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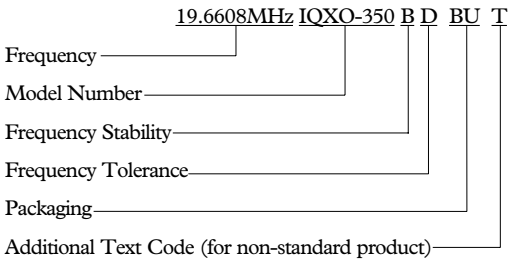
SPECIFYING SIMPLE PACKAGED CRYSTAL OSCILLATORS (SPXOs)

A typical SPXO specification reads like this:



The following notes define each element of the specification.

Frequency

Frequency is normally specified in kilohertz (kHz) up to 999.999 kHz and in megahertz (MHz) from 1.0MHz. All our computer-generated transaction documents follow this standard convention automatically.

The SPXO frequency should be described to seven significant figures. If seven significant figures are not used, we assume that any figure that might follow those given may be taken as zero. Thus a frequency given as 16.6MHz will be taken as 16.60, not 16.66667.

Model Number

The model number incorporates information which describes output compatibility and holder style.

Frequency Stability

The frequency stability of an SPXO includes the initial adjustment tolerance at room temperature, the tolerance over operating temperature range and the effect of supply voltage variation. This value is specified as 'parts per million' (ppm) and is available in four ranges; ±15ppm, ±25ppm, ±50ppm & ±100ppm.

- A = ±25ppm
- B = ±50ppm
- C = ±100ppm
- N = ±15ppm

Non-Standard Frequency Tolerances

During manufacture, it is possible to adjust some SPXO's to a specific tolerance at room temperature. The frequency tolerance forms part of the frequency stability. These oscillators have a second letter code to indicate the frequency tolerance.

- D = ±5ppm
- E = ±10ppm
- F= ±25ppm

Standard Operating Temperature Ranges

- 0 to 50°C –40 to 85°C
  0 to 70°C –55 to 125°C

Operating Temperature Range

An oscillator is designed to work over any one of three temperature ranges:

- Commercial: 0 to 70°C
- Military: –55 to 125°C
- Industrial: –40 to 85°C

Although in general oscillators will continue to operate outside their normal temperature range with a degradation in frequency stability, damage can result if the temperatures reached are excessive.

Packaging Code

All items are bulked packed only.

- BU = Bulk packed

Additional Text Code

If the product is non-standard, the letter 'T' will appear at the end of the product specification. This refers to additional text on the purchase order to identify the special requirements.

Outline Drawings

Dimensions on the oscillator outline drawings are shown only as a guide. Precise dimensions of oscillator holders are available from our Engineering Department upon request. All dimensions are shown in mm (& inches) and are nominal unless otherwise stated. All outlines are at a scale of 1:1 unless otherwise specified.

Delivery Options

The following Express delivery options are available for certain oscillators; timescales refer to despatch from our factories.

- 3 working days (Express service)
- 5 working days (Express service)
- 7 working days (Express service)
- 10 working days (Express service)

Prices for larger quantities and longer delivery times are generally lower due to substantially reduced manufacturing costs. Please refer to individual datasheets for further information.

Marking

Product will be indelibly marked as detailed in the individual data sheets. Where space is limited some or all of the information will be omitted/truncated at CFP's discretion. Full product description will be found on the individual batch packaging.

Ordering Information

- See individual data sheets

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NEW MILITARY OSCILLATOR RANGES

CFP has introduced several new military oscillator substrates that utilise the latest in design techniques and technology. Consequently, certain model numbers are now obsolete and new (replacement) model numbers have been issued.

The table below provide for a comparison between the old and the new model numbers. It must be emphasised that all existing devices have a direct alternative within the new range and some ranges have been extended in order to encompass new customer requirements.

Please refer to the appropriate component data sheet for more detailed information. If you require further help, please contact our sales office.

Military Oscillators Cross Reference Table

Type	Frequency Range (MHz)	Obsolete CFP Model Number *(except IQXO-525/526)*		New CFP Model Number Only 250.0kHz to 90.0MHz	
		Non-Screened	Screened	Non-Screened	Screened
HCMOS/LS TTL	0.5 to 75.0	IQXO-41	IQXO-42	IQXO-85	IQXO-86
TTL	0.5 to 75.0	IQXO-43	IQXO-44	IQXO-85	IQXO-86
Tri-state HCMOS/LS TTL	0.5 to 75.0	IQXO-45	IQX0-46	IQXO-87	IQXO-88
HCMOS/TTL	0.03 to 32.0	*IQXO-525*	*IQXO-526*	IQXO-625	IQXO-626
HCMOS/LS TTL	> 32.0 to 100.0	IQXO-527	IQXO-528	IQXO-625	IQXO-626
TTL	> 32.0 to 100.0	IQXO-529	IQXO-530	IQXO-625	IQXO-626
Tri-state HCMOS/LS TTL	0.5 to 100.0	IQXO-531	IQXO-532	IQXO-627	IQXO-628

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STOCK OSCILLATORS

Minimum Order Information Required

- Stock Number

8-pin DIL Clock Oscillators

Frequency	Type	Frequency Stability	Model No.	Stock No.
3.68640MHz	HCMOS/TTL	±100ppm	IQXO-22C	X363H
4.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X351H
8.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X352H
10.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X353H
12.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X354H
12.288MHz	HCMOS/TTL	±100ppm	IQXO-22C	X379H
14.31818MHz	HCMOS/TTL	±100ppm	IQXO-22C	X373H
14.74560MHz	HCMOS/TTL	±100ppm	IQXO-22C	X388H
16.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X355H
20.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X356H
24.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X371H
24.5760MHz	HCMOS/TTL	±100ppm	IQXO-22C	X386H
25.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X390H
25.1750MHz	HCMOS/TTL	±100ppm	IQXO-22C	X374H
28.63636MHz	HCMOS/TTL	±100ppm	IQXO-22C	X376H
32.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X360H
32.768MHz	HCMOS/TTL	±100ppm	IQXO-22C	X380H
40.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X357H
50.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X358H
60.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X381H
60.0MHz	HCMOS/TTL	±100ppm	IQXO-23C	X381T
64.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X384H
80.0MHz	HCMOS/TTL	±100ppm	IQXO-22C	X389H

14-pin DIL Clock Oscillators - HCMOS/TTL

Frequency	Type	Frequency Stability	Model No.	Stock No.
1.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X331B
1.8432MHz	HCMOS/TTL	±100ppm	IQXO-350C	X337B
2.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	E618A
3.6864MHz	HCMOS/TTL	±100ppm	IQXO-350C	X325B
4.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X351A
4.096MHz	HCMOS/TTL	±100ppm	IQXO-350C	X373A
4.9152MHz	HCMOS/TTL	±100ppm	IQXO-350C	X363A
5.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X333B
6.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X335B
8.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X352A
9.83040MHz	HCMOS/TTL	±100ppm	IQXO-350C	X359A
10.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X353A
11.2896MHz	HCMOS/TTL	±100ppm	IQXO-350C	X382A
12.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X354A
12.288MHz	HCMOS/TTL	±100ppm	IQXO-350C	X342B
16.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X355A
16.3840MHz	HCMOS/TTL	±50ppm	IQXO-350B	X370A
18.432MHz	HCMOS/TTL	±100ppm	IQXO-350C	X367A
19.66080MHz	HCMOS/TTL	±100ppm	IQXO-350C	X364A
20.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X356A
24.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X371A
25.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X350B
30.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X359B
32.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X360A
32.768MHz	HCMOS/TTL	±100ppm	IQXO-350C	X380A
33.3330MHz	HCMOS/TTL	±100ppm	IQX0-350C	X366A
33.33MHz	HCMOS/TTL	±100ppm	IQXO-350C	X361B
40.0MHz	HCMOS/TTL	±50ppm	IQXO-350B	X357B
40.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X357A
48.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X373B
50.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X358A
64.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X393B
66.0MHz	HCMOS/TTL	±100ppm	IQXO-350C	X368A

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IQXO-22, -22I, -23, -23I Commercial Oscillator

ISSUE 14; 24 JUNE 1998

Delivery Options

- Common frequencies are available from stock. Please see p36 for details
- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
- Non tri-state (IQXO-22, -22I)
- Tri-state (IQXO-23, -23I)

Package Outline

- 8-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals. Available over 0 to 70°C (IQXO-22, -23) or –40 to 85°C (IQXO-22I, -23I)

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm (over operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- 0 to 70°C (IQXO-22, -23)
- –40 to 85°C (IQXO-22I, -23I)

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Terminal Strength: 0.91kg max. Force perpendicular to top & bottom.
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Solderability: MIL-STD-202E, Method 208C
- Vibration: 10 to 55Hz 0.76mm displacement, sweep 60 seconds, duration 2 hours.
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes

Tri-state Operation (IQXO-23, -23I)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Maximum 'pull-down' resistance required to disable output = 20kΩ
- Disable current 50µA typical

