Lead-free Green

A product Line of
Diodes Incorporated

PERICOM

PI6LC4872-01

HiFlex™ High Performance Ethernet & Fibre Channel (FC) Clock Generator

Features

- Ethernet and Fibre Channel clock outputs
- Supporting and LVPECL outputs
- Pin selectable output frequencies
- Ultra low phase jitter: < 1ps (156.25MHz, 12KHz to 20MHz integration range)
- 25MHz low noise buffered output
- 33MHz PCI clock
- Selectable reference or Xtal input
- 3.3V supply voltage
- TQFN-40 package

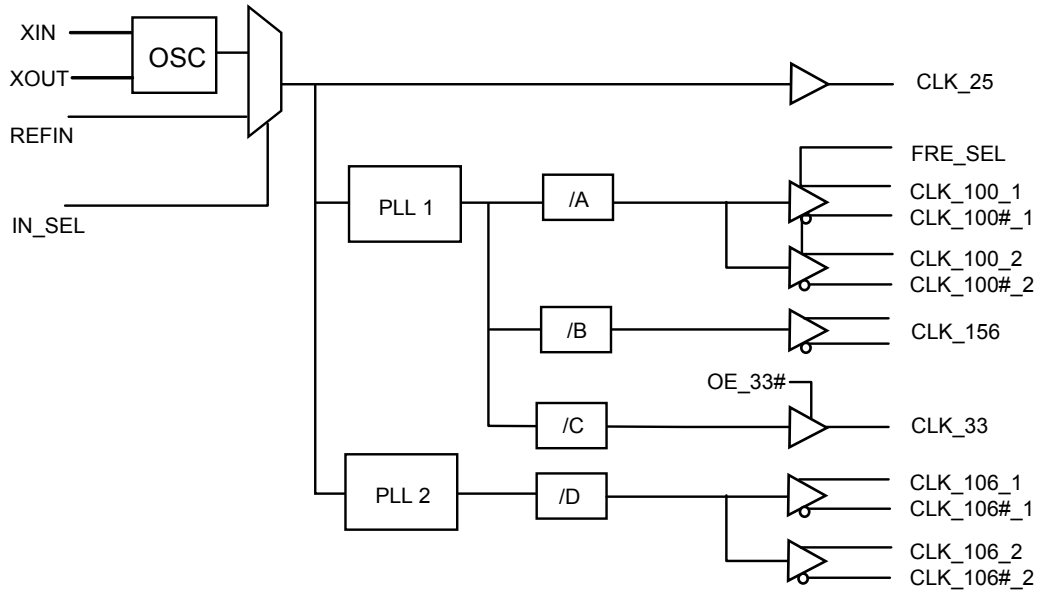
Description

The PI6LC4872-01 is high performance clock generator which supports both Ethernet frequencies and Fibre Channel (FC) frequencies. Diodes Incorporated's proprietary PLL technology used in this device generates all these frequencies in the single chip while maintaining ultra low phase jitter. This device is ideal for systems that need both Ethernet and FC clock providing great flexibility.

