



### IS100

#### Silicom 100G Intelligent Bypass Switch

##### Product Description

Silicom 100G Intelligent QSFP28

Bypass switch (IS100) is Silicom

forth generation of an active

external Bypass switch that protects network integrity from network

failures and network maintenance. The Silicom intelligent Bypass switch (IS100) is a self-generating heartbeat and controls the network switch mode of operation.



The Silicom IS100G1U is a 1U host system which supports up to two modules. A module supports one Bypass segment per module.

The Silicom IS100 supports 100 Gigabit Ethernet Multimode Fiber (100GBase-SR4) ,(100G Base-SR10 ) and 100 Gigabit Single mode fiber (100GBase-LR4) network standards. Each 100G Bypass module includes two MPO / LC ports for network ports, and two QSFP28 ports for the attached in-line network system.

The Silicom Intelligent Bypass switch (IS100) supports four modes of operations: Inline, Bypass, Tap and Linkdrop. In Inline mode, the IS100 diverts inline network traffic to attached in-line network system. In Bypass mode, the IS100 does not divert the traffic to the attached in-line network system and diverts it to other network link. In Tap mode, incoming traffic in port NET0 is mirrored to port MON0 and incoming traffic in port NET1 is mirrored to port MON1. In Linkdrop mode the IS100 disables the links on the network ports (NET0, NET1). The IS100 simulates switch / router cable disconnection.

The IS100 generates the heartbeat packets and transmits the heartbeat packet to the in-line Monitor / Network appliance port, the Monitor Network appliance receives the heartbeat packets and transmits is to its other port (bridges the heartbeat packet). The IS100 detects back the heartbeat packet and maintains the Inline mode.

The IS100 sets to Bypass, Tap or Linkdrop when it does not receive back the heartbeat packet from the Network / Monitor appliance. When the Network / Monitor appliance recovers, it transmits back the heartbeat packet and the Intelligent switch sets to Inline. The IS100 bypasses its Ethernet Monitor ports on event of power failure, Link failure, in-line software application system hang or user request.

The IS100 includes Double Bypass Safe architecture. The Silicom Double Bypass safe architecture is based on two Bypass routing circuitry: An Active Bypass circuitry and Passive Bypass circuitry. If the internal active bypass routing circuitry fails, the passive Bypass routing circuitry is activated.

The IS100 can be configured using:

- Simple CLI configuration management via a serial communication console port, Ethernet port using Telnet or SSH.
- Web interface management interface.
- SNMP.

The Silicom IS100 Bypass switch includes centralized management to all Bypass segments in the box.

The IS100G includes two redundant 90 – 240 V AC power supply or two redundant -48 DC power supply.



Figure: 1 – Front panel view of IS100G



Figure: 2 – Front panel view of IS100G with 2 modules

## Key Features

- Self generating heartbeat pulses – No driver or management port is required to generate pulses
- Sets to Bypass when it detects in-line system failure
- Sets to Bypass when it detects in-line system link failure
- Sets to Bypass when it detects in-line software application system hang
- Sets to Bypass on Power failure
- Sets to Normal when it detects in-line system recovery
- Double Safe Bypass architecture with two routing circuitries
- Centralized managements
- Two on Board Watch Dog Timer (WDT) Controllers
- Software programmable time out interval
- Software Programmable WDT Enable / Disable
- Independent Bypass / Normal / Tap /Linkdrop operation in every module
- Supports up to three 100G Bypass segment in a 1U chassis
- Supports TAP mode of operation
- Simple CLI configuration management via serial port
- Telnet management interface via network management port
- SSH management interface via network management port
- Supports SNMP version 1, 2c, 3 (SHA, AES)

- Supports remote log
- Supports TACACS+
- Support RADIUS
- Supports NTP
- Supports time zone
- Supports multi configuration backup
- Support Two ports link feature – if one of the network ports link fails it will drop the link on the other network port as well
- Two redundant power supplies
- Optional -48V DC power supplies

#### IS100M100G4BP-CSR4

- Supports Short Range Fiber 100 Gigabit Ethernet with Optical module CFP4 (100GBase-SR4 50um)

#### IS100M100G4BP-SR10

- Supports Short Range (100m) Fiber 100 Gigabit Ethernet with Optical module CXP (100GBase-SR10)

#### IS100M100G4BP-CLR4

- Supports Long Reach Fiber 100 Gigabit Ethernet with Optical module CFP4 (100GBase-LR4)

