SY05-HLPL

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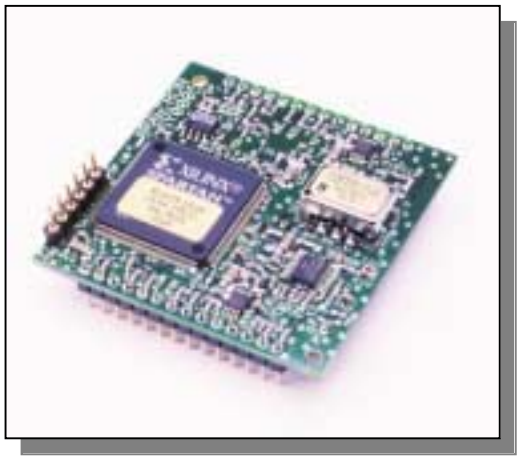

• INTRODUCTION

The SY05-HLPL is a high frequency clock that has been designed to be use at high speed Line Interface Cards in telecommunication products mainly related to STN-n or OC-n.

• FEATURES

√ A high frequency clock intended to be used at line cards for OC3 and OC12 (STM3 and STM12).

√ Along with SY0001 or SY05-HLPL provides complete timing solution.

√ Provides very low jitter output signal from **51.84MHz to 800MHz**

√ Performs hitless switching between two reference signals

√ Supports four timing modes: (1) Free-run, (2) Locked to Reference 1 (3) Locked to Reference 2, and (4) Loop-back timing.

√ Accepts reference inputs from two clock sources from **8kHz to 77.76MHz**

√ Manual or Automatic selection between operating modes.

√ Alarm and status signals.

√ Complies with ITU-T Recommendations G.813, ETSI-ETS 300 462-4 and Bellcore GR-1244-CORE for Stratum 3 and 3E applications.

√ Small dimensions of 1.8 x 1.8 x 0.50 inch.

• APPLICATION

The SY05-HLPL high frequency clock can be used in ATM, SDH, PDH, and SONET networks devices. It is designed for manufacturers of network equipment, especially Access Switches, Core Switches, Cross Connects, Digital Multiplexers-Exchangers, and SDH/SONET equipment. The SY05-HLPL is a timing solution for Line Interface Cards.

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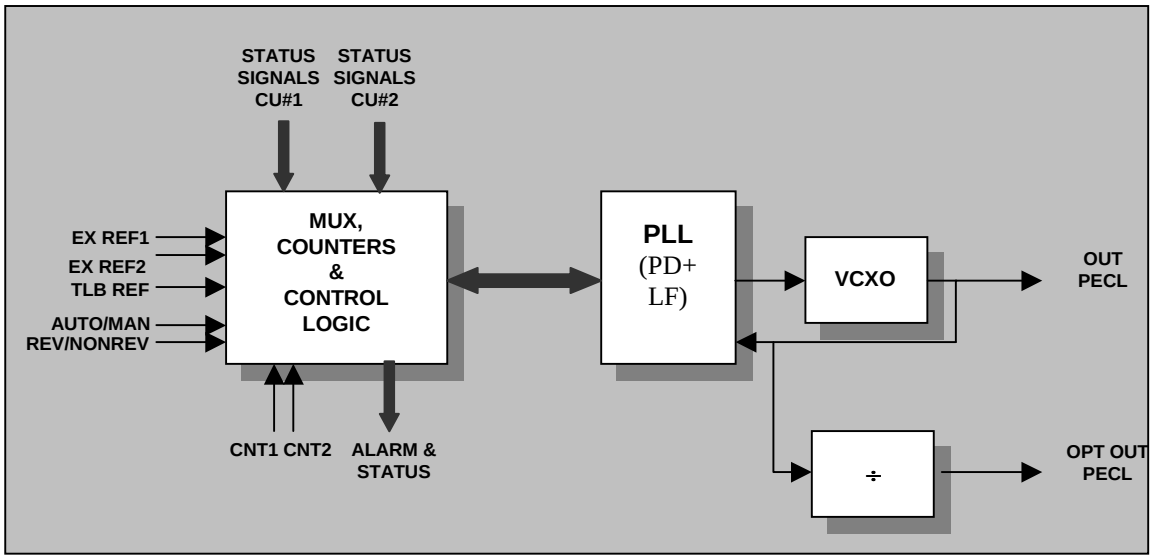


