






## APPROVAL SHEET

CUSTOMER : \_\_\_\_\_  
 DEVICE NAME : Fiber Optic Transmitter  
 CODE No. : \_\_\_\_\_  
 ITEM No. : RFT-6112  
 ISSUED DATE : 2009. 11. 03

### [ CUSTOMER APPROVAL ]





ACCEPT No.				
ACCEPT DATE				
ACCEPT	INSPECTER	CHECK	APPROVAL	COMMENT

ISSUED DEPT.	ISSUE	REVIEW	REVIEW	APPR'D
				

**RAYTRON**  **레이트론 (주)**

Tel : 82-42-863-2840  
 Fax : 82-42-861-0843  
<http://www.raytron.co.kr>

CUSTOMER :

<b>RECORD OF REVISION</b>					DATE		2009. 11. 03			
					MODEL NAME					
PART NAME		FIBER OPTIC MODULE			TYPE No.		RFT-6112			
PART No.					APPROVAL DATE		2009. . .			
No.	DATE	PAGE	REVISED CLAUSE	REVISION DETAILS		Ma	Ch	AP		
 <b>RAYTRON CO., LTD.</b> <b>HEAD OFFICE &amp; FACTORY (KOREA)</b> 104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA TEL : +82-42-863-2840 FAX : +82-42-861-0843 <b>FACTORY (CHINA)</b> 6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA TEL : +86-755-2744-7373 FAX : +86-755-2744-7235					MANAGER		CHECK		APPROVAL	
										
					FILE No.		RIS-091103-01			

CUSTOMER :

SPECIFICATIONS		SHEET No.	1 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## 1. Application

This specification applies to the outlines of the fiber-optic Transmitter unit for Digital audio Interface

- DVD players
- CD players
- PC-sound card
- Digital TV
- Set top box

## 2. Description

The opto-electrical component is assembled with AlGaInP LED And a driver IC. It Transforms the electrical signal to optical signal and be transmitted by plastic optical fiber.  
The component is operated at free voltage and has good performance at low dissipation, Current, steady Light output and efficient light coupling.



## 3. Features

- Wide Supply Voltage : 2.7 ~ 5.5V
- High Thermal Resistance Housing case.
- High speed transmission of high quality audio signal such as DVD players and AV amplifiers.  
signal transmission speed : 13.2Mbps Max. (NRZ signal)
- Low jitter ( $\Delta t_j$  : 1ns typ.)
- Directly connectable to modulation IC for digital audio equipment.
- Uni-directional data transmission using plastic optical fiber cable.

## 4. Absolute Maximum Rating

- Supply Voltage : -0.5 ~ +0.7 V
- Input Voltage : -0.5 ~ Vcc +0.5
- Operating Temperature : -20°C ~ +70°C
- Storage Temperature : -30°C ~ +80°C
- Soldering Temperature : 260°C



### RAYTRON CO., LTD.

#### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
TEL : +82-42-863-2840 FAX : +82-42-861-0843

#### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

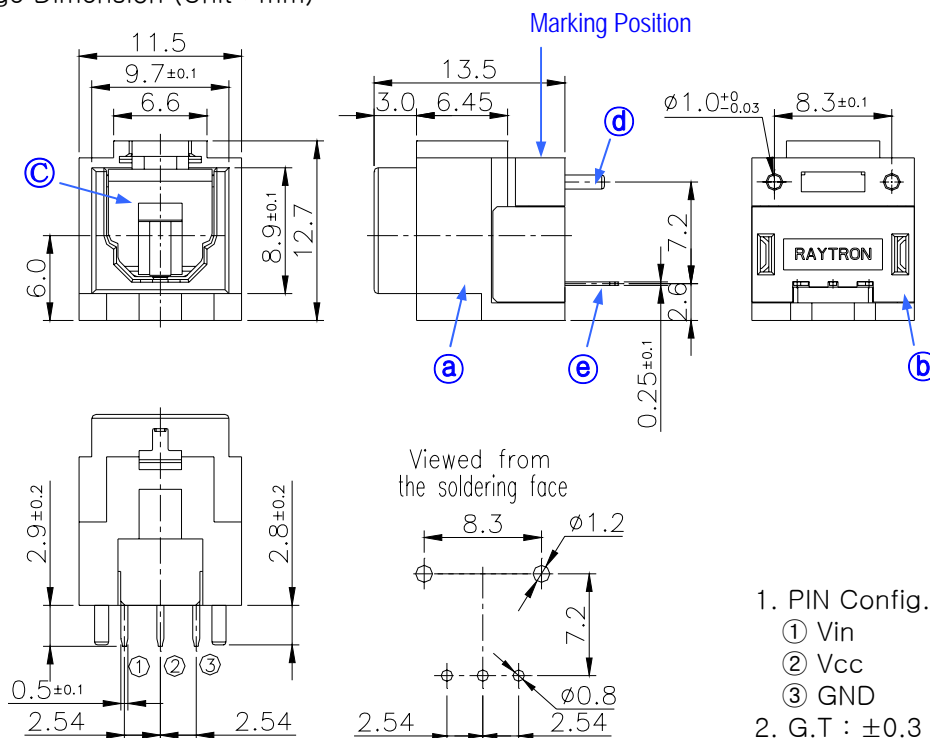
MANAGER	CHECK	APPROVAL
FILE No.	RIS-091103-01	

CUSTOMER :

SPECIFICATIONS		SHEET No.	2 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

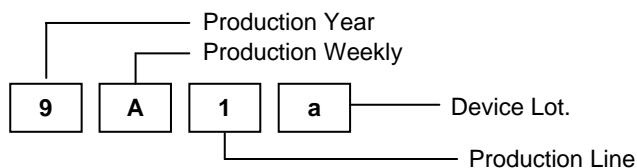
## 5. Appearance & Dimensions

### 1) Package Dimension (Unit : mm)



- PIN Config.
  - Vin
  - Vcc
  - GND
- G.T : ±0.3

### 2) Marking Position



### 3) Material List

Symbol	Description	Material
(a)	Main Body	PA66+GF30% (Color : Black)
(b)	Back Cover	PA66+GF30% (Color : Black)
(c)	Shutter	PA66+GF30% (Color : Black)
(d)	Fixing Guide	Iron (Sn Plating)
(e)	Lead pin	Cu Alloy (Ag Plating)



## RAYTRON CO., LTD.

**HEAD OFFICE & FACTORY (KOREA)**  
 104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
 TEL : +82-42-863-2840 FAX : +82-42-861-0843

**FACTORY (CHINA)**  
 6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
 TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER	CHECK	APPROVAL
FILE No.	RIS-091103-01	

CUSTOMER :

SPECIFICATIONS		SHEET No.	3 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## 6. Electro-Optical Characteristics

### 1) Absolute Maximum Rating

(at 25℃ Unless otherwise note)

Parameter	Symbol	Ratings	Unit
Supply Voltage	V <sub>CC</sub>	-0.5 ~ +7.0	V
Input Voltage	V <sub>IN</sub>	-0.5 ~ V <sub>CC</sub> +0.5	V
Operating Temperature	T <sub>opr.</sub>	-20 ~ +70	℃
Storage Temperature	T <sub>stg.</sub>	-30 ~ +80	℃
Soldering Temperature (※1)	T <sub>sol</sub>	260	℃

(※1) 6s or less / time up to 2times

### 2) Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Supply Voltage	V <sub>CC</sub>	2.7	5.0	5.5	V	
Operating Transfer Rate	F <sub>DATA</sub>	—	—	13.2	Mb/s	NRZ Signal, Duty50%
High Level Input Voltage	V <sub>IH</sub>	2.0	—	—	V	V <sub>CC</sub> =5.0V
Low Level Input Voltage	V <sub>IL</sub>	—	—	0.8	V	V <sub>CC</sub> =5.0V

