



MXO45LV & MXO45HSLV

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
- +3.3V 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 MXO45LV and MXO45HSLV are legacy thru-hole clock oscillators that offer a low cost design supporting older HCMOS/TTL applications. MXO45LV/MXO45HSLV 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 | 45LV | - 3 | C | - XXXMXXXXXX |

| Code | Package/Enable |
|---------|-----------------------------------|
| 45LV | 14-Pin DIP/STD Output [no enable] |
| 45TLV | 14-Pin DIP/Output Enable |
| 45HSLV | 8-Pin DIP/STD Output [no enable] |
| 45HSTLV | 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.**



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% | 2.97 | 3.3 | 3.63 | V |
| Supply Current | | Freq Range [tested load noted for TYP values.] | | | | |
| | | 1.0MHz to 20MHz [$C_L = 15\text{pF}$] | - | 7 | 17 | |
| | | 20.001MHz to 40MHz [$C_L = 15\text{pF}$] | - | 15 | 25 | |
| | I_{CC} | 40.001MHz to 80MHz [CL = 15pF] | - | 20 | 35 | mA |
| | | 80.001MHz to 125MHz [$C_L = 15\text{pF}$] | - | 30 | 45 | |
| | | 125.001MHz to 200MHz [$C_L = 15\text{pF}$] | - | 45 | 65 | |
| 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 | 30 | |
| | C_L | 50.001MHz to 80MHz [CMOS Load] | - | 15 | 15 | pF |
| | | 80.001MHz to 200MHz [CMOS Load] | - | 15 | 15 | |
| | | 1.0MHz to 200MHz [TTL Load] | - | - | 10 | TTL |
| Output Voltage Levels | V_{OH} | CMOS Load | 0.9 V_{CC} | - | - | |
| | | 10TTL Load | 2.4 | - | - | V |
| | V_{OL} | CMOS Load | - | - | 0.1 V_{CC} | |
| | | 10TTL Load | - | - | 0.4 | |
| Output Current Levels | I_{OH} | $V_{OH} = 2.2\text{V}, V_{CC} = 3.3\text{V}$ | - | - | -8 | mA |
| | I_{OL} | $V_{OL} = 0.4\text{V}, V_{CC} = 3.3\text{V}$ | - | - | 8 | |
| 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 [$C_L = 30\text{pF}$] | - | 8 | 10 | |
| | T_R, T_F | 20.001MHz to 80MHz [$C_L = 15\text{pF}$] | - | 5 | 8 | ns |
| | | 80.001MHz to 125MHz [CL = 15pF] | - | 2.5 | 5 | |
| | | 125.001MHz to 200MHz [$C_L = 15\text{pF}$] | - | - | 2 | |
| Start Up Time | T_S | Application of $V_{CC}, C_L = 15\text{pF}$ | - | 5 | 10 | ms |

Electrical Specifications

Output Parameters

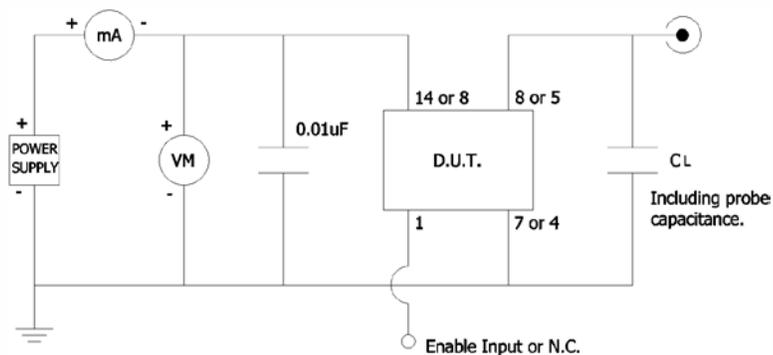
| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------|-----------|----------------------------------|-----|-----|-----|------|
| Enable Function | | | | | | |
| Enable Input Voltage | V_{IH} | Pin 1 Logic '1', Output Enabled | 2.0 | - | - | V |
| Disable Input Voltage | 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. |

