

# MPEG Clock Generator with VCXO

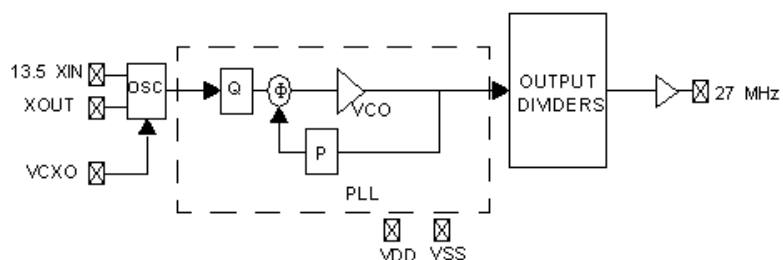
## Features

- Integrated Phase-Locked Loop (PLL)
- Low Jitter, High Accuracy Outputs
- VCXO with Analog Adjust
- 3.3 V Operation
- Compatible with MK3727 (-1, -4)
- Application compatibility for a wide variety of Designs
- Enables Design compatibility
- Lower Drive Strength settings (CY241V08A-04)

## Benefits

- Digital VCXO control
- Second source for existing designs
- Highest performance PLL tailored for multimedia applications
- Meets critical timing requirements in complex system designs

## CY241V08A-01, -04 Logic Block Diagram



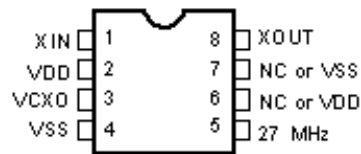
## Selector Guide

Part Number	Outputs	Input Frequency Range	Output Frequencies	VCXO Control Curve	Other Features
CY241V08A-01	1	13.5 MHz pullable crystal input according to Cypress specification	1 copy of 27 MHz	linear	Compatible with MK3727
CY241V08A-04	1	13.5 MHz pullable crystal input according to Cypress specification	1 copy of 27 MHz	linear	Same as CY241V08A-01 except lower drive strength settings

## Pin Configurations

Figure 1. 8-pin SOIC pinout

CY241V08A-01, -04



## Pin Descriptions

Name	Pin Number	Description
XIN	1	Reference crystal input
VDD	2	Voltage supply
VCXO	3	Input analog control for VCXO
VSS	4	Ground
27 MHz	5	27 MHz clock output
NC/VDD	6	No connect or voltage supply
NC/VSS	7	No connect or ground
XOUT	8	Reference crystal output

### Absolute Maximum Conditions

Exceeding maximum ratings may shorten the useful life of the device. User guidelines are not tested.

Supply Voltage ( $V_{DD}$ ) ..... -0.5 to +7.0 V  
 DC Input Voltage ..... -0.5 V to  $V_{DD} + 0.5$  V

Storage Temperature  
 (Non-condensing) ..... -55 °C to +125 °C  
 Junction Temperature ..... -40 °C to +125 °C  
 Data Retention at  $T_j = 125$  °C ..... > 10 years  
 Package Power Dissipation ..... 350 mW  
 ESD (Human Body Model) MIL-STD-883 ..... > 2000 V

### Pullable Crystal Specifications

Parameter <sup>[1]</sup>	Description	Comments	Min	Typ	Max	Unit
$F_{NOM}$	Nominal crystal frequency	Parallel resonance, fundamental mode, AT cut	-	13.5	-	MHz
$C_{LNOM}$	Nominal load capacitance		-	14	-	pF
$R_1$	Equivalent series resistance (ESR)	Fundamental mode	-	-	25	$\Omega$
$R_3/R_1$	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	150	-	-	$\mu$ W
$F_{3SEPHI}$	Third overtone separation from $3 * F_{NOM}$	High side	300	-	-	ppm
$F_{3SEPLO}$	Third overtone separation from $3 * F_{NOM}$	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
$V_{DD}$	Operating Voltage	3.135	3.3	3.465	V
$T_A$	Ambient Temperature	0	-	70	°C
$C_{LOAD}$	Maximum Load Capacitance	-	-	15	pF
$t_{PU}$	Power up time for all VDD pins to reach minimum specified voltage (power ramps must be monotonic)	0.05	-	500	ms

**Note**

1. Crystals that meet this specification include: Ecliptek ECX-5788-13.500M, Siward XTL001050A-13.5-14-400, Raltron A-13.500-14-CL, PDI HA13500XFSA14XC.

