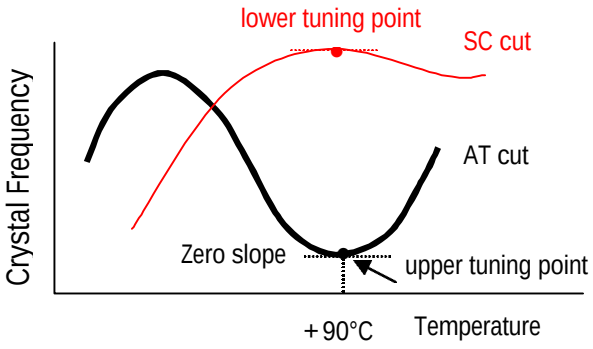
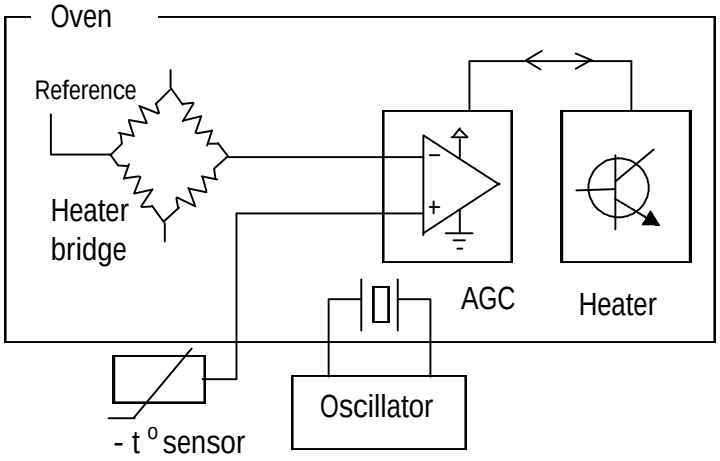
What is an OCXO ?

Relatively speaking, an OCXO performs in the ±0.01 ~ ±0.1 ppm range, a TCXO performs in the ±1 ~ ±3 ppm range while a non-compensated clock oscillator performs in the ±25, ±50 ppm range.

A TCXO relies on resistor / capacitor compensation network to counter the crystal’s temperature-dependent frequency behavior. An OCXO has a crystal that is “ovenized”. This means the crystal “sees” a constant temperature regardless the ambient temperature condition. The oven consists of a proportional heater (power transistor) and automatic gain control (AGC) circuit. Also, a thermister monitors the oven temperature and sends offset signal to the AGC which then turns the power transistor on and off accordingly. Thermal gradient and heat loss are carefully controlled to minimize the set point fluctuation of the oven. Oven temperature is normally set near the upper tuning point (UPT) of the crystal’s freq.-temp. curve. At the UPT the slope is zero and ideally no frequency change if the crystal “sees” a constant temperature.

Applications of OCXO include satellite radio beacons, Stratum 3 systems, PCS/GSM base stations, SONET clocks, frequency synthesizers and instrumentation.





Product Summary:

Output Wave Form: TTL/ CMOS Square Wave				
Package Types	**Available Frequency Range**	Package size (mm), L x W x seat height		Package size (inches), L x W x seat height
Thru-Hole Types				
OC14	1 ~ 170 MHz	4 pin DIP. Hermetically sealed.	12.8 x 20.2 x 10.8	[0.504 x 0.795 x 0.425]
OC22	1 ~ 60 MHz	7 pin	50.8 x 50.8 x19.0	[2.000 x 2.000 x 0.750]
OC30	1 ~ 60 MHz	5 pin	39.7 x 30.2 x 22.9	[1.562 x 1.188 x 0.900]
Gull Wing Surface Mount Types				
OC24	1 ~ 170 MHz	4 pin gull wing. Hermetically sealed.	12.8 x 20.2 x 10.8	[0.504 x 0.795 x 0.425]

