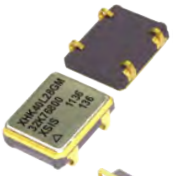
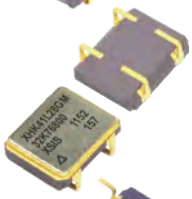
Description

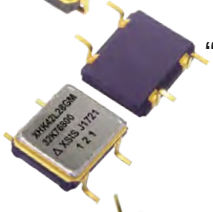
Xsis Electronics "XHK4x" Series High Temperature crystal oscillators are designed and processed to operate over an extended temperature range of -55 °C to 200 °C. These oscillators are offered in a low profile, hermetically sealed resistance welded 7x9 mm ceramic package.

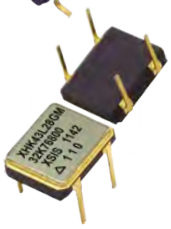
High temperature materials and proven processes are utilized to provide high reliability and long life at extreme temperatures.

In addition, the quartz crystal is mounted at four points to provide excellent shock and vibration resistance.


"XHK40"


"XHK41"

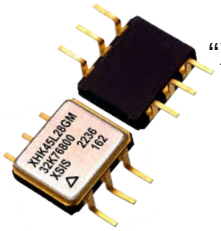

"XHK42"

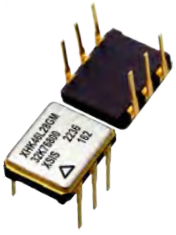

"XHK43"

Features

- Crystal Mounted at 4 Points
- > 10KG (0.3 mS) Shock Resistance
- 1.8V, 2.5V, 3.3V & 5.0V operation options
- 100% testing over operating temperature range
- Tristate Output Option
- Low Phase Noise
- Hermetically Sealed, Ceramic Package
- Tape & Reel packaging
- Made in USA, ECCN: EAR99


"XHK44"


"XHK45"


"XHK46"

Applications

- Downhole Drilling Operations
- High Shock & Vibration
- High Temperature Avionics
- Gun Launched Munitions
- Jet Engine Sensors

Package Specifications & Outline:

- Package: Ceramic 90% $AL_2 O_3$
- Seal: Hermetic – Resistance Welded
- Weight: 0.5g typical, 0.8g Max.
- Thermal Resistance, Junction to Case (θ_{JC}): 38 °C / Watt
- Solder Reflow, Temp./Time: 260 °C Max for 10 Seconds Max.
- Lead Material & Finish: Kovar, 40 to 70 µ inches gold over 100 to 250 µ inches Nickel

Contact Xsis Electronics at xsis@xsis.com for any special requirements.

Xsis Electronics, Inc. 12620 Shawnee Mission Pkwy, Shawnee, KS 66216 Tel. 913-631-0448 Fax. 913-631-1170, www.xsis.com, email xsis@xsis.com

ORDERING INFORMATION (Please build your part number from options below) :

P/N EXAMPLE: XHK40 L 28GM - 32.768 KHz — 3.3 V LVHCMOS, ± 150 PPM Frequency Accuracy over -55 °C to +180 °C, Tristate Output, 100% Screening, 32.768 KHz

