

# PacketClock™ Spread Spectrum Clock Generator

## Features

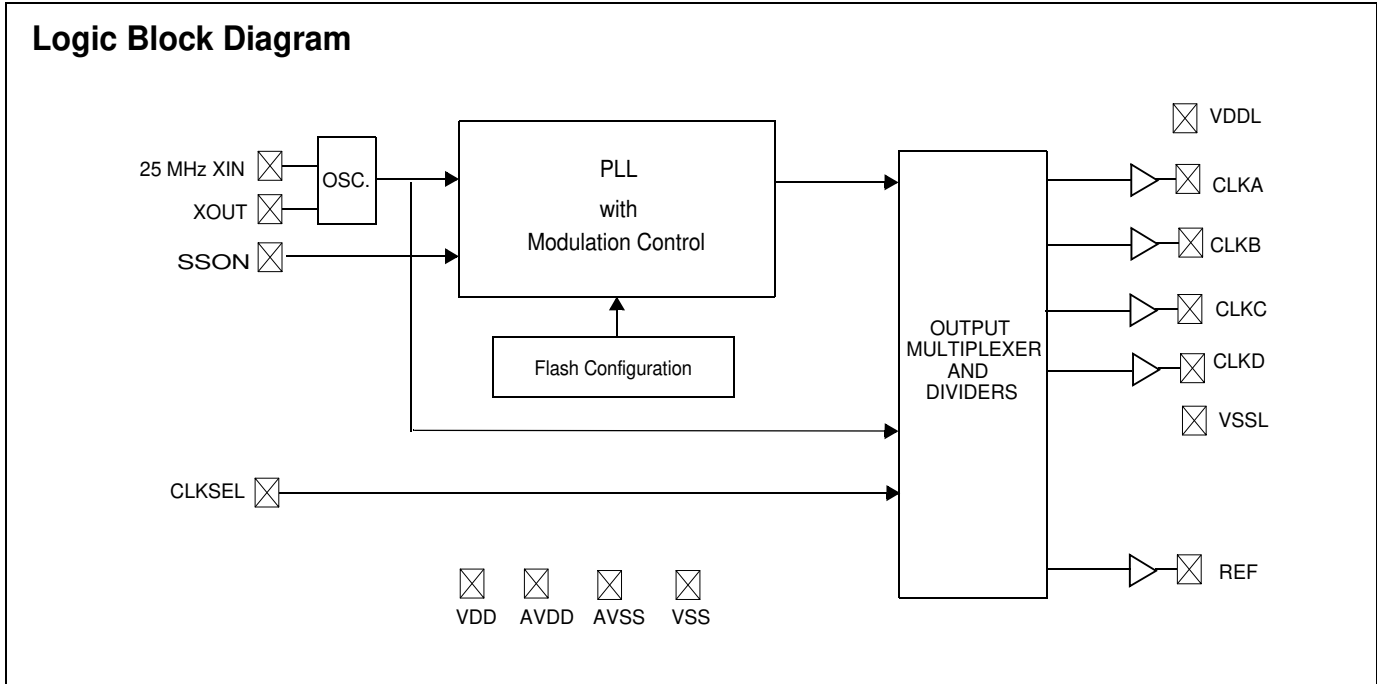
- Integrated phase-locked loop (PLL)
- Low jitter, high-accuracy outputs
- 3.3V operation
- 25-MHz input frequency
- 66.66-MHz or 33.33-MHz selectable output frequency (orig, -3,-11,-31)
- 33.33-MHz or 25-MHz selectable output frequency (-2,-21)

## Benefits

- High-performance PLL tailored for Spread Spectrum application
- Meets critical timing requirements in complex system designs
- Enables application compatibility
- Works with commonly available crystal or driven reference
- Downspread Spread Spectrum with 30-kHz nominal modulation frequency

**Table 1. Frequency Table for CLKA-D**

Part Number	CLKSEL=0	CLKSEL=1	Spread%	Parallel Crystal Load
CY26121	66.66 MHz	33.33	-2.8%	6 pF
CY26121-2	33.33 MHz	25.00	-2.8%	6 pF
CY26121-3	66.66 MHz	33.33	-1.4%	6 pF
CY26121-11	66.66 MHz	33.33	-2.8%	15 pF
CY26121-21	33.33 MHz	25.00	-2.8%	15 pF
CY26121-31	66.66 MHz	33.33	-1.4%	15 pF