Applications

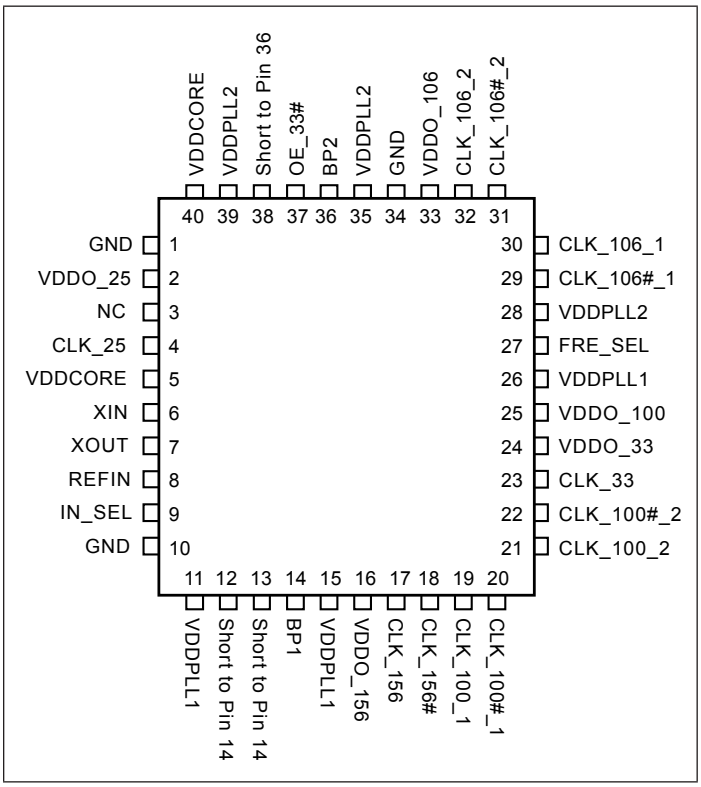
- Switches and Routers with FC interface
- Storage systems

Block Diagram



© Diodes Incorporated

Pin Configuration



Pinout Table

Pin Number	Pin Name	Description
1, 10, 34	GND	Ground. Includes external paddle (EPAD).
2	V_{DDO_25}	Power Supply Connection for the 25M CMOS Buffer.
3	NC	No Connect. This pin should be left floating.
4	CLK_25	CMOS 25 MHz Output.
5	V_{DDCORE}	Power Supply Connection for the Crystal Oscillator.
6, 7	XIN, XOUT	External 25 MHz Crystal.
8	REFIN	25 MHz Reference Clock Input. Tie low when not in use.
9	IN_SEL	Logic Input. Used to select the reference source.
11	V_{DDPLL1}	Power Supply Connection for the GbE PLL.
14, 36	BP1, BP2	These pins are for bypassing each LDO to ground with a 220 nF capacitor.
15	V_{DDPLL1}	Power Supply Connection for the GbE VCO.
16	V_{DDO_156}	Power Supply Connection for the 156M LVPECL Output Buffer and Output Dividers.
17	CLK_156	LVPECL Output at 156.25 MHz.
18	CLK_156#	Complementary LVPECL Output at 156.25 MHz.
19	CLK_100_1	LVPECL Output at 100 MHz or 125 MHz. Selected by FRE_SEL pin strapping.
20	CLK_100#_1	Complementary LVPECL/ Output at 100 MHz or 125 MHz.

© Diodes Incorporated

Pinout Table (continued from previous page)

Pin No.	Pin Name	Description
21	CLK_100_2	LVPECL Output at 100 MHz or 125 MHz. Selected by FRE_SEL pin strapping.
22	CLK_100#_2	Complementary LVPECL Output at 100 MHz or 125 MHz.
23	CLK_33	CMOS 33.33 MHz Output.
24	V_{DDO_33}	Power Supply Connection for the 33M CMOS Output Buffer and Output Dividers.
25	V_{DDO_100}	Power Supply Connection for the 100M/125M LVPECL Output Buffer and Output Dividers.
26	V_{DDPLL1}	Power Supply Connection for the GbE PLL Feedback Divider.
27	FRE_SEL	Logic Input. Used to configure output drivers.
28	V_{DDPLL2}	Power Supply Connection for the FC PLL Feedback Divider.
29	CLK_106#_1	Complementary LVPECL Output at 106.25 MHz.
30	CLK_106_1	LVPECL Output at 106.25 MHz.
31	CLK_106#_2	Complementary LVPECL Output at 106.25 MHz.
32	CLK_106_2	LVPECL Output at 106.25 MHz.
33	V_{DDO_106}	Power Supply Connection for the 106.25 MHz LVPECL Output Buffer and Output Dividers.
35	V_{DDPLL2}	Power Supply Connection for the FC VCO.
37	OE_33#	Forces the 33.33 MHz output into a low state.
39	V_{DDPLL2}	Power Supply Connection for the FC PLL.
40	V_{DDCORE}	Power Supply Connection for Miscellaneous Logic.