XHK | 40 | L | 28 | G | M | – | 32.768 KHz

Output Frequency

Package Options
See Pages 7 & 8

Supply Voltage Options

A	= 5.0 VDC
L	= 3.3 VDC
N	= 2.5 VDC
R	= 1.8 VDC

Frequency Accuracy Vs, Operating Temperature Range Options

21	=	± 40 PPM	over	-20 °C to +150 °C	***
22	=	± 100 PPM	over	-20 °C to +150 °C	*
23	=	± 150 PPM	over	-20 °C to +150 °C	*
24	=	± 40 PPM	over	-20 °C to +180 °C	***
25	=	± 100 PPM	over	-20 °C to +180 °C	***
26	=	± 150 PPM	over	-20 °C to +180 °C	*
27	=	± 100 PPM	over	-55 °C to +180 °C	***
28	=	± 150 PPM	over	-55 °C to +180 °C	*
29	=	± 250 PPM	over	-55 °C to +180 °C	*
30	=	± 100 PPM	over	-20 °C to +200 °C	***
31	=	± 150 PPM	over	-20 °C to +200 °C	***
32	=	± 200 PPM	over	-20 °C to +200 °C	*
33	=	± 250 PPM	over	-20 °C to +200 °C	*
34	=	± 100 PPM	over	-55 °C to +200 °C	***
35	=	± 150 PPM	over	-55 °C to +200 °C	***
36	=	± 200 PPM	over	-55 °C to +200 °C	*
37	=	± 250 PPM	over	-55 °C to +200 °C	*
44	=	± 45 PPM	over	-20 °C to +180 °C	***
45	=	± 300 PPM	over	-55 °C to +200 °C	*

Tristate Options

G	= Tristate
Blank	= No Tristate

100% Screening Options

X	= No Screening
M	= Per MIL-PRF-55310 Level B

*** Tight Stability * Standard Stability

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Electrical Specifications, 5V & 3.3V HC/ACMOS Oscillators

Parameter	5 V HC/ACMOS	3.3 V HC/ACMOS
Output Frequency Range	32.768 KHz	
Frequency Stability Vs Temperature	See Ordering Information on Page 2	
Operating Temperature Range	See Ordering Information on Page 2	
Supply Voltage (Vdd)	+ 5 VDC ± 10%	+ 3.3 VDC ± 10%
Input Current (No Load)	1.1 mA typical, 1.4 mA Max.	0.42 mA typical, 0.7 mA Max.
Output Waveform	Square Wave	Square Wave
Output Duty Cycle (at 50% Output Level)	50/50% Typical, 48/52% Max.	
Output High Level	0.9 Vdd Min.	
Output Low Level	0.1 Vdd Max.	
Output Load	10K // 15 pF	
Rise & Fall Times (Typical Load)	0.2 µs Typical, 1 µs Max. (10% to 90% Output Levels)	
Enable/Disable (E/D)	E/D Input ≥ 0.7 Vdd or Open : Normal Output E/D Input ≤ 0.3Vdd: High Impedance	
Start-Up Time	10 mS Max.	
Phase Jitter (10 KHz - 20 MHz Integ.)	1.5 pS rms Typical	
Aging at 70 °C	± 3 PPM Max. first year, ± 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 6.5 VDC	+ 5VDC
Storage Temperature	-65 °C to +125 °C	-65 °C to +125 °C

NOTE: Overall Frequency Accuracy Includes, Initial Accuracy at 25 °C, Frequency changes over Operating Temperature, Aging over 5 years, Frequency changes due to Supply Voltage & Load Variations.

For special requirements, such as, tighter output symmetry, faster start-up time, PIND screening, etc., please contact Xsis Electronics at xsis@xsis.com or call us at 913-631-0448.

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Electrical Specifications, 2.5V & 1.8V LVHCMOS Oscillators

Parameter	2.5 V HC/ACMOS	1.8 V HC/ACMOS
Output Frequency Range	32.768 KHz	
Frequency Stability Vs Temperature	See Ordering Information on Page 2	
Operating Temperature Range	See Ordering Information on Page 2	
Supply Voltage (Vdd)	+ 2.5 VDC ± 10%	+ 1.8 VDC ± 5%
Input Current (No Load)	0.24 mA typical, 0.5 mA Max.	0.2 mA typical, 0.25 mA Max.
Output Waveform	Square Wave	
Output Duty Cycle (at 50% Output Level)	50/50% Typical, 48/52% Max.	
Output High Level	0.9 Vdd Min.	
Output Low Level	0.1 Vdd Max.	
Output Load	10K // 15 pF	
Rise & Fall Times (Typical Load)	0.2 µs Typical, 1 µs Max. (10% to 90% Output Levels)	
Enable/Disable (E/D)	E/D Input ≥ 0.7 Vdd or Open : Normal Output E/D Input ≤ 0.3Vdd: High Impedance	
Start-Up Time	10 mS Max.	
Phase Jitter (10 KHz - 20 MHz Integ.)	1.5 pS rms Typical	
Aging at 70 °C	± 3 PPM Max. first year, ± 2 PPM Max. per year thereafter	
Absolute Maximum Applied Voltage	+ 5VDC	
Storage Temperature	-65 °C to +125 °C	-65 °C to +125 °C

