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APPROVED BY: <i>K. Imanaka</i>	DATE: <i>April, 16, 1996</i>		REPRESENTATIVE DIVISION OPTO-ELECTRONIC DEVICES DIV.

DEVICE SPECIFICATION FOR

PHOTOTRIAC COUPLER

MODEL No. **S21ME8**

Business dealing name : S21ME8F

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- 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)

 - This product is designed for use in the following application areas ;
 - OA equipment . Audio visual equipment . Home appliances
 - Telecommunication equipment (Terminal) . Mess uring equipment
 - Tooling machines . Computers

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.
 - 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 ;
 - Transportation control and safety equipment (aircraft, train, automobile etc.)
 - Traffic sign* • Gas leakage sensor breakers • Rescue and security equipment
 - Other safety equipment
 - Please do not use this product for equipment which require extremely high reliability and safety in function and precision, such as ;
 - Space equipment • Telecommunication equipment (for trunk lines)
 - Nuclear power control equipment • Medical equipment
 - Please contact and consult with a Sharp sales representative if there are any questions regarding interpretation of the above three paragraphs.
- Please contact and consult with a Sharp sales representative for any questions about this product.

CUSTOMERS APPROVAL

DATE _____

BY _____

DATE *Apr 16 '96*

PRESENTED BY *T. Matsumura*

T. Matsumura,
Department General Manager of
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SHARP CORPORATION

3/11

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ED-96055	April 15, 1996
MODEL No. S21ME8F	PAGE 1/8

1. Application

This specification applies to the outline and characteristics of phototriac coupler Model No. S21ME8.

2. Outline

Refer to the attached drawing No. CY8239E02.

3. Ratings and characteristics

Refer to the attached sheet, page 4 to 6.

4. Reliability — —

Refer to the attached sheet, page 7.

5. Incoming inspection

Refer to the attached sheet, page 8.

6. Supplement

6.1 Isolation voltage shall be measured in the following method.

- (1) Short between pin 1, 2 and pin 3 on the primary side and between pin 4, 5 and pin 6 on the secondary side.
- (2) The dielectric withstand tester with zero-cross circuit shall be used.
- (3) The wave form of the applied voltage shall be a sine wave.
(It is recommended that the isolation voltage be measured in insulation oil.)

6.2 The business dealing name used for this product when ordered or delivered shall be S21ME8F.

6.3 This product is not designed against irradiation.

This product is assembled with electrical input and output.

This product incorporates non-coherent light emitting diode.

4/11

SHARP CORPORATION

ED-96055	April 15, 1996
MODEL NO. S2 1ME8F	PAGE 2/8

7. Notes

7.1 For cleaning

- (1) Solvent cleaning: Solvent temperature 45°C or less
Immersion for 3 min or less
- (2) Ultrasonic cleaning : The affect to device by ultrasonic cleaning is different by cleaning bath size, ultrasonic power output, cleaning time, PWB size or device mounting condition etc. Please test it in actual using condition and confirm that doesn't occur any defect before starting the ultrasonic cleaning.
- (3) Applicable solvent : Ethyl alcohol, Methyl alcohol
Freon TE · TF, Diflon-solvent S3-E

Please refrain from using Chloro Fluoro Carbon type solvent to clean device as much as possible since it is internationally restricted to protect the ozonosphere. Before you use alternative solvent you are requested to confirm that it does not attack package resin.

7.2 Usage

For triggering medium and power triac.
(This model shall be used in the ON state condition of triggering power triac.)

- 7.3 If the voltage exceeding the repetitive peak off-state voltage (V_{DRM}) in the absolute maximum ratings is applied to the photo triac, it may cause not only faulty operation but breakdown. Make sure that the surge voltage exceeding V_{DRM} shall not be applied by using the varistor, CR.
- 7.4 The LED used in the Phototriac coupler generally decreases the light emission power by operation. Also, as this product is using high sensitive phototriac chip, please consider that miss-operation may be caused by too much forward current. In case of long operation time, please decide the input current which become 2 - 3 times of the Maximum value of the Minimum triggering current at circuit design with considering the degradation of the light emission power of the LED. (50%/ 5years)

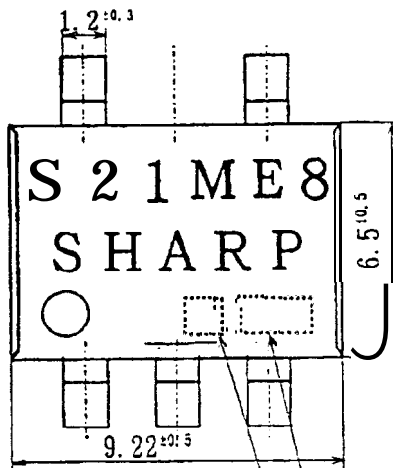
7.5 Precautions for Soldering Photocouplers

Refer to the attached sheet-1.

