

2.5 Gbps / 5.0 Gbps / 8.0 Gbps 1-Lane PCI Express Repeater with Equalization and De-Emphasis

General Description

The DS80PCI102 is a low power, 1 lane repeater with 4-stage input equalization, and output de-emphasis driver to enhance the reach of PCI express serial links in board-to-board or cable interconnects. Ideal for x1 PCI express configuration, the DS80PCI102 automatically detects and adapts to Gen-1, Gen-2 and Gen-3 data rates for easy system upgrade. Each channel supports seamless detection and management of the new Gen-3 transmit equalizer coefficients (FIR tap) handshake protocol and PCIe control signals such as transmit idle, beacon etc. without external system intervention. An automatic receive detection circuitry controls the input termination impedance based upon endpoint insertion (hot-plug events). These features guarantee PCIe interoperability at both the electrical and system level, while reducing design complexity. Powered by National's SiGe BiCMOS process, DS80PCI102 offers programmable transmit de-emphasis (up to 12 dB), transmit VoD (up to 1300 mVp-p) and receive equalization (up to 36 dB) to enable longer distance transmission in lossy copper cables (10m+), or backplanes (40"+) with multiple connectors. The receiver is capable of opening an input eye that is completely closed due to inter-symbol interference (ISI) introduced by the interconnect medium.

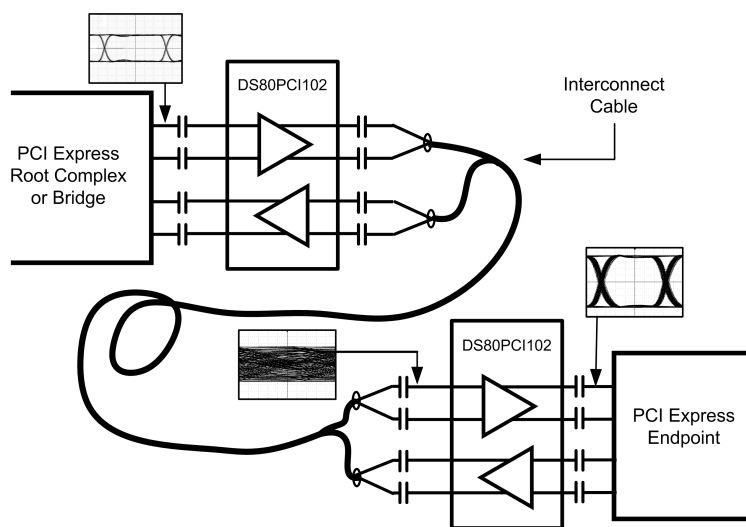
The programmable settings can be applied easily via pins, software (SMBus/I2C) or loaded via an external EEPROM. When operating in the EEPROM mode, the configuration information is automatically loaded on power up, which eliminates the need for an external microprocessor or software driver.

Notice: This document is not a full datasheet. For more information regarding this product or to order samples please contact your local National Semiconductor sales office or visit <http://www.national.com/support/dir.html>

Features

- Comprehensive family, proven system interoperability
DS80PCI102: x1 PCIe Gen-1/2/3
DS80PCI402: x4 PCIe Gen-1/2/3
DS80PCI800: x8/x16 PCIe Gen-1/2/3
- Automatic rate detect and adaption to Gen-1/2/3 speeds
- Seamless support for Gen-3 transmit FIR handshake
- Rate adaptive receive EQ (up to 36 dB), transmit de-emphasis (up to 12 dB) only Gen-1/2
- Adjustable Transmit VOD: 0.7 to 1.3Vp-p (pin mode)
- 0.2 UI of residual deterministic jitter at 8Gbps after 40" of FR4 or 10m 30awg PCIe cable
- Low power dissipation with ability to turnoff unused channels: 65mW/channel
- Automatic receiver detect (hot-plug)
- Multiple configuration modes: Pins/SMBus/Direct EEPROM load
- Single supply voltage: 2.5V or 3.3V (selectable)
- Flow-thru pinout in 4mmx4mm 24-pin leadless LLP package
- >4kV HBM ESD rating
- -10 to 85°C operating temperature range

