BROADCOM®

Data Sheet

BCM957304A3040C

Single-Port 50 Gb/s or 40 Gb/s Ethernet PCI Express Gen3 x8 Network Interface Card

General Description

The Broadcom® BCM957304A3040C is a single-port 50 Gb/s or 40 Gb/s, PCI Express Gen3 x8 network interface card (NIC) that supports both QSFP28/QSFP+ optical modules and copper direct-attach cable. The card uses the Broadcom BCM57304 50GbE MAC controller with the integrated single-channel 50GbE SFI transceiver.

Features

- Single-port pluggable media interface, which may be equipped with 50GbE or 40G QSFP28/QSFP+ optical transceiver or with copper direct-attach cable.
- Fully compliant to the SFF-8665 standard.
- x8 PCI Express v3.0 compliant.
- SR-IOV with up to 128 VFs.
- Function Level Reset (FLR) support.
- TruFlow™ flow processing engine.
- Virtual Network Termination-VXLAN, NVGRE, Geneve, GRE encap/decap.
- vSwitch acceleration.
- Tunnel-aware stateless offloads.
- DCB support: PFC, ETS, QCN, DCBx.
- TruManage™ integrated BMC.
- SMBus 2.0.
- MCTP over SMBus.
- PCIe-based UART and KCS.
- Jumbo frames up to 9 KB.
- Advanced Congestion Avoidance.
- Multiqueue, NetQueue, and VMQ.
- IPv4 and IPv6 offloads.
- TCP, UDP, and IP checksum offloads.
- Large Send Offload (LSO).
- Large Receive Offload (LRO).
- TCP Segmentation Offload (TSO).
- Receive-side Scaling (RSS).
- Transmit-side Scaling (TSS).
- VLAN insertion/removal.
- Interrupt coalescing.
- Network boot-PXE, UEFI.
- iSCSI boot.
- MSI and MSI-X
- Conforms to the PCI Express Card Electromechanical Specification Rev. 3.0.

Applications

- Single-Port 50-Gigabit or 40-Gigabit Ethernet network interface card for data center or cloud computing.

