

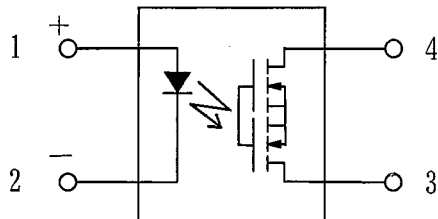
TITLE	SPECIFICATIONS FOR PHOTOMOS RELAY	PAGE	1/7
NAME	PhotoMOS Relay	AQY28 · S	

1. TYPE ; AQY282S, AQY280S, AQY284S GU SOP 1a type (4pin)

2. DRAWING NO. ; AQY280S

3. CHARACTERISTICS

3- 1 Equivalent circuit



3- 2 Absolute maximum ratings (Ta=25°C)

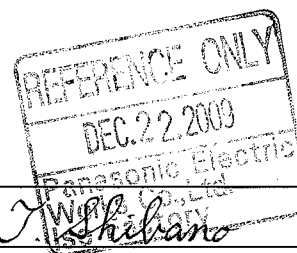
Item		Symbol	AQY282S	AQY280S	AQY284S	Unit
Input	LED forward current	I_F	50			mA
	LED reverse voltage	V_R	5			V
	Peak forward current *1	I_{FP}	1			A
	Power dissipation	P_{in}	75			mW
Output	Load voltage (Peak AC)	V_L	60	350	400	V
	Continuous load current *2	I_L	0.5	0.12	0.1	A
	Peak load current *3	I_{peak}	1.5	0.3	0.24	A
	Power dissipation	P_{out}	300			mW
Total power dissipation		P_T	350			mW
I/O isolation voltage		V_{iso}	1500 (AC)			V
Temperature Limits	Operating *4	T_{opr}	-40 to 85			°C
	Storage	T_{stg}	-40 to 100			°C

*1 f=100Hz, Duty factor=0.1%

*2 Peak AC/DC

*3 100ms (1 shot), $V_L=DC$

*4 Non-condensing at low temperatures



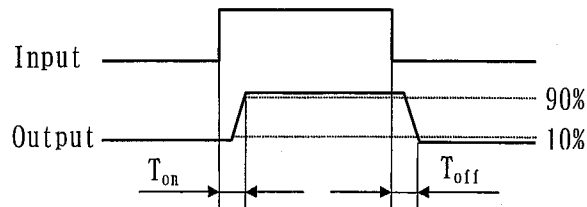
Panasonic Electric Works Co., Ltd. Switching Device Division	DESIGNED	<i>T. Wada</i>	DATE : DEC. 12. '02
	CHECKED	<i>Y. Miyamoto</i>	
	ENACTED	<i>S. Akagi</i>	

3- 3 Electrical characteristics (Ta=25°C)

Item		Symbol	Test conditions	Min.	Typ.	Max.	Unit	
Input	LED operate current	I_{Fon}	$I_L=Max.$	—	1.8	3	mA	
	LED turn off current	I_{Foff}	$I_L=Max.$	0.2	1.6	—	mA	
	LED dropout voltage *1	V_F	$I_F=5mA$	—	1.14	1.5	V	
Output	On resistance	AQY282S	$I_F=5mA, I_L=Max.$	—	0.85	2.5	Ω	
		AQY280S		—	20	25		
		AQY284S		—	28	35		
Off state leakage current		I_{Leak}	$I_F=0mA, V_L=Max.$	—	—	1	μA	
Transfer characteristics	Switching speed	Turn on time *2	AQY282S	$I_F=5mA, I_L=Max.$	—	0.9	3	ms
			AQY280S		—	0.3		
			AQY284S		—	0.3		
	Turn off time *2		T_{off}	$I_F=5mA, I_L=Max.$	—	0.5	0.2	ms
I/O capacitance		C_{iso}	$f=1MHz, V_B=0V$	—	0.8	1.5	pF	
Initial I/O isolation resistance		R_{iso}	DC500V	1000	—	—	M Ω	