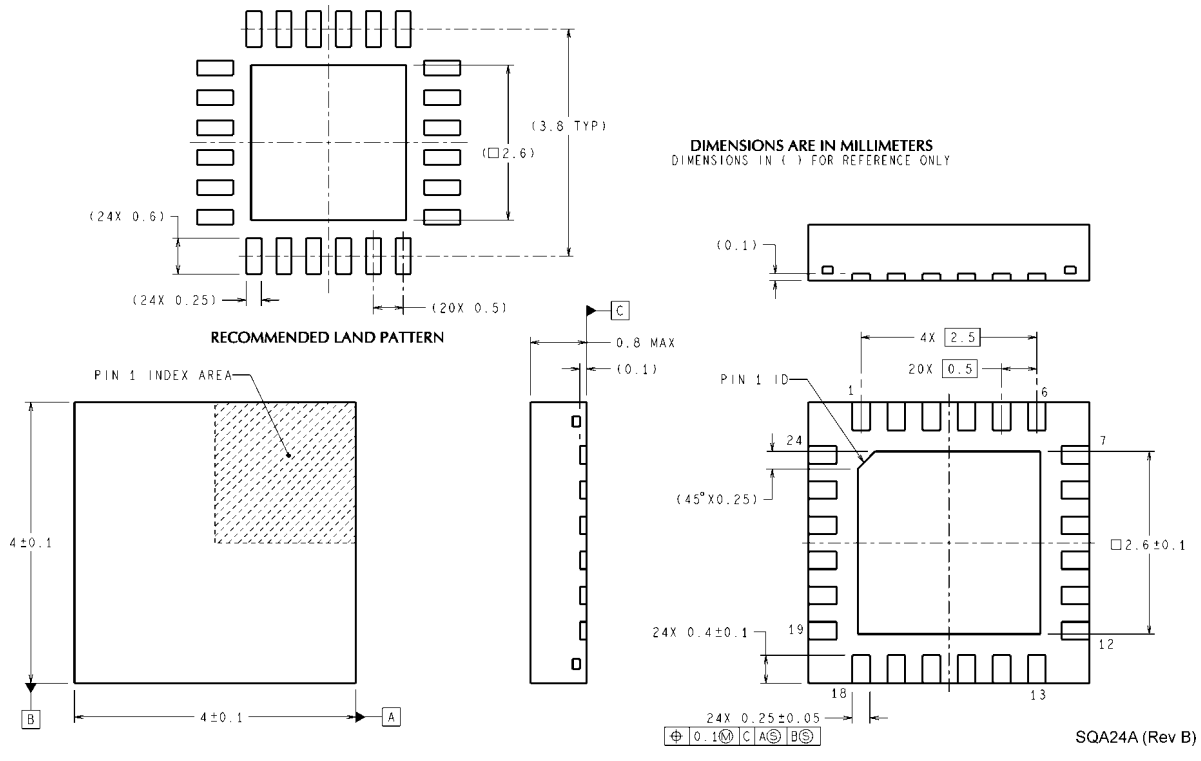
Typical Application



Ordering Information

NSID	Qty	Spec	Package
DS80PCI102SQX	Tape & Reel Supplied As 4,500 Units	NOPB	SQA24A
DS80PCI102SQ	Tape & Reel Supplied As 1,000 Units	NOPB	SQA24A
DS80PCI102SQE	Tape & Reel Supplied As 250 Units	NOPB	SQA24A

Physical Dimensions inches (millimeters) unless otherwise noted



- Order Number DS80PCI102SQX (Tape and Reel 4500 units)**
- Order Number DS80PCI102SQ (Tape and Reel 1000 units)**
- Order Number DS80PCI102SQE (Tape and Reel 250 units)**
- NS Package Number SQA24A**
- (See AN-1187 for PCB Design and Assembly Recommendations)**

Notes

For more National Semiconductor product information and proven design tools, visit the following Web sites at:
www.national.com

