

KXO-HC/KHO-HC Series Crystal Clock Oscillators

HCMOS Drive - TTL or CMOS Compatible

f_o : 1 to 80 MHz

FEATURES

- 1) High speed CMOS clock oscillator
- 2) High power drive level
- 3) Low current consumption
- 4) Output available with TTL or CMOS compatibility
- 5) Enable/disable option
- 6) KHO-HC in 8 pin DIP

HOW TO ORDER

KXO-HC 1 - T S E - 32.0000M T

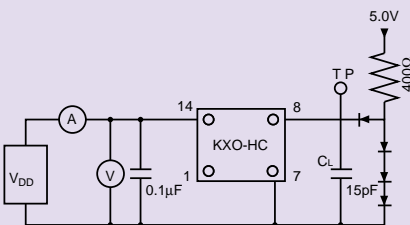
- ① Type: KXO = 14 pin DIP; KHO = 8 pin DIP
 ② Frequency precision:
 S = ± 25 ppm (special), 0 = ± 50 ppm, 1 = ± 100 ppm
 ③ Output level/Duty cycle:
 TS = TTL compatible/45 to 55%
 CS = CMOS compatible/45 to 55%
 ④ Enable/Disable function:
 □ = without function, E = with function
 ⑤ Frequency
 ⑥ Packaging:
 T = tube



SPECIFICATIONS (KXO-HC-T/KHO-HC-T TTL COMPATIBLE)

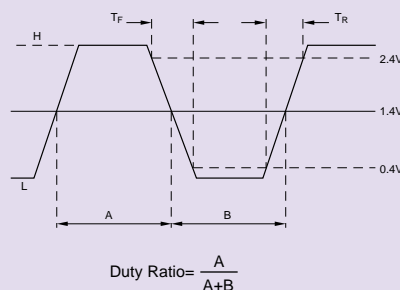
Classification		Code	Rating		Unit	Remarks
Output Frequency		f_{OUT}	1 to 50	>50	MHz	
Frequency Precision		$\Delta f/f_o$	S: ± 25 0: ± 50 1: ± 100	S: ± 25 0: ± 50 1: ± 100	ppm ppm ppm	0 to 70°C 4.5V to 5.5V
Operating Temperature Range		T_{OPR}	0 to +70	0 to +70	°C	
Voltage		V_{DD}	5 ± 0.5	5 ± 0.25	V	
Electrical Current Consumption		I_{DD}	50 max	70 max	mA	$f=50$ MHz, $C_L=15$ pF (10TTL load)
Output	Duty Cycle	S_Y	45 to 55	45 to 55	%	1.4V DC level
	"0" Level	V_{OL}	0.4 max	0.4 max	V	At $I_{OL}=16$ mA
	"1" Level	V_{OH}	2.4 min	2.4 min	V	At $I_{OH}=-1$ mA
	Rise and Fall Time	T_R, T_F	5 max	3.5 max	nsec	0.4V to 2.4V, $C_L=15$ pF (10TTL load)
Fan Out			TTL 10 gates	TTL 10 gates		CMOS level OK
Time to Enable/Disable			100 max	100 max	nsec	Tristate output
Input Current		I_{IH} I_{IL}	10 max -150 max	10 max -150 max	μ A μ A	
Input Voltage		V_{IH} V_{IL}	2.2 min 0.8 max	2.2 min 0.8 max	V V	

TEST CIRCUIT (KXO-HC-T/KHO-HC-T)



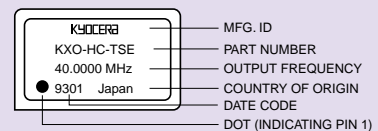
$C_L=15$ pF max
(Inclusive of test jig and probe capacitance)

SHAPE OF OUTPUT WAVE (KXO-HC-T/KHO-HC-T)

