














Содержание

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Freq

| | | | | |
|---|-----------------------|--|--------|-----------------------|
| http://mxtal.ru/ru/ | ООО «Мэджик Кристалл» |  | Омск | |
| https://bmgplus.ru/ | НПФ «БМГ ПЛЮС» |  | Москва | |
| https://morion.com.ru/ | Морион |  | СПб | |
| https://www5.epsondevice.com/en/ | EPSON | | | XTAL, RTC, TXCO, OXCO |
| https://www.electronsik.ru/item/YXC | YXC |  | | |
| https://www.sztkd.com/index.html | TKD |  | | XTAL, RTC, TXCO, OXCO |
| https://www.chinafronter.com/ | chinafronter |  | | XTAL, TXCO, OXCO, etc |
| https://www.microcrystal.com/ | Micro Crystal |  | | XTAL, RTC, TXCO, OXCO |
| https://www.xtalong.com/ | xtalong |  | | XTAL, XCO, TXCO |
| http://www.conwin.com/ | Connor Winfield |  | | OCXO, ... |
| http://www.abracon.com/ | Abracon |  | | OCXO, ... |
| | Vectron | | | OCXO, ... |
| | NDK | | | OCXO, ... |
| https://www.dptel.com/ | DAPU |  | | OCXO, ... |
| https://www.q-crystal.com | SJK |  | | XCO, ... |
| http://www.hci.com.hk/en/ | HCI | | | XCO, ... |
| https://www.jackson-labs.com/ | jackson-labs |  | | GPSDO, timing modules |
| https://www.crystek.com/ | Crystek | | | VCO, CXO, XTAL, ... |

| | | |
|---------|---------------|--------------------|
| SIN | Sinus | Синусоидальный |
| CSIN | Clipped Sinus | Ограниченный Синус |
| CMOS | | |
| LVC MOS | | |
| LVDS | | |
| HCSL | | |
| PECL | | |
| LVPECL | | |

XTAL

| | | | | | | |
|--------|-----------|---------|-----|---|------|-------------------|
| 32 KHz | -40...+85 | 3.2×1.5 | YXC | https://www.electronsik.ru/item/YXC/X321532768KGD2SI | ~10p | ABS07-32.768KHZ-T |
| 25 MHz | -40...+85 | 3.2×2.5 | YXC | https://www.electronsik.ru/item/YXC/X322525MOB4SI | ~5p | |

XCO

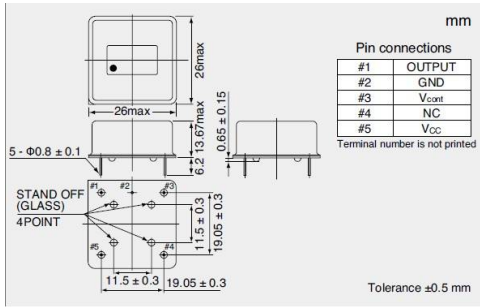
OCXO\VCOCXO

| | |
|---|-----------------|
| http://www.conwin.com/datasheets/cx/cx309.pdf | Connor-Winfield |
| https://www.dptel.com/Products/ProductLevel3/126 | DAPU |

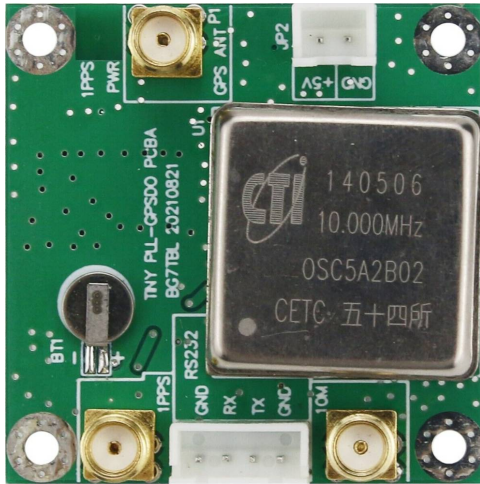
<https://www.yic.com.tw/en/products-en/ocxo/> YIC

