PC817XNNSZ0F Series

DIP 4pin
Photocoupler

■Description

PC817XNNSZ0F Series contains an IRED optically coupled to a phototransistor.
It is packaged in a 4-pin DIP.
Input-output isolation voltage(rms) is 5kV.
Collector-emitter voltage is 80V.

■Agency approvals/Compliance

1. Approved by UL
   file No. E64380 (as model No. PC817)
2. Approved by CSA
   file No. CA95323 (as model No. PC817)
3. Package resin : UL flammability grade (94V-0)

■Features

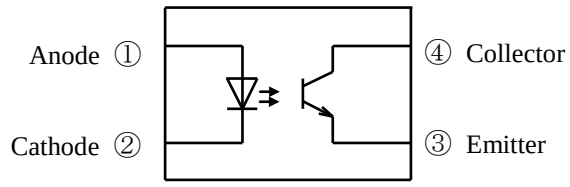
1. 4-pin DIP package
2. Double transfer mold package (Ideal for Flow Soldering)
3. High isolation voltage between input and output (Viso(rms) : 5kV)
4. High collector-emitter voltage(V_{CEO} : 80V)
5. Current transfer ratio (CTR : MIN. 50% at I_F=5 mA, V_{CE}=5V)
6. RoHS directive compliant

■Applications

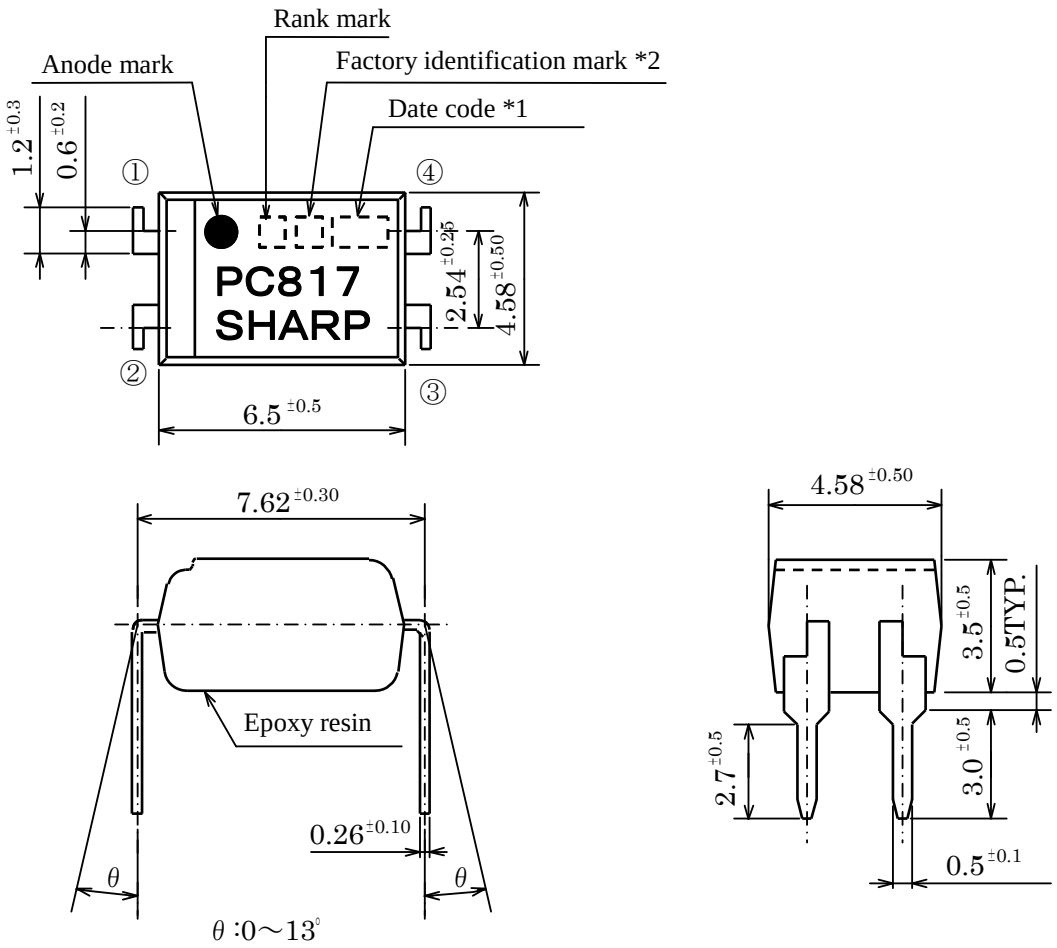
1. Programmable controllers
2. Facsimiles
3. Telephones