NOTE: Overall Frequency Accuracy Includes, Initial Accuracy at 25 °C, Frequency changes over Operating Temperature, Aging over 5 years, Frequency changes due to Supply Voltage & Load Variations.

For special requirements, such as, tighter output symmetry, faster start-up time, PIND screening, etc., please contact Xsis Electronics at xsis@xsis.com or call us at 913-631-0448.

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Packaging Options:

Standard Packaging in ESD foam trays

Tape & Reel, EIA-481-A Compliant is available at additional cost

Thermal Characteristics:

Junction to case Thermal Constant (θ_{JC}): 38 °C / Watt

Environmental Specifications:

XHK4x series oscillators are designed to meet or exceed the Environmental tests specified below. Customized screening and environmental testing are also available to meet your special requirements.

Test	Test Conditions
Vibration	0.06" DA, 30 G peak, 10 - 2000 Hz, MIL-STD-202, Method 204, Cond. G
Shock	5000 G, 0.3 mS, half-Sine, MIL-STD-883, Method 2002, Cond. D
Temperature Cycling	MIL-STD-883, Method 1010, Cond. C
Thermal Shock	MIL-STD-202, Method 107, Cond. B
Seal (Fine and Gross)	MIL-STD-883, Method 1014 Cond. A & C
Burn-in	160 Hours, 125 °C, Nominal Supply Voltage & Load
Frequency Aging	30 days at 70 °C, ± 1.5 PPM Max.
Altitude	MIL-STD-202, Method 105, Cond. C
Constant Acceleration	MIL-STD-883, Method 2001, 5000 G
Moisture Resistance	MIL-STD-202, Method 106, Vibration Sub Cycle Omitted
Solderability	MIL-STD-202, Method 208
Resistance to Soldering Heat	MIL-STD-202, Method 210, Cond B. or C as applicable
Resistance to Solvents	MIL-STD-202, Method 215
Internal Water Vapor Content	MIL-STD-883, Method 1018
ESD Classification	MIL-STD-883, Method 3015, Class 1C, HBM 1000 to 1999
Moisture Sensitivity Level	J-STD-020, MSL=1

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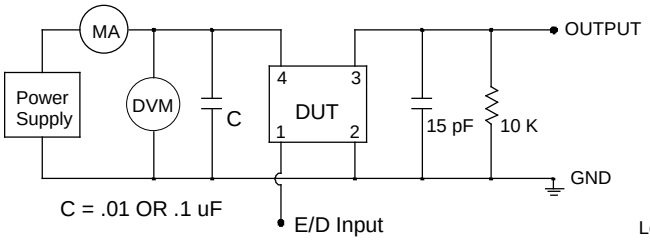
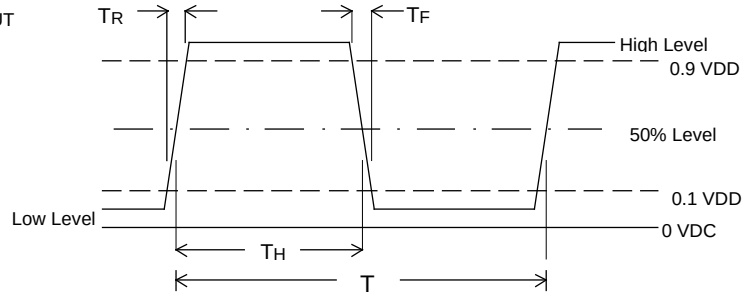
HCMOS Test Circuit



