

# MPEG Clock Generator with VCXO

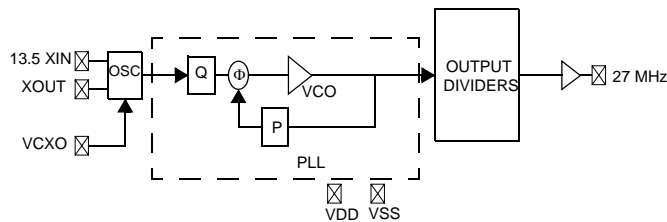
## Features

- Integrated phase-locked loop (PLL)
- Low-jitter, high-accuracy outputs
- VCXO with analog adjust
- 3.3V operation
- Compatible with MK3727 (-1, -4)
- Application compatibility for a wide variety of designs
- Enables design compatibility
- Lower drive strength settings (CY241V08A-04)

## Benefits

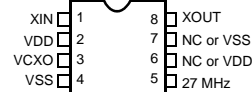
- Digital VCXO control
- Second source for existing designs
- Highest-performance PLL tailored for multimedia applications
- Meets critical timing requirements in complex system designs
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### CY241V08A-01,-04 Logic Block Diagram



### Pin Configurations

#### CY241V08A-01,-04 8-pin SOIC



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

**Pin Description**

<b>Name</b>	<b>Pin Number</b>	<b>Description</b>
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**

(Above which the useful life may be impaired. For user guidelines, not tested.)

Supply Voltage ( $V_{DD}$ ) .....-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

**Pullable Crystal Specifications<sup>[1]</sup>**

Parameter	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	-	-	$\mu\text{W}$
$F_{3SEPHI}$	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
VDD	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 VDD pins to reach minimum specified voltage (power ramps must be monotonic)	0.05	-	500	ms

**DC Electrical Specifications**

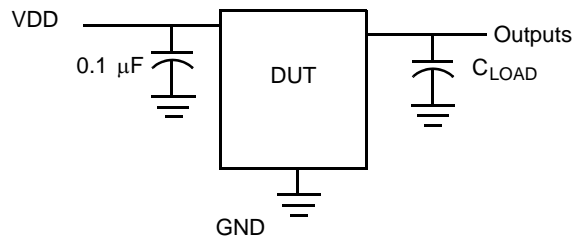
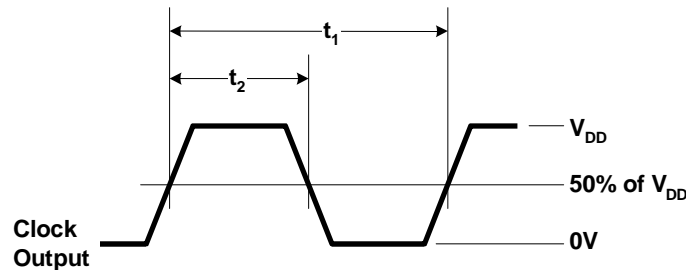
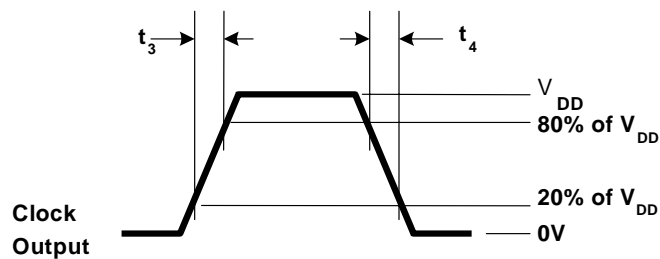
Parameter	Name	Description	Min.	Typ.	Max.	Unit
$I_{OH}$	Output HIGH Current	$V_{OH} = V_{DD} - 0.5V, V_{DD} = 3.3V$	12	24	-	mA
$I_{OL}$	Output LOW Current	$V_{OL} = 0.5V, V_{DD} = 3.3V$	12	24	-	mA
$C_{IN}$	Input Capacitance	Except XIN, XOUT pins	-	-	7	pF
$V_{VCXO}$	VCXO Input Range		0	-	$V_{DD}$	V
$f_{\Delta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

**Notes:**

1. Crystals that meet this specification includes: Ecliptek ECX-5788-13.500M, Siward XTL001050A-13.5-14-400, Raltron A-13.500-14-CL, PDI HA13500XFSA14XC.
2. -115/+115 ppm assumes 2.5pF of additional board level load capacitance. This range will be shifted down with more board capacitance or shifted up with less board capacitance.