5/11

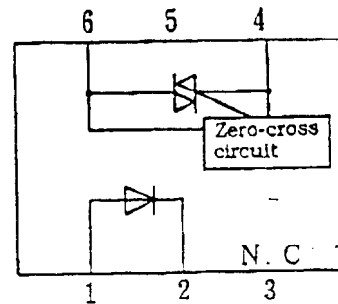
SHARP CORPORATION

ED-96055	April 15, 1996
MODEL No.	PAGE
S21ME8F	3/8

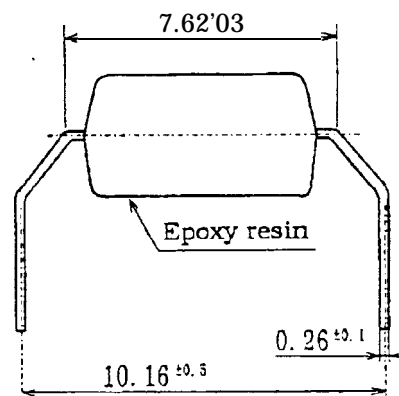
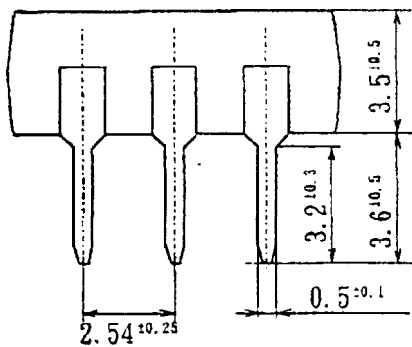


Lot No. *1

Factory identification mark *2



Pin Nos. and internal connection diagram



*1) 2-digit number shall be marked according to DIN standard.

*2) Factory identification mark shall be or shall not be marked.

UNIT: 1/1 mm	
Name	S21ME8 Outline Dimensions (Business dealing name : S21 ME8F)
Drawing No.	CY8239E02

6/11

SHARP CORPORATION

ED-96055	April 15, 1996
MODEL No. S21ME8F	PAGE 4/8

3.1 Absolute maximum ratings

Ta=25°C

Parameter		Symbol	Rating	unit
Input	Forward current	I_F	15	mA
	Reverse voltage	V_R	6	v
output	RMS on-state current *1	I_T	0.1	Arms
	Peak one cycle surge current	I_{surge}	1.2 (50Hz sine wave)	A
	Repetitive peak off-state voltage	V_{DRM}	800	v
Operating temperature		T_{opr}	-30 to +100	°c
Storage temperature		T_{stg}	-55 to +125	°c
Isolation voltage *2		V_{iso}	5.0	kVrms
Soldering temperature		T_{sol}	260 (For 10s)	°C

*1 The derating factors of absolute maximum rating due to ambient temperature are shown in Fig 1, 2.

*2 AC for 1min, 40 to 60%RH, f=60Hz

7/11

SHARP CORPORAT ON

ED-96055	April 15, 1996
MODEL No. S21ME8F	PAGE 5/8

3.2 Electrical characteristics

Ta=25°C

Parameter		Symbol	MIN.	TYP.	MAX.	unit	Conditions
Input	Forward voltage	V_F	-	1.2	1.4	v	$I_F=6mA$
	Reverse current	I_R	-	-	10^{-5}	A	$V_R=3V$
output	Repetitive peak off-state current	I_{DRM}	-	-	10^{-6}	A	$V_{DRM}=\text{Rated}$
	On-state voltage	V_T	-	1.7	3.0	V	$I_T=0.1A$
	Holding current	I_H	0.1	-	3.5	mA	$V_D=6V$
	Critical rate of rise of off-state voltage	dv/dt	500		-	V/ μs	$V_{DRM}=I/\sqrt{2} \cdot \text{Rated}$
	Zero-cross voltage	V_{ox}	-		20	v	R load, $I_F=6mA$
Transfer characteristics	Minimum trigger current	I_{FT}	-		3.0	mA	$V_D=6V$ $R_L=100\Omega$
	Isolation resistance	Riso	5×10	10^{11}	-	Ω	DC500V 40 to 60%RH
	Turn on time	t_{ON}	-		50	μs	$V_D=6V, R_L=100\Omega$ $I_F=6mA$

7/11

SHARP CORPORATION

ED-96055 | April 15, 1996

MODEL NO.