*1 Typ. 1.25V at $I_F=50mA$

*2 Turn on/Turn off time

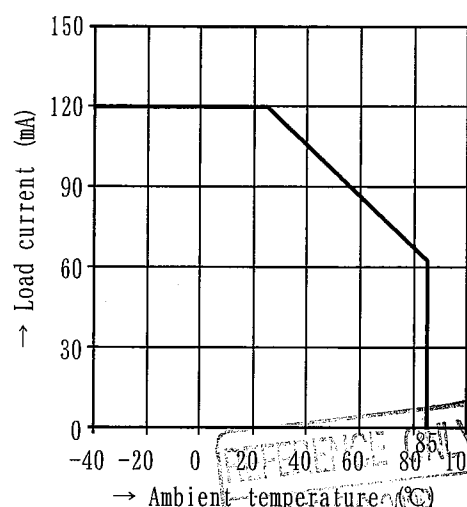
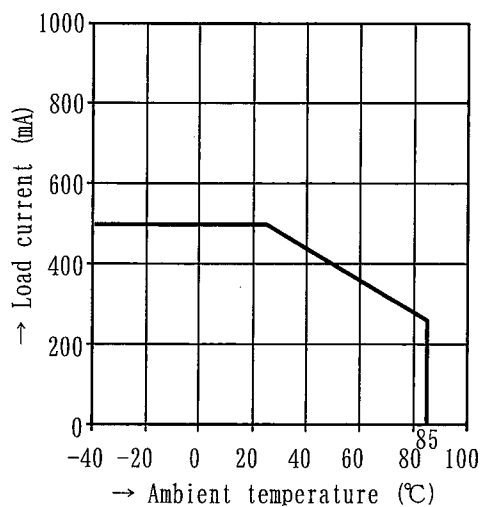


3- 4 The terminal leads receive solder plating or solder dip plating.

4. LOAD CURRENT VS. AMBIENT TEMPERATURE CHARACTERISTICS

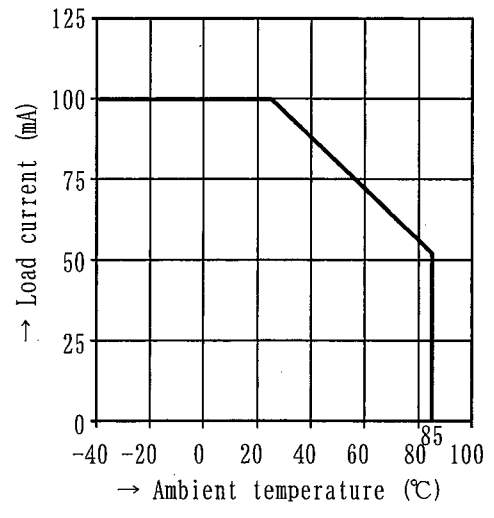
(1) AQY282S

(2) AQY280S



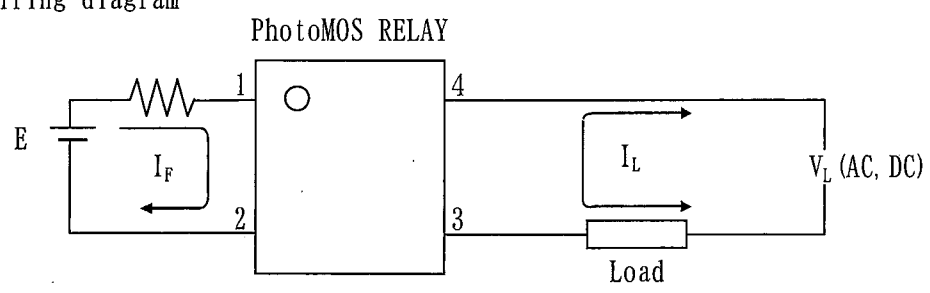
Panasonic Electric Works Co., Ltd.
 Use Factory
 DATE : DEC. 12. '02

