

PRODUCT DATA SHEET

DQSP

DVI Dual Link Extension System



Revision History

Version Number	Revision Date	Page	Description of Changes
1.0	May.30.2011	ALL	Initial Version
1.1	Jul. 04.2011	6	Electrical Specification modified
1.2	Sep.16,2011	6	Electrical Specification modified
1.3	Apr.09.2012	13	Ordering Information Removed
1.4	Dec.10.2019	ALL	Renewal Specification
1.5	Jan.18.2021	7,8,9	Add to the optical characteristics

PROPRIETARY NOTE

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1. General Description

DQSP, fiber optical extension system, lets your Dual digital flat panel display signal extend up to 300 meters (1000 feet) away from host by TMDS digital signal transmission.

- High speed and long distance transmission by SC type multi Mode fibers
(Uses 2 strand multi mode SC fiber optic cable)
- TMDS video signals and EDID data are transmitted by optical fiber
- Extends up to 300m
- It can support single link and dual link.
- DVI Specification 1.0 Compliant
- Supports HDCP Compliant Device with HDCP Rev 1.1 Specification

2. General Specification

Parameter	Symbol	
	Transmitter	Receiver
Optical Converter	850nm, 7ch Transmit OSA 911nm, 1Ch VCSEL 980nm, 1Ch PIN P/D Diode	850nm, 7ch Receive OSA 980nm, 1Ch VCSEL 911nm, 1Ch PIN P/D Diode
Input and Output Signal	TMDS Signal(DVI 1.0 standard)	TMDS Signal(DVI 1.0 standard)
Video Bandwidth	3.5Gbps / Channel	
Module Dimension	50.0 x 15.1 x 75.6 mm (W x H x D)	
Module Weight	--	--
Used electrical Connector	24 PIN DVI-D Plug(input)	24 PIN DVI-D Plug(output)
Optical Connector	2 SC Connector	2 SC Connector
Recommended Fiber	50/125um Multi-mode glass-fiber	
Maximum Supported Resolution	Single Link : WUXGA(1920x1200)60Hz Dual Link : WQXGA(2560x1600)60Hz	

3. Absolute Maximum Ratings

Parameter	Rating
Storage temperature	-20°C ~ +70°C Non-Condensing
Operating temperature	0°C ~ +50°C Non-Condensing
Transportation temperature	-20°C ~ +70°C Non-Condensing
Power Supply	-0.3 ~ 5.5 V
Relative Humidity	10 ~ 80 %

NOTICE

Stresses greater than those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those indicated in the operations section for extended periods of time may affect reliability.

4. Electrical Specification

4.1 Electrical Specification

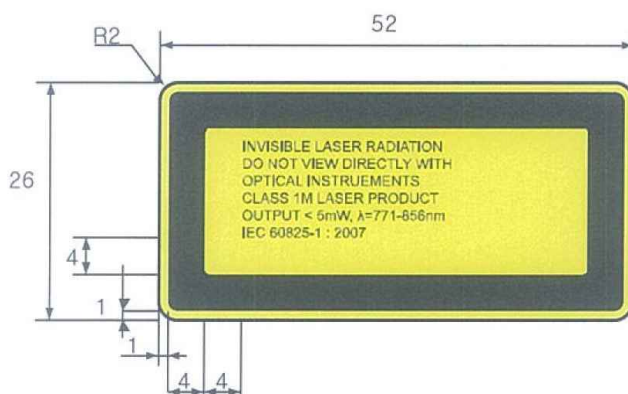
4.1.1 Transmitter Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
P O W E R	Supply Voltage (Option External Power)	V_{CC}		5.0	5.5	V	
	Power consumption	P_O	-	1.5	1.6	W	Dual
T M D S	Reference voltage for graphic signal	V_{REF}	3.1	3.3	3.5	V	
	Single-ended high level input voltage	VH	$V_{REF} - 0.01$		$V_{REF} + 0.01$	V	
	Single-ended low level input voltage	VL	$V_{REF} - 0.6$		$V_{REF} - 0.4$	V	
	Single-ended input swing voltage	V_{ISWING}	0.4		0.6	V	
	Single-ended standby input voltage		$V_{REF} - 0.01$		$V_{REF} + 0.01$	V	
	Data Output Load	RLD		50		Ω	

Transmitter module of Model DQSP includes 7 channel VCSEL (Vertical Surface Emitting Laser Diode) with 850 nm invisible laser radiation.

