

## BCM957504-P425G

### Quad-Port 25 Gb/s SFP28 Ethernet PCI Express 4.0 x16 Network Interface Card

#### General Description

The Broadcom BCM957504-P425G is a quad-port 25 Gb/s PCI Express 4.0 x16 network interface card that supports SFP28/SFP+ optical modules and copper direct-attach cables. The card uses the Broadcom BCM57504 100GbE MAC controller with an integrated quad-channel 25GbE SFI transceiver.

#### Features

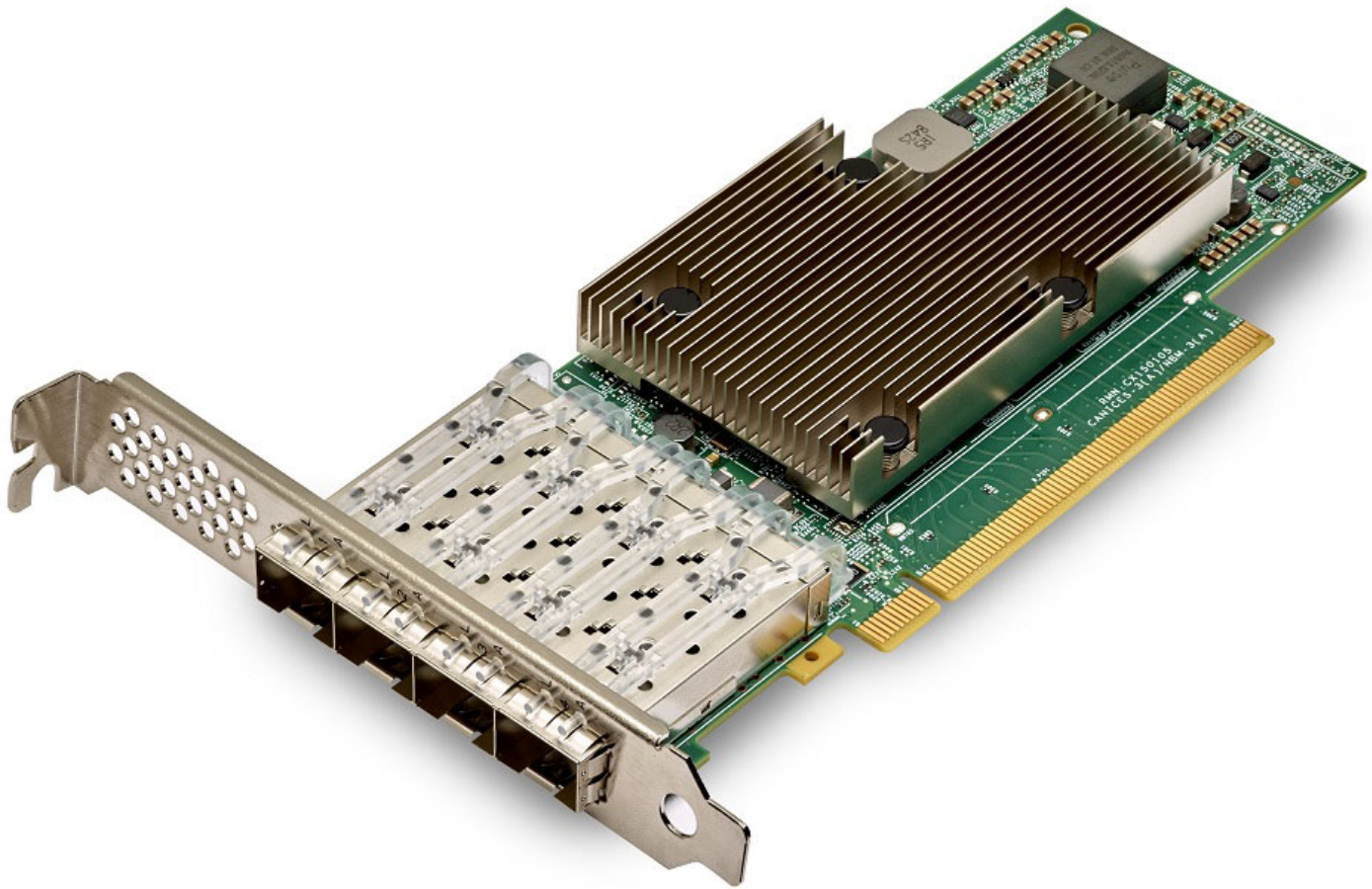
- Quad-port pluggable media interface, which is compatible with an SFP28/SFP+ optical transceiver or a copper direct-attach cable.
- Industry's most secure PCIe adapter solution leveraging Broadcom's BroadSAFE® technology.
- Multi-Host Support: Dual-Host x8 mode<sup>1</sup>.
- Fully compliant with the SFF-8402 standard.
- x16 PCI Express 4.0 compliant.
- SR-IOV with up to 1k virtual functions (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.
- RDMA over Converged Ethernet (RoCE)
- Network Controller Sideband Interface (NC-SI)<sup>1</sup>.
- SMBus 2.0.
- MCTP over SMBus.
- 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.
- FRU support.

