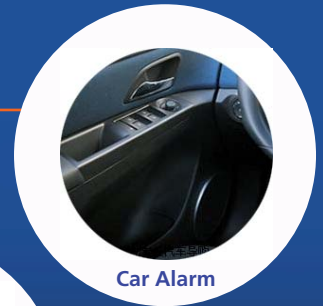
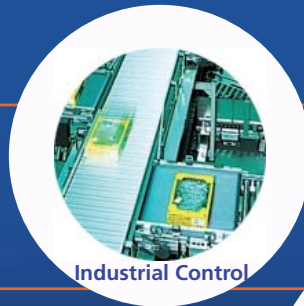


SENSOR SWITCHES

- >> Small size & compact space
- >> Increased strength between housing and base
- >> High temperature and fire proof
- >> Suitable to IC trigger signal
- >> Complete replacement of mercury switches
- >> Meet environmental protection
- >> RoHS compliant

Vibration Sensor Switches

NV1 Series



NV2 Series



NV3 Series



NV4 Series

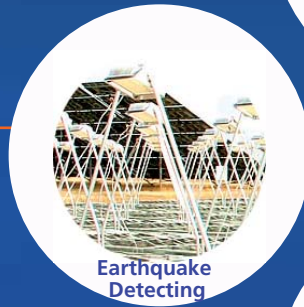


Roll Ball Sensor Switches

NR1 Series



NR2 Series



NR3 Series



Optical Roll Ball Sensor Switches

NP1 Series



NP2 Series





Applications:

1. 45° Tilt Detecting within a 360° radius:
Home Appliance Tilt Off function
2. Slight Vibration Detecting: Earthquake Alarm

Dimensions/ Operation/ P.C.B. Layout(Unit:mm,Tolerance: ±0.25mm)

<p>P.C.B.</p>	<p> Uncertain (35°~55°) (-35°~-55°) Lo district (0°~35°) (0°~-35°) Hi district (55°~180°) (-55°~-180°) </p> <p>Operation Angle $\theta=45^\circ \pm 10^\circ$</p>	<p>10.5 8 12 7.62 4.5</p>	<p>Cathode Emitter Anode Collector</p> <p>For Horizontal P.C.B Layout</p> <p>0.5 2.54 7.62</p>
<p>P.C.B.</p>	<p> Uncertain (20°~40°) (-20°~-40°) Lo district (0°~20°) (0°~-20°) Hi district (40°~180°) (-40°~-180°) </p> <p>Operation Angle $\theta=30^\circ \pm 10^\circ$</p>	<p>10.5 8 12 7.62 4.5</p>	<p>Cathode Emitter Anode Collector</p> <p>For Horizontal P.C.B Layout</p> <p>0.5 2.54 7.62</p>
<p>P.C.B.</p>	<p> Uncertain (10°~30°) (-10°~-30°) Lo district (0°~10°) (0°~-10°) Hi district (30°~180°) (-30°~-180°) </p> <p>Operation Angle $\theta=20^\circ \pm 10^\circ$</p>	<p>10.5 8 12 7.62 4.5</p>	<p>Cathode Emitter Anode Collector</p> <p>For Horizontal P.C.B Layout</p> <p>0.5 2.54 7.62</p>
<p>P.C.B.</p>	<p> Uncertain (5°~25°) (-5°~-25°) Lo district (0°~5°) (0°~-5°) Hi district (25°~180°) (-25°~-180°) </p> <p>Operation Angle $\theta=15^\circ \pm 10^\circ$</p>	<p>10.5 8 12 7.62 4.5</p>	<p>Cathode Emitter Anode Collector</p> <p>For Horizontal P.C.B Layout</p> <p>0.5 2.54 7.62</p>

GENERAL SPECIFICATIONS

Features:

1. Small size & compact space.
2. Housing made of high insulation plastics material, free from electric conduction and rust problem.
3. Using photo transistors to detect signal makes the signal highly reliable and stable.
4. All plastic material subject to industrial purpose meets with UL94V grade; high temperature and fireproof function
5. Suitable to IC trigger signal.
6. Suitable to horizontal PCB.
7. Tilt Angles: 15°, 20°, 30° and 45° within a 360° radius.
8. Complete replacement of mercury switch and meet with environmental protection