Do not view directly laser module of transmitter or the end of the other side of optical cable connected to transmitter with optical instrument.

Transmitter module of DQSP is Class 1M Laser Product.



4.1.2 Receiver Module

	Parameter	Symbol	Min	Typ	Max	Units	Condition
P O W E R	Supply Voltage (External Power)	V_{CC}		5.0	5.5	V	
	Power consumption	P_O	-	1.6	1.65	W	
T M D S	Reference voltage for graphic signal	V_{REF}	3.1	3.3	3.5	V	
	Single-ended output swing voltage	V_{OSWING}	0.4		0.6	V	AC couple
	Data Input Load	RLD		50		Ω	

4.2 Optical Specification

4.2.1 Transmitter Characteristics

■ Port "A"-High Speed Lanes

Parameter (per lane)	Symbol	Min	Typ	Max	Units
Average Optical Power, per Lane	P_{out}	-3.0	0.0		dBm
Optical Modulation Amplitude		-6.25			dBm
Center Wavelength – Lane 0			778		nm
Center Wavelength – Lane 1			800		nm
Center Wavelength – Lane 2			825		nm
Center Wavelength – Lane 3			850		nm
Optical Rise/Fall Time				100	Ps

■ Port "A"-Low Speed Lanes

Laser Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 4			911		nm
Data Rate			5		Mb/s
Average Optical Power	P_{avg}		-0.5		dBm
Rise/Fall Time				75	ns
Slope Efficiency	SE	0.09			mW/mA
Threshold Current	TC			3.6	mA

Photodiode Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 5			980		nm
Responsivity		0.13			mA/mW
Data Rate			5		Mb/s
Rise/Fall Time				75	ns
Maximum Optical Input Power	Pin			8	dBm
Crosstalk				1	μA

■ Port “B”

Parameter (per lane)	Symbol	Min	Typ	Max	Units
Optical Power	Pout	-3.0	0.0		dBm
Optical Modulation Amplitude		-6.25			dBm
Center Wavelength – Lane 0			778		nm
Center Wavelength – Lane 2			800		nm
Center Wavelength – Lane 2			825		nm
Center Wavelength – Lane 3			850		nm
Optical Rise/Fall Time			200		Ps

4.2.2 Receiver Characteristics

■ Port “A”-High Speed Lanes

Parameter (per lane)	Symbol	Min	Typ	Max	Units
Wavelength – Lane 0			778		nm
Wavelength – Lane 1			800		nm
Wavelength – Lane 2			825		nm
Wavelength – Lane 3			850		nm
Data Rate				3.50	Gb/s
Peak Optical Input Power	Pin			4.0	dBm
OMA Sensitivity		-14.25	-16.00		dBm

■ Port “A”-Low Speed Lanes

Photodiode Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 4			911		nm
Responsivity		0.13			mA/mW
Data Rate			5		Mb/s
Rise/Fall Time				75	ns
Maximum Optical Input Power	Pin			8	dBm
Crosstalk				1	μA

Laser Parameter	Symbol	Min	Typ	Max	Units
Wavelength - Lane 5			980		nm
Data Rate			5		Mb/s
Average Optical Power	Pavg		-0.5		dBm
Rise/Fall Time				75	ns
Slope Efficiency	SE	0.09			mW/mA
Threshold Current	TC			3.6	mA

■ Port “B”

