



FIBER OPTIC TRANSMITTING MODULE

■ **FEATURES**

- 1) Conform to EIAJ standard CP-1201 (For Digital audio interfaces including fiber optic inter-connections).
- 2) TTL interface.
- 3) LED is driven by differential circuit.
- 4) +3V ~ +5V single power supply.
- 5) High speed signal transmission (12.5M NRZ signal).
- 6) ESD tolerance IC > 8KV.
- 7) Housing heat deflection temperature 240 °C (@ 1.8MPa / ISO75)

■ **APPLICATIONS**

- 1) Digital audio equipment: PC sound cards, Notebook and Portable DVD Player.
- 2) Navigation system.

■ **MAXIMUM RATINGS (Ta= 25 °C)**

Characteristic	Symbol	Rating	Units
Supply Voltage	V _{CC}	-0.5 to 7	V
Input Voltage	V _{IN}	-0.5 to V _{CC} +0.5	V
Operating Temperature	T _{opr}	-20 to 70	°C
Storage Temperature	T _{stg}	-30 to 80	°C



■ RECOMMENDED OPERATING CONDITIONS AND ELECTRICAL CHARACTERISTICS (T_a=25 °C , V_{cc}=5V)

Characteristic	Symbol	Condition	Min	Typ	Max	Units
Operating Voltage	V _{cc}		2.7	-	5.25	V
Operating Current	I _{op}		-	8	13	mA
Transmitter Wavelength	λ _p		-	660	-	nm
Transmitter Light Power	P _f	*1	-21	-	-15	dBm
Data Rate	T	NRZ Code *2	DC	-	12.5	Mb/s
Pulse Width Distortion	Δ _{tw}	Pulse width 80ns Pulse cycle 160ns, CL=10pF Using APRX179	-25	-	25	ns
Jitter	Δ _{tj}		-	4	25	ns
Low to High Delay Time	t _{PLH}		-	100	180	ns
High to Low Delay Time	t _{PHL}		-	100	180	ns
High Level Input Voltage	V _{IH}		2.0	-	-	V
Low Level Input Voltage	V _{IL}		-	-	0.8	V
High Level Input Current	I _{IH}		-	-	20	μA
Low Level Input Current	I _{IL}		-	-	-0.4	mA

*1: Fiber insertion measure peak value.

*2: For data rate > 12Mb/s(NRZ), the duty factor must be such as kept 25 to 75%.

■ MECHANICAL ELECTRO-OPTICAL CHARACTERISTICS (JACK)

Characteristic	Symbol	Condition	Min	Typ	Max	Units
Insertion and Withdrawal Force	F _p	*1	3.9	-	34.3	N
Contact Resistance	R _{con}	*2	-	-	30	mΩ
Isolation Resistance	R _{iso}	D.C.500V, 1min	100	-	-	MΩ