Bill Of Material:

1. Housing: Class-Fiber Polyamide, UL 94-0
2. Base: Class-Fiber Polyamide, UL 94-0
3. Ball :Stainless Steel
4. Infrared Emitting Diodes: -
5. Silicon Photo Transistors: -
6. Inside part: Copper Alloy, Nickel Plated

Mechanical Characteristics:

1. Temperature Range: Operating: -25°C to +85°C ;
Storage : -40°C to +85°C
2. Pull Force of Terminal: 500 gf for 1 minute
3. Operation Life: 30,000 Hours
4. Humidity: 95% RH, 40°C for 96 hrs.
5. Solder ability : After flux 260±5°C for 5±0.5 seconds 95% coverage

Absolute Maximum Rating(Ta=25°C)

Item	Symbol	Rating	Unit
Input	Power Dissipation	Pd	75 mW
	Reverse Voltage	Vr	5 V
	Forward Current	If	50 mA
	Peak Forward Current (*)	I _{fp}	1 A
Output	Collector Power Dissipation	Pc	100 mW
	Collector Current	Ic	20 mA
	C-E Voltage	V _{ce0}	30 V
	E-C Voltage	V _{eco}	5 V

(*) tw=100 uSec. T=10 mSec.

ELECTRICAL CHARACTERISTICS(Ta=25°C)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Forward Voltage	V _f	I _f =20mA	—	—	1.5	V
Reverse Current	I _r	V _r =5V	—	—	10	μA
Peak Wavelength	λ _p	I _f =10mA	—	940	—	nm
Dark Current	I ₀	V _{ce} =10V	—	—	2	μA
C-E Saturation Voltage	V _{ce(sat)}	I _c =0.25mA I _f =20mA	—	—	0.4	V
Light Current	I _l	V _{ce} =5V I _f =20mA	0.5	5	—	mA
Rise Time	T _r	I _c =0.8mA	—	5	—	μsec
Fall Time	T _f	V _{cc} =30v R _L =1KΩ	—	5	—	μsec

Character: When tilt degree: Θ < 45° ± 10°, Output current = I_{ce0} (Lo);
Θ > 45° ± 10°, Output current = I_c (Hi).

Typical Electrical / Optical Characteristics Curves (Ta=25°C)