Sheet No.: OP14004EN

■Internal Connection Diagram



■Outline



*1) 2-digit number shall be marked according to OLD DIN standard.
*2) Factory identification mark applies to the below.
Without : SUN-S Corporation (Japan)
: WUXI WONDERFUL ELECTRONICS CO., LTD. (CHINA)
or : SUN-S Electronic Technology (KUNSHAN) Co., Ltd (CHINA)

Pin material : Copper Alloy
Pin finish : SnCu plating (Cu : TYP. 2%)

Product mass : Approx. 0.23g

	UNIT : 1/1 mm
Marking is laser marking	Name: PC817 Outline Dimensions (Business dealing name : PC817X*NSZ0F)

■Absolute maximum ratings

Ta=25°C

Parameter			Symbol	Rating	Unit
Input	*1	Forward current	I_F	50	mA
	*2	Peak forward current	I_{FM}	1	A
		Reverse voltage	V_R	6	V
	*1	Power dissipation	P	70	mW
Output		Collector-emitter voltage	V_{CEO}	80	V
		Emitter-collector voltage	V_{ECO}	6	V
		Collector current	I_c	50	mA
	*1	Collector power dissipation	P_c	150	mW
*1		Total power dissipation	P_{tot}	200	mW
		Operating temperature	T_{opr}	-30 to +100	°C
		Storage temperature	T_{stg}	-55 to +125	°C
*3		Isolation voltage	$V_{iso(rms)}$	5	kV
*4		Soldering temperature	T_{sol}	270	°C

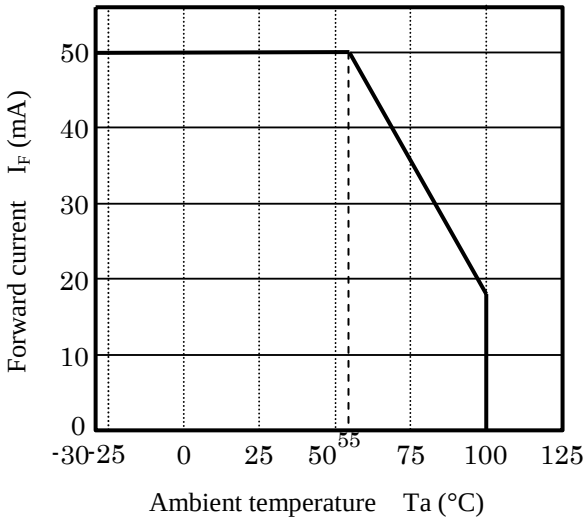
*1 The derating factors of absolute maximum ratings due to ambient temperature are shown in Fig. 1 to 4.
*2 Pulse width≦100μs, Duty ratio : 0.001 (Refer to Fig. 5)
*3 AC for 1 min, 40 to 60%RH
*4 For 10 s