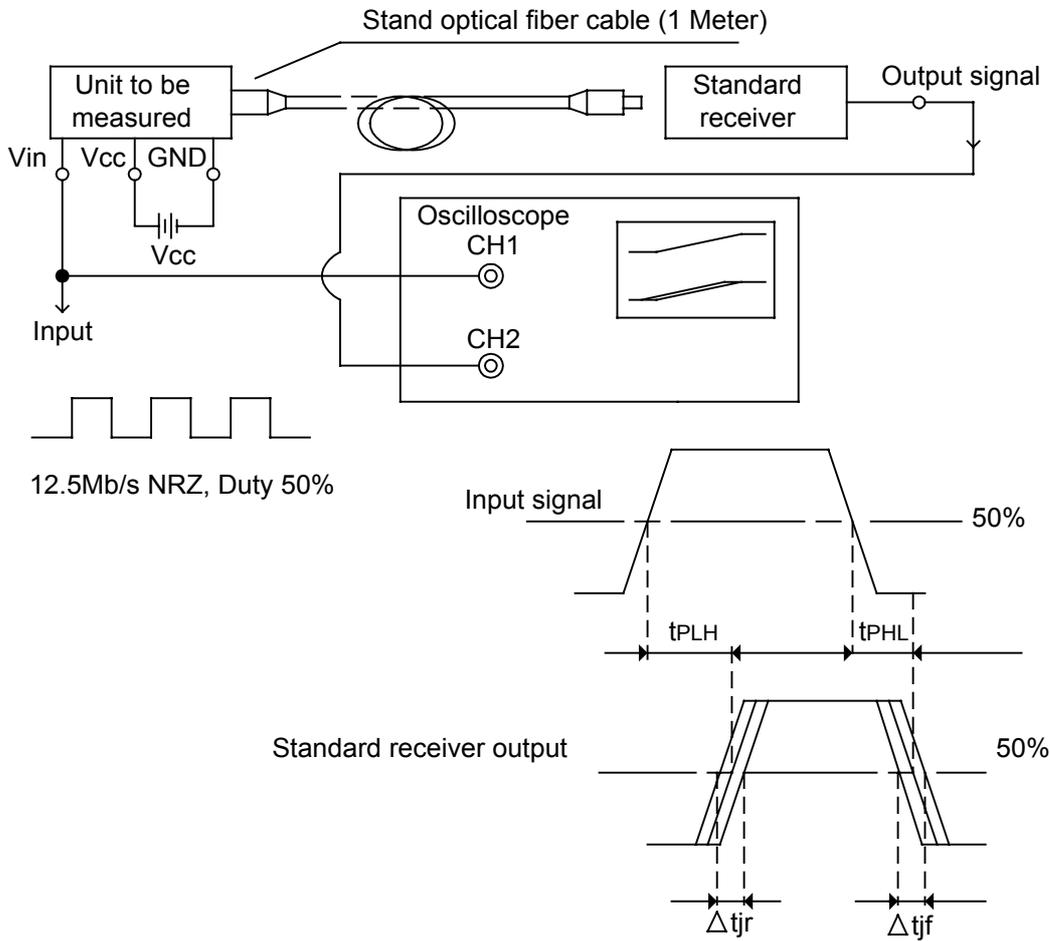
*1: Using JIS C6560 standard plug (φ3.5) for test.

*2: It measures at 100mA or less 1000Hz at the condition of inserting JIS C6560 plug.

The APT_X179J light transmitting unit satisfies EIAJ CP-1201 digital audio interface standard.