Fig.1 Power Dissipation vs. Ambient Temperature

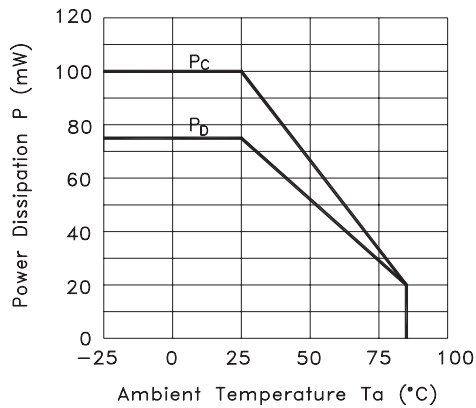


Fig.2 Forward Current vs. Forward Voltage

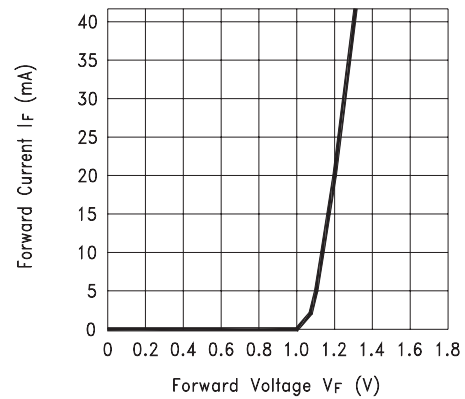


Fig.3 Collector Current vs. Collector-emitter Voltage

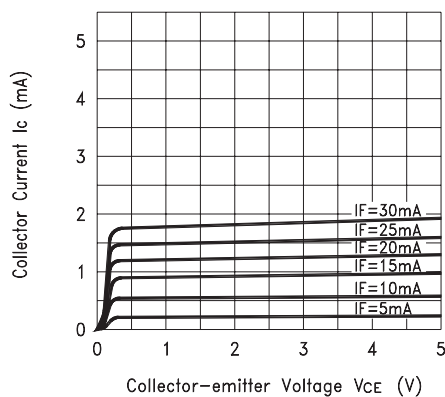


Fig.4 Collector Current vs. Ambient Temperature

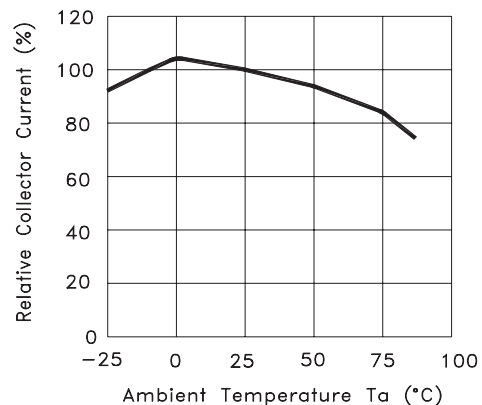


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

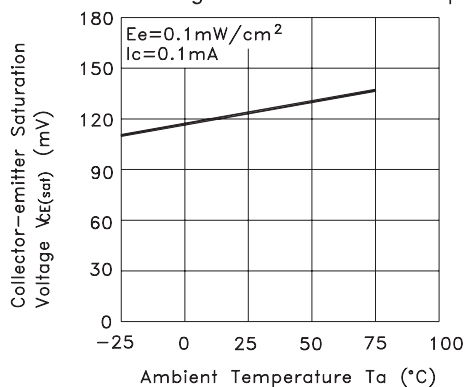


Fig.6 Response Time vs. Load Resistance

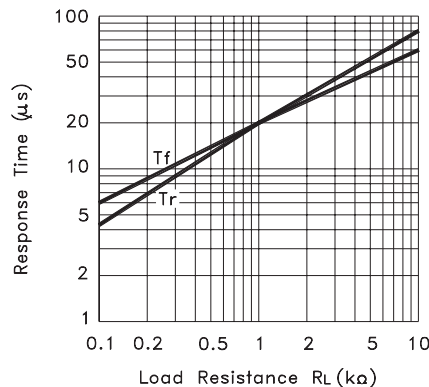
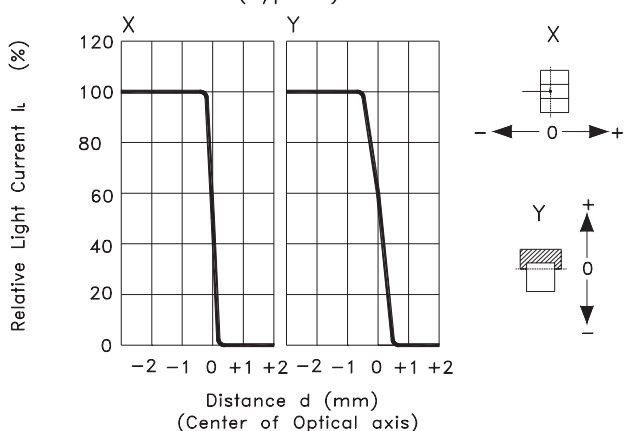


Fig.7 Sensing Position Characteristics (Typical)



» NOTE

1. Strongly recommend that using 20mA as input current.
2. For the continued product improvement as one of the company policy, specifications may change or update without notice. The latest information can be obtained through our sales offices. Normally, all products are supplied under our standard conditions.

» PRECAUTIONS FOR USE

1. The product is used mainly in electronic devices such as automotive devices, visual devices, home electrical appliances, information devices and communication settings. If the products is intended to be used for other endurance equipments requiring higher safety and reliability such as life support system, space and aviations devices, disaster and safety system, it's necessary to make verification of conformity or contact us for the details before using.
2. Don't try to clean the switch with a solvent or similar substance after the solderring process
3. The switch might be damaged if using the water-soluble flux.

