NEC

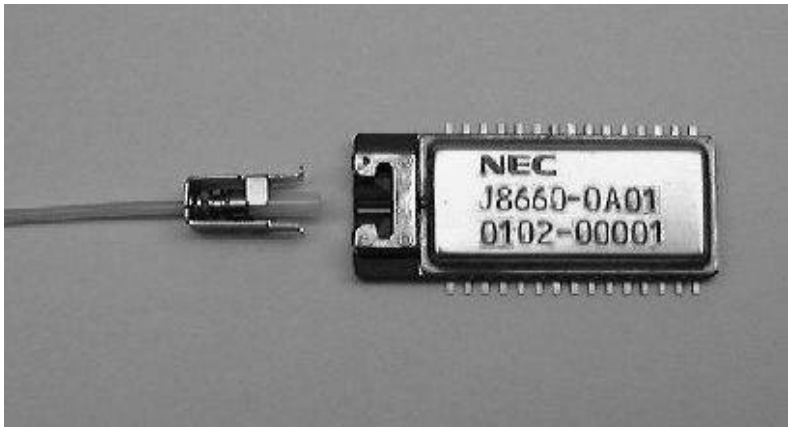
OE HYBRID

2.48832Gbps Transmitter

OD-J8680-0A01/0B01

OC-48: LR-2/LR-3

STM-16: L-16.2/L-16.3



7th September 2001
Rev. 0.1, Preliminary

NEC

- Contents -

1. Product Number

Product Number	Specification	Operating Case Temperature Range
OD-J8680-0A01	SONET OC-48 LR-2 , and ITU-T G. 957 L-16.2 compliant	0 to +75 deg.C
OD-J8680-0B01	SONET OC-48 LR-3 , and ITU-T G. 957 L-16.3 compliant	

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 7 -6 for connecting a pigtail cord to the above products.

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

2. Specifications

2.1 Absolute Maximum Ratings

Parameter	Specification		Unit	Note
	Min	Max		
Supply Voltage (Vcc)	-0.3	+4.0	V	
Storage temperature	-40	+85	deg.C	
RF Input Pins (AC-coupled, 50 ohms)	0	+1.2	Vpp	Pin 11: CLK IN Pin 13: CLK INB Pin 18: DATA IN Pin 20: DATA INB
Input pins (Except for RF input pins)	0	Vcc	V	

2.2 Environmental Conditions

Parameter	Specification	Note
Data Rate	2.48832 Gbps	
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	
Supply Voltage	+3.3V +/-5%	
Power Consumption	0.38 W (Typ)	Under condition at +25 deg.C, +3.30V
	0.77 W (Max)	Under condition at +85deg.C, +3.47V

2.3 Optical Signal Interface Specifications

Parameter	Specification		Unit	Note
	Min	Max		
Average Optical Output Power	-2	+3	dBm	
Extinction Ratio	8.2	-	dB	
Spectral –20dB Width	-	1	nm	
Center Wavelength	1500	1580	nm	
Maximum dispersion	1600		ps/nm	OD-J8680-0A01
	NA			OD-J8680-0B01
Optical Output Eye Diagram	ITU-T G.957 compliant			Refer to fig. 1
Laser Diode Classification	IEC 60825-1 Class 1 compliant			
Optical Signal Polarity	Positive logic			

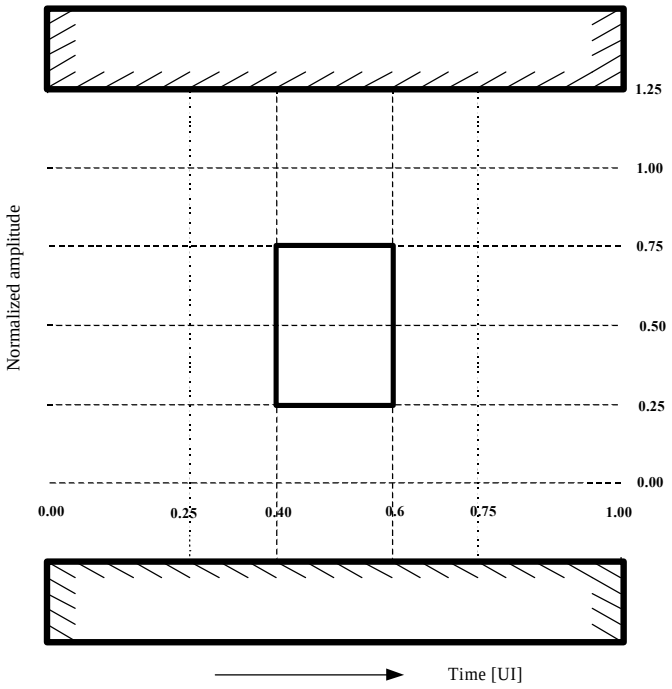
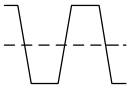
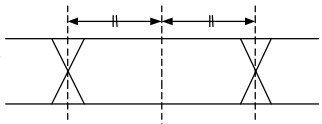
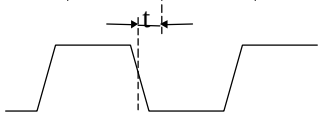


