

IC for XO Monolithic IC MM1424, MM1624 Series

Outline

This is a low current consumption, low operating voltage XO IC with Colpitz oscillation circuit. Smaller size is achieved by the on-chip bias circuit and Colpitz oscillation capacitor.

Features

- | | |
|---|--------------------------------|
| 1. Low current consumption. | 1.5mA max. ($V_{cc} = 2.8V$) |
| 2. Low power supply operating voltage. | $V_{cc} = 2.3$ to $3.3V$ |
| 3. On-chip Colpitz oscillation capacitor · On-chip bias resistor. | |
| 4. Low phase noise. | -140dBc (@1kHz) |
| 5. Ultra-small package type. | |

Package

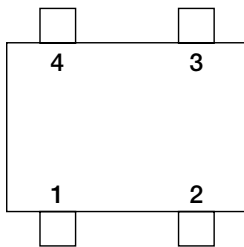
- SC-82 (MM1424CUXX)
- MCSP-4A (MM1424CCXX)
- WLCSP-4A (MM1624CLXX)

Applications

- 1. Crystal oscillators
- 2. VCXO
- 3. TCXO

Pin Assignment

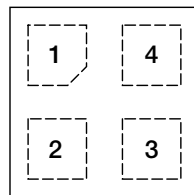
MM1424CUXX



SC-82
(TOP VIEW)

| | |
|---|------------------|
| 1 | X'tal |
| 2 | GND |
| 3 | V _{OUT} |
| 4 | V _{CC} |

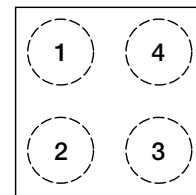
MM1424CCXX



MCSP-4A
(TOP VIEW)

| | |
|---|------------------|
| 1 | GND |
| 2 | X'tal |
| 3 | V _{CC} |
| 4 | V _{OUT} |

MM1624CLXX

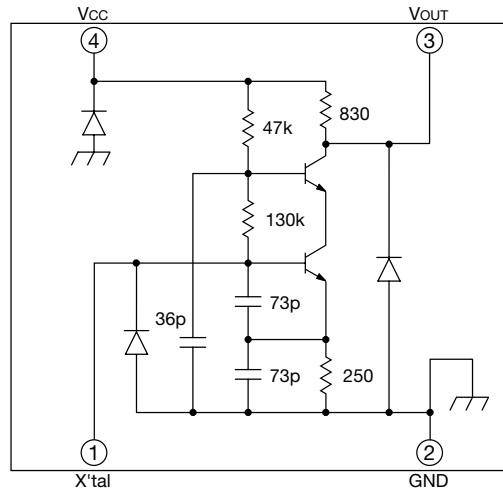


WLCSP-4A
(TOP VIEW)

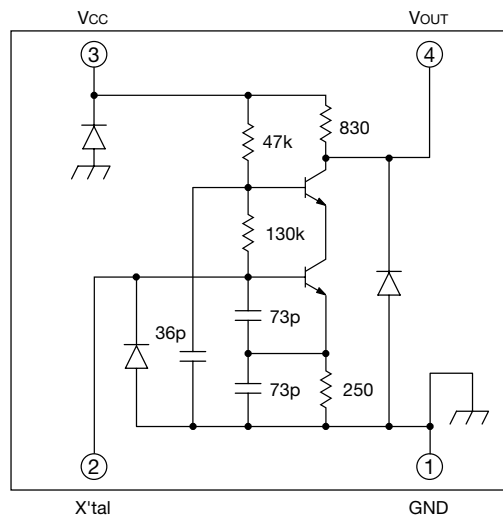
| | |
|---|------------------|
| 1 | X'tal |
| 2 | GND |
| 3 | V _{OUT} |
| 4 | V _{CC} |

Equivalent Circuit Diagram

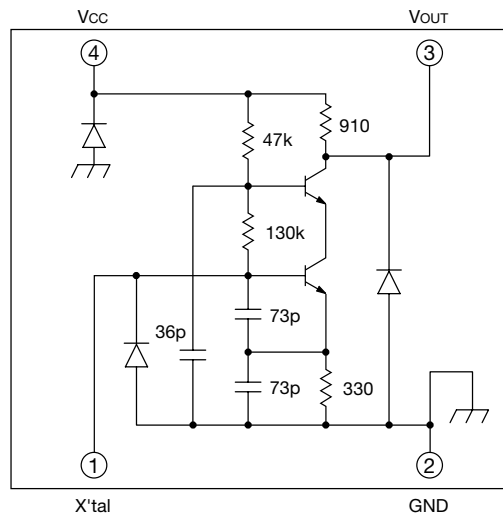
MM1424CUXX



MM1424CCXX



MM1624CL□□



Note : The component values in the schematic circuit diagram are typical.

