

**1 310 nm InGaAsP STRAINED MQW DC-PBH LASER DIODE  
COAXIAL MODULE WITH SINGLE MODE FIBER****DESCRIPTION**

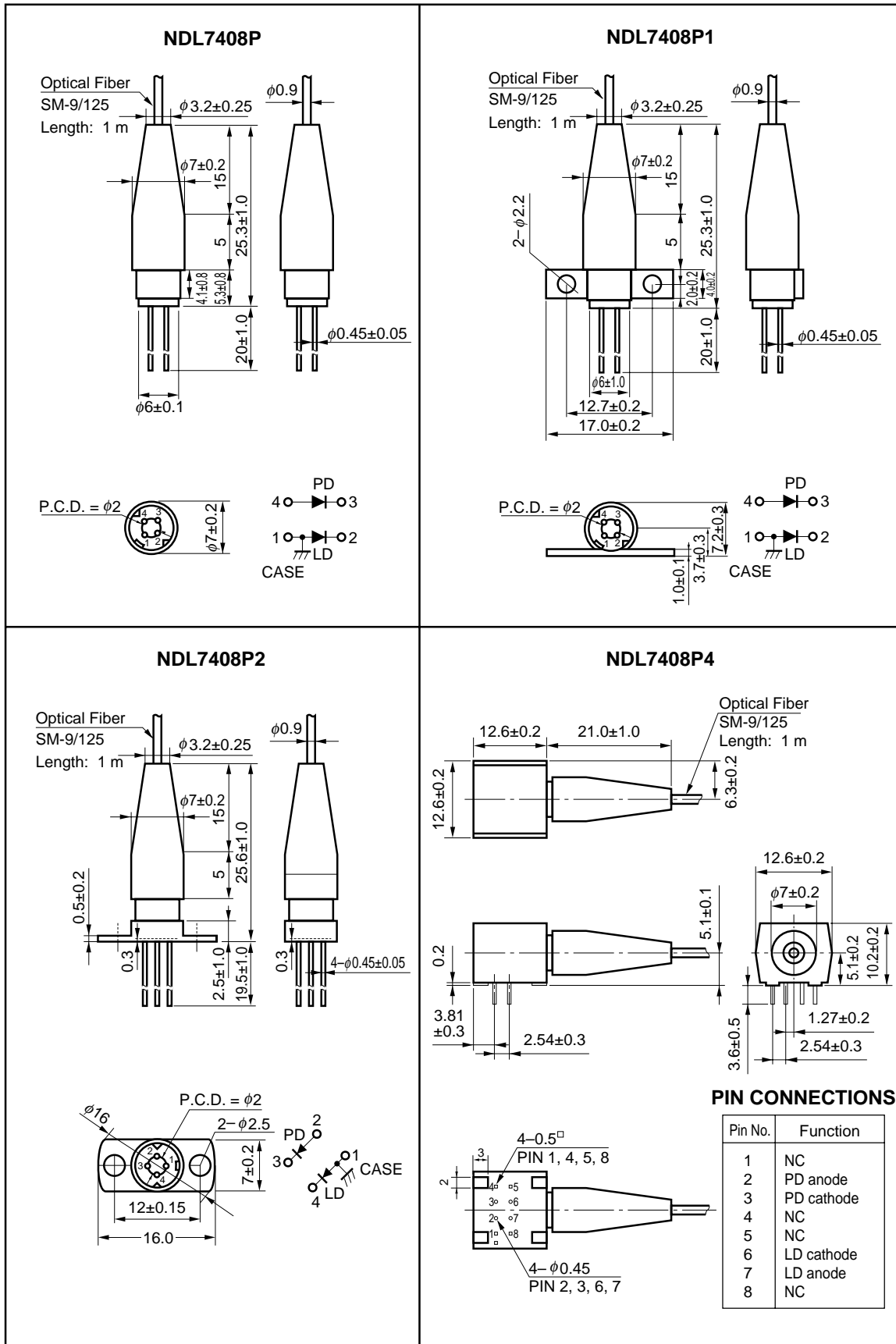
NDL7408P Series is a 1 310 nm laser diode coaxial module with single mode fiber. It has a strained Multiple Quantum Well (st-MQW) structure and a built-in InGaAs monitor photo diode. It is recommended for junction or access network systems. The series is available in two types of output power: 1.0 mW and 0.2 mW.