### 3) Electro - Optical Characteristics

(Ta=25℃) (V<sub>CC</sub>=5.0V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Peak Emission Wavelength	λ <sub>P</sub>	630	660	690	nm	
Optical Power Output Coupling with Fiber (※1)	P <sub>C</sub>	-21	-18	-15	dBm	Ref. to Fig.1
Supply Current	I <sub>CC</sub>	—	8	13	mA	Ref. to Fig.2
L → H delay Time	T <sub>PLH</sub>	—	—	180	ns	Ref. to Fig.3
H → L delay Time	T <sub>PHL</sub>	—	—	180	ns	Ref. to Fig.3
Pulse Width Distortion	Δtw	-15	—	+15	ns	Ref. to Fig.3
Jitter of Output Current	Δtj	—	1	15	ns	Ref. to Fig.4

(※1) Measure with a standard optical fiber, Peak value.



## RAYTRON CO., LTD.

### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
 TEL : +82-42-863-2840 FAX : +82-42-861-0843

### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
 TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER	CHECK	APPROVAL
FILE No.	RIS-091103-01	

# SPECIFICATIONS

SHEET No.

4 of 10

DATE

2009. 11. 03

PART NAME

FIBER OPTIC MODULE

MODEL NAME

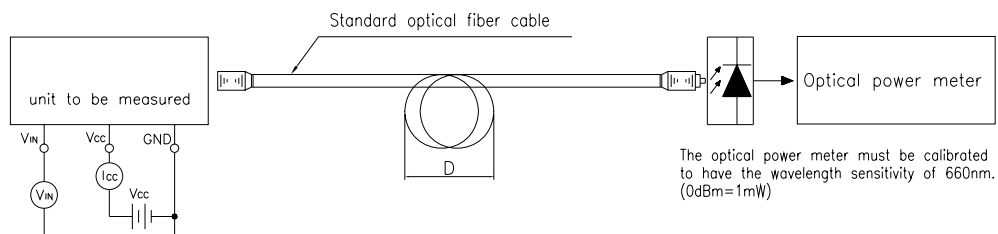
PART No.

TYPE No.

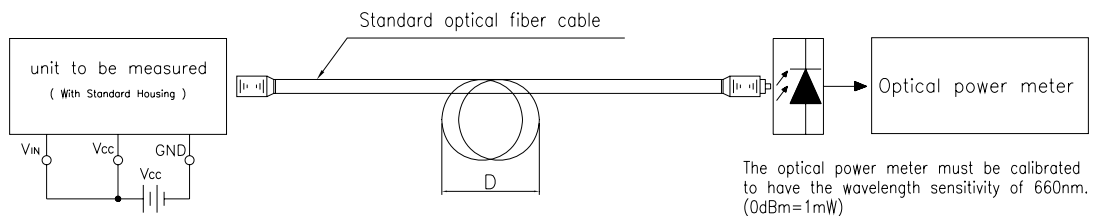
RFT-6112

## 4) Measurement Conditions

### ① Fig.1 Measuring Method of Optical output coupling with Fiber

Notes (1)  $V_{CC}=5.0\pm0.05V$  (ON-state)