Figure 1. - The functional block diagram of SY05-HLPL

• DESCRIPTION

The SY05-HLPL synchronization module is a high frequency PLL that performs hitless switching plus additional features necessary for timing at high-speed Line Interface Cards. The functional block diagram is shown in figure 1. The SY05-HLPL receives two reference signals, usually 19.44MHz and using PLL synthesizer generates a high frequency signal necessary for transceivers or framers. The PLL that is complemented by high-speed logic that provide processing, switching between the timing modes, alarm and status messages and etc. A high quality VCXO provides very low jitter at the output. The additional output is provided using a divider.

The module supports two operating modes: AUTO mode is the mode where all switching are done automatically and MANUAL mode is where unit will switch according to the two external control pins CON1 and CON2.

CON1	CON2	Operational mode
0	0	Free-run (Unlocked)
1	0	Locked to EX REF 1
0	1	Locked to EX REF 2
1	1	Locked to TLB REF

The module operates in the following four timing modes: 1) Free-run, 2) Locked to EX REF1, 3) Locked to EX REF2 and 4) Locked to TBL REF. Free-run it a mode the unit is unlocked to either of the inputs. The accuracy of the output frequencies in this mode is equal to the accuracy of free running VCXO. Locked to EX REF 1 is the mode where the output of the module is phase locked to input reference 1. Locked to EX REF 2 is the mode where the output of the module is phase locked to input reference 2, Locked to TBL REF is the mode where is the output of the module is phase locked to the signal used in Time Loop-back operation.

- **SPECIFICATIONS**

General Specifications	Mechanical	1.82" (D) x 1.82" (W) x 0.425" (H) 1.95" (D) x 1.95" (W) x 0.45" (H)	Metal Box Module on PCB
	Power Supply Current Supply Operating Temperature Storage Temperature Humidity Internal Oscillators	+3.3VDC TBD -20°C to 70°C -40° to 85°C 5% to 95% non-condensing VCXO	 SAW oscillators
Input Signals	Number of Inputs	2	
	Input reference frequency Signal Level	8KHz~19.44MHz HCMOS/TTL Compatible	
Output Signal	Number of Outputs	2	
	Output 1 Output 2	155.52MHz Out1 divide by 2/4 or 8	622.08MHz optional
	Signal Level	LVPECL	50+/-5%
Signal Quality Performance	Jitter Tolerance		Bell-core: GR-1244-core 4.2, ITU-T: G.812
	Phase Transient Tolerance		Bell-core: GR-1244-core 4.4
	Wander Tolerance		Bell-core: GR-1244-core 4.3, ITU-T: G.812
	Jitter Generation and Transfer		Bell-core: GR-1244-core 5.5, ITU-T: G.812
Frequency Output Performance	Free run accuracy	±20ppm	
	Pull-In Range	±50ppm	
	MTIE		Bell-core: GR-1244-core 4.2, ITU-T: G.812
	TDEV		Bell-core: GR-1244-core 4.2, ITU-T: G.812

- **PIN ASSIGNMENT**

On the picture below it is shown the pin-out for the SY05-HLPL. For other pin-out requirement please contact the Raltron.