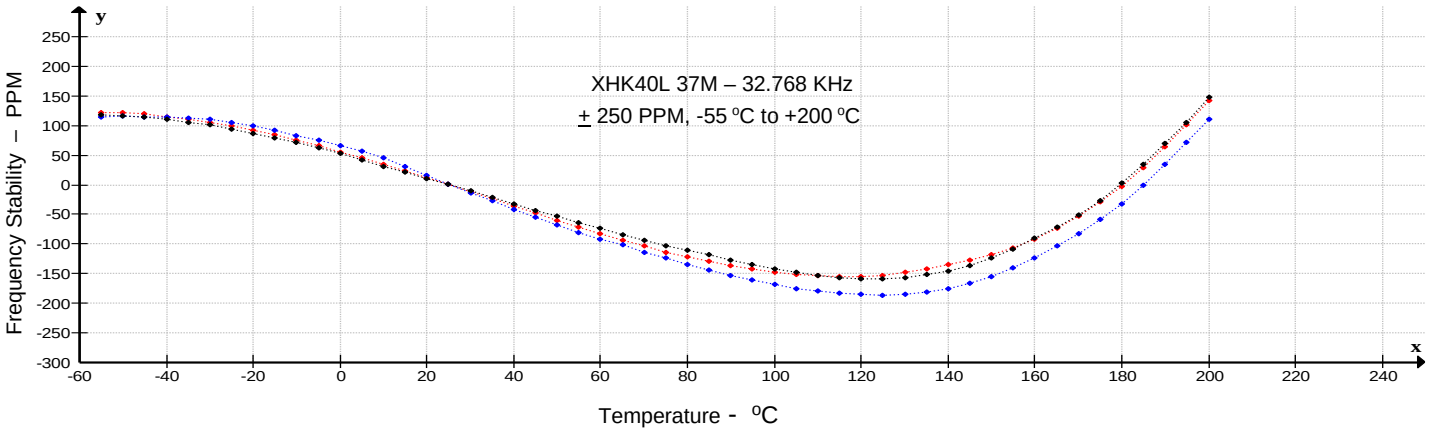
E/D (Enable/Disable) Input has an internal pull-up resistor. It can be left floating or connected to Vdd.