**AC Electrical Specifications** ( $V_{DD} = 3.3V$ ) <sup>[3]</sup>

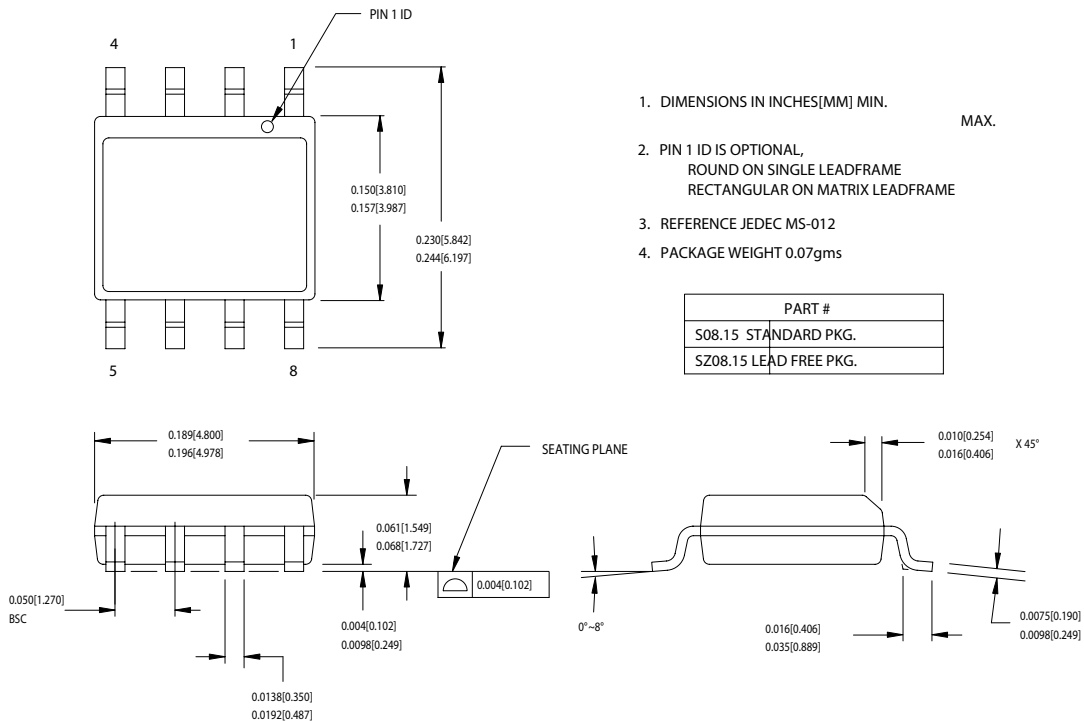
Parameter <sup>[3]</sup>	Name	Description	Min.	Typ.	Max.	Unit
DC	Output Duty Cycle	Duty Cycle is defined in <i>Figure 1</i> , 50% of $V_{DD}$	45	50	55	%
ER <sub>OR</sub>	Rising Edge Rate –01	Output Clock Edge Rate, Measured from 20% to 80% of $V_{DD}$ , CLOAD = 15 pF See <i>Figure 2</i> .	0.8	1.4	–	V/ns
ER <sub>OF</sub>	Falling Edge Rate –01	Output Clock Edge Rate, Measured from 80% to 20% of $V_{DD}$ , CLOAD = 15 pF See <i>Figure 2</i> .	0.8	1.4	–	V/ns
ER <sub>OR</sub>	Rising Edge Rate –04	Output Clock Edge Rate, Measured from 20% to 80% of $V_{DD}$ , CLOAD = 15 pF See <i>Figure 2</i> .	0.7	1.1	–	V/ns
ER <sub>OF</sub>	Falling Edge Rate –04	Output Clock Edge Rate, Measured from 80% to 20% of $V_{DD}$ , CLOAD = 15 pF See <i>Figure 2</i> .	0.7	1.1	–	V/ns
t <sub>9</sub>	Clock Jitter	Peak-to-peak period jitter	–	–	100	ps
t <sub>10</sub>	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 =  $(0.6 \times V_{DD})/t_4$** 

Note:  
 3. Not 100% tested.

**Ordering Information**

Ordering Code	Package Type	Operating Range	Operating Voltage	Features
CY241V08ASC-01	8-pin SOIC	Commercial	3.3V	Linear VCXO control curve
CY241V08ASC-01T	8-pin SOIC – Tape and Reel	Commercial	3.3V	Linear VCXO control curve
CY241V08ASC-04	8-pin SOIC	Commercial	3.3V	Linear VCXO control curve
CY241V08ASC-04T	8-pin SOIC – Tape and Reel	Commercial	3.3V	Linear VCXO control curve
<b>Lead-free</b>				
CY241V8ASXC-01	8-pin SOIC	Commercial	3.3V	Linear VCXO control curve
CY241V8ASXC-01T	8-pin SOIC - Tape and Reel	Commercial	3.3V	Linear VCXO control curve

**Package Drawing and Dimensions**
**8-lead (150-Mil) SOIC S8**


51-85066-°C

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**Document History Page**

Document Title: CY241V08A-01,04/ CY241V8A-01MPEG Clock Generator with VCXO				
Document Number: 38-07656				
REV.	ECN NO.	Issue 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