■Electro-optical Characteristics

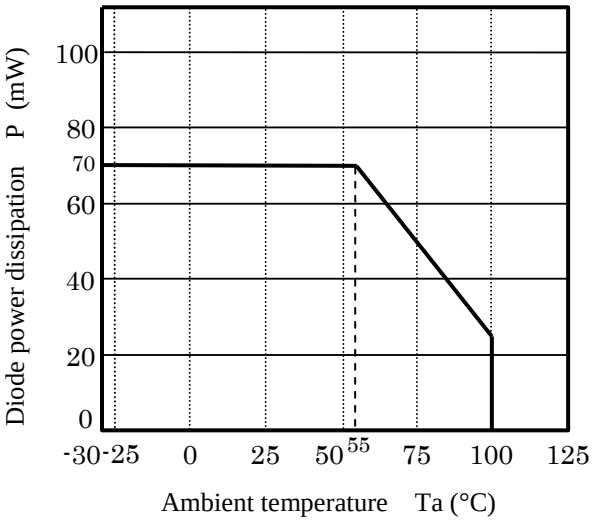
Ta=25°C

Parameter		Symbol	Condition	MIN.	TYP.	MAX.	Unit
Input	Forward voltage	V_F	I_F=20mA	-	1.2	1.4	V
	Peak forward voltage	V_{FM}	I_{FM}=0.5A	-	-	3.0	V
	Reverse current	I_R	V_R=4V	-	-	10	μA
	Terminal capacitance	C_t	V=0, f=1kHz	-	30	250	pF
Output	Dark current	I_{CEO}	V_{CE}=50V, I_F=0	-	-	100	nA
	Collector-emitter breakdown voltage	BV_{CEO}	I_c=0.1mA I_F=0	80	-	-	V
	Emitter-collector breakdown voltage	BV_{ECO}	I_E=10μA, I_F=0	6	-	-	V
Transfer charac-teristics	Collector current	I_c	I_F=5mA, V_{CE}=5V	2.5	-	30	mA
	Collector-emitter saturation voltage	$V_{CE(sat)}$	I_F=20mA I_c=1mA	-	0.1	0.2	V
	Isolation resistance	R_{ISO}	DC500V 40 to 60%RH	5×10^{10}	10^{11}	-	Ω
	Floating capacitance	C_f	V=0, f=1MHz	-	0.6	1.0	pF
	Cut-off frequency	f_c	V_{CE}=5V, I_c=2mA R_L=100Ω, -3dB	-	80	-	kHz
	Rise time	tr	V_{CE}=2V I_c=2mA R_L=100Ω	-	4	18	μs
	Fall time	t_f		-	3	18	μs

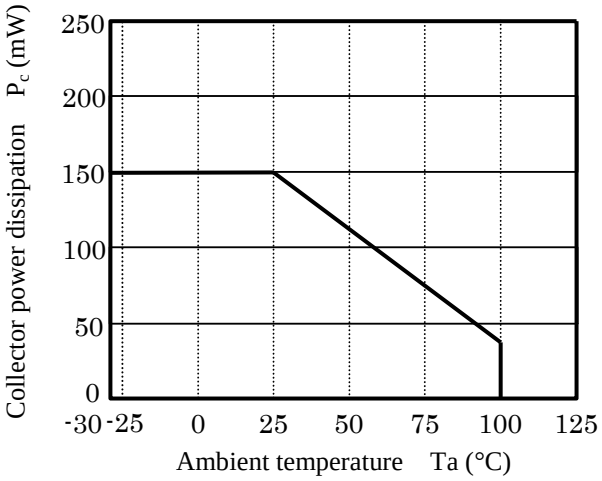
(Fig. 1)
Forward current vs. ambient temperature



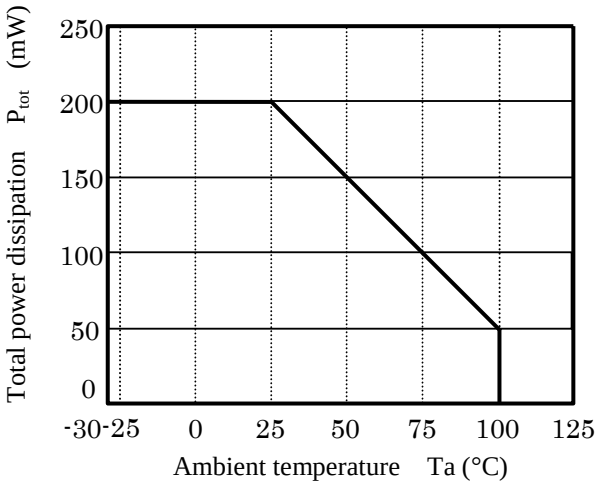
(Fig. 2)
Diode power dissipation vs. ambient temperature



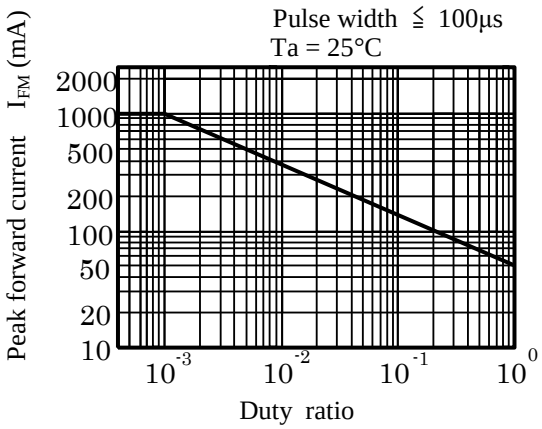
(Fig. 3)
Collector power dissipation vs. ambient temperature



