

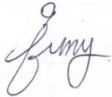




APPROVAL SHEET

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

[CUSTOMER APPROVAL]

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| ACCEPT No. | | | | |
| ACCEPT DATE | | | | |
| ACCEPT | INSPECTER | CHECK | APPROVAL | COMMENT |
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| | ISSUE | REVIEW | REVIEW | APPR'D |
| ISSUED DEPT. |  | |  |  |



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

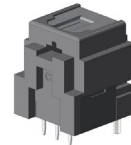
1. Application

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 (Δt_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

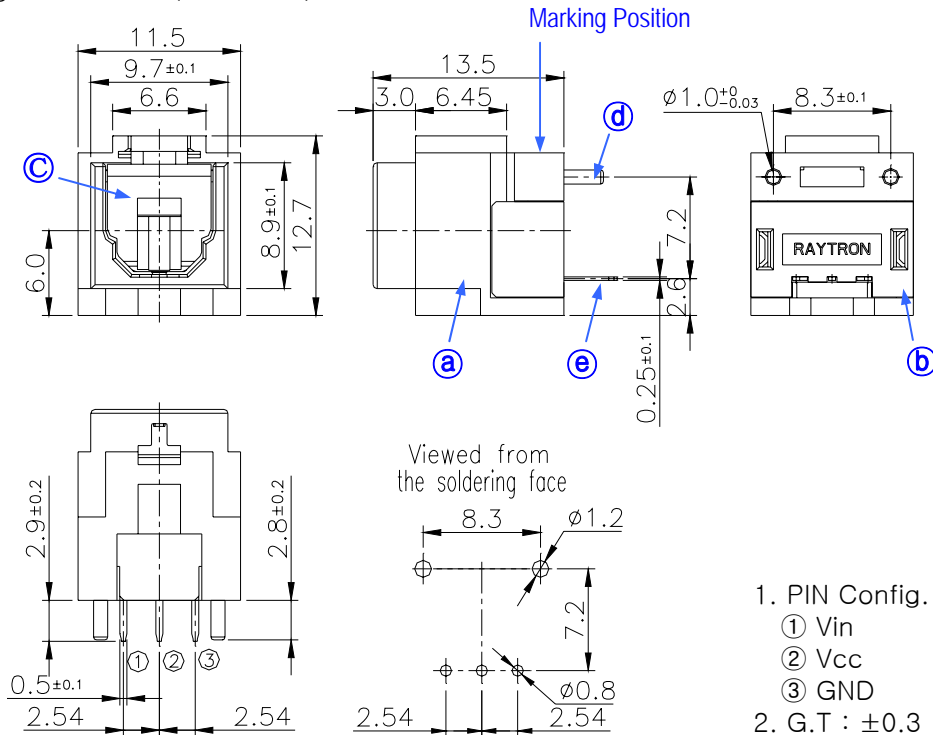
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| | | | |
|-------------------------|--------------------|------------|--------------|
| <h1>SPECIFICATIONS</h1> | | SHEET No. | 2 of 10 |
| | | DATE | 2009. 11. 03 |
| PART NAME | FIBER OPTIC MODULE | MODEL NAME | |
| PART No. | | TYPE No. | RFT-6112 |

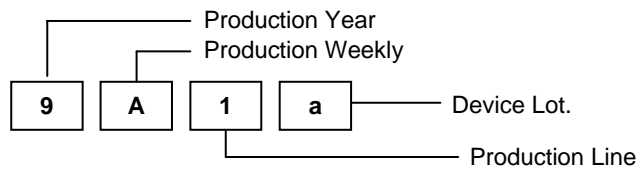
5. Appearance & Dimensions

1) Package Dimension (Unit : mm)



1. PIN Config.
 - ① Vin
 - ② Vcc
 - ③ GND
2. 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) |



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| FILE No. | RIS-091103-01 | |

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|-----------------------|--------------------|------------|--------------|
| 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°C Unless otherwise note)

| Parameter | Symbol | Ratings | Unit |
|----------------------------|-------------------|-----------------------------|------|
| Supply Voltage | V _{CC} | -0.5 ~ +7.0 | V |
| Input Voltage | V _{IN} | -0.5 ~ V _{CC} +0.5 | V |
| Operating Temperature | T _{opr.} | -20 ~ +70 | °C |
| Storage Temperature | T _{stg.} | -30 ~ +80 | °C |
| Soldering Temperature (※1) | T _{sol} | 260 | °C |

(※1) 6s or less / time up to 2times

2) Recommended Operating Conditions

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

3) Electro - Optical Characteristics (T_a=25°C) (V_{CC}=5.0V)

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|------------------|------|------|------|------|---------------|
| Peak Emission Wavelength | λ _P | 630 | 660 | 690 | nm | |
| Optical Power Output Coupling with Fiber (※1) | P _C | -21 | -18 | -15 | dBm | Ref. to Fig.1 |
| Supply Current | I _{CC} | - | 8 | 13 | mA | Ref. to Fig.2 |
| L → H delay Time | T _{PLH} | - | - | 180 | ns | Ref. to Fig.3 |
| H → L delay Time | T _{PHL} | - | - | 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 |

