NEC

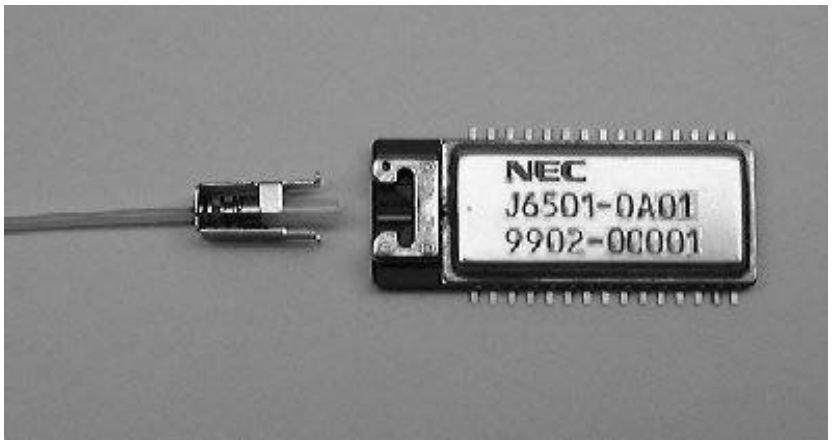
OE HYBRID

155.52Mbps Receiver

OD-J6501-0A01/HB01

OC-3: SR, IR-1, IR-2, LR-1, LR-2 and LR-3

STM-1: I-1, S-1.1, S-1.2, L-1.1, L-1.2 and L-1.3



11th September, 2001
Rev.7

NEC

- Contents -

NEC

1. Product Number

Product Number	Specification	Operating Case Temperature Range
OD-J6501-0A01	SONET OC-3 SR, IR-1, IR-2, LR-1, LR-2 and LR-3, ITU-T G.957 I-1, S-1.1, S-1.2, L-1.1, L-1.2, L-1.3 compliant	0 to +75 deg.C
OD-J6501-HB01		-40 to +85 deg.C

Pigtail fiber cord is not included with the above products; it has to be separately ordered. The applicable pigtail fiber cords are listed below. Please refer to section 9-6 for connecting a pigtail cord to the above products.

Product Number	Connector Type	Fiber Cord Length
OD-S524-SC-MM	SC	51 to 55 cm
OD-S524-FCPC-MM	FC	
OD-S524-MUJ-MM	MUJ	
OD-S524-MU-MM	MU	

2. Specifications

2-1. Absolute Maximum Ratings

Parameter	Specification		Unit	Note
	Min	Max		
Supply Voltage (Vcc)	0	+4.0	V	
Storage Temperature	-40	+85	deg.C	
Optical Input Power		0	dBm	

2-2. Environmental Conditions

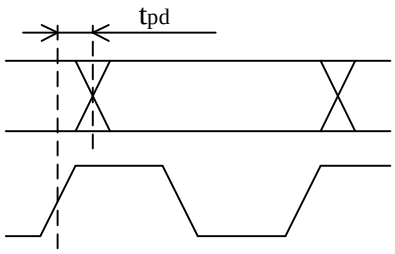
Parameter	Specification	Note
Data Rate	155.52 Mbps	
Data Format	Scrambled NRZ	Scrambler is not included.
Transmission Cable	Single-mode fiber	SI-10/125
Operating Case Temperature Range	0 to +75 deg.C	OD-J6501-0A01
	-40 to +85 deg.C	OD-J6501-HB01
Supply Voltage (Vcc)	+3.3V +/-5%	
Power Consumption	0.3 W(Typ)	Under condition at +25 deg.C, +3.30V
	0.45 W(Max)	Under condition at +85 deg.C, +3.47V

2-3. Optical Signal Interface Specifications

Parameter	Specification		Unit	Note
	Min	Max		
Sensitivity		-34	dBm	
Overload	0		dBm	
Reflectance of Receiver		-25	dB	
Operating Wavelength Range	1260	1360	nm	
	1430	1580		
Optical Signal Polarity	Positive logic			

