

SHARP

OPTO-ANALOG DEVICES DIVISION
ELECTRONIC COMPONENTS GROUP
SHARP CORPORATION

SPECIFICATION

DEVICE SPECIFICATION FOR

PHOTOTRANSISTOR

MODEL No. PT100ME0MP

REFERENCE

Specified for _____

Enclosed please find copies of the Specifications which consists of 14 pages including cover.
After confirmation of the contents, please be sure to send back copy of the Specifications
with approving signature on each.

CUSTOMER'S APPROVAL

DATE

BY

PRESENTED

DATE

BY H. O

H. Ogura,
Department General Manager of
Engineering Dept., III
Opto-Analog Devices Div.
ELECOM Group
SHARP CORPORATION

REFERENCEProduct name : PHOTOTRANSISTORModel No. : PT100MF0MP

1. These specification sheets include materials protected under copyright of Sharp Corporation ("Sharp"). Please do not reproduce or cause anyone to reproduce them without Sharp's consent.
2. When using this product, please observe the absolute maximum ratings and the instructions for use outlined in these specification sheets, as well as the precautions mentioned below. Sharp assumes no responsibility for any damage resulting from use of the product which does not comply with the absolute maximum ratings and the instructions included in these specification sheets, and the precautions mentioned below.

(Precautions)

- (1) This product is designed for use in the following application areas ;

<ul style="list-style-type: none"> · OA equipment · Telecommunication equipment (Terminal) · Tooling machines 	·	<ul style="list-style-type: none"> · Audio visual equipment · Measuring equipment · Computers 	·	<ul style="list-style-type: none"> · Home appliances
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If the use of the product in the above application areas is for equipment listed in paragraphs (2) or (3), please be sure to observe the precautions given in those respective paragraphs.

- (2) Appropriate measures, such as fail-safe design and redundant design considering the safety design of the overall system and equipment, should be taken to ensure reliability and safety when this product is used for equipment which demands high reliability and safety in function and precision, such as ;

<ul style="list-style-type: none"> · Transportation control and safety equipment (aircraft, train, automobile etc.) · Other safety equipment 	·	<ul style="list-style-type: none"> · Traffic signals · Gas leakage sensor breakers 	·	<ul style="list-style-type: none"> · Rescue and security equipment
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- (3) Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;

<ul style="list-style-type: none"> · Space equipment · Nuclear power control equipment 	·	<ul style="list-style-type: none"> · Telecommunication equipment (for trunk lines) · Medical equipment
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- (4) Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.

3. Please contact and consult with a Sharp sales representative for any questions about this product.

1. Application

This specification applies to the outline and characteristics of Silicon phototransistor Model No.PT100MF0MP.

2. Outline

Refer to the attached drawing No. 13644H02 ,page 3.

3. Ratings and characteristics

Refer to the attached sheet, page 4, 5.

4. Reliability

Refer to the attached sheet, page 6.

5. Outgoing inspection

Refer to the attached sheet, page 7.

6. Supplement

(6-1) Packing

Refer to the attached sheet, attachment -2-1 to 2-5.

(6-2) This product is not designed against electromagnetic and ionized-particle irradiation.

(6-3) 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 : CFCs, Halon, Carbon tetrachloride

1,1,1-Trichloroethane (Methyl chloroform)

(6-4) This product does not contain the chemical materials regulated by RoHS.

(6-5) This product does not contain specific brominated flame retardants such as the PBB and PBDE .

(6-6) Product mass (Piece) : Approximately 10mg

7. Notes

Soldering

(7-1) Solder reflow

Please do only one time soldering at the temperature and the time within the temperature profile in attached sheet-1.

(7-2) Soldering by hand

To solder onto terminals, please solder at 260°C for 3 seconds or less.

Please be careful not to give the mechanical force to the package when soldering because it may cause the deformation or defect due to the plated connection.