Function Tables

INSEL Definition

IN_SEL	Input
0	External reference clock
1 or NC	External Xtal

FRE_SEL Definition

FRE_SEL	Pin 19 and pin 20	Pin 21 and pin 22
0	125 MHz	125 MHz
1	100 MHz	100 MHz
NC	125 MHz	100 MHz

© Diodes Incorporated

OE_33# Definition

OE_33#	CLK_33
0 or NC	33.33MHz
1	Low

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

Storage temperature..... -65°C to +155°C
Ambient Operating Temperature.....-40°C to +85°C
3.3V Supply Voltage..... -0.5 to +4.6V
Storage Temperature, T_{STG} .....-65°C to 150°C
ESD Protection (HBM) 2000V
Junction Temperature ..... 125 °C max

Note:

Stresses greater than those listed under MAXIMUM RATINGS may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect reliability.

Recommended Operating Conditions

Symbol	Description	Test Conditions	Min	Type	Max	Unit
V_{DD}	Power supply	-	3.0	-	3.6	V
I_{DD}	Total Power Supply Current	All output frequencies.	-	-	400	mA
T_A	Operating temperature	-	-40		+85	°C

LVCMOS DC Electrical Characteristics (Over Operating Conditions)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{IH}	Input High Voltage	IN_SEL, OE_33#, and REFIN	2	-	V_{DD}+0.3	V
V_{IL}	Input Low Voltage	IN_SEL, OE_33#, and REFIN	-0.3	-	0.8	V
V_{IH}	Input High Voltage	FRE_SEL	$2/3V_{DD}$+0.2	-		V
V_{IL}	Input Low Voltage	FRE_SEL		-	$1/3V_{DD}$-0.2	V
V_{OH}	Output High Voltage	I_{OH} = -1mA	V_{DD}-0.1	-	-	V
V_{OL}	Output Low Voltage	I_{OL} = 1mA	-	-	0.1	V
I_{IH}	Input High Current	V_{IN} = V_{DD}, IN_SEL	-	-	1.0	µA
		V_{IN} = V_{DD}, FRE_SEL			45	
		V_{IN} = V_{DD}, OE_33#			240	
I_{IL}	Input Low Current	V_{IN} = 0V, IN_SEL	-155	-		µA
		V_{IN} = 0V, FRE_SEL	-30			
		V_{IN} = 0V, OE_33#	-3.0			

© Diodes Incorporated

LVCMOS DC Electrical Characteristics (Over Operating Conditions) Continued..

R_{PU}	Internal pull up resistance	IN_SEL	-	30		KΩ
		FRE_SEL		150		
R_{DN}	Internal pull down resistance	OE_33#	-	16	-	KΩ
		FRE_SEL		100		

LVPECL DC Electrical Characteristics (Over Operating Conditions) - For PI6LC4872-01 only

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_{OH}	Output High Voltage	-	V_{DD}-1.24	-	V_{DD}-0.83	V
V_{OL}	Output Low Voltage	-	V_{DD}-2.07	-	V_{DD}-1.62	V
V_{OD}	Output differential voltage	-	700	-	950	mV

AC Switching Characteristics (Over Operating Conditions), Typical is given for VDD=3.3V, TA=25C

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
Fin	Input Frequency	-		25		MHz
T_{OE}	Output enable time				100	ns
T_{OEB}	Output disable time				100	ns
T_r /T_f	Output Rise/Fall time	Termination =200Ohm to 0V; C_L=0pf; 20% to 80% measured differentially		600	880	ps
O_{DC}	Output Duty Cycle		49		51	%
J_{phase}	Phase jitter (12kHz to 20MHz), RMS	Output frequency: 156.25MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz	-	510	700	fs
		Output frequency: 125MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz, 33MHz off	-	560	700	
		Output frequency: 125MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz, 33MHz on	-	600	700	
		Output frequency: 106.25MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz	-	530	700	
		Output frequency: 100MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz		600	700	