Figure 1: BCM957304A3040C Network Interface Card

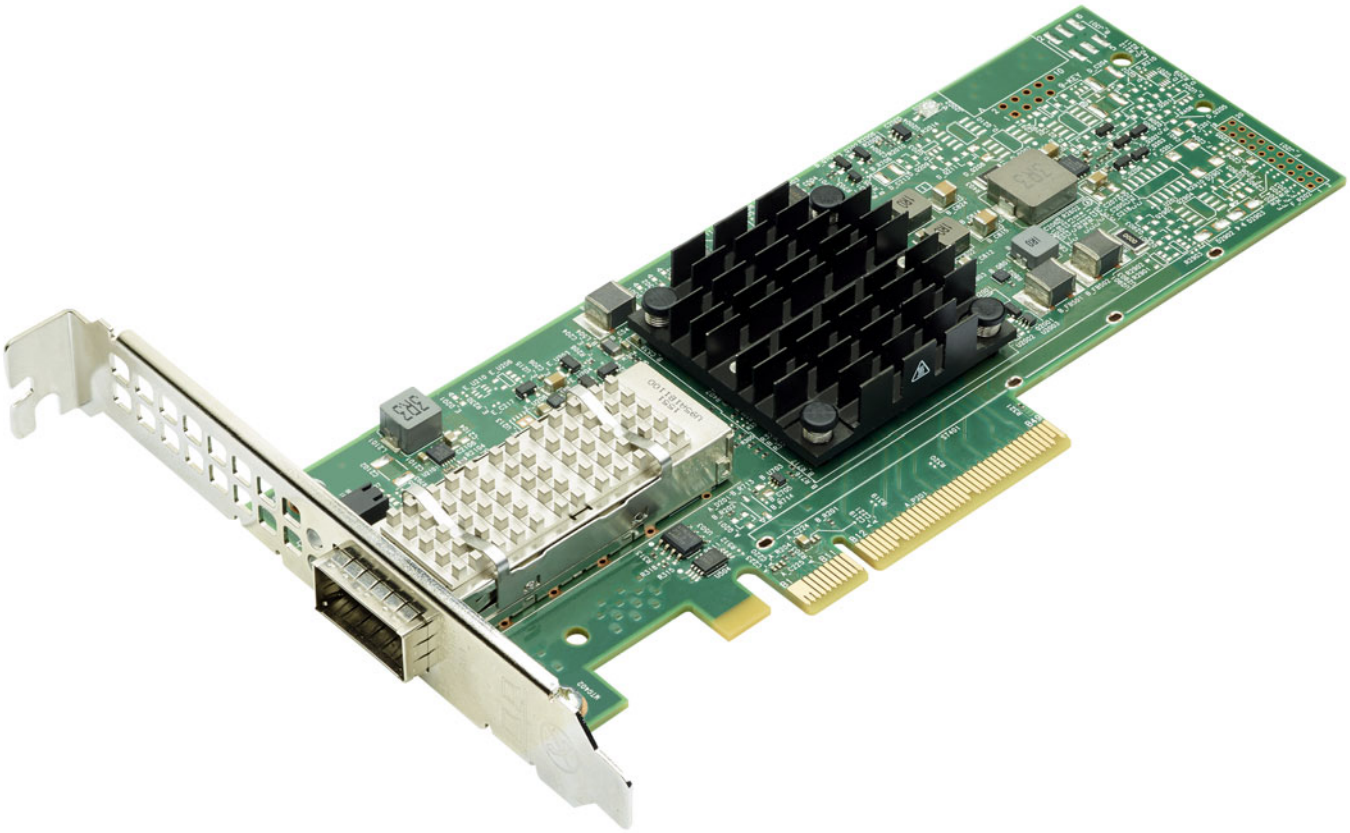


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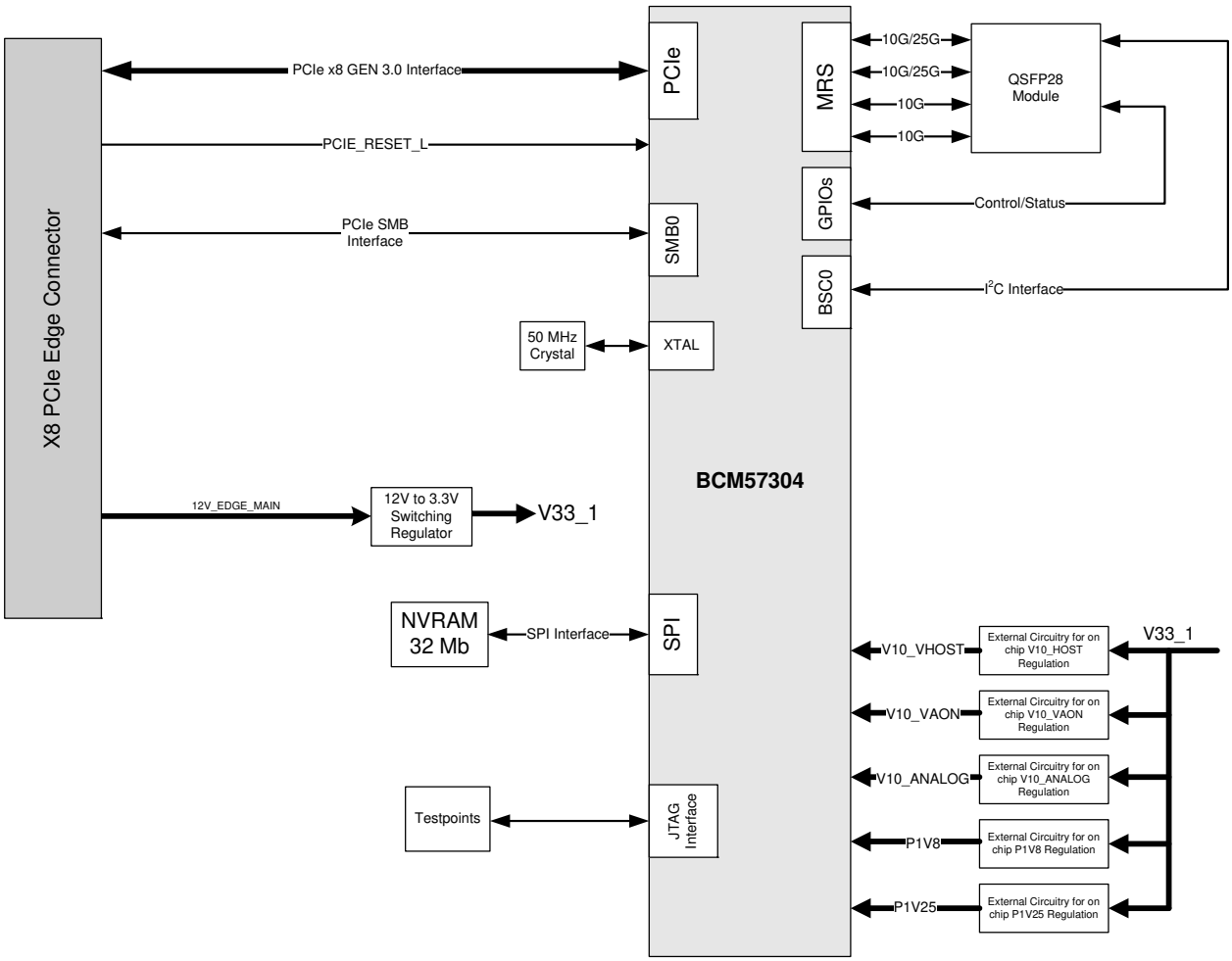
1 Functional Description

