DATA SHEET

V5824G

GPON OLT

Issue History

Version	Date of Issue	Reason for Update
V1.0	11/2013	Initial release

1 Product Overview

With increasing internet users in thinly populated regions, the demand of high-bandwidth and cost-effective systems for connecting to network has been existed in the market these days. To meet these customer needs, DASAN Networks has launched V5824G GPON (Gigabit Passive Optical Network) OLT system.

The V5824G is a compact sized 1RU GPON Optical Line Terminal (OLT) system. This system is suitable for FTTx services to the areas that have a low density of population or a small number of subscribers with less cost.

The V5824G provides 8 GPON ports on the front panel, each delivering 2.488Gbps downstream and 1.244Gbps upstream data rate. Each GPON port supports a pluggable SFP laser module that allows selection of the best speed and power to meet network requirements. This OLT provides 8 electrical (RJ45) and optical (SFP) combo GE interfaces. And two 10GE (SFP+) uplink ports as uplink towards the core network and these interfaces can be used either to cascade other switches or to connect to a collocated DSLAM. The MGMT and console interface is located on the most left of the front panel with embedded LED for LNK/ACT and TX/RX indication respectively. They are for use of equipment management via remote access or CLI.

It has the ability to support dual module-type PSUs (Power Supply Units) on the rear panel. Reliable operation and service are guaranteed through power redundancy, which prevents the system shutting down at the power-related failure.

The GPON technology adds new features and functionality targeted at improving performance and interoperability, and adds support for new applications, services, and deployment scenarios. Among these changes are improvements in data rate and reach performance, diagnostics, and stand-by mode, to name a few.

The V5824G introduces a point-to-multipoint concept with the GPON technology, which enables a cost-effective FTTx service. The reason why GPON is considered as a cost-effective solution is its usage of a passive splitter rather than an active switching system.

The benefits of the passive splitter are as follows:
- No power supply / maintenance is needed.
- The splitter does not need any fiber optic transceiver. The number of fiber optic transceivers in the network is minimized.
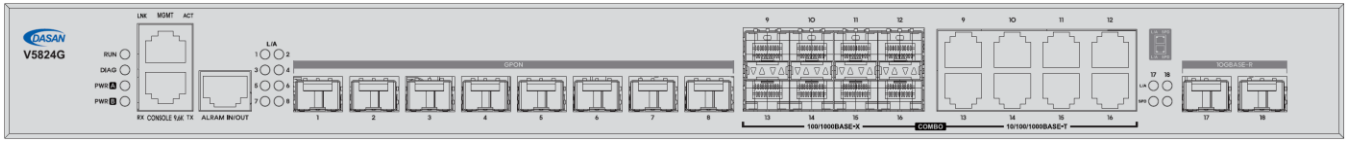
1.1 Product Interface

Figure 1   Front View of V5824G

Item	Function	Connector Type
Operating LED	Indicator for system operating status including power, fault detection and booting state.	-
CONSOLE	CLI access to configure the functions for system operation	RJ45 (RS232)
MGMT	Out-of-band TMN-OS Interface	RJ45
Subscriber i/f	8 x GPON ports	SC/PC
Combo GE i/f	8 x 100/1000Base-X or 10/100/1000Base-T combo type ports	SFP or RJ45
Uplink 10GE i/f	2 x 10GBase-R uplink ports	SFP+

Table 1   Front Access Interfaces of V5824G

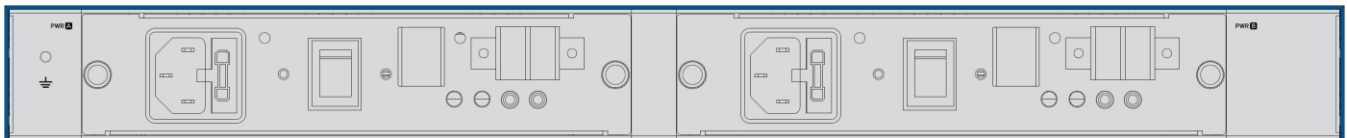The dual power supply connectors are located on the rear panel.