2-4. Electrical Interface Specifications

a) Data and clock signal

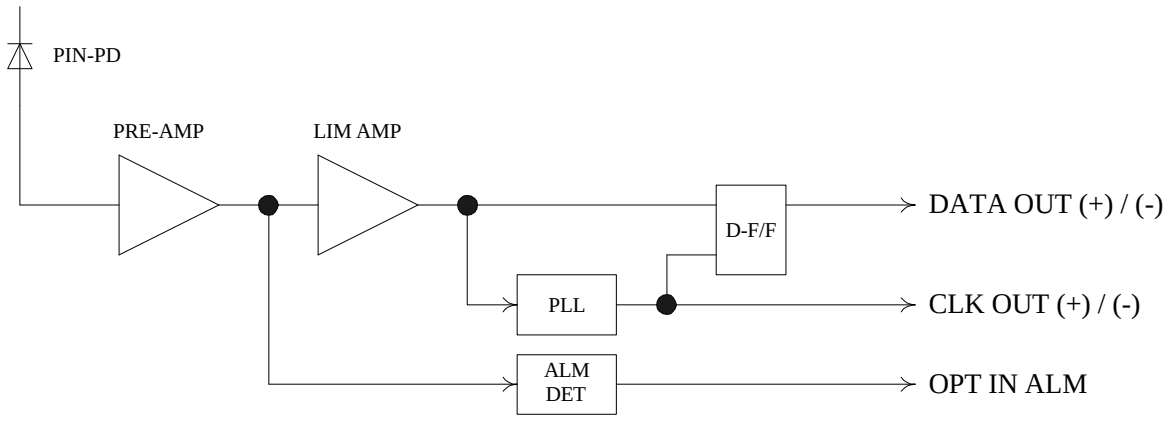
Parameter	Specification			Unit
		Min	Max	
Output Signal Level	VOH	Vcc-1.10	Vcc-0.83	V
	VOL	Vcc-1.88	Vcc-1.55	
Data and Clock signal	DATA OUT (+) CLK OUT (+) 0 ns < tpd < 1.0 ns CLK OUT duty: 50 +/-5 %			

b) Alarm output (OPT IN ALM)

Parameter	Specification			Unit
		Min	Max	
Output level	VOH	2.4	Vcc	V
	VOL	0	0.4	
Status	'H'	Normal operation		
	'L'	Fault condition		
Fan-out	IOH	-0.2		mA
	IOL	2.1		

3. Functional Block Diagram

3-1. Functional Block Diagram



PD: PIN photo diode, PRE-AMP: pre-amplifier, LIM AMP: limiting amplifier, PLL: phase locked loop oscillator, ALM DET: alarm detector, D-F.F.: D type flip flop

3-2. Alarm, monitor and control function

Parameter	Symbol	Function
Optical Input Power Loss Alarm	OPT IN ALM	To alert loss of power condition. Active 'L'.