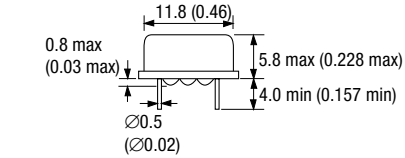
Marking

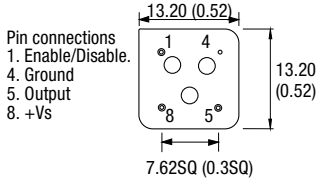
- Model number (+ Operating Temperature Code; if applicable)
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

- Frequency + Model Number + Operating Temperature Code (if applicable) + Frequency Stability

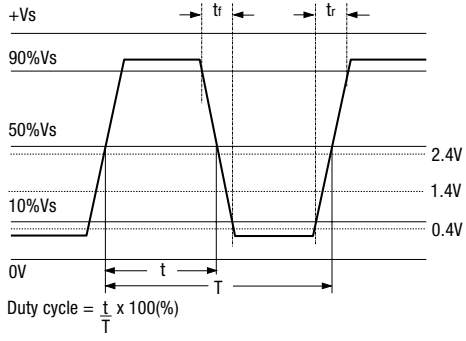
Outline in mm (inches)





Note: Pin 1= No connnection on non tri-state models

Output Waveform - HCMOS/TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

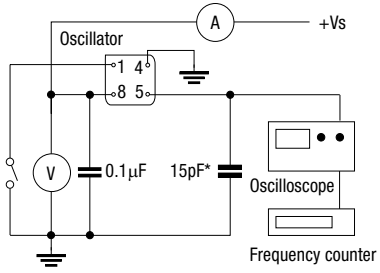
Frequency Range	Frequency Stability	Supply Voltage*	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
500.0kHz to < 5.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	15ns	15ns	45/55%	IQXO-22, -22I, -23, -23I
5.0 to < 16.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	10ns	10ns	45/55%	IQXO-22, -22I, -23, -23I
16.0 to < 30.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	10ns	10ns	45/55%	IQXO-22, -22I, -23, -23I
30.0 to < 50.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	40mA	8ns	8ns	45/55%	IQXO-22, -22I, -23, -23I
50.0 to 80.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-22, -22I, -23, -23I

Ordering Example 22.0MHz IQXO-22I B F

Frequency
Model No: -22, -22I = Non tri-state & -23, -23I = Tri-state
Operating Temperature Code: I = –40 to 85°C Not applicable for 0 to 70°C
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

Please note: Code combination A F is not available
* A 3.3V version is available upon request. Please contact the Sales office for details.

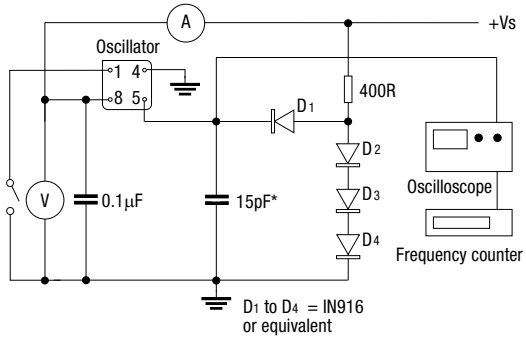
Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Note: Pin 1 = No connection on non tri-state models

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Note: Pin 1 = No connection on non tri-state models

SPXOs

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IQXO-135 Commercial Oscillator

ISSUE 8; 24 JUNE 1998

Delivery Options

- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals.

Standard Frequency Stabilities

- ±10ppm, ±15ppm
  (over operating temperature range)

Operating Temperature Range

- 0 to 50°C

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Terminal Strength: 0.91kg max. Force perpendicular to top & bottom.
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Solderability: MIL-STD-202E, Method 208C
- Vibration: 10 to 55Hz 0.76mm displacement, sweep 60 seconds, duration 2 hours.
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Shock: $981 m/s^2$ for 6ms, three shocks in each direction along the three mutually perpendicular planes

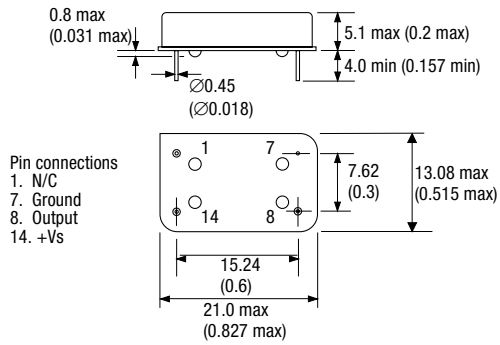
Marking

- Model number
- Frequency Stability Code
- Frequency
- Date code (Year/Week)

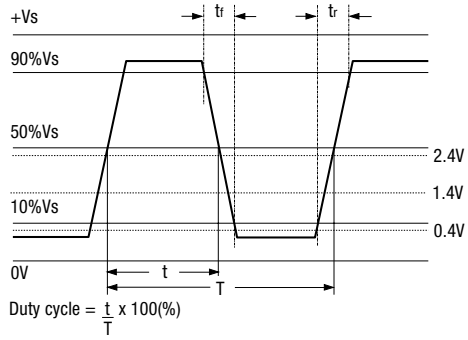
Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

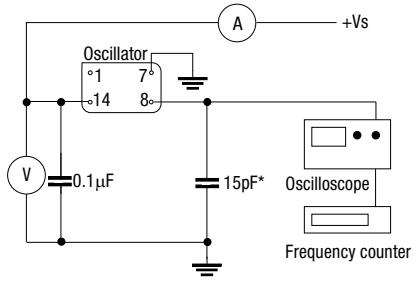
Outline in mm (inches)



Output Waveform - HCMOS/TTL



Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

SPXOs

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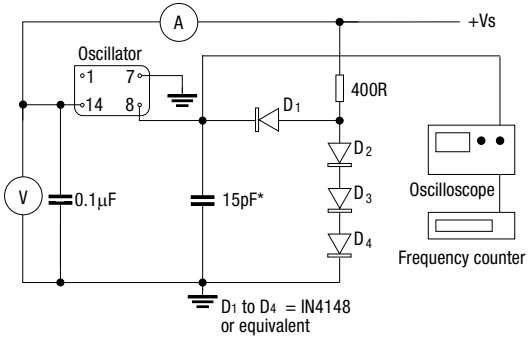
Electrical Specification – maximum limiting values when measured in HCMOS test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
4.0 to < 30.0MHz	±10ppm ±15ppm	5V±0.25V	20mA	10ns	10ns	45/55%	IQXO-135
30.0 to < 50.0MHz	±10ppm ±15ppm	5V±0.25V	30mA	8ns	8ns	45/55%	IQXO-135
50.0 to 70.0MHz	±10ppm ±15ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-135

Ordering Example 24.0MHz IQXO-135 E

Frequency
Model No
Frequency Stability: E = ±10ppm; N = ±15ppm

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

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IQXO-149, -149I Commercial Oscillator

ISSUE 10; 24 JUNE 1998

Delivery Options

- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- Tri-state HCMOS/TTL
- Drive Capability: 50pF or 10 TTL

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals. Available over 0 to 70°C (IQXO-149) or –40 to 85°C (IQXO-149I)

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm (over operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- 0 to 70°C (IQXO-149)
- –40 to 85°C (IQXO-149I)

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Terminal Strength: 0.91kg max. Force perpendicular to top & bottom.
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Solderability: MIL-STD-202E, Method 208C
- Vibration: 10 to 55Hz 0.76mm displacement, sweep 60 seconds, duration 2 hours.
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes

Tri-state Operation

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Maximum 'pull-down' resistance required to disable output = 20kΩ
- Disable current 50µA typical

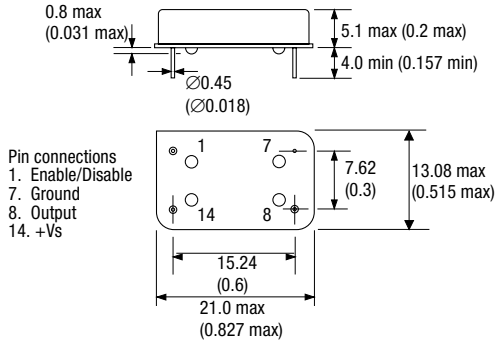
Marking

- Model number (+ Operating Temperature Code; if applicable)
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

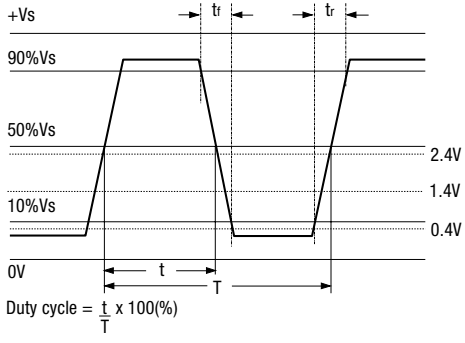
Minimum Order Information Required

- Frequency + Model Number + Operating Temperature Code (if applicable) + Frequency Stability

Outline in mm (inches)



Output Waveform - HCMOS/TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

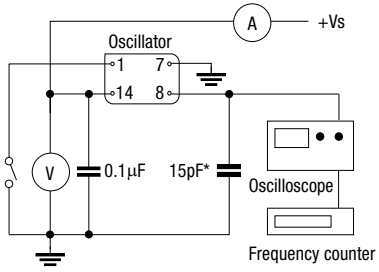
Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
250.0kHz to < 5.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	15ns	15ns	45/55%	IQXO-149, -149I
5.0 to < 30.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	10ns	10ns	45/55%	IQXO-149, -149I
30.0 to < 50.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	40mA	8ns	8ns	45/55%	IQXO-149, -149I
50.0 to 80.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-149, -149I