Fig. 1 Optical output signal mask specifications of SONET/ITU standard specified by the waveform after passing through 4th order Bessel-filter which has cut-off frequency of 2.48832GHz ×0.75.

2.4 Electrical Signal Interface Specifications

[Data and Clock Input]

Parameter	Specification		Unit	Note
	Min	Max		
Input Signal Level	500	2000	mVpp	AC-coupled, 50 ohms, Differential input
	DATA IN [CLK IN]  250mV min 1000mV max DATA INB [CLK INB] (DATA IN) - (DATA INB) , (CLK IN) - (CLK INB)  500mVpp min 2000mVpp max			
Data and Clock Signal	DATA IN  CLK IN  -100 ps < t < 100 ps			

[Alarm Output (OPT OUT ALM, CURR ALM)]

Parameter	Specification			Unit	Note
		Min	Max		
Output level	VOH	2.4	Vcc	V	
	VOL	0	0.5	V	
Status	'L'	Fault condition			
	'H'	Normal condition			
Fan-out	IOH	-0.2		mA	
	IOL	0.2		mA	

[Control input (SHUT DOWN)]

Parameter	Specification			Unit	Note
		Min	Max		
Output level	VIH	0.7 x Vcc	Vcc	V	
	VIL	0	0.3 x Vcc	V	
Status	'L'	Optical output disable			
	'H'	Optical output enable			

[Control input (CURR ALM TST)]

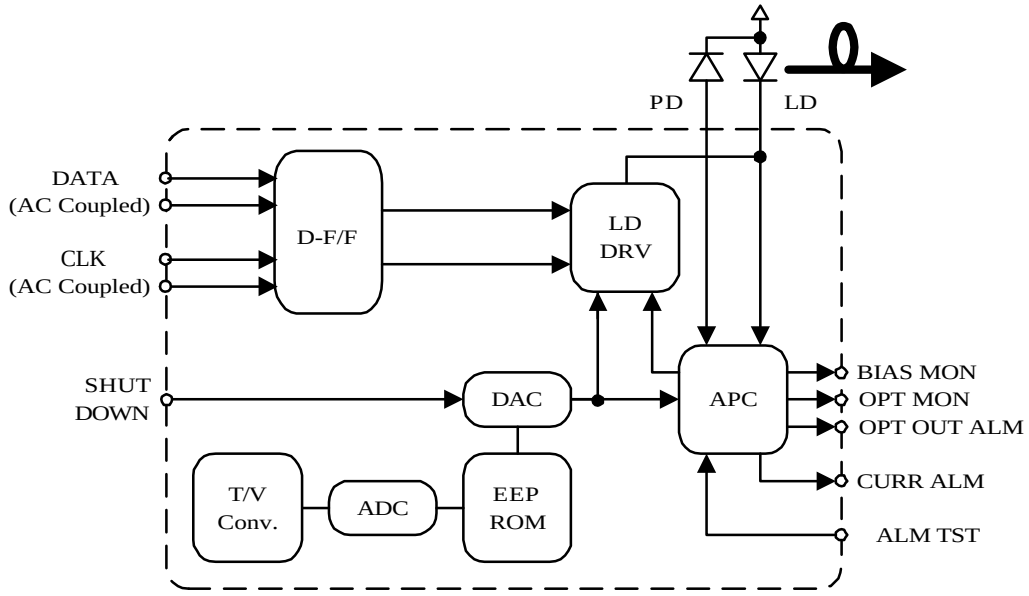
Parameter	Specification
Status	When CURR_ALM_TST is connected to GND, CURR ALM will be asserted to 'L'.
	Leave open in normal operation.