4. Reliability

4-1. FIT Number

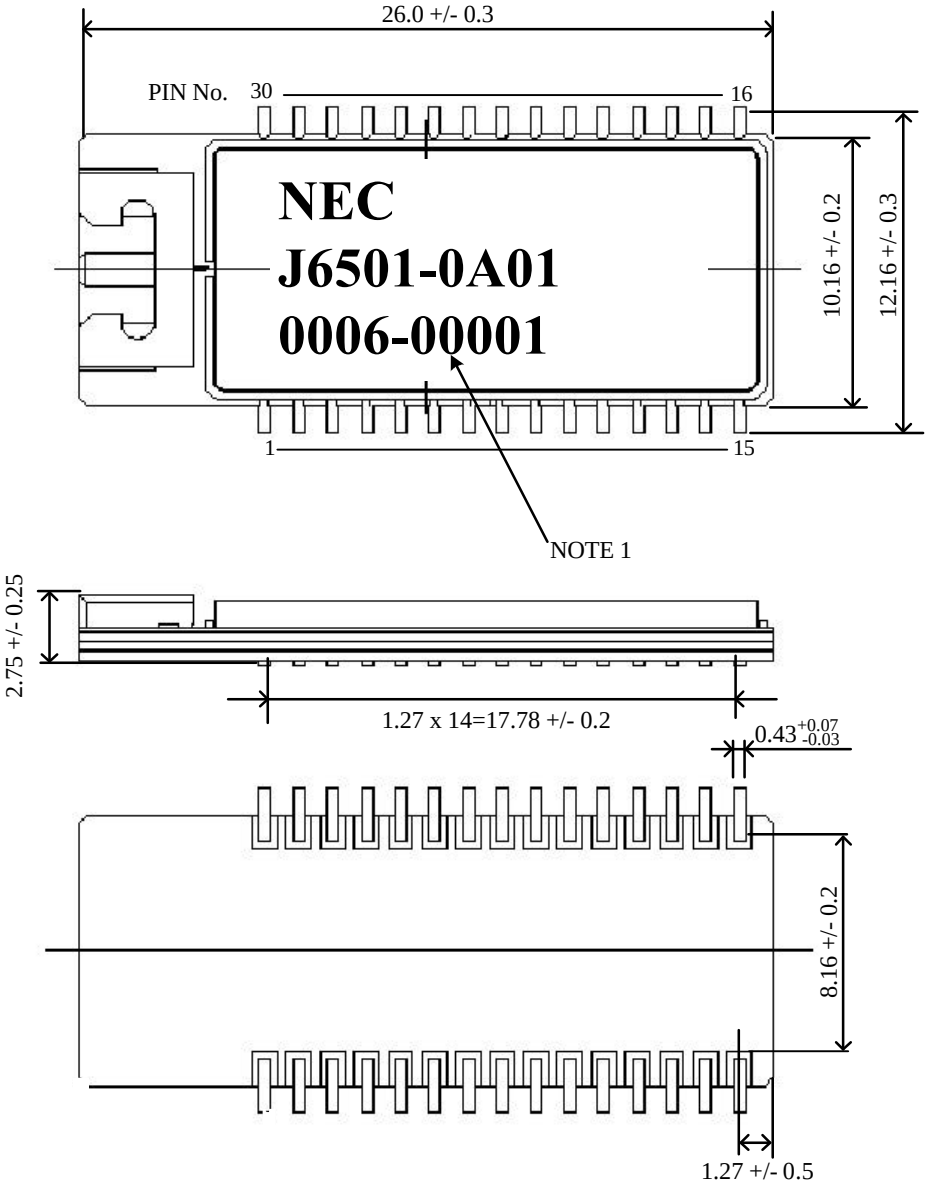
300 FIT at +45 deg.C

4-2. Reliability Test Items and Conditions

Item	Condition
Accelerated aging	+85 deg.C, 3.465 V, 5000 hours
Temperature cycle	-40 to +85 deg.C, 4 h/cycle, 500 cycles
Damp heat	+85 deg.C, 85%RH, 500 hours
Vibration	10 to 55 Hz, 1.5 mm, 1 hour for x, y, z each direction
Mechanical shock	50 G, 11 ms, 3 times for x, y, z each direction
Thermal shock	0 and +100 deg.C in water, 5 minutes each temperature, 20 cycles
Low temperature storage	-40 deg.C, 2000 hours

5. Package size, Pin Assignment

5-1. Outline diagram, Pin layout



(Unit in mm)

Note1 Product name description is given below:

NEC	:NEC logo mark
J6501-**01	:Product Number
****-*****	:Production year/month-serial number.

5-2. Pin Assignment

Pin No.	Symbol	I/O	Notes
1	GND	I	
2	GND	I	
3	GND	I	
4	GND	I	
5	GND	I	
6	GND	I	
7	GND	I	
8	GND	I	
9	Vcc	I	Refer to next page
10	EXTC 1	-	Connect a 33uF capacitor with GND. Refer to next page
11	N. C.	-	Leave open
12	EXTC 2A	-	Connect a 1.0uF capacitor and a 270k ohms resistor between EXTC 2A and 2B. Refer to next page.
13	EXTC 2B	-	
14	GND	I	
15	OPT IN ALM	O	Refer to page 4, 5
16	GND	I	
17	DATA OUT (-)	O	Refer to page 4,5
18	DATA OUT (+)	O	
19	CLK OUT (-)	O	
20	CLK OUT (+)	O	
21	GND	I	
22	GND	I	
23	GND	I	
24	Vcc	I	Refer to next page
25	Vcc	I	
26	Vcc	I	
27	Vcc	I	
28	Vcc	I	
29	GND	I	
30	EXTC 3	-	Connect a 33uF capacitor with GND. Refer to next page

I: input terminal, O: output terminal

6. Recommended peripheral circuit

It is necessary to use the circuit shown below. Please connect decoupling capacitors close to Vcc-pins.