#### Applications

Quad-port 25-Gigabit SFP28 Ethernet network interface card for data centers or cloud computing.

1. Contact Broadcom for additional details.

**Figure 1: BCM957504-P425G Network Interface Card**

**NOTE:** The surface markings of the component and/or the labels may not reflect the received product. Broadcom reserves the right to change any component on the printed circuit board with the same functionality.

Table of Contents

<b>1 Functional Description</b>	<b>4</b>
1.1 Block Diagram	4
1.2 Host Interface Connector	5
1.3 BCM57504 Ethernet Controller	5
1.4 PCI Express Interface	5
1.5 SMBus Interface	5
1.6 Nonvolatile RAM	5
1.7 Heat Sink	5
1.8 Power Supplies	5
1.9 LED Functions and Locations	6
<b>2 Regulatory and Safety Approvals</b>	<b>7</b>
2.1 Regulatory	7
2.2 Safety	7
2.3 Electromagnetic Compatibility (EMC)	7
2.4 Electrostatic Discharge (ESD) Compliance	8
2.5 FCC Statement	8
2.5.1 Information to User	8
<b>3 Board Power Consumption</b>	<b>8</b>
<b>4 Airflow Requirements</b>	<b>8</b>
<b>5 Package Weight</b>	<b>9</b>
<b>6 Physical Specifications</b>	<b>9</b>
6.1 Board Physical Dimensions	9
6.2 Bracket Outlines and Dimensions	10
6.2.1 Standard-Profile Bracket Outline and Dimensions	10
6.2.2 Low-Profile Bracket Outline and Dimensions	11
<b>7 Ordering Information</b>	<b>12</b>
<b>Revision History</b>	<b>13</b>