Ordering Example 22.0MHz IQXO-149I B F

Frequency
Model No
Operating Temperature Code: I = –40 to 85°C Not applicable for 0 to 70°C
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

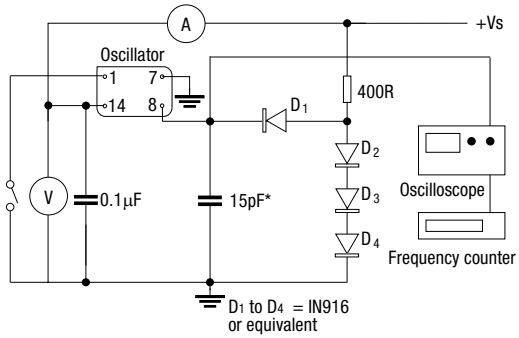
Please note: Code combination A F is not available

Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

SPXOs

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IQXO-331, -331I, -336, -336I Commercial Oscillator

ISSUE 4; 24 JUNE 1998

Recommended For New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- ACMOS/TTL
- Drive Capability: 50pF (70.0 to 110.0MHz)
  15pF (>110.0 to 150.0MHz)
  10 TTL
- Tri-state (IQXO-331, -331I)
- Non tri-state (IQXO-336, -336I)

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals. Available over 0 to 70°C (IQXO-331, -336) or –40 to 85°C (IQXO-331I, -336I)

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm
  (over operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- 0 to 70°C (IQXO-331, -336)
- –40 to 85°C (IQXO-331I, -336I)

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Terminal Strength: 0.91kg max. Force perpendicular to top & bottom.
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Solderability: MIL-STD-202E, Method 208C
- Vibration: 10 to 55Hz 0.76mm displacement, sweep 60 seconds, duration 2 hours.
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes

Tri-state Operation (IQXO-331, -331I)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Maximum 'pull-down' resistance required to disable output = 20kΩ

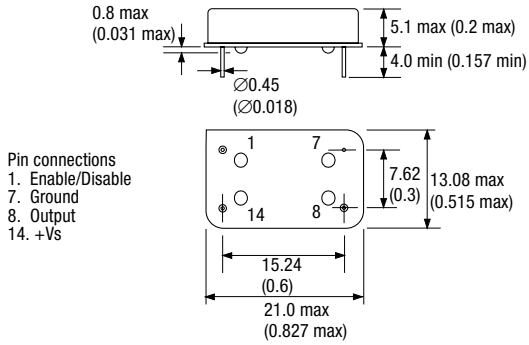
Marking

- Model number (+ Operating Temperature Code; if applicable)
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

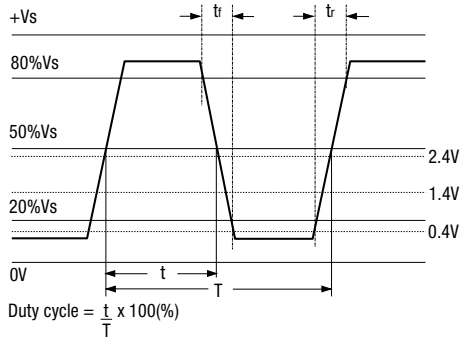
- Frequency + Model Number + Operating Temperature Code (if applicable) + Frequency Stability

Outline in mm (inches)



Note: Pin 1 = No connection on non tri-state models

Output Waveform - ACMOS/TTL



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Electrical Specification – maximum limiting values when measured in ACMOS test circuit

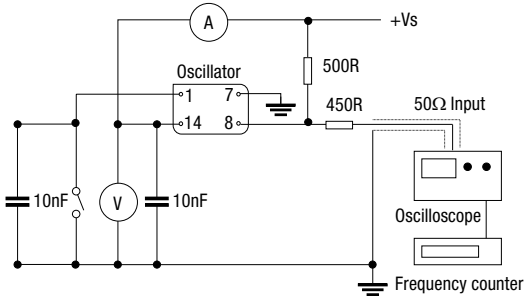
Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
70.0 to < 90.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	45mA	3ns	3ns	40/ 60%	IQXO-331, -331I, -336, -336I
90.0 to < 115.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	60mA	3ns	3ns	40/ 60%	IQXO-331, -331I, -336, -336I
115.0 to 150.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	65mA	3ns	3ns	40/ 60%	IQXO-331, -331I, -336, -336I

Ordering Example 75.0MHz IQXO-331I B F

Frequency
Model No: -331, -331I = Tri-state -336, -336I = Non tri-state
Operating Temperature Code: I = –40 to 85°C Not applicable for 0 to 70°C
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

Please note: Code combination A F is not available

Test Circuit - ACMOS



Note: Pin 1 = No connection on non tri-state models

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IQXO-350, -350I Commercial Oscillator

ISSUE 15; 24 JUNE 1998

Delivery Options

- Common frequencies are available from stock. Please see p36 for details
- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
  (1.0 to < 100.0kHz 15pF or 10 LS TTL only)

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals. Available over 0 to 70°C (IQXO-350) or –40 to 85°C (IQXO-350I)

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm
  (over operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- 0 to 70°C (IQXO-350)
- –40 to 85°C (IQXO-350I)

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Terminal Strength: 0.91kg max. Force perpendicular to top & bottom.
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Solderability: MIL-STD-202E, Method 208C
- Vibration: 10 to 55Hz 0.76mm displacement, sweep 60 seconds, duration 2 hours.
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes

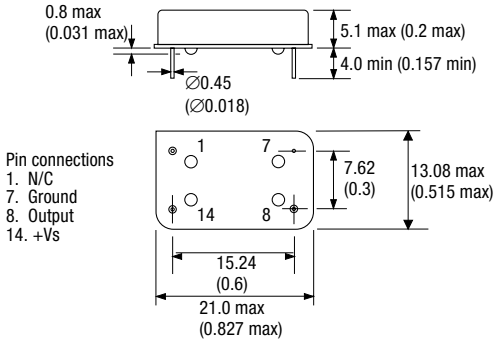
Marking

- Model number (+ Operating Temperature Code; if applicable)
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

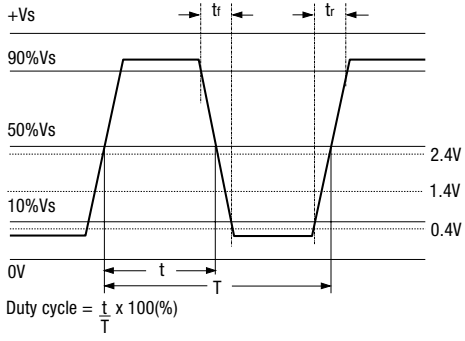
Minimum Order Information Required

- Frequency + Model Number + Operating Temperature Code (if applicable) + Frequency Stability

Outline in mm (inches)



Output Waveform - HCMOS/TTL/LS TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	*Rise Time (t_r)	*Fall Time (t_f)	**Duty Cycle	Model Number
1.0 to < 100.0kHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	10mA	10ns	10ns	45/55%	IQXO-350, -350I
100.0 to < 250.0kHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	10mA	15ns	15ns	45/55%	IQXO-350, -350I
250.0kHz to < 5.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	15ns	15ns	45/55%	IQXO-350, -350I
5.0 to < 16.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	15mA	10ns	10ns	45/55%	IQXO-350, -350I
16.0 to < 30.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	10ns	10ns	45/55%	IQXO-350, -350I
30.0 to < 50.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	40mA	8ns	8ns	45/55%	IQXO-350, -350I
50.0 to 80.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-350, -350I

Ordering Example 22.0MHz IQXO-350I B F

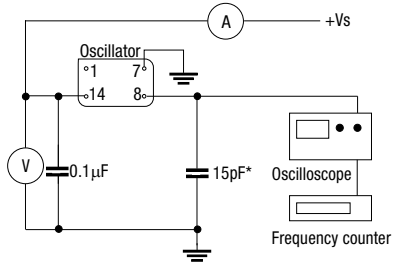
Frequency
Model No
Operating Temperature Code: I = –40 to 85°C Not applicable for 0 to 70°C
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

Please note: Code combination A F is not available

SPXOs

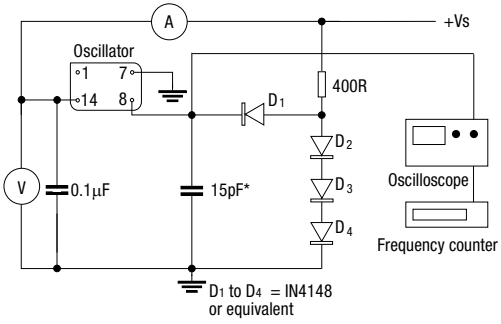
* Rise & Fall times will be 6ns max in TTL cct.
** Duty Cycle will be 40/60% in TTL cct for ≥5.0MHz