(Fig. 4)
Total power dissipation vs. ambient temperature



(Fig. 5)
Peak forward current vs. duty ratio



■Supplements

●Isolation voltage shall be measured in the following method.
(1) Short between anode and cathode on the primary side and between collector and emitter on the secondary side.
(2) The dielectric withstanding tester with zero-cross circuit shall be used.
(3) The wave form of applied voltage shall be a sine wave.
(It is recommended that the isolation voltage be measured in insulation oil.)

●Business dealing name

Business dealing name	Rank mark	Ic (mA)
PC817XNNSZ0F	with or without	2.5 to 30
PC817X1NSZ0F	A	4.0 to 8.0
PC817X2NSZ0F	B	6.5 to 13
PC817X3NSZ0F	C	10 to 20
PC817X4NSZ0F	D	15 to 30
PC817X5NSZ0F	A or B	4.0 to 13
PC817X6NSZ0F	B or C	6.5 to 20
PC817X7NSZ0F	C or D	10 to 30
PC817X8NSZ0F	A, B or C	4.0 to 20
PC817X9NSZ0F	B, C or D	6.5 to 30
PC817X0NSZ0F	A, B, C or D	4.0 to 30

Test conditions
I_F=5mA V_{CE}=5V Ta=25°C

●This Model is approved by UL.
Approved Model No. : PC817
UL file No. : E64380

●This Model is approved by CSA.
Approved Model No. : PC817
However, products shall be approved from date code“A5”(May 2010).
CSA file No. : CA95323
CSA approved mark " " shall be indicated on minimum unit package.

●This product is not designed against irradiation.
This product is assembled with electrical input and output.
This product incorporates non-coherent light emitting diode.

●ODS materials
This product shall not contain the following materials.
Also, the following materials shall not be used in the production process for this product.
Materials for ODS : CFC_S, Halon, Carbon tetrachloride, 1.1.1-Trichloroethane (Methyl chloroform)

●Specified brominated flame retardants
Specified brominated flame retardants (PBB and PBDE) are not used in this device at all.

●Compliance with each regulation
(1) The RoHS directive (2002/95/EC)
This product complies with the RoHS directive (2002/95/EC).
Object substances: mercury, lead, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) and polybrominated diphenyl ethers (PBDE)

(2) Content of six substances specified in Management Methods for Control of Pollution Caused by Electronic Information Products Regulation (Chinese： 电子信息产品污染控制管理办法).

Category	Toxic and hazardous substances					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent chromium (Cr^{6+})	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Photocoupler	✓	✓	✓	✓	✓	✓

✓: indicates that the content of the toxic and hazardous substance in all the homogeneous materials of the part is below the concentration limit requirement as described in SJ/T 11363-2006 standard.

■Notes

●Cleaning

(1) Solvent cleaning : Solvent temperature 45°C or less
Immersion for 3 min or less

(2) Ultrasonic cleaning : The effect to device by ultrasonic cleaning differs by cleaning bath size, ultrasonic power output, cleaning time, PCB size or device mounting condition etc. Please test it in actual using condition and confirm that any defect doesn't occur before starting the ultrasonic cleaning.

(3) Applicable solvent : Ethyl alcohol, Methyl alcohol, Isopropyl alcohol
When the other solvent is used, there are cases that the packaging resin is eroded.
Please use the other solvent after thorough confirmation is performed in actual using condition.

●Circuit design

(1) The LED used in the Photocoupler generally decreases the light emission power by operation.
In case of long operation time, please design the circuit in consideration of the degradation of the light emission power of the LED. (50%/5years)

(2) There are cases that the deviation of the CTR and the degradation of the relative light emission power of the LED increase when the setting value of I_F is less than 1.0mA. Please design the circuit in consideration of this point.