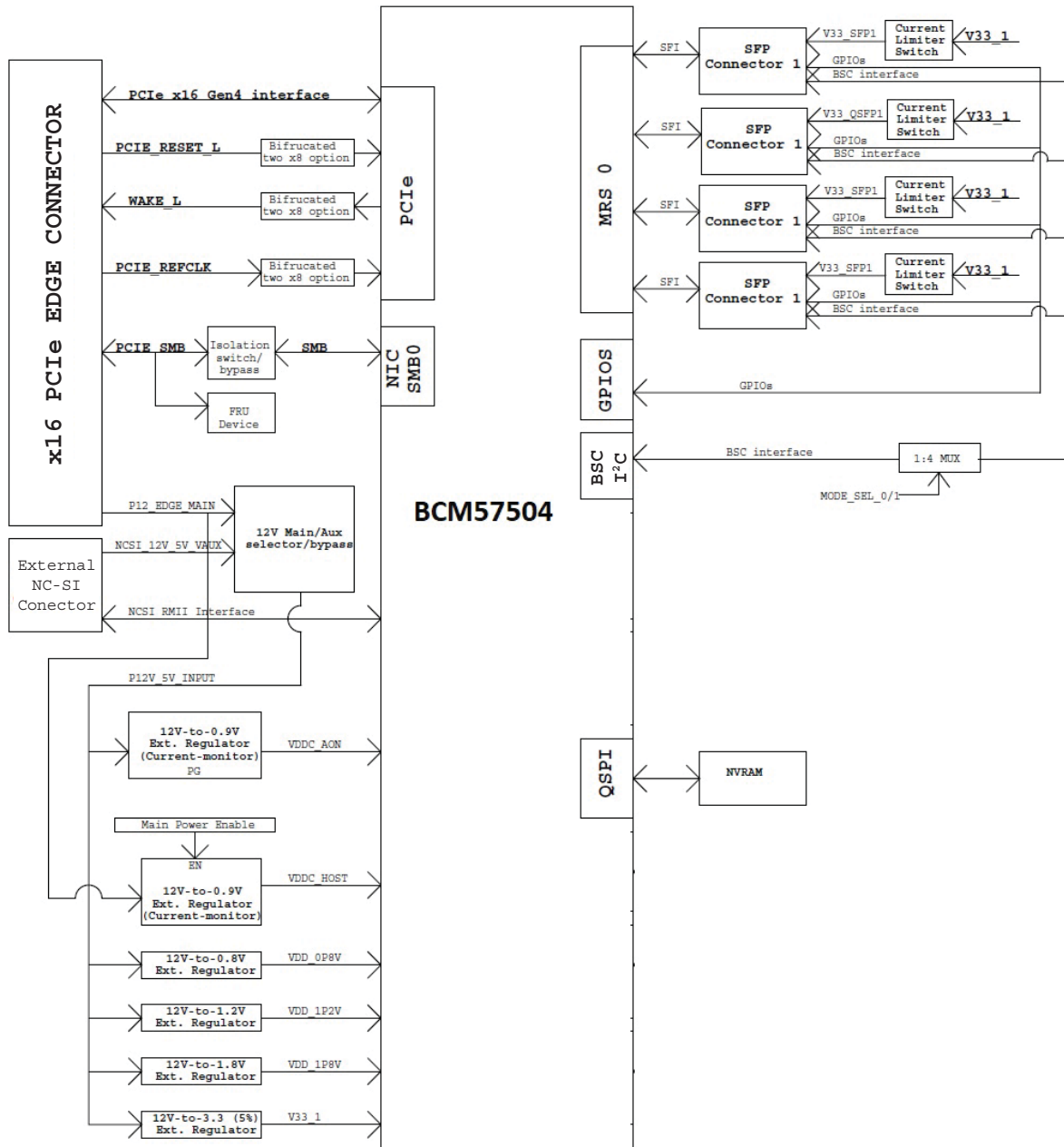
# 1 Functional Description

This section provides the functional description of the BCM957504-P425G network interface card.

## 1.1 Block Diagram

Figure 2 shows the main functional blocks on the BCM957504-P425G network interface card.

Figure 2: BCM957504-P425G Block Diagram



## 1.2 Host Interface Connector

The BCM957504-P425G NIC is a PCI Express 4.0 x16 add-in card with standard-height bracket. The card edge connector complies with the PCI Express 4.0 x16 standard pinout for add-in cards.

## 1.3 BCM57504 Ethernet Controller

The BCM57504 Ethernet controller is configured as quad-port 25 Gb/s interface to the line side and x16 PCI Express v4.0 interface to the system host.

## 1.4 PCI Express Interface

PCIe is a high-bandwidth serial bus providing a low pin-count interface as an alternative to parallel PCI. It is part of the host interface connector. The BCM57504 complies with the PCI Express Base Specification Revision 4.0, and supports an 16-lane PCIe 4.0 interface via the host interface connector.

## 1.5 SMBus Interface

The BCM57504 Ethernet controller SMB0 interface supports serial communications between BCM57504 and the system. The interface allows the Ethernet controller to act as an SMBus master or a slave device.

## 1.6 Nonvolatile RAM

The BCM57504 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.