PAGE

S21ME8F**5/8**

3.2 Electrical characteristics

Ta=25°C

Parameter	symbol	MIN.	TYP.	MAX.	unit	Conditions	
Input	Forward voltage	V_F	-	1.22	1.4	V	$I_F=6\text{mA}$
	Reverse current	I_R	-	-	10^{-5}	A	$V_R=3\text{V}$
output	Repetitive peak off-state current	I_{DRM}	-	-	10^{-6}	A	$V_{DRM}=\text{Rated}$
	On-state voltage	V_T	-	1.7	3.0	V	$I_T=0.1\text{A}$
	Holding current	I_H	0.1	-	3.5	mA	$V_D=6\text{V}$
	Critical rate of rise of off-state voltage	dv/dt	500	-	-	V/ μs	$V_{DRM}=1/\sqrt{2} \cdot \text{Rated}$
	Zero-cross voltage	V_{ox}	-	-	20	V	R load, $I_F=6\text{mA}$
Transfer characteristics	Minimum trigger current	I_{FT}	-	-	3.0	mA	$V_D=6\text{V}$ $R_L=100\Omega$
	Isolation resistance	R_{iso}	5×10	10^{11}	-	Ω	DC500V 40 to 60%RH
	Turn on time	t_{ON}	-	-	50	μs	$V_D=6\text{V}$, $R_L=100\Omega$ $I_F=6\text{mA}$

SHARP CORPORATION

8/11

ED-96055	April 15, 1996
MODEL No. S21ME8F	PAGE 6/8

Fig.1 Forward current vs. ambient temperature

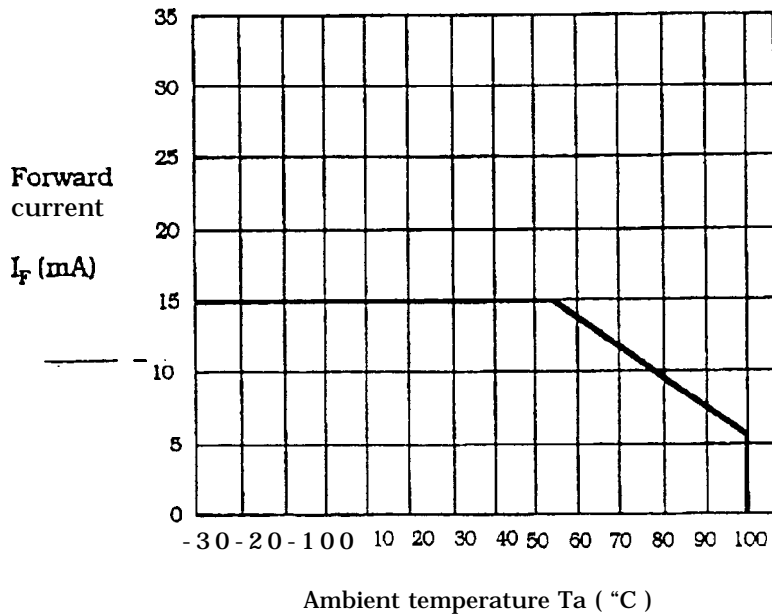
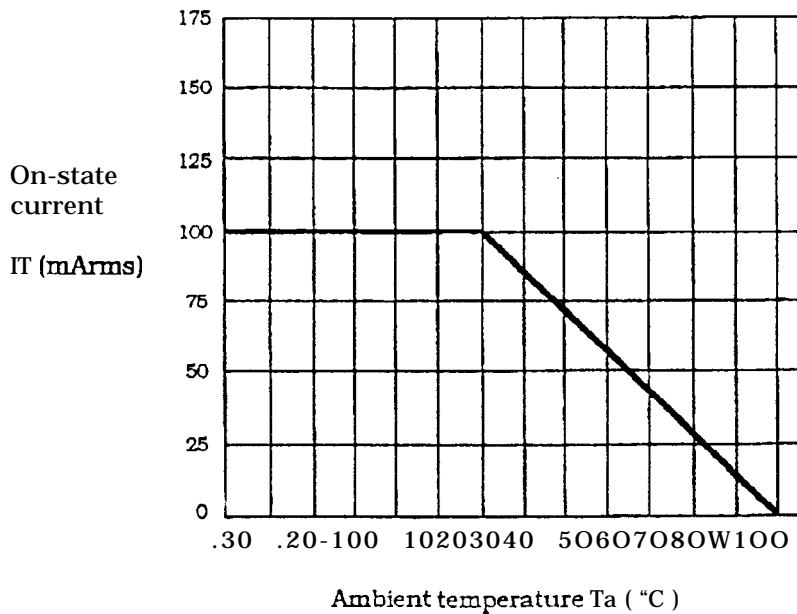