**FEATURES**

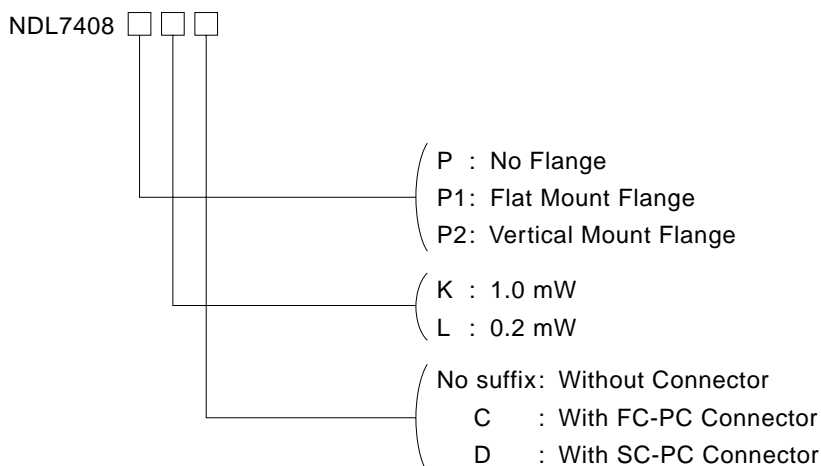
- Center wavelength  $\lambda_c = 1\ 310\ \text{nm}$
- Two types of output power : 1.0 mW (NDL7408PK Series)  
0.2 mW (NDL7408PL Series)
- Low threshold current  $I_{th} = 12\ \text{mA TYP. @}T_c = 25\ ^\circ\text{C}$
- High cut-off frequency  $f_c = 2.0\ \text{GHz}$
- InGaAs monitor PIN-PD
- Wide operating temperature range:  $-40\ \text{to}\ +85\ ^\circ\text{C}$
- Based on Bellcore TA-NWT-000983

The information in this document is subject to change without notice.

★ PACKAGE DIMENSIONS (in millimeters)



ORDERING INFORMATION



Part Number	Ranks	Description	
NDL7408PK	M	1.0 mW	Without Connector
NDL7408PKC		No Flange	With FC-PC Connector
NDL7408PKD			With SC-PC Connector
NDL7408P1K	M	1.0 mW	Without Connector
NDL7408P1KC		Flat Mount Flange	With FC-PC Connector
NDL7408P1KD			With SC-PC Connector
NDL7408P2K	M	1.0 mW	Without Connector
NDL7408P2KC		Vertical Flange	With FC-PC Connector
NDL7408P2KD			With SC-PC Connector
NDL7408P4K	M	1.0 mW	Without Connector
NDL7408P4KC		8-pin DIP	With FC-PC Connector
NDL7408P4KD			With SC-PC Connector
NDL7408PL	N	0.2 mW	Without Connector
NDL7408PLC		No Flange	With FC-PC Connector
NDL7408PLD			With SC-PC Connector
NDL7408P1L	N	0.2 mW	Without Connector
NDL7408P1LC		Flat Mount Flange	With FC-PC Connector
NDL7408P1LD			With SC-PC Connector
NDL7408P2L	N	0.2 mW	Without Connector
NDL7408P2LC		Vertical Flange	With FC-PC Connector
NDL7408P2LD			With SC-PC Connector
NDL7408P4L	N	0.2 mW	Without Connector
NDL7408P4LC		8-pin DIP	With FC-PC Connector
NDL7408P4LD			With SC-PC Connector