Figure 2   Rear View of V5824G

Name	Function	Connector Type
Grounding Terminal	Grounding the switch to avoid electric shock	-
PSU module	Mounting AC or DC type power module	AC or DC

Table 2   Rear Interfaces of V5824G

1.2 Service Scenario

A PON consists of an Optical Line Termination (OLT) located at the Central Office and a set of Optical Network Units (ONUs) or Optical Network Terminals (ONTs) located at the customer's premises. Between them is the optical distribution network (ODN) comprising of fibers and passive optical splitters or couplers. A splitter is a device that divides an optical signal into two or more signals. OLT connects the PON to the IP network, controls and manages the PON clients. ONU (ONT) connects the user specific network to PON. The ONT can be occupied by a single subscriber and also can be a gateway of the local network.
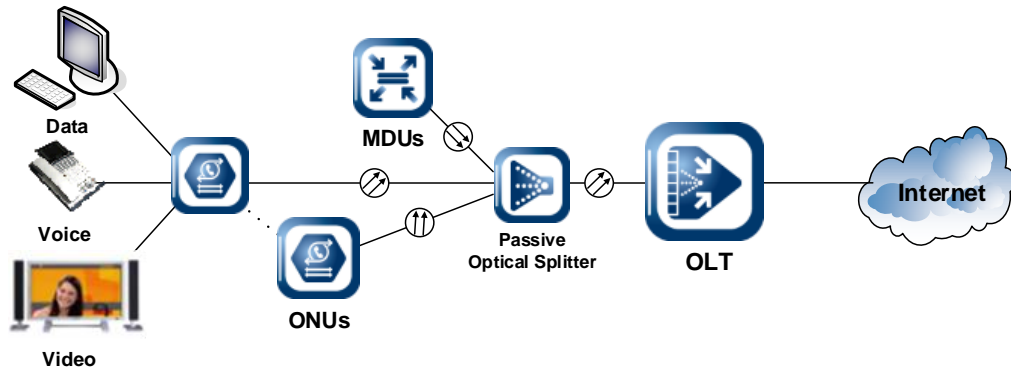

Figure 3   Optical Distribution Network by PON Architecture

The V5824G is a network element, which includes the necessary service adaptation functions to support the delivery of all types multiple services, such as Ethernet, IP telephony, and video services.

The V5824G GPON OLT system is one element of this end-to-end solution, however Dasan Networks is able to provide the complete next generation broadband access network and video integration solution, where full interoperability is ensured. Up to 64 (max.128) termination points for GPON can be attached to an OLT via passive optical splitter.