Test Circuit - HCMOS



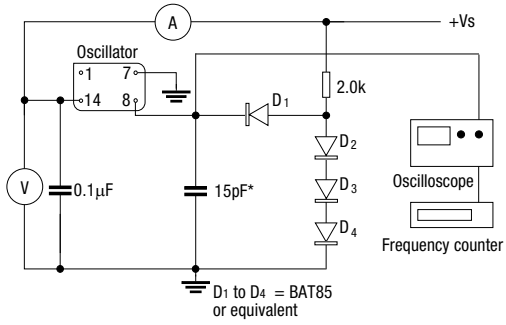
*Inclusive of jigging & equipment capacitance

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Test Circuit - LS TTL



*Inclusive of jigging & equipment capacitance

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IQXO-415, -415I Professional Oscillator

ISSUE 4; 30 JUNE 1998

Recommended For New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- Tri-state HCMOS/TTL
- Drive Capability: 50pF or 10 TTL

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals. Available over 0 to 70°C (IQXO-415) or –40 to 85°C (IQXO-415I)

Frequency Tolerance @ 25°C

- ±5ppm or ±10ppm

Frequency Stability Inclusive Of :-

- Frequency Tolerance (as above)
- Voltage Variation: ≤ ±0.5ppm
- Load Variation: ≤ ±0.5ppm (< 60.0MHz)
- Load Variation: ≤ ±1.0ppm (≥ 60.0MHz)
- Ageing for 5 years: ≤ ±5ppm

Operating Temperature Range

- 0 to 70°C (IQXO-415)
- –40 to 85°C (IQXO-415I)

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Acceleration: 490m/s^2 for 1 minute in the 'Y_1' plane
- Bump: 4000 bumps at 390m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Thermal Shock: 10 cycles from –55 to 125°C
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes

Tri-state Operation

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Disable current 50µA typical

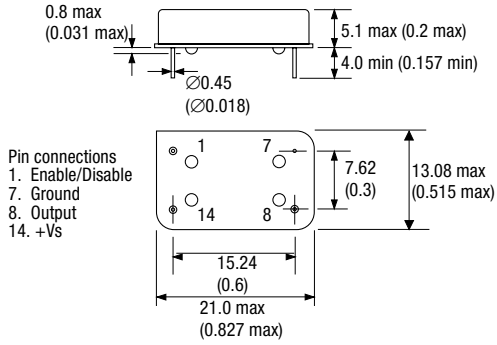
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

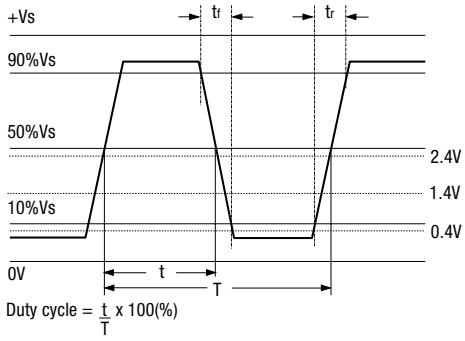
Minimum Order Information Required

- Frequency + Model Number + Operating Temperature Code (if applicable) + Frequency Stability

Outline in mm (inches)



Output Waveform - HCMOS/TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

Frequency Range	Overall Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
250.0kHz to < 8.0MHz	±15ppm, ±25ppm, ±50ppm	5V±0.5V	5mA	10ns	10ns	45/55%	IQXO-415, -415I
8.0 to < 23.0MHz	±15ppm, ±25ppm, ±50ppm	5V±0.5V	10mA	5ns	5ns	45/55%	IQXO-415, -415I
23.0 to 80.0MHz	±15ppm, ±25ppm, ±50ppm	5V±0.5V	65mA	3ns	3ns	45/55%	IQXO-415, -415I

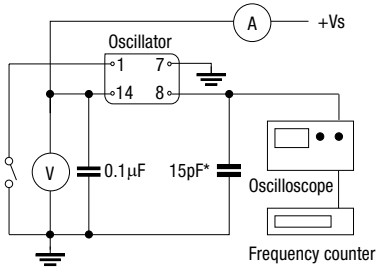
Please note that variations to the above specification are considered upon request; please contact our sales office.

Ordering Example 22.0MHz IQXO-415I B E

Frequency
Model No
Operating Temperature Code: I = –40 to 85°C Not applicable for 0 to 70°C
Frequency Stability: A = ±25ppm; B = ±50ppm; N = ±15ppm (Only available for 0 to 70°C)
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm

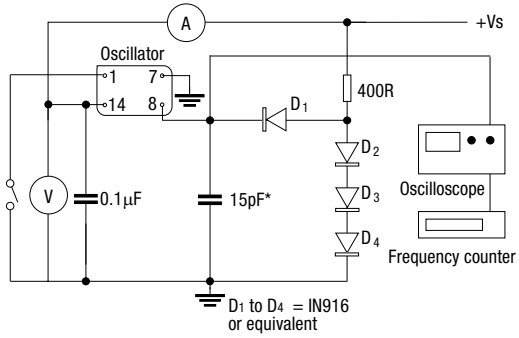
Please note: Code combination N E is not available

Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

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IQXO-35, -36 Industrial Oscillator

ISSUE 4; 26 MARCH 1998

Delivery Options

- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
- Non tri-state (IQXO-35)
- Tri-state (IQXO-36)

Package Outline

- 8-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals and high environmental performance.

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm (over the operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- –40 to 85°C

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Acceleration: 490m/s^2 for 1 minute in the 'Y_1' plane
- Bump: 4000 bumps at 390m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of Helium leakage
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes

Tri-state Operation (IQXO-36)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Maximum 'pull-down' resistance required to disable output = 20kΩ
- Disable current 50µA typical

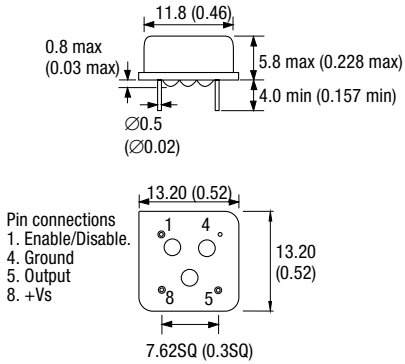
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

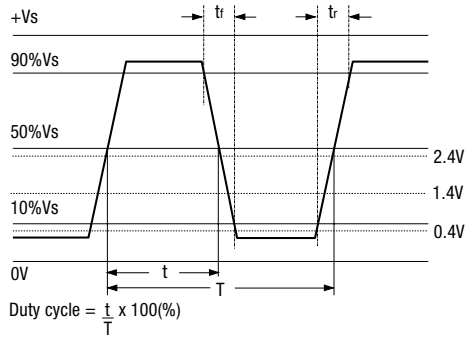
- Frequency + Model Number + Frequency Stability

Outline in mm (inches)



Note: Pin 1= No connnection on non tri-state models

Output Waveform - HCMOS/TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
500.0kHz to < 5.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	15ns	15ns	45/55%	IQXO-35, -36
5.0 to < 16.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	10ns	10ns	45/55%	IQXO-35, -36
16.0 to < 30.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	10ns	10ns	45/55%	IQXO-35, -36
30.0 to < 50.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	40mA	8ns	8ns	45/55%	IQXO-35, -36
50.0 to 70.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-35, -36

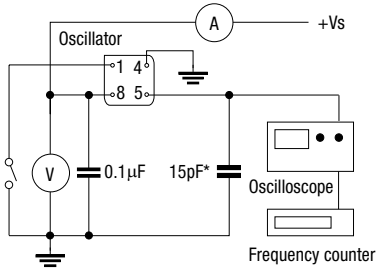
Ordering Example 22.0MHz IQXO-35 B F

Frequency
Model No: -35 = Non tri-state, -36 = Tri-state
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

Please note: Code combination A F is not available

SPXOs

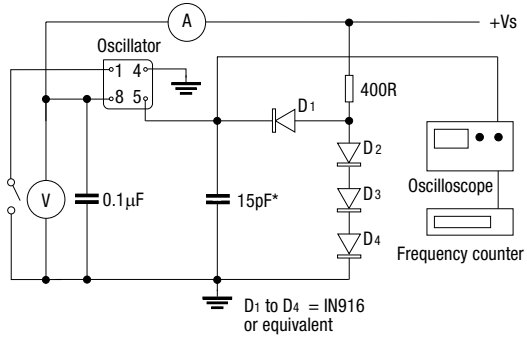
Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Note: Pin 1 = No connection on non tri-state models

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Note: Pin 1 = No connection on non tri-state models

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IQXO-365, -366 Industrial Oscillator

ISSUE 4; 26 MARCH 1998

Delivery Options

- 3 day Express Manufacturing Service, subject to piece part stock availability.

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
- Non tri-state (IQXO-365)
- Tri-state (IQXO-366)

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals and high environmental performance.