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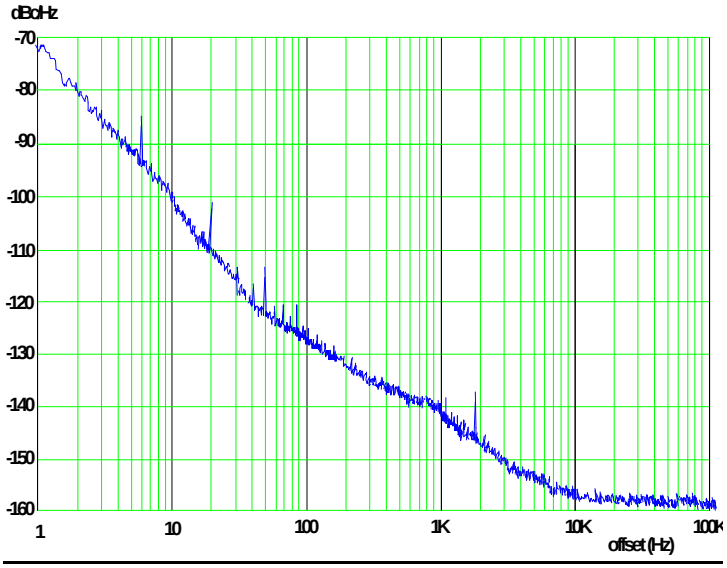
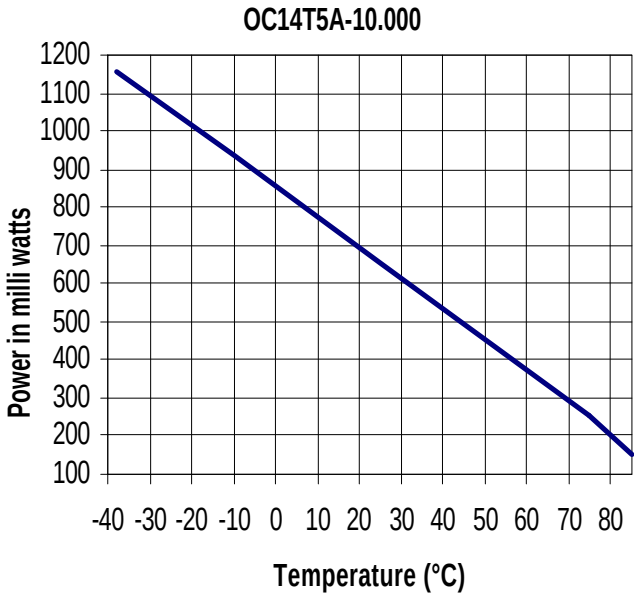
General Specifications

Output Wave From		**HCMOS** square wave. Wave form code is “**T**” or **Sine** wave. Wave form code is “**E**”.
Frequency Range		1.0 MHz ~ 170.0 MHz
Standard Frequencies (partial list)		8.192, 10.0, 15.36, 16.000, 16.384, 19.440, 20.0 MHz
Type of Crystal Cut		**AT**-cut. Use “**A**” for crystal code.
Supply Voltage (Vcc)		+5.0 V D.C. ±5% (voltage code “**5**”) or +12.0 V D.C. ±5% (voltage code “**12**”)
Initial Frequency Accuracy (at +25°C)		±2. ppm at time of shipment. With EFC at +2.5 V±0.5 V
Frequency Stability	**vs Operating Temperature Range (referenced to +25°C)**	±**0.1** ppm (0.2 ppm peak to peak) over 0°C to +50°C; or ±**0.2** ppm (0.4 ppm peak to peak) over -10°C to +70°C, or ±**0.3** ppm (0.6 ppm peak to peak) over -30°C to +75°C; or ±**0.5** ppm (1 ppm peak to peak) over -40°C to +85°C. Custom spec. on request.
	vs Aging /1 day	±10 ppb max. after 72 hours of operation
	vs Aging /first year	±500 ppb max. after 72 hours of operation
	vs Aging /year (2nd year and on)	±300 ppb max.
	vs 5% Supply Voltage Change	±10 ppb max.
	vs 5% Load Change	±10 ppb max.
Electronic Frequency Tuning (EFC)	**Tuning Range**	±5 ppm min.
	Control Voltage Range	2.5 V D.C. ±2 V
	Linearity	±10 %
	Transfer Function	Positive
	Input Impedance	100 K ohms typical
Power Dissipation		0.6 watts at steady-state at +25°C. 1.6 watts at turn-on.
Warm-up time (at +25°C)		3 minutes max. (to ±100 ppb of the nominal frequency)
HCMOS Square Wave	**V_{OH}: Logic High “1”**	4.5 V D.C. min. for Vcc = +12 V or +5.0 V, 15 pF load
	V_{OL}: Logic High “0”	0.5 V D.C. max. for Vcc = +12 V or +5.0 V, 15 pF Load
	Duty Cycle	45% ~ 55 % measured at (**V_{OH} -V_{OL}**) / 2
	Rise Time and Fall Time	10 n sec. max. (90% ↔ 10% Vcc)
	Load	15 pF
Sine Wave	**Output**	7 dBm min.
	Load	50 ohms