There are different possible deployment topologies for GPON networks, which differentiate from each other basically from the place the optical fiber is terminated. Depending on the subscriber type and desired topology to the network, the operator may adopt: FTTH (fiber to the Home), FTTB (fiber to the Building), FTTN (fiber to the neighborhood) or FTTC (fiber to the Curb). In case of very high bandwidth requirement per user, scenarios without splitters offering 2.5Gbps/1.25Gbps (downstream/upstream) data rate can also be deployed by connecting only the single user on a GPON port.
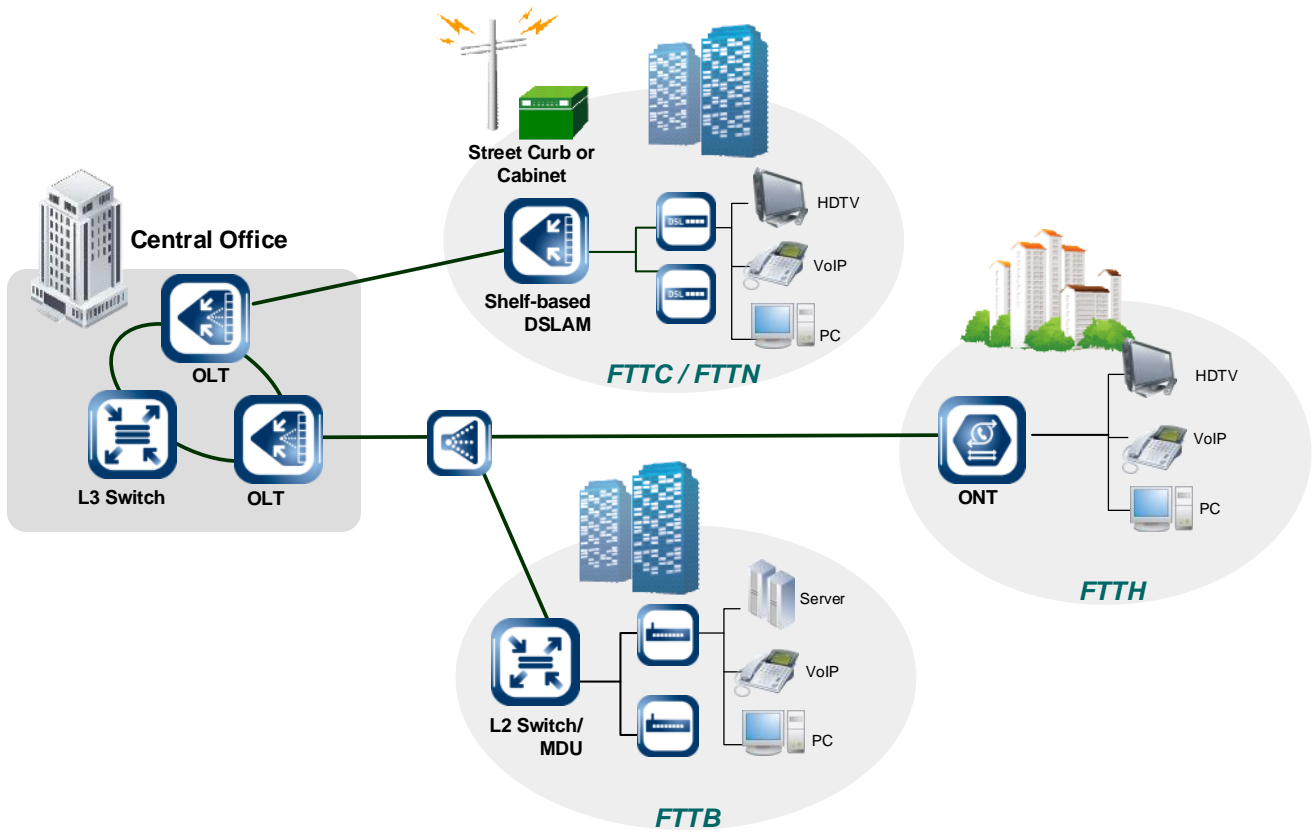
Figure 4   FTTx Service Deployments of GPON OLT

2 Product Specification

2.1 System Feature

The V5824G supports the following system features:

- 96Gbps switching capacity and 71Mpps throughput
- 8-port GPON subscriber interface:
    − 8-port of GPON interfaces (SFP, SC/PC type)
- 8-port GE interface (Combo):
    − 100/1000Base-X optical interfaces (SFP) or
    − 10/100/1000Base-T electrical interfaces (RJ45)
- 2 uplink interface ports
    − 2-port 1G/10GBase-R (SFP+)
- LED indicators
- 64MB Flash memory, 512MB DDR SDRAM
- Console command line interface (CLI) via RS232
- 1 FE interface for out-of-band management
- Redundant and load balanced plug-in Power Supply Unit (PSU)

2.2 SW Capabilities

System Performance	
MAC Address	
Max. MAC Addresses: 32K	
Concurrent VLAN	
Max. VLANs: 4K (1~4094)	Up to 4K stacked VLANs
IP Scalability	
Max. No. of L3 Route Entries IPv4, (IPv6) : 8K(4K)	
Equipment Performance	
Cold Startup Time: max. 2 min	
Ethernet Functions	
Ethernet Switching	
Switching / Bridging acc. to 802.1D and 802.1Q	Packet Format: Ethernet-II and 802.3
Address Learning with Auto Aging	Jumbo Frames up to 9k
Configurable Aging Time	Automatic and manual Auto-negotiation
Link Aggregation (Uplink)	
Link Aggregation (LAG) acc. to 802.3ad	No. of LAG Groups: 12
No. of LAG Ports per Group: 8	
Link Aggregation Control Protocol (LACP)	
MAC Address based LACP	IP Packet based (Address based) LACP
VLAN Handling	

