

TITLE	SPECIFICATIONS FOR PHOTOMOS RELAY	PAGE	1/6
NAME	PhotoMOS Relay	AQV258HAX C88	

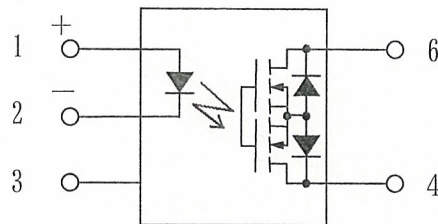
1. TYPE ; AQV258HAX C88 HE 1a SMD type

2. DRAWING NO. ; AQV258HAX C88

3. CHARACTERISTICS

3- 1 Equivalent circuit

REFERENCE ONLY  
AUG. -7.2009  
Panasonic Electric  
Works Co.,Ltd.  
Ise Factory



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

Item		Symbol	Value	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)	$V_L$	1500	V
	Continuous load current *2	$I_L$	0.02	A
	Peak load current *3	$I_{peak}$	0.06	A
	Power dissipation	$P_{out}$	360	mW
Total power dissipation		$P_T$	410	mW
I/O isolation voltage		$V_{iso}$	5000 (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

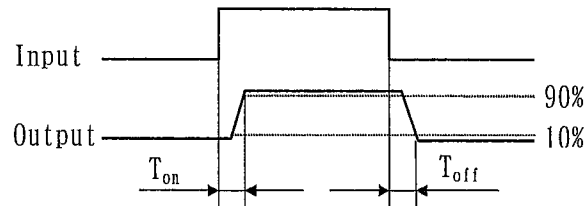
TO :	DESIGNED <i>S. Ise</i>	DATE : AUG. 5. '09
Panasonic Electric Works Co., Ltd. Switching Device Division	CHECKED <i>Y. Miyamoto</i>	
	ENACTED <i>S. Aizawa</i>	

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

Item		Symbol	Test conditions	Min.	Typ.	Max.	Unit	
Input	LED operate current	$I_{Fon}$	$I_L=Max.$	—	0.8	3	mA	
	LED turn off current	$I_{Foff}$	$I_L=Max.$	0.4	0.7	—	mA	
	LED dropout voltage *1	$V_F$	$I_F=50mA$	—	1.35	1.5	V	
Output	On resistance	$R_{on}$	$I_F=7.5mA, I_L=Max.$	—	305	500	$\Omega$	
	Off state leakage current	$I_{Leak}$	$I_F=0mA, V_L=1500V$ $I_F=0mA, V_L=250V$	—	—	10 1	$\mu A$	
Transfer characteristics	Switching speed	Turn on time *2	$T_{on}$	$I_F=7.5mA, I_L=Max.$	—	0.28	1	ms
		Turn off time *2	$T_{off}$	$I_F=7.5mA, I_L=Max.$	—	0.1	0.5	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 $\Omega$

\*1 Typ. 1.14V at  $I_F=5mA$

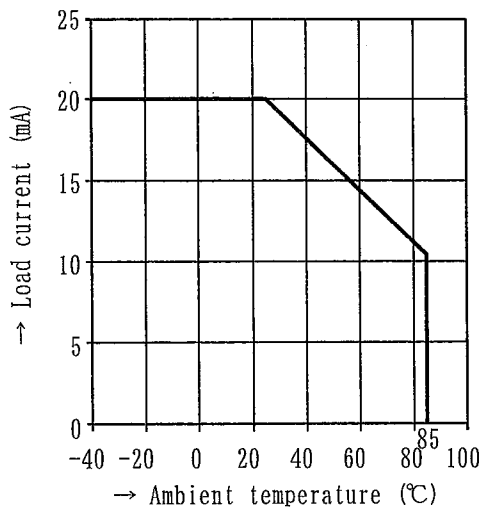
\*2 Turn on/Turn off time



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

4. AMBIENT TEMPERATURE CHARACTERISTICS

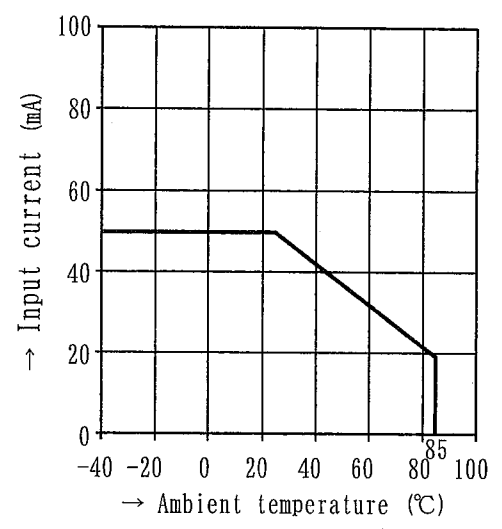
4- 1 Load current vs. Ambient temperature characteristics



TO :