**ABSOLUTE MAXIMUM RATINGS (T<sub>c</sub> = 25 °C, unless otherwise specified)**

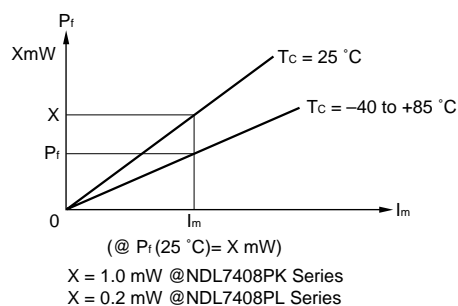
Parameter	Symbol	Ratings	Unit
Forward Current of LD	I <sub>F</sub>	I <sub>th</sub> + 50	mA
Reverse Voltage of LD	V <sub>R</sub>	2.0	V
Forward Current of PD	I <sub>F</sub>	10	mA
Reverse Voltage of PD	V <sub>R</sub>	20	V
Operating Case Temperature	T <sub>c</sub>	-40 to +85	°C
Storage Temperature	T <sub>stg</sub>	-40 to +85	°C
Lead Soldering Temperature (10 s)	T <sub>slid</sub>	260	°C

**ELECTRO-OPTICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C, unless otherwise specified)**

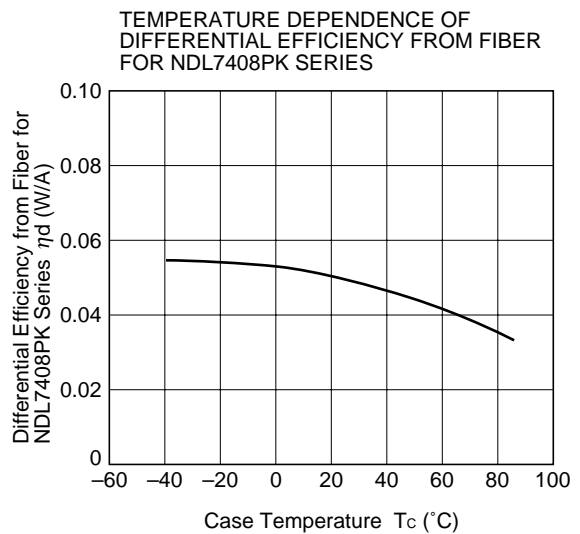
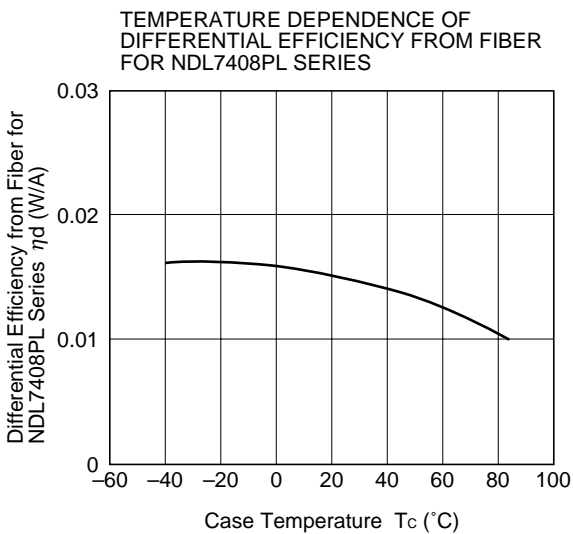
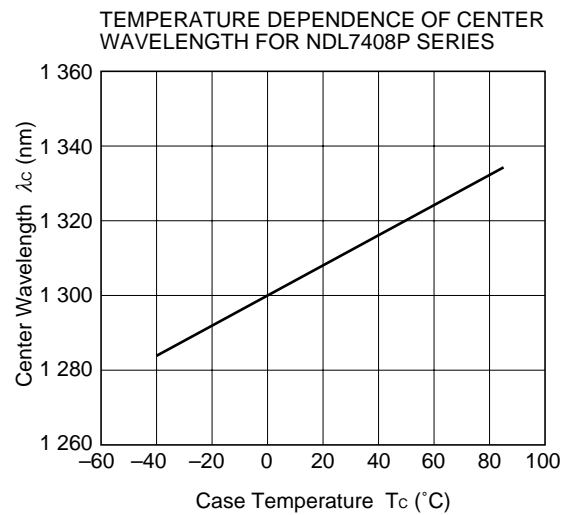
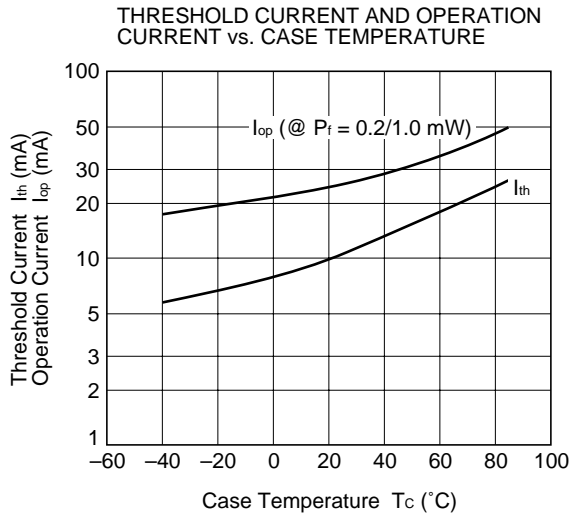
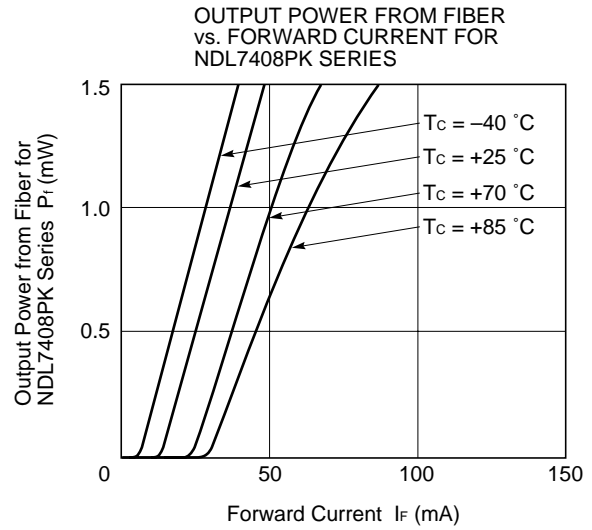
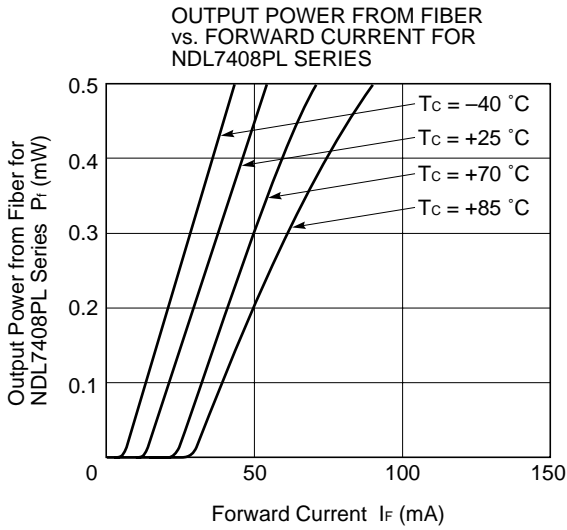
Parameter	Symbol	Conditions	MIN.	TYP.	MAX.	Unit
Operating Voltage	V <sub>op</sub>	*1		1.1	1.3	V
Threshold Current	I <sub>th</sub>			10	25	mA
		T <sub>c</sub> = +85 °C		25	50	
