



CY24204

MediaClock™ DTV, STB Clock Generator

Features

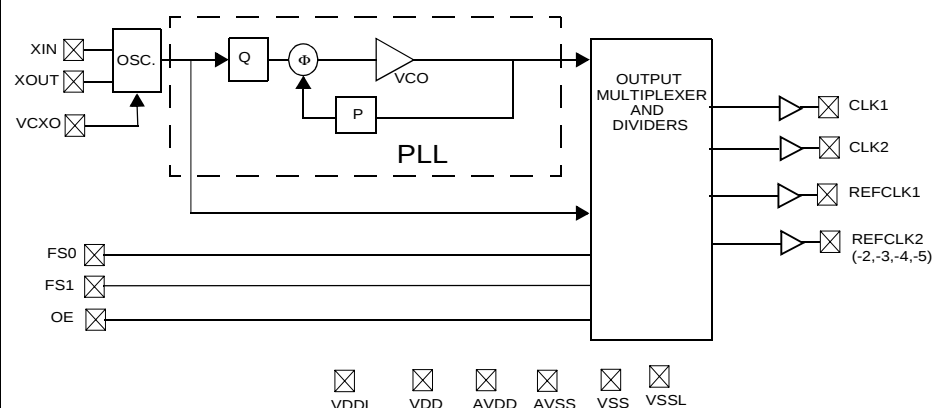
- Integrated phase-locked loop (PLL)
- Low jitter, high-accuracy outputs
- VCXO with Analog Adjust
- 3.3V operation

Benefits

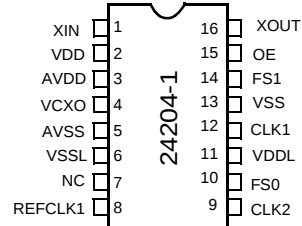
- Internal PLL with up to 400MHz internal operation
- Meets critical timing requirements in complex system designs
- Large ± 150 ppm range, better linearity
- Enables application compatibility

Part Number	Outputs	Input Frequency	Output Frequency Range
CY24204-1	3	27-MHz Crystal Input	One copy of 27-MHz reference clock output, two copies of 27/27.027/74.250/74.175 MHz (frequency selectable)
CY24204-2	4	27-MHz Crystal Input	Two copies of 27-MHz reference clock output, two copies of 27/27.027/74.250/74.175 MHz (frequency selectable)
CY24204-3	4	27-MHz Crystal Input	Two copies of 27-MHz reference clock output, two copies of 27/27.027/74.250/74.17582418 MHz (frequency selectable)
CY24204-4	4	27-MHz Crystal Input	Two copies of 27-MHz reference clock output, two copies of 27/27.027/74.250/74.17582418 MHz (frequency selectable, Increased VCXO pull range)
CY24204-5	4	27-MHz Crystal Input	Two copies of 27-MHz reference clock output, two copies of 27/27.027/74.250/74.17582418 MHz (frequency selectable, Increased output drive strength)

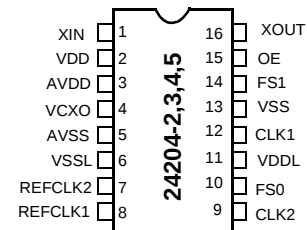
Block Diagram



Pin Configurations 16-pin TSSOP



16-pin TSSOP



Frequency Select Options

OE	FS1	FS0	CLK1/CLK2 (-1,-2) ^[1]	CLK1/CLK2 (-3,-4,-5) ^[1]	REFCLK 1/2	Unit
0	0	0	off	off	27	MHz
0	0	1	off	off	27	MHz
0	1	0	off	off	27	MHz
0	1	1	off	off	27	MHz
1	0	0	27	27	27	MHz
1	0	1	27.027	27.027	27	MHz
1	1	0	74.250	74.250	27	MHz
1	1	1	74.175	74.17582418	27	MHz

