

ISL14011

Low Jitter Clock Generators for Set-Top Box

FN6427 Rev 0.00 Jan 30, 2007

The ISL14011 series of devices are general purpose integrated Clock Synthesizers and Generators suited for consumer applications such as Set-top Box, and various other consumer applications.

The selectable reference input accepts 30MHz signal either from crystal or an external source. It is specified to operate with a nominal 3.3V supply and is offered in 16 Ld QFN package.

Contact Factory for other output frequency options.

Ordering Information

PART	PART	TEMP.	PACKAGE	PKG.	
NUMBER	MARKING	RANGE (°C)		DWG.#	
ISL14011IRZ*	11IZ	-40 to +85	16 Ld QFN	L16.3x3	

^{*}Add "-T" suffix for tape and reel.

NOTE: Intersil Pb-free plus anneal products employ special Pb-free material sets; molding compounds/die attach materials and 100% matte tin plate termination finish, which are RoHS compliant and compatible with both SnPb and Pb-free soldering operations. Intersil Pb-free products are MSL classified at Pb-free peak reflow temperatures that meet or exceed the Pb-free requirements of IPC/JEDEC J STD-020.

Selection Table

PART OPTIONS	INPUT FREQUENCY	NUMBER OF OUTPUTS	OUTPUT FREQUENCY	PACKAGE
ISL14011	30MHz	4 LVTTL	25. 30. 24. 27	16 Ld OFN

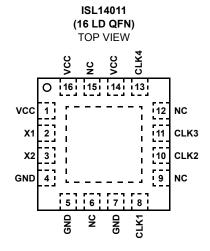
Features

- LVTTL Outputs
- · Selectable Crystal or Ref. Clock for Inputs
- Period Jitter ~50ps RMS
- · Single Supply; 3.3V nominal
- Extended Temperature Range: -40°C to +85°C
- · Available in small foot print package
 - 16 Ld QFN 3mmx3mm
- · Pb-Free plus anneal available (RoHS Compliant)

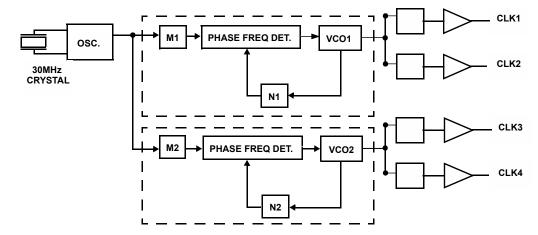
Applications

· Set-Top Boxes

Pinout



Functional Block Diagram



Pin Description

16 LD QFN	SYMBOLS	PIN DESCRIPTION
1,14,16	VCC	Supply Voltage
2	X1	The X1 pin is the terminal 1 of an external 30MHz crystal. This pin is grounded for external CK input.
3	X2	The X2 pin is the terminal 2 of external 30MHz crystal, or external clock input.
4, 5, 7	GND	Ground
8	CLK1	CLK1 Output: 25MHz
10	CLK2	CLK2 Output: 30MHz
11	CLK3	CLK3 Output: 24MHz
13	CLK4	CLK4 Output: 27MHz
6, 9,12,15	NC	No Connect

Absolute Maximum Ratings

Voltage on VCC, CLK pins (respect to Gnd) -0.3V to 4.0V Voltage on X1, X2 pins (respect to Gnd) -0.3V to 2.5V ESD Rating MIL STD-883, Method 3014 >±5kV Machine Model >500V

Thermal Information

Thermal Resistance (Typical, Note 1)	θ _{JA} (°C/W)	θ _{JC} (°C/W)
16 Ld QFN Package	59	11.5
Storage Temperature	65	°C to +150°C
Lead Temperature (Soldering 10s)		+300°C

CAUTION: Stresses above those listed in "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress only rating and operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied.

NOTE

1. θ_{JA} is measured in free air with the component mounted on a high effective thermal conductivity test board with "direct attach" features. See Tech Brief TB379.

DC Electrical Specifications $V_{CC} = 3.3V \pm 10\%$, $T_A = -40^{\circ}$ C to +85°C, Typical values are at $T_A = +25^{\circ}$ C and $V_{CC} = 3.3V$, Unless otherwise noted

SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT	
V _{CC}	Supply Voltage	3.0	3.3	3.6	V	
Icc	Supply Current CL = 5pF on all outputs		11	15	mA	
D) FOR EXTERN	NAL CLOCK MODE			1	l	
V _{IH}		1.5		2.4	V	
V _{IL}				0.5	V	
IIL, IIH	V _{X2} to Ground		0.5		mA	
-				1	l	
V _{OH}	I _{OH} = -100μA	V _{CC} -0.2			V	
	I _{OH} = -4mA	2.4			V	
	I _{OH} = -6mA	2.1			V	
V _{OL}	I _{OL} = 100μA			0.2	V	
	I _{OL} = 4mA			0.4	V	
	I _{OL} = 6mA			0.75	V	
IOSC	CLK = V _{CC} or Gnd	6	13	30	mA	
	V _{CC} I _{CC} D) FOR EXTERN V _{IH} V _{IL} IIL, IIH VOH	V_{CC} Supply Voltage I_{CC} Supply Current CL = 5pF on all outputs D) FOR EXTERNAL CLOCK MODE V_{IH} V_{IL} IIL , IIH V_{X2} to Ground V_{OH} I_{OH} = -100 μ A I_{OH} = -6mA I_{OL} = 100 μ A I_{OL} = 6mA	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	V _{CC} Supply Voltage 3.0 3.3 I _{CC} Supply Current CL = 5pF on all outputs 11 D) FOR EXTERNAL CLOCK MODE V _{IH} 1.5 V _{IL} 1.5 IIL, IIH V _{X2} to Ground 0.5 V _{OH} I _{OH} = -100μA 2.4 I _{OH} = -6mA 2.1 V _{OL} I _{OL} = 100μA I _{OL} = 4mA I _{OL} = 6mA	V _{CC} Supply Voltage 3.0 3.3 3.6 I _{CC} Supply Current CL = 5pF on all outputs 11 15 D) FOR EXTERNAL CLOCK MODE 1.5 2.4 V _{IH} 1.5 2.4 V _{IL} 0.5 0.5 IIL, IIH V _{X2} to Ground 0.5 VOH I _{OH} = -100μA V _{CC} -0.2 I _{OH} = -4mA 2.4 I _{OH} = -6mA 2.1 VOL I _{OL} = 100μA 0.2 I _{OL} = 4mA 0.4 I _{OL} = 6mA 0.75	

AC Electrical Specifications CL= 5pF on all outputs

SYMBOL	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Crystal Frequency	fin			30		MHz
CLOCK OUTPUTS						
Rise Time	t _R	20% to 80% V _{CC}		1.8		ns
Fall Time	t _F	80% to 20% V _{CC}		1.8		ns
Duty Cycle			40		60	%
Period Jitter	J _P	RMS		50		ps
Power Up Time	t _{PO}	V _{CC} >2.7V		2		ms



Typical Performance Curves (Period Jitter)

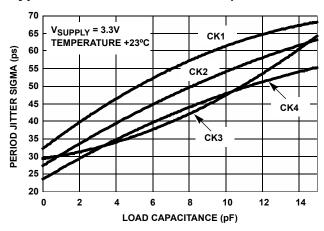


FIGURE 1. STANDARD DEVIATION vs LOAD CAPACITANCE

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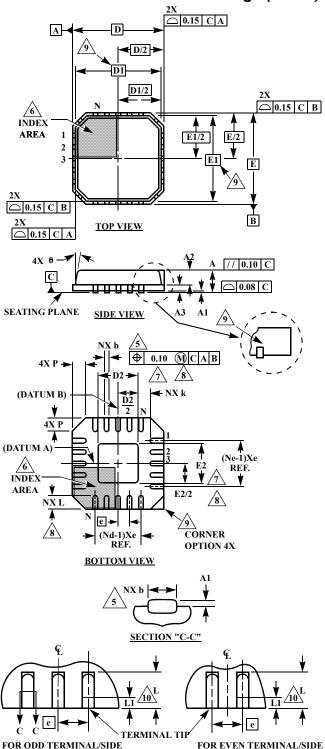
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Quad Flat No-Lead Plastic Package (QFN) Micro Lead Frame Plastic Package (MLFP)



L16.3x3 16 LEAD QUAD FLAT NO-LEAD PLASTIC PACKAGE

	MILLIMETERS			
SYMBOL	MIN	NOMINAL	MAX	NOTES
Α	0.80	0.90	1.00	-
A1	-	-	0.05	-
A2	-	-	1.00	9
A3		0.20 REF		9
b	0.18	0.23	0.30	5, 8
D		3.00 BSC		-
D1		2.75 BSC		
D2	1.35	1.50	1.65	7, 8, 10
E	3.00 BSC			-
E1		2.75 BSC		
E2	1.35	1.50 1.65		7, 8, 10
е		0.50 BSC		
k	0.20	-	-	-
L	0.30	0.40	0.50	8
N	16			2
Nd	4			3
Ne		4		
Р	-	-	0.60	9
θ	-	-	12	9

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NOTES:

- 1. Dimensioning and tolerancing conform to ASME Y14.5-1994.
- 2. N is the number of terminals.
- 3. Nd and Ne refer to the number of terminals on each D and E.
- 4. All dimensions are in millimeters. Angles are in degrees.
- 5. Dimension b applies to the metallized terminal and is measured between 0.15mm and 0.30mm from the terminal tip.
- 6. The configuration of the pin #1 identifier is optional, but must be located within the zone indicated. The pin #1 identifier may be either a mold or mark feature.
- 7. Dimensions D2 and E2 are for the exposed pads which provide improved electrical and thermal performance.
- 8. Nominal dimensions are provided to assist with PCB Land Pattern Design efforts, see Intersil Technical Brief TB389.
- 9. Features and dimensions A2, A3, D1, E1, P & θ are present when Anvil singulation method is used and not present for saw singulation.
- 10. Compliant to JEDEC MO-220VEED-2 Issue C, except for the E2 and D2 MAX dimension.