Untagged Port Configuration	VLAN can be set by Port
VLAN Tagging	VLAN-ID can be set by IP TOS/DSCP
tagged and untagged frames at mixed at uplink port (outgoing)	VLAN can be set by MAC Address List
VLAN Duplication based on IGMP	VLAN can be set by IP Source Address / Subnet
VLAN Stripping	VLAN can be set by IP Destination Address / Subnet
Independent VLAN Learning (IVL)	Tagged User Frames
Port Isolation	
Hierarchical Functions	
VLAN Stacking per port (.1Q in .1Q) (VLAN can be set by port)	Configurable Ethernet type for VLAN
VLAN Stacking (.1Q in .1Q) (single tagging / stripping)	
Ethernet Multicast / Broadcast	
Ethernet Multicast	Configurable Limit for Multicast Traffic on Uplink (with activation / deactivation possibility)
Block unknown Multicast Flow based on system Basis	Configurable Limit for Broadcast Traffic on Uplink (with activation / deactivation possibility)
Block unknown Multicast Flow based on port Basis	
GPON Functions	
GPON Basic Functions	
ITU-T Rec. G.984.3 AMD 2	ITU-T G.984.4 ONT Management & Control Interface (OMCI)
G-PON OLT compliant with ITU-T G.984	Automatic ONT ranging
1K of T-CONT ID	4K of GEM Port-ID
4K of MAC Entry	Max Splitter Ratio : 128
Max Transmission Distance: 60km	T-CONT Type (Type1 ~ Type5)
GPON Advanced Functions	
Classification/Tagging per DSCP/COS	FEC for Upstream/Downstream
Key-Exchange for Encryption	ONU Auto-discovery
ONU Authentication	ONU Encryption
ONU Upgrade	Remote ONT/ONU management
IP Functions	
IP Routing	
IPv6 H/W ready	IPv4 Routing
IP Forwarding (static routing)	OSPF v2
BGP v4	VRRP
OSPF ECMP (equal cost multi-path protocol)	Policy-based Routing
IP Multicasting	
IGMP v1/v2 Snooping	IGMP Filtering (filtering of join and leave messages)
IGMP v1/v2 Snooping with single VLAN tagged	IGMP Filtering and Throttling

IGMP v3 Snooping	IGMP Proxy
IGMP v3 Snooping with single VLAN tagged	IGMP Termination
IP Multicast Routing Protocols (PIM-SM)	PIM-SSM(Source Specific Multicast)

CoS / QoS Functions	
E2E CoS/QoS	WRED Congestion Management
802.1p Strict Priority	8 queues per port
WRR	HW-based internal Classes of Service (CoS)
DRR	Ingress Policer per VLAN & port
QoS Mapping based on ingress Port	ingress Policer Per VLAN per CoS
QoS Mapping based on 802.1q (VLAN tag)	ingress Policer Per IP SA/DA
QoS Mapping based on 802.1p Priority	ingress Policer Per DSCP
QoS Mapping based on IP TOS/DSCP	Egress Shaper per Port
QoS Mapping based on IP DA/SA	Policing in 128 Kbps, 256 Kbps and 512 Kbps up to 1 Mbps Bit Rate
QoS Mapping based on L4 Info	Minimum granularity at ingress and egress port: 64 kbit/s
CoS/802.1p Marking based on Ethertype	Granularity per traffic class: 64 kbit/s
CoS/802.1p Marking based on IP SA	Policing in 1 Mbps Steps up to 100 Mpbs Bit Rate
Tagging/Overwriting 802.1p acc. to QoS Mapping	Policing in 10 Mbps Steps from 100 Mbps to 1 Gbps Bit Rate
Tagging/Overwriting TOS/DSCP to QoS Mapping	Shaping, Policing, Classification, and Prioritization acc. to IETF Diffserv RFC 2474

Traffic Protection (L2)	
Load Sharing inside LAG Group	IEEE 802.1s (MSTP)
IEEE 802.1D (STP)	IEEE 802.1w (RSTP)

Service Layer	

Service Types	
Transparent Data Ethernet Services	Transparent L2 Protocol Ethernet Services