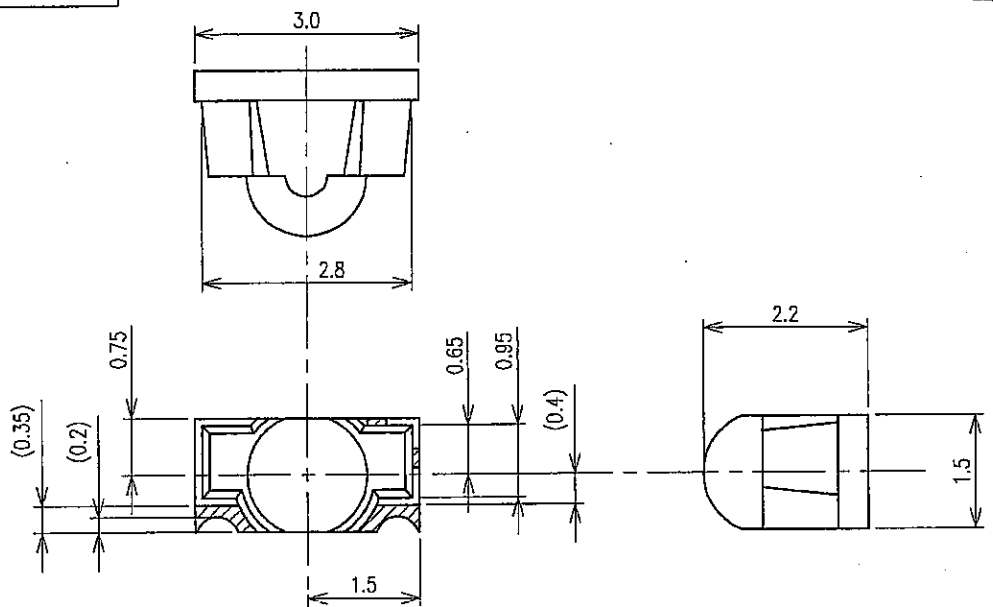
(7-3) Case of other soldering

Other soldering methods such as dip soldering and VPS should not be used.

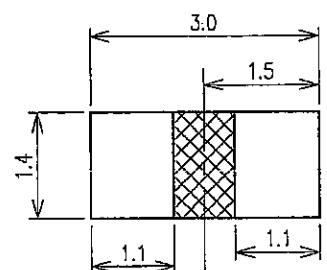
Please use (7-1) or (7-2).

REFERENCE

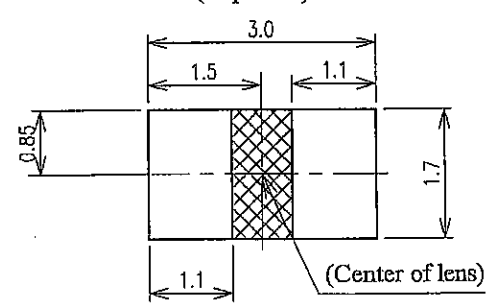
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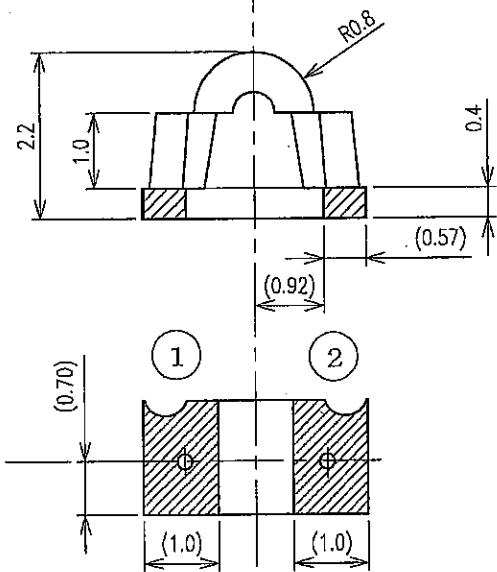
The pattern example from the view point of PCB
(Side view)



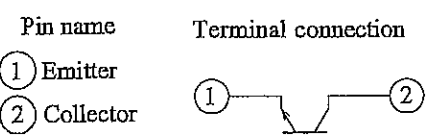
The pattern example from the view point of PCB
(Top view)



⊠ Please be careful not to put a pattern on the shaded portion



- 1) Unspecified tolerance shall be ± 0.2 .
- 2) Dimensions in parenthesis are shown for reference.
- 3) area : Au Plating
- 4) Resin burr shall not be included in outline dimensions.
- 5) Package : Black (Visible light cut-off resin)



Scale	Material	Finish	Name	PT100MF0MP									
10 / 1				Outline Dimensions									
Unit	Package : Epoxy resin	Pin: Au plating	Drawing No.	C	Y	1	3	6	4	4	H	0	2
1 = 1 / 1 mm													

3. Ratings and characteristics

3.1 Absolute maximum ratings

Ta=25°C

Parameter	Symbol	Rating	Unit
Collector-emitter voltage	V _{CEO}	35	V
Emitter-collector voltage	V _{ECO}	6	V
Collector current	I _C	20	mA
Collector power dissipation	P _C	75	mW
Operating temperature	T _{Op}	-30 to +85	°C
Storage temperature	T _{Stg}	-40 to +95	°C
* Soldering temperature	T _{Sol}	260	°C

* Within 10s (MAX.) according to the attached reflow profile.