■ TEST CIRCUIT

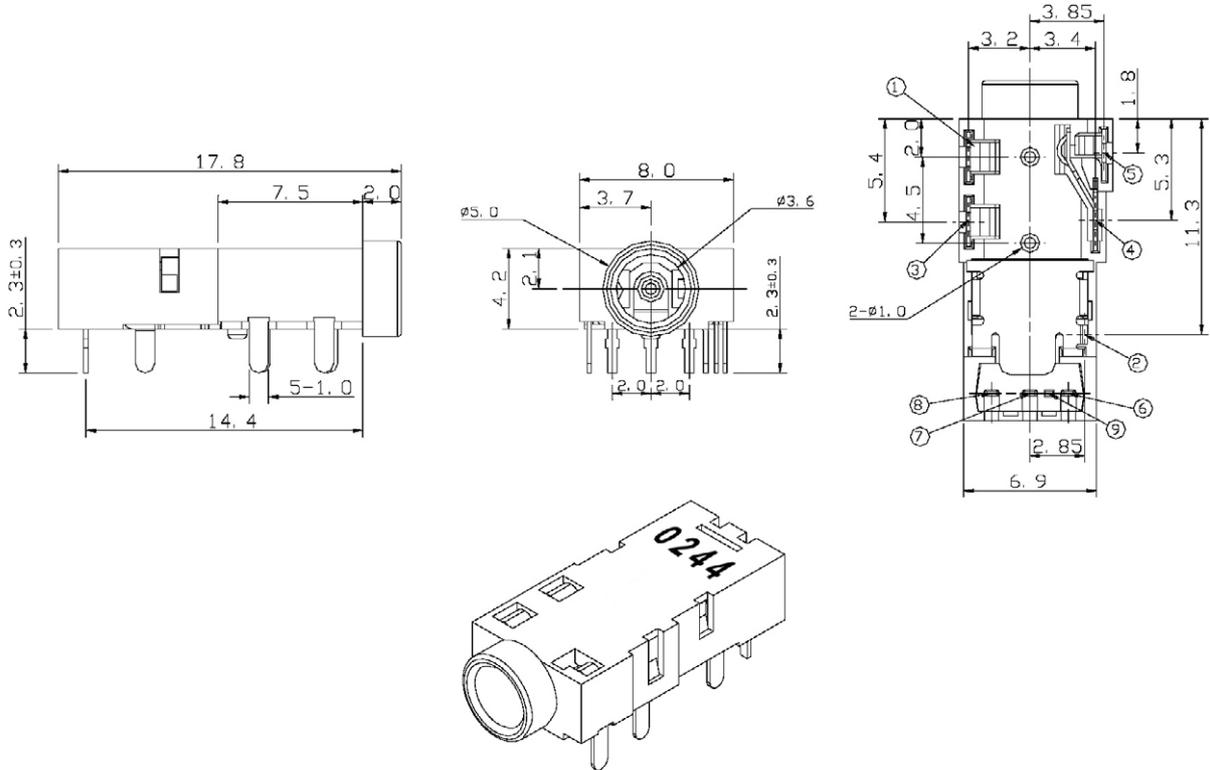


■ COMMENTS

No.	Test Item	Symbol
1	Low to High Pulse Delay Time	t_{PLH}
2	High to Low Pulse Delay Time	t_{PHL}
3	Pulse Width Distortion $\Delta tw = t_{PHL} - t_{PLH}$	Δtw
4	High Level Output Voltage	V_{OH}
5	Low Level Output Voltage	V_{OL}



■ PACKAGE DIMENSION Unit: mm



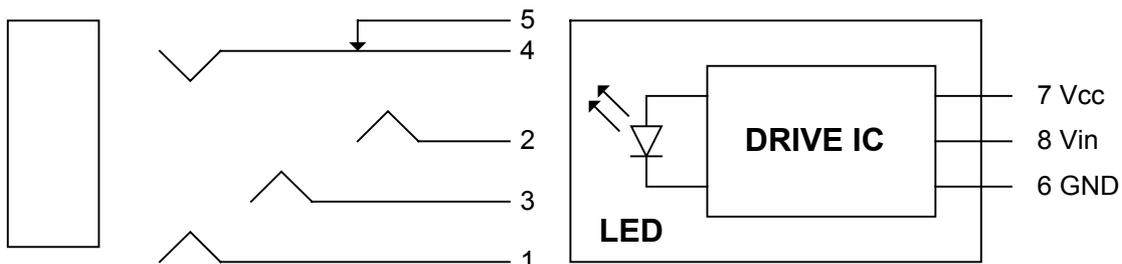
Notes:

- 1) All dimensions are in millimeters.
- 2) General Tolerance: ± 0.2mm.
- 3) Pin 1 ~ 5 golden plating.

Pin Function:

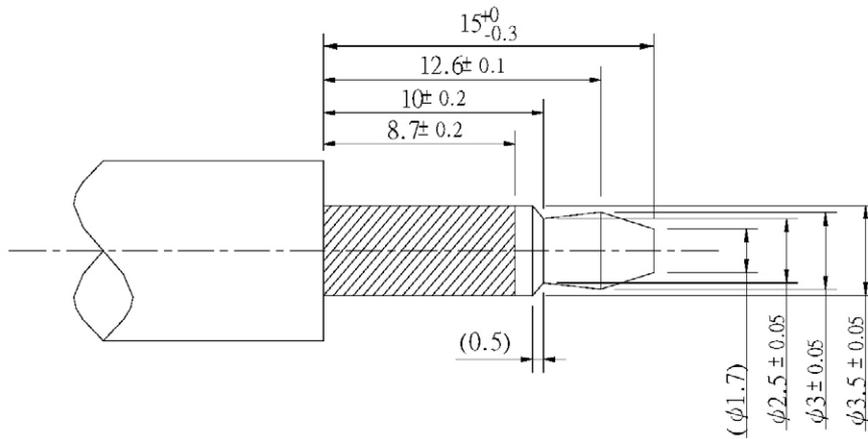
- 1~ 5 : jack terminal (1,5:detector ; 4:GND ; 2:left channel ; 3:right channel)
- 6~ 10 : device terminal (6:GND ; 7:Vcc ; 8:Vin ; 9,10:internal connection)

Jack Terminal Configuration:

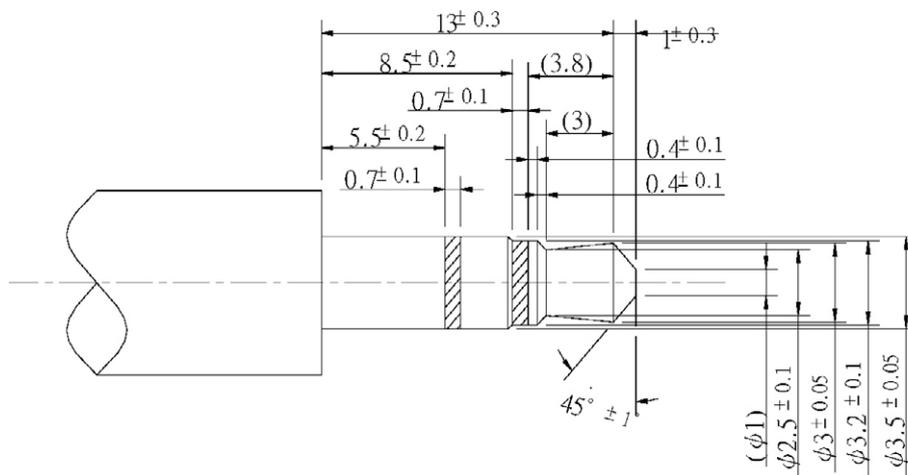




Optical circular plug (satisfys EIAJ RC-5720B):

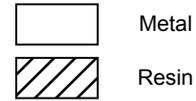
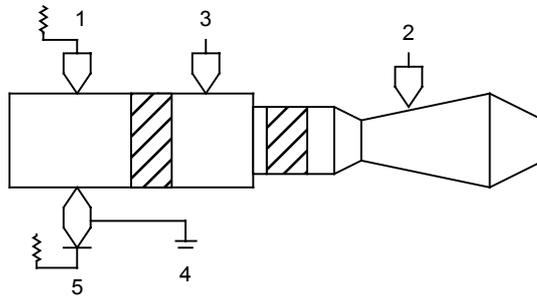


3-pole small-sized concentric plug (satisfys JIS C 6560):