PACKAGE (Minimum Order Quantity: One Bag / One Box)

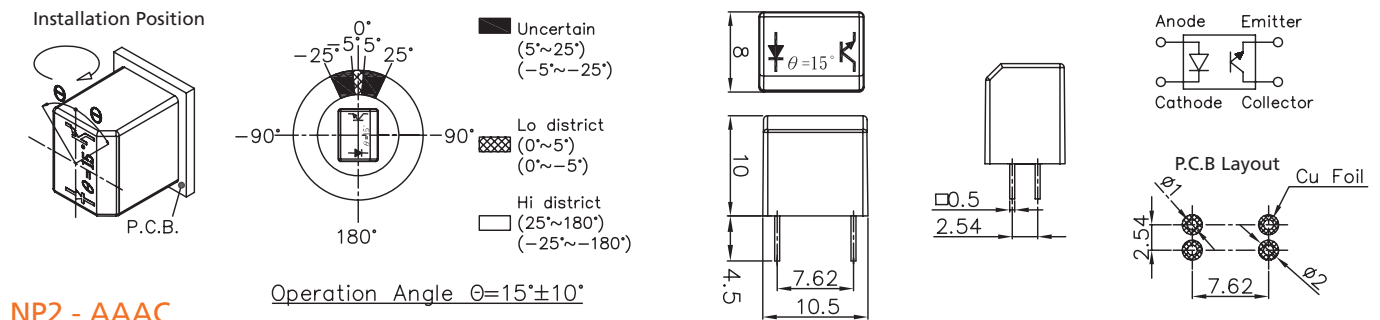
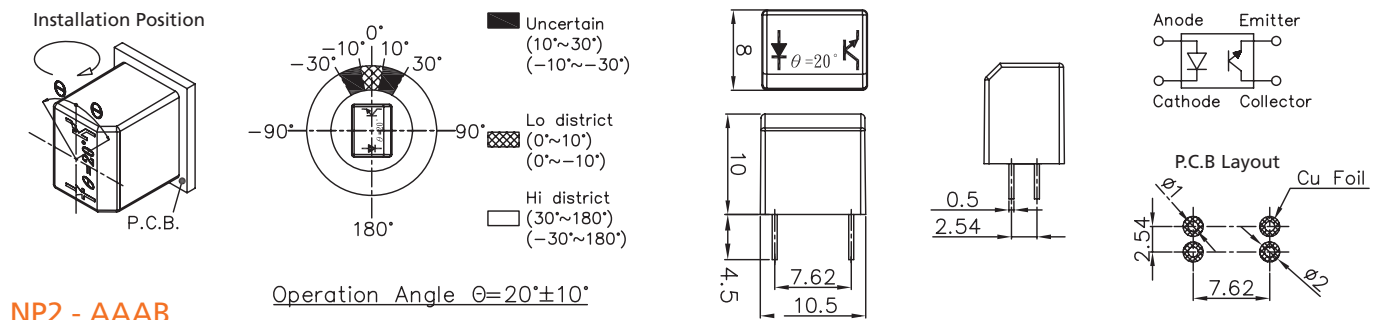
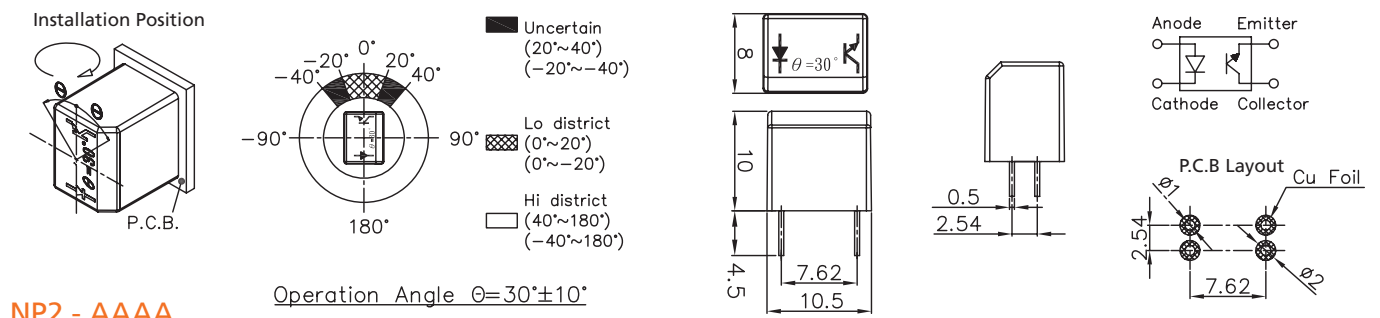
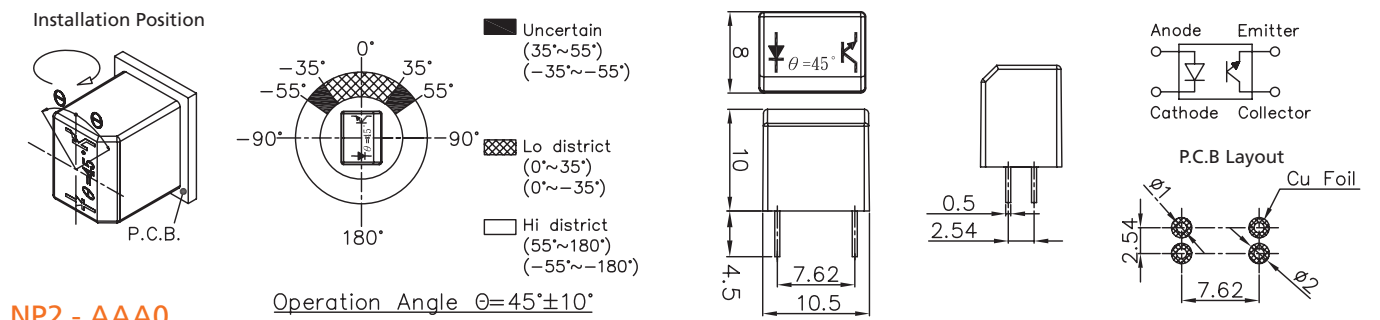
	Part Number	Package	Quantity	Total	Size
1.	NP1-0CA0	PE Bag	200 pcs	200 pcs	12.7 x 17.8 cm
	NP1-0CAA	Inner Box	8 Bags	1,600 pcs	36 x 20 x 9 cm
	NP1-0CAB		3 Boxes	4,800 pcs	36 x 28 x 23 cm
2.	NP1-0CAC	Carton	3 Boxes	4,800 pcs	36 x 28 x 23 cm
	NP1-0CA0	IC tube	48 pcs	48 pcs	52.5 x 1 x 1.75 cm
	NP1-0CAA	Inner Box	72 tubes	3,456 pcs	54 x 13 x 13 cm
NP1-0CAB	4 Boxes		13,824 pcs	55 x 29 x 29 cm	
	NP1-0CAC	Carton	4 Boxes	13,824 pcs	55 x 29 x 29 cm