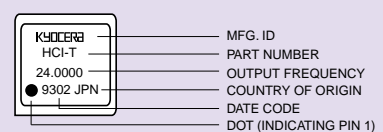


MARKINGS

KXO-HC



KHO-HC



KXO-HC/KHO-HC Series Crystal Clock Oscillators

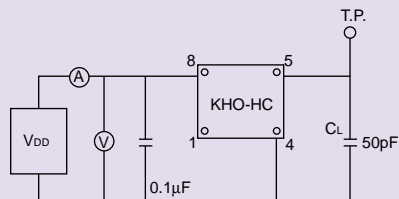
HCMOS Drive - TTL or CMOS Compatible

f_0 : 1 to 80 MHz

SPECIFICATIONS (KXO-HC-C/KHO-HC-C CMOS COMPATIBLE)

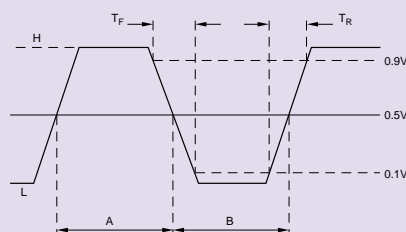
Classification		Code	Rating		Unit	Remarks
Output Frequency		f_{OUT}	1 to 50	>50	MHz	
Frequency Precision		$\Delta f/f_0$	S:±25	S:±25	ppm	0 to 70°C 4.5V to 5.5V
			0:±50	0:±50	ppm	
			1:±100	1:±100	ppm	
Operating Temperature Range		T_{OPR}	0 to +70	0 to +70	°C	
Voltage		V_{DD}	5±0.5	5±0.25	V	
Electrical Current Consumption		I_{DD}	50 max	80 max	mA	$f > 50\text{MHz}$, $C_L = 15\text{pF}$ $f < 50\text{MHz}$, $C_L = 50\text{pF}$
Output	Duty Cycle	S_Y	45 to 55	45 to 55	%	1/2 V_{DD} level
	"0" Level	V_{OL}	0.1 V_{DD} max	0.1 V_{DD} max	V	At $I_{OL} = 16\text{mA}$
	"1" Level	V_{OH}	0.9 V_{DD} min	0.9 V_{DD} min	V	At $I_{OH} = -1\text{mA}$
	Rise and Fall Time	T_R, T_F	10 max	6 max	nsec	10% V_{DD} to 90% V_{DD} $C_L = 50\text{pF}$
Time to Enable/Disable			100 max	100 max	nsec	Tristate Output
Input Current		I_{IH}	10 max	10 max	μA	
		I_{IL}	-150 max	-150 max	μA	
Input Voltage		V_{IH}	2.2 min	2.2 min	V	
		V_{IL}	0.8 max	0.8 max	V	

TEST CIRCUIT (KXO-HC-C/KHO-HC-C)



$C_L = 50\text{pF}$ max
(Inclusive of test jig and probe capacitance)

SHAPE OF OUTPUT WAVE (KXO-HC-C/KHO-HC-C)



$$\text{Duty Cycle} = \frac{A}{A+B}$$

PIN CONNECTION

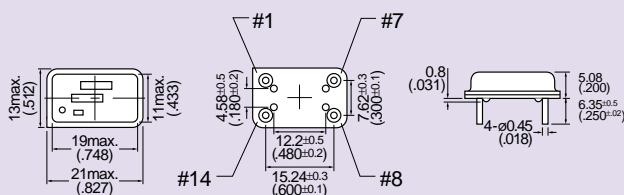
KXO	KHO	
1	1	N.C. or Control
7	4	Case /GND
8	5	Output
14	8	+5.0V D.C.

ENABLE/DISABLE FUNCTION CHART

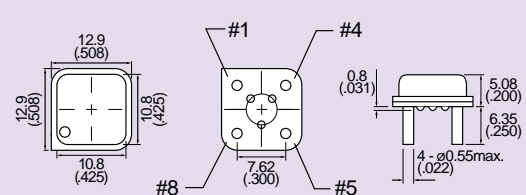
Pin 1	Pin 8
High or Open	Oscillation
Low	High Impedance

DIMENSIONS

KXO-HC



KHO-HC



Unit: mm (inch)