●Precautions for Soldering

(1) In the case of flow soldering (Whole dipping is possible)
It is recommended that flow soldering should be at 270°C or less for 10 s or less
(Pre-heating : 100 to 150°C, 30 to 80s). (2 times or less)

(2) In the case of hand soldering
What is done on the following condition is recommended. (2 times or less)
Soldering iron temperature : 400°C or less
Time : 3s or less

(3) Other precautions
Depending on equipment and soldering conditions (temperature, Using solder etc.), the effect to the device and the PCB is different.
Please confirm that there is no problem on the actual use conditions in advance.

■Package specification

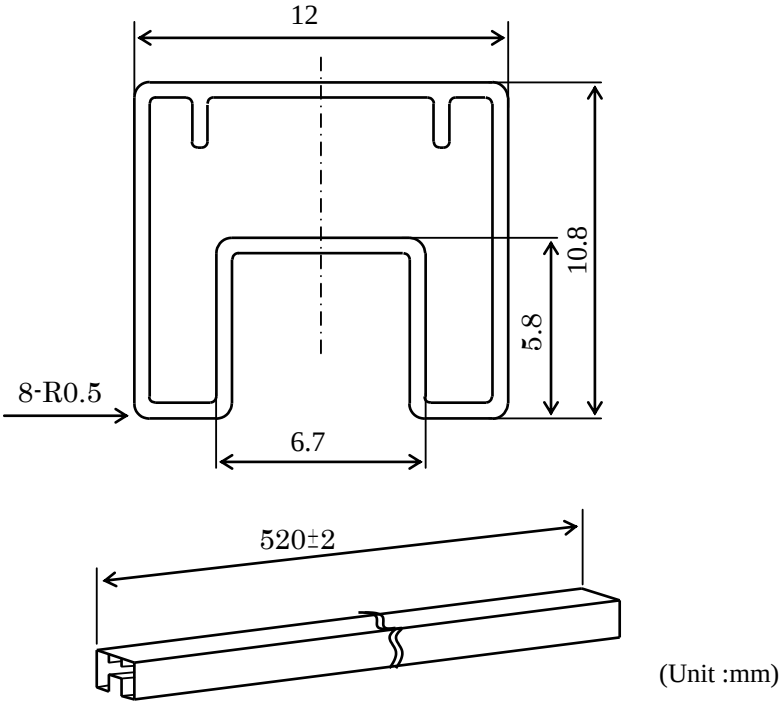
●Package materials

No.	Name	Materials	Purposes
①	Sleeve	HIPS or ABS with preventing static electricity	Products packaged
②	Stopper	Styrene-Erastomer	Products fixed
③	Packing case	Corrugated cardboard	Sleeve packaged
④	Kraft tape	Paper	Lid of packing case fixed
⑤	Label	Paper	Model No.,(Business dealing name),Lot No., Quantity, Country of origin , Company name and Inspection date specified

●Package method

(1) MAX. 100pcs. of products shall be packaged in a sleeve ① and both of sleeve edges shall be fixed by stoppers ②.
(2) MAX. 20 sleeves (Product : 2000pcs.) above shall be packaged in a packing case ③.
(3) The label ⑤ shall be put on the side of the packing case.
(4) Case shall be closed with the lid and enclosed with kraft tape ④.