Applications:

1. Detecting within a 360° radius:
LCD Monitor Rotation
Home Appliance Tilt Off function
2. Slight Vibration Detecting: Earthquake Alarm

Dimensions/ Operation/ P.C.B. Layout (Unit:mm,Tolerance: ±0.25mm)



GENERAL SPECIFICATIONS

Features:

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ELECTRICAL CHARACTERISTICS(Ta=25°C)

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Peak Wavelength	λ _p	I _f =10mA	—	940	—	nm
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Fall Time	T _f		—	5	—	μsec

Character: When tilt degree: θ < 45° ± 10°, Output current = I_{ceo} (Lo);
θ > 45° ± 10°, Output current = I_c (Hi).

Typical Electrical / Optical Characteristics Curves (Ta=25°C)

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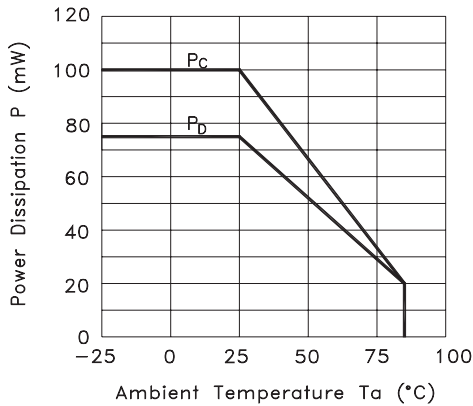


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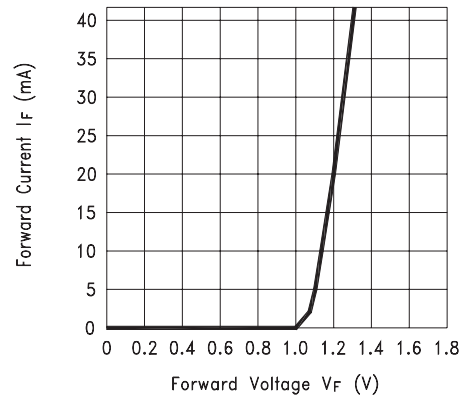