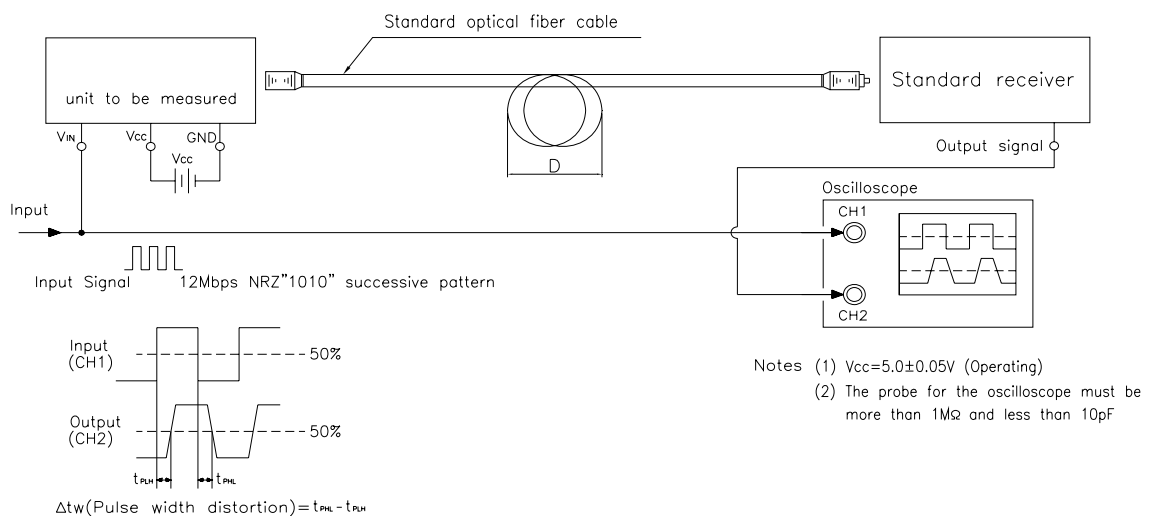
### ② Fig.2 Measuring Method of Dissipation Current / Input Voltage

Notes (1)  $V_{CC}=5.0\pm0.05V$  (Operating)

(2) To bundle up the standard fiber cable, make it into a loop with the diameter(D) of 10cm or more.

Parameter	Conditions	Judgement Method
$V_{IH}$	$V_{IN} = 2.0V$ or more	$-21 \leq PC \leq -15$ dBm , $I_{CC} = 13mA$ or less
$V_{IL}$	$V_{IN} = 0.8V$ or more	$PC \leq -36$ dBm , $I_{CC} = 13mA$ or less

### ③ Fig.3 Measuring Method of Pulse Response

Notes (1)  $V_{CC}=5.0\pm0.05V$  (Operating)(2) The probe for the oscilloscope must be more than  $1M\Omega$  and less than  $10pF$ 

## RAYTRON CO., LTD.

### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
TEL : +82-42-863-2840 FAX : +82-42-861-0843

### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER

CHECK

APPROVAL

FILE No.