Parameter (per channel)	Symbol	Min	Typ	Max	Units
Wavelength – Lane 0			778		nm
Wavelength – Lane 1			800		nm
Wavelength – Lane 2			825		nm
Wavelength – Lane 3			850		nm
Data Rate per Channel				1.65	Gb/s
Peak Optical Input Power	Pin		0.0	4.0	dBm
OMA Sensitivity		-14.25	-16.00		dBm

4.3 Connector Pin Assignment

4.3.1 Transmitter

DVI Dual Link

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data 2-	9	T.M.D.S. Data 1-	17	T.M.D.S. Data 0-
2	T.M.D.S. Data 2+	10	T.M.D.S. Data 1+	18	T.M.D.S. Data 0+
3	T.M.D.S. Data 2/4 Shield	11	T.M.D.S. Data 1/3 Shield	19	T.M.D.S. Data 0/5 Shield
4	T.M.D.S. Data 4-	12	T.M.D.S. Data 3-	20	T.M.D.S. Data 5-
5	T.M.D.S. Data 4+	13	T.M.D.S. Data 3+	21	T.M.D.S. Data 5+
6	DDC Clock (SCL)	14	Out +5V Power	22	T.M.D.S Clock Shield
7	DDC Data (SDA)	15	Ground (for out +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot Plug Detect	24	T.M.D.S Clock-

DVI Single Link

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No Connect	13	No Connect	21	No Connect
6	DDC Clock (SCL)	14	Out +5V Power	22	T.M.D.S Clock Shield
7	DDC Data (SDA)	15	Ground (for +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot Plug Detect	24	T.M.D.S Clock-

4.3.2 Receiver

DVI Dual Link

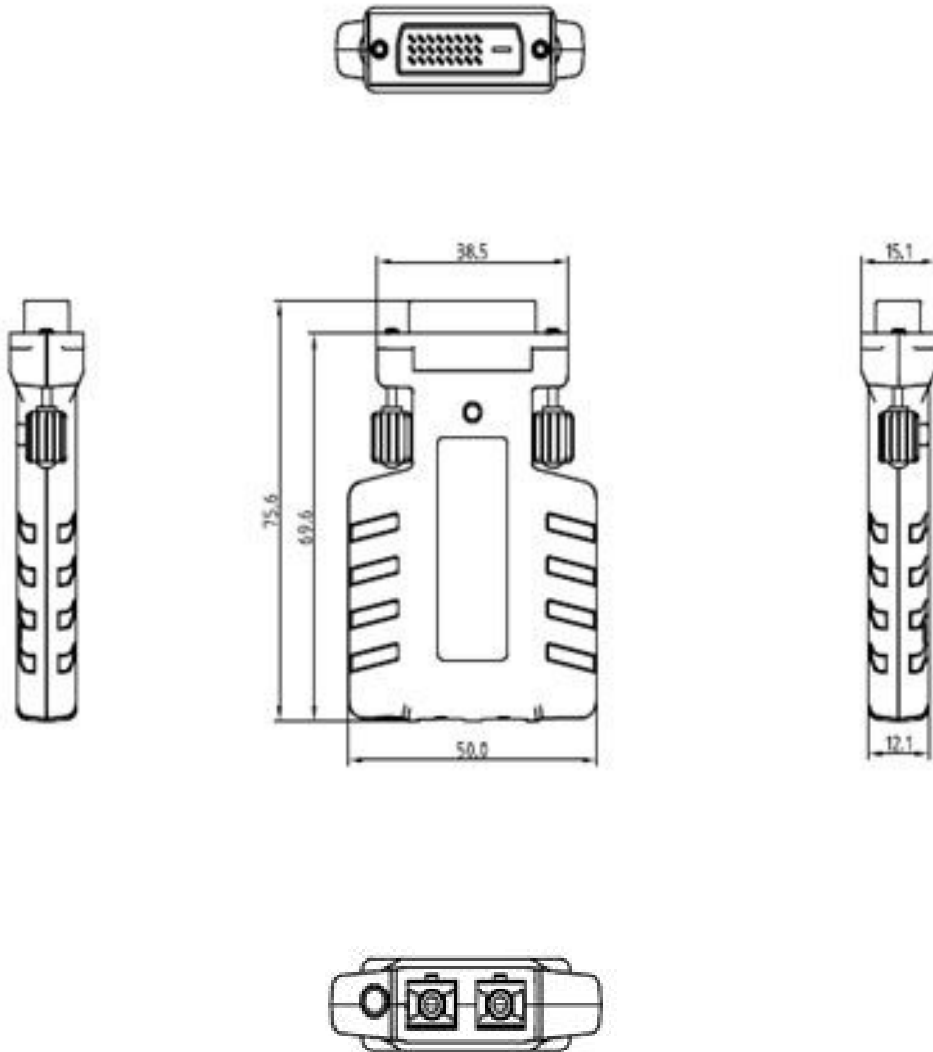
Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data 2-	9	T.M.D.S. Data 1-	17	T.M.D.S. Data 0-
2	T.M.D.S. Data 2+	10	T.M.D.S. Data 1+	18	T.M.D.S. Data 0+
3	T.M.D.S. Data 2/4 Shield	11	T.M.D.S. Data 1/3 Shield	19	T.M.D.S. Data 0/5 Shield
4	T.M.D.S. Data 4-	12	T.M.D.S. Data 3-	20	T.M.D.S. Data 5-
5	T.M.D.S. Data 4+	13	T.M.D.S. Data 3+	21	T.M.D.S. Data 5+
6	DDC Clock (SCL)	14	Out +5V Power	22	T.M.D.S Clock Shield
7	DDC Data (SDA)	15	Ground (for out +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot Plug Detect	24	T.M.D.S Clock-

