 230 MHz)
  Multiplier oscillation (fo≥230 MHz)

RoHS Compliant

Product Number (please contact us)
X1G00Xxxxxxxx00

Actual size

TCO-2000 Series

TCO-2100 Series

Specifications (characteristics)

Item	Symbol	Specifications		Remarks
		TCO-2002	TCO-2004	4 pin
		TCO-2102	TCO-2104	6 pin
Output frequency range	fo	60.000 MHz to 125.000 MHz		
Supply voltage	Vcc	3.3 V ±0.165 V		
Storage temperature range	T_stg	-45 °C to +90 °C		Store as bare product after unpacking
Operating temperature range	T_use	-40 °C to +85 °C		
Frequency tolerance	f_tol	As per table 1		-40 °C to +85 °C
Current consumption	Icc	50 mA Max.		
Frequency control range	f_cont	As per table 1. (Vc=1.65 V ±1.65 V)		
Absolute pull range	APR	As per table 1		
Input resistance	Rin	100 kΩ Min.		DC level
Frequency change polarity	—	Positive slope		Vc = 0 V to 3.3 V or Vc =0.5 V to 4.5 V
Output load condition (TTL)	L_TTL	2 TTL Max.		
Output load condition (CMOS)	L_CMOS	—	15 pF Max.	
Start-up time	t_str	10 ms Max. *1		
Frequency aging	f_aging	As per table 1		+25 °C

Specifications (characteristics)

Item	Symbol	Specifications		Remarks
		TCO-2106	TCO-2107	6pin, OE function
Output frequency range	fo	60.000 MHz to 80.000 MHz		
Supply voltage	Vcc	3.3 V ±0.165 V		
Storage temperature range	T_stg	-45 °C to +90 °C		Store as bare product after unpacking
Operating temperature range	T_use	-40 °C to +85 °C		
Frequency tolerance	f_tol	As per table 1		-40 °C to +85 °C
Current consumption	Icc	30 mA Max.		
Frequency control range	f_cont	As per table 1		Vc= 1.65 V ±1.65 V
Absolute pull range	APR	As per table 1		
Input resistance	Rin	100 kΩ Min.		DC level
Frequency change polarity	—	Positive slope		Vc= 0 V to 3.3 V
Output load condition (TTL)	L_TTL	2 TTL Max.	—	
Output load condition (CMOS)	L_CMOS	—	15 pF Max.	
Start-up time	t_str	10 ms Max. *1		
Frequency aging	f_aging	As per table 1		+25 °C

Specifications (characteristics)

Item	Symbol	Specifications		Remarks
		TCO-2111	TCO-2114	6 pin
Output frequency range	fo	60.000 MHz to 800.000 MHz	60.000 MHz to 230.000 MHz	
Supply voltage	Vcc	3.3 V ±0.165 V		
Storage temperature range	T_stg	-45 °C to +90 °C		Store as bare product after unpacking
Operating temperature range	T_use	-40 °C to +85 °C		
Frequency tolerance	f_tol	As per table 1		-40 °C to +85 °C
Current consumption	Icc	65 mA Max.	40 mA Max.	
Frequency control range	f_cont	As per table 1 (Vc= 1.65 V ±1.65 V)	As per table 1 (Vc= 1.65 V ±1.65 V)	
Absolute pull range	APR	As per table 1		
Input resistance	Rin	100 kΩ Min.		DC level
Frequency change polarity	—	Positive slope		Vc = 0 V to 3.3 V or Vc =0.5 V to 4.5 V
Output level	—	LV-PECL	LVDS	
Start-up time	t_str	10 ms Max. *1		
Frequency aging	f_aging	As per table 1		+25 °C

Specifications (characteristics)

Item	Symbol	Specifications TCO-2131	Remarks 6pin, OE function
Output frequency range	f_O	60.000 MHz to 700.000 MHz	
Supply voltage	V_{CC}	3.3 V ±0.165 V	
Storage temperature range	T_stg	-45 °C to +90 °C	Store as bare product after unpacking
Operating temperature range	T_use	-40 °C to +85 °C	
Frequency tolerance	f_tol	As per table 1	-40 °C to +85 °C
Current consumption	I_{CC}	75 mA Max.	
Frequency control range	f_cont	As per table 1	V_C= 1.65 V ±1.65 V
Absolute pull range	APR	As per table 1	
Input resistance	Rin	100 kΩ Min.	DC level
Frequency change polarity	—	Positive slope	V_C= 0 V to 3.3 V
Output load condition	—	LV-PECL	
Start-up time	t_str	10 ms Max. *1.	
Frequency aging	f_aging	As per table 1	+25 °C