## DC Electrical Specifications

Parameter	Name	Description	Min	Typ	Max	Unit
$I_{OH}$	Output HIGH Current	$V_{OH} = V_{DD} - 0.5 \text{ V}$ , $V_{DD} = 3.3 \text{ V}$	12	24	–	mA
$I_{OL}$	Output LOW Current	$V_{OL} = 0.5 \text{ V}$ , $V_{DD} = 3.3 \text{ V}$	12	24	–	mA
$C_{IN}$	Input Capacitance	Except XIN, XOUT pins	–	–	7	pF
$V_{VCXO}$	VCXO Input Range		0	–	$V_{DD}$	V
$f_{\Delta XO}^{[2]}$	VCXO Pullability Range	Low Side	–	–	–115	ppm
		High Side	115	–	–	ppm
$I_{VDD}$	Supply Current		–	30	35	mA

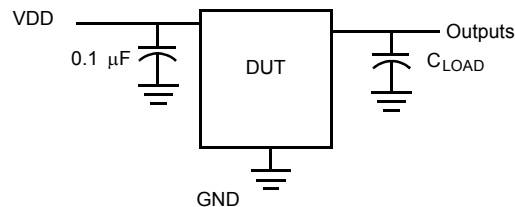
## AC Electrical Specifications

( $V_{DD} = 3.3 \text{ V}$ )

Parameter <sup>[3]</sup>	Name	Description	Min	Typ	Max	Unit
DC	Output Duty Cycle	Duty Cycle is defined in Figure 3, 50% of $V_{DD}$	45	50	55	%
$ER_{OR}$	Rising Edge Rate -01	Output Clock Edge Rate, Measured from 20% to 80% of $V_{DD}$ , $C_{LOAD} = 15 \text{ pF}$ See Figure 4.	0.8	1.4	–	V/ns
$ER_{OF}$	Falling Edge Rate -01	Output Clock Edge Rate, Measured from 80% to 20% of $V_{DD}$ , $C_{LOAD} = 15 \text{ pF}$ , See Figure 4.	0.8	1.4	–	V/ns
$ER_{OR}$	Rising Edge Rate -04	Output Clock Edge Rate, Measured from 20% to 80% of $V_{DD}$ , $C_{LOAD} = 15 \text{ pF}$ , See Figure 4.	0.7	1.1	–	V/ns
$ER_{OF}$	Falling Edge Rate -04	Output Clock Edge Rate, Measured from 80% to 20% of $V_{DD}$ , $C_{LOAD} = 15 \text{ pF}$ , See Figure 4.	0.7	1.1	–	V/ns
$t_g$	Clock Jitter	Peak-to-peak period jitter	–	–	100	ps
$t_{10}$	PLL Lock Time		–	–	3	ms

## Test and Measurement Setup

Figure 2. Test and Measurement Setup



### Notes

- 115/+115 ppm assumes 2.5 pF of additional board level load capacitance. This range will be shifted down with more board capacitance or shifted up with less board capacitance.
- Not 100% tested.