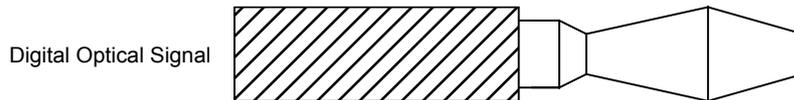




■ OPTICAL MINI-JACK CONNECTION



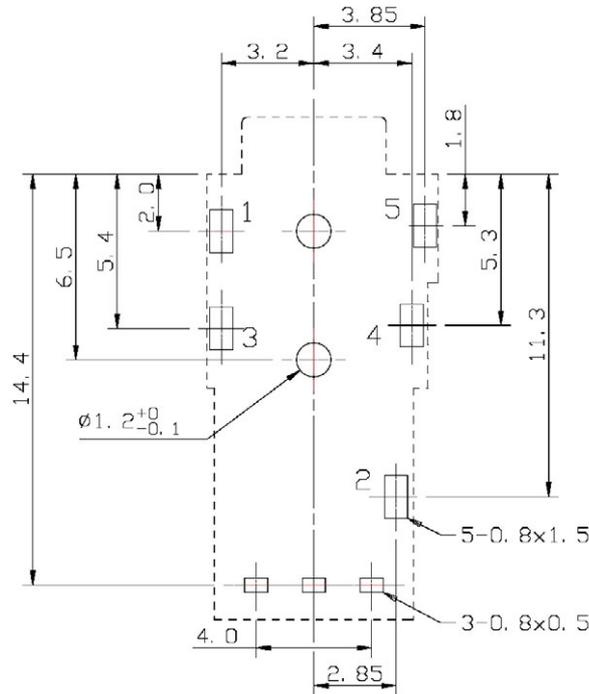
Input Side	Output Side
LINE IN MIC	LINE OUT HEAD PHONE
Optical Digital Input	Optical Digital Output



Type of plug	Output of terminal		Output of terminal
	5	1	2, 3
Analog Electricity	L	L	Signal data input/output
Digital Optics	L	H	Signal data output
No plug	H	H	-



■ PCB LAYOUT FOR ELECTRICAL CIRCUIT



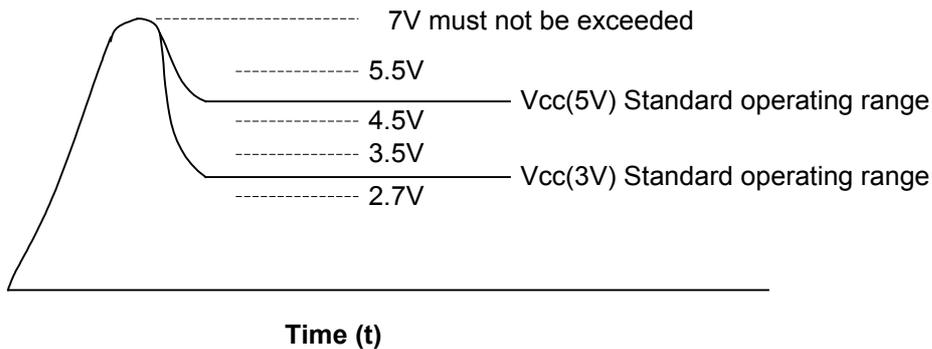
Recommended Pads Layout
<BOTTOM VIEW>

Note:

- 1) Unit : mm
- 2) Unspecified Tolerance : ± 0.3 mm
- 3) Substrate Thickness : 1.6mm

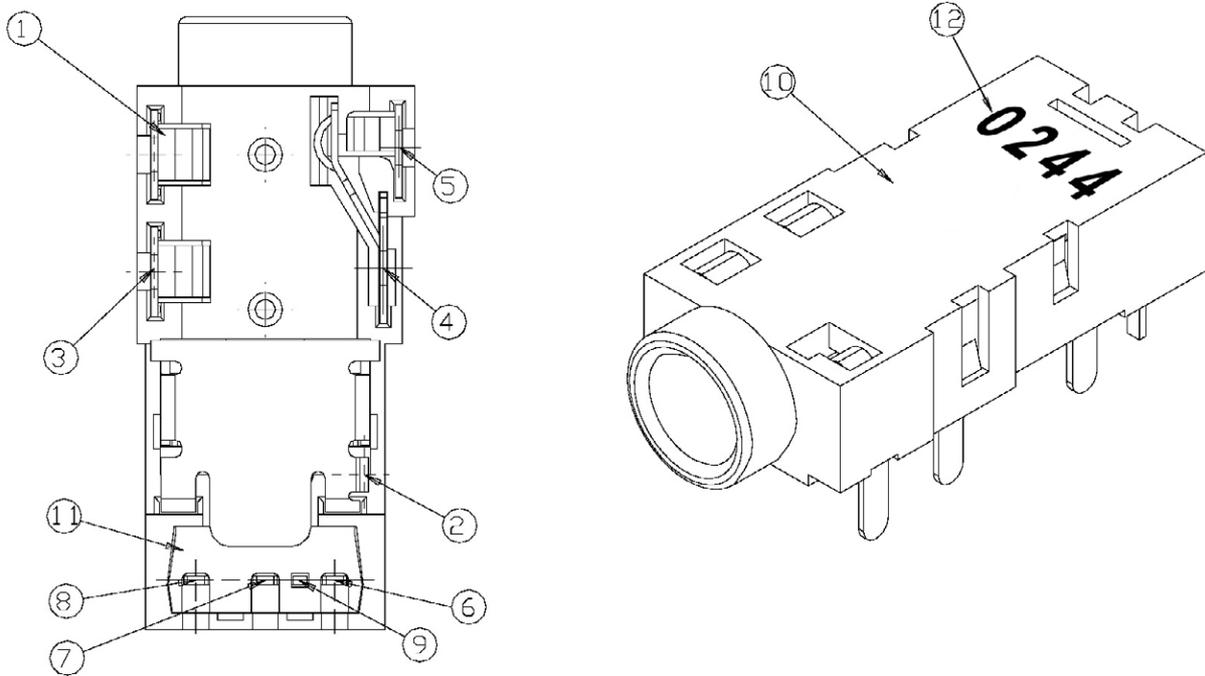
■ PRECAUTIONS FOR USING METHOD:

- 1) Connect a by-pass capacitor (0.1 μ F) close to the APT_X179J within 7mm of the unit lead frame.
- 2) Take proper electrostatic-discharge (ESD) precautions while handling these devices.
These devices are sensitive to ESD.
- 3) Please follow the conditions described in the diagram below.





■ MATERIAL DESCRIPTION

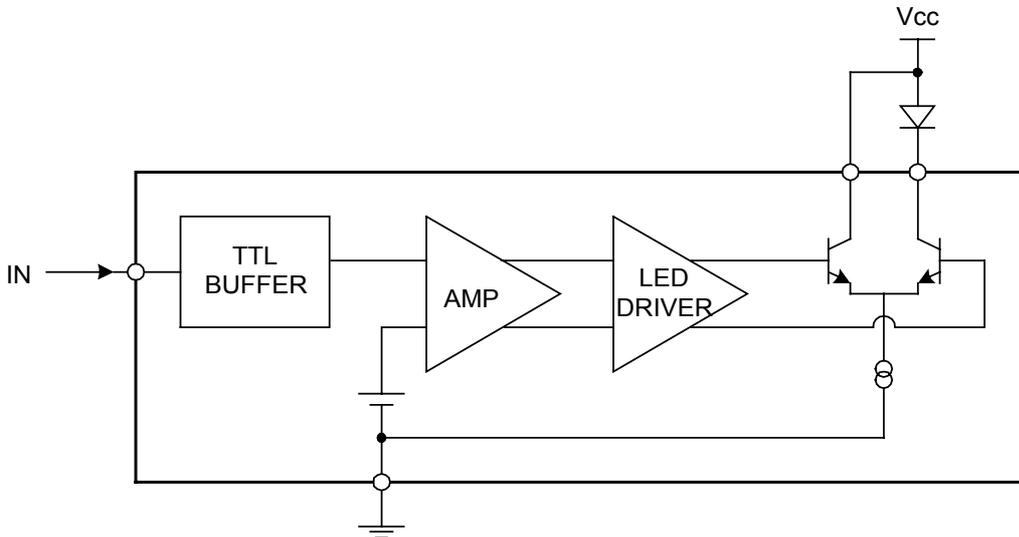


Item	Name	Material	Finish	Note
1	Jack Terminal	PBS	Au	
2	Jack Terminal	PBS	Au	
3	Jack Terminal	PBS	Au	
4	Jack Terminal	Be-Cu	Au	
5	Jack Terminal	PBS	Au	
6	GND	PBS	Tin	
7	Vcc	PBS	Tin	
8	Vin	PBS	Tin	
9	Connection	PBS	Tin	
10	Jack Body	PA9T		UL94V - 0
11	Cover	PA9T		UL94V - 0
12	Date code			*1