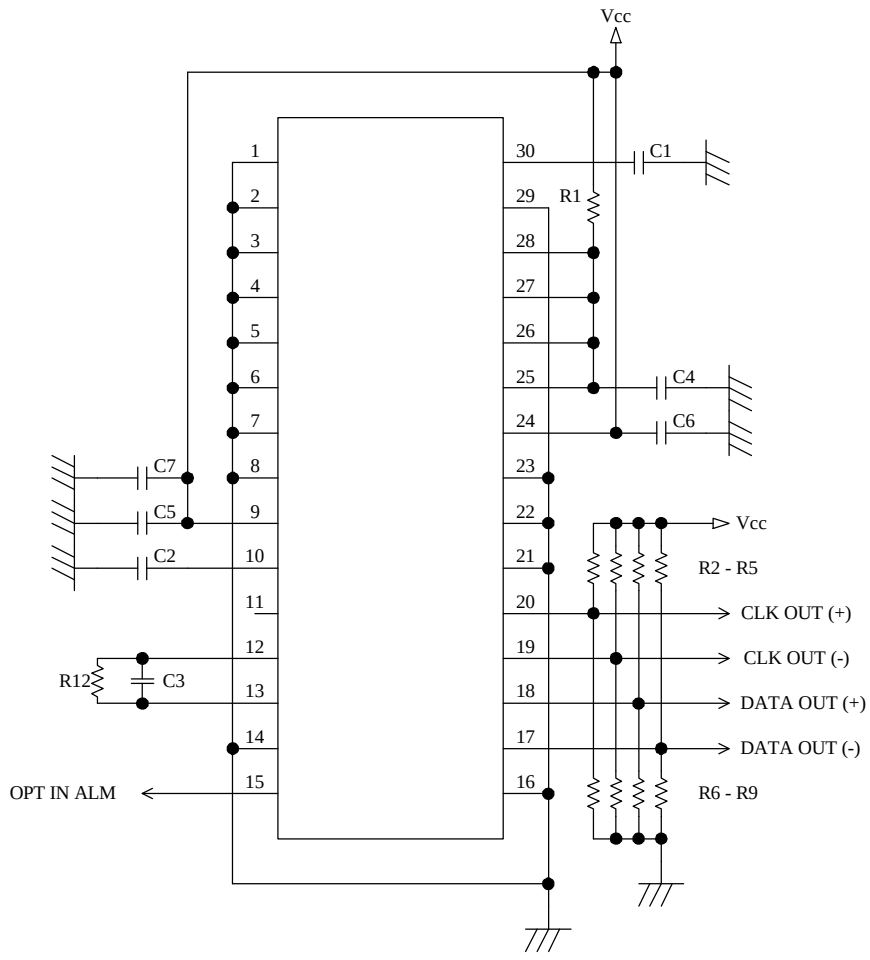
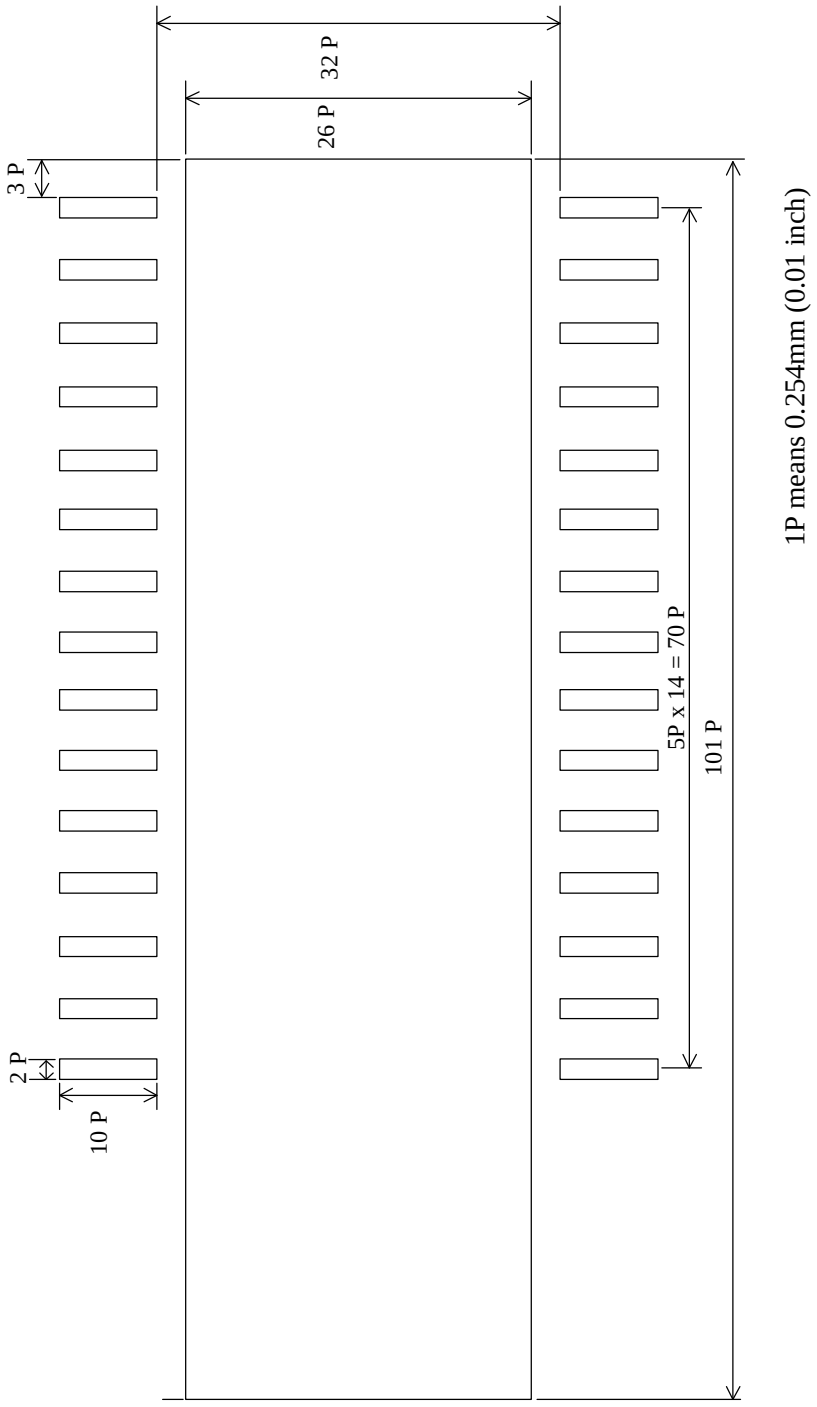