Modulation Current	I <sub>mod</sub>	P <sub>f</sub> = 1.0 mW @NDL7408PK Series		15	30	mA
		P <sub>f</sub> = 0.2 mW @NDL7408PL Series				
Differential Efficiency from Fiber for NDL7408PK Series	η <sub>d</sub>		0.025	0.050		W/A
		T <sub>c</sub> = +85 °C	0.018	0.035		
Differential Efficiency from Fiber for NDL7408PL Series	η <sub>d</sub>		0.010	0.015		
		T <sub>c</sub> = +85 °C	0.005	0.010		
Center Emission Wavelength	λ <sub>c</sub>	*1, RMS (-20 dB)	1 290	1 310	1 330	nm
		T <sub>c</sub> = -40 to +85 °C	1 260		1 360	
Temperature Dependence of Center Emission Wavelength	Δλ/ΔT	T <sub>c</sub> = -40 to +85 °C		0.4	0.5	nm/°C
Spectral Width	σ	*1, RMS (-20 dB)		1.3	2.5	nm
		T <sub>c</sub> = +85 °C		1.5	4	
Cut-off Frequency	f <sub>c</sub>	-3 dB		2.0		GHz
Rise Time	t <sub>r</sub>	10 to 90 %		0.2	0.5	ns
Fall Time	t <sub>f</sub>	90 to 10 %		0.3	0.5	ns
Monitor Current of PD	I <sub>m</sub>	V <sub>RD</sub> = 5 V, *1	100	700		μA
Dark Current of PD	I <sub>D</sub>	V <sub>RD</sub> = 5 V		0.1	10	nA
Tracking Error	γ <sup>2</sup>	I <sub>m</sub> = const., T <sub>c</sub> = -40 to +85 °C		0.5	1.0	dB