Service Connectivity	
Multiple Services on a single Customer Access	Point-to-Multi-Point (via VLAN and SVLAN)
Point-to-Point (EVC) (via VLAN and SVLAN)	Any-to-Any (LAN 802.1d bridge) (via VLAN and SVLAN)
Multiplexed Point-to-Point (via VLAN and SVLAN)	Uni- / Bi-directional (via VLAN and SVLAN)
Multipoint to Multipoint (EVC) (via VLAN and SVLAN)	Asymmetrical / symmetrical BW Assignment (via VLAN and SVLAN)
Multiplex Multipoint to Multipoint (EVC) (via VLAN and SVLAN)	DHCP Relay Agent Option 82 for User Traffic

Security Services for Traffic Interfaces	
Access Control List (ACL) based on Port	Port based Authentication acc. to 802.1x for Traffic Interfaces
ACL based on MAC Addresses	MAC based Authentication acc. to 802.1x for Traffic Interfaces
ACL based on Ether Type	Anti-spoofing Mechanism

ACL based on IP SA/DA	Storm Control
ACL (for IGMP) based on IP Multicast Address (multicast filtering)	DHCP Filtering
ACL based on L4	Check IP/MAC Address provided by DHCP Relay Agent
Blocking of STP BPDUs at ingress	Suppression of Broadcast & Multicast Frames
Limit Number of MAC Addresses per any Kind of Port	

Management & Control

TMN Embedding

Element Management by CLI	

Management Interfaces - Layer 1 - 4

Out-of-band RS232 with 9600 Baud Rate	DHCP Server
Loopback IP Address per Switch	DHCP Option82
Dynamic ARP	DHCP Simplified Option82
Static Routing Table	DHCP Snoop
Support of static IP Addresses	DHCP Simplified Relay Agent
DHCP Client	DHCP Relay Agent

Management Interfaces - Layer 5 - 7

CLI	ICMP RFC 792
SNMP v1/v2	Telnet Server
SNMP v3	SNTP Client V3 RFC 2030
GUI-based Management	

Security

Disable / Enable in-band Management Traffic for a given Port	SSH and SNMPv3
Password Management for NE	User Password must be stored in an encrypted Mode
3 Levels of Access privileged	2 Levels of Community Strings
2 Levels of Access privileged	SSH v1/v2

MIBs

Same Set of Standard MIBs for all NE	DASAN IGMP SNOOPING MIB

Configuration Database / Log

Current Configuration File	Manual Reset of Configuration Log
Retrieval of all historical Configuration Log Entries	Restore of Database Backup File

Accuracy of Event Processing

Time Stamping Accuracy of 1s	

Fault Monitoring & Handling

Alarm level: - Critical Alarm - Major Alarm - Minor Alarm - Alarm of Information	Alarm information: - Name of the Object - Severity - Day and Hour of the Event - Description of the Event - State of the Event

Monitoring acc. to the related MIBs for each Technology (Excluding RPR)

Performance & Traffic Related Alarms	
Link State up/down	Resource Threshold

Alarm Event Filtering	
Filter outgoing alarms acc. to precedence	

Alarm Thresholds	
Threshold for Traffic Counters and Resource Status	

Equipment Related Fault Types	
Temperature of the Chassis Threshold	Fan Failure

Fault Log	
Retrieval of all current Transmission / Equipment Alarm Entries (Using syslog)	Log Files for Events and Alarms
Alarm Log Size of (at least) 500 Entries using FIFO Principle	Manual Reset of entire historical Alarm Log
Retrieval of all historical Alarm Log Entries	

Performance Monitoring & Handling	
24 Hour Interval Counters	15 min Data Information polled by TMN
15 min Interval Counters	15 Min Data Storage for 24H
Free-running Counters	24 Data Storage for 2 days

Ethernet Performance Monitoring	
Packet Counting	No. of Bytes per Port
Packets per Port	Errors acc. to MIB (CRC, truncated, etc)
Drop Packets per Port/CoS	

Maintenance, Supervision & Diagnostics	

Transmission Diagnostics - Monitor Points	
Port Mirroring	Service Mirroring

Transmission Diagnostics - LEDs Supervision	
LED Indication of Power Status	LED Indication of Port Activity per Port
LED Indication of Equipment Failure Status (e.g. fan)	Temperature Sensor