## Technical Specifications

Bypass Specifications	
<b>WDT Interval (Software Programmable):</b>	<b>Routing</b> Transmit heart beat packet every 3mS – 10Sec. Default 5mS Verification packets received every 10mS – 50Sec. Default 20mSec <b>Double Bypass</b> Transmit heart beat packet every 300mS – 60Sec. Default 7Sec Verification packets received every 1S – 253Sec. Default 20Sec
Production Default configuration	
<b>Mode at Power up:</b>	Bypass
<b>Heartbeat:</b>	Activated
<b>Bypass Switch is ready and in-line device responds to heartbeat:</b>	Change to Normal
<b>In-line device responds to heartbeat:</b>	Normal
<b>In-line device does not respond heartbeat:</b>	Bypass

<b>Mode at Power Off:</b>	Bypass
<b>Heartbeat Packet:</b>	Internetwork Packet Exchange
<b>IS1001U: Bypass Switch 1U Host System Technical Specifications</b>	
<b>Dockings:</b>	Front holders
<b>Voltage Input:</b>	AC: 90-240 VAC Auto-Select -48 (-75 – -36) VDC
<b>Power Consumption:</b>	With no module : 240W With one LR4 module (with 90% utilization):405W With 2 LR4modules (with 90% utilization):552W
<b>Size:</b>	435mm x 586 mm x 44 mm ( 17.12" x 23.07" x 1.732") Wide x Depth X Height
<b>Weight:</b>	10Kg
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B FCC / CE / VCCI
<b>MTBF*:</b>	12.65 Years Operating conditions: Environment: GB, Temperature: 40.00 °C Current mode: Operating FR Units: FIT Default prediction Method: Telcordia Issue 4
<b>IS1001U: Bypass Switch 1U Host System LEDs &amp; Switches Specifications</b>	
<b>LEDs:</b>	<p><b>Two Power LEDs: PS1, PS2</b></p> <ul style="list-style-type: none"> <li>PS1: power on – Light Green.</li> <li>PS2: power on – Light Green.</li> </ul> <p><b>System Status LEDs: 3 LEDs</b></p> <ul style="list-style-type: none"> <li>SysOK: system normal operation – Light Green.</li> <li><b>Whol'm: in rack identification – Blinking Green.</b></li> <li>SysUP: system init during power up – Light Yellow.</li> <li>Alm/Fail: system alarm – Light Red.</li> </ul> <p>Module Power LEDs: 3BICOLOR LEDs</p> <p>1. M1: module1 power on – Light Green. module1 fail – Light Red.</p> <p>2. M2: module2 power on – Light Green. module2 fail – Light Red</p>
<b>Switches</b>	<p>Sys PWR: Turn all system ON From ON to OFF – In order to switch system off required press and hold this pushbutton during 8s From OFF to ON – simple push will turn system on.</p> <p>Module ON/OFF power: 2 switches</p> <p>MxPWR: Turn Module x power (x = 1,2) From ON to OFF – In order to switch module off required press and hold this pushbutton during 5s From OFF to ON – simple push will turn module on.</p> <p>Reset:</p>

	Small micro-switch stand behind hidden hole allows reset the system if this is necessary.
<b>Connectors:</b>	Management RJ-11 serial port RJ-45 Ethernet USB port
<b>IS100M100G4BP-QS4 (50um)</b>	
<b>Fiber Gigabit Ethernet Technical Specifications – (100GBase-SR4) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 100GBase-SR4 (850nm)
<b>Data Transfer Rate:</b>	4 x 25.78125G for each lane
<b>Cables and Operating distance:</b>	4x Multimode fiber:50um *50m maximum on OM3 MMF *75m maximum on OM4 MMF Theoretical Distance – Defined as half a distance
<b>Output Transmit Power:</b>	As defined by IEEE 802.3bm
<b>Optical Receive Sensitivity:</b>	As defined by IEEE 802.3bm
<b>Insertion Loss ( Passive: Normal Mode)</b>	Typical: 1.2dB Maximum: 2.1dB
<b>Insertion Loss ( Passive: Bypass Mode)</b>	Typical: 1.2dB Maximum: 2.1dB
<b>Power Consumption:</b>	~30W
<b>Size:</b>	158.2mm x163.9 mm x 40.5 mm Wide x Depth x Height
<b>Weight:</b>	980gr / 34.57oz
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class A FCC / CE
<b>Safety:</b>	CB/UL
<b>MTBF*:</b>	170 Years. Operating conditions: Environment: GB, Temperature: 40.00 °C Current mode: Operating FR Units: FIT Default prediction Method: Telcordia Issue 4
<b>Connectors:</b>	Network: 2 MPO OM4