[Performance Monitor]

Parameter	Specification	Unit	Note
OPT MON	550 (max.)	mV	Voltage output. Please receive with high impedance (>1M ohms) circuit.
BIAS MON	42 x Ib (Ib: Laser bias compensation current:[mA]	mV	Voltage output. Please receive with high impedance (>1M ohms) circuit.

3. Functional Block Diagram

3.1 Functional Block Diagram



D-F/F: D flip-flop, LD DRV: Laser diode driver, DAC: Digital to analogue converter, T/V Conv.: Temperature to voltage converter, APC: Automatic power control circuit ADC: Analogue to digital converter, EEPROM: Electronic erasable ROM, PD: PIN photo diode, LD: 1.55 um DFB laser diode

3.2 Alarm, monitor and control function

Parameter	Symbol	Function
Optical output power loss alarm	OPT OUT ALM	To alert loss of power condition. Alarm does not assert until power degradation exceeds 3 dB.
Laser degrade alarm	CURR ALM	To alert laser degradation. Alarm asserts when laser bias compensation current (Ib) increases by 25 mA +/- 5 mA from the initial value.
Laser shut down	SHUT DOWN *	To shutdown laser output.
Current alarm test	CURR ALM TST	To test CURR ALM function. When connected to GND, CURR ALM is forced to active 'L'.
Laser bias current monitor	BIAS MON	To monitor laser bias compensation current (Ib). The Ib is calculated from output voltage (Vo) of this terminal; Ib=Vo/42mA. Initial value is nearly 0V.
Optical output power monitor	OPT MON	To monitor the voltage that is proportional to optical launched power.

* In the event of the loss of signal (data and clock), laser output status is undefined. The SHUT DOWN is required to disable the laser radiation.

4. Reliability

4.1 FIT Number

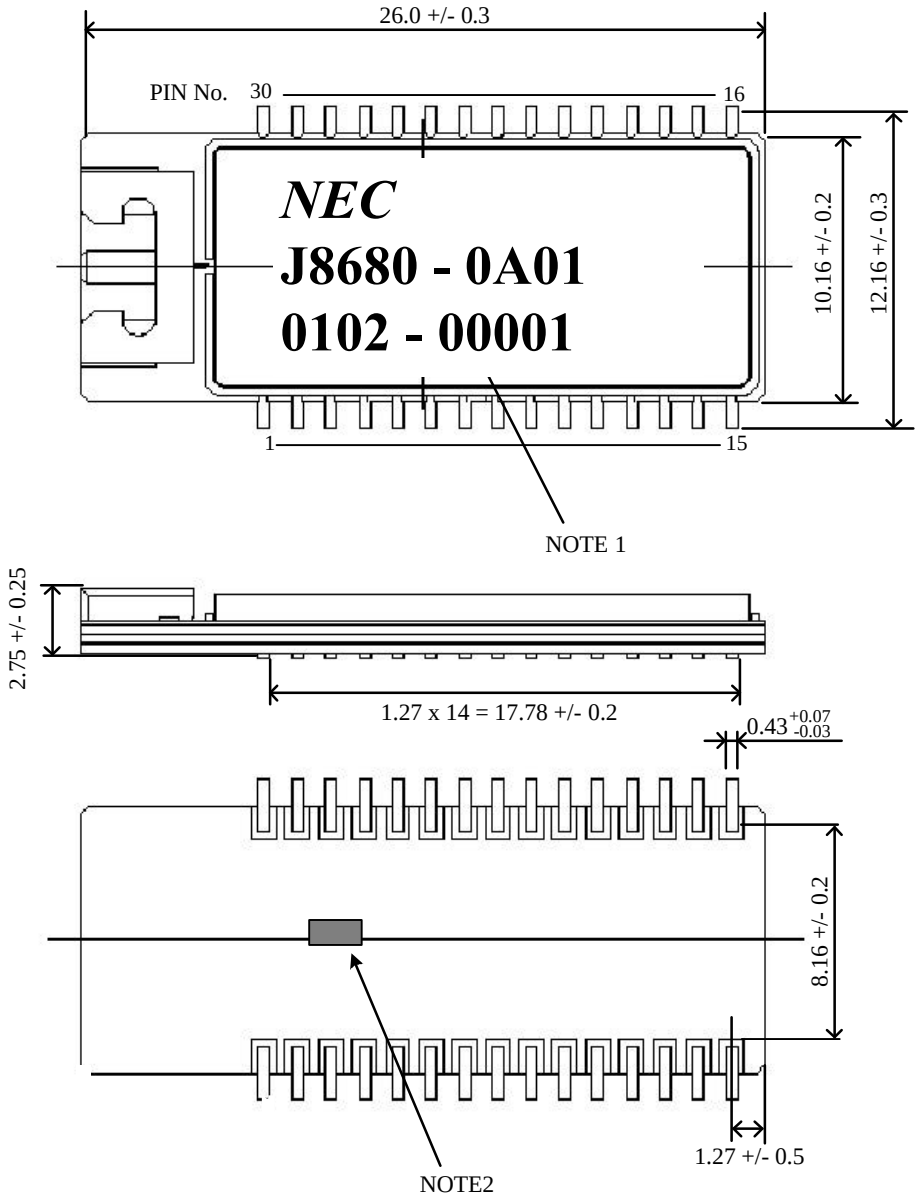
T.B.D.