## Voltage and Timing Definitions

Figure 3. Duty Cycle Definition

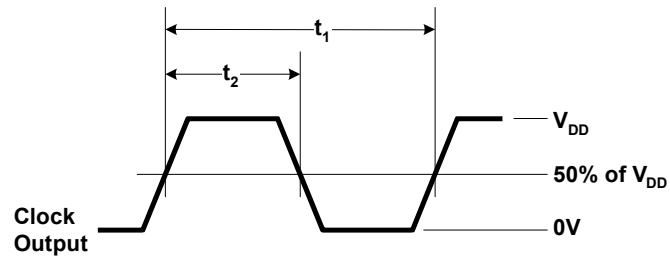
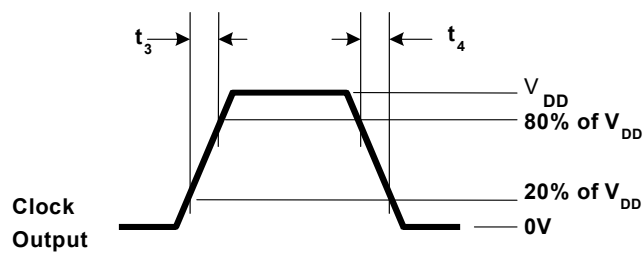


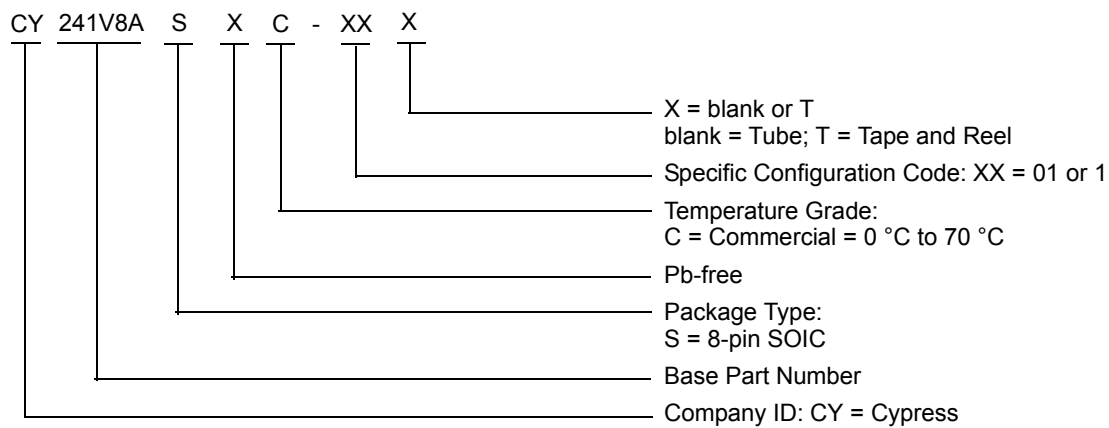
Figure 4.  $ER = (0.6 \times V_{DD})/t_3$ ,  $EF = (0.6 \times V_{DD})/t_4$