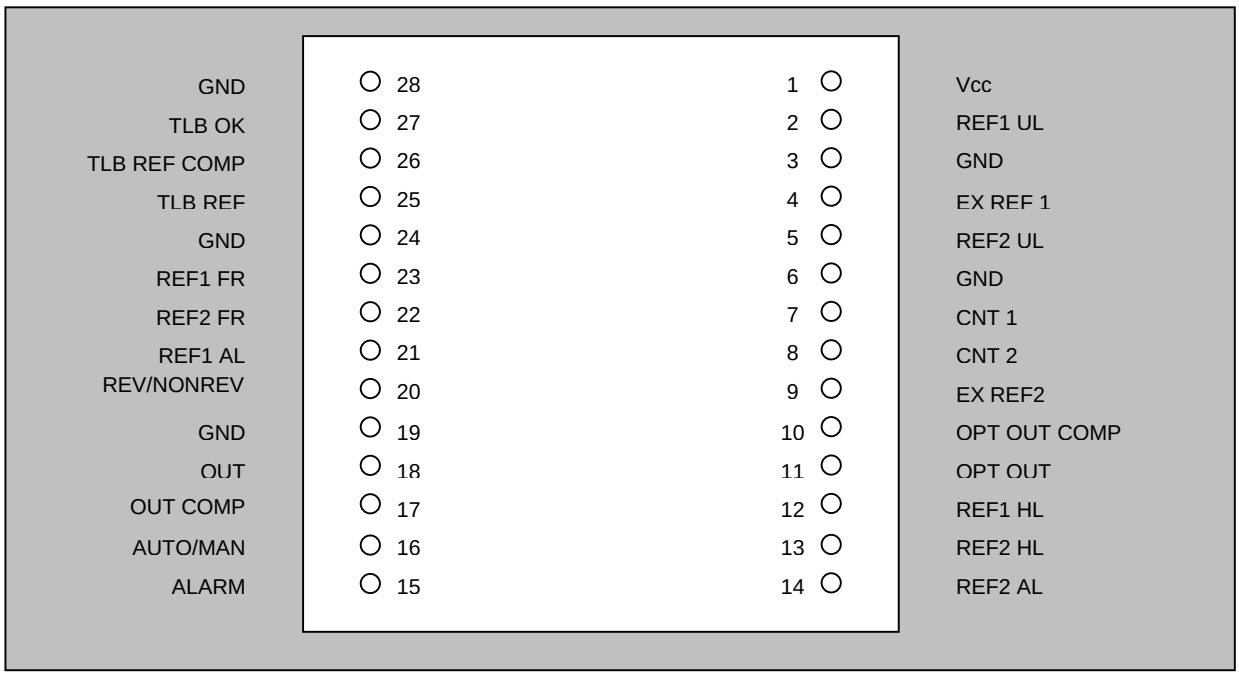


Figure 3 – Bottom view

Pin #	Name	Description	Signal Technology	VL			VH/ DC Voltage		
				Min	Typ	Max	Min	Typ	Max
1	+Vcc	Positive Voltage Supply	DC	-----	-----	-----	4.75** (3.135)	5.0** (3.3)	5.25** (3.465)
2	REF1 UL	Reference 1 Unlocked Input -> the signal PLL UNLOCK comes from Clock Unit 1	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
3	GND	Ground	-----	-----	-----	----	------	------	------
4	EX REF 1	External Reference 1 Input -> the input signal from reference 1	HCMOS (3.3 Tolerable)	0 -----	0.5** (0.3)	4.5**	(2.97)	----	----
5	REF2 UL	Reference 2 Unlocked Input -> the signal PLL UNLOCK comes from Clock Unit 2	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
6	GND	Ground	-----	-----	-----	----	------	------	------
7	CNT 2	Control Input 2 -> the external input for selecting mode of the unit – see table.	DC	0	0.25 (0.15)	0.5 (0.3)	4.5 (2.97)	5.0 (3.3)	5.25 (3.465)
8	CNT 1	Control Input 1 -> the external input for selecting mode of the unit – see table.	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
9	EX REF 2	External Reference 2 Input -> the input signal from reference 2	HCMOS (3.3 Tolerable)	0 -----	0.5** (0.3)	4.5**	(2.97)	----	----
10	OPT OUT COMP	Optional Output -> the secondary output of the synchronized signal, for frequency range see table below	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885
11	OPT OUT	Optional Output -> the secondary output of the synchronized signal, for frequency range see table below.	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885
12	REF1 HL	Reference 1 Holdover Input -> the signal HOLDOVER comes from Clock Unit 1	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
13	REF2 HL	Reference 2 Holdover Input -> the signal HOLDOVER comes from Clock Unit 2	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
14	REF2 AL	Reference 2 Alarm Input -> the signal ALARM OUT comes from Clock Unit 2	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
15	ALARM	Alarm signal -> the output is high when there is an alarm in the module	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
16	AUTO/MAN	Auto/Manual configuration input -> selection input for operating mode	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
17	OUT	Synchronized Output -> the output of the synchronized signal.	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885
18	OUT COMP	Synchronized Complementary Output -> the output of the synchronized signal.	LV/PECL	Vcc-1.680	Vcc-1.620	Vcc-1.560	Vcc-1.085	Vcc-1.025	Vcc-0.885
19	GND	Ground	-----	-----	-----	----	------	------	------
20	RV/NRV	Revert / Non revert input-> selection input for revert feature Revertive-"1" ; Non-Revertive = "0"	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
21	REF1 AL	Reference 1 Alarm Input -> the signal ALARM OUT comes from Clock Unit 1	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
22	REF2 FR	Reference 2 Free-run Input -> the signal FREERUN comes from Clock Unit 2	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
23	REF1 FR	Reference 1 Free-run Input -> the signal FREERUN comes from Clock Unit 1	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
24	GND	Ground	-----	-----	-----	----	------	------	------
25	TLB REF	Time Loop-back Reference Input -> the input from time loop-back reference	DC	0	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)
26	TLB REF COMP	Time Loop-back Reference Complementary Input -> the input from time loop-back	DC	0	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)
27	TLB OK	Time Loop-back OK -> The reference is valid for use.	DC	0	0.25 ** (0.15)	0.5** (0.3)	4.5** (2.97)	5.0** (3.3)	5.25** (3.465)
28	GND	Ground	-----	-----	-----	----	------	------	------