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
J8680-0*01	:Product Number
****-*****	:Production year/month-serial number

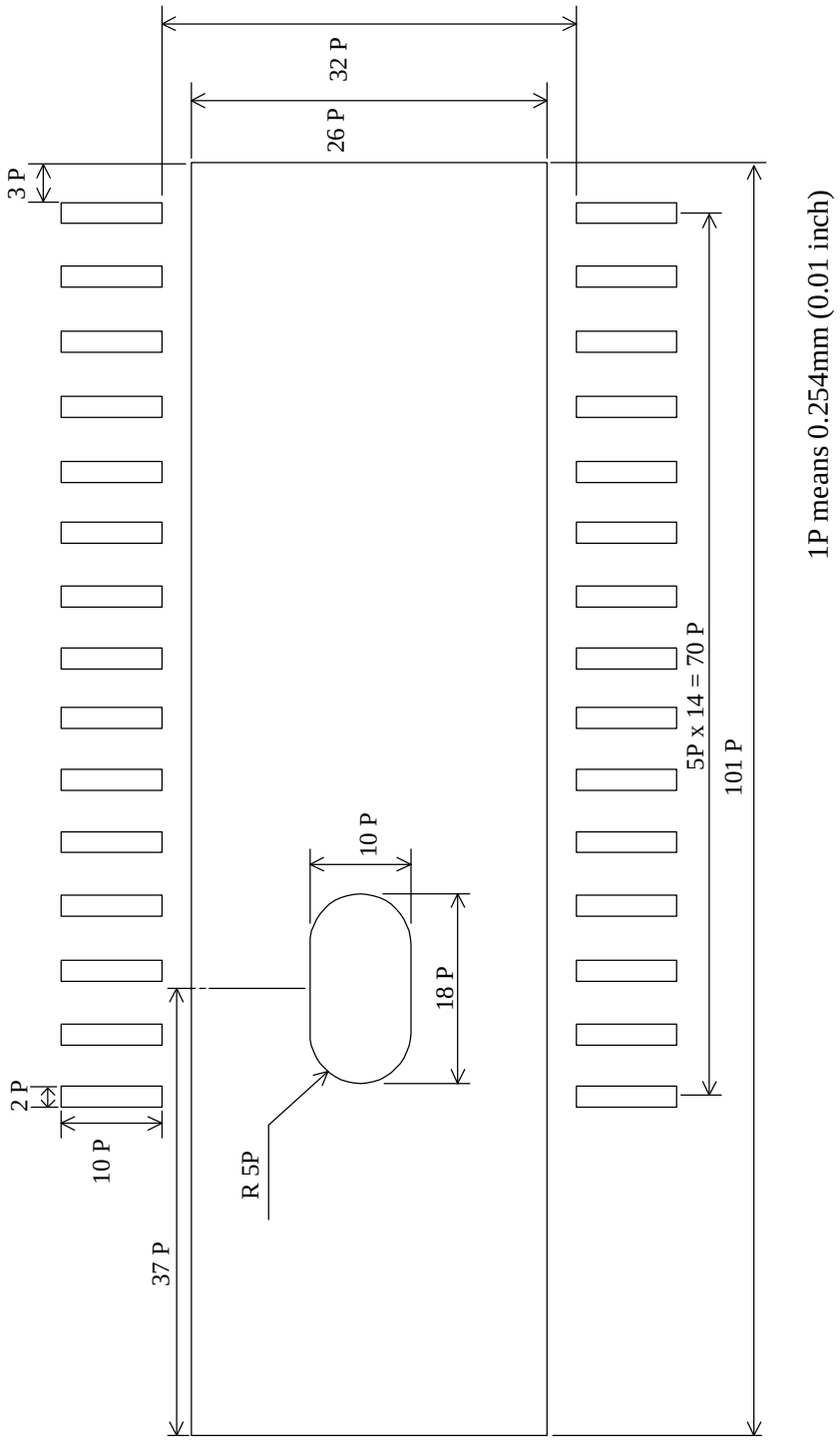
Note 2 Product testing terminal : Please keep open and don't connect to any other pattern or GND.