Standard Frequency Stabilities

- ±25ppm, ±50ppm, ±100ppm
  (over the operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±5ppm, ±10ppm, ±25ppm

Operating Temperature Range

- –40 to 85°C

Storage Temperature Range

- –55 to 125°C

Environmental Specification

- Acceleration: 490m/s^2 for 1 minute in the 'Y_1' plane
- Bump: 4000 bumps at 390m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1 × 10^{-8} mBar litres of Helium leakage
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Rapid Change of Temperature over Operating Temperature Range: 10 cycles
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes

Tri-state Operation (IQXO-366)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Maximum 'pull-down' resistance required to disable output = 20kΩ
- Disable current 50µA typical

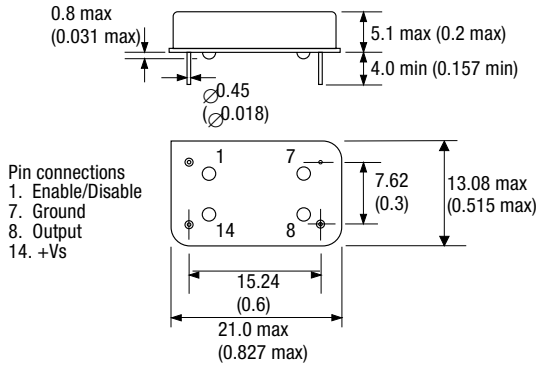
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

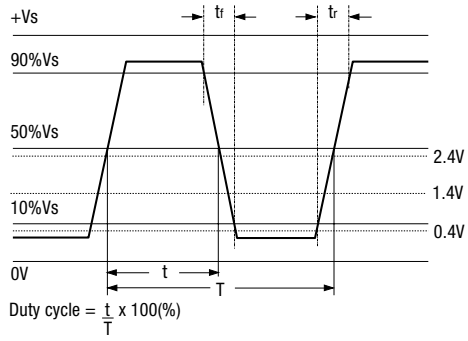
- Frequency + Model Number + Frequency Stability

Outline in mm (inches)



Note: Pin 1 = No connection on non tri-state models

Output Waveform - HCMOS/TTL



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Electrical Specification – maximum limiting values when measured in HCMOS test circuit

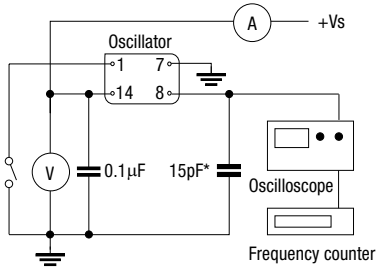
Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
250.0kHz to < 5.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	15ns	15ns	45/55%	IQXO-365, -366
5.0 to < 16.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	20mA	10ns	10ns	45/55%	IQXO-365, -366
16.0 to < 30.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	30mA	10ns	10ns	45/55%	IQXO-365, -366
30.0 to < 50.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	40mA	8ns	8ns	45/55%	IQXO-365, -366
50.0 to 70.0MHz	±25ppm, ±50ppm, ±100ppm	5V±0.25V	50mA	8ns	8ns	40/60%	IQXO-365, -366

Ordering Example 22.0MHz IQXO-365 B F

Frequency
Model No: -365 = Non tri-state, -366 = Tri-state
Frequency Stability: A = ±25ppm; B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: D = ±5ppm; E = ±10ppm; F = ±25ppm

Please note: Code combination A F is not available

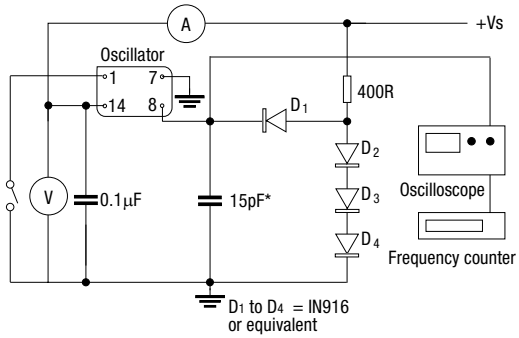
Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Note: Pin 1= No connection on non tri-state models

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Note: Pin 1= No connection on non tri-state models

SPXOs

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MILITARY OSCILLATOR CAPABILITY

For customers preferring full BS release, CFP are able to offer the following products:

QC6107 series of DIL oscillator (released to BS9625 F0014)

- Frequency Range: 1.5kHz to 32.0MHz (HCMOS)
- Package Styles: Full DIL (4 pins), Full DIL (14 pins)
- Stabilities: down to ± 25ppm
- Operating Temperature Ranges: –40 to 85°C or -55 to 125°C

QC6108 series of DIL oscillator (released to BS9625 F0014)

- Frequency Range: 375kHz to 32.0MHz (TTL)
- Package Styles: Full DIL (4 pins), Full DIL (14 pins)
- Stabilities: down to ± 25ppm
- Operating Temperature Ranges: –40 to 85°C or -55 to 125°C

QC6115 series of tri-stateable high drive DIL oscillator (released to BS 9265 F0018)

- Frequency Range: 5.0 to 25.0MHz
- Package Style: Full DIL (4 pins)
- Stabilities: down to ±25ppm
- Operating Temperature Ranges: –40 to 85°C or -55 to 125°C
- Output enable at Pin 1: Logic 1 or Logic 0
- Drive Capability: 150pF

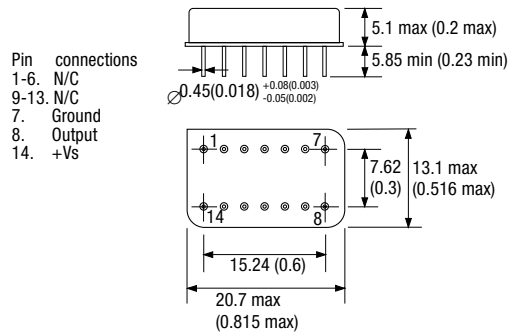
QC6111 series of 40 pin leadless chip carrier (LCC) oscillator (released to BS9625 F0016)

- Frequency Range: 375kHz to 30.0MHz (HCMOS)
- Package Style: 40 pin leadless chip carrier oscillator (LCC)
- Stabilities: down to ± 35ppm
- Operating Temperature Ranges: of –40 to 85°C or -55 to 125°C

QC6112 series of 40 pin leadless chip carrier (LCC) oscillator (released to BS9625 F0016)

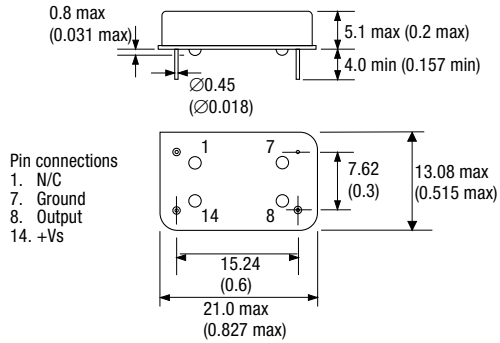
- Frequency Range: 375kHz to 30.0MHz (TTL)
- Package Style: 40 pin leadless chip carrier oscillator (LCC)
- Stabilities: down to ± 35ppm
- Operating Temperature Ranges: of –40 to 85°C or -55 to 125°C

Outline in mm (inches) - QC6107/2 & QC6108/2



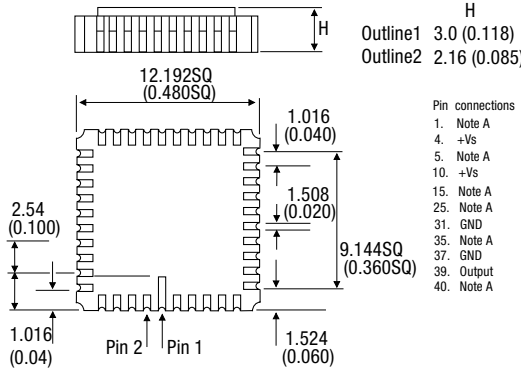
Note: 14 Pin package has no insulating stand-off.

Outline in mm (inches) - QC6107/1, QC6108/1 & QC6115



*Pin 1 is the enable/disable pin for the QC6115 series

Outline in mm (inches) - QC6111 & QC 6112



A - Internally connected. No external electrical connections permissable
B - All other pins may have external electrical connections

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Customer Military SPXO Requirements Fax Form - Please copy form, fill out using BLOCK CAPITALS and fax to CFP on +44 (0)1460 72578				
x = Minimum Specification Information Required for Military SPXO pricing				
Frequency		x		MHz
QC Reference				
Part 70 release?				Yes/No
Please note - if QC Reference or Part 70 release is given - all other information below will not be required				
Output Waveform				TTL/CMOS/Sine
Output Level/Load		x		TTL/CMOS/Sine
Rise/Fall Time				ns
Duty Cycle				%
Supply Voltage		x		Vdc
Output Current				mA
Frequency Tolerance @ 25°C				ppm
Operating Temperature Range		x		°C
Frequency Stability	vs. Input Voltage Change			ppm
	vs. load Change			ppm
	vs. Operating Temperature	x		ppm
Screening required?				Yes/No
Ageing				per year
Tri-state Option				Yes/No
Package	Outline	x		
	Connections	x		
	Marking			
Additional Notes				
Name				
Job Title				
Company Name				
Address				
Postcode				
Telephone			E-mail	
Fax			http://	

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IQXO-85, -86, -87, -88 Military Oscillator

ISSUE 4; 17 JUNE 1998

Recommended For New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
- Non tri-state (IQXO-85, -86)
- Tri-state (IQXO-87, -88)

Package Outline

- 8-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals and gold plated pins and bases. Available non-screened (IQXO-85, -87) and fully screened (IQXO-86, -88).