This section provides the functional description of the BCM957304A3040C Network Interface Card.

1.1 Block Diagram

Figure 2 shows the main functional blocks on the BCM957304A3040C Network Interface Card.

Figure 2: BCM957304A3040C Block Diagram



1.2 Host Interface Connector

The BCM957304A3040C NIC is a PCI Express Gen3 x8 add-in card with standard height bracket. The card edge connector complies with the PCI Express Gen3 x8 standard pinout for add-in cards outlined in the PCI Express Electromechanical Specification v3.0 section 6.1, table 6-1.

The PCI Express interface is Gen3 compliant.

NOTE: Refer to section 6 of the PCI Express Electromechanical Specification v3.0 for more details on the card edge connector pinout, and to section 9 for add-in card mechanical information.

1.3 BCM57304

The BCM57304 Ethernet Controller is configured as single-port 50 Gb/s MAC with integrated QSFP28 optical interface to the line side and x8 PCI Express v3.0 interface to the system host.

1.3.1 Internal Clocks

The BCM57304 has an integrated differential oscillator circuit that operates from an external 50 MHz crystal. The 50 MHz clock source is used to generate the clock frequencies for the device internal circuitries.

1.3.2 SMBus Interface

The BCM57304 Ethernet Controller SMB0 interface supports serial communications between BCM57304 and the system. The interface allows the Ethernet Controller to act as an SMBus master or a slave device.

1.4 Nonvolatile RAM

The BCM57304 Ethernet Controller requires a nonvolatile serial flash memory (NVRAM) to store the device firmware, PCI Configuration space settings (for example, Device ID, Vendor ID), MAC address, and so on. After power-up, the firmware is downloaded into the device memory and executed by the on-chip processor.

1.5 Heat Sink

The passive heat sink is attached to the Ethernet Controller using four spring-loaded push pins that insert into four mounting holes.

To prevent damage to the BCM57304 Ethernet Controller in the event of a missing heat sink, the NIC is not allowed to power up.

1.6 DC/DC Regulators

The on-board voltage regulators use the 12V edge main power from the host interface connector to derive the necessary power rails for different circuits and components on the board.

1.7 Power Supplies

All power is derived from the PCI Express Host Interface Connector 12V supply pins. These voltage supply pins feed on-board regulators that provide the necessary power to the various components on the card. The NIC has six switching regulators, which power the card's various +1.0V, +1.25V, +1.8V, and +3.3V loads. The 3.3V power (+3.3V) and 3.3V auxiliary power (3.3Vaux) from the PCIe edge connector are also used to supply the power control logics and signals.

1.8 LED Functions and Locations

The QSFP28 port supports two LEDs to indicate traffic activities and link speed. The LEDs are visible through the cutout on the bracket, as shown in Figure 3. The LED functionality is described in Table 1.