(3) AQY284S



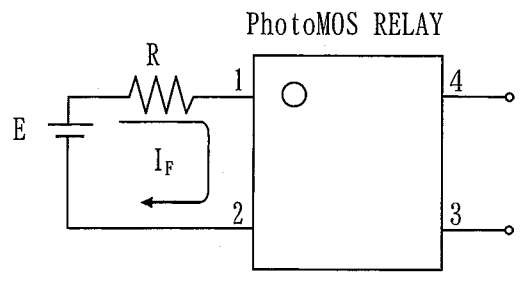
5. USING METHODS

5- 1 Wiring diagram



E : Power source at input side
 I_F : LED forward current
 V_L : Load voltage
 I_L : Load current

5- 2 Examples of each input power supply and current limit resistors ($I_F=5\text{mA}$)



E	R
5V	Approx. 700Ω
15V	Approx. 2.7kΩ
24V	Approx. 4.5kΩ

REFERENCE ONLY
 DEC. 22. 2009
 Panasonic Electric
 Works Co., Ltd.
 Ise Factory

DATE : DEC. 12. '02

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6. NOTE

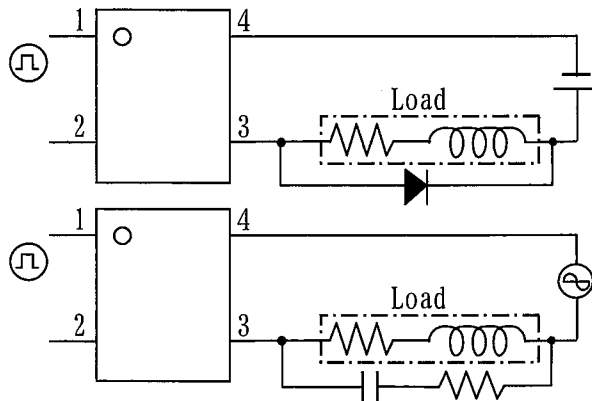
6- 1 Regarding cautions for use and explanation of technical terms, please refer to our general catalog.

6- 2 Short across terminals

Do not short circuit between terminals when relay is energized, since there is possibility of breaking of the internal IC.

6- 3 Output spike voltages

(1) If an inductive load generates spike voltages which exceed the absolute maximum rating, the spike voltage must be limited. Typical circuits are shown below.



Add a clamp diode to the load

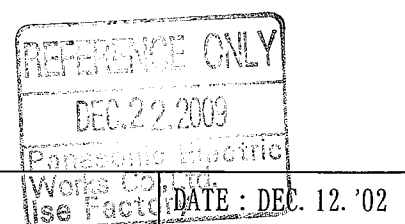
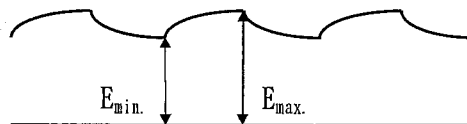
Add a CR Snubber circuit to the load

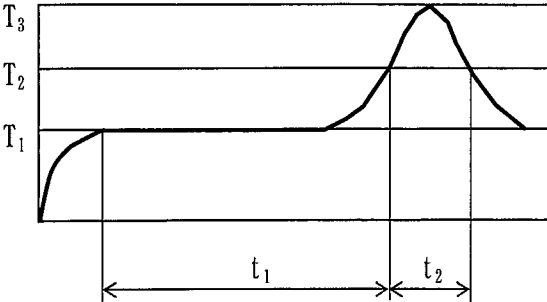
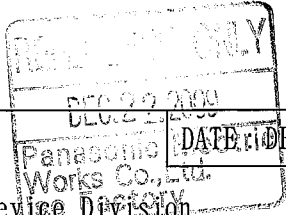
(2) Even if spike voltages generated at the load are limited with a clamp diode if the circuit wires are long, spike voltages will occur by inductance. Keep wires as short as possible to minimize inductance.

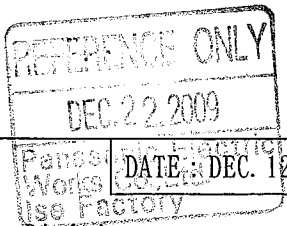
6- 4 Ripple in the input power supply

If ripple is present in the input power supply, observe the following:

- (1) For LED forward current at E_{min} , maintain min. 5mA
- (2) Keep the LED forward current at 50mA or less at E_{max} .