Pin Description

Name	Pin Number	Description
XIN	1	Reference Crystal Input.
V _{DD}	2	Voltage Supply.
AV _{DD}	3	Analog Voltage Supply.
VCXO	4	Input Analog Control for VCXO.
AV _{SS}	5	Analog Ground.
V _{SSL}	6	CLK Ground.
N/C (-1)	7	No Connect.
REFCLK2 (-2,-3,-4,-5)	7	Reference Clock Output.
REFCLK1	8	Reference Clock Output.
CLK1 (-1, -2)	9	27-/27.027-/74.250-/74.175-MHz Clock Output (Frequency Selectable).
CLK1 (-3,-4,-5)	9	27-/27.027-/74.250-/74.17582418-MHz Clock Output (Frequency Selectable).
FS0	10	Frequency Select 0, Weak Internal Pull-up.
V _{DDL}	11	CLK Voltage Supply.
CLK2 (-1, -2)	12	27-/27.027-/74.250-/74.175-MHz Clock Output (Frequency Selectable).
CLK2 (-3,-4,-5)	12	27-/27.027-/74.250-/74.17582418-MHz Clock Output (Frequency Selectable).
V _{SS}	13	Ground.
FS1	14	Frequency Select 1, Weak Internal Pull-up.
OE	15	Output Enable, Weak Internal Pull-up.
XOUT	16	Reference Crystal Output.

Note:

1. "off" = output is driven high.



Absolute Maximum Conditions

Supply Voltage (V_{DD} , AV_{DDL} , V_{DDL}).....-0.5 to +7.0V
 DC Input Voltage.....-0.5V to $V_{DD} + 0.5$
 Storage Temperature (Non-Condensing)-55°C to +125°C
 Junction Temperature -40°C to +125°C

Data Retention @ $T_j=125^\circ\text{C}$> 10 years
 Package Power Dissipation..... 350 mW
 ESD (Human Body Model) MIL-STD-883..... 2000V
 (Above which the useful life may be impaired. For user guide-
 lines, not tested.)

Pullable Crystal Specifications

Parameter	Description	Comments	Min.	Typ.	Max.	Unit
F_{NOM}	Nominal crystal frequency	Parallel resonance, fundamental mode, AT cut		27.0		MHz
C_{LNOM}	Nominal load capacitance			14		pF
R_1	Equivalent series resistance (ESR)	Fundamental mode			25	Ω
R_3/R_1	Ratio of third overtone mode ESR to fundamental mode ESR	Ratio used because typical R_1 values are much less than the maximum spec	3			
DL	Crystal drive level	No external series resistor assumed		0.5	2	mW
F_{3SEPHI}	Third overtone separation from $3F_{NOM}$	High side	300			ppm
F_{3SEPLO}	Third overtone separation from $3F_{NOM}$	Low side			-150	ppm
C_0	Crystal shunt capacitance				7	pF
C_0/C_1	Ratio of shunt to motional capacitance		180		250	
C_1	Crystal motional capacitance		14.4	18	21.6	fF

Recommended Operating Conditions

Parameter	Description	Min.	Typ.	Max.	Unit
$V_{DD}/AV_{DDL}/V_{DDL}$	Operating Voltage	3.135	3.3	3.465	V
T_A	Ambient Temperature	0		70	$^\circ\text{C}$
C_{LOAD}	Max. Load Capacitance			15	pF
t_{PU}	Power-up time for all V_{DD} 's to reach minimum specified voltage (power ramps must be monotonic)	0.05		500	ms

DC Electrical Specifications

Parameter ^[2]	Name	Description	Min.	Typ.	Max.	Unit
I_{OH1}	Output High Current for -1,-2,-3,-4	$V_{OH} = V_{DD} - 0.5$, $V_{DD}/V_{DDL} = 3.3V$	12	24		mA
I_{OL1}	Output Low Current for -1,-2,-3,-4	$V_{OL} = 0.5$, $V_{DD}/V_{DDL} = 3.3V$	12	24		mA
I_{OH2}	Output High Current for -5	$V_{OH} = V_{DD} - 0.5$, $V_{DD}/V_{DDL} = 3.3V$	18	26		mA
I_{OL2}	Output Low Current for -5	$V_{OL} = 0.5$, $V_{DD}/V_{DDL} = 3.3V$	18	26		mA
V_{IH}	Input High Voltage	CMOS levels, 70% of V_{DD}	0.7			V_{DD}
V_{IL}	Input Low Voltage	CMOS levels, 30% of V_{DD}			0.3	V_{DD}
I_{VDD}	Supply Current	AV_{DD}/V_{DD} Current			25	mA
I_{VDDL}	Supply Current	V_{DDL} Current ($V_{DDL} = 3.47V$)			20	mA
C_{IN}	Input Capacitance				7	pF
$f_{\Delta XO}$	V_{CXO} pullability range	Nominal pullability for -1,-2,-3,-5	± 150			ppm
$f_{\Delta XO}$	V_{CXO} pullability range	Extended pullability for -4		± 200		ppm
V_{VCXO}	V_{CXO} input range		0		V_{DD}	V
R_{UP}	Pull-up resistor on inputs	$V_{DD} = 3.14$ to $3.47V$, measured at $V_{IN} = 0V$		100	150	k Ω