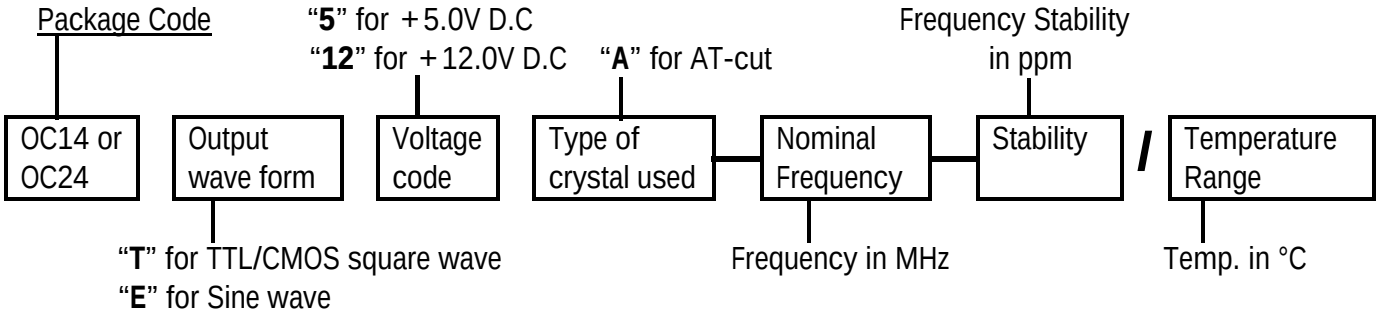
SSB Phase Noise: OC14T5A-10.000 (AT cut crystal)



Power Consumption vs Temperature:



Part Number Format and Examples:



OC14T5A-10.000-0.1/-10+70

represents +5.0 V OCXO 10.000 MHz in OC14 thru-hole package, TTL/CMOS square wave output, AT-cut crystal, stability is ±0.1 ppm over –10 to +70°C.

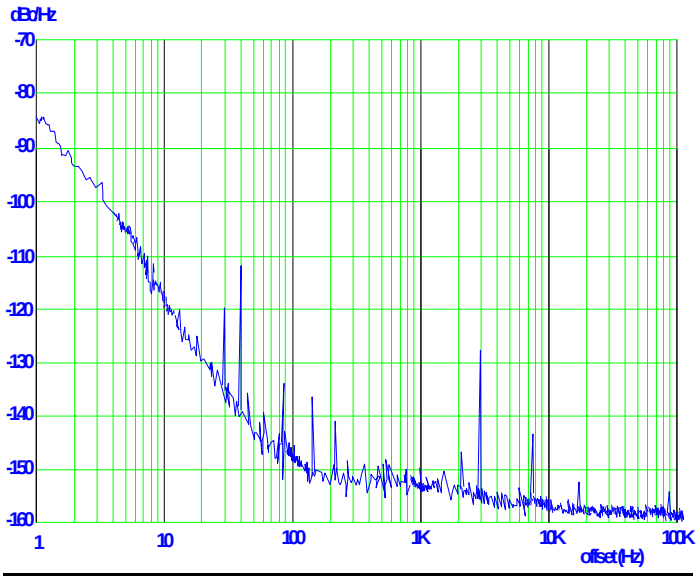
OC24E12A-19.440-0.5/-40+85

represents +12.0 V OCXO 19.440 MHz in OC24 gull wing SMD package, sine wave output, AT-cut crystal, stability is ±0.5 ppm over –40 to +85°C.