Pin Description

| Pin No | | | Pin name | Functions |
|------------|------------|------------|------------------|----------------|
| MM1424CUXX | MM1424CCXX | MM1624CLXX | | |
| 1 | 2 | 1 | X'tal | X'tal pin |
| 2 | 1 | 2 | GND | GND |
| 3 | 4 | 3 | V _{OUT} | Output pin |
| 4 | 3 | 4 | V _{CC} | Supply voltage |

Absolute Maximum Ratings (Ta=25°C)

| Item | Symbol | Ratings | Unit |
|-----------------------|----------------------|---|------|
| Storage temperature | T _{STG} | -40~+125 | °C |
| Operating temperature | T _{OPR} | -30~+80 | °C |
| Supply voltage | V _{CC} max. | 5.5 | V |
| Input voltage | V _{IN} max. | 0 ≤ V _{IN} ≤ V _{CC} | V |
| Power dissipation | P _d | 150(MM1424CUXX) 180(MM1424CCXX) ★ 220(MM1624CLXX) ★ | mW |

Note *: Assembled on PC board.

Pc board dimensions : 80×20mm, t=0.8mm, (MM1424CCXX)

Material : Glass epoxy 110×40mm, t=0.8mm, 4 stratum (MM1624CLXX)

Recommended Operating Conditions

| Item | Symbol | Ratings | Unit |
|-----------------------|------------------|---------|------|
| Operating temperature | T _{OPR} | -30~+80 | °C |
| Supply voltage | V _{OP} | 2.3~3.3 | V |
| Operating frequency | F _{OPR} | 10~26 | MHz |

Note *: The definition of the operation at the recommended operating conditions is to oscillate.

Electrical Characteristics (V_{CC}=2.7V, Ta=25±2°C, Load : 2kΩ // 10pF, fosc=26MHz unless otherwise specified)

| Item | Symbol | Measurement conditions | Min. | Typ. | Max. | Unit |
|--|--------------------|--|------|------|------|------|
| Current consumption | I _{CC} | V _{CC} =2.8V | | 1.3 | 1.5 | mA |
| Output frequency | Δf _o | ★1 | -30 | 0 | 30 | ppm |
| Output voltage | V _{OUT} | V _{CC} =2.6V | 0.8 | 1.05 | | V |
| Duty ratio | Duty | V _{CC} =2.6~2.8V ★2 | 40 | 50 | 60 | % |
| Negative resistance★3 | R _N | V _{IN} =0.1V _{rms} , 26MHz | -100 | -150 | | Ω |
| Frequency stability-supply voltage variation★3 | Δf-V _{CC} | V _{CC} =2.7V±0.1V | -0.2 | 0 | 0.2 | ppm |
| Frequency stability-load variation★3 | Δf-Lo | R _L =2kΩ±10% C _L =10pF±10% | -0.3 | 0 | 0.3 | ppm |

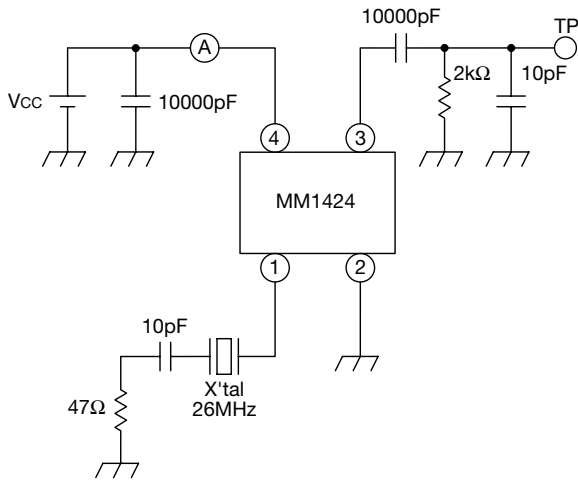
Note1 ★1: Output frequency satisfies the results measured by the correlation test boxes.