Fig. 1 Recommended peripheral circuit

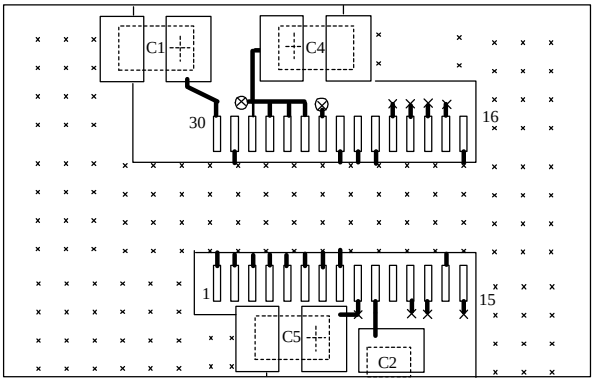
Peripheral circuit part list

Symbol	Description
R1	5.1 ohm, 1/16W
R2 - R5	130 ohm, 1/16W
R6 - R9	82 ohm, 1/8W
R12	270k ohm, 1/16W
C1, C2, C4, C5	33 uF, +/- 20%, 10V
C3	1.0 uF, +/- 10%, temp. variation +/- 15% (-40 to +85 deg.C), 10V
C6, C7	0.1 uF, +80/-20%, 10V

7. Pad layout



8. Recommended pattern layout

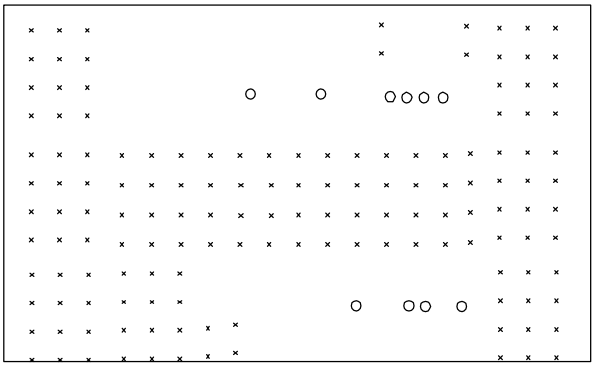


First Layer (Component side)

a) Please make GND pattern under this device (See pad layout on section 7). This GND pattern should be conneted to a low impedance GND layer by many through holes.

b) Please also make GND pattern on a blank area around this device as possible.