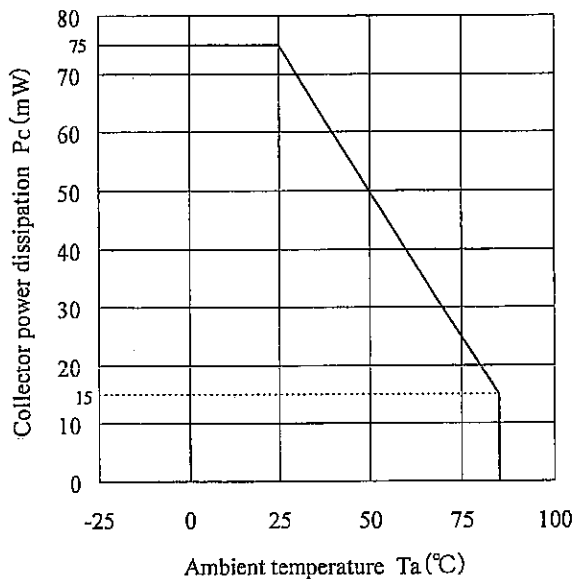
3.2 Electro-optical characteristics

Ta=25°C

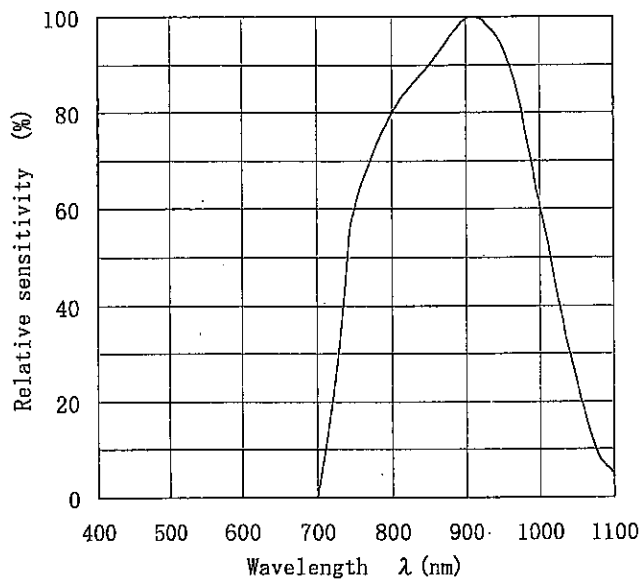
Parameter	Symbol	MIN.	TYP.	MAX.	Unit	Conditions
Collector current	I _C	1.15	2	3.45	mA	※Ee=1mW/cm ² V _{CE} =5V
Dark current	I _{CEO}	-	1.0	100	nA	Ee=0, V _{CE} =20V
Collector-emitter saturation voltage	V _{CE(sat)}	-	0.1	0.4	V	※Ee=10mW/cm ² I _C =0.5mA
Collector-emitter breakdown voltage	BV _{CEO}	35	-	-	V	I _C =0.1mA Ee=0
Emitter-collector breakdown voltage	BV _{ECO}	6	-	-	V	I _E =0.01mA Ee=0
Peak sensitivity wavelength	λ _p	-	910	-	nm	—
Response time (Rise)	t _r	-	5.0	-	μs	V _{CE} =2V, I _C =2mA R _L =100Ω
Response time (Fall)	t _f	-	6.0	-	μs	
Half intensity angle	Δθ	-	±15	-	°	—

※Ee : Irradiance by CIE standard light source A (tungsten lamp)