## 1.7 Heat Sink

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

## 1.8 Power Supplies

All power is derived from the network adapter card host interface connector 12V and 3.3V supply which feeds the on-board regulators that provide the necessary power to the various components on the card. The network adapter card has six switching voltage regulators that power the card's VDDC\_AON, VDDC\_HOST, +0.8V, +1.2V, +1.8V, and +3.3V loads.

## 1.9 LED Functions and Locations

The SFP28 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](#).

Figure 3: Activity and Link LED Locations

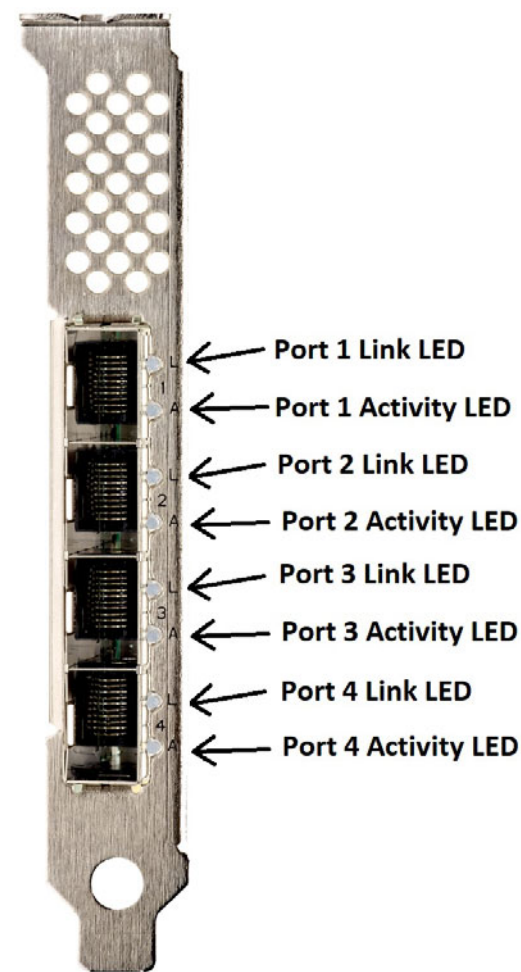


Table 1: LED Functions

LED Type	Color/Behavior	Note
Activity	Off	No Link
	Green (blinking)	Link up (traffic flowing)
Link	Off	No Link
	Green	Linked at 25 Gb/s
	Amber	Linked at lower speed

## 2 Regulatory and Safety Approvals

The following sections detail the Regulatory, Safety, Electromagnetic Compatibility (EMC), and Electrostatic Discharge (ESD) standard compliance for the BCM957504-P425G network interface card.

### 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 A 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 A	FCC/IC DoC and EMC report referencing FCC and IC standards
IC/Canada	ICES-003 Class A	FCC/IC DoC and report referencing FCC and IC standards
ACA/Australia, New Zealand	AS/NZS CISPR 22:2009 +A1 :2010	ACA certificate
BSM/Taiwan	CNS 13438 (2006) Class A	BSMI certificate
BSMI/Taiwan	CNS 15663	BSMI certificate/RoHS table
MSIP/S. Korea	KN32 Class A 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 device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

### 2.5.1 Information to User

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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

## 3 Board Power Consumption

Table 6 shows the total power consumption required on the 12V and 3.3V edge connector pins for the BCM957504-P425G.

Table 6: Board Power Consumption (Estimated)

Traffic Mode	Typical (Watt)
Quad-Port 25G	16.9

**NOTE:** Typical: NN, BCM57504  $T_C$  (Case Temperature) = 85°C, PCIe 3.0 x16, 100% traffic, and DAC cable.

## 4 Airflow Requirements

The maximum junction temperature ( $T_J$ ) for the BCM57504 is 110°C. The system designer should deploy methods to monitor the BCM57504  $T_J$  and provide sufficient airflow for keeping  $T_J$  below 110°C. According to the thermal analysis, 225 LFM is required for the BCM957504-P425G to operate at 55°C ambient temperature ( $T_a$ ) with passive QSFP56 module rated at 85°C.