Fig.2 On-state current vs. ambient temperature



9/11

SHARP CORPORATION

ED-96055

April 15, 1996

MODEL No.

S21ME8F

PAGE

7/8

4. Reliability

The reliability of products shall be satisfied with items listed below.

Confidence level : 90%
LTPD : 10 °A/20%

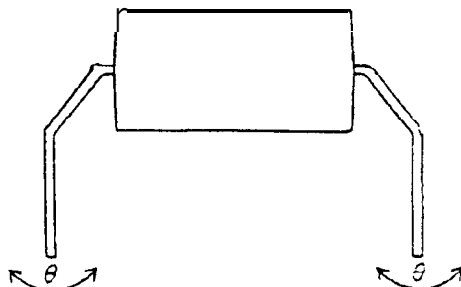
Test Items	Test Conditions *1	Failure Judgement Criteria	Samples (n)
			Defective(C)
Solderability ● 2	230 °C, 5s	—	n=11, C=0
Soldering heat ● 3	260 °C, 10 s	$V_F > U \times 1.2$ $V_T > U \times 1.2$ $I_{FT} > U \times 1.3$ $I_R > U \times 2.0$ $I_{DRM} > U \times 2.0$ U : Upper specification limit L : Lower specification limit	n=11, C=0
Terminal strength (Tension)	Weight: 5.0N 5 s/each terminal		n=11, C=0
Terminal strength (Bending) ● 4	Weight: 2.5N 2 times/each terminal		n=11, C=0
Mechanical shock	15000 m/s ² , 0.5ms 3 times/ ±X, ±Y, ±Z direction		n=11, C=0
Variable frequency vibration	100 to 2000 to 100Hz/4min 200m/s ² 4 times/ X, Y, Z direction		n=11, C=0
Temperature cycling	1 cycle -55 °C to +125°C (30min) (30min) 20 cycles test, Without Road		n=22, C=0
High temp. and high humidity storage	+60 °C, 90 %RH, 500h		n=22, C=0
High temp. storage	+125 °C, 1000h		n=22, C=0
Low temp. storage	-55 °C, 1000h		n=22, C=0
Operation life	$I_F = 15\text{mA}$, $I_T = 100\text{mA}$ $T_a = 25^\circ\text{C}$, 1000h		n=22, C=0

*1 Test method, conforms to JIS C 7021.

*2 Solder shall adhere at the area of 95 % or more of immersed portion of lead and pin hole or other holes shall not be concentrated on one portion.

*3 Dip into the position of 1.0mm from the resin part.

● 4 Terminal bending direction is shown below.



11/11

SHARP CORPORATION

ED-96056	April 15, 1996
MODEL No. S21ME8	PAGE 8/8

5. Incoming inspection

5.1 Inspection items

(1) Electrical characteristics

$V_F, I_R, I_{DRM}, V_T, I_{FT}, R_{iso}, V_{iso}$

(2) Appearance

5.2 Sampling method and Inspection level

A single sampling plan, normal inspection level II based on ISO 2859 is applied. The AQL according to the inspection items are shown below.

Defect	Inspection item	AQL (Y.)
Major defect	Electrical characteristics Unreadable marking	0.1
Minor defect	Appearance defect except the above mentioned.	0.4