MXO45 & MXO45HS
HCMOS/TTL Clock Oscillators

Features

- Standard 14-Pin or 8-Pin Metal DIP Packages
- Fundamental and 3rd Overtone Crystal Designs
- Low Phase Jitter Performance
- Frequency Range 1 – 200MHz
- +5.0V Operation
- Output Enable Option Available
- Three Approved Packing Methods.

Part Dimensions:
20.8 × 13.2 × 5.1mm • 3.774537g
13.2 × 13.2 × 5.1mm • 2.206637g

Applications

- Computers & Peripherals
- Storage Area Networking
- Broadband Access
- Microcontrollers/FPGAs
- Networking Equipment
- Ethernet/Gigabit Ethernet
- Fiber Channel
- Test and Measurement

Description

CTS MXO45 and MXO45HS are legacy thru-hole clock oscillators that offer a low cost design supporting older HCMOS/TTL applications. MXO45/MXO45HS is not recommended for new design activity, but is available to support existing applications developed for the full and half-size metal DIP packages.

Ordering Information

Model	Package Type/ Output Enable	Frequency Stability	Temperature Range	Frequency Code [MHz]
MXO	45	- 3	C	- XXXMXXXXXX

Code	Package/Enable
45	14-Pin DIP/STD Output [no enable]
45T	14-Pin DIP/Output Enable
45HS	8-Pin DIP/STD Output [no enable]
45HST	8-Pin DIP/Output Enable

Code	Temp. Range
C	-20°C to +70°C
I	-40°C to +85°C

Code	Stability
6	±20ppm [1]
5	±25ppm
3	±50ppm
2	±100ppm

Code	Frequency
	Product Frequency Code [2]

Notes:
1] Consult factory for availability of 6C Stability/Temperature combination. The 6I combination is not available.
2] Frequency is recorded with only 1, 2 or 3 leading significant digits before and 4 - 6 significant digits [including zeroes] after the "M".
[Ex. 3M579545 (3.579545MHz), 14M31818 (14.31818MHz), 125M0000 (125MHz)]

Not all performance combinations and frequencies may be available.
Contact your local CTS Representative or CTS Customer Service for availability.

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Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V_{CC}	-	-0.5	-	7.0	V
Supply Voltage	V_{CC}	±10%	4.5	5.0	5.5	V
Supply Current		Freq Range [tested load noted for TYP values.]				
		1.0MHz to 20MHz [C_L = 50pF]	-	10	26	
		20.001MHz to 40MHz [C_L = 30pF]	-	20	40	
	I_{CC}	40.001MHz to 80MHz [CL = 30pF]	-	30	60	mA
		80.001MHz to 125MHz [C_L = 15pF]	-	40	70	
		125.001MHz to 200MHz [C_L = 15pF]	-	55	80	
Operating Temperature	T_A	-	-20 / -40	+25	+70 / +85	°C
Storage Temperature	T_{STG}	-	-40	-	+100	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		1 - 200		MHz
Frequency Stability [Note 1]	$\Delta f/f_O$	-		20, 25, 50 or 100		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal V_{CC}	-5	±3	5	ppm

1.] Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year aging.

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Load		1.0MHz to 50MHz [CMOS Load]	-	15	50	
	C_L	50.001MHz to 80MHz [CMOS Load]	-	15	30	pF
		80.001MHz to 200MHz [CMOS Load]	-	15	15	
		1.0MHz to 200MHz [TTL Load]	-	-	10	TTL
Output Voltage Levels	V_{OH}	CMOS Load	$0.9V_{CC}$	-	-	V
		10TTL Load	2.4	-	-	
	V_{OL}	CMOS Load	-	-	$0.1V_{CC}$	
		10TTL Load	-	-	0.4	
Output Current Levels	I_{OH}	V_{OH} = 3.9V, V_{CC} = 4.5V	-	-	-16	mA
	I_{OL}	V_{OL} = 0.4V, V_{CC} = 4.5V	-	-	16	
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time		@ 10%/90% Levels [tested load noted for TYP values.]				
		1.0MHz to 20MHz [C_L = 50pF]	-	8	10	
	T_R, T_F	20.001MHz to 80MHz [C_L = 30pF]	-	5	8	ns
		80.001MHz to 125MHz [CL = 15pF]	-	2.5	5	
		125.001MHz to 200MHz [C_L = 15pF]	-	-	2	
Start Up Time	T_S	Application of V_{CC}, C_L = 15pF	-	5	10	ms