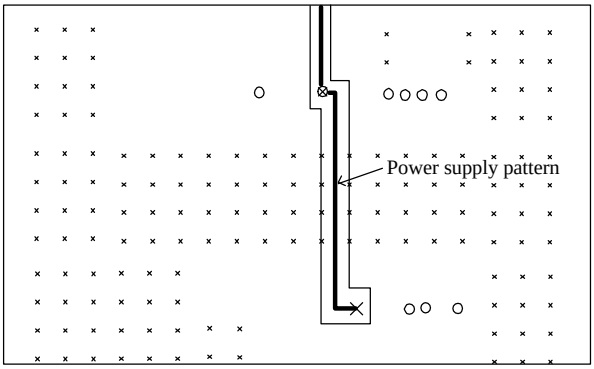
c) High gain amplifier is used in this device. Pin-24 to 30 which are power supply terminal of the amplifier are sensitive against a noise.
Please keep high level signal line, clock signal etc., away from 24 to 30-pins and decoupling capacitor for those pins.



Second Layer (Ground layer)

a) Please don't separate PCB GND pattern and device GND pattern.

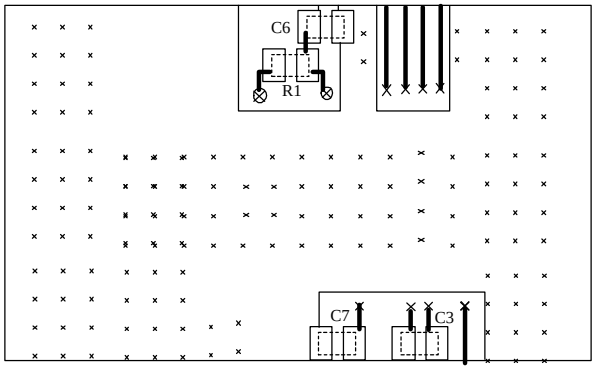
x : through holes



Third Layer (Power supply layer)

a) Please make GND pattern on a blank area around this device as possible.

x : through holes



Fourth Layer (Signal layer and solder side)

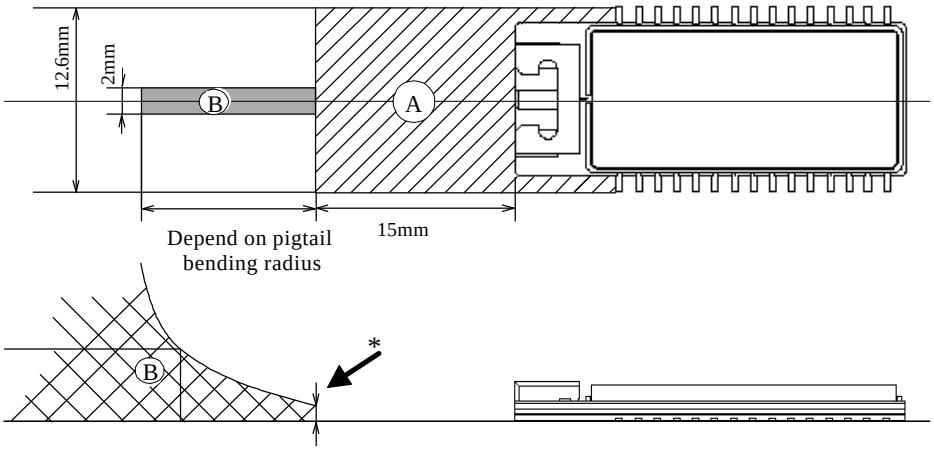
a) Please connect decoupling capacitors close to Vcc pins and GND pattern with low impedance against this device.

b) Please make GND pattern on a blank area around this device as possible.

x : through holes

9. Recommended Mounting Conditions

9-1. Mount prohibitive area



a) 'A' is necessary space for the pigtail connection tool. Keep this area (12.6mm x 15.0mm) empty.

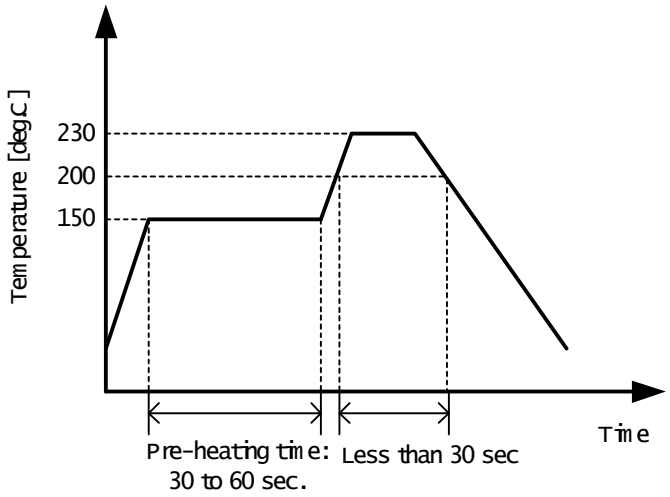
b) 'B' is space for pigtail cord. Keep the bending radius of pigtail cord more than 30mm.

c) Pigtail bending start after '*' point.