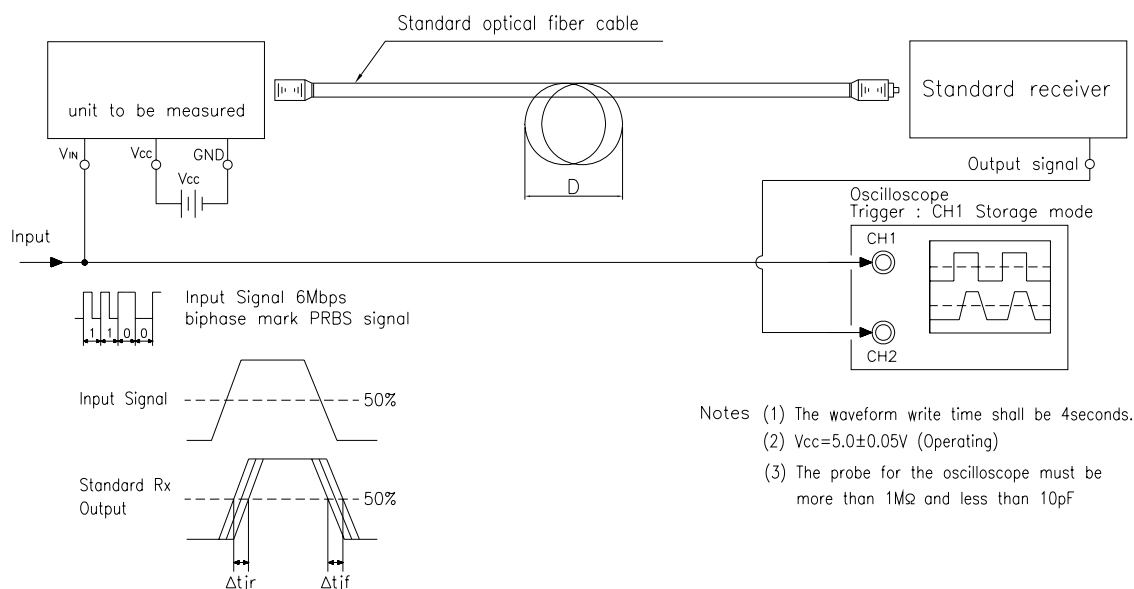
RIS-091103-01

# SPECIFICATIONS

SHEET No. 5 of 10  
DATE 2009. 11. 03

PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## ④ Fig.4 Measuring Method of Dissipation Current / Input Voltage



Parameter	Symbol	Test Conditions
Low → High Pulse Delay Time	$T_{PLH}$	Refer to the above prescriptions
High → Low Pulse Delay Time	$T_{PHL}$	Refer to the above prescriptions
Pulse width Distortion	$\Delta tw$	$\Delta tw = T_{PHL} - T_{PLH}$
Low → High Jitter	$\Delta t_{jr}$	Set the trigger on the rise of input signal to measure the jitter of the rise of output
High → Low Jitter	$\Delta t_{jf}$	Set the trigger on the fall of input signal to measure the jitter of the fall of output

### ※ Note

- Standard of operating :  $V_{CC}=5.0V\pm0.05V$ .
- Input signal : 6.6Mbps Bi-phase PRBS  $V_{IH}\geq 2.0V$ ,  $V_{IL}\leq 0.8V$ ,  $t_r$ ,  $t_f\leq 5ns$ .
- Standard fiber optical cable (POF, 1m)
- To bundle up the standard fiber cable, make it into a loop with the diameter of 10cm or more.
- At measure jitter, set the oscilloscope to the storage mode and write time to 4 seconds.



## RAYTRON CO., LTD.

### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
TEL : +82-42-863-2840 FAX : +82-42-861-0843

### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER CHECK APPROVAL

*[Signatures]*

FILE No. RIS-091103-01

CUSTOMER :

SPECIFICATIONS		SHEET No.	6 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## 7. Reliability Test Item and Standard.

- 1) All output products shall satisfy below Reliability test items.
- 2) Related sampling quantity and acceptance/failure judgment standard accordance with MIL standard MIL-STD-883 is as listed below.

① Confidence level : 90%

② LTPD : 10% / 20%

No	Test Items	Test Conditions	Failure Judgement	Samples(n)
				Defective(c)
1	High temp. and High humidity Operating	Ta= +85℃ 85% RH /500h Vcc=5 V applying	Failure judgment criteria Of each characteristics Given in 1 to6 Must be with The Following range.  1) Pc Brightness attenuate Difference : 20% less  2) Icc Current attenuate Difference : 20% less  3) Tr Time attenuate Difference : 20% less  3) Tf Time attenuate Difference : 20% less	n=22, C=0
2	High temp. Storage (*2)	Ta= +85℃/500h		n=22, C=0
3	Low temp. Storage (*2)	Ta= -30℃/500h		n=22, C=0
4	Temperature Cycling (*2) (*3)	Ta= -20℃ to +85℃ (30min/30min) 20 Cycle test		n=22, C=0
5	Room temp. Operation life	Ta= +25℃ Vcc= 5V applying 500h		n=22, C=0
6	Soldering heat (*4)	Tsol = 260℃ ± 5℃, 5 sec		n=11, C=0

\*1. Supply voltage of load test is 5V.(Standard Jig of Raytron)

\*2. Electro-optical characteristics shall be satisfied after leaving 2 hours in the normal condition.

\*3. Temperature cycle test shall repeat above condition 20 times under no load.

\*4. For 5sec (after mounting on PCB with thickness of 1.6mm)

☞ In cased any trouble or question arises related to above test items, both parties agree to make full discussion and covering the said matters.