| | | | | | | | | | |
|-----------------|----------|--------|-----------|----------|----------------|-------|------------|--------------|------------------------------|
| Abracon | AOC1409 | ?OCXO | | | 14.9×9.7×7 | | | | O11H/F (DAPU) |
| Abracon | AOC2012 | ?OCXO | | | 20×12.7×11 | | | | |
| Abracon | AOC2522 | ?OCXO | | | 25.4×22×12 | | | | O22S (DAPU) |
| Abracon | AOCJY | ?OCXO | | | 25.5×22.1×12.5 | | | | |
| Abracon | AOCJYR | ?OCXO | | | 9.7×7.5×4.3 | | | | O97A (DAPU) |
| Abracon | AOCJY2 | ?OCXO | | | 21×21×11 | | | | OX21215 (YIC) |
| Abracon | AOCJY3 | ?OCXO | | | 25.4×25.4×13 | | | | O22B (DAPU) OX25255 (YIC) |
| Connor-Winfield | OH100 | ?OCXO | | | | | | | |
| Connor-Winfield | OH200 | ?OCXO | | | | | | | |
| Connor-Winfield | OH300 | ?OCXO | | | | | | | O22S (DAPU) |
| Connor-Winfield | OH320 | ?OCXO | | | | | | | O22S (DAPU) |
| Connor-Winfield | DOC | ?OCXO | | | | | | | |
| TKD | TOC-2525 | ?OCXO | | | 25×25×14.8 | | 10M...100M | | |
| TKD | TOC-1409 | ?OCXO | | | 14×9×6.5 | | 10M...40M | | |
| TKD | TOC-0907 | ?OCXO | | | 9×7×4.1 | | 10M...40M | | |
| DAPU | O55A | ?OCXO | | | 50.8×50.8×19 | | 10M | ±0.01ppb | |
| DAPU | O23B | ?OCXO | | | 36×27×12.7 | | 10M | ±0.1ppb | |
| DAPU | O22B | ?OCXO | | | 25.4×25.4×12.7 | | 10M\100M | ±0.5/10ppb | |
| DAPU | O22S | ?OCXO | | | 25×22×12 | | 10M | ±0.5ppb | |
| DAPU | O11H/F | ?OCXO | | | 14.4×9.5×6.5 | | 10M...48M | ±0.5/5ppb | |
| DAPU | O97A | ?OCXO | | | 9.7×7.5×3.8 | | 10M...48M | ±3/10ppb | |
| DAPU | O75A | ?OCXO | | | 7.5×5.5×3.3 | | 10M...48M | ±10/20ppb | |
| YIC | OX14106 | OCXO | CMOS | -40...85 | 14.4×9.5×8 | 6 SMD | 5M...40M | ±5/50ppb | |
| YIC | OX10084 | OCXO | CMOS/CSIN | -40...85 | 9.7×7.5×3.9 | 4 SMD | 5M...40M | ±10/50ppb | |
| YIC | VOX14106 | VCOCXO | CMOS | -40...85 | 14.4×9.5×8 | 6 SMD | 5M...40M | ±5/50ppb | |
| YIC | VOX10084 | VCOCXO | CMOS/CSIN | -40...85 | 9.7×7.5×3.9 | 4 SMD | 5M...40M | ±10/50ppb | |
| YIC | OX20134 | OCXO | CMOS/SIN | -40...85 | 20.3×12.7×11 | 4 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | OX21215 | OCXO | CMOS/SIN | -40...85 | 20.6×20.6×11 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | OX25255 | OCXO | CMOS/SIN | -40...85 | 25.4×25.4×12.7 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | OX36275 | OCXO | CMOS/SIN | -40...85 | 36.3×27.2×12.7 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | OX51515 | OCXO | CMOS/SIN | -40...85 | 50.8×50.8×15 | 5 DIP | 5M...10M | ±0.05/0.5ppb | |
| YIC | VOX20134 | VCOCXO | CMOS/SIN | -40...85 | 20.3×12.7×11 | 4 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | VOX21215 | VCOCXO | CMOS/SIN | -40...85 | 20.6×20.6×11 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | VOX25255 | VCOCXO | CMOS/SIN | -40...85 | 25.4×25.4×12.7 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | VOX36275 | VCOCXO | CMOS/SIN | -40...85 | 36.3×27.2×12.7 | 5 DIP | 5M...40M | ±0.05/0.5ppb | |
| YIC | VOX51515 | VCOCXO | CMOS/SIN | -40...85 | 50.8×50.8×15 | 5 DIP | 5M...10M | ±0.05/0.5ppb | |

NDK ENE3311A



CTS OSC5A2B02



EBAY: PCBA GPSDO Board GPS Disciplined Oscillator 10M Frequency Reference GNSS 1PPS

XCO diff

| | | | |
|---|---------|--|-----------------------|
| https://www.q-crystal.com/home/index/product/eng/Oscillator-%28Differential%29/f_eng/CrystalOscillator.html | SJK | | XCO DIFF, ... |
| https://www.sztkd.com/index.html | TKD | | XTAL, RTC, TXCO, OXCO |
| http://www.abracon.com/ | Abracon | | XCO DIFF, ... |

| p\n | datasheet | Mfg | Output | freq | jitter |
|-------------------------|----------------------|---------|------------------|------------|--------|
| | link | TKD | LVDS\HCSL\LVPECL | 1-125 MHz | 0.1ps |
| AX3DAF1-122.8800 | | Abracon | LVDS | 122.88 MHz | 0.14ps |
| SJK-3D-122.880-3.3-30-C | | SJK | LVDS | 122.88 MHz | 1ps |

RTC

RTC

CLK BUF\MUX

| link | ext | description | manufacturer | version | date | lang |
|--------------------------------|-----|--|--------------|---------|---------|------|
| PI6C485352.pdf | pdf | PI6C485352 2.5/3.3V, 500MHz 12 2-to-1 diff LVPECL clock MUX | PERICOM | Rev. A | 2013.01 | EN |