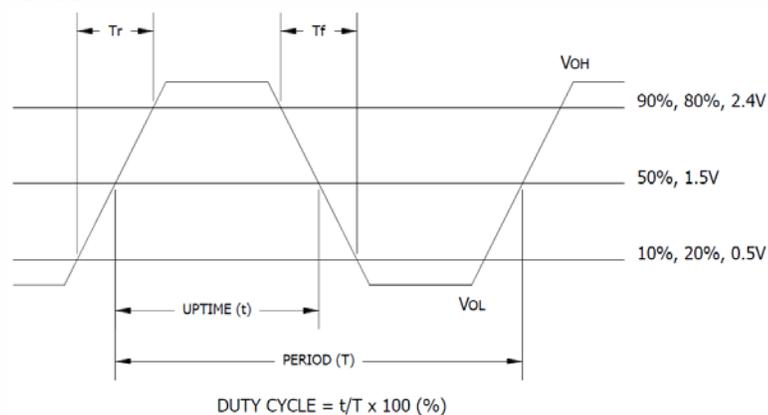
Test Circuit

HCMOS



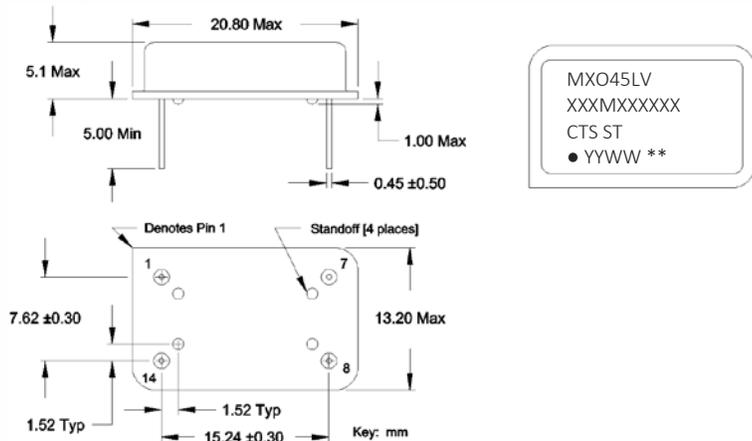
Output Waveform

HCMOS



Mechanical Specifications

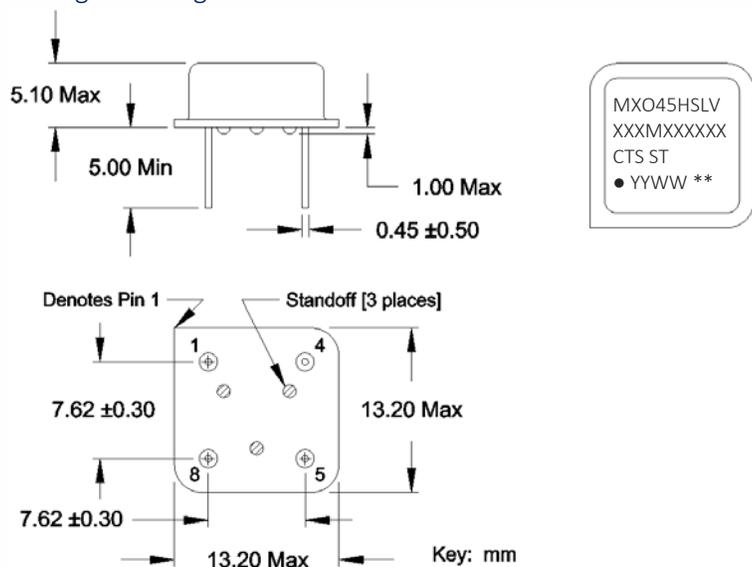
Package Drawing – DIP-14



Marking Information

- Model Name:
DIP-14 – MXO45LV or MXO45TLV
DIP-8 – MXO45HSLV or MXO45HSTLV
- XXXXMXXXXXX – 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)]
- ST – Frequency Stability/Temperature Code.
[Refer to Ordering Information]
- YYWW – Date Code; YY – year, WW – week.
- ** - Manufacturing Site Code.

Package Drawing - DIP-8



Notes

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