 <b>RAYTRON CO., LTD.</b> <b>HEAD OFFICE &amp; FACTORY (KOREA)</b> 104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA TEL : +82-42-863-2840 FAX : +82-42-861-0843 <b>FACTORY (CHINA)</b> 6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA TEL : +86-755-2744-7373 FAX : +86-755-2744-7235	MANAGER	CHECK	APPROVAL
			
	FILE No.	RIS-091103-01	



CUSTOMER :

SPECIFICATIONS		SHEET No.	7 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## 8. Mechanical Characteristics

Parameter	Min.	Typ.	Max.	Unit	Conditions
Insertion force, Withdrawal force	4	–	40	N	Initial value when STD-Fiber optic Cable used

## 9. Outgoing Inspection

### 1) Inspection lot

Inspection shall be carried out per each delivery lot.

### 2) Inspection method

A single sampling plan, normal inspection level II based on ISO2859 shall be adopted.

Parameter		Inspection items	AQL(%)
Major Defect	1	Satisfies electro-optical characteristics in parameter	0.4
	2	It should have no disconnection of lead terminal. It should have no dust and solder that would hinder PCB insertion	
	3	Free from foreign on the connector coupling portion that would hinder plug insertion.	
Minor defect	1	Deformation of case and lead terminal	1.5
	2	Stamp should be indicated at fixed position	

## 10. Soldering Condition

- The distance between holes should be the same as that of between terminal leads of the component to avoid any stress during the soldering process.  
This may lead to the open circuit. Also, lead forming should be done before soldering process not to apply any stress to the inside of the epoxy resin.
- Not to apply any stress to the component during the soldering process.
- Recommended soldering condition.

Item	Conditions
Pre-heating & Solder Bath	<ul style="list-style-type: none"> <li>Pre-heating : Less than 90℃</li> <li>Solder Bath : 260℃</li> <li>Soldering Area : 3mm away from the bottom the epoxy resin</li> <li>Dip time : Less than 5seconds. Less than twice.</li> </ul>
Soldering – Iron	<ul style="list-style-type: none"> <li>Temperature : Less than 350℃, within 3 seconds.</li> </ul>

※ Note

- Not to apply high temperature exceeding the maximum storage temperature to the epoxy resin.
- Not to apply any force to the epoxy resin at high temperature.



## RAYTRON CO., LTD.

### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
TEL : +82-42-863-2840 FAX : +82-42-861-0843

### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER	CHECK	APPROVAL
FILE No.	RIS-091103-01	

CUSTOMER :

SPECIFICATIONS		SHEET No.	8 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

4) Washing

Some chemicals may damage the epoxy resin.

Ethyl-alcohol is recommended under the following condition.


Chemical washing	* Temperature : Less than 45℃ * Wash time : Less than 3 minutes
Ultrasound washing	* Power : Less than 15W * Wash time : Less than 3 minutes

## 11. Notice

- 1) The circuit application examples in this publication are provided to explain representative applications of RAYTRON devices and are not intended to guarantee any circuit design or license any intellectual property rights. RAYTRON takes no responsibility for any problems related to any intellectual property right of a third party resulting from the use of RAYTRON's device.
- 2) Contact RAYTRON in order to obtain the latest device specification sheets before using any RAYTRON reserves the right to make changes in the specification, characteristics, data, materials, structure, and other contents described herein at any time without notice in order to improve design or reliability. Manufacturing locations are also subject to change without notice.
- 3) Observe the following points when using any devices in this publication. RAYTRON takes no responsibility for damage caused by improper use of the devices which does not meet the condition and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions.
  - ① The devices in this publication are designed for use in general electronic equipment designs such as :
    - . Personal computers
    - . Office automation equipment [ terminal ]
    - . Telecommunication equipment
    - . Test and measurement equipment
    - . Industrial control
    - . Audio visual equipment
    - . Consumer electronics

 <b>RAYTRON CO., LTD.</b> <b>HEAD OFFICE &amp; FACTORY (KOREA)</b> 104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA TEL : +82-42-863-2840 FAX : +82-42-861-0843 <b>FACTORY (CHINA)</b> 6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA TEL : +86-755-2744-7373 FAX : +86-755-2744-7235	MANAGER	CHECK	APPROVAL
			