- **ORDERING INFORMATION**

  - Input Frequencies available

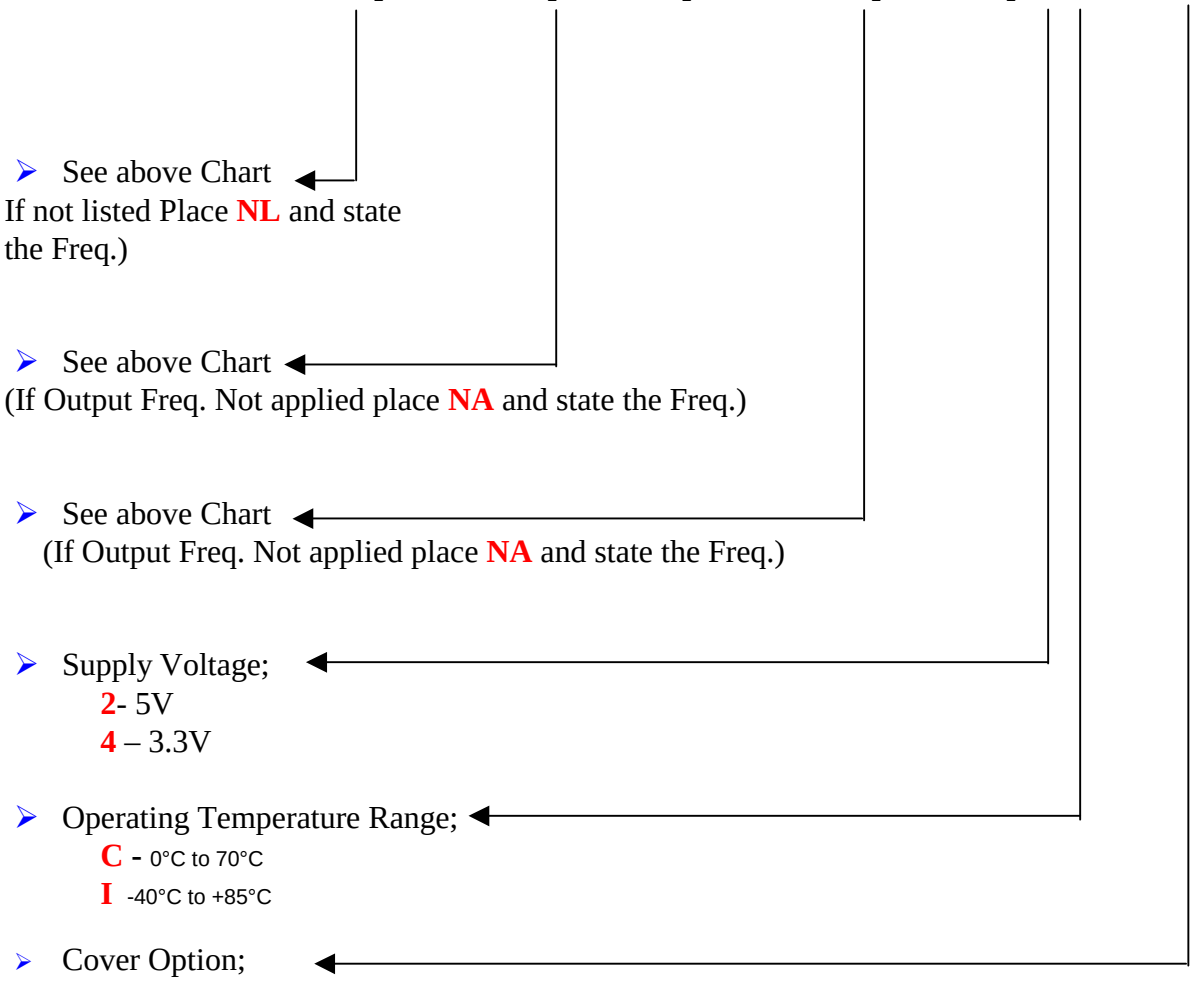
Frequency	Suffix	Frequency	Suffix
8KHz	F8	20.4800MHz	A4
1.024MHz	E0	22.2171MHz	A5
1.544MHz	T1	26.0000MHz	G2
2.048MHz	E1	27.0000MHz	A6
4.096MHz	E2	29.4912MHz	A7
6.1760MHz	T2	32.768MHz	E4
6.480MHz	D1	34.560MHz	A8
8.192MHz	E3	37.0560MHz	A9
10.000MHz	A1	38.880MHz	O2
12.800MHz	S1	44.4343MHz	B1
13.000MHz	G1	44.7360MHz	T3
15.000MHz	A2	51.8400MHz	D1
16.384MHz	E4	61.4400MHz	U1
19.440MHz	O1	62.5000MHz	G1
20.000MHz	M1	65.5360MHz	B2
20.1416MHz	A3	77.7600MHz	O3