## 5 Package Weight

Table 7 shows the BCM957504-P425G package weight with the standard-profile bracket installed by default (excluding the optical module).

Table 7: Package Weight

Parameter	Symbol	Value	Unit
BCM957504-P425G weight	g	160	gram

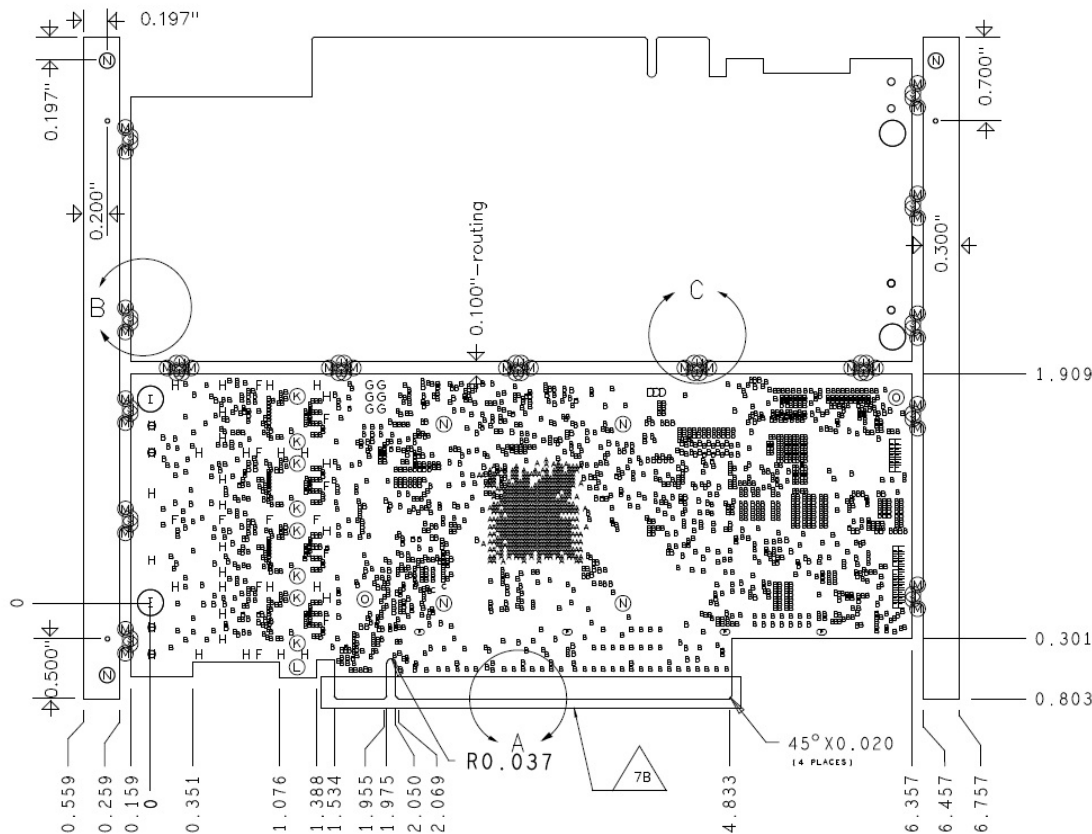
## 6 Physical Specifications

This section outlines the mechanical aspects of the BCM957504-P425G network interface card.

### 6.1 Board Physical Dimensions

The BCM957504-P425G physical board dimensions are compliant with PCI Express Card Electromechanical Specification Revision 4.0 except for minor differences with the edge finger alignment, bracket mounting scheme, and low-profile bracket opening. These differ slightly from the PCI CEM specification due to the mechanical constraint of the single quad-port SFP28 cage. It is recommended to use the associated 3D step file available from Broadcom docSAFE for mechanical simulation.