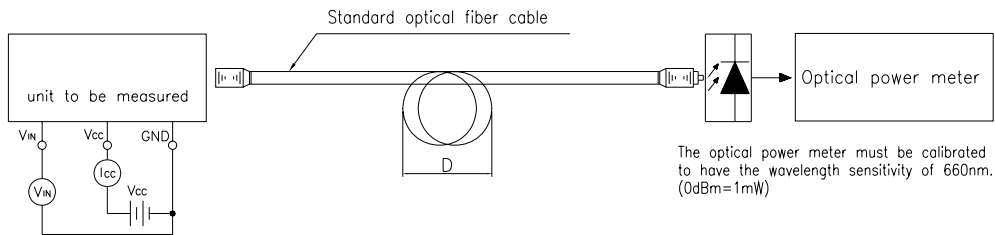
(※ 1) Measure with a standard optical fiber, Peak value.

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| | | | |
|-------------------------|--------------------|------------|--------------|
| <h1>SPECIFICATIONS</h1> | | 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

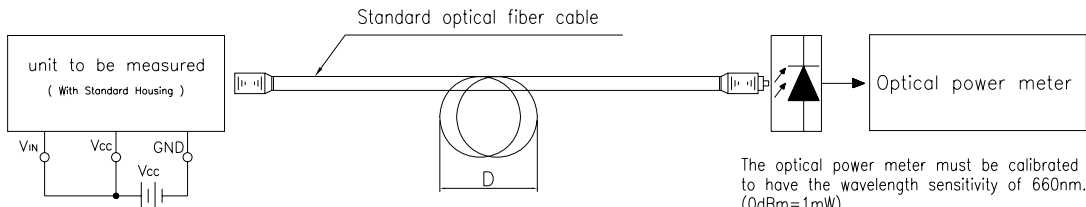
① Fig.1 Measuring Method of Optical output coupling with Fiber



The optical power meter must be calibrated to have the wavelength sensitivity of 660nm. (0dBm=1mW)

Notes (1) Vcc=5.0±0.05V (ON-state)

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



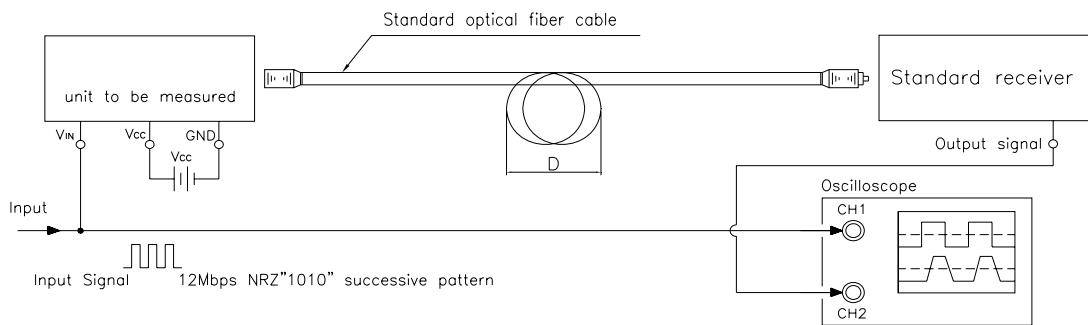
The optical power meter must be calibrated to have the wavelength sensitivity of 660nm. (0dBm=1mW)

Notes (1) Vcc=5.0±0.05V (Operating)

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

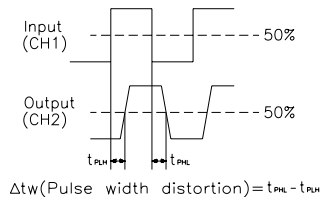
| Parameter | Conditions | Judgement Method |
|-----------------|--------------------------------|---|
| V _{IH} | V _{IN} = 2.0V or more | -21 ≤ PC ≤ -15 dBm , I _{cc} = 13mA or less |
| V _{IL} | V _{IN} = 0.8V or more | PC ≤ - 36 dBm , I _{cc} = 13mA or less |

③ Fig.3 Measuring Method of Pulse Response



Notes (1) Vcc=5.0±0.05V (Operating)