CLK GEN

| Diodes | | | | | | |
|---|-----|---|--------------|---------|---------|------|
| link | ext | description | manufacturer | version | date | lang |
| Diodes_Inc.-PI6CG184Q2ZHQEX-datasheet.pdf | pdf | PI6CG184Q 4-Output PCIe Gen 4 Clock Generator for Automotive Applications Diodes | Diodes | rev 2-2 | 2020.02 | EN |
| Diodes_Inc.-PI6CG18401ZHIEX-datasheet.pdf | pdf | PI6CG18401 Very Low Power 4- Output PCIe Clock Generator With On-chip Termination | Diodes | rev 2-2 | 2020.06 | EN |
| PI6CG18401.pdf | pdf | PI6CG18401 Very Low Power 4- Output PCIe Clock Generator With On-chip Termination Diodes | Diodes | rev 3-2 | 2022.01 | EN |

Clock Module

<https://www.dptel.com/Products/ProductLevel3/2> DAPU

| built in | P\N | sync acc | Hold | Freq Tol | Phase Noise | Temp | Dim |
|-----------|-------|----------|------------------|----------|-------------|-----------|-------------|
| TCXO | CM11T | ±50ns | ±5us/1H ±2°C | ±50ppb | -138 | -40...105 | 10x10x2.2 |
| OCXO | CM55 | ±30ns | ±1.5us/24H ±15°C | ±0.1ppb | -155 | -40...85 | 51x51x13 |
| OCXO | CM22 | ±50ns | ±1.5us/8H ±10°C | ±0.3ppb | -155 | -40...85 | 20.2×20.2×9 |
| OCXO | CM11H | ±50ns | ±80us/24H ±40°C | ±0.5ppb | -160 | -40...85 | 14.4×9.5×7 |
| OCXO+GNSS | CM66 | ±30ns | ±1.5us/24H ±15°C | ±0.1ppb | -155 | -40...85 | 60x60x13 |
| OCXO+1588 | CM35P | ±50ns | ±1.5us/8H ±5°C | | | | |

Jitter Attenuator

Si5344D Silabs Jitter Attenuator

Timing Server

<https://www.dptel.com/Products/ProductLevel3/5> DAPU

GPSDO

https://www.jackson-labs.com/index.php/products/firefly_1a jackson labs GPSDO firefly-1a

IEEE1588v3 Chip

| | | |
|---|----------|---|
| https://www.dptel.com/Products/ProductLevel3/3 | DAPU | |
| 82P33831 | IDT | SyncE & 1588V2 Ethernet Packet Clock Network Synchronizer |
| AU5508 | Aurasemi | 1588 Network Sync |

Network Interface Clock Nominals

Table 2.1. Reference Clock Frequencies and Jitter Specifications

| Protocol/ System | Clock frequency (MHz) | Jitter specification (fs) |
|-------------------------|-----------------------|---------------------------|
| 10GbE/40GbE | 161.1328125 | 350 |
| | 322.265625 | 350 |
| | 257.8125 | 350 |
| SerDes reference clocks | 125 | 350 |
| | 150 | 350 |
| | 156.25 | 350 |
| | 312.5 | 350 |
| PCIe | 100 | 500 |
| System reference clocks | 100 | 5000 |
| | 125 | 5000 |
| | 133.33 | 5000 |
| | 266.67 | 5000 |

Line and Reference Clock Rate

| OTN | Line Rates (Gbps) | Typical Reference Clock Rates (MHz) | |
|-------|-------------------|-------------------------------------|---------|
| OTU2 | 10.709 | 669.31 | 167.33 |
| OTU2e | 11.095 | 693.44 | 173.36 |
| OTU1e | 11.049 | 690.56 | 172.64 |
| OTU2f | 11.317 | 707.31 | 176.83 |
| OTU1f | 11.27 | 704.38 | 176.09 |
| OTU3 | 43.018 | 2688.63 | 672.16 |
| OTU4 | 111.809 | | 1747.02 |
| OTU4v | 127.156 | | 1986.82 |

| SONET/SDH | | | |
|-----------------|----------|---------|--------|
| STS-192/STM-64 | 9.95328 | 622.08 | 155.52 |
| STS-768/STM-256 | 39.81312 | 2488.32 | 622.08 |

| Ethernet | | | |
|-------------------|----------|--------|--------|
| 10GE LAN | 10.3125 | | 156.25 |
| 10GE WAN | 9.95328 | 622.08 | 155.52 |
| XAU1 (4 x 3.125G) | 3.125 | | 156.25 |
| 40GE (4 x 10G) | 10.3125 | | 156.25 |
| 100GE (4 x 25G) | 25.78125 | 805.66 | 156.25 |

| Fibre Channel (FC) | | | |
|--------------------|--------|--|--------|
| 10GFC | 10.52 | | 164.38 |
| 16GFC | 14.025 | | 212.5 |
| 32GFC | 28.5 | | 425 |

$$156.25 = 625/4$$