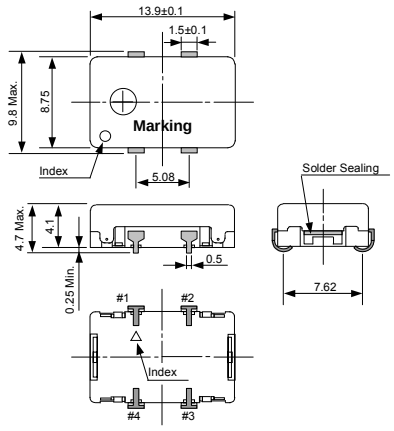
Table 1. Frequency tolerance, Absolute pull range and aging (TCO-2102-xx)

xx	Frequency tolerance	Absolute pull range *4	(Frequency control range)	Aging
AA	±50 × 10^{-6} Max. *2	±50 × 10^{-6} Min.	±100 × 10^{-6} Min.	1year (First year)
AB		±100 × 10^{-6} Min.	±150 × 10^{-6} Min.	
BA	±60 × 10^{-6} Max. *3	±50 × 10^{-6} Min.	±110 × 10^{-6} Min.	20 years
BB		±100 × 10^{-6} Min.	±160 × 10^{-6} Min.	

*1 Time at minimum supply voltage to be 0 s.
*2 This includes initial frequency tolerance, temperature variation, supply voltage variation and aging (+25℃, 1 year).
*3 This includes initial frequency tolerance, temperature variation, supply voltage variation and aging (+25℃, 20 years).
*4 Absolute pull range = Frequency control range - Frequency tolerance

External dimensions (Unit:mm)

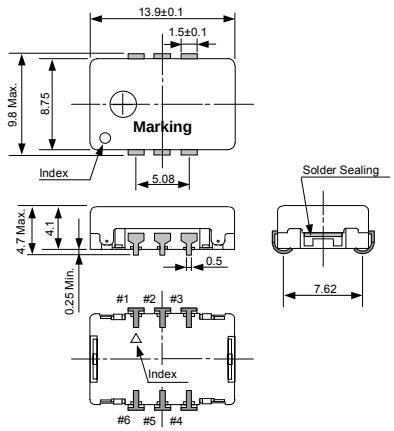
●TCO-2002/2004



Pin map

Pin	CONNECTION
1	VC
2	GND/case
3	OUT
4	VCC

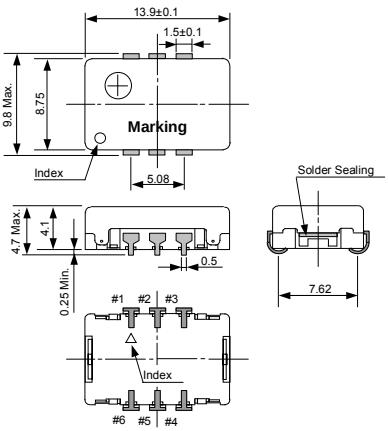
●TCO-2102/2104



Pin map

Pin	CONNECTION
1	VC
2	N.C.
3	GND/case
4	OUT
5	N.C.
6	VCC

●TCO-2106/2107/2111/2114/2131

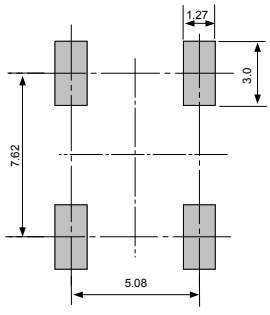


Pin map

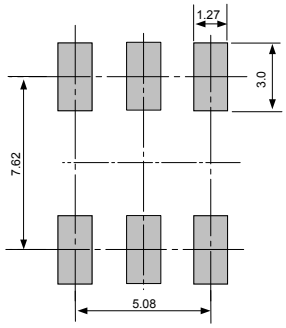
Pin	CONNECTION		
	TCO-2106/2107	TCO-2110 series	TCO-2131
1	VC		
2	OE	N.C.	OE
3	GND/case		
4	OUT	OUT1(Positive)	
5	N.C.	OUT2(Negative)	
6	VCC		

External dimensions (Unit:mm)

●TCO-2000 series



●TCO-2100 series



OE terminal

●TCO-2106 / 2107

OE pin = "H" or "open" : Specified frequency output.
OE pin = "L" : Output is high impedance, oscillation stops.

●TCO-2131

OE pin = "L" or "open" : Specified frequency output.
OE pin = "H" : Output is high impedance, oscillation stops.