## Pin Configuration

Figure 1. CY26121, 16-pin TSSOP

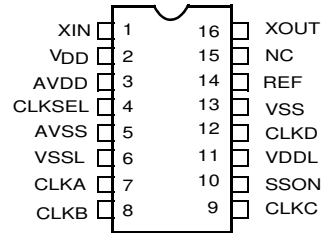


Table 2. Pin Definitions

Name	Pin Number	Description
XIN	1	Reference input Or Crystal Input
VDD	2	3.3V Voltage Supply
AVDD	3	3.3V Analog Voltage
CLKSEL	4 (orig., -11,-3,-31)	0 = 66.66MHz out, 1 = 33.33 MHz Out. Weak pull up.
CLKSEL	4 (-2, -21)	0 = 33.33MHz out, 1 = 25 MHz Out. Weak pull up.
AVSS	5	Analog Ground
VSSL	6	CLK Ground
CLK(A:D)	7,8,9,12	Clock Outputs at V <sub>DDL</sub> level
SSON	10	Spread Spectrum Enable pin 0 = SS off; 1 = SS on. Weak pull up.
VDDL	11	3.3V Clock Voltage Supply
VSS	13	Ground
REF	14	Reference Output at V <sub>DD</sub> Level
NC	15	No Connect
XOUT <sup>[1]</sup>	16	Crystal Output

## Maximum Ratings

Exceeding maximum ratings may impair the useful life of the device. These user guidelines are not tested.

Supply Voltage ( $V_{DD}$ ,  $AV_{DD}$ ,  $V_{DDL}$ ) ..... -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 at  $T_j = 125^\circ\text{C}$  ..... > 10 years

Package Power Dissipation ..... 350 mW

Static Discharge Voltage .....  $\geq 2000\text{V}$   
(per MIL-STD-883, Method 3015)

## Recommended Operating Conditions

Parameter	Description	Min	Typ.	Max	Unit
$V_{DD}$ , $AV_{DD}$	Supply voltage	3.135	3.30	3.465	V
$V_{DDL}$	Supply voltage for CLK (A-D)	3.135	3.30	3.465	V
$T_A$	Ambient temperature (commercial temp. grade)	0		70	°C
$T_A$	Ambient Temperature (industrial temp grade)	-40		85	°C
$C_{LOAD}$	Max. output load capacitance			15	pF
$F_{ref}$	Reference frequency		25		MHz

## Crystal Specification<sup>[2]</sup>

Parameter	Name	Min	Typ	Max	Unit
$CR_{load}$	Crystal load capacitance (original, -2, -3)		6		pF
$CR_{load}$	Crystal load capacitance (-11, -21, -31)		15		pF
ESR	Equivalent series resistance			50	$\Omega$

## DC Electrical Specifications

Parameter	Description	Condition	Min	Typ.	Max	Unit
$I_{OH}$	Output High Current	$V_{OH} = V_{DD} - 0.5$ , $V_{DD}/V_{DDL}=3.3\text{V}$	12	24		mA
$I_{OL}$	Output Low Current	$V_{OL} = 0.5$ , $V_{DD}/V_{DDL} = 3.3\text{V}$	12	24		mA
$I_{IH}$	Input High Current	$V_{IH} = V_{DD}$		5	10	$\mu\text{A}$
$I_{IL}$	Input Low Current	$V_{IL} = 0\text{V}$			50	$\mu\text{A}$
$V_{IH}$	Input High Voltage	CMOS levels	0.7			$V_{DD}$
$V_{IL}$	Input Low Voltage	CMOS levels			0.3	$V_{DD}$
$C_{IN}^{[3]}$	Input Capacitance	Input pins excluding XIN			7	pF
$R_{UP}^{[3]}$	Pull up resistor on input pins	$V_{DD} = 3.14$ to $3.47\text{V}$ , measured at $V_{IN} = 0\text{V}$	80	100	150	k $\Omega$
$I_{DD}$	Supply Current	$AV_{DD}/V_{DD}/V_{DDL}$ Current.		42	60	mA