Figure 3: Activity and Link LED Locations

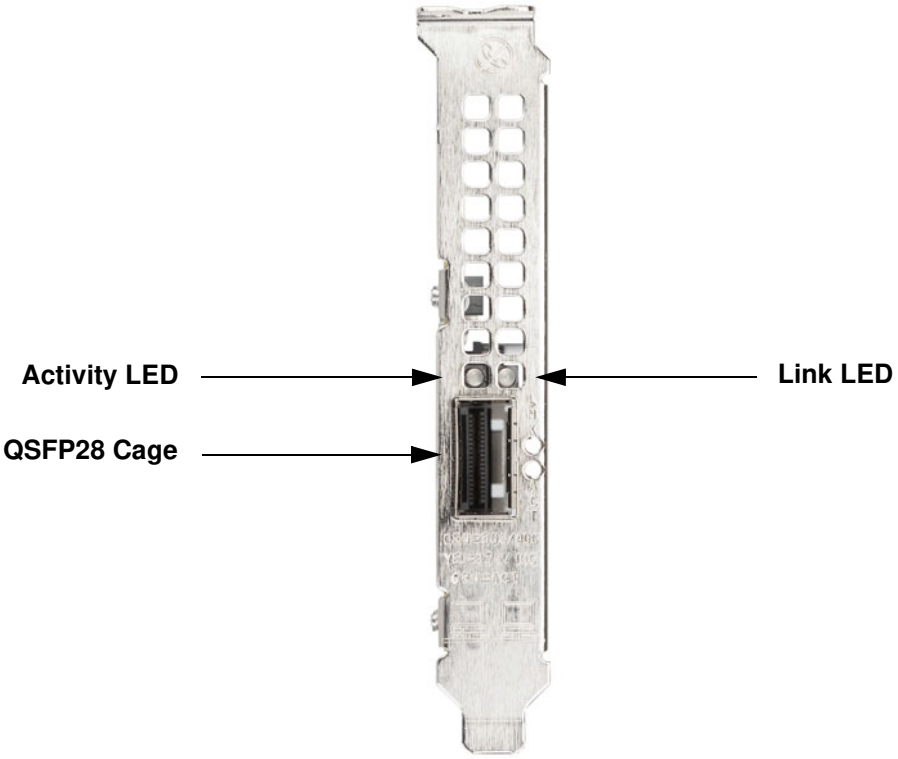


Table 1: LED Functions

NVRAM Manufacturer	Device	Mbit
Activity	Off	No Activity
	Green blinking	Traffic Flowing Activity
Link	Off	No Link
	Green	Linked at 50 Gb/s or 40 Gb/s
	Yellow	Linked at 25 Gb/s or 10 Gb/s

2 Regulatory and Safety Approvals

The following sections detail the regulatory, safety, electromagnetic compatibility (emc), and electrostatic discharge (ESD) standard compliance for the BCM957304A3040C NIC.

2.1 Regulatory

Table 2: Regulatory Approvals

Item	Applicable Standard	Approval (A)/Certificate (C)
CE/European Union	EN 62368-1:2014	CB report and certificate
UL/USA	IEC 62368-1 (ed. 2)	CB report and certificate

2.2 Safety

Table 3: Safety Approvals

Country	Certification Type/Standard	Compliance
International	CB Scheme ICES 003 – Digital Device UL 1977 (connector safety) UL 796 (PCB wiring safety) UL 94 (flammability of parts)	Yes

2.3 Electromagnetic Compatibility (EMC)

Table 4: Electromagnetic Compatibility

Standard/Country	Certification Type	Compliance
CE/EU	EN 55032:2012/AC:2013 Class B EN 55024:2010 EN 61000-3-2:2014 EN 61000-3-3:2013	CE report and CE DoC
FCC/USA	CFR47 Part 15 Subpart B Class B	FCC/IC DoC and EMC report referencing FCC and IC standards
IC/Canada	ICES-003 Class B	FCC/IC DoC and report referencing FCC and IC standards
ACA/Australia, New Zealand	AS/NZS CISPR 22:2009 +A1:2010	ACA certificate RCM mark
BSM/Taiwan	CNS 13438 (2006) Class B	BSMI certificate
BSMI/Taiwan	CNS 15663	BSMI certificate/RoHS table
MSIP/S. Korea	KN32 Class B KN35	Korea certificate MSIP mark
VCCI/Japan	VCCI V-3 (2015-04)	Copy of VCCI online certificate

2.4 Electrostatic Discharge (ESD) Compliance

Table 5: ESD Compliance Summary

Standard	Certification Type	Compliance
EN 55024:2010 (EN 61000-4-2)	Air/Direct discharge	Yes

2.5 FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer or an experienced radio/TV technician for help.

NOTE: Changes or modifications not expressly approved by the manufacturer responsible for compliance could void the user's authority to operate the equipment.