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<p>6- 5 Soldering condition</p> <p>(1) IR (Infrared reflow) soldering method</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>$T_1=150$ to 180°C</p> <p>$T_2=230^{\circ}\text{C}$</p> <p>$T_3=250^{\circ}\text{C}$ or less</p> <p>$t_1=60$ to 120s or less</p> <p>$t_2=30\text{s}$ or less</p> </div> </div> <p>(2) Soldering iron method</p> <p>Tip temperature ; 350 to 400°C</p> <p>Wattage ; 30 to 60W</p> <p>Soldering time ; Within 3s</p> <p>(3) Others</p> <p>Check mounting conditions before using other soldering methods (DWS, VPS, hot-air, hot plate, pulse heater, etc.)</p> <p>6- 6 Notes for mounting</p> <p>(1) If many different packages are combined on a single substrate, then lead temperature rise is highly dependent on package size. For this reason, please make sure that the temperatures of the terminal solder area of the PhotoMOS relay falls within the temperature conditions of item "6-5 Soldering condition" before mounting.</p> <p>(2) If the mounting conditions exceed the recommended solder conditions in item "6-5 Soldering condition", resin strength will fall and the nonconformity of the heat expansion coefficient of each constituent material will increase markedly, possibly causing cracks in the package, severed bonding wires, and the like. For this reason, please inquire with us about whether this use is possible.</p> <p>6- 7 Cleaning solvents compatibility</p> <p>The PhotoMOS relay forms an optical path by coupling a light-emitting diode (LED) and photodiode via transparent resin. For this reason, unlike other directory element molded resin products (e.g., MOS transistors and bipolar transistors), avoid ultrasonic cleansing if at all possible. We recommend cleaning with an organic solvent. If you cannot avoid using ultrasonic cleansing, please ensure that the following conditions are met, and check beforehand for defects.</p> <ul style="list-style-type: none"> • Frequency : 27 to 29kHz • Ultrasonic output : No greater than $0.25\text{W}/\text{cm}^2$ • Cleaning time : No longer than 30s • Cleanser used : Asahiklin AK-225 • Others : Submerge in solvent in order to prevent the PCB and elements from being contacted directly by the ultrasonic vibrations. <p>Note ; Applies to unit area ultrasonic output for ultrasonic baths.</p>		
Panasonic Electric Works Co., Ltd. Switching Device Division		

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<p>6- 8 Transportation and storage</p> <p>(1) Extreme vibration during transport will warp the lead or damage the relay. Handle the outer and inner boxes with care.</p> <p>(2) Storage under extreme conditions will cause soldering degradation, external appearance defects, and deterioration of the characteristics. The following storage conditions are recommended:</p> <ul style="list-style-type: none"> • Temperature : 0 to 45°C • Humidity : Less than 70%R. H. • Atmosphere : No harmful gasses such as sulfurous acid gas, minimal dust. <p>(3) This relay implemented in SO package is sensitive to moisture and come in sealed moisture-proof package. Observe the following cautions on storage.</p> <ul style="list-style-type: none"> • After the moisture-proof package is unsealed, take the devices out of storage as soon as possible (within 1 month at the most). • If the devices are to be left in storage for a considerable period after the moisture-proof package has been unsealed, it is recommended to keep them in another moisture-proof bag containing silica gel (within 3 months at the most). <p>* In case the heat stress of soldering is applied to the relay which absorbs moisture inside of its package, the evaporation of the moisture gains the pressure inside the package and it may result in package swelling or cracking. Please refer recommended soldering condition. (6-5 and 6-6)</p>		
<div style="text-align: right;">  </div> <p style="text-align: center;">Panasonic Electric Works Co., Ltd. Switching Device Division</p>		