5.2 Pin Assignment

Pin No.	Symbol	I/O	Note
1	Vcc	I	+3.3 V
2	GND	I	
3	OPT MON	O	Optical output power monitor
4	NC	---	(Leave open)
5	SHUT DOWN	I	Laser shutdown. Active 'L'
6	GND	I	
7	Vcc	I	+ 3.3 V
8	CURR ALM	O	Laser bias current alarm
9	OPT OUT ALM	O	Laser degrade alarm
10	GND	I	
11	CLK IN	I	Clock signal input. AC coupled.
12	GND	I	
13	CLK INB	I	Inverted clock signal input. AC coupled.
14	GND	I	
15	GND	I	
16	GND	I	
17	GND	I	
18	DATA IN	I	Data signal input. AC coupled
19	GND	I	
20	DATA INB	I	Inverted data signal input. AC coupled
21	BIAS MON	O	Laser bias current monitor.
22	EXTC	---	Connect 0.1 uF capacitor to ground.
23	CURR ALM TST	I	Current alarm test.
24	GND	I	
25	GND	I	
26	GND	I	
27	GND	I	
28	GND	I	
29	Vcc	I	+3.3 V
30	GND	I	

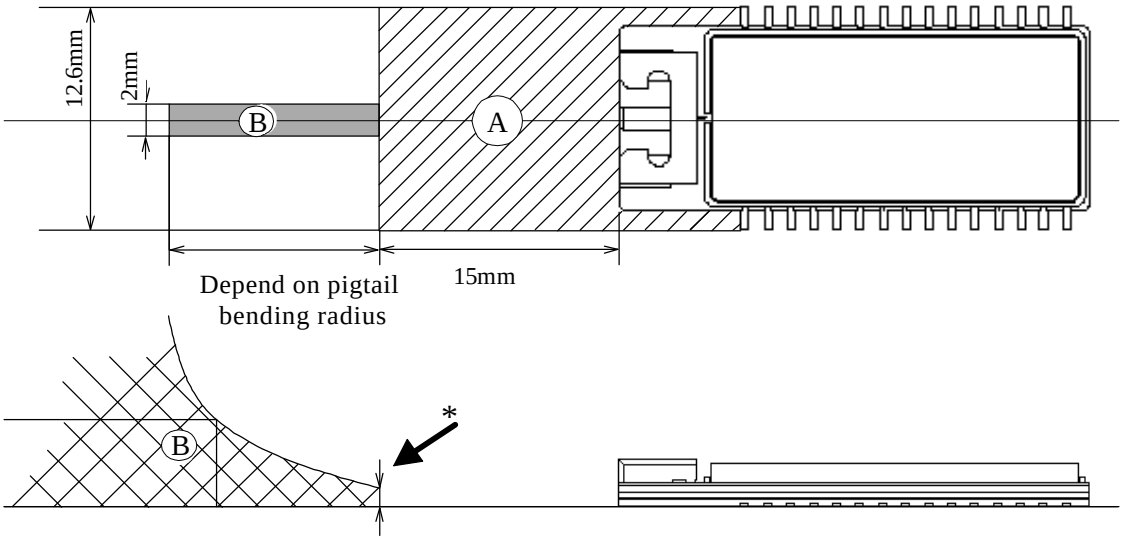
I: input terminal, O: output terminal