KXO-AC Series Crystal Clock Oscillators

ACMOS Drive - CMOS Compatible

f_o : 80 to 135 MHz

FEATURES

- 1) Advanced CMOS drive
- 2) Full size 14 pin DIP package
- 3) Enable/disable option (Tristate output)
- 4) Power consumption ($I_{DD} = 80$ mA max)
- 5) High reliability, dual encapsulated crystal

HOW TO ORDER

KXO-AC 1 - C E - 80.0000M T

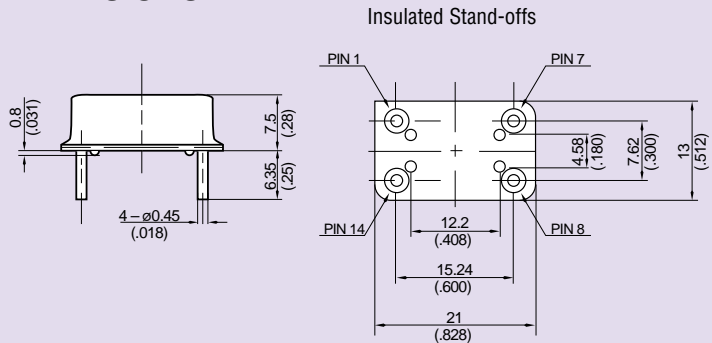
- ① Type: KXO = 14 pin DIP
 ② Frequency precision: 1 = ± 100 ppm
 ③ Output level/ Duty cycle: C = CMOS/40 to 60%
 ④ Enable/disable function:
 E = with function, □ = without function
 ⑤ Frequency
 ⑥ Packaging:
 □ = tray, T = tube



SPECIFICATIONS (KXO-AC/KHO-AC)

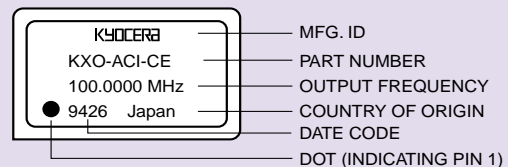
Classification	Code	KXO-AC	Unit	Remarks	
Output Frequency	f_{OUT}	80.0 to 135	MHz		
Frequency Precision	$\Delta f/f_o$	± 100	ppm	$V_{DD}=4.75$ to 5.2 Temp=0 to 70°C	
Operating Temperature Range	T_{OPR}	0 to $+70$	$^\circ\text{C}$		
Storage Temperature Range		-55 to $+125$	$^\circ\text{C}$		
Voltage	V_{DD}	5 ± 0.25	V		
Start up Time	T_{SU}	20	millisec		
Aging	$\Delta f/f_o$	± 5	ppm/yr		
Electrical Current Consumption	I_{DD}	95max	mA	At $C_L=15\text{pF}$, $V_{DD}=5\text{V}$	
Output	Duty Cycle	S_Y	40 to 60	% At $1/2V_{DD}$	
	"0" Level	V_{OL}	0.5 max	V	
	"1" Level	V_{OH}	$V_{DD}-0.5$ min	V	
	Rise and Fall Time	T_R, T_F	2.5 max	nsec	$0.1V_{DD}$ to $0.9V_{DD}$
	Load Capacitance	C_L	15 max	pf	CMOS
Input	Current	I_{IH} I_{IL}	10 max -150 max	μA μA	At $V_{IH}= 5.5\text{V}$ At $V_{IL}=0\text{V}$
	Voltage	V_{IH} V_{IL}	2.2 min 0.8 max	V V	

DIMENSIONS



Unit: mm (inch)