	Monitor: 2 CFP4
<b>IS100M100G4BP-QL4</b>	
<b>Fiber Gigabit Ethernet Technical Specifications – (100GBase-LR4) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 100GBase-LR4 range of 4 wavelength (per 100G LR4 spec)
<b>Data Transfer Rate:</b>	4 x 25.78125G in four wavelengths
<b>Network ports Cables and Operating distance:</b>	Single mode fiber: four wavelengths 5000m maximum at 9 um **
<b>Insertion Loss ( Passive: Normal Mode)</b>	Typical: 1.2dB Maximum: 2.1dB
<b>Insertion Loss ( Passive: Bypass Mode)</b>	Typical: 1.2dB Maximum: 2.1dB
<b>Power Consumption:</b>	~30W
<b>Size:</b>	158.2mm x163.9 mm x 40.5 mm Wide x Depth x Height
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class A FCC / CE
<b>Safety:</b>	CB/UL
<b>MTBF*:</b>	170 Years. Operating conditions: Environment: GB, Temperature: 40.00 °C Current mode: Operating FR Units: FIT Default prediction Method: Telcordia Issue 4
<b>Connectors</b>	Network: 2 MPO Monitor: 2 CFP4
<b>IS100M100G4BP-SR10</b>	
<b>Fiber Gigabit Ethernet Technical Specifications – (100GBase-SR10) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 100GBase-SR10 (850nm)
<b>Data Transfer Rate:</b>	10 x 10.3125G for each lane
<b>Cables and Operating distance:</b>	10x Multimode fiber *50m maximum on OM3 MMF *75m maximum on OM4 MMF

	Theoretical Distance – Defined as half a distance
<b>Output Transmit Power per lane:</b>	Max : 3 DBM Min: – 7.6 DBM
<b>Optical Receive Sensitivity per lane:</b>	Max -5.4 DBM
<b>Power Consumption:</b>	~30W
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B / FCC / CE / VCCI
<b>Safety:</b>	UL
<b>MTBF:</b>	49 Years. *According to Telcordia SR-332 Issue 2. Environmental condition – GB (Ground, Fixed, and Controlled). Ambient temperature 40°C.
<b>Connectors:</b>	Network: 2 MPO OM4 Monitor: 2 CXP

#### IS100M100G4BP-CSR4 (50um)

#### Fiber Gigabit Ethernet Technical Specifications – (100GBase-SR4) Adapters:

<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 100GBase-SR4 (850nm)
<b>Data Transfer Rate:</b>	<b>4 x 25.78125G for each lane</b>
<b>Cables and Operating distance:</b>	4x Multimode fiber:50um *50m maximum on OM3 MMF *75m maximum on OM4 MMF Theoretical Distance – Defined as half a distance
<b>Output Transmit Power:</b>	As defined by IEEE 802.3bm
<b>Optical Receive Sensitivity:</b>	As defined by IEEE 802.3bm
<b>Power Consumption:</b>	~30W
<b>Weight</b>	1.2Kg
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)

<b>EMC Certifications:</b>	Class B / FCC / CE / VCCI
<b>Safety:</b>	UL
<b>MTBF:</b>	57 Years. *According to Telcordia SR-332 Issue 2. Environmental condition – GB (Ground, Fixed, and Controlled). Ambient temperature 40°C.
<b>Connectors:</b>	Network: 2 MPO OM4 Monitor: 2 CFP4
<b>IS100M100G4BP-CLR4</b>	
<b>Fiber 100Gigabit Ethernet Technical Specifications – (100G Base-LR4) Adapters:</b>	
<b>IEEE Standard / Network topology:</b>	Fiber Gigabit Ethernet, 100GBase-LR4 range of 4 wavelength (per 100G LR4 spec)
<b>Data Transfer Rate:</b>	4 x 25.78125G in four wavelengths
<b>Network ports Cables and Operating distance:</b>	Single mode fiber: four wavelengths 5000m maximum at 9 um **
<b>Power Consumption:</b>	~30W
<b>Weight</b>	1.2kg
<b>Operating Humidity:</b>	0%–90%, non-condensing
<b>Operating Temperature:</b>	0°C – 40°C (32°F – 104°F)
<b>Storage Temperature:</b>	-20°C–65°C (-4°F–149°F)
<b>EMC Certifications:</b>	Class B FCC / CE / VCCI /
<b>Safety:</b>	UL
<b>MTBF*:</b>	> 150,000 hours
<b>Connectors</b>	Network: 2 MPO Monitor: 2 CFP4