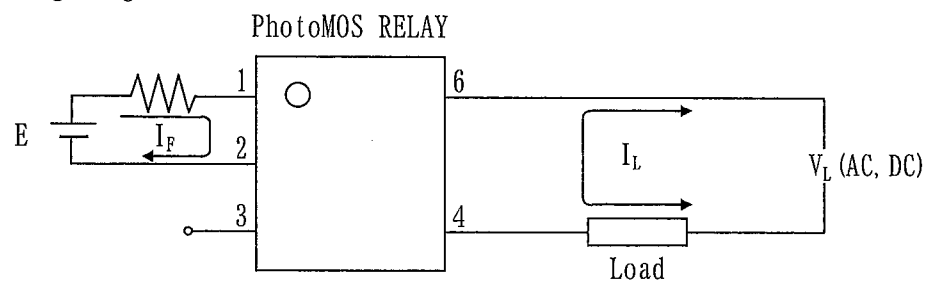
DATE : AUG. 5. '09

4- 2 Input current vs. Ambient temperature characteristics



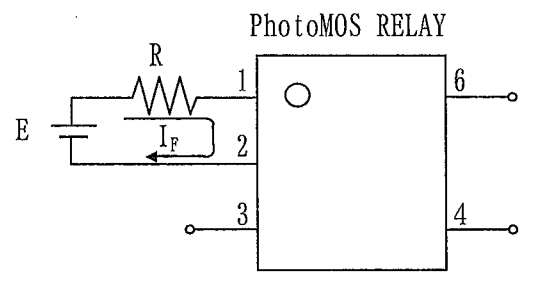
5. USING METHODS

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 ( $I_F=7.5\text{mA}$ )



E	R
5V	Approx. 460Ω
15V	Approx. 1.8kΩ
24V	Approx. 3kΩ

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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 Unused terminals

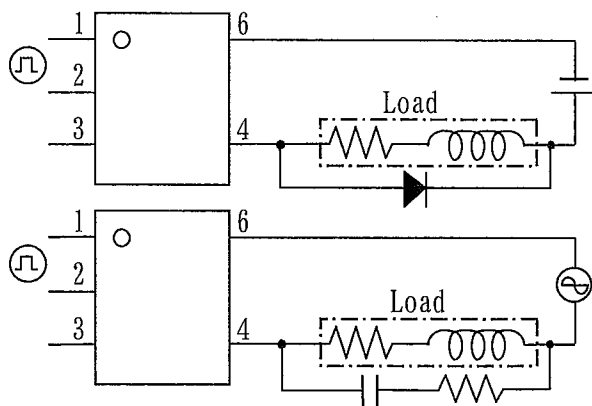
Do not use terminal No. 3, because it is no connection terminal.

6- 3 Short across terminals

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

6- 4 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

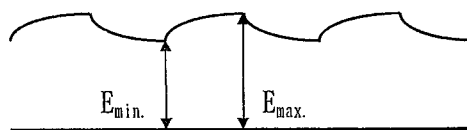
(2) Even if spike voltages generated at the load are limited with a clamp diode if the circuit wires are long, spike voltages will occur by inductance. Keep wires as short as possible to minimize inductance.

6- 5 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  $E_{max}$ .



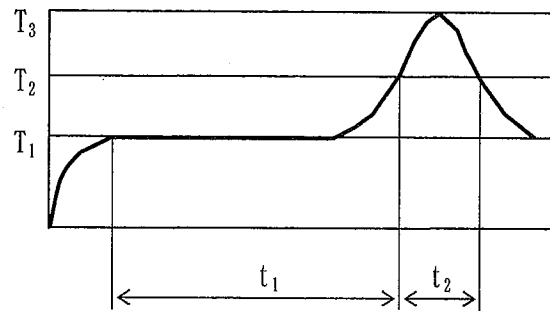
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6- 6 Soldering condition

(1) IR (Infrared reflow) soldering method



$T_1=150$  to  $180^{\circ}\text{C}$   
 $T_2=230^{\circ}\text{C}$   
 $T_3=250^{\circ}\text{C}$  or less  
 $t_1=60$  to  $120\text{s}$  or less  
 $t_2=30\text{s}$  or less

(2) Soldering iron method

Tip temperature :  $350$  to  $400^{\circ}\text{C}$   
 Wattage :  $30$  to  $60\text{W}$   
 Soldering time : Within  $3\text{s}$

(3) Others

- Check mounting conditions before using other soldering methods (DWS, VPS, hot-air, hot plate, pulse heater, etc.)
- The temperature profile indicates the temperature of the soldered terminal on the surface of the PC board. The ambient temperature may increase excessively. Check the temperature under mounting conditions.

6- 7 Cleaning solvents compatibility

The PhotoMOS relay forms an optical path by coupling a light-emitting diode (LED) and photodiode via light transmissive 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.

- Frequency :  $27$  to  $29\text{kHz}$
- Ultrasonic output : No greater than  $0.25\text{W}/\text{cm}^2$
- Cleaning time : No longer than  $30\text{s}$
- 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.