DVI Single Link

Pin	Signal Assignment	Pin	Signal Assignment	Pin	Signal Assignment
1	T.M.D.S. Data2-	9	T.M.D.S. Data1-	17	T.M.D.S. Data0-
2	T.M.D.S. Data2+	10	T.M.D.S. Data1+	18	T.M.D.S. Data0+
3	T.M.D.S. Data2 Shield	11	T.M.D.S. Data1 Shield	19	T.M.D.S. Data0 Shield
4	No Connect	12	No Connect	20	No Connect
5	No Connect	13	No Connect	21	No Connect
6	DDC Clock (SCL)	14	Out +5V Power	22	T.M.D.S Clock Shield
7	DDC Data (SDA)	15	Ground (for +5V)	23	T.M.D.S Clock+
8	No Connect	16	Hot Plug Detect	24	T.M.D.S Clock-

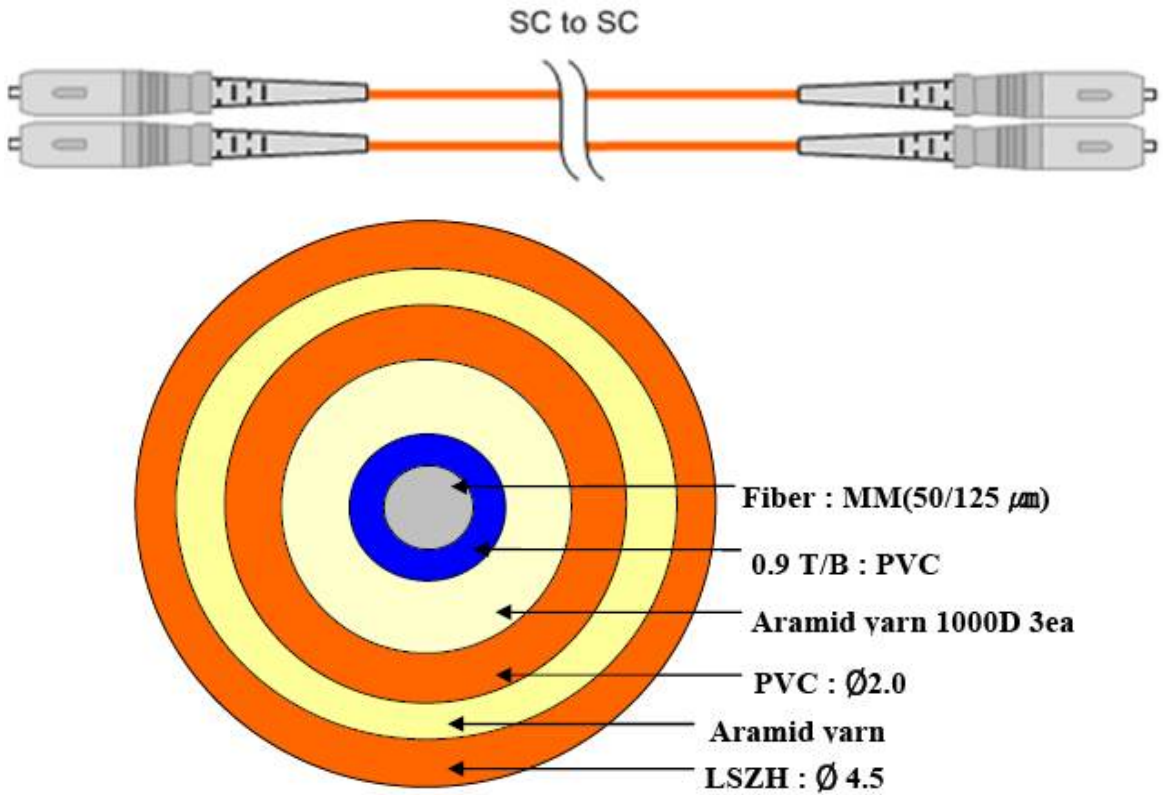
5. Mechanical Specification

5.1 Transmitter and Receiver Case Dimension

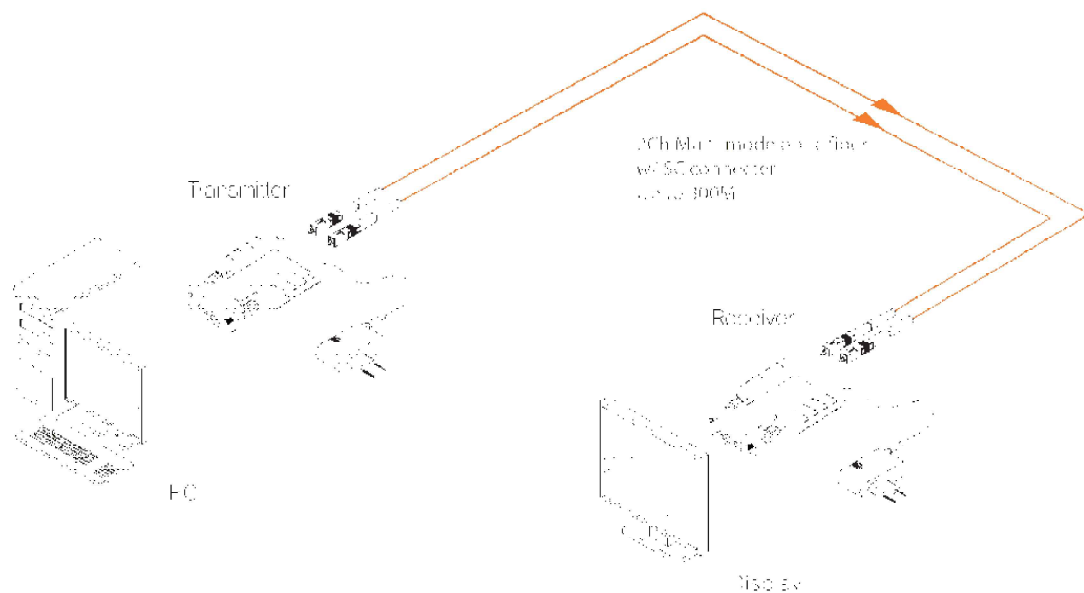


5.2 Optical Cable

- Optical Fiber Cable (MMF 50/125)