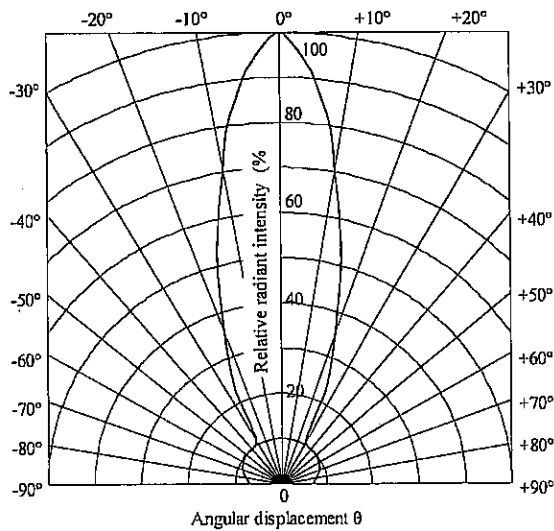
(3.3) Collector power dissipation vs. ambient temperature



(3.4) Spectral sensitivity (reference)



(3.5) Radiation diagram (reference)



4. Reliability

The reliability of products shall satisfy items listed below.

Confidence level : 90%

LTPD : 10 or 20

Test Items	Test Conditions	Failure Judgement Criteria	Samples (n)
			Defective(C)
Temperature cycling	1 cycle -40°C ← → +95°C (30min) (30min) 20 cycles test	$I_c < L \times 0.8$ $I_c > U \times 1.2$ $I_{CBO} > U \times 2.0$ $V_{CE(sat)} > U \times 1.2$ U: Upper specification limit L: Lower specification limit	n=22, C=0
High temp. and high humidity storage	+60°C, 90%RH, 500h		n=22, C=0
High temp. storage	+95°C, 500h		n=22, C=0
Low temp. storage	-40°C, 500h		n=22, C=0
Operation life	+25°C $P_C=75mW$, 500h		n=22, C=0
Mechanical shock	1000m/s ² , 6ms, Half sine wave 3 times/±X, Y, Z direction		n=11, C=0
Variable frequency vibration	100 to 2000 to 100Hz/Sweep for 4min 200m/s ² , 48min/X, Y, Z direction		n=11, C=0
Soldering heat	260±5°C, 10±0.5s The temperature profile is according to the precautions for soldering (attachment-1).		n=11, C=0

REFERENCE

5. Outgoing inspection

(1) Inspection lot

Inspection shall be carried out per each delivery lot.

(2) Inspection method

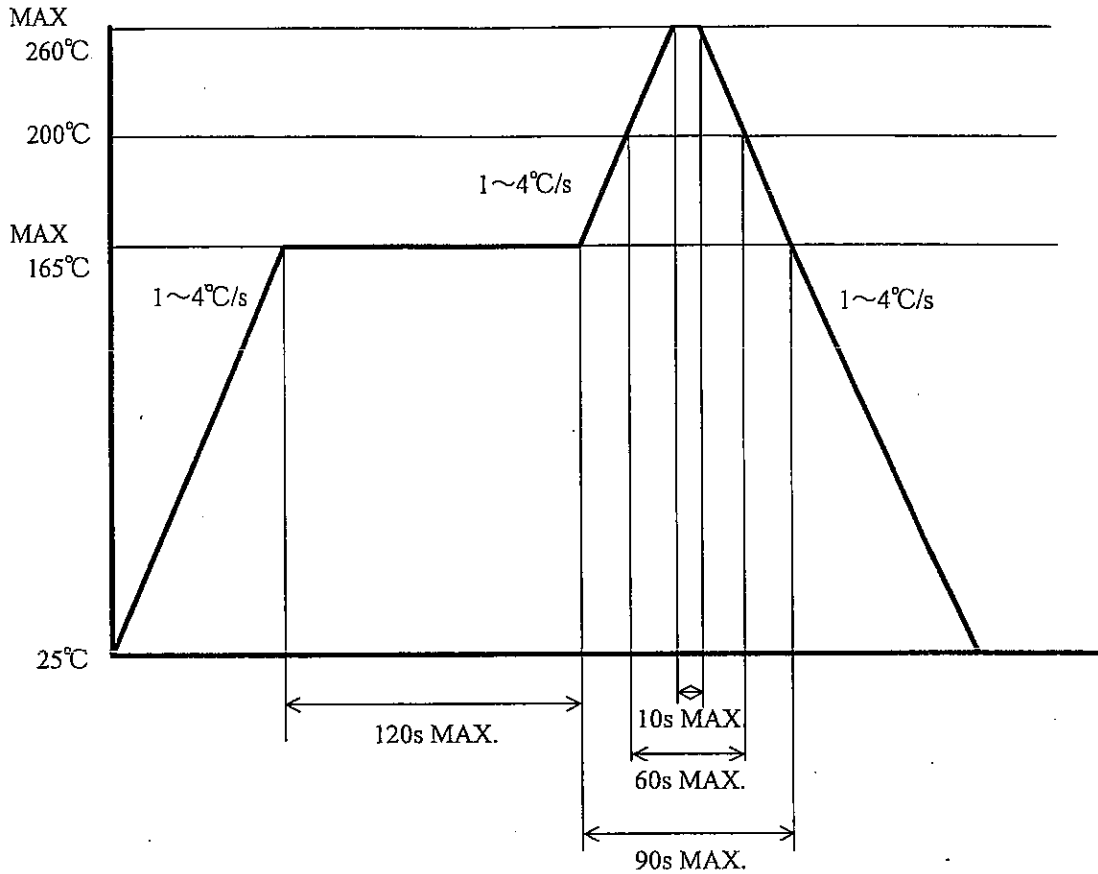
A single sampling plan, normal inspection level II based on ISO2859 shall be adopted.