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±10ppm, ±25ppm

Operating Temperature Range

- –55 to 125°C

Storage Temperature Range

- –55 to 125°C

Screening On Each Device (IQXO-86, -88)

- Acceleration: 49000m/s^2 for 1 minute in the 'Y_1' plane
- High Temperature Storage: 24hrs at 150°C
- Rapid Change of Temperature: –55 to 125°C, 10 cycles
- Dynamic burn-in for 168hrs at 125°C
- Check all parameters & assess

Environmental Specification

- Bump: 4000 bumps at 391m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1×10^{-8} mBar litres of helium
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes.

Tri-state Operation (IQXO-87, -88)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Disable current 50µA typical

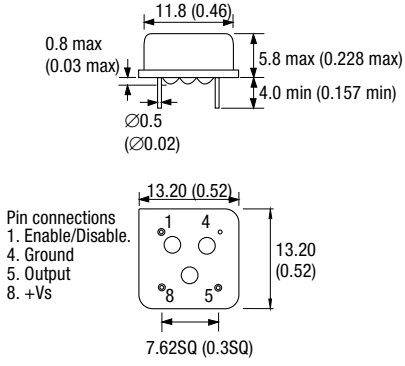
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

Outline in mm (inches)



Note: Pin 1= No connnection on non tri-state models

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Electrical Specification – maximum limiting values measured in HCMOS test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
250.0kHz to < 8.0MHz	±50ppm ±100ppm	5V±0.5V	5mA	10ns	10ns	45/55%	IQXO-85, -86, -87, -88
8.0 to < 23.0MHz	±50ppm ±100ppm	5V±0.5V	10mA	5ns	5ns	40/60%	IQXO-85, -86, -87, -88
23.0 to < 48.0MHz	±50ppm ±100ppm	5V±0.5V	50mA	5ns	5ns	40/60%	IQXO-85, -86, -87, -88
48.0 to 90.0MHz	±50ppm ±100ppm	5V±0.5V	65mA	3ns	3ns	40/60%	IQXO-85, -86, -87, -88

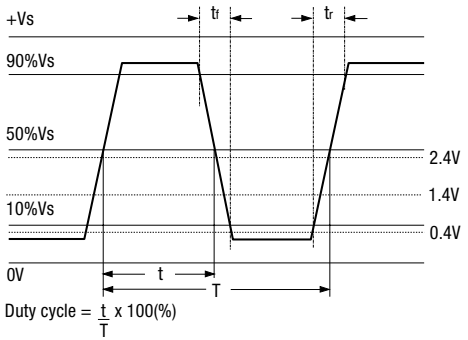
Ordering Example 50.0MHz IQXO-85 B E

Frequency
Model No: -85, -86, = Non tri-state, -87, -88 = Tri-state
Frequency Stability: B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: E = ±10ppm; F = ±25ppm

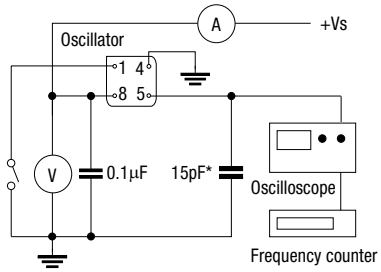
Please note: Code combination B F is not available

SPXOs

Output Waveform - HCMOS/TTL



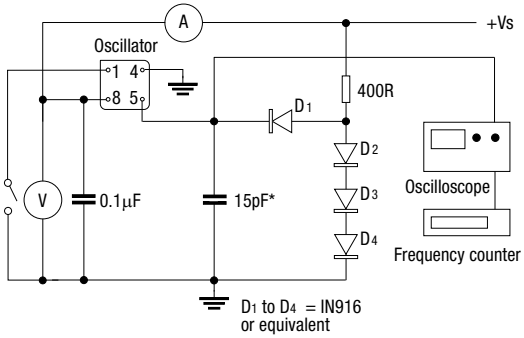
Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Note: Pin 1=No connection on non tri-state models

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Note: Pin 1= No connection on non tri-state models

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IQXO-525, -526 Military Oscillator

ISSUE 4; 19 JUNE 1998

Not Recommended For New Designs (although still available) See P60 For Latest Model

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals and gold plated pins and bases. Available non-screened (IQXO-525) and fully screened (IQXO-526).

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±10ppm, ±25ppm

Operating Temperature Range

- –55 to 125°C

Storage Temperature Range

- –55 to 125°C

Screening On Each Device (IQXO-526)

- Acceleration: 49000m/s^2 for 1 minute in the 'Y1' plane
- High Temperature Storage: 24hrs at 150°C
- Rapid Change of Temperature: –55 to 125°C, 10 cycles
- Dynamic burn-in for 168hrs at 125°C
- Check all parameters & assess

Environmental Specification

- Bump: 4000 bumps at 391m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1 × 10^{-8} mBar litres of helium
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes.

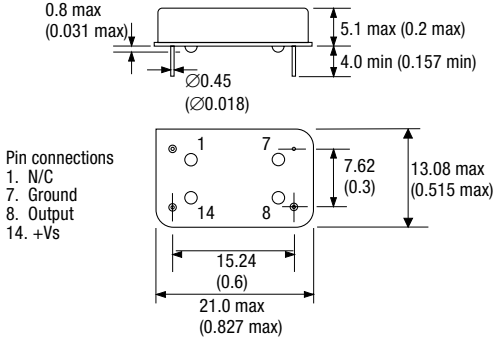
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

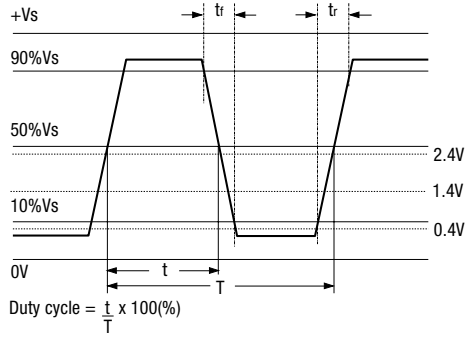
Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

Outline in mm (inches)



Output Waveform- HCMOS/TTL



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Electrical Specification – maximum limiting values measured in HCMOS test circuit

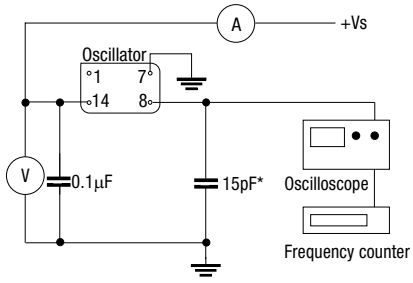
Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
30.0kHz to < 4.0MHz	±50ppm ±100ppm	5V±0.5V	50mA	15ns	15ns	45/55%	IQXO-525, -526
4.0MHz to < 30.0MHz	±50ppm ±100ppm	5V±0.5V	40mA	10ns	10ns	40/60%	IQXO-525, -526
30.0MHz to 32.0MHz	±50ppm ±100ppm	5V±0.5V	60mA	8ns	8ns	40/60%	IQXO-525, -526

Ordering Example 24.0MHz IQXO-525 B E

Frequency
Model No
Frequency Stability: B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: E = ±10ppm; F = ±25ppm

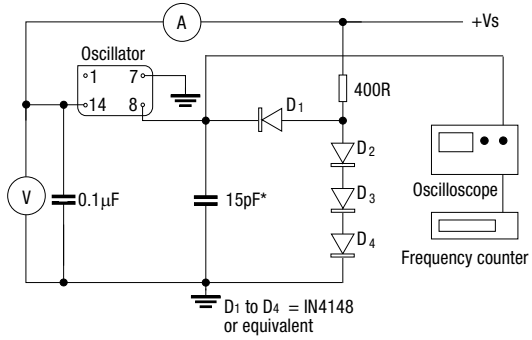
Please note: Code combination B F is not available

Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

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IQXO-625, -626, -627, -628 Military Oscillator

ISSUE 3; 26 MARCH 1998

Recommended For New Designs

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- HCMOS/TTL
- Drive Capability: 50pF or 10 TTL
- Non tri-state (IQXO-625, -626)
- Tri-state (IQXO-627, -628)

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals and gold plated pins and bases. Available non-screened (IQXO-625, -627) and fully screened (IQXO-626, -628).

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Frequency Tolerance at 25°C (Optional)

- ±10ppm, ±25ppm

Operating Temperature Range

- –55 to 125°C

Storage Temperature Range

- –55 to 125°C

Screening On Each Device (IQXO-626,- 628)

- Acceleration: 49000m/s^2 for 1 minute in the 'Y_1' plane
- High Temperature Storage: 24hrs at 150°C
- Rapid Change of Temperature: –55 to 125°C, 10 cycles
- Dynamic burn-in for 168hrs at 125°C
- Check all parameters & assess

Environmental Specification

- Bump: 4000 bumps at 391m/s^2 in each of the three mutually perpendicular planes
- Hermetic Seal: not to exceed 1 × 10^{-8} mBar litres of helium
- Humidity: steady state: in accordance with test Ca of IEC 68-2-3, for 56 days at 40°C at a relative humidity of 93%, cyclic: in accordance with test Db variant 1 of IEC 68-2-30, at severity b), 55 deg.C for six cycles
- Shock: 981m/s^2 for 6ms, three shocks in each direction along the three mutually perpendicular planes
- Solderability: BS2011 test TA
- Vibration: 10 to 60Hz 0.75mm displacement, 60 to 2000Hz 98.1m/s^2 acceleration, 30 minutes in each of three mutually perpendicular planes.