\*1 P<sub>f</sub> = 1.0 mW @NDL7408PK Series  
 P<sub>f</sub> = 0.2 mW @NDL7408PL Series

\*2  $\gamma = \left| 10 \log \frac{P_f}{X \text{ mW}} \right|$

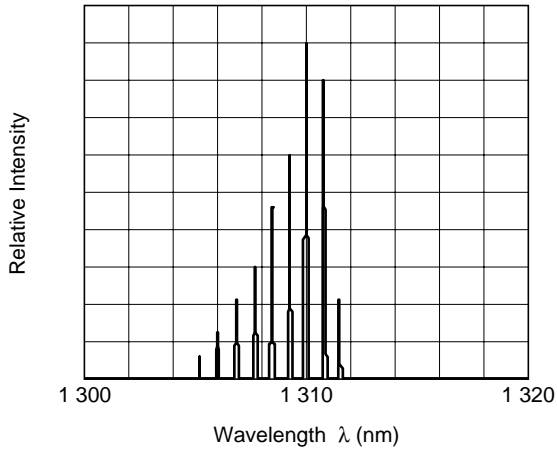


TYPICAL CHARACTERISTICS ( $T_c = -40$  to  $+85$  °C)

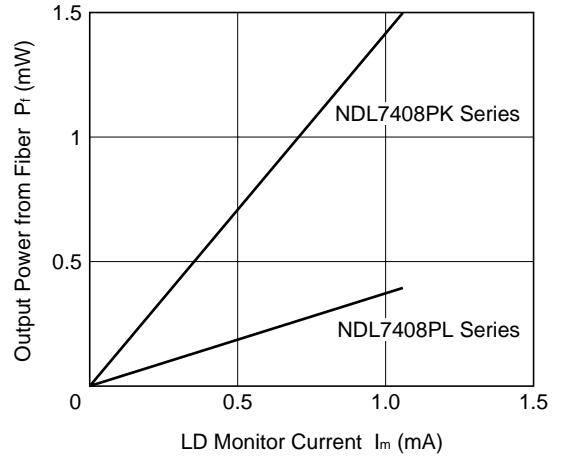


TYPICAL CHARACTERISTICS (T<sub>c</sub> = 25 °C)