Figure: 3 – Normal Mode Functional Block Diagram

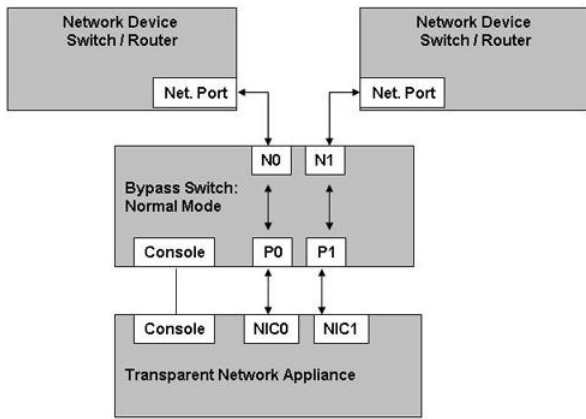


Figure: 4 – Bypass Mode Functional Block Diagram

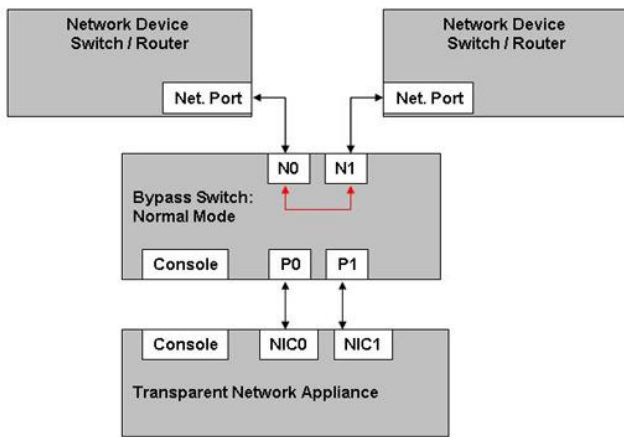


Figure: 5 – Tap Mode Functional Block Diagram

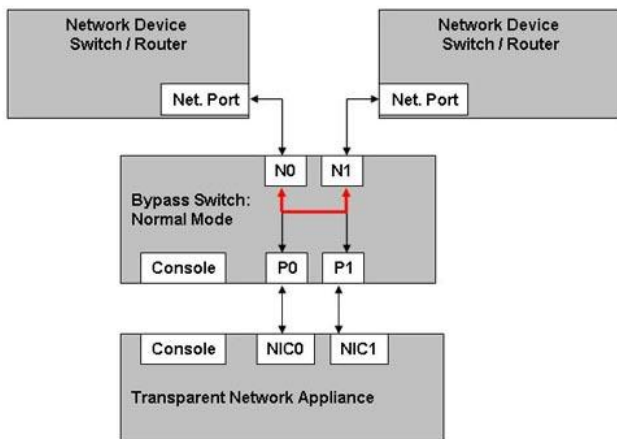
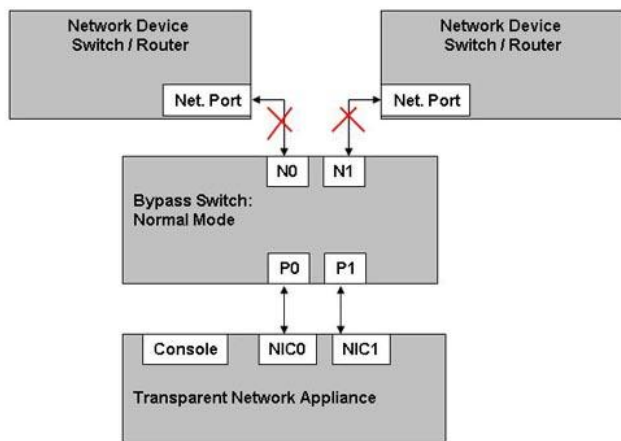


Figure: 6 – Linkdrop Mode Functional Block Diagram



Order Information

P/N	Description	Notes
IS100G-Q-US	Bypass Switch 1U Host System	90-240 VAC Auto-Select, US cable
IS100G-Q-48V	Bypass Switch 1U Host System	Power supply -48VDC
IS100M100G4BP-QS4	4 ports 100 Gigabit QSFP28 (SR4) fiber Intelligent Bypass Switch module	SR4 MMF Bypass 100G – (SR4 on the Network and Monitor ports)
IS100M100G4BP-QL4	4 ports 100 Gigabit QSFP28 (LR4) fiber Intelligent Bypass Switch module	LR4 SMF Bypass 100G – (LR4 on the Network and Monitor ports)
IS100M100G4BP-QL4S4	4 ports 100 Gigabit QSFP28 (LR4/SR4) fiber Intelligent Bypass Switch module	LR4 SMF Bypass 100G – (LR4 on the Network and SR4 on the Monitor ports)
IS100M100G4BP-CSR4	4 ports 100 Gigabit CFP4 (SR4) fiber Intelligent Bypass Switch module	SR4 MMF Bypass 100G – (SR4 on the Network and Monitor ports)
IS100M100G4BP-CLR4	4 ports 100 Gigabit CFP4 (LR4) fiber Intelligent Bypass Switch module	LR4 SMF Bypass 100G – (LR4 on the Network and Monitor ports)
IS100M100G4BP-CSR10	4 ports 100 Gigabit CXP (SR10) fiber Intelligent Bypass Switch module	SR10 Bypass 100G – (SR10 on the Network and Monitor ports)