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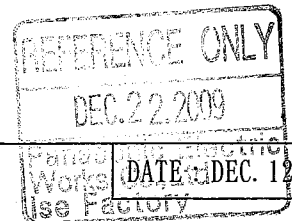
7. WARRANTY

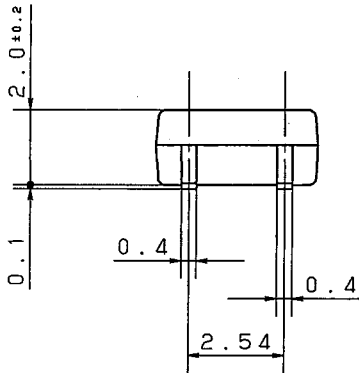
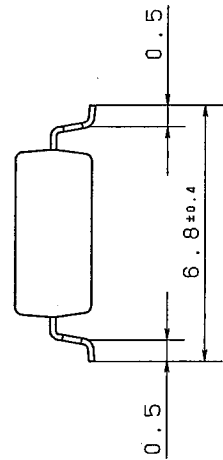
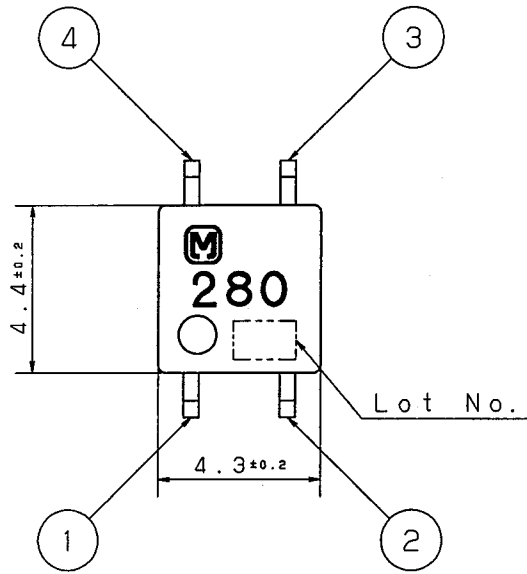
Panasonic Electric Works Co., Ltd. will do our utmost to keep our product to be free from defects. However:

- (1) To avoid uses of the product not in accordance with its specifications, Panasonic Electric Works asks the purchaser to present the purchaser's specification, the final destination, application of the final product and the method of installation of the product.
- (2) If the purchaser believes that the possibility exists that the installation or anticipated use of the product may cause personal injury, death or property damage, Panasonic Electric Works advises the purchaser to be broad-minded about conditions and performance requirements listed on this specification and to take precautions such as applying a double-circuit.
- (3) The warranty period of this product is one year from the date of arrival of the product at the location of the purchaser, and is limited to the listed items on this specification. If upon arrival any defect due to Panasonic Electric Works's failure to perform becomes apparent, Panasonic Electric Works will replace, exchange or repair the defective product on the site where it was received.

The following are excluded from the warranty conditions:

- ① Any consequential damages or loss of profits are resulting from malfunctions or defects of the product.
- ② The product is affected by the use, the storage and the transport after the delivery.
- ③ An unforeseen situation arises which was unable to be predicted by the technology level at the time of shipment.
- ④ A natural or man-made disaster which is outside of Panasonic Electric Works's control occurs such as earthquake, flood, fire or social strife.





- ① INPUT: DC+
- ② INPUT: DC-
- ③ OUTPUT: AC/DC
- ④ OUTPUT: AC/DC

t = 0.15

General tolerance: ±0.1

sym	Item or Code No.	Material & Size	qt.	Process	Remark
Catalog No. AQY280S			Drawing Name DIMENSIONS		
Name PhotoMOS RELAY GU SOP 1a-type (4pin)			Drawing No. AQY280S		
Remark		Scale 5:1		Unit: mm	Date DEC.12.'02
Drawn <i>B. Imue</i>	Checked <i>M. Iijima</i>		Panasonic Electric Works Co., Ltd.		
Designed <i>T. Shibano</i>	Engraved <i>S. Akagi</i>		Switching Device Division		