Defect	Inspection items and test method				AQL(%)	
Major defect	1	Disconnection, short			0.065	
	2	Inverse polarity on terminal				
	3	Characteristics defect				
		Parameter	Symbol	Judgement criteria MIN. MAX.		Unit
		Collector current	I_C	1.15 3.45		mA
		Dark current	I_{CEO}	- 100		nA
		Collector-emitter breakdown voltage	BV_{CEO}	35 -		V
	Emitter-collector breakdown voltage	BV_{ECO}	6.0 -	V		
	Test conditions refer to paragraph 3.2.					
Minor defect	1	Appearance defect			0.25	
		Parameter	Judgement criteria			
		Crack	Visible crack irrespective of its position shall be defect.			
		Split, Chip, Scratch, Stain, Blur	One which affects the characteristics of paragraph 3.2. shall be defect.			
	Bubble, Foreign matter (One on resin surface which can wipe off shall not be applied.)	1. Area on light emitter One which affects the characteristics of paragraph 3.2 shall be defect. 2. Area excepting the above area 1.0mm ϕ or more shall be defect.				

Precautions for Soldering PT100MF0MP

1. In case, solder reflow

Please do only one time soldering at the temperature and the time within the temperature profile as shown in the figure below.



2. Other precautions

An infrared lamp used to heat up for soldering may cause a localized temperature rise in the resin. So keep the package temperature within that specified in Item 1. Please be careful not to give the mechanical force to the package when soldering because it may cause the deformation or defect due to the plated connection. Even if within the temperature profile above, there is the possibility that the gold wire in package is broken in case that the deformation of PCB gives the affection to terminals. Please use after confirming the conditions fully by actual solder reflow machine.

3. Storage and management after opening the package

3.1 Storage condition : Storage shall be in accordance with the below conditions.

Storage temp. : 5 to 30°C

Storage humidity : 70%RH or less

3.2 Treatment after opening the package

- (1) After opening the package, please mount at the conditions of humidity 60%RH or less and temperature 5 to 25°C within 2 days.
- (2) In case of long time storage after open, please mount at the conditions of humidity 70%RH or less and temperature 5 to 30°C within 2 weeks by using dry box or resealing with desiccant in moisture-proof sack by sealer.

3.3 Baking before mounting

In case that it could not carry out the above treatment, it is able to mount by baking treatment.
However baking treatment shall be limited only 1 time.

Recommended conditions : 125°C, 16 to 24 hours

※ Baking treatment can not be carried out at the packaged condition.

Please carry out baking at the condition of mounting on PCB or getting on the metal tray.

Package specifications (ϕ 180mm reel)

1. Application

This specification applies to the taping specifications and the relation items for the PT100MF0MP.

2. Taping method

(2.1) Tape structure and Dimensions (Refer to the attached sheet-2-2)

The tape shall have a structure in which a cover tape is sealed heat-pressed on the carrier tape made by PS to protect against static electricity.

(2.2) Reel structure and Dimensions (Refer to the attached sheet-2-3)

(2.3) Direction of product insertion (Refer to the attached sheet-2-3)

Product direction in carrier tape shall direct to the emitting diode at the hole side on the tape.