Transmission Diagnostics - Self Monitoring / Diagnostic Functions	
Power up Self Test	Watch Dog Function for autonomous SW Reset

Equipment Diagnostics	
Error messages must be easy to read and self-explanatory.	HW Fault Indication down to individual in-field exchangeable Module / card
Monitoring of CPU, Memory and Overload	

Equipment Inventory	
Factory Module Label in non-volatile Memory	Automatic Detection of SFPs capability

Standard Compliance	

Layer 2 - Switching	
IEEE 802.1d. Local and Metropolitan Area Networks - Media Access Control (MAC) Bridges	IEEE 802.1x (Authentication)

IEEE 802.1q	IEEE 802.3
RFC 826 ARP	IEEE 802.3x Flow Control
IEEE 802.1v (VLAN Classification by protocol and port)	
Layer 3 - Routing	
RFC 2328 OSPF v2 (including MDS authentication)	RFC 1587 OSPF NSSA Option
RFC 1765 OSPF Database Overflow	RFC 2370 OSPF Opaque LSA Option
RFC 1771 Border Gateway Protocol 4	RFC 1965 Autonomous System Confederations for BGP
RFC 1966 BGP Route Reflection	RFC 1997 BGP Communities Attribute
RFC 1745 BGP/OSPF Interaction	RFC 2385 TCP MDS Authentication for BGP v4
IP Multicast	
RFC 1112 IGMP v1	RFC 1591 DNS (client operation)
RFC 2236 IGMP v2	RFC 1122 Host Requirements
IGMP v3	RFC 768 UDP
IGMP Termination	RFC 791 IP
IGMP Monitoring (in meaning of IGMP querier, same features as 3089)	RFC 792 ICMP
RFC 783 TFTP	RFC 793 TCP
RFC 951, 1542 BootP	RFC 826 ARP
Management - SNMP & MIBs & Others	
RFC 1155 Structure of MGMT Information (SMI v1)	RFC 1901 - 1907 SNMP Version 2c, SMIv2 and Revised MIB-II
RFC 1493 Bridge-MIB (D-Bridge)	RFC 1354 IP v4 Forwarding Table MIB
RFC 1757 RMON 4 Groups: Stats, History, Alarms, and Events	RFC 2922 Physical Topology MIB
Siemens Enterprise MIB (SLE)	RFC 2934 PIM MIB
RFC 1157 SNMP v1/v2c	RFC 854 Telnet
RFC-1212, RFC-1213, RFC-1215 MIP-II & TRAPs	RFC 2030 Simple Network Time Protocol v4 (SNTP)
Security	
RFC 1492 TACACS+	Radius Client
RFC 2138 RADIUS Authentication	RFC 2267 Network Ingress Filtering

2.3 Physical Specification

Mechanics

Dimensions (W x H x D)	432 x 43 x 320 mm (17.0 x 1.7 x 12.6 in)
Operating Temperature	-4~140° F (-20 ~ 60°C)
Storage Temperature	-40~176° F (-40 ~ 80°C)
Operating Humidity Range	0% to 90% Non-condensing

Power Supply

DC power voltage (Dual DC)	-48/60VDC
AC power voltage (Dual AC)	100-240VAC, 50/60Hz
Power Consumption	70W

Operating Indicators

System LEDs	RUN / DIAG / PWR A / PWR B
PON i/f LEDs	L/A
Combo type GE i/f LEDs	L/A, SPD
10GbE i/f LEDs	L/A, SPD
Console	RX / TX
MGMT	LNK / ACT

Interface Parameter

PON i/f	8 x GPON (SFP)
Combo type Gigabit Ethernet i/f	8 x 10/100/1000Base-T (RJ45) or 100/1000Base-X (SFP)
1/10Gigabit Ethernet uplink i/f	2 x 10GbE (SFP+)
Ethernet i/f for local management	10/100Base-TX (RJ45)
Serial i/f, Console	1-Port (RS232)

3 Component Options for V5824G

3.1 SFP+ Options

The following different optical SFP+ modules are available and can be inserted into the dedicated modules.