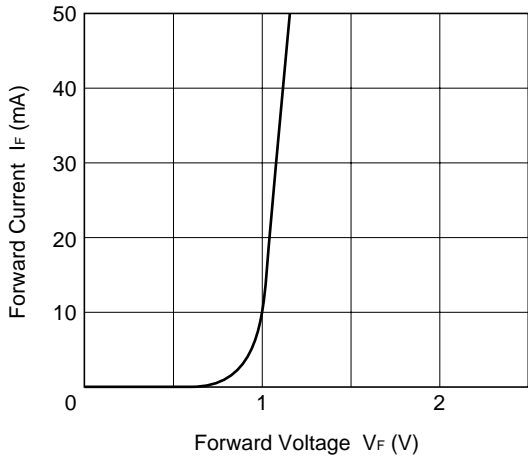
LONGITUDINAL MODE FROM FIBER FOR NDL7408P SERIES



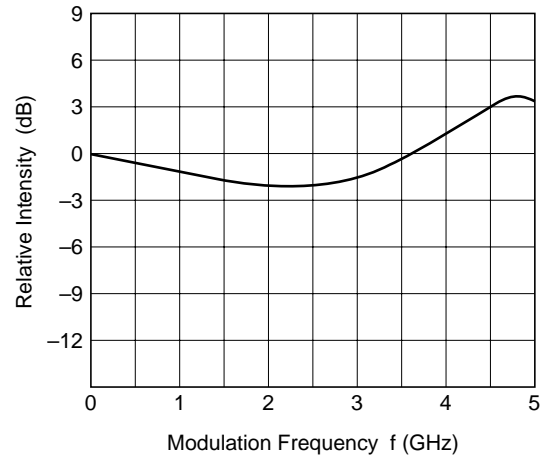
OUTPUT POWER FROM FIBER vs. LD MONITOR CURRENT



FORWARD CURRENT vs. FORWARD VOLTAGE FOR NDL7408P SERIES



FREQUENCY RESPONSE (P<sub>f</sub> = 0.2 / 1.0 (mW))



**1.3  $\mu\text{m}$  FABRY-PEROT DC-PBH LASER DIODE FAMILY**

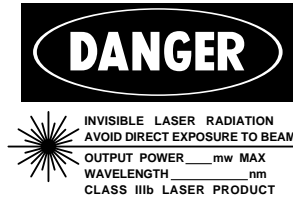
Package	Features	Part Number	Remarks
$\phi$ 5.6 mm Small Can		NDL7001	With monitor photo diode
$\phi$ 5.6 mm Small Can with Lens		NDL7001L	With monitor photo diode
4-pin Coaxial Module with SMF		NDL7401P Series NDL7408P Series	Without TEC With monitor photo diode

**REFERENCE**

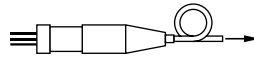
Document Name	Document No.
NEC semiconductor device reliability/quality control system	LEI-1201
Quality grades on NEC semiconductor devices	IEI-1209
Semiconductor device mounting technology manual	C10535E
Guide to quality assurance for semiconductor devices	MEI-1202
Semiconductor selection guide	X10679E

**CAUTION**

**Within this device there exists GaAs (Gallium Arsenide) material which is a harmful substance if ingested. Please do not under any circumstances break the hermetic seal.**



**SEMICONDUCTOR LASER**



**AVOID EXPOSURE-Invisible**  
Laser Radiation is emitted from this aperture

NEC Corporation  
NEC Building, 7-1, Shiba 5-chome,  
Minato-ku, Tokyo 108-01, Japan  
Type number: \_\_\_\_\_  
Manufactured: \_\_\_\_\_  
Serial number: \_\_\_\_\_  
This product conforms to FDA regulations as applicable to standards 21 CFR Chapter 1, Subchapter J.

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Standard: Computers, office equipment, communications equipment, test and measurement equipment, audio and visual equipment, home electronic appliances, machine tools, personal electronic equipment and industrial robots

Special: Transportation equipment (automobiles, trains, ships, etc.), traffic control systems, anti-disaster systems, anti-crime systems, safety equipment and medical equipment (not specifically designed for life support)

Specific: Aircrafts, aerospace equipment, submersible repeaters, nuclear reactor control systems, life support systems or medical equipment for life support, etc.

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Anti-radioactive design is not implemented in this product.