3. Adhesiveness of cover tape

The exhalation force between carrier tape and cover tape shall be 0.2N to 1N for the angle from 160° to 180° .

4. Rolling method and quantity

Wind the tape back on the reel so that the cover tape will be outside the tape.

Attach more than 20cm of blank tape to the trailer and the leader of the tape and fix the both ends with adhesive tape.

One reel shall contain 2000 pcs.

5. Marking

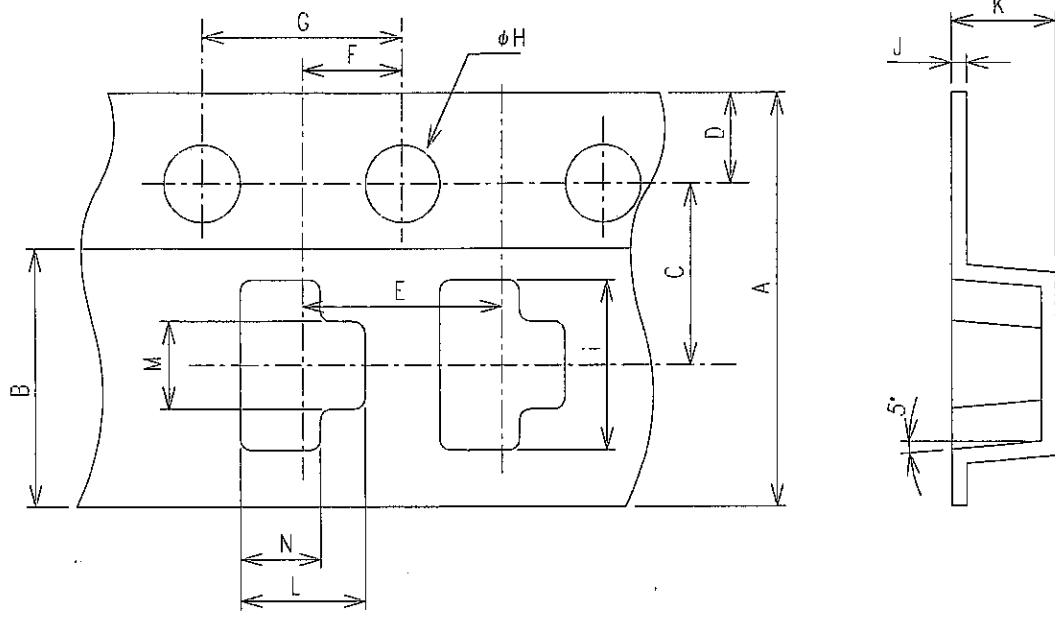
The outer packaging case shall be marked with following information.

* Model No. * Number of pieces delivered * Production date

6. Safety protection during shipping

There shall be no deformation of component or degradation of electrical characteristics due to shipping.

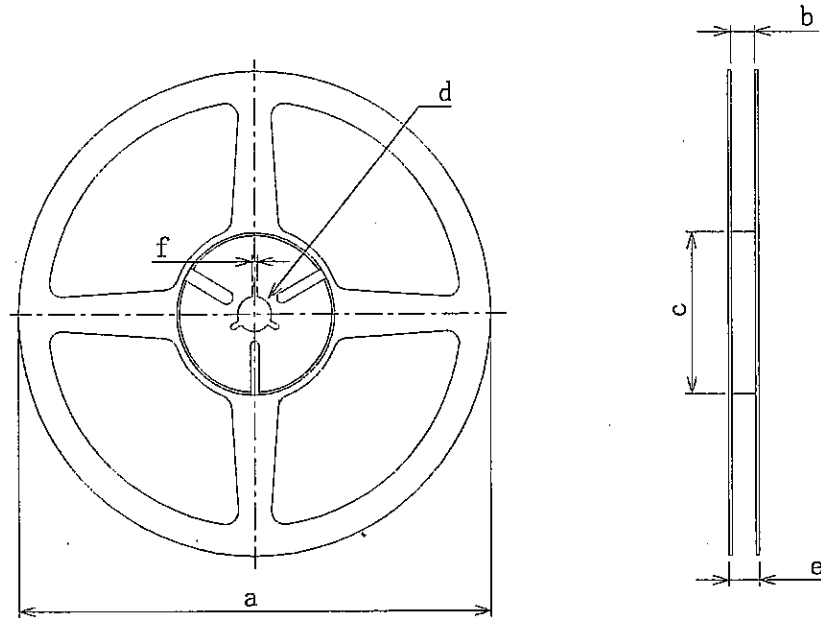
Tape structure and Dimensions



Symbol Unit	A	B	C	D	E	F	G
mm	8.0 ^{±0.3}	5.5 ^{±0.1}	3.5 ^{±0.05}	1.75 ^{±0.1}	4.0 ^{±0.1}	2.0 ^{±0.05}	4.0 ^{±0.1}