SFP Module	Description
SFPP-10GE-SR	SFP+ 10GE SR - Wavelength: 850 nm / Distance: 300 m / Mode: multi-mode - Connector: LC / Data rate: 103125 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C - 10GBASE-SR(10G)
SFPP-1GE10GE-SR	SFP+ 1GE/10GE SR - Wavelength: 850nm / Distance: 300m / Mode: multi-mode - Connector: LC / Data rate: 103125 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C - 1000BASE-SX(1G), 10GBASE-SR(10G)
SFPP-10GE-LR	SFP+ 10GE LR - Wavelength: 1310 nm / Distance: 10 km / Mode: single-mode - Connector: LC / Data rate: 103125 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C - 10GBASE-LR(10G)
SFPP-10GE-ER	SFP 10GE ER - Wavelength: 1550 nm / Distance: 40 km / Mode: single-mode - Connector: LC / Data rate: 103125 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C ~ 70 °C - 10GBASE-ER(10G)
SFPP-10GE-ZR	SFP+ 10GE ZR - Wavelength: 1550 nm / Distance: 80 km / Mode: single-mode - Connector: LC / Data rate: 103125 Gbit/s / Core type: Dual Core - Operating Temperature: 0°C ~ 70 °C - 10GBASE-ZR(10G)

Table 3   SFP+ Modules

i   Other types of SFP+ module can be also available upon customer request.

3.2   SFP Options

The following different optical SFP modules are available and can be inserted into the dedicated slots. Each SFP module contains one port.

SFP Module	Description
SFP-GE-SX	SFP GE SX - Wavelength: 850 nm / Distance: 550 m / Mode: multi-mode - Connector: LC / Data rate: 1.25Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C - 70 °C
SFP-GE-LX5	SFP GE LX5 - Wavelength : 1310nm / Distance : 5km / Mode : Singlemode - Connector : LC / Data rate : 125Gbit/s / Core type : Dual Core - Operating Temperature : 0 °C ~ 70 °C
SFP-GE-LX10	SFP GE LX10 - Wavelength: 1310 nm / Distance: 10 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C - 70 °C
SFP-GE-LX15	SFP GE LX15 - Wavelength : 1310nm / Distance : 15km / Mode : Singlemode - Connector : LC / Data rate : 125Gbit/s / Core type : Dual Core - Operating Temperature : 0 °C ~ 70 °C
SFP-GE-LX20	SFP GE LX20 - Wavelength: 1310 nm / Distance: 20 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C - 70 °C
SFP-GE-LX40	SFP GE LX40 - Wavelength: 1310 nm / Distance: 40 km / Mode: single-mode - Connector: LC / Data rate: 1.25 Gbit/s / Core type: Dual Core - Operating Temperature: 0 °C - 70 °C

Table 4   SFP Modules

SFP Module	Description
SFP-GPON-OLT20	SFP GPON OLT -. Wavelength: 1490nm/1310nm / Distance: 20km / Mode: singlemode -. Connector: SC/PC / Data rate: 2.488Gbit/s (Up), 1.25Gbit/s (Down) -. Core type : Single Core / Operating Temperature : -40 °C ~ 85 °C

Table 5   SFP Modules for GPON

| i |

Other types of SFP module can be also available upon customer request.

3.3 Power Options

Name	Description	Maximum quantity
PSU_AC	AC_power supply unit for V5824G	2
PSU_DC	DC_power supply unit for V5824G	2
PSU_blank panel	Blank panel for power supply unit	2

Table 6   Power Options

4   Ordering Information

Bases
<u>V5824G</u> 8-Ports GPON SFP, 8-Ports Combo type GbE(10/100/1000Base-T or 100/1000Base-X SFP), 2-Ports 1GE/10GE SFP+, 2 Blank Power Supply Module Slot
SFP+ Options
SFPP-10GE-SR, SFPP-1GE10GE-SR, SFPP-10GE-LR, SFPP-10GE-ER, SFPP-10GE-ZR
SFP Options
SFP-GE-SX, SFP-GE-LX5, SFP-GE-LX10, SFP-GE-LX15, SFP-LX20, SFP-GE-LX40
Power Options
PSU_DC, PSU_AC, PSU blank panel