Products		Design Support	
Amplifiers	www.national.com/amplifiers	WEBENCH® Tools	www.national.com/webench
Audio	www.national.com/audio	App Notes	www.national.com/appnotes
Clock and Timing	www.national.com/timing	Reference Designs	www.national.com/refdesigns
Data Converters	www.national.com/adc	Samples	www.national.com/samples
Interface	www.national.com/interface	Eval Boards	www.national.com/evalboards
LVDS	www.national.com/lvds	Packaging	www.national.com/packaging
Power Management	www.national.com/power	Green Compliance	www.national.com/quality/green
Switching Regulators	www.national.com/switchers	Distributors	www.national.com/contacts
LDOs	www.national.com/ldo	Quality and Reliability	www.national.com/quality
LED Lighting	www.national.com/led	Feedback/Support	www.national.com/feedback
Voltage References	www.national.com/vref	Design Made Easy	www.national.com/easy
PowerWise® Solutions	www.national.com/powerwise	Applications & Markets	www.national.com/solutions
Serial Digital Interface (SDI)	www.national.com/sdi	Mil/Aero	www.national.com/milaero
Temperature Sensors	www.national.com/tempensors	SolarMagic™	www.national.com/solarmagic
PLL/VCO	www.national.com/wireless	PowerWise® Design University	www.national.com/training

THE CONTENTS OF THIS DOCUMENT ARE PROVIDED IN CONNECTION WITH NATIONAL SEMICONDUCTOR CORPORATION ("NATIONAL") PRODUCTS. NATIONAL MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE ACCURACY OR COMPLETENESS OF THE CONTENTS OF THIS PUBLICATION AND RESERVES THE RIGHT TO MAKE CHANGES TO SPECIFICATIONS AND PRODUCT DESCRIPTIONS AT ANY TIME WITHOUT NOTICE. NO LICENSE, WHETHER EXPRESS, IMPLIED, ARISING BY ESTOPPEL OR OTHERWISE, TO ANY INTELLECTUAL PROPERTY RIGHTS IS GRANTED BY THIS DOCUMENT.

TESTING AND OTHER QUALITY CONTROLS ARE USED TO THE EXTENT NATIONAL DEEMS NECESSARY TO SUPPORT NATIONAL'S PRODUCT WARRANTY. EXCEPT WHERE MANDATED BY GOVERNMENT REQUIREMENTS, TESTING OF ALL PARAMETERS OF EACH PRODUCT IS NOT NECESSARILY PERFORMED. NATIONAL ASSUMES NO LIABILITY FOR APPLICATIONS ASSISTANCE OR BUYER PRODUCT DESIGN. BUYERS ARE RESPONSIBLE FOR THEIR PRODUCTS AND APPLICATIONS USING NATIONAL COMPONENTS. PRIOR TO USING OR DISTRIBUTING ANY PRODUCTS THAT INCLUDE NATIONAL COMPONENTS, BUYERS SHOULD PROVIDE ADEQUATE DESIGN, TESTING AND OPERATING SAFEGUARDS.

EXCEPT AS PROVIDED IN NATIONAL'S TERMS AND CONDITIONS OF SALE FOR SUCH PRODUCTS, NATIONAL ASSUMES NO LIABILITY WHATSOEVER, AND NATIONAL DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY RELATING TO THE SALE AND/OR USE OF NATIONAL PRODUCTS INCLUDING LIABILITY OR WARRANTIES RELATING TO FITNESS FOR A PARTICULAR PURPOSE, MERCHANTABILITY, OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

LIFE SUPPORT POLICY

NATIONAL'S PRODUCTS ARE NOT AUTHORIZED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS PRIOR WRITTEN APPROVAL OF THE CHIEF EXECUTIVE OFFICER AND GENERAL COUNSEL OF NATIONAL SEMICONDUCTOR CORPORATION. As used herein:

Life support devices or systems are devices which (a) are intended for surgical implant into the body, or (b) 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 a significant injury to the user. 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 system or to affect its safety or effectiveness.

National Semiconductor and the National Semiconductor logo are registered trademarks of National Semiconductor Corporation. All other brand or product names may be trademarks or registered trademarks of their respective holders.

Copyright© 2011 National Semiconductor Corporation

For the most current product information visit us at www.national.com



National Semiconductor Americas Technical Support Center
 Email: support@nsc.com
 Tel: 1-800-272-9959

National Semiconductor Europe Technical Support Center
 Email: europe.support@nsc.com

National Semiconductor Asia Pacific Technical Support Center
 Email: ap.support@nsc.com

National Semiconductor Japan Technical Support Center
 Email: jpn.feedback@nsc.com