MARKINGS

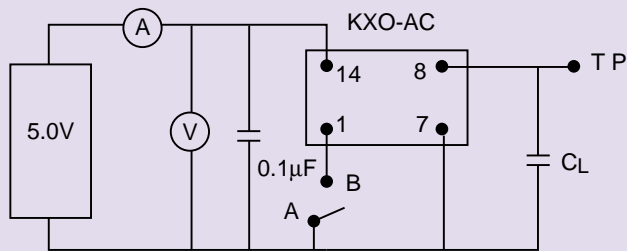


KXO-AC Series Crystal Clock Oscillators

ACMOS Drive - CMOS Compatible

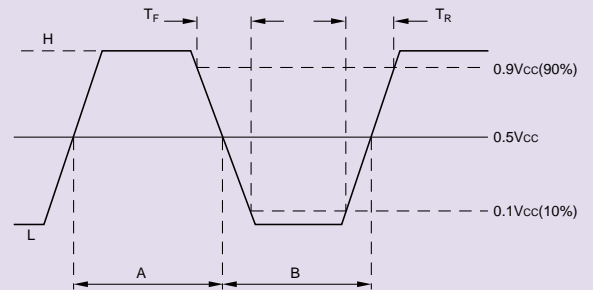
f_o : 80 to 135 MHz

TEST CIRCUIT



CL=15pF max
(Inclusive of test jig and probe capacitance)

SHAPE OF OUTPUT WAVE



$$\text{Duty Cycle} = \frac{A}{A+B}$$

PIN CONNECTION

1	Enable/Disable
7	Case/GND
8	Output
14	+V _{DD}

ENABLE/DISABLE FUNCTION CHART

Pin 1	Pin 8
High or Open	Oscillation
Low	High Impedance

K50-HC-C Series Miniature SMT Crystal Clock Oscillators

HCMOS Compatible

f_o : 8 to 68 MHz

Features:

- 1) Miniature SMT ceramic package
- 2) Frequency: 8~68MHz
- 3) Stability: 100ppm, 50ppm
- 4) Load: 50pF maximum
- 5) Tristate output inhibit
- 6) Hermetically sealed package
- 7) Optional bumped solder pads for ease of washing

How to Order

K50-HC 1 CS E 40.0000M R X

- ① Type: (K50-HC series)
 ② Stability: 1-100ppm, 0-50ppm
 ③ Output compatibility:
 CS-CMOS 45/55 duty cycle @ 50% V_{DD}
 CS-TTL 40/60 duty cycle @ 1.4 volts
 ④ Tristate output: E with function
 ⑤ Frequency (MHz)
 ⑥ Packaging: R-tape and reel (3k or 1k per reel)
 □-taped but not reeled
 ⑦ Optional solder pad bump: □-without bump (standard)
 X-with bump (option)



SPECIFICATIONS (K50-HC)

Classification	Code	TTL		CMOS		Unit
		Rating	Remarks	Rating	Remarks	
Output Frequency	f_{OUT}	8~68		8~68		MHz
Frequency precision	$\Delta f/f$	1=100, 0=50	-10 to 70°C, $V_{DD}=5\pm 0.5V$	1=100, 0=50	-10 to 70°C, $V_{DD}=5\pm 0.5V$	ppm
Operating temp	t_{OPR}	-10 to +70		-10 to +70		°C
Storage temp	t_{STOR}	-55 to +125		-55 to +125		°C
Supply voltage	V_{DD}	5 ±0.5		5 ±0.5		V
Supply current	I_{DD}	40 max @ 10TTL/15pF	25°C, 50MHz	50 max @ 50pF	25°C, 50MHz	mA
Duty cycle	S_Y	40/60	at 1.4 volts	45/55	@50% V_{DD}	%
Output "0" level	V_{OL}	0.4max	@ $I_{OL} = 16mA$	0.5max	@ $I_{OL} = 16mA$	V
Output "1" level	V_{OH}	2.4min	@ $I_{OH} = -1mA$	$V_{DD}-0.5min$	@ $I_{OH} = -1mA$	V
Rise / Fall time	T_R/T_F	5max	0.4V-2.4V	10max	10-90% V_{DD} , 50pF	nS
Load		$f_o \leq 50MHz = 50pF$ $f_o > 50MHz = 15pF$		$f_o \leq 50MHz = 50pF$ $f_o > 50MHz = 15pF$		
Enable/disable time		100max		100max		nS
Aging rate		±5max		±5max		ppm/y
Input voltage-high	V_{IH}	2.2min		2.2min		V
Input voltage-low	V_{IL}	0.8max		0.8max		V