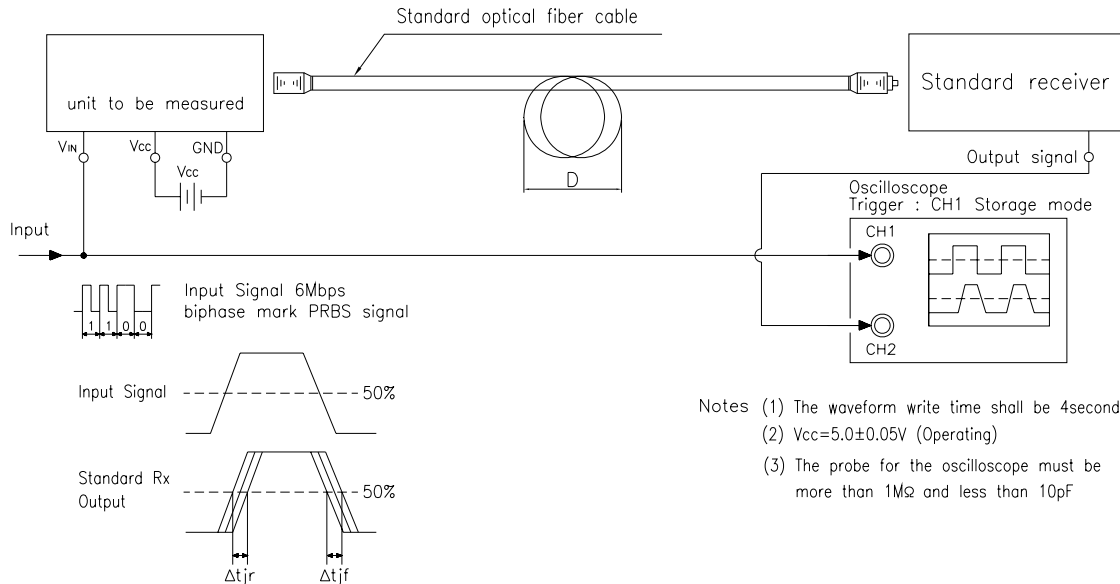
(2) The probe for the oscilloscope must be more than 1MΩ and less than 10pF



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| | <i>Jimmy</i> | <i>[Signature]</i> | <i>Kim Jung</i> |
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|-------------------------|--------------------|------------|--------------|
| <h1>SPECIFICATIONS</h1> | | 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 | Δtw | Δtw = T _{PHL} - T _{PLH} |
| Low → High Jitter | Δtjr | Set the trigger on the rise of input signal to measure the jitter of the rise of output |
| High → Low Jitter | Δtjf | 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±0.05V.
- Input signal : 6.6Mbps Bi-phase PRBS V_{IH}≥2.0V, V_{IL}≤0.8V, tr, tf≤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.



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| | | | |
|-----------------------|--------------------|------------|--------------|
| 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 case any trouble or question arises related to above test items, both parties agree to make full discussion and covering the said matters.

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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

- 1) 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.
- 2) Not to apply any stress to the component during the soldering process.
- 3) Recommended soldering condition.

| Item | Conditions |
|------------------------------|---|
| Pre-heating & Solder Bath | - Pre-heating : Less than 90℃ - Solder Bath : 260℃ - Soldering Area : 3mm away from the bottom the epoxy resin - Dip time : Less than 5seconds. Less than twice. |
| Soldering - Iron | - Temperature : Less than 350℃, within 3 seconds. |

※ Note

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

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|-----------------------|--------------------|------------|--------------|
| 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 |

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 - . Test and measurement equipment
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| | | | |
|-----------------------|--------------------|------------|--------------|
| SPECIFICATIONS | | SHEET No. | 9 of 10 |
| | | DATE | 2009. 11. 03 |
| PART NAME | FIBER OPTIC MODULE | MODEL NAME | |
| PART No. | | TYPE No. | RFT-6112 |

- 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 :
- Transportation control and safety equipment (aircraft, trains, automobiles, etc.)
 - Traffic signals
 - Gas leakage sensor breakers
 - Alarm equipment
 - Various safety devices, etc.
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 - Telecommunication equipment
 - Nuclear power control equipment
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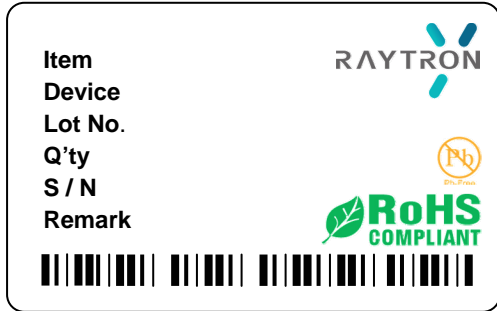
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|-----------------------|--------------------|------------|--------------|
| SPECIFICATIONS | | SHEET No. | 10 of 10 |
| | | DATE | 2009. 11. 03 |
| PART NAME | FIBER OPTIC MODULE | MODEL NAME | |
| PART No. | | TYPE No. | RFT-6112 |

12. Packing Specifications

1) Label Specification (Bar Code Sticker)



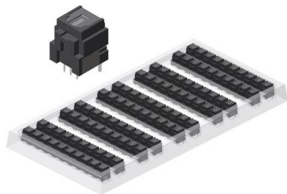
Label Dimensions (Unit : mm)

| Label Type | L | W | Remark |
|------------|----|----|--------|
| Label #1 | 65 | 40 | |

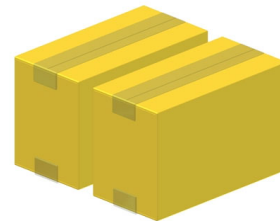
2) Box Specifications & Packing Method

(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.



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



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



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