*1 : XXXX : Date Code (ex: 02 44)
 02 : Year 44 : Week



■ **BLOCK DIAGRAM**



■ **PRECAUTIONS DURING USE**

1) Maximum rating

The maximum ratings are the limit values which must not be exceeded when using the device. Any one of the rating must not be exceeded. If the maximum rating is exceeded, the characteristics may not be recovered. In some extreme cases, the device may be permanently damage.

2) Life of light emitters

When the optical module is used for over a long period, degeneration of characteristics is mostly due to lowering of the fiber output power (Pf). This is caused by the degradation of the optical output of the LED's used as the light source. The cause of degradation of the optical output of the LED's may be defects in wafer crystallization or mold resin stress. The detailed caused are, however, not clear.

The life of light emitters is greatly influenced by operating conditions and usage environment as well as the life characteristics unique to the device. Thus, when selecting a light emitter and setting the operating conditions, Ampson recommends that you check the life characteristics.

Depending on the environment conditions, Ampson recommends maintenance such as regular checks on the amount of optical output.

3) Soldering

Optical modules use semiconductor devices internally. However, in principle, optical modules are optical components. At soldering, take care that flux dose not contact the emitting surface or detecting surface. Also take care at flux removal after soldering. Some optical modules come with protective cap. The protective cap is used to avoid malfunction when the optical module is not in use. Not that it is not dust or waterproof.

As mentioned before, optical modules are optical component. Thus, in principle, soldering where there may be flux residue or flux removal after soldering is not recommended. Ampson recommends that soldering be performed without the optical module mounted on the board. Then, after the board is cleaned, solder the optical module manually. Do not perform any further cleaning. If the optical module cannot be soldered manually, use non-halogen (chlorine-free) flux and make sure, without cleaning, there is no residue such as chlorine. This is one of the ways to eliminate the effects of flux. In such a case, check the reliability.



4) Vibration and shock

This module is resin-molded construction with wire fixed by resin. This structure is relatively sound against vibration or shock. In actual equipment, there are some cases where vibration, shock, and stress is applied to soldered parts or connected parts, resulting in line cut. Attention must be paid to the design of the mechanism for applications which are subject to large amounts of vibration.

5) Fixing fiber optical transceiving module

Solder the fixed pin of fiber optic transmitting module APTX179XX to the printed circuit board to fix the module to the board.

6) Solvent

When using solvent for flux removal, do not use a high acid or high alkali solvent. Be-careful not to pour solvent in the optical connector ports. If solvent is inadvertently poured there, clean with cotton tips.

7) Protective cap

When the fiber optic transmitting module APTX179XX is not in use, use the protective cap.

8) Supply voltage

Use the supply voltage within the Typ. Operating condition ($V_{cc} = 5 \pm 0.25V$). Make sure that supply voltage does not exceed the maximum rating value of 7V, even instantaneously.

9) Input voltage

If a voltage exceeding the maximum rating value ($V_{cc}+0.5V$) is applied to the transmitter Input, the internal IC may degrade causing some damage. If excessive voltage due to surge may be added to the input, insert a protective circuit.

10) Soldering condition

Solder at 240 °C within ten seconds.

11) Precaution on waste

When discarding devices and packing materials, follow procedures stipulated by local regulations in order to protect the environment against contamination.

Compound semiconductors such as GaAs are used as LED materials for this module. When discarding waste or at final processing, attention must be paid to workers and the environment.

12) Precaution on use

Ampson is continually working to improve the quality and the reliability of its products.

Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing Ampson products, to observe standards of safety, and to avoid situations in which a malfunction or failure of a Ampson product could cause loss of human life, bodily injury or damage to property.

In developing your designs, please ensure that Ampson products are used within specified operating ranges as set forth in the most recent product specifications.