Figure 4: Board Physical Dimensions



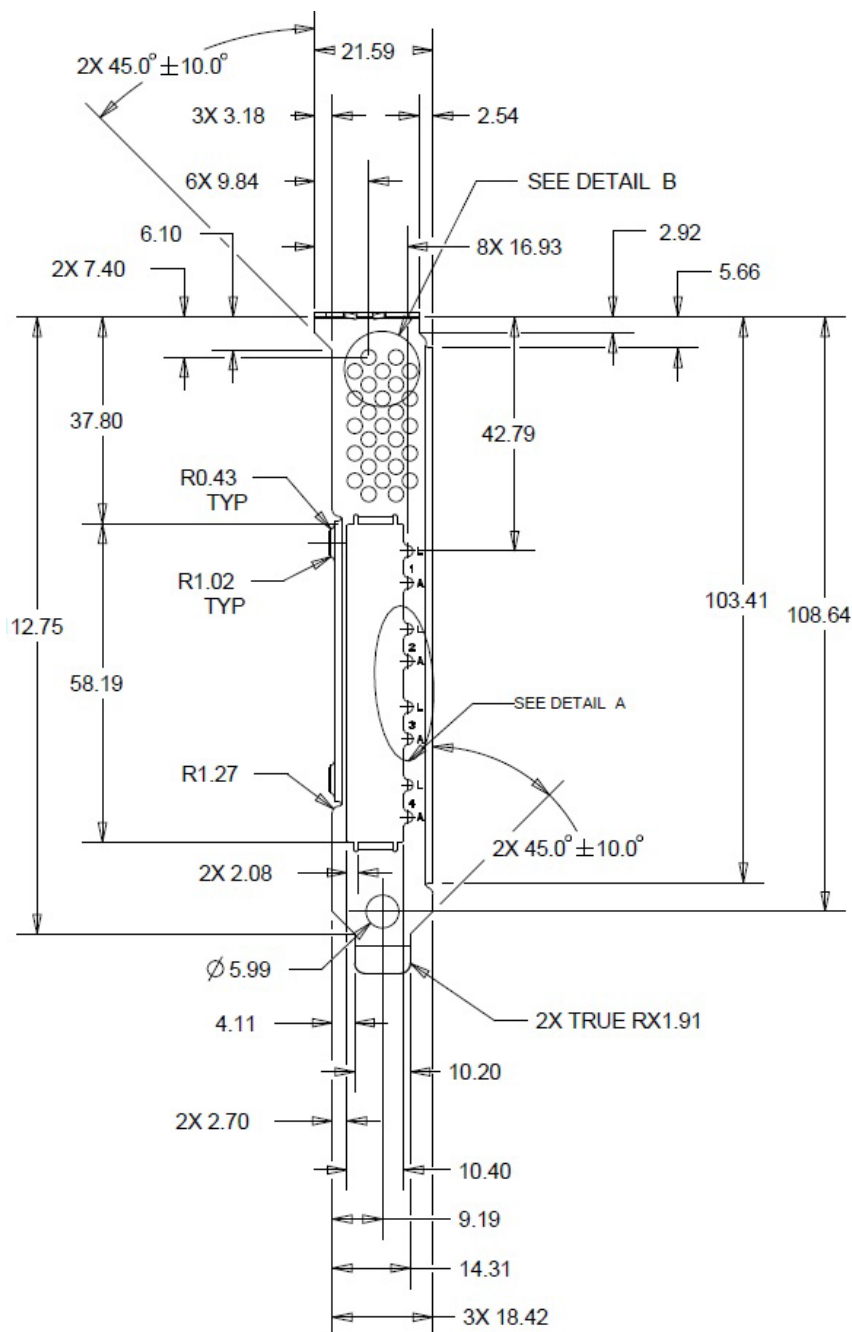
## 6.2 Bracket Outlines and Dimensions

The BCM957504-P425G supports both standard and low-profile brackets.

### 6.2.1 Standard-Profile Bracket Outline and Dimensions

Standard-profile bracket outline and physical dimensions are shown in [Figure 5](#).