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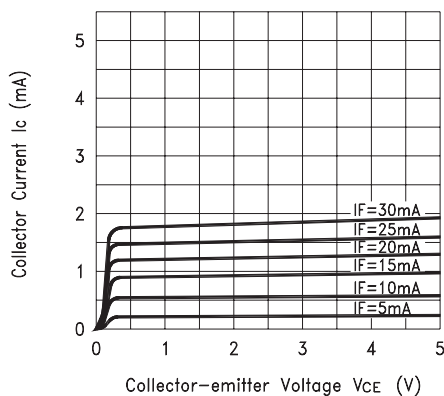


Fig.4 Collector Current vs. Ambient Temperature

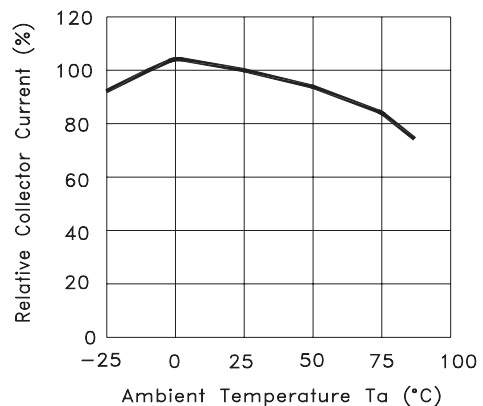


Fig.5 Collector-emitter Saturation Voltage vs. Ambient Temperature

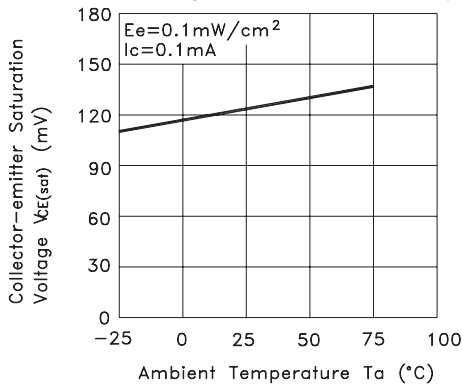


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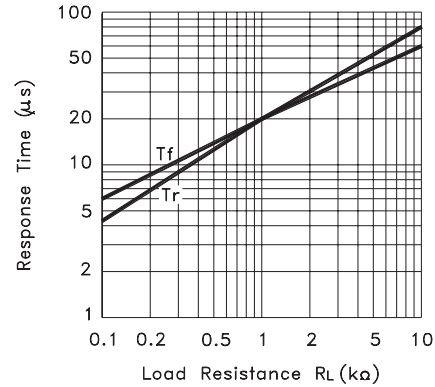
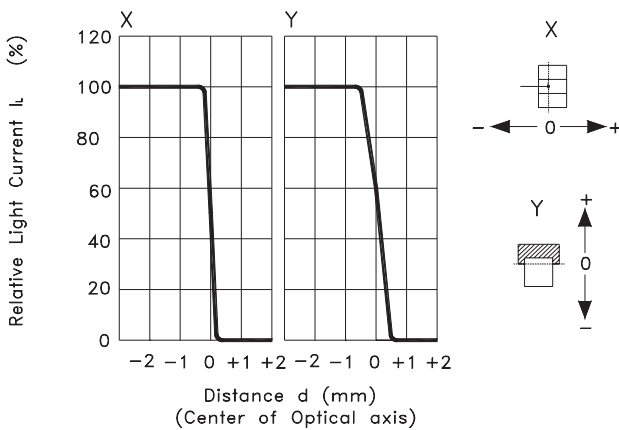


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2.	NP1-0CA0	IC tube	48 pcs	48 pcs	52.5 x 1 x 1.75 cm
	NP1-0CAA	Inner Box	84 tubes	4,032 pcs	54 x 13 x 13 cm
	NP1-0CAB		4 Boxes	16,128 pcs	55 x 29 x 29 cm
	NP1-0CAC				