Electrical Specifications

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Enable Function						
Enable Input Voltage	V_{IH}	Pin 1 Logic '1', Output Enabled	2.0	-	-	V
Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Disabled	-	-	0.8	V
Disable Current	I_{IL}	Pin 1 Logic '0', Output Disabled	-	-	10	uA
Enable Time	T_{PLZ}	Pin 1 Logic '1', Output Enabled	-	-	100	ns
Phase Jitter, RMS	tjrms	Bandwidth 12 kHz - 20 MHz	-	0.7	1	ps
Period Jitter, RMS	pjrms	-	-	-	5	ps
Period Jitter, pk-pk	pjpk-pk	-	-	-	50	ps

Enable Truth Table

Pin 1	Pin 8 or Pin 5
Logic '1'	Output
Open	Output
Logic '0'	High Imp.

Test Circuit
HCMOS
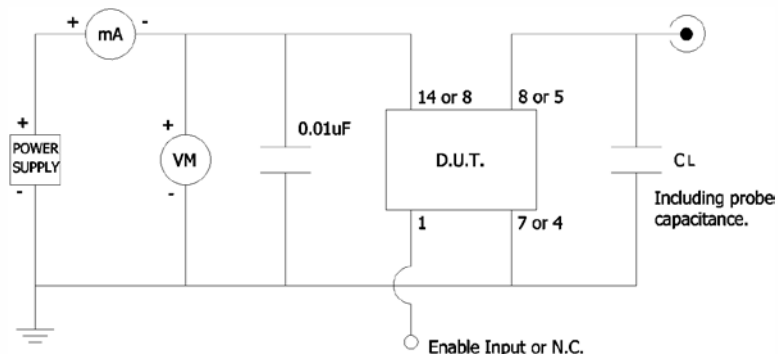
Output Waveform
HCMOS
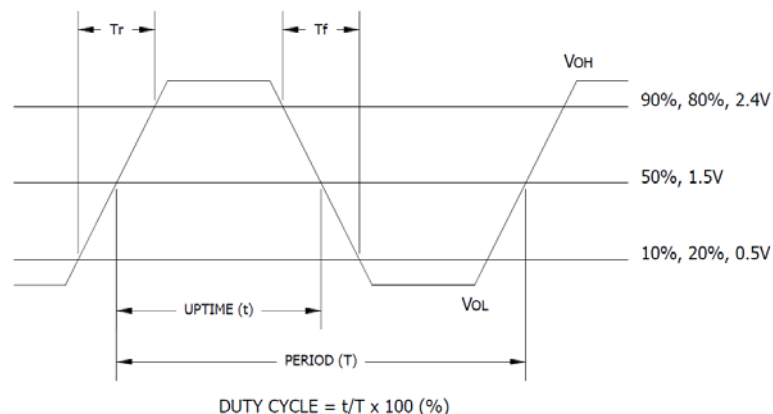
Mechanical Specifications

Package Drawing – DIP-14


```
MXO45
XXXMXXXXXX
CTS ST
● YYWW **
```
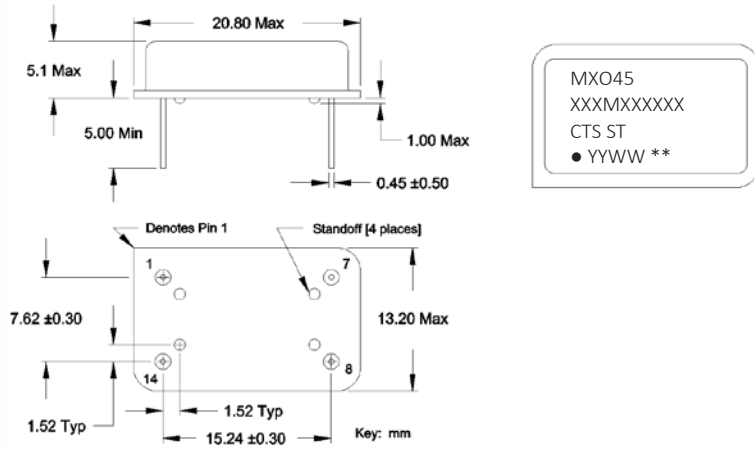
Marking Information