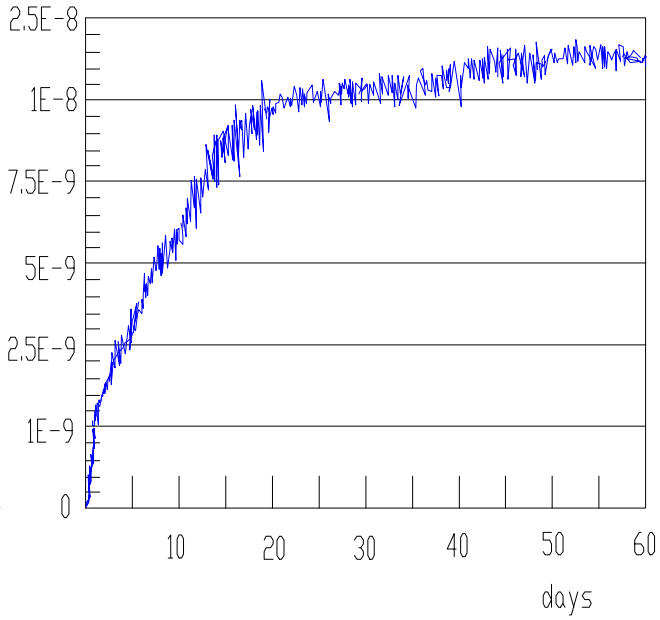
General Specifications

Output Wave From		**HCMOS** square wave. Wave form code is “**T**” or **Sine** wave. Wave form code is “**E**”.	
Frequency Range		1.0 MHz ~ 60.0 MHz	
Standard Frequencies (partial list)		5, 10.0, 10.245, 13.000, 16.384 MHz	
Supply Voltage (Vcc)		+5.0 V D.C. ±5% (voltage code “**5**”) or +12.0 V D.C. ±5% (voltage code “**12**”) +15.0 V D.C. ±5% (voltage code “**15**”)	
Type of Crystal Cut		**AT**-cut. Use “**A**” for crystal code.	**SC**-cut. Use “**S**” for crystal code.
Frequency Stability	**vs Operating Temperature Range (referenced to +25°C)**	±1E-7 over -30 to +70°C custom spec. on request	±1E-8 over -30 to +70°C custom spec. on request
	vs Aging /1 day	±3E-9 max. after 72 hours of operation	±1E-9 max. after 72 hours of operation
	vs Aging /first year	±5E-7 max. after 72 hours of operation	±1E-7 max. after 72 hours of operation
	vs short term	±5E-11 max.	±1E-11 max.
	vs 5% Supply Voltage Change	±10 ppb max.	
	vs 5% Load Change	±10 ppb max.	
Electronic Frequency Tuning (EFC)	**Tuning Range**	±3.6E-6 min.	±8.8E-7 min.
	Control Voltage Range	0 to +5.0 V or 0 to +10 V D.C. (please specify)	
	Linearity	±20 %	
	Transfer Function	Positive	
	Input Impedance	20 K ohms typical	
Initial Frequency Accuracy (at +25°C)		±2. ppm at time of shipment. With EFC at +2.5 V ±0.5 V	
Power Dissipation		5 watts at steady-state at +25°C. 1.7 watts at turn-on.	
Warm-up time (at +25°C)		10 minutes max. (to ±2E-8 of the nominal frequency)	7 minutes max. (to ±2E-8 of the nominal frequency)
HCMOS Square Wave	**V_{OH}: Logic High “1”**	4.5 V D.C. min. for Vcc = +12 V or +5.0 V, 15 pF load	
	V_{OL}: Logic High “0”	0.5 V D.C. max. for Vcc = +12 V or +5.0 V, 15 pF Load	
	Duty Cycle	45% ~ 55 % measured at (V_{OH} -V_{OL}) / 2	
	Rise Time and Fall Time	10 n sec. max. (90% ↔ 10% Vcc)	
	Load	15 pF	
Sine Wave	**Output**	0 to +17 dBm min. Please specify.	
	Load	50ohms	
	Harmonics	-20 dBc	
	Spurious	-80 dBc	