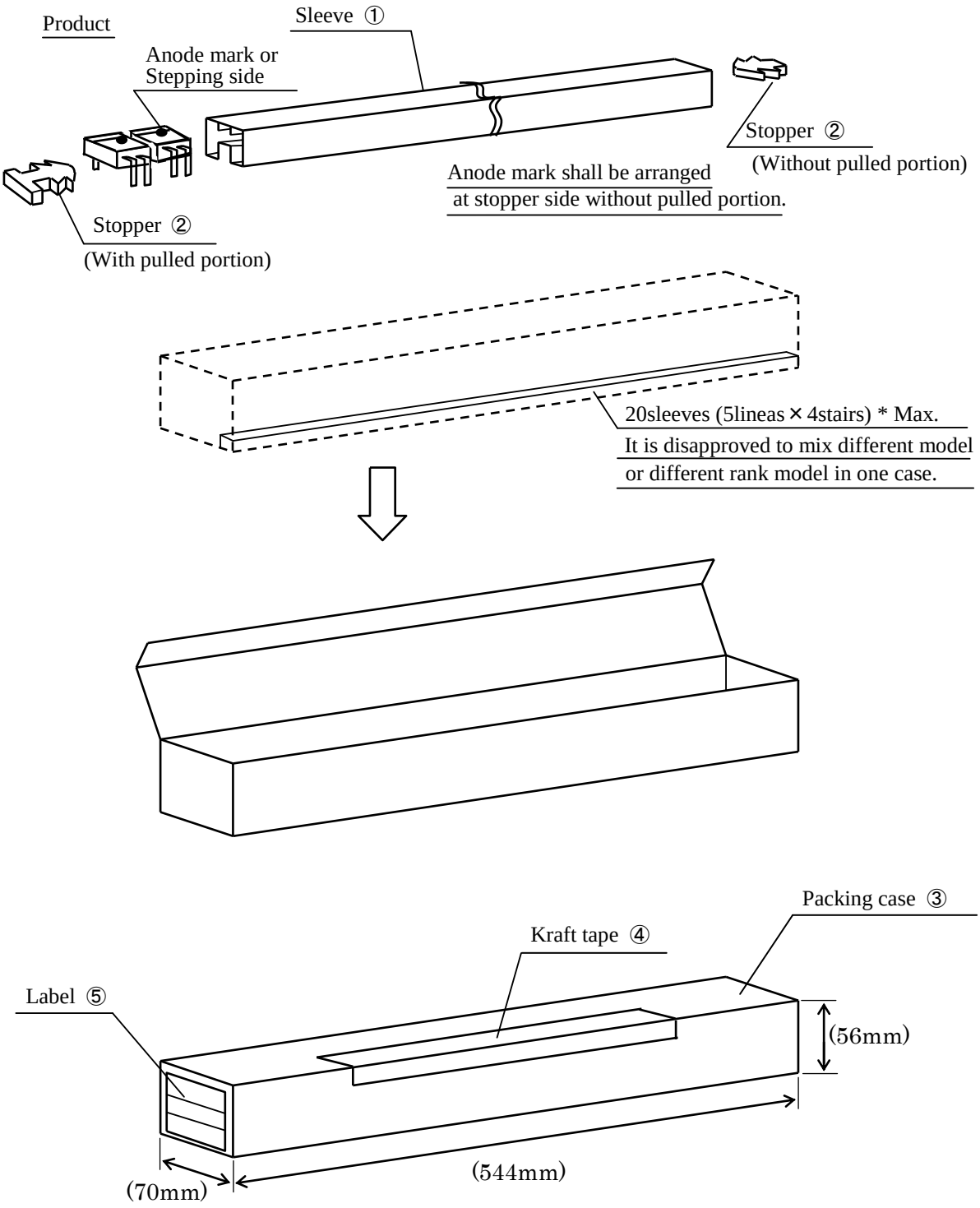
●Sleeve ① outline dimensions



(Unit :mm)

Note 1) Thickness : 0.5±0.2mm
2) Process with applying antistatic agent.
3) Unless otherwise specified tolerances shall be ±0.5mm.
(However except for deformation due to the stopper in sleeve.)

●Packaging case outline dimensions



Regular packing mass : Approx. 860g

( ) : Reference dimensions

■Important Notices

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· Observe the following points when using any devices in this publication. SHARP takes no responsibility for damage caused by improper use of the devices which does not meet the conditions and absolute maximum ratings to be used specified in the relevant specification sheet nor meet the following conditions:

(i) The devices in this publication are designed for use in general electronic equipment designs such as:

--- Personal computers
--- Office automation equipment
--- Telecommunication equipment [terminal]
--- Test and measurement equipment
--- Industrial control
--- Audio visual equipment
--- Consumer electronics

(ii) Measures such as fail-safe function and redundant design should be taken to ensure reliability and safety when SHARP devices are used for or in connection with equipment that requires higher reliability such as:

--- Transportation control and safety equipment (i.e., aircraft, trains, automobiles, etc.)
--- Traffic signals
--- Gas leakage sensor breakers
--- Alarm equipment
--- Various safety devices, etc.

(iii) SHARP devices shall not be used for or in connection with equipment that requires an extremely high level of reliability and safety such as:

--- Space applications
--- Telecommunication equipment [trunk lines]
--- Nuclear power control equipment
--- Medical and other life support equipment (e.g., scuba).

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