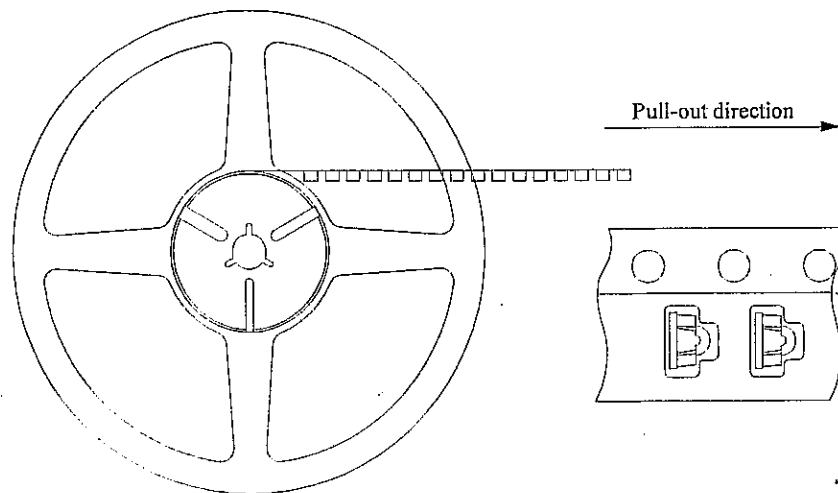
Symbol Unit	H	I	J	K	L	M	N
mm	φ1.5 ^{+0.1/-0}	3.3 ^{±0.1}	0.3 ^{±0.05}	1.75 ^{±0.1}	2.5 ^{±0.1}	1.7 ^{±0.1}	1.6 ^{±0.1}

Reel structure and Dimensions



Symbol	a	b	c	d	e	f
Unit						
mm	180	9 ^{+0.3} ₋₀	60 ⁺¹ ₋₀	13 ^{±0.2}	11.4 ^{±1}	2.0 ^{±0.5}

Direction of product insertion



Moisture-proof package specification (φ 180mm reel)

1. Application

This specification applies to the products which Sharp delivers to customer.

2. Packing specifications

2.1 Packaging material

Name	Material	Q'ty	Aim
Aluminum laminated bag	Aluminum polyethylene	Refer to 2.2	Moisture-proof
Label	Paper(-made)	-	Indication of Model No. and Q'ty
Humidity indicator card	Paper(-made)	1 sheet / reel	Indication of Humidity

2.2 Packaging method

- (1) Seal the aluminum laminated bag included the ruled tape-reel and humidity indicator card quantity.
- (2) Fill up the blank of label and paste on the bag.
- (3) Put the moisture-proof laminated bag in the ruled case

Package shape	Product	Q'ty	Moisture-proof sack Q'ty
Tape-reel (φ 180mm)	1ch. type	2000pcs. / reel	1reel / bag

Minimum order Q'ty : 1 reel / bag

3. Storage and management after opening the package

3.1 Storage condition : Storage shall be in accordance with the below conditions.

Storage temp. : 5 to 30°C

Storage humidity : 70%RH or less

3.2 Treatment after opening the package

- (1) After opening the package, please mount at the conditions of humidity 60%RH or less and temperature 5 to 25°C within 2 days.
- (2) In case of long time storage after open, please mount at the conditions of humidity 70%RH or less and temperature 5 to 30°C within 2 weeks by using dry box or resealing with desiccant in moisture-proof sack by sealer.

3.3 Baking before mounting

In case that it could not carry out the above treatment, it is able to mount by baking treatment. However baking treatment shall be limited only 1 time.

Recommended conditions : 125°C, 16 to 24 hours

※ Baking treatment can not be carried out at the packaged condition. Please carry out baking at the condition of mounting on PCB or getting on the metal tray.