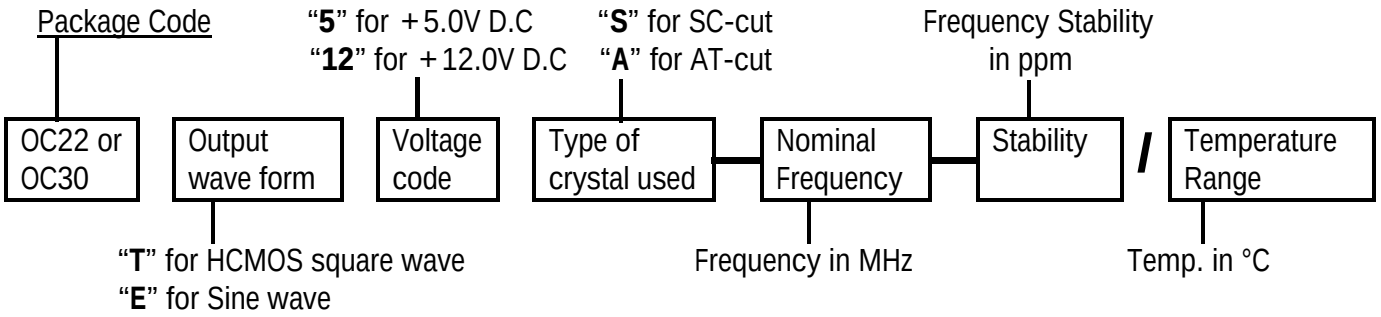
SSB Phase Noise: OC30E12S-10.000 (SC-cut crystal)



Aging: OC30E12S-10.000 (SC-cut crystal)



Part Number Format and Examples:



OC22T5A-10.000-0.1/-10+70

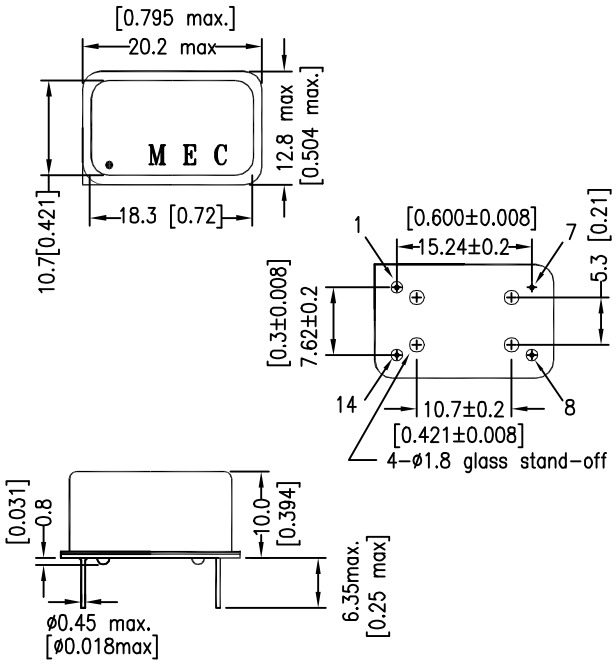
represents +5.0 V OCXO 10.000 MHz in OC22 package, HCMOS square wave output, AT-cut crystal, stability is ±0.1 ppm over –10 to +70°C.

OC30E12S-13.000-0.05/-30+75

represents +12.0 V OCXO 13.000 MHz in OC30 package, sine wave output, SC-cut crystal, stability is ±0.05 ppm over –30 to +75°C.