1. Model Name:
   DIP-14 – MXO45 or MXO45T
   DIP-8 – MXO45HS or MXO45HST
2. XXXMXXXXXX – Frequency is recorded with only 1, 2 or 3 leading significant digits before and 4 - 6 significant digits [including zeroes] after the "M". [Ex. 3M579545 (3.579545MHz), 14M31818 (14.31818MHz), 125M0000 (125MHz)]
3. ST – Frequency Stability/Temperature Code. [Refer to Ordering Information]
4. YYWW – Date Code; YY – year, WW – week.
5. ** - Manufacturing Site Code.

Package Drawing - DIP-8


```
MXO45HS
XXXMXXXXXX
CTS ST
● YYWW **
```
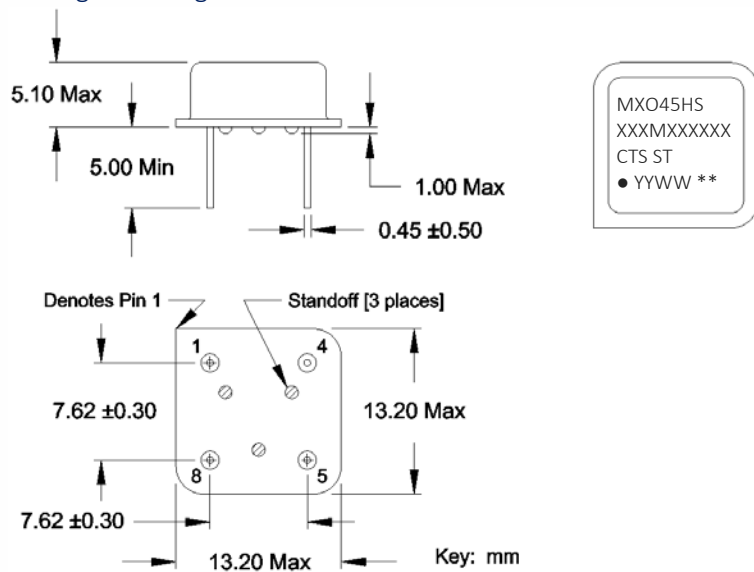
Notes

1. JEDEC termination code (e1). Lead finish is tin-silver-copper [SnAgCu].
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. Hand soldering conditions; solder iron temperature +350°C maximum, 10 seconds.
4. MSL = 1.

Pin Assignments

Pin	Symbol	Function
1	EOH	Enable
7 or 4	GND	Circuit & Package Ground
8 or 5	Output	RF Output
14 or 8	V_{CC}	Supply Voltage

Packaging - CTS Approved Methods

Anti-Static Plastic Trays

Typical packing format:

1. 50pcs. per plastic tray.
   Tray size is approximately 180mm x 136mm x 18mm [LxWxH].
2. 2 trays per anti-static bag [100pcs.] or 10 trays per anti-static bag [500pcs.]
   Bag height for 10 trays is approximately 175mm.
3. One anti-static bag per inner cardboard carton.
4. Master-pack multiple inner cartons in a larger outer cardboard carton.
   8 inner cartons [10 trays per carton] per outer carton, is approximately 460mm x 380mm x 400mm [LxWxH].

Anti-Static Foam in Cardboard Carton

Typical packing format:

1. 50pcs. per anti-static foam layer.
2. 2 layers of anti-static foam [100pcs.] per inner cardboard carton.
   Carton size is approximately 170mm x 120mm x 45mm [LxWxH].
3. A foam sheet layer is placed as a buffer on top of each layer containing oscillators.
4. Master-pack multiple inner cartons in a larger outer cardboard carton.
   20 inner cartons [100pcs. per carton] per outer carton, is approximately 550mm x 350mm x 180mm [LxWxH].

Anti-Static Plastic Tubes

Typical packing format:

1. 10pcs. per plastic tube – Full-Size package.
   15pcs. per plastic tube – Half-Size package.
2. Plastic tubes are master packed in cardboard carton.
   Carton is approximately 35mm x 35mm x 20mm [LxWxH].