  - Output Frequencies available

Frequency	Suffix	Frequency	Suffix	Frequency	Suffix
1.024MHz	E0	44.4343MHz	B1	178.9440MHz	C4
1.544MHz	T1	44.7360MHz	T3	184.3200MHz	C5
2.048MHz	E1	51.8400MHz	D1	311.0400MHz	O5
4.096MHz	E2	61.4400MHz	U1	622.0800MHz	O6
6.1760MHz	T2	62.5000MHz	G1	625.000MHz	C7
6.480MHz	D1	65.5360MHz	B2	644.5312MHz	C8
8.192MHz	E3	77.7600MHz	O3	666.5143MHz	C9
10.000MHz	A1	78.125MHz	B3	669.1281MHz	F1
12.800MHz	S1	78.6432MHz	B4	669.3266MHz	F2
13.000MHz	G1	82.9440MHz	B5	690.5692MHz	F3
15.000MHz	A2	92.6000MHz	U3	710.9486MHz	F4
16.384MHz	E4	100.000MHz	B5	719.7344MHz	F5
19.440MHz	O1	112.000MHz	B6	777.6000MHz	F6
20.000MHz	M1	114.000MHz	B7		
20.1416MHz	A3	125.000MHz	G2		
20.4800MHz	A4	133.000MHz	G3		
22.2171MHz	A5	139.264MHz	E5		
26.0000MHz	G2	155.520MHz	O4		
27.0000MHz	A6	156.250MHz	G4		
29.4912MHz	A7	161.1328MHz	B8		
32.768MHz	E4	166.6286MHz	B9		
34.560MHz	A8	167.3316MHz	C1		
37.0560MHz	A9	168.0407MHz	C2		
38.880MHz	O2	175.0000MHz	C3		

- **P/N System**

SY05-HLPL – IP < In Freq>-OU1<Output 1 Freq.>- OU2<Output 1 Freq.>S-T-C <Cover>



- See above Chart
If not listed Place **NL** and state the Freq.)

- See above Chart
(If Output Freq. Not applied place **NA** and state the Freq.)

- See above Chart
(If Output Freq. Not applied place **NA** and state the Freq.)