HCMOS Output Waveform



$$\text{Symmetry} = \frac{T_H}{T} \times 100\ \%$$

Typical Freq. Stability Vs. Temperature



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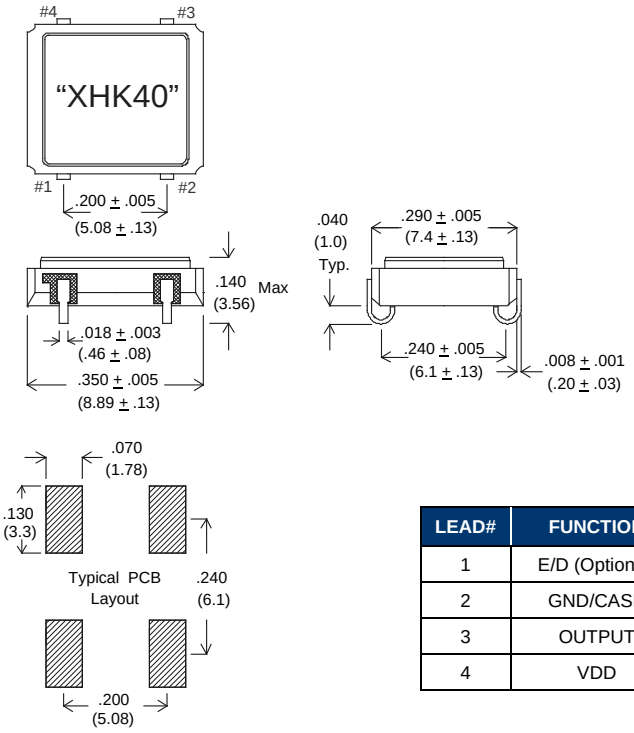
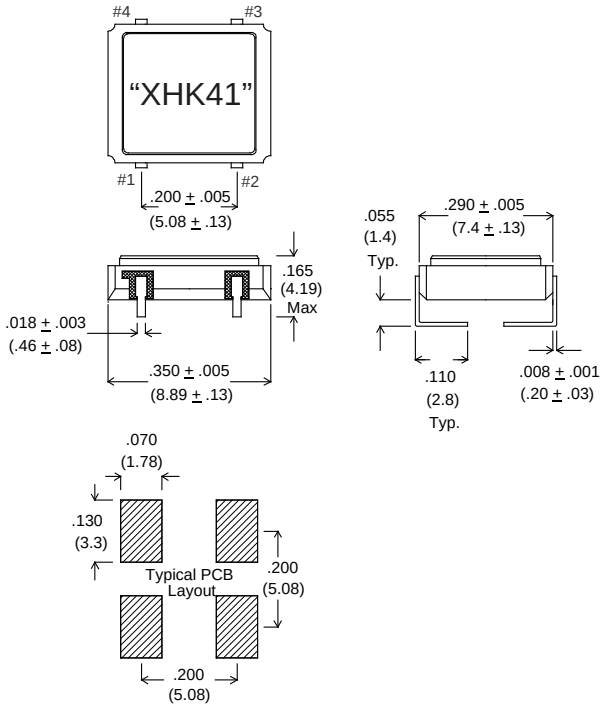
Package Outline and Pin Connections – Dimensions are in inches (mm)

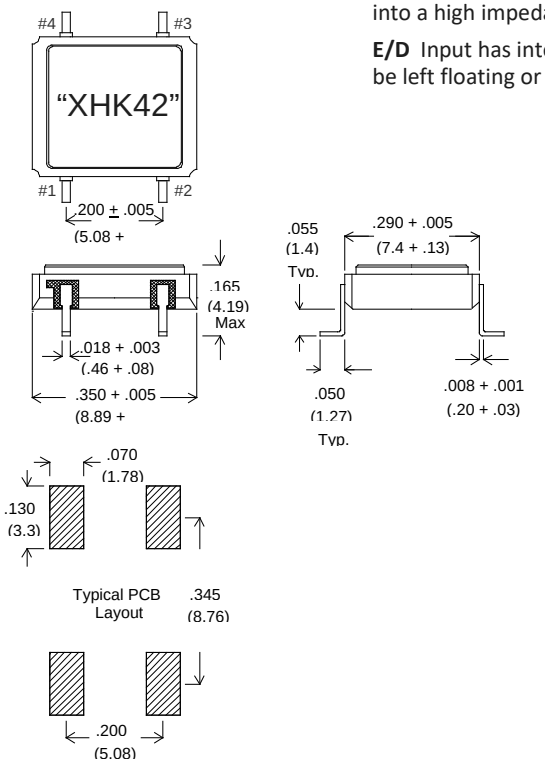


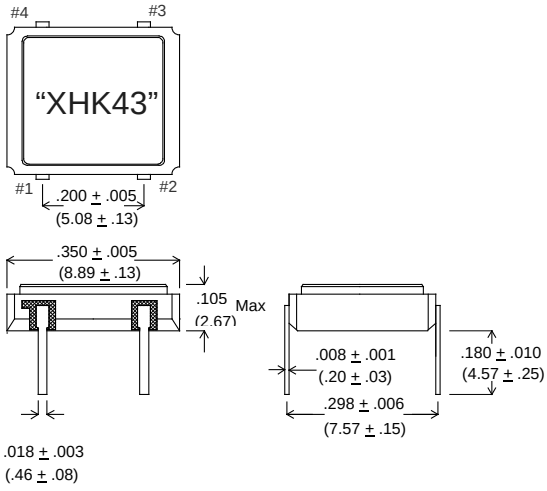


LEAD#	FUNCTION
1	E/D (Optional)
2	GND/CASE
3	OUTPUT
4	VDD

E/D (Enable/Disable) Input: A "Low" level at the input disables the Output into a high impedance state.