### Notes

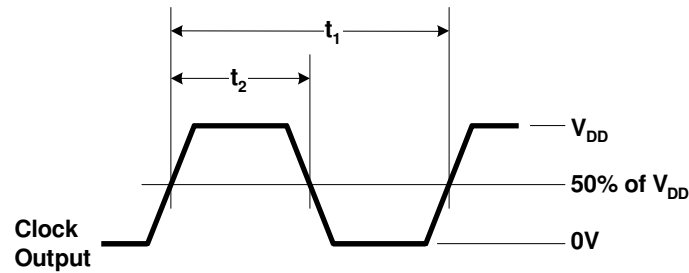
1. Float XOUT if XIN is externally driven.
2. A fundamental parallel resonant crystal must be used

**AC Electrical Specifications**<sup>[3]</sup>

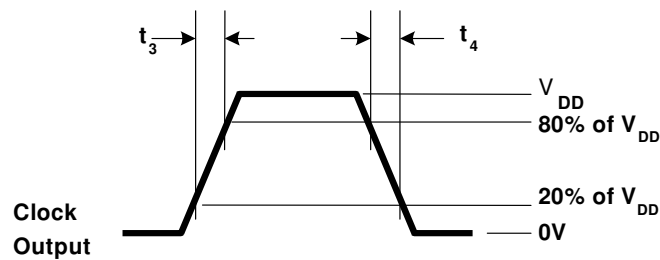
Parameter	Description	Condition	Min	Typ.	Max	Unit
DC	Output Duty Cycle	Duty Cycle is defined in Figure 2, 50% of $V_{DD}$	45	50	55	%
ER	Rising Edge Rate	Output Clock Edge Rate, Measured from 20% to 80% of $V_{DD}$ , $C_{LOAD} = 15\text{ pF}$ See Figure 3.	0.8	1.4		V/ns
EF	Falling Edge Rate	Output Clock Edge Rate, Measured from 80% to 20% of $V_{DD}$ , $C_{LOAD} = 15\text{ pF}$ See Figure 3.	0.8	1.4		V/ns
tj	RMS Clock Cycle-to-Cycle Jitter	RMS cycle-to-cycle jitter with Spread on. Measured at $V_{DD}/2$ .		15	40	ps