© Diodes Incorporated

CMOS AC Characteristics

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
T_r /T_f	Output Rise/Fall time	Termination =50Ohm to 0V; CL=5pf; 20% to 80%	250	500	2500	ps
O_{DC}	Output Duty Cycle		48		52	%
J_{phase}	Phase jitter (12kHz to 5MHz), RMS	Output frequency: 25MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz	-	200	-	fs
		Output frequency: 33MHz, output combination=1x156.25MHz, 1x100MHz, 1x125MHz, 2x106.25MHz	-	505	-	

© Diodes Incorporated

Crystal Specification

Parameter	Conditions	Min.	Typ.	Max.	Unit
Frequency	Fundamental mode		25		MHz
ESR				50	Ω
Load capacitance			14		pF
Stability		-30		30	ppm
Phase noise	@ 1kHz offset		-135		dBc/Hz

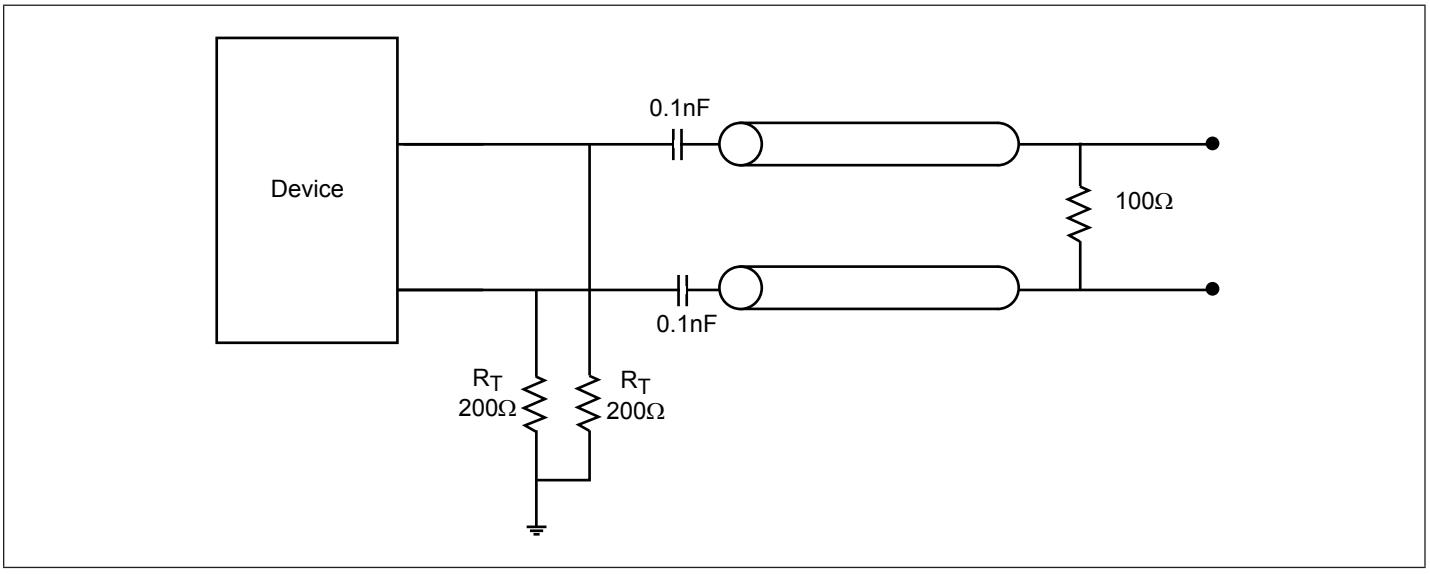


Figure 1. Configuration Test Load Board Termination for LVPECL Output

© Diodes Incorporated

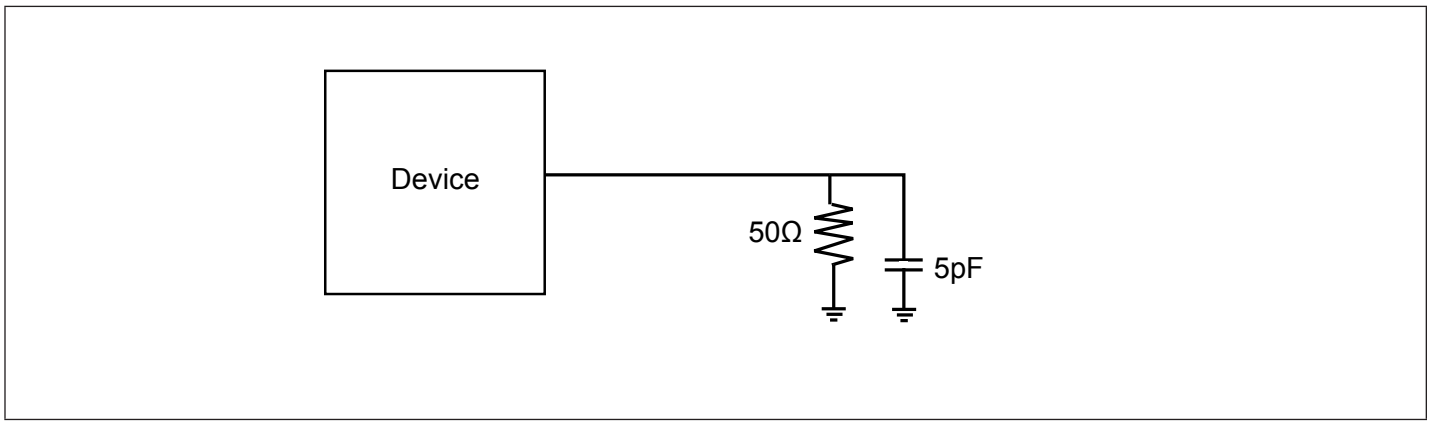


Figure 2. Configuration Test Load Board Termination for LVCMOS output

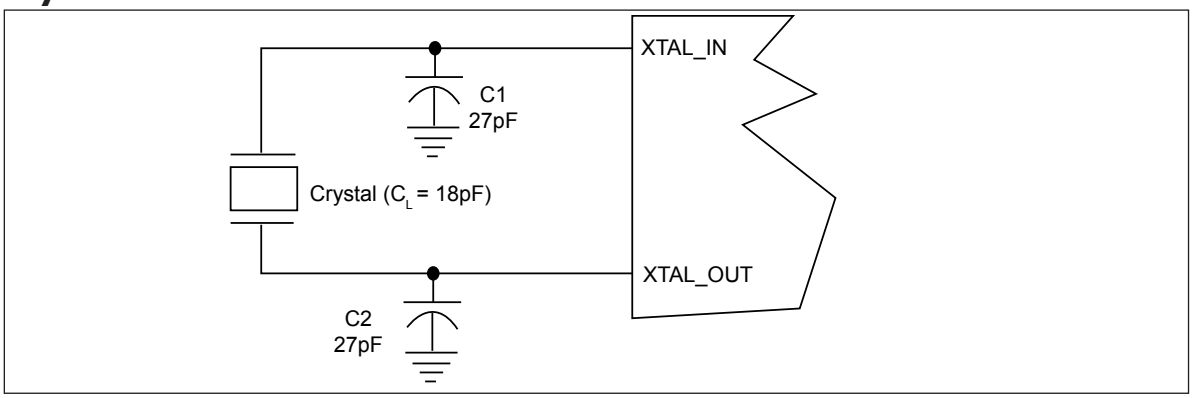
© Diodes Incorporated

Application Notes

Crystal circuit connection

The following diagram shows PI6LC4872-01 crystal circuit connection with a parallel crystal. For the C_L=18pF crystal, it is suggested to use C1=27pF, C2=27pF. C1 and C2 can be adjusted to fine tune to the target ppm of crystal oscillator according to different board layouts.