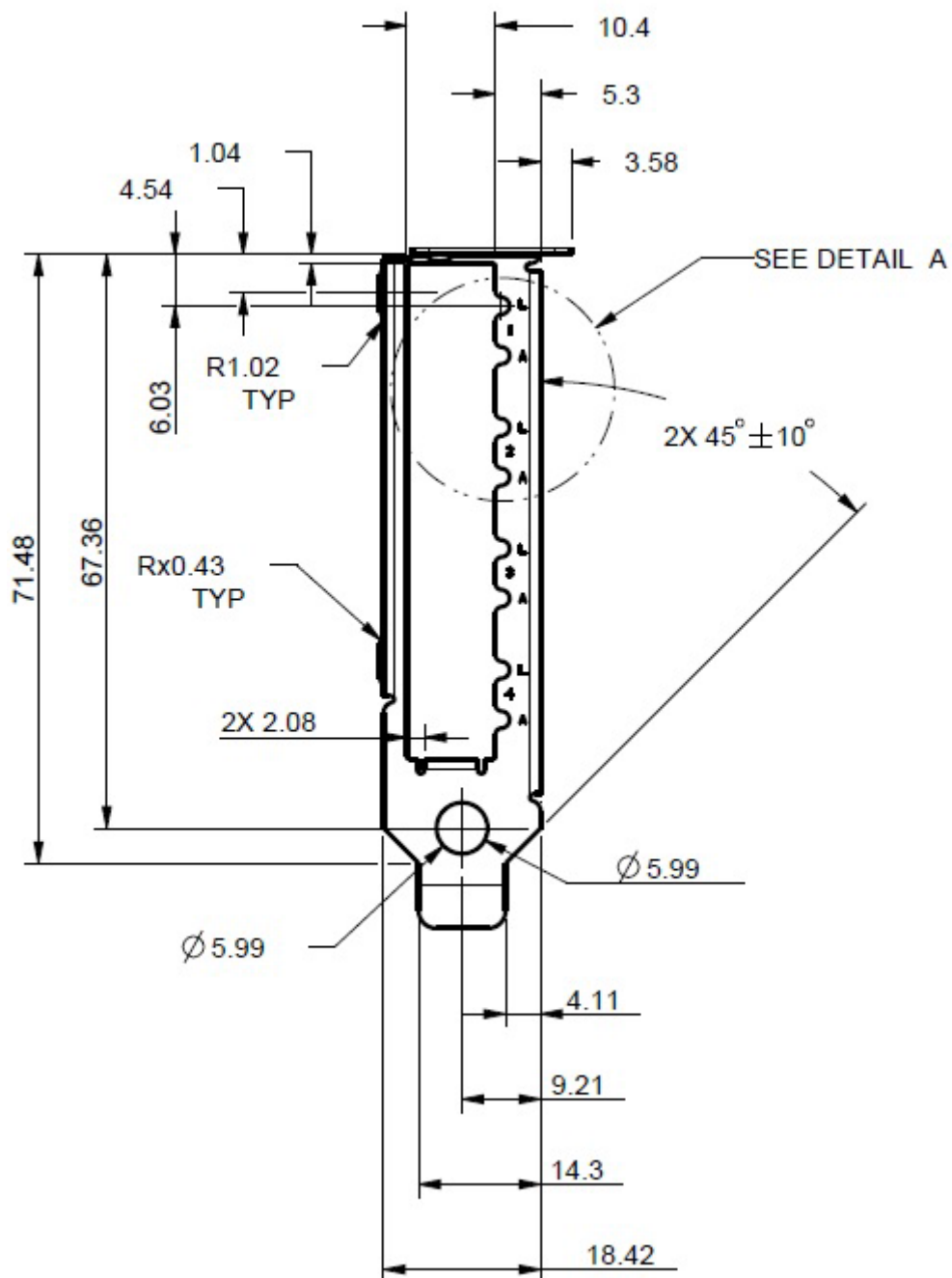
**Figure 5: Standard-Profile Bracket Outline and Dimensions**



## 6.2.2 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



# 7 Ordering Information

Table 8: Ordering Information

Part Number	Description
BCM957504-P425G	Quad-Port 25 Gb/s SFP28 Ethernet PCI Express 4.0 x16 Network Interface Card, Halogen-Free

## Revision History

### 957504-P425G-DS100; October 7, 2019

Initial release.

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