6. Pad layout


32 P
26 P
3 P
1P means 0.254mm (0.01 inch)
5P x 14 = 70 P
101 P
10 P
18 P
2 P
10 P
R 5P
37 P

7. Recommended Mounting Conditions

7.1 Mount prohibit 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.

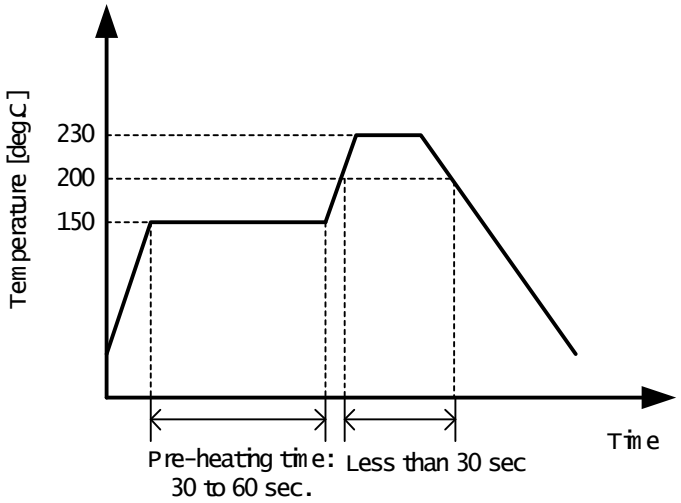
c) Start bending pigtail cord after '*' point.

7.2 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.

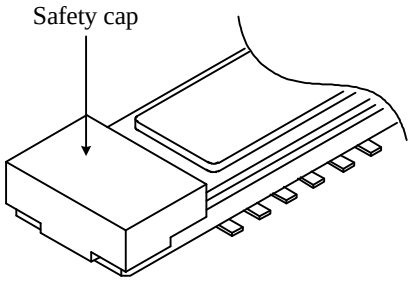


7.3 Solvent Cleaning

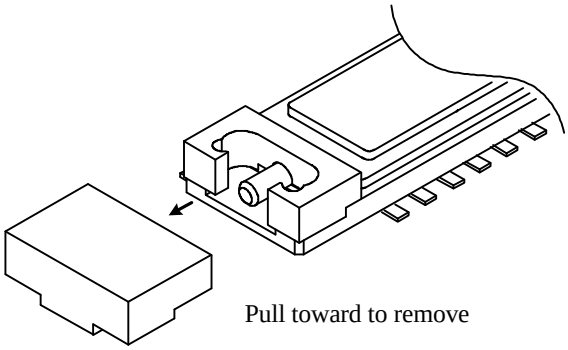
Solvent cleaning is not recommended.

7.4 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

7.5 De-soldering from the Printed Board

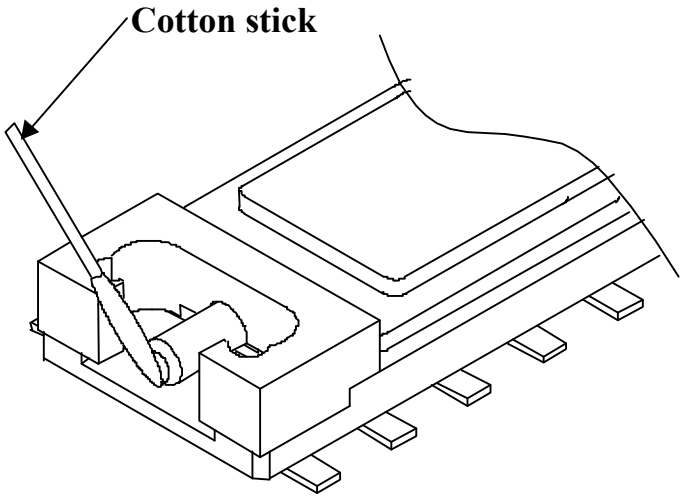
The product performance is not guaranteed in case of de-soldering from a PCB. If it is necessary to de-solder, Please detach pigtail in advance. Pigtail can be used again.