	FILE No.	RIS-091103-01	

CUSTOMER :




SPECIFICATIONS		SHEET No.	9 of 10	
		DATE	2009. 11. 03	
PART NAME	FIBER OPTIC MODULE	MODEL NAME		
PART No.		TYPE No.	RFT-6112	
<p>② Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when RAYTRON devices are used for or in connection with equipment that requires higher reliability such as :</p> <ul style="list-style-type: none"> <li>- Transportation control and safety equipment (aircraft, trains, automobiles, etc.)</li> <li>- Traffic signals</li> <li>- Gas leakage sensor breakers</li> <li>- Alarm equipment</li> <li>- Various safety devices, etc.</li> </ul> <p>③ RAYTRON devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as :</p> <ul style="list-style-type: none"> <li>- Space application</li> <li>- Telecommunication equipment</li> <li>- Nuclear power control equipment</li> <li>- Medical and other life support equipment.</li> </ul> <p>4) Contact a RAYTRON representative in advance when intending to use RAYTRON devices for any "specific" application other than those recommended by RAYTRON or when it is unclear which category mentioned above controls the intended use.</p> <p>5) This publication is the proprietary product of RAYTRON and is copyrighted, with all rights reserved. Under the copyright laws, no part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, in whole or in part, without the express written permission of RAYTRON. Express written permission is also required before any use of this publication may be a third party.</p> <p>6) Contact and consult with a RAYTRON representative if there are any questions about the contents of this publication .</p>				
 <b>RAYTRON CO., LTD.</b> <b>HEAD OFFICE &amp; FACTORY (KOREA)</b> 104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA TEL : +82-42-863-2840 FAX : +82-42-861-0843 <b>FACTORY (CHINA)</b> 6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA TEL : +86-755-2744-7373 FAX : +86-755-2744-7235		MANAGER	CHECK	APPROVAL
		FILE No.	RIS-091103-01	

CUSTOMER :

SPECIFICATIONS		SHEET No.	10 of 10
		DATE	2009. 11. 03
PART NAME	FIBER OPTIC MODULE	MODEL NAME	
PART No.		TYPE No.	RFT-6112

## 12. Packing Specifications

### 1) Label Specification (Bar Code Sticker)

Item	 
Device	
Lot No.	
Q'ty	
S / N	
Remark	
	

Label Dimensions (Unit : mm)

Label Type	L	W	Remark
Label #1	65	40	

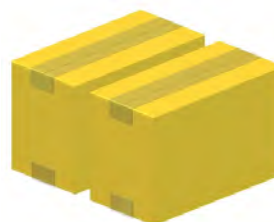
### 2) Box Specifications & Packing Method

(Unit : mm)

Packing Type	Materials	L x W x H	Quantity
Tray	PET	273 x 140 x 20	100 pcs
RTT-#1	Corrugated Cardboard	279 x 139 x 179	1,000 pcs
RTT-#2	Corrugated Cardboard	295 x 290 x 205	2,000 pcs
RTT-#3	Corrugated Cardboard	620 x 310 x 450	8,000 pcs



1. Put 100pcs of products in a tray.



2. Pile 10pcs x2 of tray.



4. Put 6pcs of #2 packing boxes in a #3 packing box.



3. Put them(2pcs of #1) in a #2 packing box.






## RAYTRON CO., LTD.

### HEAD OFFICE & FACTORY (KOREA)

104-6, Moonji-Dong, Yusung-Gu, Daejeon, KOREA  
TEL : +82-42-863-2840 FAX : +82-42-861-0843

### FACTORY (CHINA)

6/F, BlockA, Huafeng GongYeYuan, Bao'an72, Shenzhen, CHINA  
TEL : +86-755-2744-7373 FAX : +86-755-2744-7235

MANAGER	CHECK	APPROVAL
		
FILE No.	RIS-091103-01	