9-2. Re-flow Soldering Conditions

a) Soldering temperature: At the temperature more than +200 deg.C, the time should be less than 30 sec., +230 deg.C max.

b) Pre-heating time: That is not specified particularly (depends on PCB). Typically +150 deg.C, 30 to 60 sec. c) Temperature rise and falling time: less than 5 deg.C/ sec.

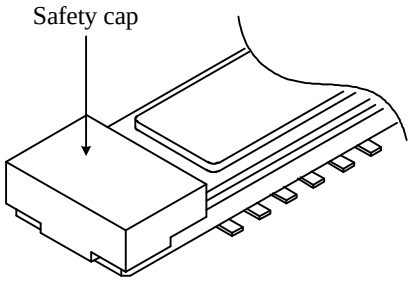


9-3. Solvent Cleaning

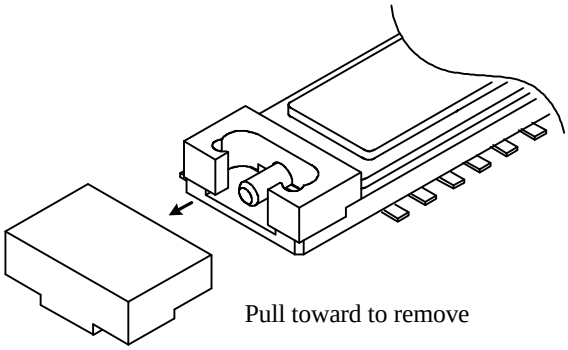
Solvent cleaning is not recommended.

9-4. Mounting Precautions

Do not remove safety cap over the ferrule at the time of re-flow soldering.
Please remove the safety cap after re-flow soldering.



Safety cap mounted position



Safety cap removed position

9-5. De-soldering from the Printed Board

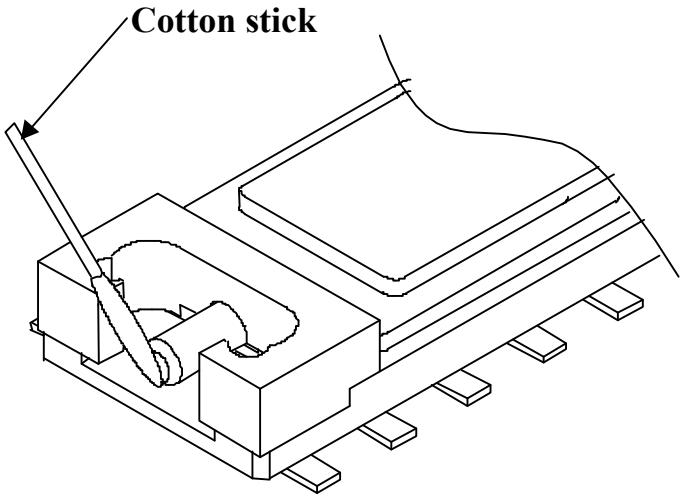
The product performance is not guaranteed in case of de-soldering from a PCB. If it is necessary to de-solder, Please detach pigtail in advance. Pigtail can be used again.

9-6. Pigtail Attachment

Pigtail should be attached after soldering the product on PCB. Please pay attention to following points while attaching a pigtail:

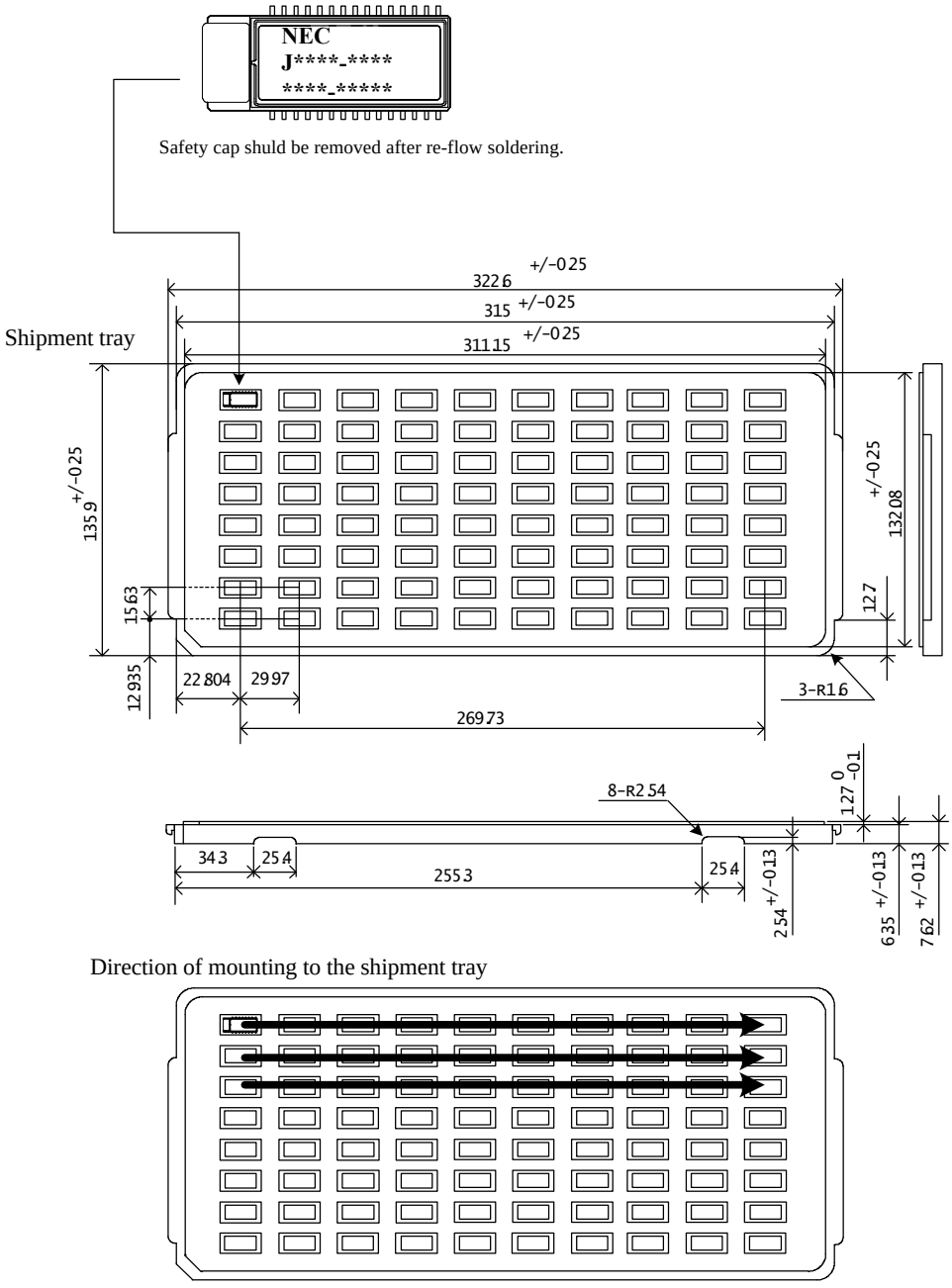
a) To attach pigtail use pigtail attach / detach tool specially designed for this device.
b) Please refer to instruction manual of pigtail attach / detach tool for details. (Supplied separately)
c) Ferrule may be broken upon applying excess strength and its characteristics may be changed.
Don't stretch or bend pigtail cord more than specified values. Recommended value for stretch is less than 200gf and bending radius should be more than 30 mm.

d) Please clean the ferrule surface by a cotton stick before attaching a pigtail.



Recommended cotton stick
Maker :NTT ME
Product name :CLETOP stick type
Product Number :14100400

9-7. Shipment Packing



Direction of mounting to the shipment tray

10. Application Precautions

a) To prevent optical connector surface from crack or stain, please put the dust cap while this device is not in use. When the connector surface is stained, please wipe with a kind of lens paper.

b) The bending radius for pigtail fiber cord should be more than 30mm.

c) Optical components are mounted inside this device. Please handle with care. Mechanical shock due to falling could lead permanent damage.

d) The device performance given in this manual is guaranteed for correct applications. Device performances are not guaranteed under incorrect use.

e) Sudden heating or cooling by dryer or cooling spray could lead permanent damage to the device. The device may not work normally while sudden heating or cooling.

f) This product should be handled as a CMOS product.