7.6 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.

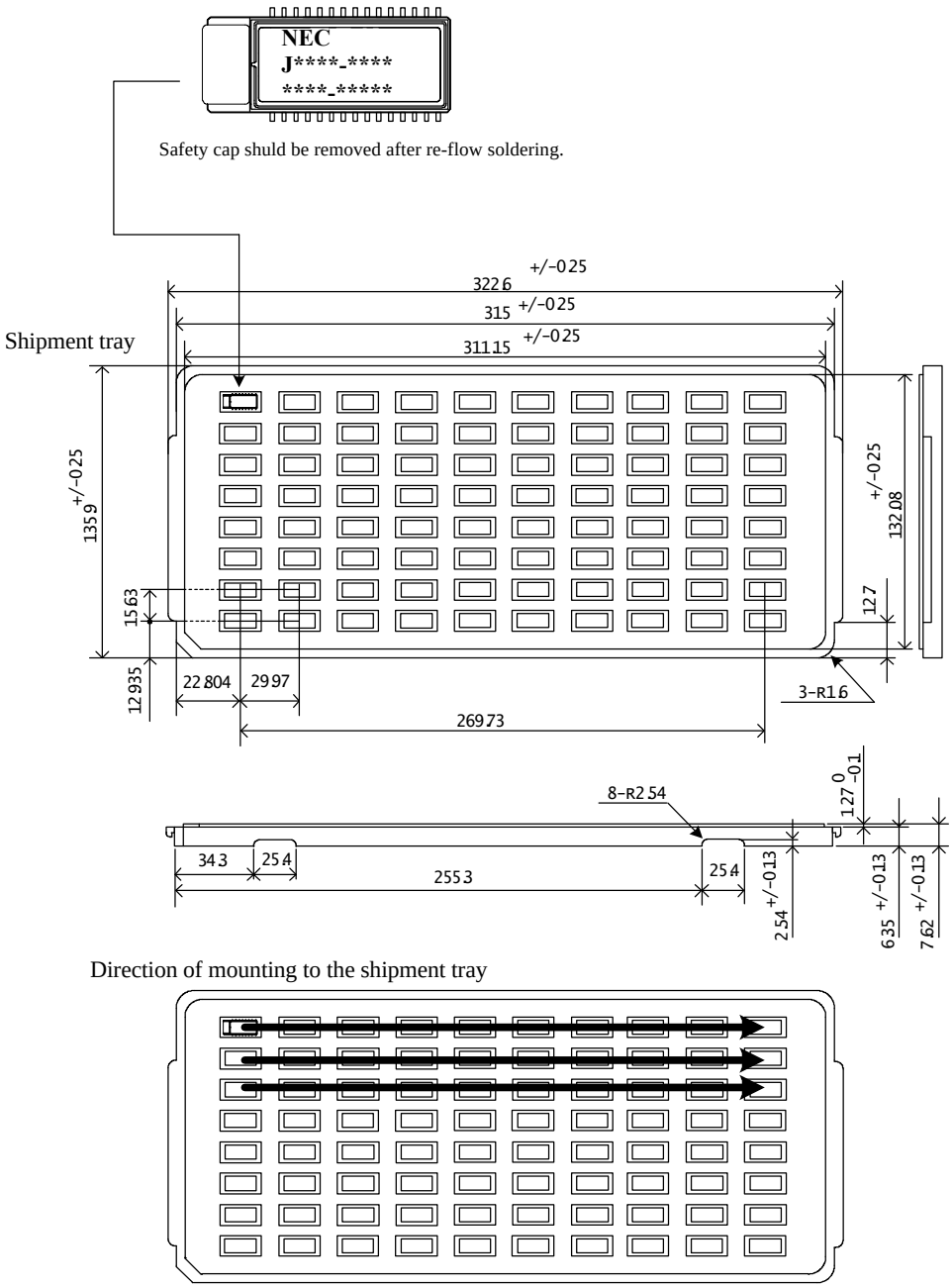
d) Please clean the ferrule surface by a cotton stick before attaching a pigtail.



Recommended cotton stick

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

7.7 Shipment Packing



8. 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.