E/D Input has internal pull-up. It can be left floating or connected to Vdd.





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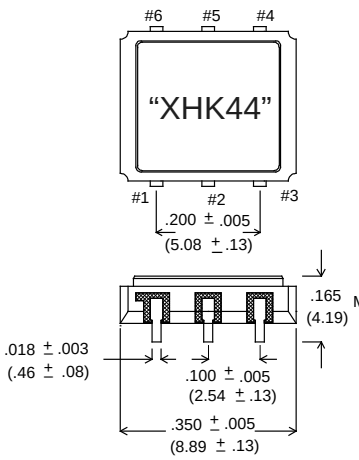
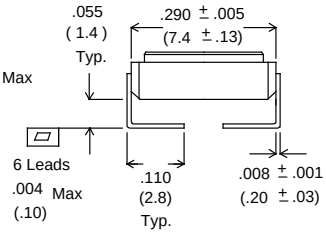
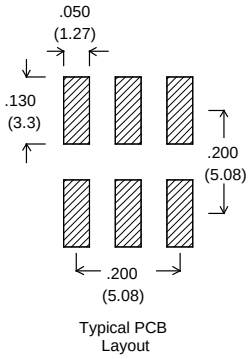
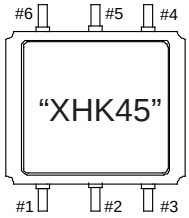
Package Outline and Pin Connections – Dimensions are in inches (mm)

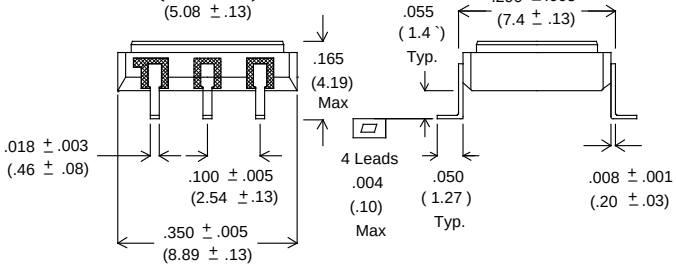
LEAD/PAD#	FUNCTION
1	E/D (Optional)
2	N/C
3	GND/CASE
4	OUTPUT
5	N/C
6	VDD





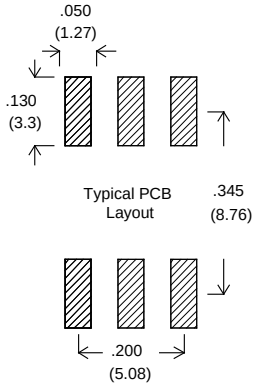


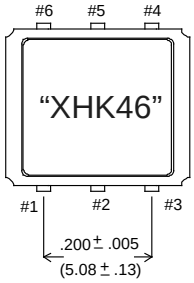


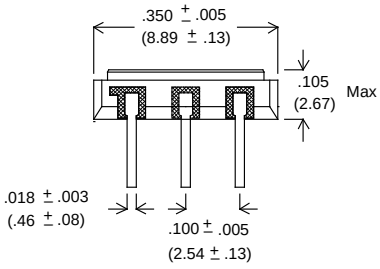


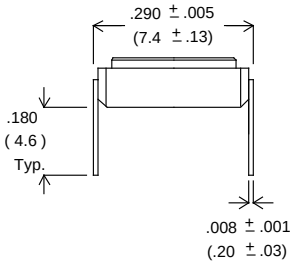
E/D (Enable/Disable) Input: A "Low" level at the input disables the Output into a high impedance state.

E/D Input has internal pull-up. It can be left floating or connected to Vdd.









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