- Supply Voltage;
  - **2**- 5V
  - **4** – 3.3V

- Operating Temperature Range;
  - **C** - 0°C to 70°C
  - **I** -40°C to +85°C

- Cover Option;
  - **M** – Metal Cover
  - **N** - Non Covered unit

- *For other Options please contact the factory*

- **MECHANICAL DIMENSIONS**

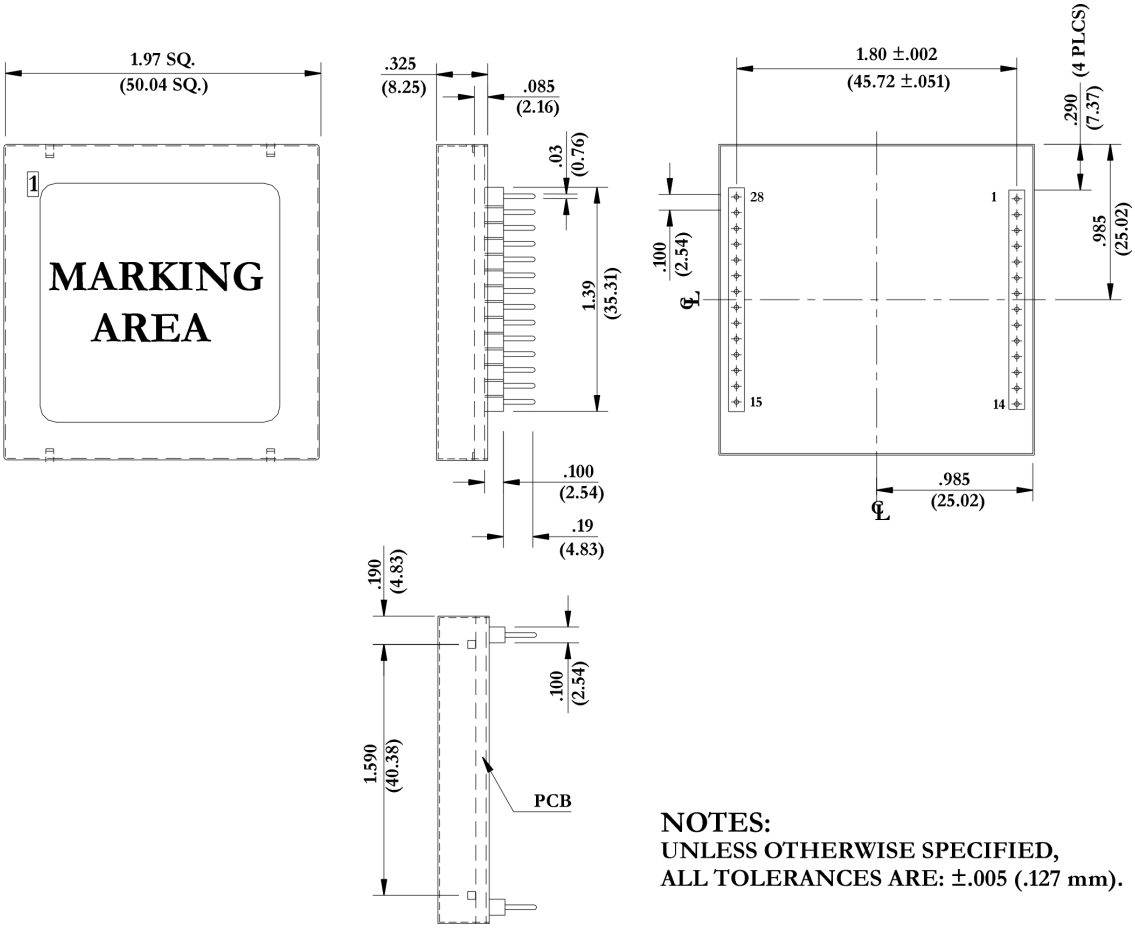


Figure 4 – The mechanical dimensions.

Figure 4 shows the mechanical dimension of the SY05-HLPL module. The module can be supplied in two different types of packaging:

- ✓ Metal box
- ✓ Module without packaging

The dimensions shown on the picture are valid for first and second type of packaging, keeping the pin-out dimensions the same for both. The label on the module shows part number, factory name, week and year of production.

➢ See above Chart
If not listed Place **NL** and state the Freq.)

➢ See Input Freq. Chart
If Freq. not listed Place **NL** and state the Freq.)