5.3 Connection



6. Regulatory

6.1 EMC & Safety Agency approval

6.1.1 CE-EMC compliance:

This Product is investigated to EN55022:2009+A1:2010, EN60601-1-2:2007 Medical and EN61000-3-3:2008

6.1.2 FCC compliance:

This Product is investigated to FCC 47CFR part 2 and part 15

6.1.3 Eye Safety

CLASS 1M LASER PRODUCT-IEC60825-1:2007(2nd Edition)

7. Packing Information

Set(Unpacking, DQSP Only)	50.0mm*75.6mm*15.1mm	120.0g
Package(1Set, Inner Box Packing)	192.0mm*127.0mm*56.0mm	645.0g
Package(Multi, 32PCS Packing)	595.0mm*305.0mm*345.0mm	10.0Kg

8. RoHS

OPHIT is fully aware of the requirement under the **Restriction of Hazardous Substances in Electrical and Electronic Equipment Directive EU 2015/863(RoHS3)**, which adds four new restricted substances to the previous Directive 2011/65/EU(RoHS2).

Hereby we guarantee that we do not intentionally use the substances described below and based on third party chemical analysis the thresholds of the substances as indicated are not exceeded for our all products.

Substance	CAS #	RoHS Limity by % (PPM)
Lead (Pb)	7439-92-1	0.1% (1000 PPM)
Mercury (Hg)	7439-97-6	0.1% (1000 PPM)
Hexavalent Chromium (CrVI)	15840-29-9	0.1% (1000 PPM)
Polybrominated Biphenyls (PBB)	-	0.1% (1000 PPM)
Polybrominated Diphenyl Ethers (PBDE)	-	0.1% (1000 PPM)
Cadmium (Cd)	7440-43-9	0.01% (100 PPM)
Bis(2-Ethylhexyl) phthalate(DEHP)	117-81-7	0.1% (1000 PPM)
Benzyl butyl phthalate(BBP)	85-68-7	0.1% (1000 PPM)
Dibutyl Phthalate(DBP)	84-74-2	0.1% (1000 PPM)
Diisobutyl Phthalate(DIBP)	84-69-5	0.1% (1000 PPM)

Banned Substances by RoHS Directive 2011/65/EU+2015/863/EU, EN50581:2012

OPHIT will continue to monitor any new amendments/changes to Directive and subsequently review our all products with regards to compliance. OPHIT will also ensure that any new information is communicated to its customers, suppliers and stakeholders as required.

Signature : Jong-Kook, Moon



Title/Issue date : President/July.22.2019

9. REACH

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals(REACH), Annex XV II entered into Force in June 2009, and affects all companies producing, Importing, using, or placing Products on the European market. The aim of the REACH regulation is to ensure a high Level of protection of human health and the environment from chemical substances.

OPHIT Co., Ltd substances management system follow and complies with the current revision of the REACH Regulation on the substances as identified by ECHA(European Chemical Agency).

OPHIT Co., Ltd products are considered articles as defined in REACH Article 3(3). These products/articles under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7(1)(b) for registration of substances contained in these products/articles does not apply.

OPHIT Co., Ltd products/articles, do not contain **Substances of very High Concern** or if there **SVHC** in the product/article, the content is less than the 0.1%(wt/wt) as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Therefore the requirement in REACH Article 7(2) to notify ECHA if a product/article contains more than 0.1% wt/wt of an SVHC and tonnage exceeding 1 tone per importer per year is not applicable.

OPHIT's European operations do not manufacture or import chemicals, therefore OPHIT Co., Ltd has no obligation to register substances.



Jong-Kook, Moon
President

OPHIT Co., Ltd ACCEPTS NO DUTY TO NOTIFY USERS OF THIS OF DECLARATION OF UPDATES OR CHANGES TO THIS DECLARATION.