Note2 ★2: Duty ratio is measured at the center of V_{p-p}.

Note3 ★3: The items of ★3 are only guaranteed by the design of the circuit.

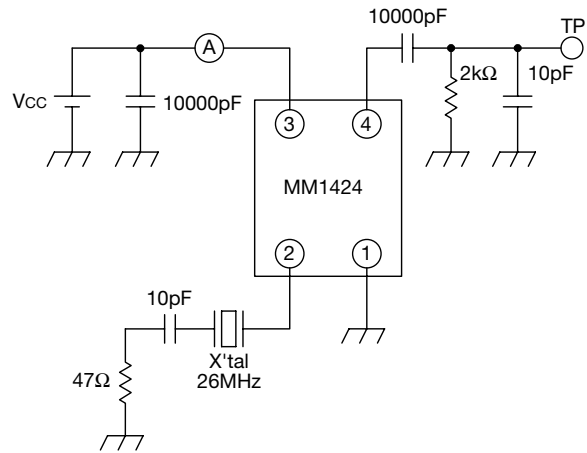
Measuring Circuit

■ MM1424CUXX



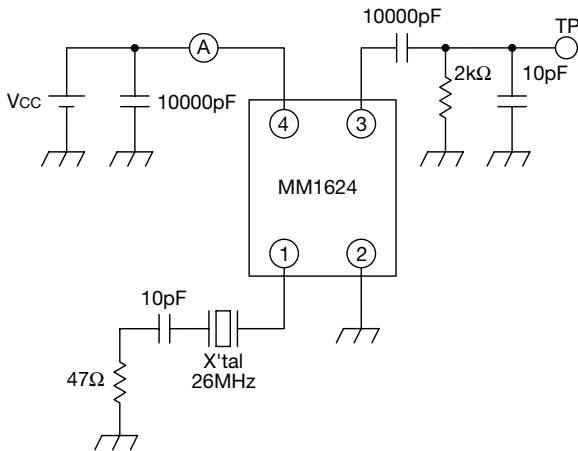
- This load capacity (10pF) contains a capacity of a probe.

■ MM1424CCXX



- This load capacity (10pF) contains a capacity of a probe.

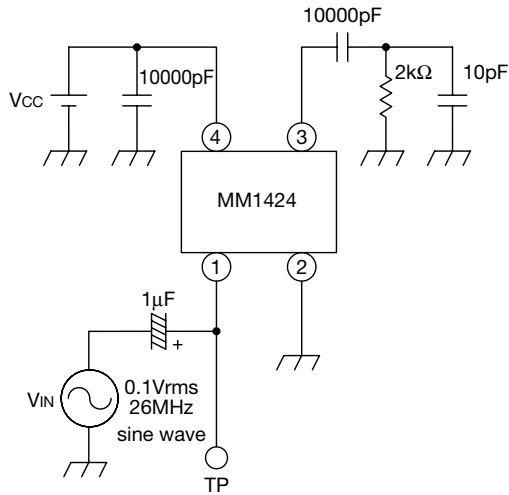
■ MM1624CLXX



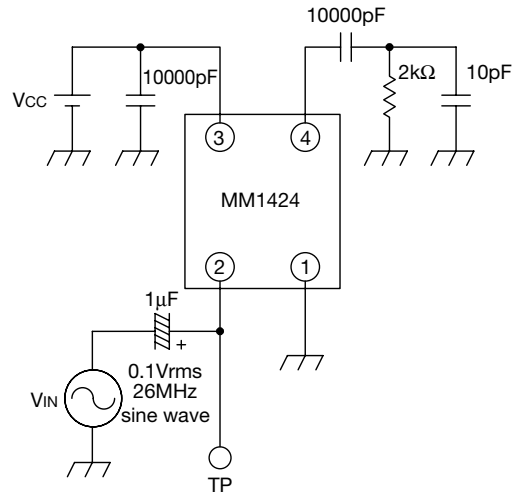
- This load capacity (10pF) contains a capacity of a probe.

Circuit diagram which is to measure the negative resistance.

■ MM1424CUXX



■ MM1424CCXX



■ MM1624CLXX