Tri-state Operation (IQXO-627, -628)

- Logic '0' to pin 1 disables oscillator output; when disabled the oscillator output goes to the high impedance state
- No connection or Logic '1' to pin 1 enables oscillator output
- Disable current 50µA typical

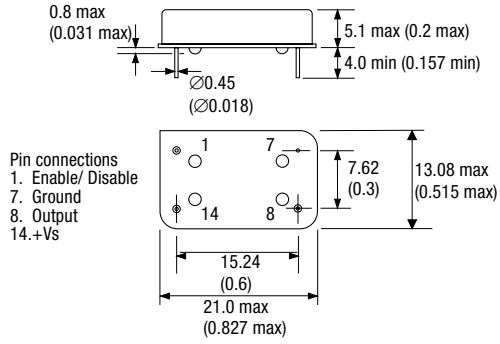
Marking

- Model number
- Frequency Stability Code
- Frequency Tolerance Code (Optional)
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

Outline in mm (inches)



Note: Pin 1 = No connection on non tri-state models

SPXOs

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Electrical Specification – maximum limiting values measured in HCMOS test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
250.0kHz to < 8.0MHz	±50ppm ±100ppm	5V±0.5V	5mA	10ns	10ns	45/55%	IQXO-625, -626 -627, -628
8.0 to < 23.0MHz	±50ppm ±100ppm	5V±0.5V	10mA	5ns	5ns	40/60%	IQXO-625, -626 -627, -628
23.0 to < 48.0MHz	±50ppm ±100ppm	5V±0.5V	50mA	5ns	5ns	40/60%	IQXO-625, -626 -627, -628
48.0 to 90.0MHz	±50ppm ±100ppm	5V±0.5V	65mA	3ns	3ns	40/60%	IQXO-625, -626 -627, -628

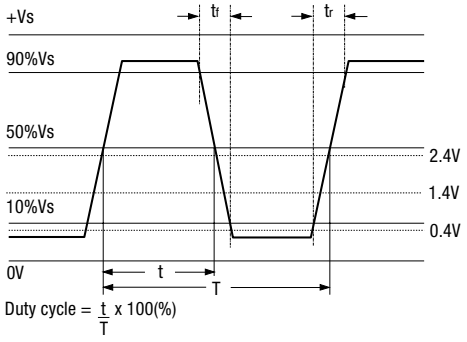
Ordering Example 50.0MHz IQXO-625 B E

Frequency
Model No: -625, -626 = Non tri-state, -627, -628 = Tri-state
Frequency Stability: B = ±50ppm; C = ±100ppm
Frequency Tolerance @ 25°C: E = ±10ppm; F = ±25ppm

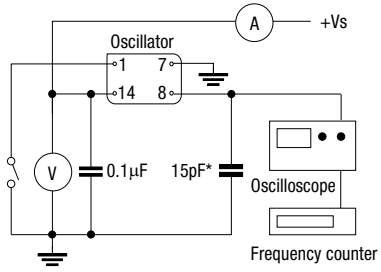
Please note: Code combination B F is not available

SPXOs

Output Waveform- HCMOS/TTL



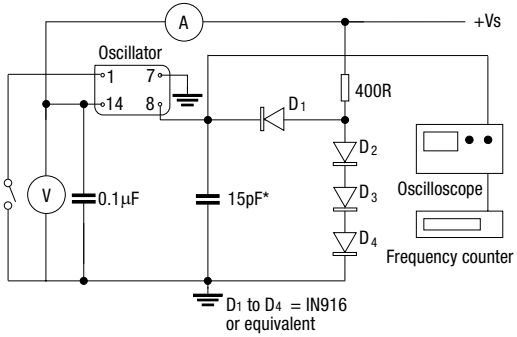
Test Circuit - HCMOS



*Inclusive of jigging & equipment capacitance

Note: Pin 1= No connection on non tri-state models

Test Circuit - TTL



*Inclusive of jigging & equipment capacitance

Note: Pin 1= No connection on non tri-state models

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IQXO-899

ISSUE 7; 19 JUNE 1997

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- ECL 10kH

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals.

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Operating Temperature Range

- 0 to 70°C

Storage Temperature Range

- –55 to 125°C

Marking

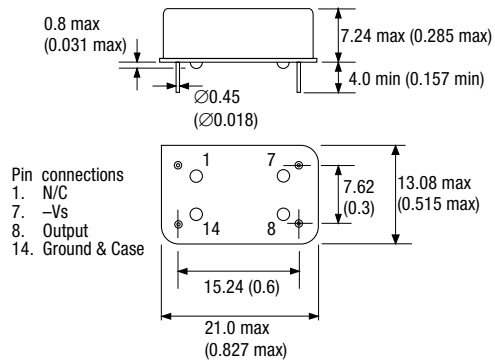
- Model number
- Frequency Stability Code
- Frequency
- Date code (Year/Week)

Minimum Order Information Required

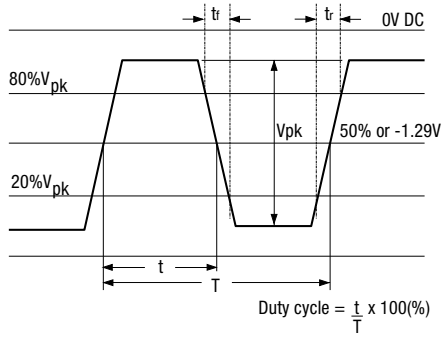
- Frequency + Model Number + Frequency Stability

SPXOs

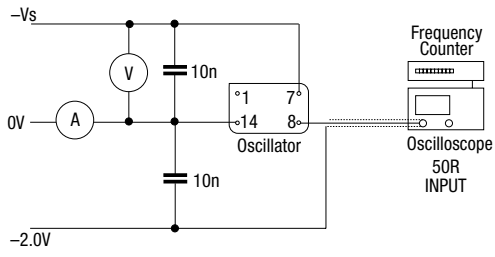
Outline in mm (inches)



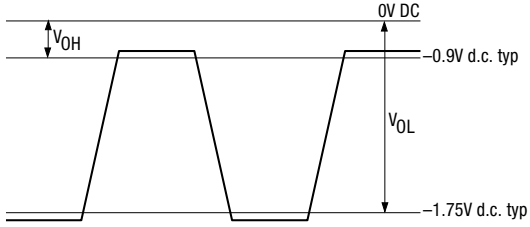
Output Waveform



Test Circuit



Logic Levels



Logic 0 (V_{OL}) minimum –1.87V; maximum –1.625V
Logic 1 (V_{OH}) minimum –1.06V; maximum –0.72V

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Electrical Specification – maximum limiting values when measured in test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
30.0 to < 70.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-899
70.0 to < 125.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-899
125.0 to < 200.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-899
200.0 to 250.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-899

Note: ECL output require a pull-down resistor in the range 270Ω to 2kΩ to the most negative rail.

Ordering Example 125.0MHz IQXO-899 B

Frequency
Model No
Frequency Stability: B = ±50ppm; C = ±100ppm

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IQXO-904

ISSUE 8; 19 JUNE 1997

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- PECL 10kH

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals.

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Operating Temperature Range

- 0 to 70°C

Storage Temperature Range

- –55 to 125°C

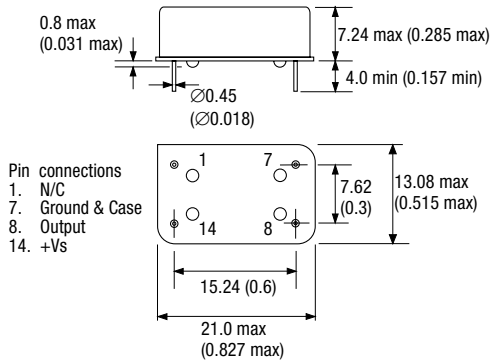
Marking

- Model number
- Frequency Stability Code
- Frequency
- Date code (Year/Week)

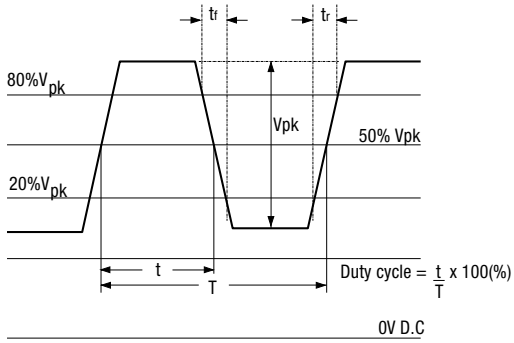
Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

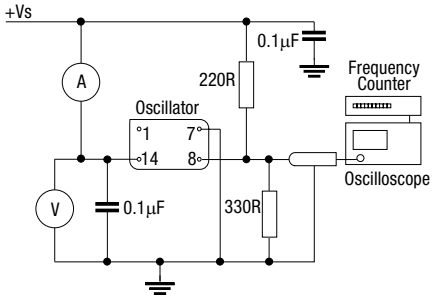
Outline in mm (inches)



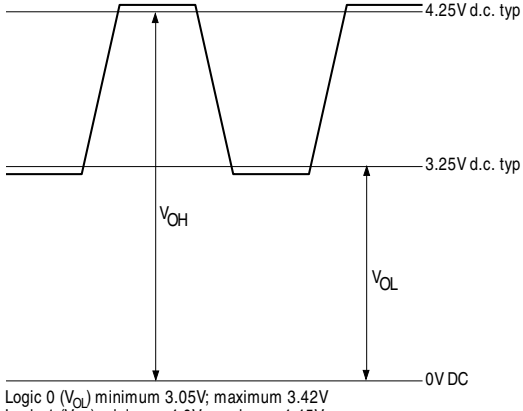
Output Waveform



Test Circuit



Logic Levels



Logic 0 (V_{OL}) minimum 3.05V; maximum 3.42V
Logic 1 (V_{OH}) minimum 4.0V; maximum 4.45V

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Electrical Specification – maximum limiting values when measured in test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
30.0 to < 70.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-904
70.0 to < 125.0MHz	±50ppm ±100ppm	5.0V±0. 25V	60mA	2ns	2ns	40/60%	IQXO-904
125.0 to < 200.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-904
200.0 to 250.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-904

Ordering Example 125.0MHz IQXO-904 B

Frequency

Model No

Frequency Stability: B = ±50ppm; C = ±100ppm

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IQXO-909

ISSUE 8; 30 JUNE 1998

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- Dual Complimentary ECL 10kH

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals.