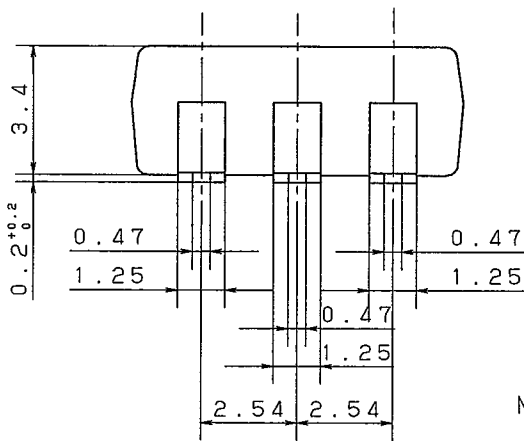
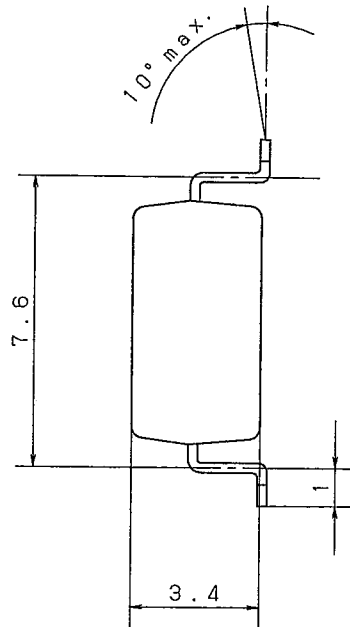
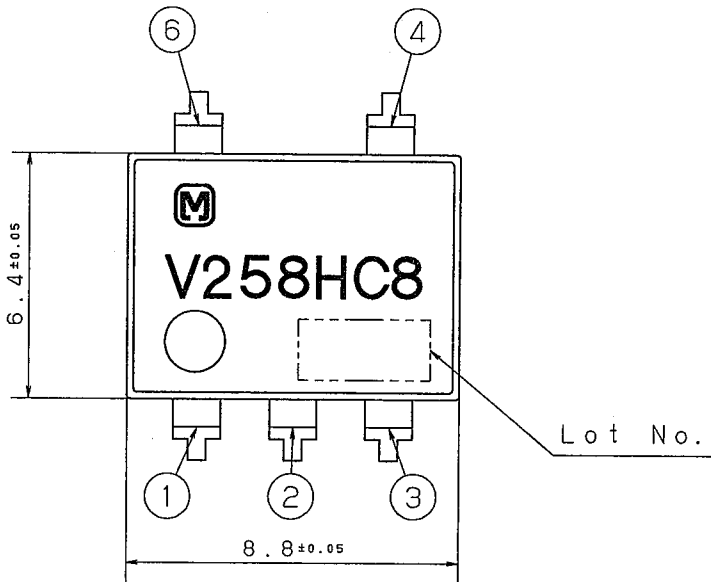
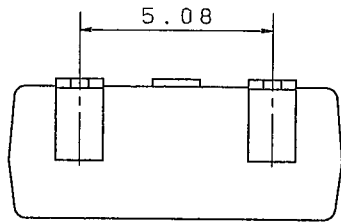
Note; Applies to unit area ultrasonic output for ultrasonic baths.

6- 8 Transportation and storage

- (1) Extreme vibration during transport will warp the lead or damage the relay. Handle the outer and inner boxes with care.
- (2) Storage under extreme conditions will cause soldering degradation, external appearance defects, and deterioration of the characteristics. The following storage conditions are recommended:
  - Temperature :  $0$  to  $45^{\circ}\text{C}$
  - Humidity : Less than  $70\% \text{R. H.}$
  - Atmosphere : No harmful gasses such as sulfurous acid gas, minimal dust.

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<p>7. WARRANTY</p> <p>Panasonic Electric Works Co., Ltd. will do our utmost to keep our product to be free from defects. However:</p> <p>(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.</p> <p>(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.</p> <p>(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.</p> <p>The following are excluded from the warranty conditions:</p> <p>① Any consequential damages or loss of profits are resulting from malfunctions or defects of the product.</p> <p>② The product is affected by the use, the storage and the transport after the delivery.</p> <p>③ An unforeseen situation arises which was unable to be predicted by the technology level at the time of shipment.</p> <p>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.</p>			
TO :			DATE : AUG. 5. '09
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- ① INPUT: DC+
- ② INPUT: DC-
- ③ NO CONNECTION
- ④ OUTPUT: AC/DC
- ⑥ OUTPUT: AC/DC

t = 0.25

Note: Lot No. marked on the relay has to 5 digits stands for as follows.



Consecutive numbers  
 Second and last digit: No. of week  
 First digit: Last figure of the christian era

General tolerance: ±0.1

sym	Item or Code No.	Material & Size	qt.	Process	Remark
Catalog No. AQV258HAX C88			Drawing Name DIMENSIONS		
Name PhotoMOS RELAY (HE 1a SMD type)			Drawing No. AQV258HAX C88		
Remark TO:			Scale 5:1	Unit: mm	Date AUG. 5.'09
Drawn <i>B. Inoue</i>	Checked <i>Y. Miyamoto</i>	Panasonic Electric Works Co., Ltd.			
Designed <i>S. Akashi</i>	Enacted <i>S. Akashi</i>	Switching Device Division			

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