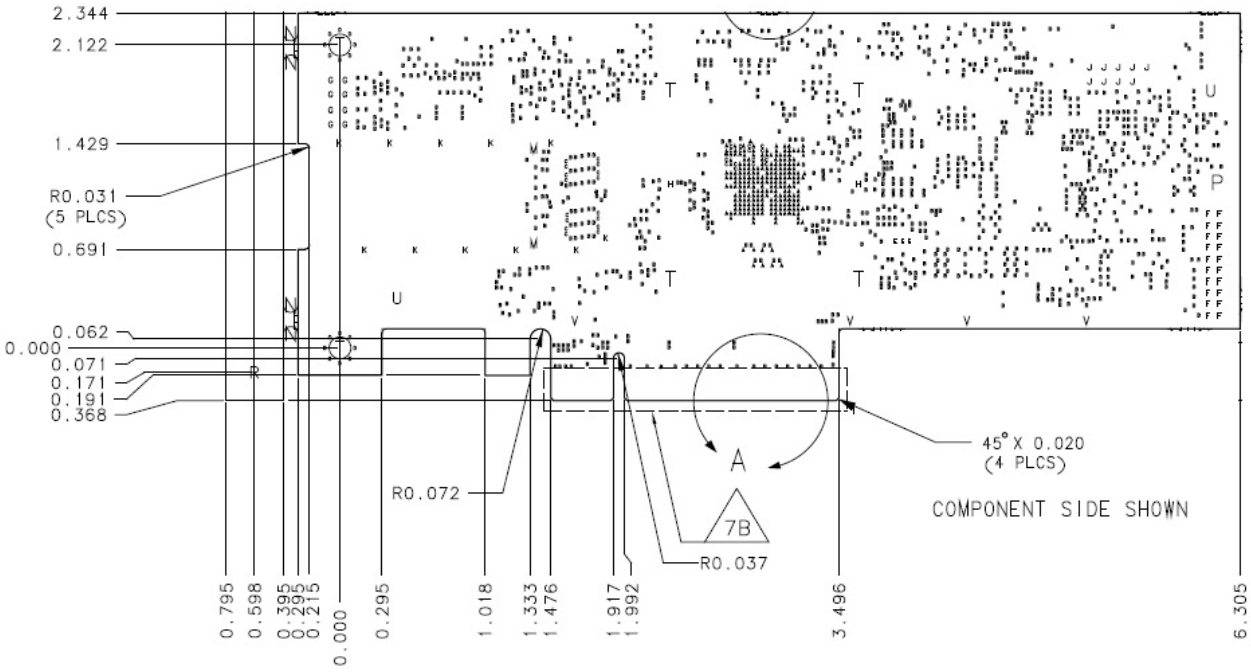
3 Physical and Electrical Specifications

This section outlines the mechanicals of the BCM957304A3040C NIC as well as the Environmental Specifications.

3.1 Board Physical Dimensions

The BCM957304A3040C board dimensions are shown in Figure 4. The dimensions are in inches with a tolerance of ±0.005.