**Voltage and Timing Definitions**

**Figure 2. Duty Cycle Definition**



**Figure 3.  $ER = (0.6 \times V_{DD}) / t_3$ ,  $EF = (0.6 \times V_{DD}) / t_4$**



**Note**

3. Guaranteed by Characterization, not 100% tested.

### Ordering Information

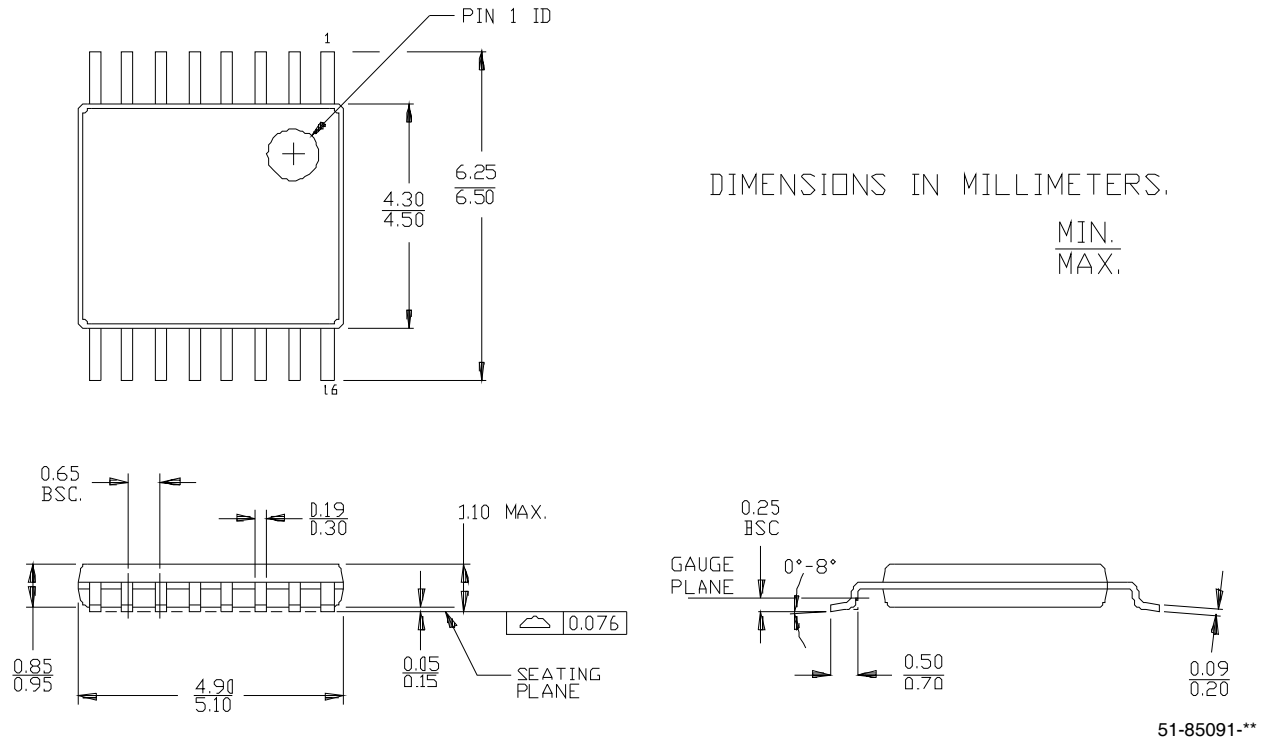
Ordering Code	Package Type	Operating Range
CY26121ZC <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZCT <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZI <sup>[4]</sup>	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121ZIT <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
CY26121ZC-2 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZC-2T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZI-2 <sup>[4]</sup>	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121ZI-2T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
CY26121ZC-3 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZC-3T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZI-3 <sup>[4]</sup>	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121ZI-3T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
CY26121ZC-11 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZC-11T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZC-21 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZC-21T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZI-21 <sup>[4]</sup>	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121ZI-21T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
CY26121ZC-31 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZC-31T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121KZC-21	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121KZC-21T	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121KZI-21	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121KZI-21T	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
<b>Pb-Free</b>		
CY26121ZXC-21 <sup>[4]</sup>	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121ZXC-21T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121ZXI-21 <sup>[4]</sup>	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121ZXI-21T <sup>[4]</sup>	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C
CY26121KZXC-21	16-pin TSSOP	Commercial, 0°C to 70°C
CY26121KZXC-21T	16-pin TSSOP – Tape and Reel	Commercial, 0°C to 70°C
CY26121KZXI-21	16-pin TSSOP	Industrial, –40°C to 85°C
CY26121KZXI-21T	16-pin TSSOP – Tape and Reel	Industrial, –40°C to 85°C

**Note**

4. Not recommended for new designs.

### Package Drawing and Dimensions

Figure 4. 16-lead Thin Shrunk Small Outline Package (4.40 MM Body) Z16



Parameter	Inches			Millimeters		
	Min	Nom.	Max	Min	Nom.	Max.
A	-	-	0.047	-	-	1.20
A <sub>1</sub>	0.002	-	0.006	0.05	-	0.15
A <sub>2</sub>	0.031	0.039	0.041	0.80	1.00	1.05
B	0.007	-	0.012	0.19	-	0.30
C	0.004	-	0.008	0.09	-	0.20
D	0.193	0.197	0.201	4.90	5.00	5.10
E	0.169	0.173	0.177	4.30	4.40	4.50
e	0.026 BSC			0.65 BSC		
H	0.244	0.252	0.260	6.20	6.40	6.60
L	0.018	0.024	0.030	0.45	0.60	0.75
a	0°	-	8°	0°	-	8°

## Document History Page

Document Title: CY26121 PacketClock™ Spread Spectrum Clock Generator Document Number: 38-07350				
REV.	ECN NO.	Issue Date	Orig. of Change	Description of Change
**	121669	02/11/03	CKN	New Data Sheet
*A	2440886	See ECN	KVM/AESA	Updated template. Added Note "Not recommended for new designs." Added part numbers CY26121ZXG-21, CY26121ZXG-21T, CY26121ZXI-21, and CY26121ZXI-21T in ordering information table. Added part numbers CY26121KZC-21, CY26121KZC-21T, CY26121KZI-21, and CY26121KZI-21T. Added part numbers CY26121KZXC-21, CY26121KZXC-21T, CY26121KZXI-21, and CY26121KZXI-21T. Removed part numbers CY26121ZI-11, CY26121ZI-11T, CY26121ZI-31 and CY26121ZI-31T

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