Package: OC14

4 pins



Pin Connections

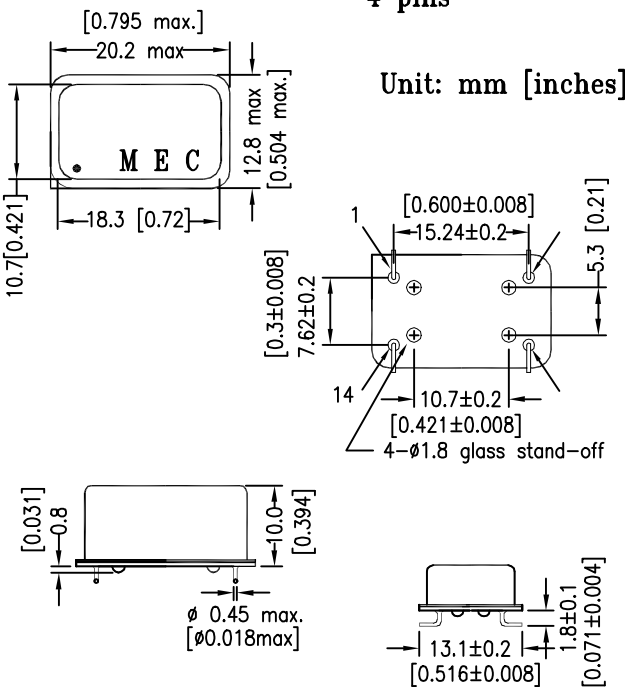
Square corner is pin No. 1

Pin 1: Voltage Control
Pin 7: Ground
Pin 8: Output
Pin 14: Supply Voltage

Package: OC24

4 pins

Unit: mm [inches]



Pin Connections

Square corner is pin No. 1

Pin 1: Voltage Control
Pin 7: Ground
Pin 8: Output
Pin 14: Supply Voltage

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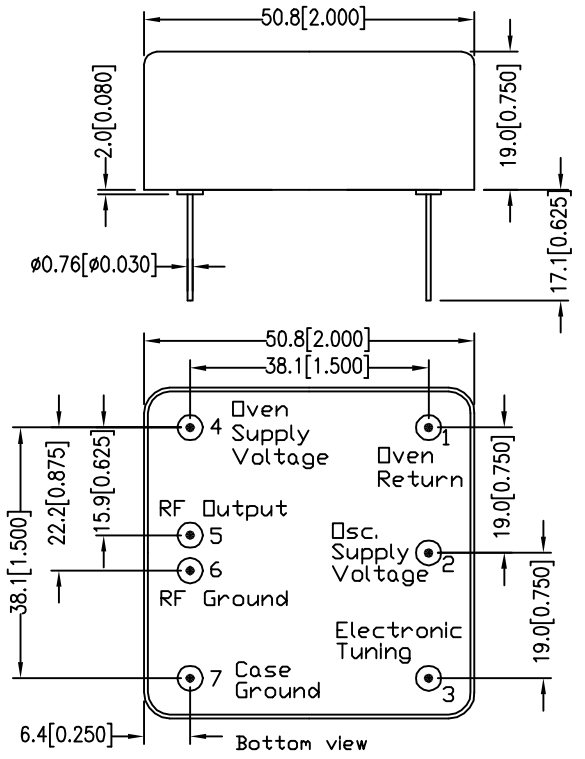
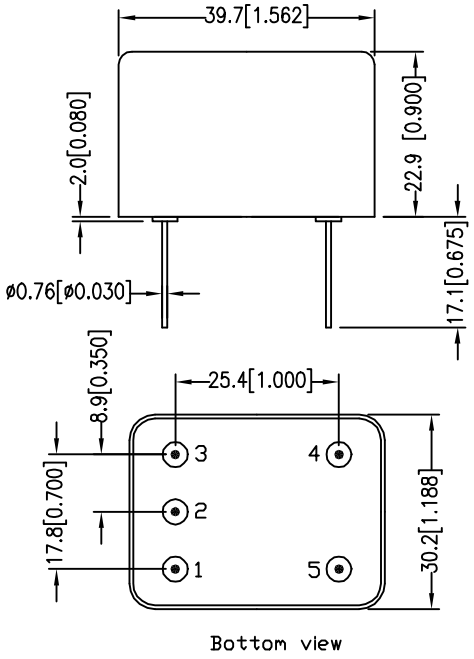
Package: OC22



Package: OC30



Pin Connections

Pin 1: Voltage Control
Pin 2: Ground
Pin 3: Output
Pin 4: Referene Voltage Output
Pin 5: Supply Voltage