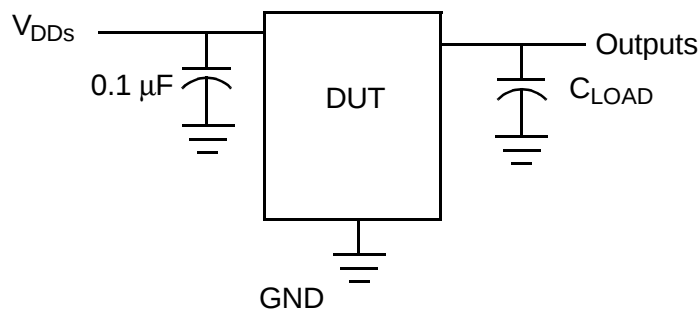
Note:

2. Not 100% tested.

AC Electrical Specifications

Parameter ^[2]	Name	Description	Min.	Typ.	Max.	Unit
DC	Output Duty Cycle	Duty Cycle is defined in <i>Figure 1</i> ; t_1/t_2 , 50% of V_{DD}	45	50	55	%
ER ₁	Rising Edge Rate for -1,-2,-3,-4	Output Clock Edge Rate, Measured from 20% to 80% of V_{DD} , $C_{LOAD} = 15$ pF See <i>Figure 2</i> .	0.8	1.4		V/ns
EF ₁	Falling Edge Rate for -1,-2,-3,-4	Output Clock Edge Rate, Measured from 80% to 20% of V_{DD} , $C_{LOAD} = 15$ pF See <i>Figure 2</i> .	0.8	1.4		V/ns
ER ₂	Rising Edge Rate for -5	Output Clock Edge Rate, Measured from 20% to 80% of V_{DD} , $C_{LOAD} = 15$ pF See <i>Figure 2</i> .	1.0	1.8		V/ns
EF ₂	Falling Edge Rate for -5	Output Clock Edge Rate, Measured from 80% to 20% of V_{DD} , $C_{LOAD} = 15$ pF See <i>Figure 2</i> .	1.0	1.8		V/ns
t_9	Clock Jitter	CLK1, CLK2 Peak-Peak period jitter		120		ps
t_{10}	PLL Lock Time				3	ms