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Operating Temperature Range

- 0 to 70°C

Storage Temperature Range

- –55 to 125°C

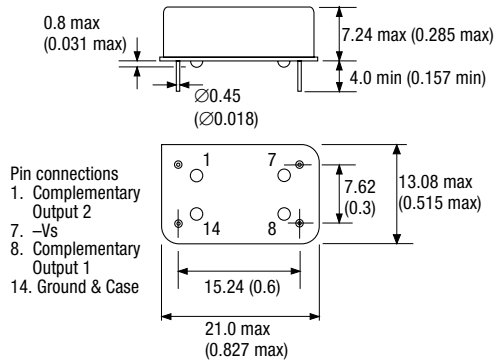
Marking

- Model number
- Frequency Stability Code
- Frequency
- Date code (Year/Week)

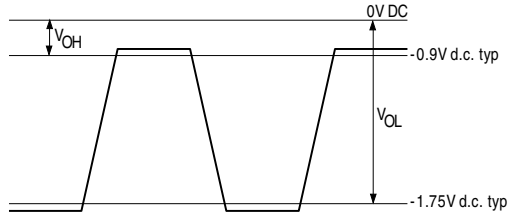
Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

Outline in mm (inches)

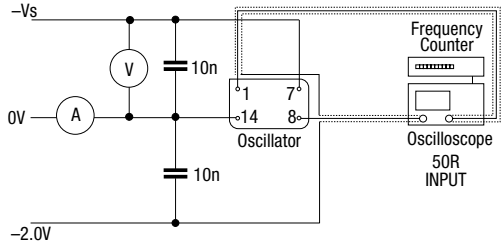


Logic Levels



Logic 0 (V_{OL}) minimum -1.87V; maximum -1.625V
Logic 1 (V_{OH}) minimum -1.06V; maximum -0.72V

Test Circuit



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Electrical Specification – maximum limiting values when measured in test circuit

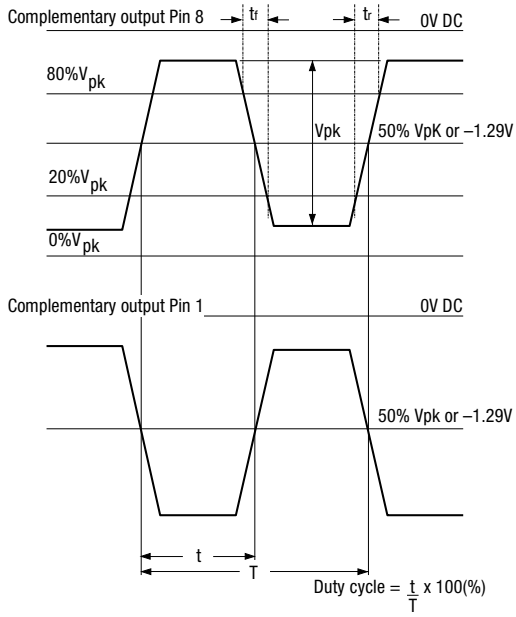
Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
30.0 to < 70.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-909
70.0 to < 125.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-909
125.0 to < 200.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-909
200.0 to 250.0MHz	±50ppm ±100ppm	–5.2V±0.25V	60mA	2ns	2ns	40/60%	IQXO-909

Note: Both Complimentary outputs require terminating to either 270Ω to most negative rail or 50Ω to –2.0V d.c.

Ordering Example 125.0MHz IQXO-909 B

Frequency
Model No
Frequency Stability: B = ±50ppm; C = ±100ppm

Output Waveform



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IQXO-919

ISSUE 5; 19 JUNE 1997

Delivery Options

- Please contact our sales office for current leadtimes

Output Compatibility

- Dual Complimentary PECL 10kH

Package Outline

- 14-pin DIL compatible resistance welded enclosure, hermetically sealed with glass to metal seals.

Standard Frequency Stabilities

- ±50ppm, ±100ppm
  (inclusive of supply voltage variations over the operating temperature range)

Operating Temperature Range

- 0 to 70°C

Storage Temperature Range

- –55 to 125°C

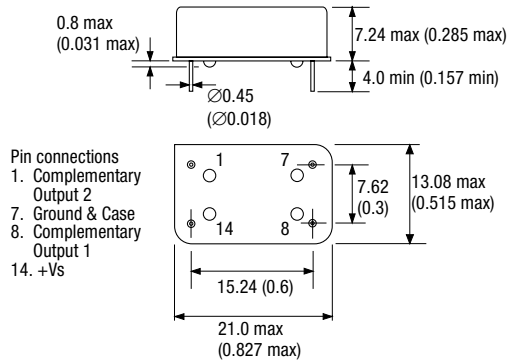
Marking

- Model number
- Frequency Stability Code
- Frequency
- Date code (Year/Week)

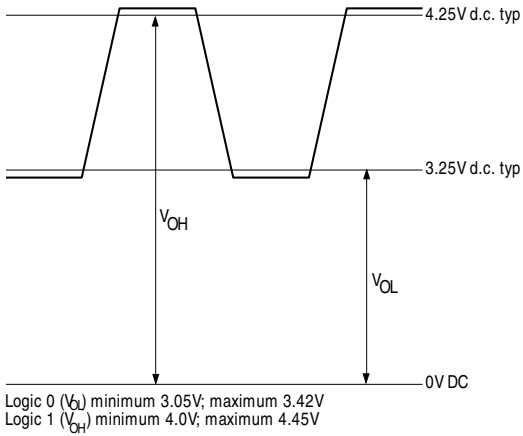
Minimum Order Information Required

- Frequency + Model Number + Frequency Stability

Outline in mm (inches)

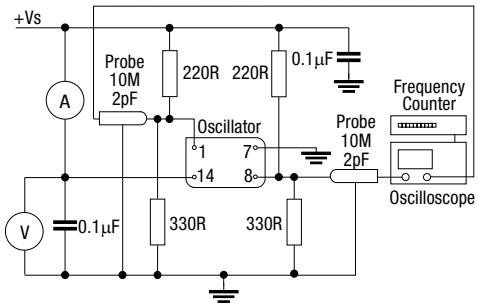


Logic Levels



Logic 0 (V_{OL}) minimum 3.05V; maximum 3.42V
Logic 1 (V_{OH}) minimum 4.0V; maximum 4.45V

Test Circuit



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Electrical Specification – maximum limiting values when measured in test circuit

Frequency Range	Frequency Stability	Supply Voltage	Supply Current	Rise Time (t_r)	Fall Time (t_f)	Duty Cycle	Model Number
30.0 to < 70.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-919
70.0 to < 125.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-919
125.0 to < 200.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-919
200.0 to 250.0MHz	±50ppm ±100ppm	5.0V±0.25V	60mA	2ns	2ns	40/60%	IQXO-919

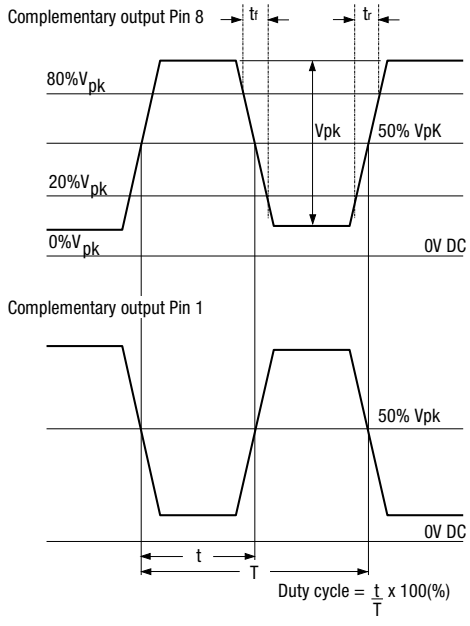
Ordering Example 125.0MHz IQXO-919 B

Frequency

Model No

Frequency Stability: B = ±50ppm; C = ±100ppm

Output Waveform



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