Crystal Oscillator Circuit



Recommended Crystal Specification

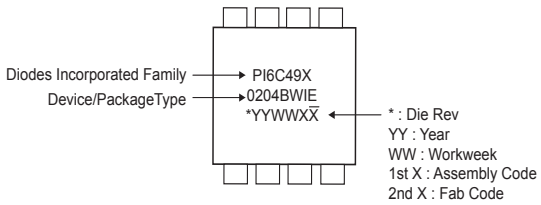
Pericom recommends:

a) GC2500003 XTAL 49S/SMD(4.0 mm), 25M, CL=18pF, +/-30ppm, http://www.pericom.com/pdf/datasheets/se/GC_GF.pdf

b) FY2500081, SMD 5x3.2(4P), 25M, CL=18pF, +/-30ppm, http://www.pericom.com/pdf/datasheets/se/FY_F9.pdf

c) FL2500047, SMD 3.2x2.5(4P), 25M, CL=18pF, +/-20ppm, http://www.pericom.com/pdf/datasheets/se/FL.pdf

Part Marking

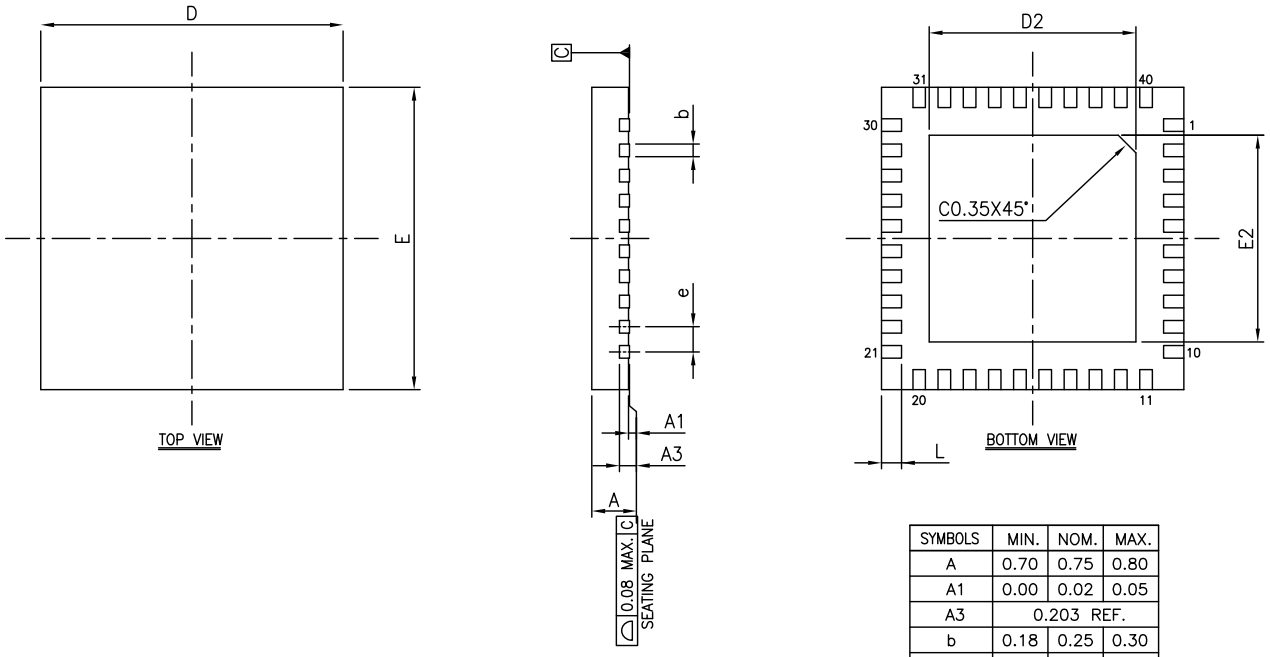


Note:

1. For latest datecode info, please check: https://www.diodes.com/assets/MediaList-Attachments/Pericom-Datecode-Format-Explanation.pdf

© Diodes Incorporated

Packaging Mechanical: 40-Pin QFN (ZD)



SYMBOLS	MIN.	NOM.	MAX.
A	0.70	0.75	0.80
A1	0.00	0.02	0.05
A3		0.203 REF.	
b	0.18	0.25	0.30
D	5.90	6.00	6.10
E	5.90	6.00	6.10
e		0.50 BSC	
L	0.35	0.40	0.45
D2	4.40	4.50	4.55
E2	4.40	4.50	4.55

Notes:
1. All dimensions are in mm.
2. Refer JEDEC MO-220.
3. Bilateral coplanarity zone applies to the exposed heat sink slug as well as the terminals.

PERICOM Enabling Serial Connectivity — **DATE: 07/12/11**

DESCRIPTION: 40-contact, Thin Fine Pitch Quad Flat No-Lead, TQFN

PACKAGE CODE: ZD (ZD40)

DOCUMENT CONTROL #: PD-2021 **REVISION: C**

11-0148

Ordering Information

Ordering Code	Package Code	Package Type	Operating Temperature
PI6LC4872-01ZDIEX	ZD	Pb-free & Green, 40-pin QFN	Industrial

© Diodes Incorporated

IMPORTANT NOTICE

DIODES INCORPORATED MAKES NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARDS TO THIS DOCUMENT, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION).

Diodes Incorporated and its subsidiaries reserve the right to make modifications, enhancements, improvements, corrections or other changes without further notice to this document and any product described herein. Diodes Incorporated does not assume any liability arising out of the application or use of this document or any product described herein; neither does Diodes Incorporated convey any license under its patent or trademark rights, nor the rights of others. Any Customer or user of this document or products described herein in such applications shall assume all risks of such use and will agree to hold Diodes Incorporated and all the companies whose products are represented on Diodes Incorporated website, harmless against all damages.

Diodes Incorporated does not warrant or accept any liability whatsoever in respect of any products purchased through unauthorized sales channel.

Should Customers purchase or use Diodes Incorporated products for any unintended or unauthorized application, Customers shall indemnify and hold Diodes Incorporated and its representatives harmless against all claims, damages, expenses, and attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized application.

Products described herein may be covered by one or more United States, international or foreign patents pending. Product names and markings noted herein may also be covered by one or more United States, international or foreign trademarks.

This document is written in English but may be translated into multiple languages for reference. Only the English version of this document is the final and determinative format released by Diodes Incorporated.

LIFE SUPPORT

Diodes Incorporated products are specifically not authorized for use as critical components in life support devices or systems without the express written approval of the Chief Executive Officer of Diodes Incorporated. As used herein:

A. Life support devices or systems are devices or systems which:

1. are intended to implant into the body, or

2. support or sustain life and whose failure to perform when properly used in accordance with instructions for use provided in the labeling can be reasonably expected to result in significant injury to the user.

B. A critical component is any component in a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or to affect its safety or effectiveness.

Customers represent that they have all necessary expertise in the safety and regulatory ramifications of their life support devices or systems, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of Diodes Incorporated products in such safety-critical, life support devices or systems, notwithstanding any devices- or systems-related information or support that may be provided by Diodes Incorporated. Further, Customers must fully indemnify Diodes Incorporated and its representatives against any damages arising out of the use of Diodes Incorporated products in such safety-critical, life support devices or systems.

Copyright © 2016, Diodes Incorporated

www.diodes.com