Figure 4: Board Physical Dimensions



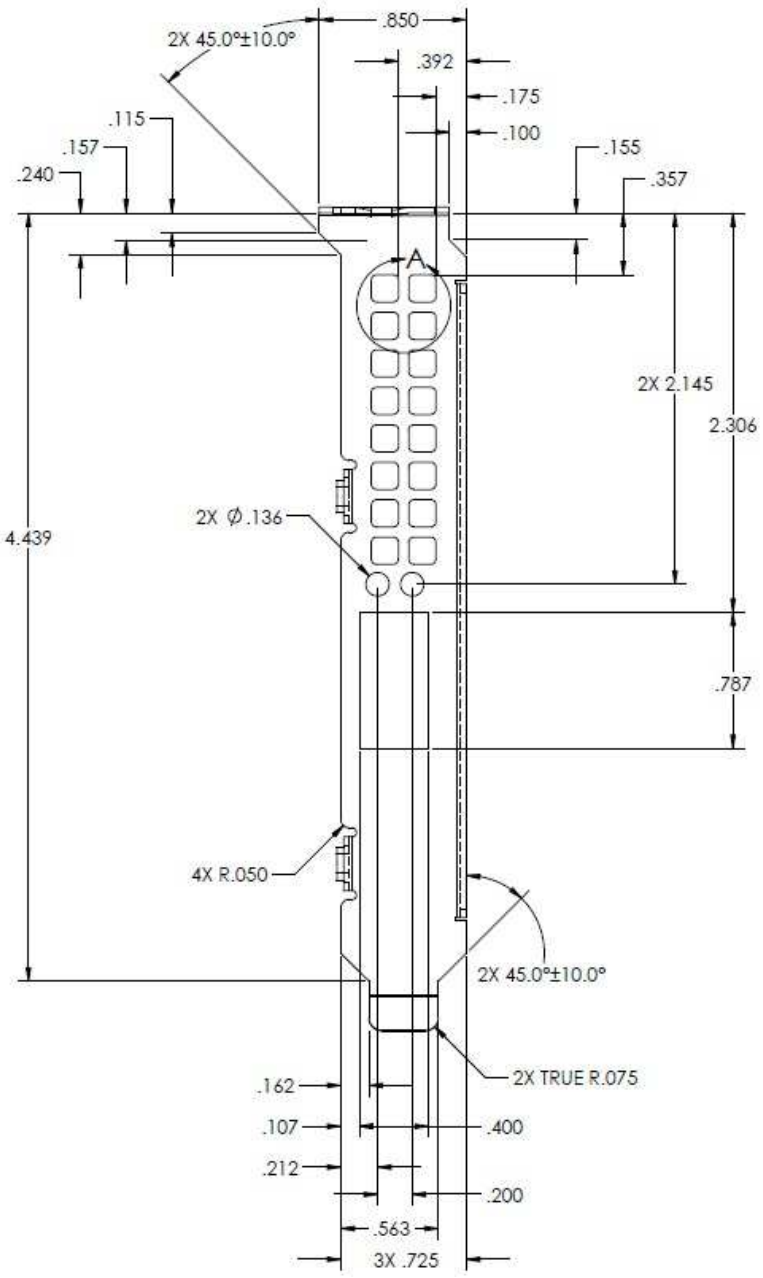
3.2 Bracket Outlines and Dimensions

The BCM957304A3040C supports both standard and low-profile brackets.

3.2.1 Standard-Profile Bracket Outline and Dimensions

Standard-profile bracket outline and physical dimensions are shown in Figure 5.

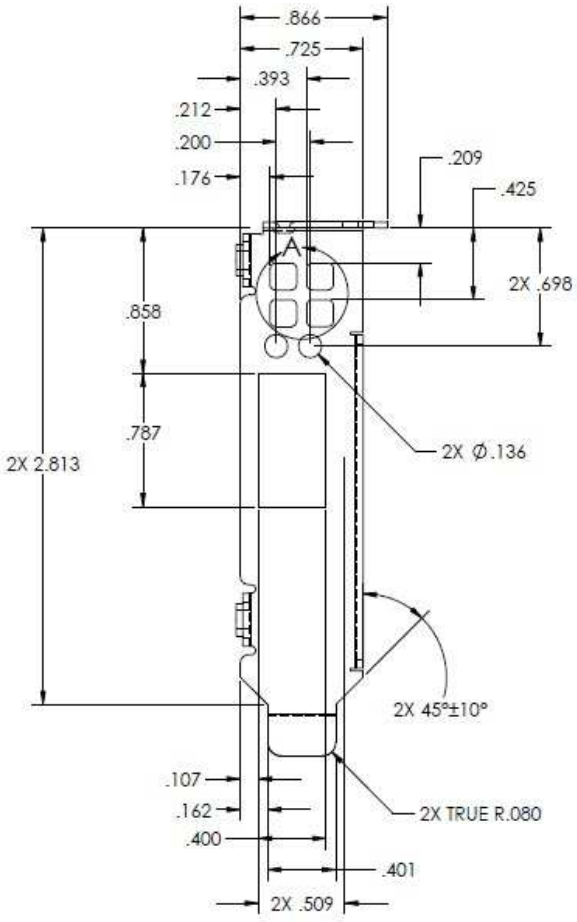
Figure 5: Standard-Profile Bracket Outline and Dimensions



3.2.2 Low-Profile Bracket Outline and Dimensions

Low-profile bracket outline and physical dimensions are shown in Figure 6.

Figure 6: Low-Profile Bracket Outline and Dimensions



3.3 Environment Specifications

Table 6: Environment Specifications

Parameter	Condition
Storage Temperature	–40°C to +65°C
Storage Humidity	5% to 95% non-condensing
Vibration and Shock	IEC78-2-(*) and IEC721-3-(*)

4 Ordering Information

Table 7: Ordering Information

Part Number	Description
BCM957304A3040C	Single-Port 50 Gb/s or 40 Gb/s QSFP28/QSFP+ Ethernet PCI Express Network Interface Card; RoHS-compliant

Revision History

957304A3040C-DS101; December 27, 2017

Updated:

- Regulatory and Safety Approvals

957304A3040C-DS100; November 6, 2017

Initial release.

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