## Ordering Information

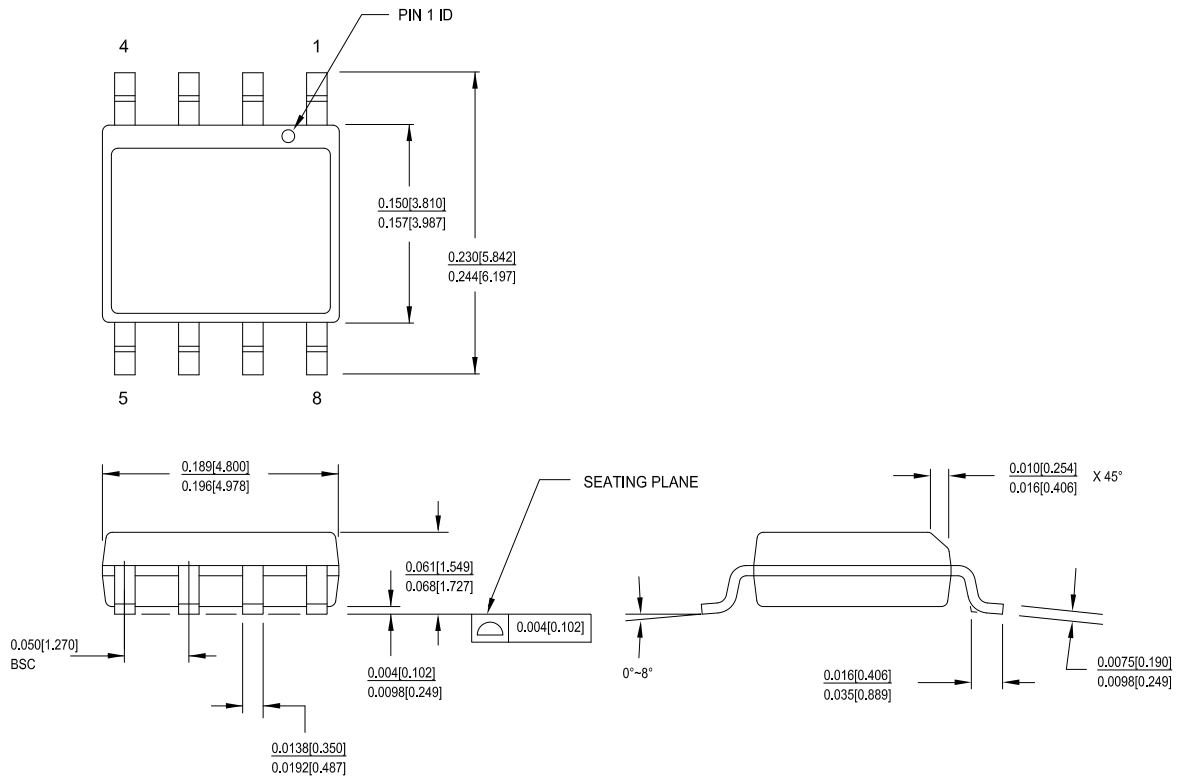
Ordering Code	Package Type	Operating Range	Operating Voltage	Features
<b>Pb-free</b>				
CY241V8ASXC-01	8-pin SOIC	Commercial	3.3 V	Linear VCXO control curve
CY241V8ASXC-01T	8-pin SOIC –Tape and Reel	Commercial	3.3 V	Linear VCXO control curve
<b>Pure Sn</b>				
CY241V8ASXC-1S	8-pin SOIC	Commercial	3.3 V	Linear VCXO control curve

## Ordering Code Definitions



### Package Diagrams

Figure 5. 8-pin SOIC (150 Mils) S0815/SZ815/SW815 Package Outline, 51-85066



51-85066 \*F

## Acronyms

Acronym	Description
ESD	Electrostatic Discharge
ESR	Equivalent Series Resistance
PLL	Phase Locked Loop
SOIC	Small Outline Integrated Circuit
VCXO	Voltage Controlled Crystal Oscillator

## Document Conventions

### Units of Measure

Symbol	Unit of Measure
°C	degree Celsius
fF	femtofarad
MHz	megahertz
μF	microfarad
μW	microwatt
mA	milliampere
ms	millisecond
mW	milliwatt
ns	nanosecond
Ω	ohm
%	percent
pF	picofarad
ppm	parts per million
ps	picosecond
V	volt



## Document History Page

Document Title: CY241V08A-01,04/CY241V8A-01, MPEG Clock Generator with VCXO Document Number: 38-07656				
Rev.	ECN No.	Submission Date	Orig. of Change	Description of Change
**	214069	See ECN	RGL	New data sheet
*A	220404	See ECN	RGL	Minor Change: To post on web
*B	393122	See ECN	RGL	Added Lead-free device for -01 Added the CY241V8A-01 in the title
*C	414184	See ECN	RGL	Minor Change: Deleted unnecessary text in the benefit section
*D	455059	See ECN	RGL	Added Pure Sn parts for -01
*E	2759384	09/02/2009	TSAI	Updated template Post to external web
*F	2897423	03/22/10	CXQ	Updated ordering information table. Removed part numbers, CY241V08ASC-01, CY241V08ASC-01T, CY241V08ASC-04, and CY241V08ASC-04T Updated package diagram. Updated copyright section.
*G	4009177	05/23/2013	CINM	Added <a href="#">Ordering Code Definitions</a> .  Updated <a href="#">Package Diagrams</a> : spec 51-85066 – Changed revision from *D to *F.  Added <a href="#">Acronyms and Units of Measure</a> .  Updated in new template.  Completing Sunset Review.

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