Test and Measurement Set-up



Voltage and Timing Definitions

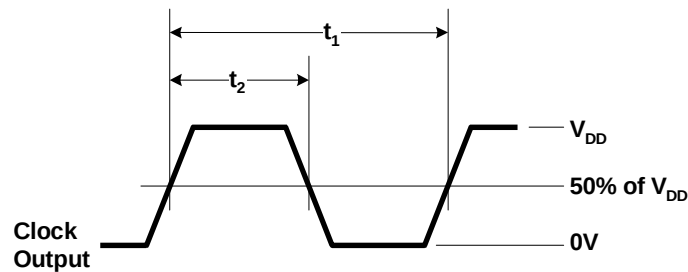


Figure 1. Duty Cycle Definition

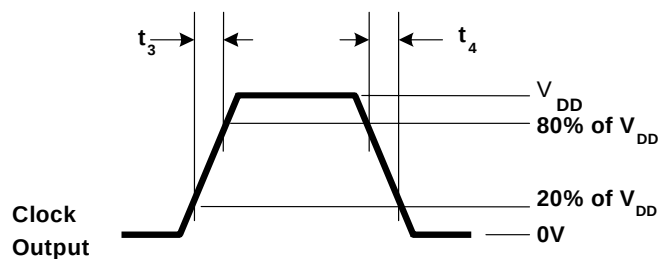


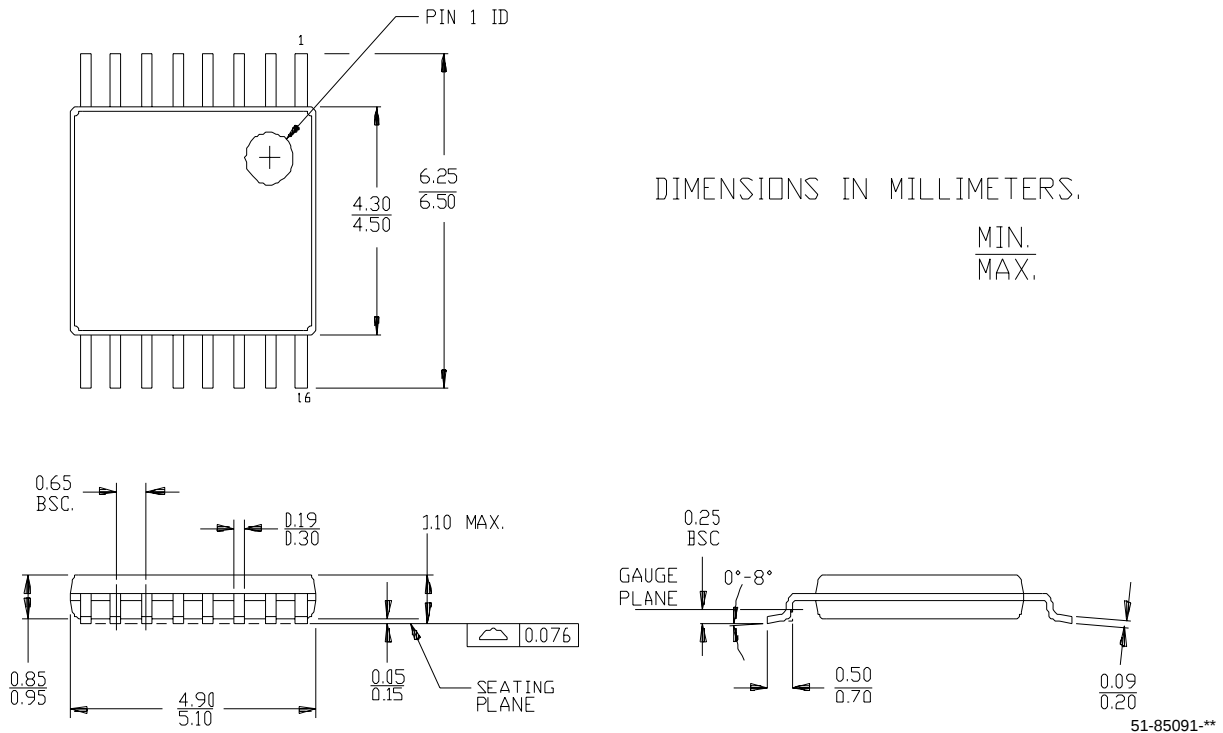
Figure 2. $ER = (0.6 \times V_{DD}) / t_3$, $EF = (0.6 \times V_{DD}) / t_4$

Ordering Information

Ordering Code	Package Name	Package Type	Operating Range	Operating Voltage
CY24204ZC-1	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-1T	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-2	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-2T	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-3	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-3T	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-4	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-4T	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-5	Z16	16-Pin TSSOP	Commercial	3.3V
CY24204ZC-5T	Z16	16-Pin TSSOP	Commercial	3.3V

Package Drawing and Dimensions

16-Lead Thin Shrink Small Outline Package (4.40 MM Body) Z16



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Document History Page

Document Title: CY24204 MediaClock™ DTV, STB Clock Generator Document Number: 38-07450				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	123842	04/10/03	CKN	New Data Sheet
*A	128775	09/0803	IJA	Added -4 and -5 parts